

**STUDIES IN THE DERMAPTERA AND ORTHOPTERA OF THE COASTAL PLAIN
AND PIEDMONT REGION OF THE SOUTHEASTERN UNITED STATES.**

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In the summers of 1911 and 1913, the present authors made extensive collections of, and field studies in, the Dermaptera and Orthoptera found in the southeastern States. About the time we were able to begin laboratory work on the first season's collecting, other series from the same general region were placed in our hands, since which time an increasing amount of data has become available bearing on the same subject. We feel the most advisable method of making available to workers the really great amount of distributional, synonymic and variational information now in hand, to be the publication of this single large paper. The authors' time has been given more or less regularly for a period of two years to the preparation of this paper and others made necessary by collections referred to herein. It should be borne in mind that the present paper is not a final one, but instead a contribution based on available material, although nearly all of the species known from the regions studied are treated.

In general, the geographic area covered by the collections here studied is, the Coastal Plain and Piedmont regions from the Potomac River south to north-central (non-peninsular) Florida, west to the western boundary of Georgia. In addition a fair amount of material from the higher elevations in Georgia, from certain localities in central Florida and also from Maryland and other more northern States has been included. Aside from the Georgia mountain region records, which are geographically very important, those from outside the main area covered by the paper have been included to place on record the extreme geographic limits of certain species, or to cite material used in the detailed discussion on the species.

In the study of certain genera here treated we have found it not only desirable, but necessary, to revise completely those groups as found within North America, in the course of which work practically all the available collections bearing on the subjects have been examined. These revisions consumed much time and involved some travel. The collections of the United States National Museum, the Museum of Comparative Zoology and the Georgia State Collection

and the private series of Mr. W. T. Davis and Prof. A. P. Morse have furnished a great amount of important data, although the greater portion of our information has been derived from our own collections. The genera which have required comprehensive revisionary study are *Cariblatta*, *Scudderia*, *Amblycorypha*, *Neoconocephalus*, *Orchelimum*, *Conocephalus*, *Atlanticus*, *Cycloptilum*, *Cryptoptilum*, *Gryllus* and *Miogryllus*.

Many data have been accumulated in the course of the studies here presented, which show the necessity of revisionary work in a number of other genera, but, unfortunately, either material or time is lacking at present to consider properly or thoroughly these groups; we have, however, given summaries of such general conclusions as we have reached in these cases, the contributions being presented as abstracts of detailed studies we have in preparation or contemplation, or as accumulations of important general conclusions for the use of other workers. Such contributions will be found under *Nomotettix*, *Neotettix*, *Tettigidea*, *Pardalophora*, *Hippiscus*, *Schistocerca*, *Melanoplus*, and the Group Anaxiphites with particular reference to *Anaxipha*.

The total number of specimens from the area under consideration examined in the preparation of this paper is 14,402, representing 251 species and geographic races, belonging to 100 genera. Of these species nine are here described as new, but a number of other new forms in the recently studied genera were based on material comprising portions of the series here recorded. In the text of this paper forty specific names and that of one genus have been placed in the synonymy, the completeness of the present material, with the consequent clearer appreciation of specific variation and character constancy, making the sinking of these names necessary. No synonymy has been established without several careful checkings of the evidence. Of the specimens examined, 7,294, or about one-half, were collected by the authors, chiefly in July, August and September, 1911 and 1913. The other principal sources of material, with the number of specimens examined from each, are as follows:

Collection of W. T. Davis.....	1,071
Georgia State Collection.....	877
Collection of A. P. Morse.....	784
United States National Museum Collection.....	703
Cornell University Collection.....	636
Hebard Collection (other than Rehn and Hebard collecting).....	611
Academy of Natural Sciences of Philadelphia Collection (other than Rehn and Hebard collecting).....	211

Smaller series have also been examined belonging to the North Carolina Department of Agriculture, the Museum of the Brooklyn Institute of Arts and Sciences, the Pennsylvania State Department of Zoology and the Museum of Comparative Zoology. The necessity of seeing the historic Scudder Collection in the latter institution, to which three visits were made while preparing the present paper, is always very pressing in work on the North American species of the Orthoptera.

In order to reduce the length of our entries and yet give complete data, we have used in the present paper, as in a number of previous ones, standard abbreviations for the sources of the material, or, in the case of the larger series which can be located by the collector's name we have considered the latter sufficient to place the specimens.

No location is given for material collected by Rehn and Hebard, jointly or individually, as it is understood it is in the Philadelphia collections, either the Academy of Natural Sciences or the Hebard Collection. Material in the collection of Mr. W. T. Davis, of New Brighton, New York, collected by himself, and that of Dr. A. P. Morse, of Wellesley, Massachusetts, collected by the same individual, has no location given for it, as it is understood such material is in their respective collections unless otherwise specified. Material collected by other individuals in the Davis and Morse Collections has the location indicated by the abbreviations given below. No location is given for material credited as collected by Dr. J. Chester Bradley, it being understood that is in the Georgia State Collection at Atlanta unless from localities in the Okeefenokee Swamp, in which case it is in the collection of Cornell University. From each of these collections a representation has been retained in the Philadelphia collections in return for the work of identification.

The abbreviations for the source of material used through the present paper are as follows:

- A. N. S. P., for the Academy of Natural Sciences of Philadelphia.
- B. I., for the Museum of the Brooklyn Institute of Arts and Sciences.
- Cornell Univ., for the collection of Cornell University.
- Davis Cln., for the collection of Mr. W. T. Davis, of New Brighton, Staten Island, New York.
- Ga. St. Cln., for the Georgia State Collection, located at Atlanta.
- Hebard Cln., for the Hebard Collection, in Philadelphia.
- M. C. Z., for the Museum of Comparative Zoology, at Cambridge, Massachusetts.
- Morse Cln., for the collection of Prof. A. P. Morse, of Wellesley, Massachusetts.

- N. C. St. Dept. Agr., for the collection of the North Carolina State Department of Agriculture at Raleigh.
 Pa. St. Dept. Zool. Cln., for the collection of the Pennsylvania State Department of Zoology at Harrisburg.
 U. S. N. M., for the United States National Museum at Washington.

In the references to the authors as collectors they are indicated by the initials R. and H.

LOCALITIES.

To facilitate the placing of localities given in the body of the paper we have tabulated alphabetically under States the localities represented by fair series. The elevations given have been taken from Government topographical charts, official lists of elevations or our own aneroid determinations. In a few cases we have been unable to secure information on the elevation, in which case the fact is so stated. In addition, localities at or very near the sea-level have no elevation given. The dates given are those for the specimens examined and the location is that of the ownership of the same.

Virginia.

- Arlington, Alexandria County, elevation about 200 feet. VII, 9, 1914. (H.)
 Falls Church, Fairfax County, elevation 364 feet. V, 25, 1913. (A. N. Caudell.) [U. S. N. M.]
 Fredericksburg, Spotsylvania and Stafford Counties, elevation about 10 to 250 feet. VII, 20, 1913. (R. & H.)
 Lynchburg, Campbell County, elevation about 700 feet. VII, 22, 1913. (R. & H.)
 Glencarlyn, Alexandria County, elevation 183 feet. IV, 27, 1913. (A. N. Caudell.) [U. S. N. M.]
 Orange, Orange County, elevation 500 to 800 feet. VII, 21, 1913. (R. & H.)
 Petersburg, Dinwiddie County, elevation about 100 feet. VII, 23, 1913. (R. & H.)

North Carolina.

- Charlotte, Mecklenburg County, elevation 670 to 750 feet. VII, 27, 1913. (R. & H.)
 Fayetteville, Cumberland County, elevation 100 to 150 feet. IX, 9, 1911. (R. & H.)
 Goldsboro, Wayne County, elevation 110 feet. VII, 25, 1913. (R. & H.)

- Greensboro, Guilford County, elevation 900 feet. VII, 26, 1913. (R. & H.)
 Lake Waccamaw, Columbus County, elevation 60 feet. IX, 8, 1911. (R. & H.)
 Murphy, Cherokee County, elevation 1,540 feet. VII, 25, 1903. (Morse.) [Morse Cln.]
 Raleigh, Wake County, elevation 350 feet. Various dates, collectors and collections.
 Southern Pines, Moore County, elevation 519 feet. XI, 1908 and 1905. (A. H. Manee.) [N. C. Dept. Agr.]
 Tryon, Polk County, elevation 1,090 feet. (W. F. Fiske.) [U. S. N. M.]
 Weldon, Halifax County, elevation 70 feet. VII, 24, 1913. (R. & H.)
 Wilmington, New Hanover County. IX, 8, 1911. (R. & H.)
 Winter Park, New Hanover County. IX, 7, 1911. (R. & H.)
 Wrightsville, New Hanover County. IX, 7, 1911. (R. & H.)

South Carolina.

- Ashley Junction, Charleston County. VIII, 15, 1913. (R.)
 Columbia, Richland County, elevation 300 feet. VII, 28, 1913. (R. & H.)
 Denmark, Bamberg County, elevation 257 feet. VIII, 15, 1903. (Morse.) [Morse Cln.]

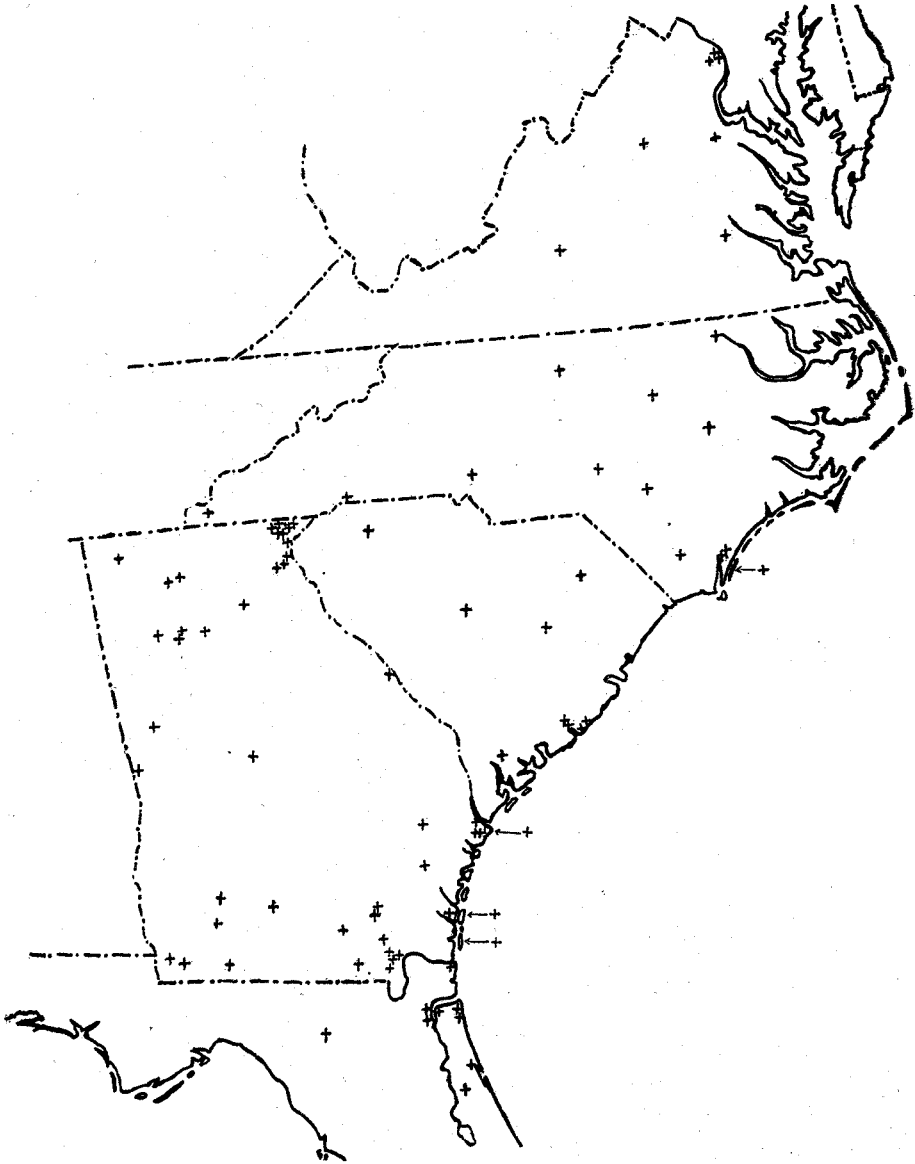


Fig. 1.—Outline map of the southeastern United States, showing the positions of the principal localities, represented by series, in the collections studied in connection with this paper.

- Florence, Florence County, elevation 138 feet. IX, 6, 1911. (R. & H.)
- Isle of Palms, Charleston County. VIII, 15, 1913. (R.)
- Magnolia, Charleston County. IX, 5, 1911. (R. & H.)
- Manning, Clarendon County, elevation 91 feet V, 1914. (Witmer Stone.) [A. N. S. P.]
- Spartanburg, Spartanburg County, elevation 875 feet. VIII, 6, 1913. (H.)
- Sullivan Island, Charleston County. IX, 5, 1911. (R. & H.)
- Yemassee, Hampton and Beaufort Counties, elevation 18 to 40 feet. IX, 4, 1911. (R. & H.)
- Georgia.*
- Albany, Dougherty County, elevation 184 feet. VIII, 1, 1913. (R. & H.)
- Atlanta, Fulton County, elevation 900 to 1,050 feet. Numerous dates and collectors. [Ga. St. Cln.]
- Augusta, Richmond County, elevation 140 to 200 feet. VII, 29, 1913. (R. & H.)
- Austell, Cobb County, elevation 900 to 1,000 feet. VIII, 6, 1910. [Ga. St. Cln.]
- Bainbridge, Decatur County, elevation 110 feet. Numerous dates. (J. Chester Bradley.) [Ga. St. Cln.]
- Billy's Island, Okeefeenokee Swamp, Charlton County. V and VI, 1912, IX and XII, 1913. (J. Chester Bradley.) [Cornell University.]
- Black Rock Mountain, Rabun County, elevation 2,000 to 3,500 feet. V, 20 to 25, 1911. [Ga. St. Cln.]
- Brunswick, Glynn County. II, 12, 1911. [Ga. St. Cln.] VII, 30, 1911. (R. & H.)
- Buckhead, Fulton County, elevation 1,000 feet. IV, 16, 1911. [Ga. St. Cln.] VIII, 2, 1913. (R. & H.)
- Burton, Rabun County, elevation 1,800 feet. V, 21, 1911. (J. Chester Bradley.) [Ga. St. Cln.]
- Chase Prairie, Okeefeenokee Swamp, Charlton County. IX, 5, 1913. (J. Chester Bradley.) [Cornell Univ.]
- Clayton, Rabun County, elevation 2,000 to 3,700 feet. VI. (Davis.) [Davis Cln.]
- Columbus, Muscogee County, elevation 200 to 350 feet. VII, 16, 1913. (J. Chester Bradley.) [Ga. St. Cln.]
- Cornelia, Habersham County, elevation 1,500 feet. V, 28, 1906. [Ga. St. Cln.] VII, 1910. (Davis.) [Davis Cln.]
- Cumberland Island, Camden County. VIII, 31, 1911. (R. & H.)
- Currahee Mountain, Stephens County, elevation 1,700 feet. VIII, 5, 1913. (H.)
- Dalton, Whitfield County, elevation 1,000 to 1,200 feet. VIII, 7, 1913. (R.)
- De Witt, Mitchell County, elevation cannot be ascertained. VIII, 19, 1912. [Ga. St. Cln.]
- Fargo, Clinch County, elevation 116 feet. VIII, 31, 1913. (J. Chester Bradley.) [Cornell Univ.]
- Groveland, Bryan County, elevation cannot be ascertained. VII, 28, 1913. (J. Chester Bradley.) [Ga. St. Cln.]
- Hebardville, Ware County, elevation about 150 feet. V, 15, 1915. (H.)
- Homerville, Clinch County, elevation 176 feet. VIII, 27, 1911. (R. & H.)
- Honey Island, Okeefeenokee Swamp, Charlton County. VI, 1912. (J. Chester Bradley.) [Cornell Univ.]
- Isle of Hope, Chatham County. IX, 3, 1911. (R. & H.)
- Jesup, Wayne County, elevation 100 to 125 feet. IX, 1, 1911. (R. & H.)
- Jasper, Pickens County, elevation 1,200 to 1,500 feet. VIII, 5, 1913. (R.)
- Macon, Bibb County, elevation 350 feet. VII, 30 to 31, 1913. (R. & H.)
- Mixon's Hammock, Okeefeenokee Swamp, Charlton County. V, 16, 1915. (H.)
- Okeefeenokee Swamp (general label), Ware, Charlton and Clinch Counties. V, 1911. (J. Chester Bradley.) [Cornell Univ.]
- Pinnacle Peak, Rabun County, elevation 4,100 feet. VIII, 20, 1913. (J. Chester Bradley.) [Ga. St. Cln.]
- Rabun Bald, Rabun County, elevation 4,000 to 4,800 feet. VIII, 21, 1913. (J. Chester Bradley.) [Ga. St. Cln.]
- Sandfly, Chatham County. IX, 3, 1911. (R. & H.)
- Savannah, Chatham County. Various dates, collectors and collections.
- Sharp Mountain, Pickens County, elevation 1,800 to 2,000 feet (barometric).¹ VIII, 6, 1913. (R.)

¹ This peak is about nine miles to the westward of Jasper and should not be confused with Sharp-top Mountain near the same place. The latter peak is higher than Sharp Mountain and is to the eastward of Jasper. Sharp-top Mountain was visited by Morse in 1903.

- Spring Creek, Decatur County, elevation about 110 feet. Numerous dates. (J. Chester Bradley.) [Ga. St. Cln.]
- Stone Mountain, De Kalb County, elevation 1,050 to 1,686 feet. Vicinity of same, elevation 950 to 1,050 feet. VIII, 3, 1913. (R. & H.)
- St. Simon's Island, Glynn County, IV to V, 1911 and 1912. (J. Chester Bradley.) [Ga. St. Cln.] VIII, 30, 1911. (R. & H.)
- Suwanee Creek, Lot 328, 12th District, Okeefenokee Swamp, Charlton County. VIII, 28, 1911. (R. & H.)
- Tallahul Falls, Rabun County, elevation 1,630 feet. VIII, 1887. [U. S. N. M. and Hebard Cln.] VII, 1910. (Davis.) [Davis Cln.]
- Thomasville, Thomas County, elevation 250 feet. Various dates. (H. and R. & H.)
- Thompson's Mills, Jackson County, elevation cannot be ascertained. Various dates. (H. A. Allard.) [U. S. N. M.]
- Tifton, Tift County, elevation 370 feet. IX, 8, 1910. [Ga. St. Cln.]
- Toccoa, Stephens County, elevation 1,094 feet. VIII, 4, 1913. (H.)
- Tuckoluge Creek, Rabun County, elevation 1,600 to 2,600 feet. VII, 1910. (Davis.) [Davis Cln.]
- Tybee Island, Chatham County. IX, 2, 1911. (R. & H.)
- Warm Springs, Meriwether County, elevation 850 to 1,200 feet. VIII, 9 to 10, 1913. (R.)
- Waycross, Ware County, elevation 138 feet. VIII, 11, 1903. (Morse.) [Morse Cln.]
- Wilson Gap, Mountain City, Rabun County, elevation cannot be ascertained. VIII, 22, 1913. (J. Chester Bradley.) [Ga. St. Cln.]

Florida.

- Atlantic Beach, Duval County. VIII, 24 to 25, 1911. (R. & H.)
- Fernandina, Nassau County. (W. H. Finn.) [U. S. N. M.]
- Hastings, St. John County. Various dates. (A. J. Brown.) [Morse Cln.]
- Indian River, Volusia and Brevard Counties. 1896. (T. J. Priddey.) [Hebard Cln.]
- Jacksonville, Duval County. Various dates, collectors and collections. Examined by authors, VIII, 25, 1911.
- Live Oak, Suwanee County, elevation 100 to 120 feet. VIII, 26, 1911. (R. & H.)
- Ortega, Duval County. IX, 6, 1913. (Davis.) [Davis Cln.]
- Pablo Beach, Duval County. IX, 5, 1913. (Davis.) [Davis Cln.]
- South Jacksonville, Duval County. IX, 7, 1913. (Davis.) [Davis Cln.]
- St. Augustine, St. John County. XI, 8, 1911. (G. P. Englehardt.) [B. I.]

DISTRIBUTIONAL SUMMARY.

Two important influences or sets of factors quite evidently control the distribution of the Dermaptera and Orthoptera in the area studied, these influences being the same which largely control the character of the biota of any region. The two are: physiography and immediate environment; temperature and climatic regions or life-zones. The two influences share equally in controlling the distribution of certain species, but in numerous cases one and not the other is the governing factor. It seems best, therefore, to summarize our distributional generalizations separately under each of the main divisions. We must always bear in mind that a fauna is not a fixture, but a complex constantly changing and modifying, either through the evolution of its own living components or the modification of its own limitations by readjustment of its physical or climatic barriers. Of the first grouping the effect of immediate environment is best studied in a relatively circumscribed area and, other things being equal, the occurrence of the environment is controlled by the

more broadly influencing factor of the physiography of the land. The physiographic divisions we here use are those which are correlated with the distribution of groups of species of the orders studied.

Physiographic Regions.

The physiographic regions we find correlated with the distribution of the species found in Virginia, North Carolina, South Carolina, Georgia and northern Florida are:

- a. High Appalachian summits.
- b. Lower summits of the Appalachian uplift and higher valleys of the same area.
- c. Piedmont.
- d. Coastal Plain. This is divisible into two sections which we have for convenience called the Upper Coastal and the Lower Coastal.
- e. Maritime and estuarine region.

These regions may be roughly delimited as follows:

High Appalachian Summits.—Only the highest peaks of the North Carolina and Virginia mountains are embraced in this term. Very few Orthoptera have been taken in this region.

Lower Summits and Valleys of the Appalachian Uplift.—Comprising the greater (remaining) portion of the Southern Appalachian system to its disappearance in Alabama, and the typical mountain valleys, as opposed to the broad intrusive Piedmont valleys, are grouped under this heading. The Georgia mountains, having in general a lower elevation than the major portion of the North Carolina mountain area, lack a number of the species found in the latter region, and also on their lower portions shelter species more typical of the Piedmont. Other species, which also occur in the Georgia mountains, penetrate the valleys of the North Carolina mountains, but do not frequent the main ridges in the latter State.

Piedmont.—This division includes the area of the Piedmont plain, or the region from the base of the Appalachians down to the fall-line, also embracing some of the larger and broader valleys which penetrate into the mountainous region proper. The fall-line extends in a curve from the vicinity of Washington, District of Columbia, to Columbus, Georgia.

Coastal Plain.—All the area situated below (*i.e.*, coastward of) the fall-line is embraced in this grouping. It is, from the Orthopteran evidence, distinctly divisible into two portions which may for convenience be called the Upper and Lower Coastal Plain regions. The Upper region covers all the territory of the Coastal Plain situated

to the north and inland of a line drawn from the vicinity of Newbern, North Carolina, to the vicinity of Albany, Georgia, passing a short distance inland of Wilmington, North Carolina, Charleston, South Carolina, and Savannah, Georgia. The territory on the coastal side of this line, except the very limited section included in the next

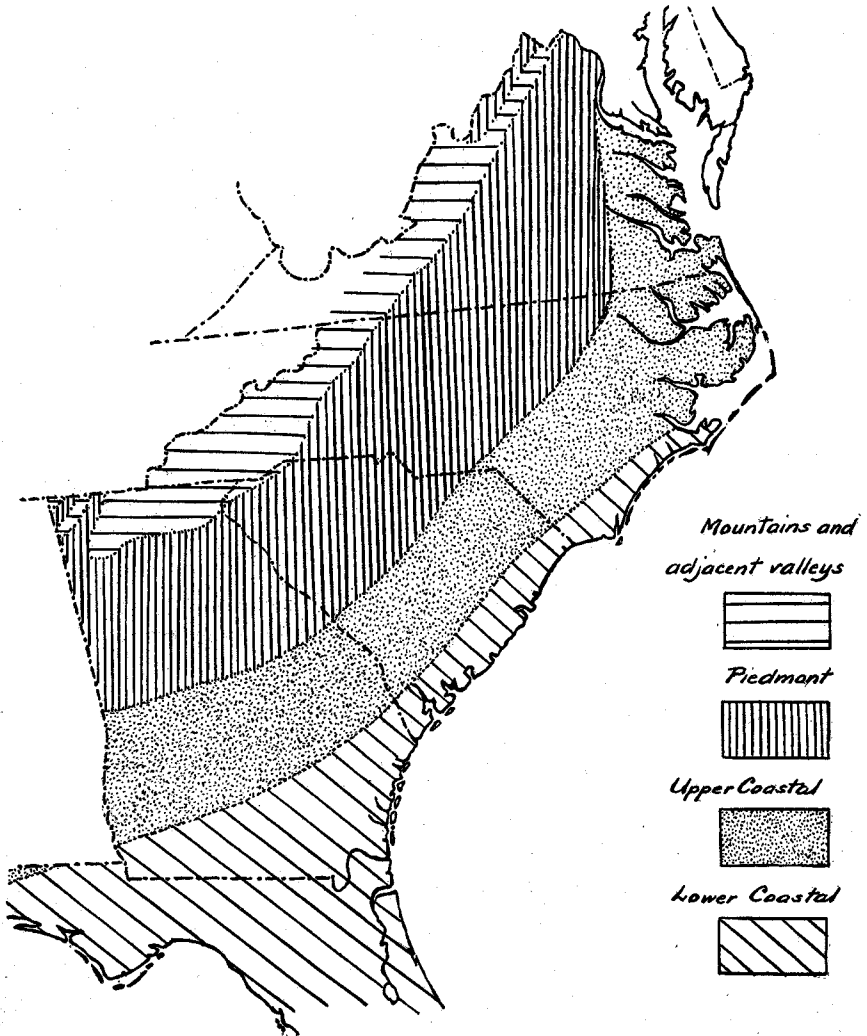


Fig. 2.—Outline map of the southeastern United States, showing the more extensive physiographic regions here discussed. The limited areas treated under "High Mountain Summits" and the very narrow "Sea-coast and Estuarine" region are not indicated.

area, we would consider the Lower Coastal Plain, which condition passes southward into peninsular Florida. The western boundary of the Lower Coastal Plain influence is not fixed as yet.

Maritime and Estuarine Region.—We include under this, barrier beach and coastal sand dunes, salt marshes and the extensive fresh marshes of the larger estuaries. The region is limited to a distance of a few miles from the coast-line, except in the case of the estuaries.

The following tabulations of species have been made on the basis of their distribution in relation to the physiographic features of the region studied.

I. General.

<i>Labia minor</i> (Probably introduced.)	<i>Blatta orientalis</i> (Introduced.)
<i>Blattella germanica</i> (Introduced.)	<i>Nemobius carolinus carolinus</i>

II. Appalachians (except high summits) to coast.

<i>Neotettix femoratus</i> (Up to 5,500 feet elevation in North Carolina.)	<i>Scudderia furcata furcata</i> (Up to 3,800 feet in North Carolina.)
<i>Paratettix cucullatus</i>	<i>Conocephalus fasciatus</i>
<i>Orphulella pelidna</i> (Up to 5,000 feet in North Carolina.)	<i>Conocephalus brevipennis</i>
<i>Arphia xanthoptera</i>	<i>Ellipes minuta</i>
<i>Arphia sulphurea</i> (Up to 5,700 feet in North Carolina.)	<i>Myrmecophila pergandei</i>
<i>Dissosteira carolina</i> (Up to 4,500 feet in North Carolina.)	<i>Gryllus assimilis</i> (Up to 4,500 feet in North Carolina.)
<i>Schistocerca serialis</i> (Up to 5,700 feet in North Carolina.)	<i>Æcanthus angustipennis</i> (Up to 4,000 feet in North Carolina.)
	<i>Æcanthus quadripunctatus</i> (Up to 4,000 feet in North Carolina.)

III. Appalachian valleys and lower mountains in Georgia to coast.

<i>Oligonyx scudderi</i>	<i>Trimerotropis citrina</i>
<i>Tettigidea armata</i>	<i>Æcanthus latipennis</i>
<i>Truxalis brevicornis</i>	<i>Neozabea bipunctata</i>
<i>Amblytropidia occidentalis</i>	<i>Phylloscyrtus pulchellus</i>
<i>Pardalophora phænicoptera</i>	

IV. High Appalachian summits only.

<i>Nomotettix cristatus cristatus</i>	<i>Melanoplus divergens</i>
<i>Podisma glacialis variegata</i>	

V. Mountains only (summits and adjacent valley localities) in southeastern States.

<i>Cryptocercus punctulatus</i>	<i>Melanoplus sylvestris</i>
<i>Diapheromera carolina</i>	<i>Melanoplus walshii</i>
<i>Acrydium hancocki</i>	<i>Neoconocephalus ensiger</i> (Northward occurring Piedmont and Coastal.)
<i>Chorthippus curtippennis</i> (Northward occurring Piedmont and Coastal.)	<i>Conocephalus allardi</i>
<i>Pardalophora apiculata</i>	<i>Atlanticus monticola</i>
<i>Paratylotropidia beutenmuelleri</i>	<i>Ceuthophilus lapidicola</i>
<i>Melanoplus similis</i>	<i>Æcanthus nigricornis</i>
<i>Melanoplus deceptus</i>	

VI. Mountains and Piedmont.

- Anisomorpha ferruginea*
Acrydium arenosum angustum (Northward occurring Coastal.)
Acrydium ornatum
Neotettix proavus
Eritettix simplex (Northward occurring Coastal.)
Orphulella speciosa (Northward occurring Coastal.)
Chlœaltis conspersa (Northward occurring Coastal.)
Encoptolophus sordidus (Northward occurring Coastal.)
Hesperotettix brevipennis (Northward occurring Coastal.)
Trimerotropis saxatilis
Melanoplus tribulus (Northward occurring Coastal.)
Melanoplus devius
Melanoplus decoratus
- Melanoplus luridus luridus* (Northward occurring Coastal.)
Melanoplus punctulatus punctulatus (Northward occurring Coastal.)
Amblycorypha rotundifolia rotundifolia (Northward occurring Coastal, passing at lower elevations in Southeastern States toward *A. r. parvipennis*.)
Pterophylla camellifolia camellifolia (Northward occurring Coastal.)
Conocephalus nemoralis
Atlanticus davisi
Ceuthophilus uhleri (Northward occurring Coastal.)
Ceuthophilus gracilipes
Nemobius fasciatus fasciatus (Occurring Coastal northward.)
Nemobius maculatus
Ecanthus niveus (Northward occurring Coastal.)

VII. Lower Mountains, Piedmont and Upper Coastal Plain.

- Nomotettix cristatus compressus*
Chortophaga viridifasciata (To Sullivan Island, South Carolina.)
Melanoplus carnegiei (To Yemassee, South Carolina.)
- Melanoplus femur-rubrum femur-rubrum*
Melanoplus femoratus
Orchelimum vulgare
Hapithus agitator agitator

VIII. Lower Mountains and Piedmont Region south to southwestern Georgia and adjacent northern Florida, absent from all or most of Carolinian and low Georgian Coastal.

- Diapheromera femorata* (To Monticello, Florida.)
Spharagemon bolli (To Tallahassee, Florida.)
Melanoplus scudderi scudderi (To Monticello, Florida.)
Melanoplus atlantis (To Marianna, Florida.)
- Melanoplus impudicus* (To Spring Creek, Georgia.)
Conocephalus saltans (To Thomasville and Spring Creek, Georgia.)
Atlanticus americanus (To Tallahassee and River Junction, Florida.)

IX. Piedmont Region.

- Doru aculeatum*
Ischnoptera pensylvanica pensylvanica (Occurring Coastal northward.)
Ischnoptera uhleriana uhleriana (Occurring Coastal northward.)
Ischnoptera insolita
Schistocerca damnifica damnifica (Occurring Coastal northward.)
Campylacantha olivacea (Macon, Georgia, only.)
Melanoplus impiger (Augusta, Georgia, only.)
Atlanticus testaceus (Occurring Coastal northward.)
- Ceuthophilus latens*
Ceuthophilus spinosus (Occurring Coastal northward.)
Ceuthophilus neglectus (Occurring Coastal northward.)
Nemobius griseus funeralis (Macon, Georgia, only.)
Nemobius bruneri
Nemobius confusus
Ecanthus exclamationis (Raleigh, North Carolina, only.)
Ecanthus pini (Raleigh, North Carolina, only.)

X. Piedmont and Coastal Plain only to extreme northern Florida.

Acrydium arenosum arenosum
Melanoplus strumosus (To De Funiak
 Springs, Florida.)

Hadenocercus puteanus
Anaxipha exigua
Cyrtoxipha columbiana

XI. Piedmont and Coastal Plain to peninsular Florida.

Vostox brunneipennis
Ischnoptera deropeltiformis
Ischnoptera johnsoni
Ischnoptera coultoniana
Ischnoptera borealis
Ischnoptera bolliana (Northward only
 to Raleigh, North Carolina.)
Periplaneta americana
Chorisonneura texensis (Northward only
 to Tryon, North Carolina.)
Stagmomantis carolina
Tettigidea lateralis lateralis (At higher
 elevations and northward in Coastal
 Plain passing into *T. l. parvipennis*.)
Mermiria alacris (Northward only to
 Newbern, North Carolina.)
Syrbula admirabilis
Dichromorpha viridis
Romalea microptera (Northward only
 to central North Carolina.)
Leptysma marginicollis (Northward
 only to vicinity of Washington,
 District of Columbia.)
Melanoplus luridus keeleri (At higher
 elevations and northward passing
 into *M. l. luridus*.)
Paroxya clavuligera (Local in Pied-
 mont.)

Scudderella texensis
Amblycorypha uhleri (Coastal alone
 northward.)
Microcentrum rhombifolium
Neoconocephalus robustus crepitans
 (Northward Coastal only and pass-
 ing into *N. r. robustus*.)
Neoconocephalus triops
Orchelimum agile
Orchelimum minor (Northward Coastal
 only.)
Odontoxiphidium apterum (Extending
 as high as Sand Mountain and Blue
 Ridge, Georgia, but only north to
 Fayetteville, North Carolina.)
Camptonotus carolinensis
Gryllotalpa hezadactyla
Tridactylus apicalis (Data poor.)
Cycloptilum squamosum (North Caro-
 lina northward Coastal only.)
Nemobius ambitiosus (North only to
 Florence, South Carolina.)
Anurogryllus muticus (Northward
 Coastal only.)
Gryllus domesticus
Miogryllus verticalis
Orocharis saltator (Northward Coastal
 only.)

XII. Piedmont and Coastal Plain in northern area of Southeastern States only.

Melanoplus confusus (South to Have-
 lock, North Carolina.)
Amblycorypha oblongifolia (South to
 Weldon, North Carolina, and Chat-
 tanooga, Tennessee.)
Amblycorypha floridana carinata (South
 of fall line in South Carolina and
 Georgia passing into *A. f. floridana*;
 northward Coastal only.)

Conocephalus strictus (South to Raleigh
 and Newbern, North Carolina.)
Atlanticus pachymerus (South to Have-
 lock, North Carolina, and "South
 Carolina.")
Nemobius palustris (Only Coastal in
 region, south to Wilmington, North
 Carolina; Piedmont northward.)

XIII. Coastal Plain to peninsular Florida.

Anisolabis annulipes
Labidura bidens
Procladia unidentata
Ischnoptera divisa
Ischnoptera uhleriana fulvescens (North
 only to southeastern Virginia.)

Cariblatta lutea lutea (North only to
 northern North Carolina.)
Manomera tenuescens (North only to
 northern North Carolina.)
Neotettix bolteri

- Paxilla obesa* (North only to eastern North Carolina.)
- Tettigidea prorsa* (To northern Florida.)
- Radinotatum brevipenne brevipenne* (North only to Yemassee, South Carolina; straggler into Piedmont in Georgia.)
- Climocephalus elegans* (Maritime only northward.)
- Spharagemon collare wyomingianum*
- Scirtetica marmorata picta* (In northern North Carolina passing into *S. m. marmorata*.)
- Psinidia fenestralis*
- Schistocerca obscura* (North to Maryland; straggler in Piedmont.)
- Schistocerca alutacea* (In Tennessee drainage in western North Carolina.)
- Schistocerca damnifica calidior* (Passing at fall line and north of North Carolina into *S. d. damnifica*.)
- Eotettix pusillus* (North only to North Carolina; straggler into Piedmont in Georgia.)
- Hesperotettix floridensis* (North only to Augusta, Georgia; straggler in Piedmont in Georgia.)
- Melanoplus decorus* (Limited distribution in North Carolina.)
- Melanoplus australis* (Limited distribution in South Carolina and Georgia.)
- Melanoplus attenuatus* (Limited distribution, Georgia to North Carolina.)
- Melanoplus hebardii* (Limited distribution in Georgia.)
- Melanoplus nubilus* (Limited distribution in North Carolina.)
- Melanoplus mirus* (Limited distribution in North Carolina.)
- Melanoplus stegocercus* (Limited distribution in Georgia.)
- Melanoplus scapularis* (Limited distribution in Georgia.)
- Melanoplus nigrescens* (Limited distribution in North Carolina and Georgia.)
- Melanoplus querneus* (Limited distribution in Georgia.)
- Melanoplus clypeatus* (Limited distribution in Georgia.)
- Melanoplus punctulatus arboreus* (Passing in Georgia Piedmont and northward in Coastal Plain into *M. p. punctulatus*.)
- Paroxya atlantica atlantica*
- Arethaea phalangium* (North only to Augusta, Georgia.)
- Scudderia cuneata* (North only to Raleigh, North Carolina.)
- Symmetropleura modesta* (North only to Raleigh, North Carolina.)
- Pterophylla camellifolia intermedia* (Passing in Georgia Piedmont and northward in Coastal Plain into *P. c. camellifolia*.)
- Pyrgocorypha uncinata* (North only to Raleigh, North Carolina.)
- Neoconocephalus exilis canorus* (Straggler in Georgia Piedmont from Upper Coastal Plain.)
- Neoconocephalus caudellianus*
- Neoconocephalus palustris*
- Orchelimum glaberrimum*
- Orchelimum laticauda* (Straggler in Georgia Piedmont.)
- Orchelimum militare*
- Orchelimum superbum* (Virginia and New Jersey only.)
- Conocephalus stictomerus* (South only to Raleigh, North Carolina.)
- Cryptoptilum antillarum* (North only to Alamance County, North Carolina.)
- Cryptoptilum trigonipalpus* (North only to Petersburg, Virginia; straggler in Georgia Piedmont.)
- Nemobius fasciatus socius* (North only to Raleigh, North Carolina, northward and in southern Piedmont passing into *N. f. fasciatus*.)
- Nemobius cubensis cubensis*
- Anaxipha pulicaria* (North only to Raleigh, North Carolina.)
- Falcicula hebardii* (Straggler in North Carolina Piedmont.)

XIV. Lower Coastal Plain in the Carolinas, Georgia and extreme northern Florida.

- Nomotettix cristatus arcuatus* (Passing northward and higher into *N. c. compressus* and southward into *N. c. floridanus*.)
- Melanoplus furcatus* (Georgia and Florida only.)
- Scudderia curvicauda laticauda* (Gradually intergrading northward and higher into *S. c. curvicauda*.)
- Orchelimum bradleyi* (North to Wilmington, North Carolina.)
- Atlanticus dorsalis* (North to "South Carolina.")
- Atlanticus calcaratus* (Georgia and Florida only.)
- Scapteriscus vicinus* (Georgia only.)
- Scapteriscus aletus* (Georgia only.)
- Nemobius palustris aurantius* (Georgia only.)

XV. Lower Coastal Plain into peninsular Florida.

<i>Ischnoptera nigricollis</i> (Not north of Georgia.)	<i>Melanoplus rotundipennis</i> (Not north of Georgia.)
<i>Ceratinoptera diaphana</i> (Not north of Georgia.)	<i>Melanoplus femur-rubrum propinquus</i> (Passing at the Georgia and South Carolina fall line into <i>M. f. femur-rubrum</i> ; not typical north of Wilmington, North Carolina.)
<i>Eurycotis floridana</i> (Not north of Georgia.)	<i>Aptenopedes sphenarioides sphenarioides</i> (Not north of Georgia.)
<i>Periplaneta australasiae</i> (Not north of Florida.)	<i>Aptenopedes aptera</i> (Not north of Georgia.)
<i>Periplaneta brunnea</i> (Not north of Georgia.)	<i>Belocephalus subapterus</i> (North to South Carolina.)
<i>Pycnoscelus surinamensis</i> (Not north of Florida.)	<i>Belocephalus davisii</i> (Not north of Georgia.)
<i>Gonatista grisea</i> (North to South Carolina.)	<i>Neoconocephalus velox</i> (Not north of Georgia.)
<i>Thesprotia graminis</i> (Not north of Georgia.)	<i>Atlanticus gibbosus</i> (Straggler into Georgia Piedmont.)
<i>Anisomorpha buprestoides</i> (North to South Carolina.)	<i>Ceuthophilus latibuli</i> (Not north of Georgia.)
<i>Paratettix rugosus</i> (Not north of Georgia.)	<i>Scapteriscus abbreviatus</i> (Not north of Georgia.)
<i>Tettigidea spicata</i> (Not north of Georgia.)	<i>Anaxipha vittata</i> (Not north of Georgia.)
<i>Mermiria bivittata</i>	<i>Hapithus agitator quadratus</i> (Inland and northward passing into <i>H. a. agitator</i> .)
<i>Arphia granulata</i>	<i>Hapithus brevipennis</i> (Not north of Georgia.)
<i>Chortophaga australior</i> (North to Savannah, Georgia.)	
<i>Spharagemon crepitans</i> (Not north of Georgia.)	
<i>Stenacris vitreipennis</i>	
<i>Gymnoscirtetes pusillus</i> (Not north of Georgia.)	

XVI. Maritime and Estuarine Element.

<i>Anisolabis maritima</i>	<i>Orchelimum concinnum</i>
<i>Mermiria intertexta</i>	<i>Orchelimum fidicinium</i>
<i>Orphulella olivacea</i>	<i>Conocephalus aigialus</i>
<i>Orphulella halophila</i> (Southern Florida.)	<i>Conocephalus nigropleuroides</i>
<i>Trimerotropis maritima</i>	<i>Conocephalus spartinae</i>

In table II, we have given as a matter of information the elevation of the upper limit of distribution, where this is exactly known. Table III covers forms occurring in the larger Appalachian valleys, as far north as North Carolina or the lower mountains in Georgia, or both, to the coast, exclusive of the Maritime and Estuarine Region. In table V appear species which considerably modify their physiographic distribution elsewhere in the eastern United States, and this fact is there, and in subsequent tables, indicated in parentheses. In table VIII, we have endeavored to express a peculiar type of distribution: one covering the lower mountains and Piedmont and, although absent from most or all of the Coastal Plain, extending south into southwestern Georgia or even into the adjacent portion of northern Florida.

The more interesting generalizations drawn from the physiographic summaries are the following. Northward numerous species, characteristic of the Piedmont in the area here treated, pass to the Coastal Plain of that region, frequently, or rather generally, leaving the Piedmont. The explanation of this is apparently temperature control and the distribution is typical of the Upper Austral life-zone. Toward the southern end of the Piedmont region numerous forms, characteristic of this section in the Carolinas, enter the lower mountains, doubtless as valley intrusions; this also can be explained by temperature control and is zonal in character. Along the coastal side of the Piedmont in Georgia, a number of Coastal Plain species penetrate the Piedmont for considerable distances to points such as Warm Springs, vicinity of Stone Mountain, Thompson's Mills, Toccoa and even to suitable situations on the slopes of Currahee Mountain, an outlying knob near Toccoa. This is quite marked in the case of Warm Springs, which has seven species of this category occurring there.² The extending influence of the larger river valleys, such as the Savannah, Oconee, Ocmulgee, Flint and Chattahoochee, is doubtless responsible for these intrusions, for such they are evidenced by the known distribution of the species elsewhere and the generic habitat. The division of the Coastal Plain into two areas has abundant evidence in its favor in the Orthoptera, as the tabulations show. It is significant also that quite a few of the forms do not reach into peninsular Florida. Further studies on the distribution of central Florida forms of the orders will doubtless throw much additional light on the fixity of these limitations. It is possible that a lack of material may be partly responsible for the apparent restriction of these ranges. In the case of the divisions of the Coastal Plain, our material is sufficiently full to show the correlations very clearly.

Life Zones.

The life zones represented in the area studied are the following:

- a. Boreal or Canadian.
- b. Transition or Alleghanian.
- c. Upper Austral or Carolinian.
- d. Lower Austral or Austroriparian.
- e. Basic Austral or Sabalian.³

² These are: *Cariblatta lutea lutea* (also Thompson's Mills), *Radinotatum brevipenne brevipenne*, *Scirtetica marmorata picta*, *Eotettix pusillus*, *Hesperotettix floridensis*, *Atlanticus gibbosus* (also on Currahee Mountain) and *Cryptoptilum trigonipalpus* (also vicinity of Stone Mountain).

³ For remarks on this zone see p. 104.

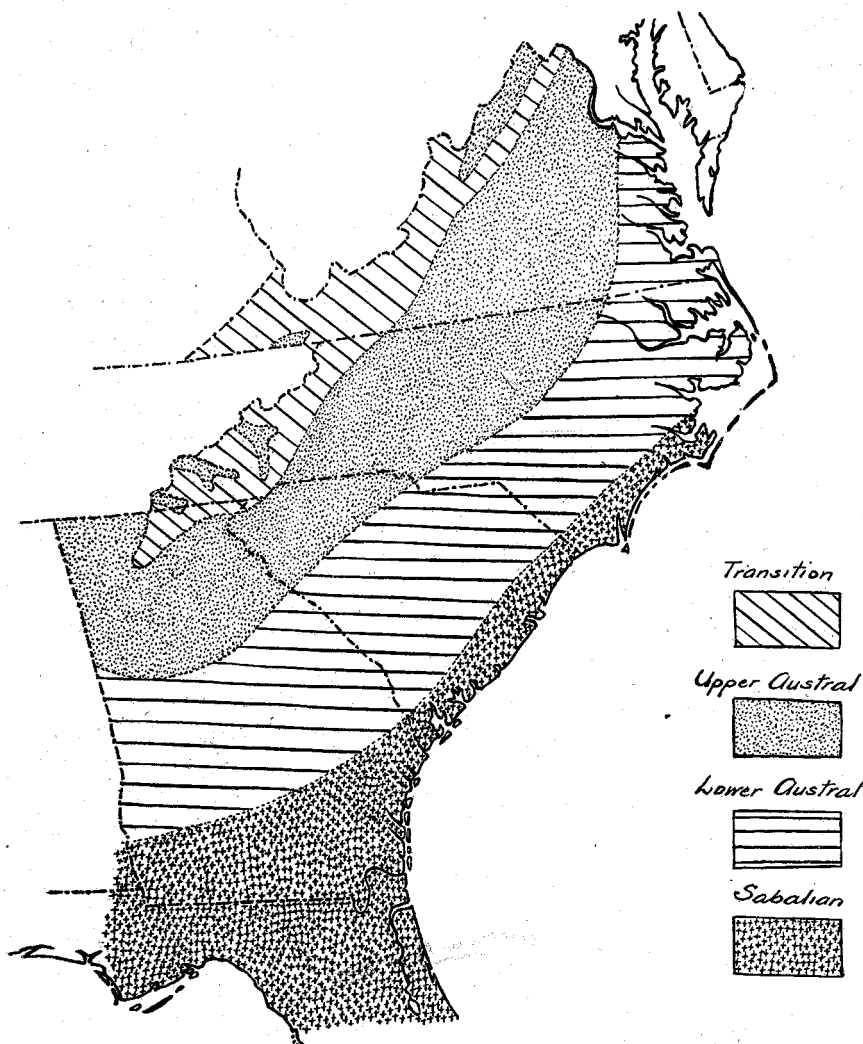


Fig. 3.—Outline map of the southeastern United States, showing the extent of the principal life zones. The circumscribed Boreal areas on the mountains of North Carolina and Virginia have not been indicated. For comments upon and definition of the Sabalian zone see the zonal distributional information in the introductory portion of this paper. The extent of the Sabalian, as well as the other zones to the west of the Georgia-Alabama line and the Chattahoochee River, has not been determined by us.

The zones may be briefly outlined as follows:⁴

Boreal or Canadian Zone.—This zone occupies the summits of the higher mountains in North Carolina and Virginia, such as the Black Mountains, Roan Mountain, Grandfather Mountain, Mt. Pisgah, Balsam Mountains, etc. This is the area of balsam forests within the territory studied. We do not feel that the zone has been sufficiently studied to consider the total number of species reported from it as a fair index of the Orthoptera therein.

Transition or Alleghanian Zone.—This zone comprises all the truly mountainous country below the Boreal summits; in Georgia, however, being largely restricted to the elevations greater than 1,500 feet. Slope exposure is largely responsible for the presence or absence of this element near its upper and lower margins. In North Carolina, large valleys of tributary streams of the Tennessee carry tongues of the Upper Austral for considerable distances into the otherwise solidly Transition country. The same appears to be true to a lesser degree in the Transition area of Georgia, which is in large part much tinctured with Upper Austral elements.

Upper Austral or Carolinian.—The area comprised in this zone extends from the lower border of the Transition zone down to a line roughly drawn from a short distance up stream of the mouth of the Potomac River, to Weldon, North Carolina, to Raleigh and Charlotte, North Carolina, traversing transversely the area between Spartanburg and Columbia, South Carolina, and crossing the State of Georgia in a southwesterly direction to the vicinity of Warm Springs, Georgia, then curving northwest into Alabama. As stated above, pronounced valley intrusions of this fauna enter western North Carolina from the Tennessee Valley, while in Georgia it apparently pushes its way well into and even up the lower slopes of the mountains, apparently in sharp competition with the Transition forms occurring in the same region. The two elements will be governed in their distribution, at one of their points of contact, by slope exposure; at another, by the normal cover or by the burning-over of the land. As we have discussed above under Physiography, a number of distinctly Lower Austral forms occur within normally Upper Austral areas, at localities such as Currahee Mountain, Toccoa, vicinity of Stone Mountain and Thompson's Mills, and these extensions probably are, as suggested there, due to the extending influence of large river valleys, which provide

⁴ For a careful presentation of the life zones of North Carolina, see Brimley, *Journ. Elisha Mitchell Scient. Soc.*, XXIX, pp. 19 to 27, (1913).

avenues of entrance to suitable environments in a region in general characterized by a different fauna. The fact that these extensions occur only, as far as known, at a few localities gives support to this explanation.

Lower Austral or Austroriparian.—This zone covers the area situated below (*i.e.*, in elevation) the Upper Austral, down to a line extending from the southern portion of Pamlico Sound, North Carolina, to Lake Waccamaw, North Carolina, to Yemassee, South Carolina, then swinging in a curve to Albany, Georgia, and the Chattahoochee River west of the last-mentioned locality. A few forms, which we would consider more representative of the Upper Austral zone, occur as stragglers within this area at localities such as Goldsboro and Fayetteville, North Carolina, Sumter and Florence, South Carolina, Augusta and Macon, Georgia. It is possible that future work may show these forms to be equally characteristic of the Lower Austral; a very questionable possibility to our minds. In these cases, the interdigitation which we have mentioned as occurring at the upper limit of the Lower Austral is probably repeated in the reverse direction, but physiographic control features are probably responsible for these intrusions.

Basic Austral or Sabalian.—The present zone, which is co-extensive with the physiographic area called Lower Coastal by us, we find is so decidedly characterized by a considerable number of species, which extend southward to southern or at least to central or north-central Florida, that we have been compelled to give it a name. We have found no term in the literature which we could use, so we here propose the name Sabalian. The name has been derived from the technical name of the cabbage palmetto (*Sabal palmetto*), which is probably the most striking tree of the region named, and whose distribution is co-extensive with that area.

The Sabalian zone is characterized by at least six species, outside of those occurring only in central and southern Florida, which are also West Indian in distribution or extremely close to West Indian species.

The zone extends from the coast-line inland to the lower boundary of the Lower Austral, given above in defining that region, north to the region of Pamlico Sound and south into Florida. It is narrow in the Carolinas, but becomes broad in Georgia and its exact extent to the westward remains to be worked out. The exact line where this same influence gives way to the Tropical in southern Florida has not been critically mapped, owing to the need of more information

from the central and south-central portions of the peninsula. The information from the Tropical area of southern Florida is relatively full.

The zonal distribution of the species treated in the present paper is tabulated below. In some cases it is known that the species, in certain regions of North America, occur in zones other than those here checked, but, unless this has a distinct bearing on the possible occurrence of the species in the same zone in the region here studied, we have not indicated its presence other than as found in the southeastern States. In a few cases where species will in all probability be found in a certain zone in the southeastern States, judging by the analogy of other regions, or where the form is found in two zones, but by defect of the record is not known from one situated between these two, we have inserted a check for that life zone with a brief qualification.

DERMAPTERA.	Boreal.	Transi- tion.	Upper Austral.	Lower Austral.	Sabalian.
LABIDURIDÆ.					
<i>Anisolabis annulipes</i>			1 (part)	1	1
<i>Anisolabis maritima</i>			1	1	1
<i>Labidura bidens</i>				1	1
LABIIDÆ.					
<i>Vostox brunneipennis</i>			1	1	1
<i>Labia minor</i>	Introduced-range	nearly general.		1	1
<i>Prolabia unidentata</i>				1	1
FORFICULIDÆ.					
<i>Doru aculeatum</i>			1		
ORTHOPTERA.					
BLATTIDÆ.					
<i>Ischnoptera deropeltiformis</i>			1	1	1
<i>Ischnoptera nigricollis</i>					1
<i>Ischnoptera johnsoni</i>			1	1	1
<i>Ischnoptera p. pensylvanica</i>	1		1		
<i>Ischnoptera divisa</i>			1 (part)	1	
<i>Ischnoptera coultoniana</i>			1	1	1
<i>Ischnoptera u. uhleriana</i>			1		
<i>Ischnoptera u. fulvescens</i>				1	1
<i>Ischnoptera borealis</i>			1	1	1
<i>Ischnoptera bolliana</i>			1	1	1
<i>Ischnoptera insolita</i>			1		
<i>Blattella germanica</i>	Introduced-range	general.			
<i>Ceratinoptera diaphana</i>					1
<i>Cariblatta l. lutea</i>				1	1
<i>Eurycotis floridana</i>				1	1
<i>Blatta orientalis</i>	Introduced-range	general.			
<i>Periplaneta americana</i>			1	1	1
<i>Periplaneta australasiae</i>					1

	Boreal.	Transi- tion.	Upper Austral.	Lower Austral.	Sabalian.
<i>Periplaneta brunnea</i>					1
<i>Pycnoscelus surinamensis</i> ..					1
<i>Chorisonoura texensis</i>			1	1	1
<i>Cryptocercus punctulatus</i>		1	1 (strag- gler)		
MANTIDÆ.					
<i>Stagmomantis carolina</i>			1	1	1
<i>Gonatista grisea</i>					1
<i>Oligonyx scudderi</i>			1	1	1
<i>Thesprotia graminis</i>				1	1
PHASMIDÆ.					
<i>Diapheromera femorata</i>		1	1	1 (part)	1 (part)
<i>Manomera tenuescens</i>				1	1
<i>Anisomorpha buprestoides</i> ..					1
<i>Anisomorpha ferruginea</i>			1	1	
ACRIDIDÆ.					
<i>Nomotettix c. cristatus</i>	1	1			
<i>Nomotettix c. compressus</i>			1		
<i>Nomotettix c. arcuatus</i>				1	1
<i>Acrydium a. arenosum</i>				1	1
<i>Acrydium a. angustum</i>		1	1		
<i>Acrydium ornatum</i>		1	1		
<i>Neotettix proavus</i>			1		
<i>Neotettix femoratus</i>		1	1	1	1
<i>Neotettix bolteri</i>				1	1
<i>Paratettix rugosus</i>					1
<i>Paratettix cucullatus</i>		1	1	1	1 (part)
<i>Paxilla obesa</i>				1	1
<i>Tettigidea prorsa</i>				1	1
<i>Tettigidea spicata</i>					1
<i>Tettigidea l. lateralis</i>			1 (part)	1	1
<i>Tettigidea armata</i>			1	1	1
<i>Radinotatum b. brevipenne</i> ..				1	1
<i>Truzalis brevicornis</i>			1	1	1
<i>Mermiria alacris</i>			1 (part)	1	1
<i>Mermiria intertexta</i>				1	1
<i>Mermiria bivittata</i>				1	1
<i>Syrbula admirabilis</i>			1	1	1
<i>Eritettix simplex</i>			1		
<i>Amblytropidia occidentalis</i> ..			1	1	1
<i>Orphulella pelidna</i>		1	1	1	1
<i>Orphulella olivacea</i>			1	1	1
<i>Orphulella speciosa</i>		1	1		
<i>Dichromorpha viridis</i>			1	1	1
<i>Clinocephalus elegans</i>				1	1
<i>Chloeaaltis conspersa</i>	1	1	1 (part)		
<i>Chorthippus curtipennis</i>	1	1			
<i>Arphia xanthoptera</i>		1	1	1	1
<i>Arphia granulata</i>				1	1
<i>Arphia sulphurea</i>		1	1	1	1
<i>Chortophaga viridifasciata</i> ..		1	1	1	1 (part)
<i>Chortophaga australior</i>					1
<i>Encoptolophus sordidus</i>		1	1		
<i>Pardalophora phænicoptera</i> ..			1	1	1
<i>Hippiscus rugosus</i>			1	1	1
<i>Dissosteira carolina</i>		1	1	1	1

	Boreal.	Transi- tion.	Upper Austral.	Lower Austral.	Sabalian.
<i>Spharagemon crepitans</i>					1
<i>Spharagemon bolli</i>		1	1	1	1 (part)
<i>Spharagemon collare wyo- mingianum</i>				1	1
<i>Scirtetica marmorata picta</i> ..				1	1
<i>Psinidia fenestralis</i>				1	1
<i>Trimerotropis maritima</i>		1 (part)	1 (part)	1 (part)	1 (part)
<i>Trimerotropis citrina</i>			1	1	1
<i>Trimerotropis saxatilis</i>		1	1		
<i>Romalea microptera</i>				1	1
<i>Stenacris vitreipennis</i>					1
<i>Leptysmia marginicollis</i>			1	1	1
<i>Schistocerca obscura</i>			1	1	1
<i>Schistocerca alutacea</i>			1 (part)	1	1
<i>Schistocerca serialis</i>		1	1	1	1
<i>Schistocerca d. damnifica</i> ...			1		
<i>Schistocerca d. calidior</i>				1 (part)	1
<i>Gymnoscirtetes pusillus</i>					1
<i>Campylacantha olivacea</i>			1	1	
<i>Eotettix pusillus</i>				1	1
<i>Eotettix signatus</i>					1
<i>Hesperotettix floridensis</i>				1 (part)	1
<i>Hesperotettix b. brevipennis</i>			1		
<i>Hesperotettix b. pratensis</i> ...					1 (part)
<i>Paratylotropidia beuten- muelleri</i>		1 (location provisional)			
<i>Melanoplus similis</i>		1			
<i>Melanoplus deceptus</i>		1			
<i>Melanoplus decorus</i>					1
<i>Melanoplus australis</i>					1
<i>Melanoplus attenuatus</i>				1	1
<i>Melanoplus hebarði</i>					1
<i>Melanoplus nubilis</i>				1	
<i>Melanoplus tribulus</i>			1		
<i>Melanoplus devius</i>		1	1		
<i>Melanoplus decoratus</i>		1	1		
<i>Melanoplus rotundipennis</i> ..					1
<i>Melanoplus stegocercus</i>					1
<i>Melanoplus mirus</i>				1	
<i>Melanoplus scapularis</i>					1
<i>Melanoplus strumosus</i>			1 (part)	1	1
<i>Melanoplus sylvestris</i>		1			
<i>Melanoplus carnegiei</i>		1	1	1 (part)	
<i>Melanoplus s. scudderi</i>			1	1	1 (part)
<i>Melanoplus walshii</i>		1	1 (part)		
<i>Melanoplus nigrescens</i>					1
<i>Melanoplus querneus</i>					1
<i>Melanoplus atlantis</i>	1	1	1	1	1 (part)
<i>Melanoplus f. femur-ru- brum</i>	1	1	1	1 (part)	
<i>Melanoplus f. propinquus</i> ..				1 (part)	1
<i>Melanoplus impudicus</i>			1	1	
<i>Melanoplus impiger</i>				1	
<i>Melanoplus confusus</i>			1	1	1 (part)
<i>Melanoplus l. luridus</i>		1	1 (part)		
<i>Melanoplus l. keeleri</i>			1 (part)	1	1
<i>Melanoplus femoratus</i>		1	1 (part)	1 (part)	
<i>Melanoplus furcatus</i>					1
<i>Melanoplus clypeatus</i>					1

	Boreal.	Transi- tion.	Upper Austral.	Lower Austral.	Sabalian.
<i>Melanoplus p. punctulatus</i>			1		
<i>Melanoplus p. arboreus</i>				1	1 (part)
<i>Paroxya a. atlantica</i>			1 (part)	1	1
<i>Paroxya clavuligera</i>			1	1	1
<i>Aptenopedes s. sphenari- oides</i>					1
<i>Aptenopedes aptera</i>					1

TETTIGONIIDÆ.

<i>Arethaea phalangium</i>				1 (part)	1
<i>Stilpnochlora marginella</i>					1
<i>Scudderia c. curvicauda-c. laticauda</i>			1		
<i>Scudderia c. laticauda</i>				1	1
<i>Scudderia texensis</i>			1	1	1
<i>Scudderia f. furcata</i>		1	1	1	1
<i>Scudderia cuneata</i>				1	1
<i>Symmetropleura modesta</i>				1	1
<i>Amblycorypha oblongifolia</i>			1		
<i>Amblycorypha f. floridana</i> ..					1
<i>Amblycorypha f. carinata</i>			1	1	
<i>Amblycorypha uhleri</i>			1	1	1
<i>Amblycorypha r. rotundi- folia</i>		1	1 (part)		
<i>Amblycorypha r. r.-r. par- vipennis</i>			1 (part)	—	1 (part)
<i>Microcentrum rhombifo- lium</i>			1	1	1
<i>Microcentrum retinerve</i>			1	1	1
<i>Pterophylla c. camellifolia</i> ..		1	1		
<i>Pterophylla c. intermedia</i>				1	?
<i>Belocephalus subapterus</i>					1
<i>Belocephalus davisii</i>					1
<i>Pyrgocorypha uncinata</i>				1	1
<i>Neoconocephalus exilis- canorus</i>			1		
<i>Neoconocephalus robustus crepitans</i>			1	1	1
<i>Neoconocephalus caudell- ianus</i>					1
<i>Neoconocephalus velox</i>					1
<i>Neoconocephalus retusus</i>			1	1	1
<i>Neoconocephalus triops</i>			1	1	1
<i>Homorocoryphus malivo- lans</i>				1 (part)	1
<i>Orchelimum agile</i>			1	1	1
<i>Orchelimum glaberrimum</i>				1	1
<i>Orchelimum vulgare</i>		1	1	1 (part)	
<i>Orchelimum laticauda</i>			1	1	1
<i>Orchelimum minor</i>			1	1	1
<i>Orchelimum concinnum</i>			1 (part)	1 (part)	1 (part)
<i>Orchelimum fidicinium</i>				1 (part)	1 (part)
<i>Orchelimum militare</i>				1	1
<i>Orchelimum bradleyi</i>					1
<i>Orchelimum superbum</i>				1 (part)	
<i>Conocephalus allardi</i>		1			
<i>Conocephalus f. fasciatus</i>	1	1	1	1	1
<i>Conocephalus brevipennis</i> ...		1	1	1	1
<i>Conocephalus nemoralis</i>			1		

	Boreal.	Transi- tion.	Upper Austral.	Lower Austral.	Sabalian.
<i>Conocephalus strictus</i>			1 (part)	1 (part)	
<i>Conocephalus stictomerus</i>			1 (part)	1 (part)	
<i>Conocephalus aigialus</i>				1 (part)	1 (part)
<i>Conocephalus nigropleu- roides</i>				1 (part)	1 (part)
<i>Conocephalus spartinae</i>				1 (part)	1 (part)
<i>Conocephalus saltans</i>			1	1	1 (part)
<i>Odontoxiphidium apterum</i> ..			1 (part)	1	1
<i>Atlanticus testaceus</i>		1 (not in region)	1 (part)		
<i>Atlanticus pachymerus</i>			1 (part)	1	
<i>Atlanticus davisii</i>		1 (part)	1 (part)		
<i>Atlanticus monticola</i>	1	1			
<i>Atlanticus americanus</i>		1	1	1 (part)	
<i>Atlanticus gibbosus</i>			1 (part)	1	1
<i>Atlanticus dorsalis</i>					1
<i>Atlanticus calcaratus</i>					1
<i>Camptonotus carolinensis</i> ...			1	1	1
<i>Hadenococcus puteanus</i>		1	1	1	1
<i>Ceuthophilus uhleri</i>		1	1		
<i>Ceuthophilus latibuli</i>					1
<i>Ceuthophilus gracilipes</i>		1	1		
<i>Ceuthophilus lapidicola</i>		1	1		
<i>Ceuthophilus latens</i>			1		
<i>Ceuthophilus sallei</i>					1
<i>Ceuthophilus spinosus</i>			1		
<i>Ceuthophilus neglectus</i>			1		

GRYLLIDÆ.

<i>Gryllotalpa hezadactyla</i>		1 (?)	1	1	1
<i>Scapteriscus vicinus</i>					1
<i>Scapteriscus acletus</i>					1
<i>Scapteriscus abbreviatus</i>					1
<i>Tridactylus apicalis</i>		1 (elsewhere)	1 (elsewhere)	1	1
<i>Ellipes minuta</i>		1	1	1	1
<i>Myrmecophila pergandei</i>		1	1	1	1
<i>Cryptoptilum antillarum</i>				1	1
<i>Cryptoptilum trigonipal- pum</i>				1	1
<i>Cycloptilum squamosum</i>			1	1	1
<i>Nemobius f. fasciatus</i>		1	1		
<i>Nemobius f. socius</i>				1	1
<i>Nemobius maculatus</i>		1	1		
<i>Nemobius griseus funeralis</i>				1	
<i>Nemobius ambitiosus</i>			1 (part)	1	1
<i>Nemobius bruneri</i>			1		
<i>Nemobius c. cubensis</i>			1		1
<i>Nemobius p. palustris</i>			1 (part)	1 (part)	1 (part)
<i>Nemobius p. aurantius</i>					1
<i>Nemobius c. carolinus</i>	1	1	1	1	1
<i>Nemobius confusus</i>			1		
<i>Anurogryllus muticus</i>			1		1
<i>Gryllus assimilis</i>		1	1	1	1
<i>Gryllus domesticus</i>			1	1	1
<i>Miogryllus verticalis</i>			1		1
<i>Oecanthus niveus</i>		1	1		
<i>Oecanthus exclamationis</i>			1		
<i>Oecanthus angustipennis</i>		1	1	1	1
<i>Oecanthus quadripunctatus</i> ..		1	1	1	1
<i>Oecanthus nigricornis</i>		1	1 (elsewhere)		

	Boreal.	Transi- tion.	Upper Austral.	Lower Austral.	Sabalian.
<i>Oecanthus pini</i>			1		
<i>Oecanthus latipennis</i>			1		
<i>Neoxabea bipunctata</i>			1	1	1 (part)
<i>Anaxipha exigua</i>			1	1	1
<i>Anaxipha pulicaria</i>			1	1	1
<i>Anaxipha vittata</i>				1	1
<i>Falcicula hebaridi</i>					1
<i>Cyrtoxipha columbiana</i>			1	1	1
<i>Phylloscyrtus pulchellus</i>			1	1	1
<i>Hapithus a. agitator</i>			1	1	1
<i>Hapithus a. quadratus</i>			1 (part)	1 (part)	
<i>Hapithus brevipennis</i>				1 (part)	1
<i>Orocharis saltator</i>					1
			1	1	1

Physiographic and Zonal Factors Compared.

When the physiographic and zonal correlations are contrasted, we find that in Virginia the two factors are largely governed by the same boundaries, the Lower Austral alone not extending up the valley of the Potomac as far as the fall-line, which is the Piedmont-Upper Coastal Plain line. In North Carolina, the increased temperature effect of lower latitudes is evident, as the upper line of the Lower Austral, after following the fall-line, crosses it and ascends to higher country, this tendency increasing in Georgia, where the upper boundary of the same zone is in places as high as a thousand feet above sea level. Conversely, this crossing of the physiographic boundaries by zonal boundaries is found to the northward of the area here treated, where the entire Coastal Plain section of New Jersey and all or at least the greater portion of the Coastal Plain eastern peninsula of Virginia, Maryland and Delaware, is Upper Austral. It has been found in the Middle Atlantic States that many Upper Austral species are limited to southern New Jersey, not occurring above the fall-line. This restriction is probably due to the fact that the southern portion of New Jersey has a more equable winter climate (and consequently a higher sum total annual temperature) than the Piedmont of Pennsylvania, an Upper Austral region. There is also in southern New Jersey an extension of certain elsewhere Lower Austral species, although in the great majority of the forms the region is clearly Carolinian. The control governing the distribution of these species is probably environment, as the sands and gravels of southern New Jersey are in general similar to those of the Coastal Plain to the south.

Origin of the Orthopterous Fauna of the Southeastern States.

We have made some tabulations bearing on the probable origin

of the Orthopterous fauna of the region studied. It is essential, however, for a proper understanding of the subject, to have similar data on the fauna of the Gulf Coast and Texas, in order to make definite or conclusive generalizations. The material from which such data can be obtained is now available, but it will be some years before our studies will permit us to make the desired tabulations. In consequence any expressions on the question of origin would be premature and certainly require amplification, if not revision, within a relatively short time, as the Gulf Coast can be expected to supply much of the really vital information on origin and dispersal. We propose, therefore, to discuss at a later date, as a whole, the information on this subject for the Southern States.

TETTIGONIIDÆ.

Arethæa phalangium Scudder.

Hebardville, Georgia, V, 15, 1915, (H.; undergrowth in pine woods), 1 juv. ♀.

This very scarce species is further represented in the series now under consideration by a single male from Augusta, Georgia, which specimen has recently been studied in a revisionary paper on the present genus.¹¹⁰

¹¹⁰ See Rehn and Hebard, *Trans. Am. Ent. Soc.*, XL, pp. 146, 147, 148, (1914).

Stilpnochlora marginella (Serville).

Sanford, Florida, XI, 28, 1911, (G. P. Englehardt), 1 ♀, [B. I.].

Fort Myers and Lake Worth, Florida, are the most northern localities previously recorded for this species.

SCUDDERIA Stål.

We have recently fully treated the material of this genus in the present collections.¹¹¹ The localities for the collections here being studied are as follows:

Scudderia curvicauda laticauda Brunner.

Typical material. Wilmington and Winter Park, North Carolina; Yemassee, South Carolina; Mixon's Hammock, Billy's Island, Albany and Spring Creek, Georgia, and Jacksonville and Atlantic Beach, Florida.

Material approaching *S. curvicauda* s.s. Petersburg and Orange, Virginia; Weldon, Charlotte and Fayetteville, North Carolina; Spartanburg and Columbia, South Carolina, and Jasper, Currahee Mountain, vicinity of Stone Mountain, Warm Springs and Macon, Georgia.

Scudderia texensis Saussure and Pictet.

Wrightsville and Winter Park, North Carolina; Yemassee, South Carolina; Tybee Island, Jesup, Billy's Island, Honey Island, Tifton, Albany and Bainbridge, Georgia, and Jacksonville, Atlantic Beach and Live Oak, Florida.

In addition we now have 1 juv. ♂, Manning, South Carolina, V, 28, 1914, (W. Stone), [A. N. S. P.].

Scudderia furcata furcata Brunner.

Washington, District of Columbia; Fayetteville, Wrightsville and Lake Waccamaw, North Carolina; Yemassee, South Carolina; Rome, Stone Mountain, Isle of Hope, Albany and Spring Creek; Georgia, and Jacksonville, Florida.

A female of this species from Highlands, North Carolina, is now before us, which specimen has been incorrectly recorded as *S. cuneata* by Sherman and Brimley.

Scudderia cuneata Morse.

Fayetteville, Lake Waccamaw and Wrightsville, North Carolina; Florence, South Carolina; Sandfly, Brunswick and Billy's Island, Georgia, and Jacksonville, Florida.

¹¹¹ *Trans. Am. Ent. Soc.*, XL, pp. 271-314, (1914).

Symmetropleura modesta Brunner.*North Carolina.*

State record, 1 ♂, [Hebard Cln.]
 Raleigh, VIII, 8, 1905, 1 ♀, [U. S.
 N. M.]

Georgia.

Billy's Island, VI, 1912, (J. C. Brad-
 ley), 1 ♂.
 Spring Creek, VI, 7-23, 1911, (J. C.
 Bradley), 2 ♂.

Florida.

Fernandina, (W. H. Finn), 1 ♂,
 [U. S. N. M.]
 Atlantic Beach, VIII, 25, 1911, (R.),
 2 ♀.
 Crescent City, VI, 1 ♂, [U. S. N. M.]
 Enterprise, V, 25, 1 ♂, [U. S. N. M.]

Quite decided size variation is shown by the material of this very scarce species now before us. The specimens from southeastern Georgia and northwestern Florida are exceptionally large, a condition which has been noted in material of numerous other species from that region.

The species was found in reeds in a marshy spot and was beaten from bayberry bushes, *Myrica cerifera*, at Atlantic Beach, while the specimen from Crescent City was found on orange trees.

The known distribution of the species is considerably extended by the above records.

AMBLYCORYPHA Stål.

The material of this genus found in the present collections has recently been fully studied by the authors.¹¹² The localities for the present collections are as follows:

Amblycorypha oblongifolia (De Geer).

Weldon, North Carolina.

Amblycorypha floridana floridana Rehn and Hebard.

Typical material. Jacksonville and Atlantic Beach, Florida.

Material intermediate between *floridana* s.s. and *floridana carinata*. Jacksonville, Florida; Billy's Island, Honey Island, Spring Creek and Isle of Hope, Georgia, and Yemassee and Ashley Junction, South Carolina.

The following specimens now before us probably represent the immature condition of such intermediates between the races of the present species:

Hebardville, Georgia, V, 15, 1915, (H.; undergrowth in pine woods), 1 juv. ♂.

Mixon's Hammock, Ga., V, 16, 1915, (H.; hammock undergrowth), 1 juv. ♀.

Amblycorypha floridana carinata Rehn and Hebard.

Petersburg, Virginia, and Silver Lake, Georgia.

¹¹² *Trans. Am. Ent. Soc.*, XL, pp. 315-340, (1914).

Amblycorypha uhleri Stål.

Fredericksburg, Virginia; Weldon, Goldsboro and Lake Waccamaw, North Carolina; Columbia and Yemassee, South Carolina; Currahee Mountain, Toccoa, Jasper, Buckhead, Stone Mountain, Augusta, Isle of Hope, Sandfly, Brunswick, Macon, Albany and Spring Creek, Georgia, and Jacksonville, Florida.

Amblycorypha rotundifolia rotundifolia (Scudder).

Typical material. Spartanburg, South Carolina, and Tuckoluge Creek in Rabun County, Toccoa and Currahee Mountain, Georgia.

In addition we now have 1 ♂, Black Mountain, North Carolina, VII, 1912, (W. Beutenmüller), [Davis Cln.].

Intermediates between *rotundifolia* s.s. and *rotundifolia parvipennis*. Winter Park, North Carolina, and Macon and Warm Springs, Georgia.

Microcentrum rhombifolium (Saussure).*Delaware.*

Delaware, 1 ♀, [A. N. S. P.].

Maryland.

Chestertown, VIII, 2-23, 1899-1909, (E. G. Vanatta), 6 ♂, 5 ♀, [A. N. S. P.].

Virginia.

Near Washington, D. C., IX, 2-X, 1, 1883, 1 ♂, 1 ♀, [Hebard Cln.].

South Carolina.

Florence, IX, 6, 1911, (R. & H.), 1 ♀.

Ashley Junction, VIII, 15, 1913, (R.), 1 ♂.

Georgia.

Austell, VIII, 27, 1910, 1 ♂, [Ga. State Cln.].

Isle of Hope, IX, 3, 1911, (R. & H.), 1 ♂, 1 ♀.

Cumberland Island, VIII, 31, 1911, (R. & H.), 1 ♂.

Spring Creek, (J. C. Bradley), 1 ♀, [Ga. State Cln.].

At Florence this insect was taken in an open area covered with grasses, while at Ashley Junction and Isle of Hope it was beaten from heavy undergrowth in pine woods, and secured in the same fashion from bayberry, *Myrica cerifera*, on Cumberland Island.

Microcentrum retinerve (Burmeister).*Maryland.*

Plummer's Island, VIII, 28 to X, 13, 1904 to 1906, (Caudell; McAtee; Fisher), 19 ♂, [U. S. N. M.].

Washington, District of Columbia, IX, 24 to XI, 3, 1906 and 1907, (A. N. Caudell), 3 ♂, [U. S. N. M.].

Virginia.

Near Washington, D. C., X, 13, 1883, 1 ♂, 1 ♀, [Hebard Cln.].

Georgia.

Thompson's Mills, X, 1910, (H. A. Allard), 1 ♂, [U. S. N. M.].

Bainbridge, (J. C. Bradley), 1 ♀, [Ga. State Cln.].

Pterophylla camellifolia camellifolia (Fabricius).

Cyrtophyllus perspicillatus of authors.

1906. *Cyrtophyllus elongatus* Caudell, Jour. N. Y. Ent. Soc., XIV, figs. 37, 40. [Crawford and Fountain Counties, Indiana.]

Maryland.

Chestertown, VIII, 24, (E. G. Van-atta), 1 ♀, [A. N. S. P.].
 Plummer's Island, VII, 16 to X, 1, 1905 to 1915, (Barber; Schwarz; Clemons; Fisher; McAtee), 9 ♂, 9 ♀, [U. S. N. M.].

District of Columbia.

Washington, IX, 15, 1909, (H. E. Ausherman), 1 ♂, [U. S. N. M.].
 Piney Branch, VIII, 15, 1905, (D. H. Clemons), 1 ♂, [U. S. N. M.].

*North Carolina.*¹¹³

Blowing Rock, 1902, (J. Willar), 1 ♀,

[A. N. S. P.]; VIII, 1907, (F. Sherman, Jr.), 1 ♀, [N. C. State Dept. Agr.].

Winston, VIII, 1906, (R. S. Wolgum), 1 ♀, [N. C. State Dept. Agr.].
 Alamance County, VII, 1905, (F. Sherman), 1 ♀, [N. C. State Dept. Agr.].

Georgia.

Mountain City, VIII, 19, 1913, (J. C. Bradley), 2 ♂.
 Thompson's Mills, (H. A. Allard), 1 ♂, [U. S. N. M.].

The name *Pterophylla* has been revived by W. F. Kirby,¹¹⁴ and an examination of the original place of publication of the name¹¹⁵ shows that it was proposed by W. Kirby for five species, one of which was *Locusta camellifolia* of Fabricius.¹¹⁶ W. F. Kirby has selected this species as the type of the genus.

The names *camellifolia* and *perspicillata*, one based on the female sex and the other on the male sex, were proposed by Fabricius on the same page, the former having line priority. In consequence it is necessary to use the name standing first.

Pterophylla camellifolia intermedia (Caudell).

Cyrtophyllus intermedius of Caudell.

Examination of the types and a single male before us from South Carolina leads us to believe that Caudell's *intermedius* is the southern race of *camellifolia*. The specimen from South Carolina is nearly intermediate in character between the two conditions, the ventral fork of the cercus not being as short, and the mesal production not as decided, as in the types of this race. In this specimen the tegmina are long and the enlargement of the distal portion of the subgenital plate is greater than in *camellifolia* s.s. (greatest width 2.6 mm.).

In the heavily forested areas bordering the rivers of the southeastern United States we have at night often heard a species of the present genus. The song was much quicker and sharper than that of the

¹¹³ Although all of the specimens from this State here recorded are females, we have before us previously recorded males from Raleigh, which show the material from this region, at least from above the fall line, to be typical *camellifolia*.

¹¹⁴ *Syn. Cat. Orth.*, II, p. 343, (1906).

¹¹⁵ Kirby and Spence, *Introd. Ent.*, II, p. 218, (1828).

¹¹⁶ *Syst. Ent.*, p. 283, (1775).

northern insect, and these individuals probably belonged to the present form.¹¹⁷

Belocephalus subapterus Scudder.

South Carolina.

Florence, IX, 6, 1911, (R. & H.), 1 ♂,
2 juv. ♂, 1 juv. ♀.
Ashley Junction, VIII, 15, 1913, (R.),
1 juv. ♀.
Yemassee, IX, 4, 1911, (R. & H.),
4 ♂, 2 juv. ♂, 7 juv. ♀.

Georgia.

Savannah, VIII, 14, 1903, (A. P. Morse), 1 juv. ♂.
Isle of Hope, IX, 3, 1911, (R. & H.),
2 ♂, 3 ♀, 1 juv. ♀.
Sandfly, IX, 3, 1911, (R. & H.), 2 ♂,
1 ♀, 2 juv. ♀.
Jesup, IX, 1, 1911, (R. & H.), 1 juv. ♂.
Brunswick, VIII, 30, 1911, (H.),
1 juv. ♂.
Cumberland Island, VIII, 31, 1911,
(R. & H.), 1 juv. ♂.
Billy's Island, IX, 1-5, 1913, (J. C. Bradley), 1 juv. ♂; XII, 23, 1913,
(J. C. Bradley), 8 ♂.

Homerville, VIII, 27, 1911, (R. & H.),
1 juv. ♀.
Thomasville, XII, 18, 1908, (H.), 2 ♂.

Florida.

Jacksonville, VIII, 25, 1911, (R. & H.),
1 juv. ♀; XI, 6, 1911, (G. P. Englehardt), 1 ♀, [B. I].
Atlantic Beach, VIII, 24, 1911, (R. & H.), 2 ♂, 2 ♀, 2 juv. ♂, 1 juv. ♀.
Hastings, (A. J. Brown), 3 ♂, 3 ♀,
1 juv. ♂, 1 juv. ♀.
Williston, I, 9, 1893, (M. H. Barton),
1 ♂, [U. S. N. M.].
Sanford, X, 24, 1889, (W. A. Gould),
1 ♀, [U. S. N. M.].
Orlando, (A. Haden), 1 ♀, [Hebard Cln.].
Fort Drum, 1 ♀, [Hebard Cln.].
Live Oak, VIII, 26, 1911, (H.), 1 ♀.
Tallahassee, VIII, 8, 1903, (A. P. Morse), 1 juv. ♂.

Measurements (in millimeters) of extremes.

	Length of body.	Production of vertex beyond eye.	Ventral length of fastigium of vertex.	Length of pronotum.	Length of caudal femur.
♂					
Florence, S. C.	25.3	2.9	1.9	6.9	14.7
Yemassee, S. C.	24.6-26.3	2.7-2.8	1.7-2	6.5-6.9	13.3-14.3
Sandfly, Ga.	27.4-29.7	3 -3.2	2.4-2.2	7-7.2	15-15.1
Billy's Island, Ga.	23.8-27.3	2.5-3	1.7-2.1	6.2-7.7	13.1-15.8
Thomasville, Ga.	24.5-24.7	2.4-2.6	1.6	6.3-7.3	13.5-15.1
Atlantic Beach, Fla.	32.3-36.1	3.3-4	2.3-3.2	7.8-8.3	16.1-18.8
♀					
Live Oak, Fla.	37.3	4	3.1	8.7	18.8

These measurements show that scarcely any size variation may be correlated with the northern and southern distribution of this insect. Material from the region about Jacksonville (including Atlantic Beach and Pablo Beach) is the largest we have ever seen; this has been found to be true in the case of a number of other species and is apparently due to environmental conditions. The series from the not distant Billy's Island in the Okefenokee Swamp

¹¹⁷ Caudell records a specimen of what he considered *elongatus*, which we find to be a synonym of *camellifolia*, as taken when stridulating "a higher quicker note." The unquestionable status and full distribution of *intermedia* will only be known when much larger collections of these insects have been made.

averages the smallest of any before us, the average being nearer the minimum measurements given above.

The material before us shows the vertex to be variable in the present insect, both in degree of production and shape. The vertex ranges from a produced form in which the apical spine is long and nearly straight, to one in which the vertex is decidedly less produced with the apical spine short and strongly uncinatè. The former type is most decided in material before us from Live Oak and the region about Jacksonville, while the specimens from Thomasville represent the most decided development of the latter type.

The majority of specimens before us are, apparently irrespective of sex, of the green color phase. In the brown color phase the latero-dorsal lines of the pronotum are more pronounced.

The present species is one of the latest to appear; in southern Georgia adults are present in the greatest numbers probably early in December, at which time the first killing frosts usually occur. Davis has found the closely related *B. rehni* apparently hibernating in winter in northeastern peninsular Florida.

The above records considerably extend the known range of the species both northward and southward. The material before us was taken in an open spot in the pine woods covered with high grass (Florence), in wet spot in pine woods (Ashley Junction), in gray-bark pine woods in heavy undergrowth of green plants and vines (Isle of Hope and Sandfly), on a young cabbage palmetto (Thomasville), in a palmetto "hammock," in a tangle of raspberry and grape vines and other plants (Atlantic Beach), in a small clump of ground oak on the side of a sink hole (Live Oak) and on pineapple (Orlando).

Belocephalus davisi new species.

The present species, which we take pleasure in naming after the devoted student of this genus, Mr. William T. Davis, is related more closely to *B. sabalis* and *B. sleighti* than to the other species of the genus. It is a large insect, nearly as robust as the two species mentioned above, but agrees with the otherwise very different *B. subapterus* in having similar black markings on head, antennæ and pronotum.

Nearest affinity to *sabalis* and *sleighti* is shown by the supranal plate, which in these species only is very deeply emarginate mesad. This deep emargination is usually constant in form and distinctive in these species; in *sabalis* it has the sides straight with angle acute, the lateral productions formed by this emargination have evenly converging sides with acute apex situated mesad;

in *sleighti* this emargination is extremely deep and has the sides concave with angle not acute, but rather narrowly rounded, the lateral productions thus formed have sharply acute apices, which, however, are situated on their outer margins, due to the convexity of their inner margins; in *davisi* the emargination is not quite as deep as in *sleighti*, with the sides convex and angle very broadly rounded, the lateral productions formed by this emargination have evenly converging sides with blunt and sharply rounded apex situated mesad. The supra-anal plate in the other species of the genus, with distal margin very broadly and shallowly concave, is very distinct.

TYPE: ♂; Billy's Island, Okeefenokee Swamp, Georgia. September 1-5, 1913. (J. C. Bradley.) [Hebard Collection, Type No. 156.]

Description of Type.—Size large for the genus, form robust, but not as decidedly robust as in *sabalis* and *sleighti*. Head in form much as in those species, but with ventral portion not as broad; not immaculate as in those species, but agreeing with the other species of the genus in having the ventral margin of the face above the clypeus broadly banded with black, and with the base of the antennæ margined ventrad, and the dorsal surface of the fastigium of the vertex lined laterad, with the same color. Antennæ with proximal joints marked with black, these markings becoming fainter distad and disappearing at the end of the proximal third. Pronotum with dorsum more constricted than in *sabalis* and *sleighti* and striped latero-dorsad with black. Tegmina as in those species. Supra-anal plate deeply emarginate mesad with sides convex and angle broadly rounded, the lateral productions formed by this emargination having evenly converging sides, but with apex blunt and sharply rounded. Cerci and subgenital plate as in *sabalis* and *sleighti*, limbs and armament of the same similar, but decidedly less robust; unlike in those species the limbs are marked with fine black punctæ on the more exposed surfaces.

Allotype: ♀; Same data as the type, but taken on December 28, 1913. [Hebard Collection.]

Description of Allotype.—Size somewhat larger than type, form similar. Head broader, more inflated than in females of *subapterus*; antennæ similar. Pronotum more inflated than in type, but, as in the other species of the genus, the latero-dorsal stripes are in this sex no further separated caudad than cephalad. Tegmina very small and pad-like and wings not visible, as in females of the other species of the genus. Supra-anal plate triangularly produced with sides concave and apex acute. Ovipositor slightly shorter than

caudal femur, heavy proximad and tapering gently, and with a very weak dorsad curvature, to the sharp, unarmed apex. Subgenital plate large, lateral margins produced in long, slender spines which are subparallel and lie along the shaft of the ovipositor. General color brown with black markings as in the type.

Ten paratypic males bearing the same data as the type are before us.

Measurements (in millimeters).

	TYPE. ♂	Paratypic ♂♂	Allotype. ♀
Length of body.....	34.3	32.9-40.3	36
Length of vertex.....	3.8	3.7- 4.5	4.1
Vertex from tooth to apex.....	2.6	2.6- 3.6	3.4
Length of pronotum.....	8.3	7.9- 8.9	8.1
Length of tegmen.....	6	5.6- 7.1	2.3
Length of caudal femur.....	16.4	16.7-18.8	18.4
Length of ovipositor.....			19.2

As in the other species of the genus of which we have a number of specimens, a considerable amount of size variation is present in this insect. There is also a decided amount of variation in the shape of the supra-anal plate in the above examples, though material of *sleighti* and *sabalis* is constant in this respect, and, although in none of the paratypes is the median emargination as deep as in *sleighti*, the form of this emargination, and of the lateral productions thus formed, is in one of the paratypes similar to the type found in that species, and in several others is intermediate in character.

Four male paratypes and the female allotype are of the brown color phase, the other six specimens, male type and paratypes, are green.

The males were taken at night by Dr. Bradley, when they were found in numbers stridulating in the undergrowth of the pine woods.

In addition to this material we have before us a dried alcoholic pair taken by R. A. Mills at Chuluota, Florida, and now in the United States National Museum.

Pyrgocorypha uncinata (Harris).

Arkansas.

Hot Springs, IV, 1906, (C. S. Hebard),
1 ♂, [Hebard Cln.].

Georgia.

Thompson's Mills, IX, 1909, (H. A.
Allard), 1 ♀, [U. S. N. M.].
Bainbridge, (J. C. Bradley), 1 ♀.

The specimen from Hot Springs was taken in a hotel where it had been attracted by the lights at night, with it several examples of *Neoconocephalus triops (mexicanus)* of most authors) were taken.

NEOCONOCEPHALUS Karny.

The authors have recently studied the species of this genus found in North America north of the Mexican boundary.¹¹⁸ The material from the region at present under consideration is there treated in full. We give below the localities for this material.

Neoconocephalus exiliscanorus (Davis).

Washington, District of Columbia, and Rosslyn and Clarendon, Virginia.

The species has also been recorded in the region under consideration from Raleigh, North Carolina, and Thompsons Mills, Georgia.

Neoconocephalus melanorhinus (Rehn and Hebard).

Ocean City, Maryland.

Neoconocephalus robustus crepitans (Scudder).

Chesapeake Beach, Somerset Heights, Plummer's Island, Maryland; Washington, District of Columbia; Herndon, Clarendon, Oceanview and Virginia Beach, Virginia; Tarboro, Raleigh, Salisbury, Southern Pines and Wrightsville, North Carolina; Columbia and Denmark, South Carolina; Atlanta, Augusta, Tybee Island and Albany, Georgia, and Atlantic Beach and Hastings, Florida.

Neoconocephalus caudellianus (Davis).

Yemassee, South Carolina, and Billy's Island, Georgia.

Neoconocephalus velox Rehn and Hebard.

Billy's Island, Georgia.

Neoconocephalus retusus (Scudder).

Laurel and Plummer's Island, Maryland; Washington and Anolostan Island, District of Columbia; Rosslyn, Falls Church and Roanoke, Virginia; Fayetteville, Wrightsville and Winter Park, North Carolina; Florence, South Carolina; Atlanta, Albany, Bainbridge and Fargo, Georgia, and South Jacksonville and Daytona, Florida.

Neoconocephalus triops (Linnæus).

Conocephalus mexicanus and *fusco-striatus* of recent authors.

Washington, District of Columbia; Hampton and Virginia Beach, Virginia; Fayetteville, North Carolina; Florence and Yemassee, South Carolina; Atlanta, Jesup, St. Simon's Island, Cumberland Island, Billy's Island, Thomasville and Bainbridge, Georgia, and Jacksonville, Hastings and Daytona, Florida.

¹¹⁸ *Trans. Am. Ent. Soc.*, XL, pp. 365-413, (1915).

Homorocoryphus malivolans (Seudder).

Tappahannock, Virginia, VII, 13 to VIII, 18, 1915, (H. Fox), 29 ♂, 12 ♀, [Fox Cln.] Wilmington, North Carolina, VIII, 1, (G. P. Englehardt), 1 ♀,¹¹⁹ [U. S. N. M.].

From the area covered by the present paper, the species has previously been recorded only from the single specimen from Wilmington, North Carolina. It, however, probably occurs in the tidal marshes of the Atlantic coast, from southern Florida northward as far as the Virginia locality given above.

This interesting species was found by Dr. Fox quite frequent in the dense growth of tall reeds, *Spartina cynosuroides*, in a tidal marsh.

ORCHELIMUM Serville.

The material of this genus in the collections before us has recently been fully treated by the present authors.¹²⁰ The localities from the collections here being studied are as follows:

Orchelimum agile (DeGeer).

Chestertown, Cedar Point and Hyattsville, Maryland; Washington, D. C.; Rosslyn, Addison, Appomattox and Virginia Beach, Virginia; Hamlet, Wilmington, Winter Park, Wrightsville and Lake Waccamaw, North Carolina; Yemassee, South Carolina; Thompson's Mills, Stone Mountain, Savannah, Jesup, Tybee Island, Cumberland Island, Hebardville and Albany, Georgia, and Jacksonville, South Jacksonville, Ortega, Atlantic Beach, Pablo Beach, Live Oak, Carrabelle, Marianna, Quincy, Hastings and Sanford, Florida.

Orchelimum glaberrimum (Burmeister).

Virginia Beach and Cape Henry, Virginia; Raleigh, Goldsboro, Fayetteville, Smithville, Wilmington, Wrightsville and Lake Waccamaw, North Carolina; Florence, Ashley Junction and Yemassee, South Carolina; Macon, Savannah, Tybee Island, Groveland, Jesup, Billy's Island, Homerville and Albany, Georgia, and South Jacksonville, Atlantic Beach, Pablo Beach, Hastings and La Grange, Florida.

Orchelimum vulgare Harris.

Chestertown, Maryland; Washington, D. C.; Falls Church, Dryden, Norfolk and Wytheville, Virginia; Edenton, Raleigh, Blowing Rock, Blantyre and Linville, North Carolina, and Thompson's Mills, Georgia.

¹¹⁹ This specimen has been previously recorded, as the synonymous *hoplomachus* Rehn and Hebard, by Sherman and Brimley.

¹²⁰ *Trans. Am. Ent. Soc.*, XLI, pp. 11-83, (1915).

Orchelimum laticauda Redtenbacher.

Tolchester, Hyattsville, Plummer's Island and Montgomery County, Maryland; Washington and Anolostan Island, D. C.; Rosslyn and Fredericksburg, Virginia; Weldon, Newbern and Lake Waccamaw, North Carolina; Florence, South Carolina; Thompson's Mills, Jesup and Billy's Island, Georgia, and Jacksonville, South Jacksonville, Ortega, Atlantic Beach and Sanford, Florida.

Orchelimum minor Bruner.

Maryland opposite Plummer's Island; District of Columbia; Raleigh and Sulphur Springs, North Carolina, and Thompson's Mills, Hoschton and Thomasville, Georgia.

Orchelimum concinnum Scudder.

Chestertown, Maryland; Oceanview and Virginia Beach, Virginia; Wrightsville and Smith Island, North Carolina; Tybee Island, Georgia, and Warrington and Fort Barrancas, Florida.

Orchelimum fidicinium Rehn and Hebard.

Oceanview, Virginia; Wrightsville, North Carolina; coast of South Carolina; Savannah, Tybee Island and Cumberland Island, Georgia.

Orchelimum militare Rehn and Hebard.

Winter Park and Lake Waccamaw, North Carolina; Florence, South Carolina; Jesup, Waycross, Jordan's on Billy's Island, Homer-ville, Tifton and Bainbridge, Georgia, and Jacksonville, Atlantic Beach and Hastings, Florida.

Orchelimum bradleyi Rehn and Hebard.

Wilmington, North Carolina; Chase Prairie in Okefenokee Swamp, Georgia, and Jacksonville and Tallahassee, Florida.

Orchelimum superbum Rehn and Hebard.

Tappahannock, Essex County, Virginia, VII, 27 to 28, 1915, (H. Fox, in tidal marsh on *Scirpus americanus*), 4 ♂, [U. S. N. M.; A. N. S. P. and Fox Cln.].

Dr. Fox has kindly permitted us to include this record in the present paper. The species was previously known only from southern New Jersey. Two of the specimens have the outer genicular lobe of the caudal femora bispinose.

CONOCEPHALUS Thunberg.

The American material of this genus in the collections before us has also recently been fully treated by the present authors.¹²¹ The

¹²¹ *Trans. Am. Ent. Soc.*, XLI, pp. 155-224, (1915); *ibid.*, pp. 225-290.

localities represented in the collections here being considered, are as follows:

Conocephalus allardi (Caudell).

Wytheville, Virginia, and Rabun County, Georgia.

Conocephalus fasciatus fasciatus (De Geer).

Chestertown and Island Creek, Maryland; Washington, D. C.; Fredericksburg, Norfolk, Virginia Beach, Hickory, Appomattox and Wytheville, Virginia; Eure, Selma, Winter Park, Lake Waccamaw, Greensboro, Salisbury, Roan Mountain, Linville, Morganton, Balsam, Governors Island and Topton, North Carolina; Denmark and Yemassee, South Carolina; Trenton, Marietta, Atlanta, Augusta, Savannah, Tybee Island, Isle of Hope, Jesup, St. Simon's Island, Brunswick, Cumberland Island, Waycross, Billy's Island, Macon, Westpoint, Columbus, Albany and Bainbridge, Georgia, and Jacksonville, South Jacksonville, Atlantic Beach, Pablo Beach, Live Oak, Tallahassee, Marianna and Cedar Keys, Florida.

In addition we have before us 1 ♀, Daytona, Fla. XI, 11, 1911, (G. P. Englehardt), [Bklyn. Inst. A. & S.].

Conocephalus brevipennis (Scudder).

Plummer's Island, Cabin John and Marshall Hall, Maryland; Washington and Anolostan Island, D. C.; Rosslyn, Falls Church, Appomattox, Wytheville, Cape Henry, Norfolk and Virginia Beach, Virginia; Fayetteville, Roan Mountain, Linville, Saluda, Governors Island, Wilmington and Lake Waccamaw, North Carolina; Spartanburg, Florence and Yemassee, South Carolina; Atlanta, Savannah, Sandfly, Billy's Island and Homerville, Georgia, and South Jacksonville and Atlantic Beach, Florida.

Conocephalus nemoralis (Scudder).¹²²

Sharpsburg and Plummer's Island, Maryland; Washington, D. C., and Luray, Virginia.

Conocephalus strictus (Scudder).

Washington, D. C.; Arlington, Falls Church, Norfolk, Virginia Beach and Appomattox, Virginia, and Newbern, North Carolina.

Conocephalus stictomerus Rehn and Hebard.

Chestertown, Maryland; Churchland, Virginia, and Raleigh, North Carolina.

¹²² A specimen from Bogotá, Colombia, recently recorded as this species by Bruner (*Ann. Carneg. Mus.*, IX, p. 375, (1915)) is certainly not this form or is erroneously labelled.

Conocephalus aigialis Rehn and Hebard.

Cape Henry and Oceanview, Virginia; Wrightsville, North Carolina; Tybee Island, Georgia, and Jacksonville, South Jacksonville and Pablo Beach, Florida.

Conocephalus nigropleuroides (Fox).

Oceanview, Virginia; Wrightsville, North Carolina; Cumberland Island, Georgia, and Cedar Keys, Florida.

Conocephalus spartinæ (Fox).

Oceanview and Virginia Beach, Virginia; Wrightsville, North Carolina, and Tybee Island, Georgia.

Conocephalus saltans (Seudder).

Somerset Heights and Cabin John Run, Maryland; Washington, D. C.; Fayetteville, Wilmington, Winter Park, Wrightsville and Lake Waccamaw, North Carolina; Florence and Yemassee, South Carolina; Atlanta, Stone Mountain and Spring Creek in Decatur County, Georgia.

Odontoxiphidium apterum (Morse).*North Carolina.*

Fayetteville, IX, 9, 1911, (H.), 1 ♂.
Winter Park, IX, 7, 1911, (R. & H.),
6 ♂.

South Carolina.

Florence, IX, 6, 1911, (H.), 2 ♂.
Ashley Junction, VIII, 15, 1913, (R.),
8 ♂, 4 ♀, 2 juv. ♀.
Denmark, VIII, 15, 1903, (A. P. Morse),
6 ♂, 8 ♀.
Yemassee, IX, 4, 1911, (R. & H.),
13 ♂, 6 ♀, 1 juv. ♀.

Georgia.

Blue Ridge, VII, 25, 1903, (A. P. Morse),
1 juv. ♀.
Dalton, VIII, 7, 1913, (R.), 1 ♀.
Sand Mountain, VIII, 25, 1903,
(A. P. Morse), 3 ♂, 1 juv. ♀.
Toccoa, VIII, 5, 1913, (H.), 1 ♀.
Currahee Mountain, VIII, 5, 1913,
(H.), 7 ♂, 1 ♀, 3 juv. ♀.
Stone Mountain, VIII, 3, 1913, (H.),
1 ♂.
Vicinity of Stone Mountain, VIII, 3,
1913, (H.), 1 ♀.
Warm Springs, VIII, 9-10, 1913, (R.),
5 ♀, 1 juv. ♂, 2 juv. ♀.
Macon, VII, 30-31, 1913, (R. & H.),
9 ♂, 4 ♀, 1 juv. ♂, 3 juv. ♀.
Tifton, IX, 8, 1910, (J. C. Bradley),
4 ♂.
Albany, VIII, 1, 1913, (R. & H.), 10 ♂,
6 ♀, 6 juv. ♀.

Bainbridge, IX, 3-7, 1910, (J. C. Bradley), 1 ♂.

Spring Creek, VII-VIII, 1912-13,
(J. C. Bradley), 3 ♂, 1 juv. ♀.

Augusta, VII, 29, 1913, (R. & H.),
2 ♂, 1 ♀, 4 juv. ♀.

Savannah, VIII, 14, 1903, (A. P. Morse),
5 ♂.

Sandfly, IX, 3, 1911, (R. & H.), 10 ♂,
5 ♀.

Isle of Hope, IX, 3, 1911, (R. & H.),
21 ♂, 16 ♀.

Groveland, VII, 28, 1913, (J. C. Bradley), 1 ♂.

Jesup, IX, 1, 1911, (R. & H.), 7 ♂,
2 ♀.

Brunswick, VIII, 30, 1911, (H.), 10 ♂,
4 ♀.

St. Simon's Island, VIII, 30, 1911,
(R. & H.), 1 ♀.

Cumberland Island, VIII, 31, 1911,
(R. & H.), 3 ♂, 3 ♀.

Waycross, VIII, 11, 1903, (A. P. Morse),
2 ♂, 2 juv. ♀.

Hebardville, V, 15, 1915, (H.), 1 juv. ♂.

Suwannee Creek, VIII, 28, 1911, (R. & H.), 3 ♂, 4 ♀.

Billy's Island, V, 16, 1915, (H.),
1 juv. ♀; VI, VII, IX, 1912, (J. C. Bradley), 15 ♂, 3 ♀.

Honey Island, VI, 1, 1912, (J. C. Bradley), 1 adult.

Homerville, VIII, 27, 1911, (R. & H.),
4 ♂, 6 ♀, 2 juv. ♀.

Florida.

Jacksonville, VIII, 25, 1911, (R. & H.),
 11 ♂, 20 ♀, 5 ♀ n.; XI, 3, 1911,
 (W. T. Davis), 2 ♂, 1 ♀.
 South Jacksonville, IX, 7, 28, 1911,
 (W. T. Davis), 5 ♂, 4 ♀.

Atlantic Beach, VIII, 24-25, 1911,
 (R. & H.), 10 ♂, 9 ♀.
 Pablo Beach, IX, 5, 1913, (W. T.
 Davis), 1 ♂, 1 ♀.
 Live Oak, VIII, 10, 1903, (A. P. Morse),
 5 ♂, 6 ♀; VIII, 26, 1911, (R. & H.),
 12 ♂, 7 ♀, 1 juv. ♀.

The material from the region about Jacksonville averages the largest of any recorded above; there appears, however, to be little size variation correlated with northern and southern distribution in the present large series, and the specimens taken at Jacksonville in November are as small as any examples we have seen. These latter specimens, when compared with the largest from that locality, give the following extremes of measurement: length of body, ♂ 9.9-14.3, ♀ 12-16.3; length of ovipositor, 11.2-15.4 mm.

The stridulation of this curious species is a very faint and intermittent zip-zip-zee-zee-zee zip-zee-zee, etc. The males when stridulating often climb high up in the undergrowth; we have frequently found them three or four feet from the ground.

Throughout the low country of the Carolinas, Georgia and Florida, this is one of the most ubiquitous species in the undergrowth of the pine woods and also on palmetto flats. At a number of localities the insects were found particularly numerous about oak shoots in such situations. In the high country of Georgia the species was found scarce in level woods (Dalton), everywhere abundant in luxuriant mountain vegetation of grasses, vines and oak sprouts under a forest predominantly black-jack oak (Currahee Mountain), in a patch of mint in a bunch-grass area under pines (on Stone Mountain) and among oak shoots in undergrowth of mixed forest (Toccoa, vicinity of Stone Mountain, Warm Springs).

ATLANTICUS Scudder.

The species of this genus have recently been studied by the authors.¹²³ A full treatment of the material from the region under consideration is there presented. We here give the localities of the material before us belonging to the eight species found in the area at present treated.

Atlantius testaceus (Scudder).

A. pachymerus of most authors.

Plummer's Island, Cabin John Run and Glen Echo, Maryland;
 Washington, D. C.; Arlington, Virginia.

¹²³ *Trans. Am. Ent. Soc.*, XLII, pp. 33-100, (1916).

Atlanticus pachymerus (Burmeister).

Greensboro, Raleigh, Goldsboro; Lake Ellis (Havelock) and Southern Pines, North Carolina.

Atlanticus davisii Rehn and Hebard.

Meadow Mountain at 3,000 feet elevation, Conowingo, Laurel, Beltsville and Glendale, Maryland; Rock Creek, D. C.; Arlington, Fairfax County, Great Falls, Falls Church, Green Dell Farm two miles west of Pohick in Fairfax County, Orkney Springs, Stony Man Mountain, Orange, Hot Springs and Addison, Virginia.

Atlanticus monticola Davis.

Washington County, Virginia; Linville, Black Mountains, Valley of Black Mountains, Jones' Knob, Balsam Mountains and Lake Toxaway, North Carolina; Pinnacle Peak and Clayton, Georgia.

Atlanticus americanus (Saussure).

A. dorsalis of most authors.

Cabin John Run and Plummer's Island, Maryland; Washington, D. C.; Arlington, Clarendon, Falls Church, Seven Mile Ford, Orange and Roanoke, Virginia; Greensboro, Sulphur Springs, Waynesville, Lake Toxaway, Topton, Andrews and Murphy, North Carolina; Clayton, Tuckoluge Creek, Rabun Bald, top of Pinnacle Peak, Tallulah Falls, Sand Mountain, Jasper and Lost Mountain, Georgia.

Atlanticus gibbosus Scudder.

Florence and Magnolia, South Carolina; Currahee Mountain, Warm Springs, Sandfly, Billy's Island and Spring Creek, Georgia; Crestview, Lake City, Jacksonville, Atlantic Beach, Pablo Beach and Hastings, Florida.

Atlanticus dorsalis (Burmeister).

Billy's Island and Thomasville, Georgia; Jacksonville, Florida.

Atlanticus calcaratus Rehn and Hebard.

Billy's Island, Georgia, and Hastings, Florida.

Camptonotus carolinensis (Gerstaecker).*Delaware.*

Dover, (Miss Lillian Hall), 1 ♀,
[A. N. S. P.].

Virginia.

Near Washington, D. C., X, 13, 1883,
1 ♀, [Hebard Cln.].
Orange, VII, 21, 1913, (R. & H.;
beaten from low herbage), 4 juv. ♂.

North Carolina.

Charlotte, VII, 27, 1913, (R. & H.;

beaten from wild grape vines on
ground in short-leaf pine woods),
1 juv. ♂.

Georgia.

Thompson's Mills, X, 1909, (H. A.
Allard), 1 ♂, [Hebard Cln.].
Spring Creek, VI, 7-23, 1911, (J. C.
Bradley), 1 juv. ♀.

Florida.

St. Augustine, (C. W. Johnson), 1 ♂,
[A. N. S. P.].

Two consecutive instars are represented in the four immature males from Orange, both earlier than that exemplified by the Charlotte specimen, which is in the instar preceding maturity. The records from Spring Creek and St. Augustine are the most southern known for the species in the Atlantic coast States.

Hadencœus puteanus Scudder.

North Carolina.

Sunburst, late May, 1912, (C. S. Brimley), 2 juv. ♀, [Brimley Cln.].

Georgia.

Rabun County, VII, 1910, (W. T. Davis), 2 juv. ♂, 2 juv. ♀.

Thompson's Mills, X, 1909, (H. A. Allard), 2 ♂, 6 ♀, 3 juv., [U. S. N. M. and Hebard Cln.].
Billy's Island, IX, 1-5, 1913, (J. C. Bradley), 2 ♂, [Cornell Univ.].

The immature females show that the dentations of the internal valves of the ovipositor are not appreciably indicated until the adult condition is reached. We have had before us for comparison a cotype from North Carolina, received from Scudder by Bruner, in whose series it was.

The above Georgia localities in a measure connect up the two previously known records of the species from the southern States, *i.e.*, North Carolina and Monticello, Mississippi.

Ceuthophilus uhleri Scudder.

Maryland.

Cabin John Run, IX, 1911, (W. T. Davis; trapped in molasses jar), 14 ♂, 34 ♀.

Georgia.

Rabun County, VII, 1910, (W. T. Davis), 3 ♂, 3 ♀.

Clayton, VIII, 18, 1 juv. ♀, [Ga. State Cln.].
Pinnacle Peak, VIII, 20, 1913, (J. C. Bradley), 1 juv. ♂.

We have examined authentic material of this species and of *C. blatchleyi* Scudder and, apparently, the supposed differential features are too variable for reliance. However, we do not care to synonymize the latter name, as our material is not sufficiently conclusive to warrant such action at this time.

This species varies greatly in size in both sexes, the extremes (in millimeters) of undoubtedly adult material of both sexes from Cabin John Run being:

	♂	♂	♀	♀
Length of pronotum.....	4.8	6	5	5.3
Length of cephalic femur.....	6.5	8	6.5	7
Length of caudal femur.....	14.3	18	14	14.5
Length of caudal tibia.....	15.3	19.9	15.6	16.2
Length of ovipositor.....			8.9	9.9

The surface of the body is never polished in the male, always being dull and at times almost velvety in appearance. In the female sex this condition is present, but not as a rule, the majority of the individuals of that sex having the surface weakly polished. The males show a very appreciable amount of individual variation in the lamellate development of the ventro-external margin of the caudal femora, as well as in the number, disposition and size of the spines on the same margin.

The species is known to range from the vicinity of the city of New York to northeastern Georgia; in addition to these given above, the only definite record of its occurrence in the southeastern States is that from Raleigh, North Carolina (Brimley).

***Ceuthophilus latibuli* Scudder.**

1905. *Ceuthophilus virgatipes* Rehn and Hebard, Proc. Acad. Nat. Sci. Phila., 1904, p. 798. [Thomasville, Georgia.]

Bainbridge, Georgia, VII, 15-27, 1909, (J. C. Bradley), 1 ♂.

Clearwater, Florida, VI, 27, 1 juv. ♀, [Cornell Univ.]

Jupiter, Fla., V, 2, 1903, (D. M. Castle), 1 ♂, 10 juv. ♂, 1 juv. ♀, [A. N. S. P.]

The species *virgatipes*, when described, was compared with *secretus* and *varicator*, with which it has, however, no relationship. This erroneous comparison was due to Scudder's key, which ran adults to the vicinity of the above-mentioned species, while *latibuli* was placed by him in another section, in which authentic material examined by him at that time, and now before us, would not fall. The type (male) of *virgatipes* is in the instar preceding maturity, but the allotype (female) is fully adult. It is evident that the full development of the caudal spurs and calcaria is not acquired until the adult condition is reached, these being relatively shorter in the nearly adult specimens than in the mature individuals. There is also some individual variation in the length and development of the spurs and in the length of the different calcaria. The more subdued general coloration of the *virgatipes* material is in part due to discoloration. The color pattern is seen to vary greatly in intensity and consequently in the relative extent of the pale and dark areas.

The species has been reported from "gopher" holes at Crescent City and Enterprise, Florida, and from "Georgia," in addition to the localities mentioned above.

***Ceuthophilus gracilipes* (Haldeman).**

1894. *Ceuthophilus grandis* Scudder, Proc. Amer. Acad. Arts and Sci., XXX, pp. 24, 38. [Chattanooga, Tennessee.]

1894. *Ceuthophilus heros* Scudder, *ibid.*, pp. 26, 54. [North Carolina.]

Maryland.

Garrett County, last week of July,
(W. Stone), 2 ♀, [A. N. S. P.].

Cabin John Run, IX, 1911, (W. T.
Davis; trapped in molasses jar),
7 ♂, 9 ♀, 3 juv. ♂.

District of Columbia, VI, 1910, (W. T.
Davis; trapped in molasses jar),
1 juv. ♂, 1 juv. ♀.

Virginia.

Alexandria County, VI, 1910, (W. T.

Davis; trapped in molasses jar),
11 juv. ♂, 6 juv. ♀.

North Carolina.

Black Mountain, IX, -6, 1 ♂, [B. I.].

Georgia.

Rabun County, VII, 1910, (W. T.
Davis), 2 ♂, 4 juv. ♀.

Wilson Gap, Rabun County, VIII,
22, 1913, (J. C. Bradley), 3 ♂, 7 ♀.

Clayton, 2,000-3,000 feet, VI, 1909,
(W. T. Davis), 1 juv. ♀.

We have carefully studied the original descriptions of the two species here synonymized, and we are unable to separate them from typical *gracilipes* by the presence of any invariable character or characters. We have also had before us a paratype of *heros*, labelled as such in Scudder's handwriting.

The species *gracilipes* is a very variable one in certain features, *i.e.*, size, relative elongation and depth of the caudal femora and spination of the same, character of the caudal tibiae and coloration. The size variation, as seems to be the rule in the genus, is very considerable, the extremes (in millimeters) of adults of both sexes from Cabin John Run being:

	♂	♂	♀	♀
Length of pronotum.....	5.1	6.7	6.2	7.2
Length of cephalic femur.....	8.6	11.9	10	11.1
Length of caudal femur.....	17.9	24.2	19.8	22.8
Greatest depth of caudal femur.....	4.4	6.4	5	5.6
Length of caudal tibia.....	20.6	26.4	22.2	25.2
Length of ovipositor.....			10.2	14.2

The caudal femora seem to show some geographic correlation in the variation of comparative depth to length, specimens from northern Georgia showing the greatest relative depth, while more northern individuals generally have the caudal femora distinctly more slender, but this is by no means a rule, as northern specimens frequently have as robust femora as more southern material. The male paratype of *heros* from North Carolina has the caudal femora relatively quite slender. The spination of the ventro-external margin of the caudal femora of the male is extremely variable in character, ranging from the relatively heavier, basally tumid, spines of typical *grandis* to the weak and relative short type found in the paratype of *heros*. Between these extremes we find all intermediates in the strength of the spines, while the number of the same varies from as few as eight to as many as sixteen.

The caudal tibiae are generally somewhat valgate proximad, but

are frequently straight. The exact thickness (*i.e.*, section) of the tibia varies somewhat, in one male from Blocton, Alabama (reported by Scudder and determined by him as *gracilipes*, the locality, however, being erroneously given as "Blocton, Florida"), being greater than in any other individual seen. The depth of the general body coloration varies appreciably, but there is generally an approximate uniformity in material from the same locality. As a rule, northern adult material shows a more transverse disposition of the color pattern and southern material a more longitudinal one. The two tendencies are to be seen in many forms of this genus, sometimes both the longitudinal and transverse being developed in the same individual, in others one at the expense of the other and again a general suffusion tones all to a deeper uniformity. The scalariform pattern of the caudal femora is weaker in northern than in southern specimens, as is also generally the case with the infuscation of the distal femoral portions and the presence of the pale pregeniculate annulus on the caudal femora. These two latter features are rarely indicated in northern adults, but distinct in all the southern specimens.

Immature specimens from all localities, however, have a decidedly contrasted color pattern, made up of longitudinal and transverse elements, much as in the southern States adults, with darkened femoral apices and distinct pale pregeniculate annuli on the caudal femora.

Ceuthophilus lapidicola (Burmeister).

North Carolina.

Grandfather Mountain, above 4,000 feet, VII, 21, 1904, (G. M. Bentley), 1 juv. ♂, [N. C. State Dept. Agr.].
Black Mountain, 1 ♀, [B. I.].

Sunburst, Haywood County, late May, 1912, (C. S. Brimley), 1 juv. ♂, 1 juv. ♀, [Brimley Cln.].
Andrews, VIII, 19, 1904, (F. Sherman Jr.), 1 ♀, [N. C. State Dept. Agr.].

We have also a pair of specimens labelled "North Carolina, (Morrison)," determined and recorded as this species by Scudder. At the present time it is not possible to determine the correctness of Scudder's assignment of Burmeister's name to this species, the description of which is quite inadequate to place positively the name, but it seems quite probable that his action was correct. In addition to this North Carolina material, we have before us quite a few specimens from the northeastern States. Through the kindness of Dr. E. M. Walker, we have been able to examine four male and three female paratypes of that author's *C. pallidipes*, described from five localities in Ontario.¹²⁴ This is the northern extreme of the

¹²⁴ *Can. Ent.*, XXXVII, p. 115, pl. IV, figs. 2-2c, (1905).

species for which we use the name *lapidicola*; the specimens are much reduced in size, but inseparable from individuals from more southern localities. The description of *pallidipes*, in its analysis of the differential characters, is a decided aid to an understanding of the species.

The specimens recorded by Sherman and Brimley,¹²⁵ from Andrews and Grandfather Mountain, North Carolina, as *C. tenebrarum*, belong to this species, as an examination of the material shows. From Andrews there is a small adult female, from Grandfather Mountain a nearly adult quite small male minus the caudal limbs. The Southern Pines record was based on a minute immature specimen which we would not care to determine. At this writing we cannot make any statement on the status of Scudder's *tenebrarum*. The Sunburst pair recorded above is not quite mature, but clearly represents the present species.

The species was described from Virginia and South Carolina, but previously we have had no exact record from the southeastern States.

Ceuthophilus latens Scudder.

Alexandria County, Virginia, VI, 1910 and 1914, (W. T. Davis; trapped in molasses jar), 36 ♂, 24 ♀, 2 juv. ♀, [Davis Cln.].

We are using for comparison certain specimens from Ithaca, New York, in the collection of Cornell University, and a female from Vigo County, Indiana, in the Hebard Collection, which were determined as this species by Scudder. The series here recorded is of considerable interest, as it shows to what extent individual variation is present in this striking and beautiful species.

In size the usual amount of variation is present, the extremes (in millimeters) being:

	♂	♂	♀	♀
Length of pronotum.....	4.8	5.5	5	5.9
Length of cephalic femur.....	5.8	6.8	5.4	6
Length of caudal femur.....	12.9	14.7	12.1	14.9
Length of caudal tibia.....	13.4	15.9	12.9	15.3
Length of ovipositor.....			8.1	9.2

The color pattern of this species is probably more uniformly constant than in any other species of the genus of which we have seen a considerable series. The broad pale dorsal line and the broad bordering dark lines are always indicated on the thoracic segments and their variation in width is relatively small, while the abdominal markings and the clouding of the caudal femora are characteristic of this species and *lapidicola*, and vary only in depth.

¹²⁵ *Ent. News*, XXII, p. 311, (1911).

The pale base color is more orange-ochraceous in some individuals than in others, the extremes being pale clay color and burnt sienna.

This species and *lapidicola* are very closely related, the females particularly being extremely hard to separate. Of the few differences shared by both sexes may be mentioned the narrower medio-longitudinal pale bar in *lapidicola*, which also has a greater irregularity of its margins, and a frequent breaking up of the dark lateral bars. The males of the two species can, in addition, be separated by the more robust caudal femora in the present species and the form of the supra-anal plate, which has the distal margin submembranous in *latens* and chitinous in *lapidicola*, the plate also more elevated disto-dorsad in *lapidicola* than in *latens*.

The immature specimens of *latens* listed above have the thoracic pattern essentially as in the adults.

***Ceuthophilus sallei* Scudder.**

De Funiak Springs,¹²⁶ Florida, 1 ♂, 1 ♀, 1 juv. ♀, [Cornell Univ.].

We have compared these specimens with a paratype from New Orleans and find no important or constant differences. The color pattern is seen to vary in intensity to such a degree that occasionally (in the adult female) the thoracic pattern is obsolete, although the abdominal section is weakly indicated and the femoral pattern typical, but not very decided.

The authors' *C. peninsularis*,¹²⁷ from southern Florida, is a close relative of this species, but just how close cannot be determined until the female sex of the more recent form is known.

The distribution of the species is here extended somewhat to the eastward of the type and only previously known locality—New Orleans.

***Ceuthophilus spinosus* Scudder.**

Cabin John Run, Maryland, IX, 1911,
(W. T. Davis; trapped in molasses
jar), 1 ♀, [Davis Cln.].

Washington, D. C., IV, 20, 1 ♀,
[Hebard Cln. ex Bruner.].¹²⁸

District of Columbia, VI, 1910, (W. T.
Davis; trapped in molasses jar),
3 ♂, 2 ♀, [Davis Cln.].

Arlington, Virginia, VII, 9, 1914, (H.;
taken at night with light), 1 ♀.

Raleigh, North Carolina, II, 9, 1904,
(Brimley; under log in pine woods),
1 ♀, [Hebard Cln.].

Atlanta, Georgia, VIII, 18, 1912, 3 ♀,
[Ga. State Cln.].

¹²⁶ These specimens are merely labelled "Funiak, Fla." but as there seems to be no locality of that name, we feel little doubt of their reference to the well-known locality given above.

¹²⁷ PROC. ACAD. NAT. SCI. PHILA., 1914, p. 408, (1914).

¹²⁸ In Scudder's original series of *C. neglectus*, a specimen from Washington, D. C., in the Bruner Collection, is listed. This record refers to the above specimen, which can be separated from the other paratypic females of *neglectus* from the Bruner Collection, by the more slender caudal femora and the fewer (four instead of five) teeth on the internal valves of the ovipositor.

We have no authentic material of this striking species and our determination rests on the agreement of our very extensive series with the original description. We have, in addition to the specimens here listed, larger series from the northeastern States, which we will treat in detail at a later date.

This species appears to be typical of a distinctive group of the genus, characterized in the male sex by the broad linguiform produced supra-anal plate. The form of the subgenital plate, which bears a cordiform callose pattern, is quite peculiar, while the general type of the caudal femora is different from that of any species of the genus found in the eastern States with which we are acquainted. There is a slight development of the fastigial ridge, less decided, however, than in the *uhleri* group. The internal valves of the ovipositor bear but four teeth, which are strongly developed, instead of the more usual five or six teeth. The distal extremity of the external ovipositor valves is obliquely truncate, with the spiniform dorso-distal point very well developed and directed at an angle of about fifty degrees to the longitudinal axis of the ovipositor.

There is a great amount of individual variation in size and robustness of the whole body, and in the male this variational feature of the caudal femora is very pronounced, and rather disproportionately so. The number of teeth on the ventro-external margin of the caudal femora and the character of the same are quite variable in the male sex. At a later date we intend to give additional information on these points from the other material we now have.

In the southern States the species appears to be one of the Piedmont region, the lowest elevation from which we have definite records being Raleigh and Southern Pines (Sherman and Brimley), North Carolina, and Atlanta, Georgia.

***Ceuthophilus neglectus* Scudder.**

Cabin John Run, Maryland, IX, 1911,
(W. T. Davis; trapped in molasses
jar), 34 ♂, 38 ♀, [Davis Cln.]
District of Columbia, VI, 1910, (W. T.
Davis; trapped in molasses jar),
22 ♂, 33 ♀, [Davis Cln.].

Alexandria County, Virginia, VI, 1910,
(W. T. Davis; trapped in molasses
jar), 51 ♂, 73 ♀, 9 juv. ♂, [Davis
Cln.]
Orange, Va., VII, 21, 1913, (R. & H.),
3 juv. ♂.

We have before us three male and three female paratypes of *neglectus*, one of the females of which, as we have already shown, belongs to *spinus*. We have also male and female paratypes of *terrestris*, these being the pair recorded by Scudder from Chateaugay Lake, Adirondack Mountains, New York. As stated by Walker,¹²⁹

¹²⁹ *Can. Ent.*, XXXVII, p. 118, (1905).

certain of the specimens considered to be *terrestris* by Scudder, in his description of the latter, are really *neglectus*. This is true of the two specimens from Chateaugay Lake, which, while quite small, are distinctly *neglectus*. Just how much of the original series of *terrestris* belongs to *neglectus* we cannot say at the present writing, but, as Walker has shown, the few adult males in the Scudder Collection represent the latter species.

As Walker has said in explanation of his figure of the subgenital plate of the male of this species,¹³⁰ the type there shown is that of the immature male. This portion of the adult male is different, having no distal projections and with the free margin arcuato-truncate or weakly emarginate, the plate entire or undivided, a median fold or sulcus frequently present distad, but this is not a true division of the plate. The supra-anal plate of the adult is elongate, trigonal-linguiform, taken with the shape of the adjacent dorsal abdominal segments and the subgenital plate being characteristic of the species.

The ovipositor of the female bears five, or more rarely six, teeth on the internal valves.¹³¹ The individual size variation in adults of the species is very great, so much so that the extremes might not be recognized as the same species, as the larger specimens, by their bulkiness, have a different general appearance. In the Alexandria County series the extremes in size (in millimeters) are as follows:

	♂	♂	♀	♀
Length of pronotum.....	4.8	6	4.9	6
Length of cephalic femur.....	5.6	6.9	5	5.6
Length of caudal femur.....	12.5	16	10.4	13.6
Length of caudal tibia.....	12.8	15.5	10.8	13.4
Length of ovipositor.....			5.9	7.4

The coloration is quite variable in the depth of the pattern, which in the paler specimens has a decided medio-longitudinal pale line on the thoracic segments, and a closely tessellate abdomen, which in the darker individuals has the median line subobsolete and the tessellations reduced in number, although but little in intensity. The caudal femoral scalariform pattern, which is generally moderately indicated, frequently strongly marked, is relatively poor in contrast in the darker individuals.

¹³⁰ *Can. Ent.*, XXXVII, p. 117, pl. V, figs. 3b-3c, (1905).

¹³¹ In very rare instances, only two females from Alexandria County, Virginia, out of one hundred and seventy-five examined for this character, we find but four teeth present on these valves, but in these individuals the usual two distal teeth are fused and the form of the caudal femora and margins of the same correctly associate the specimens.

The species appears to be one of the more abundant, if not the most abundant, of the genus found in the eastern United States. In the southeastern States it has, as far as known, a very limited distribution, not having been taken south of Orange, Virginia.

GRYLLIDÆ.

Gryllotalpa hexadactyla Perty.

1838. *Gr[yllotalpa] borealis* Burmeister, Handb. Entom., II, Abth. II, pt. 1, p. 740. [North America.]

Maryland.

Bohemia Bridge, Cecil County, V, 30, 1914, (H. W. Fowler), 3 ♀, [A. N. S. P.], brachypterous.

District of Columbia.

Washington, IV, 20, 1 ♀, [Hebard Cln.], brachypterous.

Georgia.

Rabun County, VII, 1910, (W. T. Davis), 3 juv.¹³²
Lavender, 1 ♂, [Ga. State Cln.], brachypterous.

Marietta, VII, 27, 1903, (A. P. Morse), 1 ♀.

Atlanta, VI, 26 to VIII, 28, 1909 to 1912, 3 ♀, 1 juv., [Ga. State Cln.], 2 brachypterous.

Billy's Island, Okeefenokee Swamp, VI, 1912, (J. C. Bradley), 1 ♀, brachypterous.

Florida.

Enterprise, IV, 17, (P. Laurent), 1 ♂, [Hebard Cln.], brachypterous.

Lake City, 1 ♀, [Hebard Cln.], brachypterous.

After careful examination of material from many localities in America, extending from the United States southward to the southern borders of tropical South America, we find that there is no valid ground for separating Burmeister's *borealis* from *hexadactyla* of Perty, described in 1832 from Minas Geraes, Brazil.¹³³ Few comparisons are to be found between these supposedly distinct forms, Sausure and Scudder giving as differences the somewhat smaller size of *hexadactyla* and the more rounded projection at the base of the second lateral dactyl of the cephalic tibiæ. The series before us show that the insect attains its greatest size development in the United States, but that little constancy exists is also demonstrated, as specimens from the same locality in several cases show almost the maximum difference in size found in the entire series before us, which numbers considerably over one hundred specimens. The rounded chitinous projection at the base of the second lateral dactyl of the cephalic tibiæ is normally rounded, but is often worn down to a more or less angulate condition and is naturally valueless as a character in this respect. No other differences exist between North and South American examples, and *borealis* as a result falls into the above

¹³² Two of these individuals are in the very early stages and the smallest of these has three, instead of four, tibial dactyls. In three other specimens in the same instar before us, this remarkable feature is also found.

¹³³ *Delect. Anim. Art. Brasil.*, p. 119, pl. 23, fig. 9, (1830-34).

synonymy. Previously the following names have been found to be synonyms of *borealis*: *americana* Harris, 1835; *brevipennis* Serville, 1839; *longipennis* Scudder, 1862, and *columbia* Scudder, 1869.

In the present species some variation is shown in the shape of the ocelli and in the tegminal venation.

Material from Florida and southern Georgia averages somewhat smaller than material from more northern points; the smallest adult specimen of the species we have ever seen is that from Billy's Island, Georgia, the measurements of which are: length of body 20.4, of pronotum 7.2, of tegmen 6.4, of caudal femur 6, and greatest width of pronotum 5.7 mm.

Females of the species have been taken much more frequently than males and the brachypterous condition is more frequently found in both sexes in the region at present under consideration.

Scapteriscus vicinus Scudder. Pl. XIV, figs. 4, 5, 6, 7.

1869. *Scapteriscus agassizii* Scudder, Mem. Peabody Acad. Sci., I, p. 13. [Switzerland (introduced from Central America?).]

Georgia.

Waycross, X, 20, 1914, (W. Tatum, Jr.), 1 juv., [U. S. N. M.].

Hebardville, V, 15, 1915, (H.; in sandy soil in garden, associated with *S. aletus*, but very scarce), 2 ♂, 2 ♀.

St. Simon's Island, IV, 22 to IX, 8, 1909 to 1911, (J. C. Bradley), 3 ♂, 4 ♀, 4 juv.; (W. V. Reed), 9 ♂, 3 ♀, 1 juv., [Hebard Cln.].

St. Simon's, St. Simon's Island, III, 18, 1912, (W. V. Reed), 6 ♀, [U. S. N. M.].

Brunswick, II, 5, 1903, (S. W. Good-year), 3 ♂, 1 ♀, 1 juv., [U. S. N. M. and Hebard Cln.]; IV, 18, 1912, (W. V. Reed), 1 ♂, 4 ♀, [U. S. N. M.]; XI, 1907, 1 ♂, [Ga. State Cln.].

Cumberland Island, VIII, 31, 1911, (H.; under log on strand), 1 juv.

White Oak, IX, 1904, (A. S. Barnwell), 1 ♂, [U. S. N. M.].

After careful consideration of very large series, representing every species of the present genus, we are satisfied that the species found abundantly in the southeastern United States, the West Indies and portions of South America, and which has been frequently recorded as *S. didactylus*, represents instead *vicinus* of Scudder. This species is very closely related to *didactylus* of Latreille (described from Surinam and found elsewhere in South America and northward to Costa Rica), but is somewhat heavier, with the width of the pronotum distinctly greater in proportion to its length and with the basal width between the tibial dactyls averaging somewhat less. The species is, however, not nearly as distinct as Scudder believed, for the characters of the but little dissimilar ocelli, slightly different terminal tarsal joints of the caudal tibiae and other differences which he gives in the original description are practically valueless.

The species, *agassizii*, described by that author on the following

page of the same work, is a synonym of *vicinus*, based on minor differences in these characters, which in each of the many series before us show some such slight differentiation.

This species is a serious pest in portions of the State of Georgia; at Darien, in 1906, the insects destroyed a great portion of the grass on the golf course.¹³⁴

*Scapteriscus acletus*¹³⁵ new species. Pl. XIV, figs. 8, 9, 10, 11.

Closely related to *S. mexicanus*,¹³⁶ differing¹³⁷ in the shorter dactyls and spines of the limbs, normally fewer spines of the dorso-internal margins of the caudal tibiæ,¹³⁸ shorter limbs and much less compressed terminal tarsal joints of the caudal tibiæ (in this species no wider than the caudal metatarsus, in *mexicanus* distinctly wider with dorsal portion decidedly compressed). The present species and *mexicanus* agree, however, in the wide separation of the tibial dactyls, the elongate pronotum and decidedly elongate lateral ocelli, which characters readily distinguish them from *S. vicinus*, from which species the present insect also differs greatly in color pattern of the pronotum, general coloration in life and narrower terminal tarsal joint of caudal tibiæ.

Considering *S. abbreviatus*, the remaining species of the genus found within the boundaries of the United States, we find it to be readily distinguishable from *vicinus*, *acletus* and *mexicanus* by the distinctive coloration (which gives the insect a strongly mottled appearance), small round lateral ocelli and extremely reduced tegmina and wings. The elongate and widely separated tibial dactyls, and spatula with distal portion of ventral margin briefly chitinous and with disto-ventral angle nearly rectangulate and sharply rounded in *abbreviatus*, serve further to indicate that in linear arrangement *vicinus* comes first, followed by *didactylus*, *acletus*, *mexicanus* and *abbreviatus*.

¹³⁴ Noted by Hebard, *Ent. News*, XX, p. 179, (1909).

¹³⁵ From *á* = not, and *καλῆτος* = welcome; in allusion to the destructive habits of this insect.

¹³⁶ Described by Burmeister, *Handb. Entom.*, II, Abth. II, pt. 1, p. 740, (1838). [Alvarado, Mexico.]

¹³⁷ These comparisons are made with an apparently typical female of *mexicanus* (pl. XIV, figs. 12, 13, 14 and 15) from Durango, Mexico, in the Hebard Collection, the measurements (in millimeters) of which are: length of body, 36, of pronotum 11.4, of tegmen 19.2, of wing 26.6, of longest tibial dactyl 5.1, of caudal femur 12.5, of terminal tarsal joint of caudal tibia 3.4; width of pronotum 8.3, of terminal tarsal joint of caudal tibia 1.6. Two other similar females are before us bearing only the data "Mexico."

¹³⁸ In *mexicanus* these spines are described as 5-5 in number, and this is true for the specimens of that species before us.

TYPE: ♂; Hebardville, Ware County, Georgia. May 15, 1915. (M. Hebard; in garden.) [Hebard Collection, Type No. 406.]

Description of Type.—Size medium, form rather slender. Head with lateral ocelli over twice as long as broad, in direction convergent meso-distad, separated at nearest point by a space twice the length of one ocellus. Eyes somewhat more elongate than in *vicinus*. Tegmina similar to *vicinus*, but with veins not as heavy and cross-veinlets fewer. Wings reaching slightly beyond apex of abdomen. Limb proportions much as in *vicinus*. Dactyls of cephalic tibiae separated by a space equal to basal width of one of these dactyls. Spatula with distal half of ventral margin chitinous, straight, the disto-ventral angle nearly rectangulate and sharply rounded. Median tibiae armed interno-distad with four heavy spurs. Caudal tibiae with ventro-internal margins each bearing four long spines, the last situated very slightly proximad of the three long distal spurs, disto-external margin armed with three short spurs, the dorsal widely separated from the other two. Distal joint of caudal tarsus slender, no wider than metatarsus, with dorsal margin not noticeably compressed. Coloration distinctive.

Allotype: ♀; Same data as type. [Hebard Collection.]

Description of Allotype.—Similar to type in characters common to both sexes. Tegmina similar to *vicinus*, but, as in male, with veins not as heavy and cross-veinlets fewer. Wings reaching slightly beyond apex of abdomen.

In addition to the type and allotype, we have before us a series bearing the same data and material taken at the same locality from May 15 to 31, 1915, by William Walker; these specimens, 26 ♂, 25 ♀, may be considered paratypes.

This paratyptic series shows that the species exhibits considerable size variation, the average of the majority of specimens, however, approximates the types in this respect. Both intensive and recessive color patterns are developed, and the tegminal veins and veinlets are sometimes heavier than in the typical condition. Decided uniformity is found in the shape of the lateral ocelli, length and separation of the tibial dactyls and form of distal joint of caudal tarsus. In eighty uninjured specimens the number of spines of the dorso-internal margins of the caudal tibiae are as follows:

Number of spines.....	3-4	4-4	4-5	5-5
Number of specimens.....	1	66	8	5

In one specimen having 5-5 spines, one of these spines is bifurcate.

Slight differences in ocellar form, occasional appearance of an accessory spine on one or both of the dorso-internal margins of the caudal tibiae and slight differences in the separation of the tibial dactyls and in the width of the distal joint of the caudal tarsus, cannot be used as features to separate species of this genus, as discussed above in the treatment of *vicinus*.

Measurements (in millimeters).

	♂		♀	
	TYPE.	Paratypes.	Allotype.	Paratypes.
Length of body.....	28.7	26.4-34.4	29.7	26.5-35.5
Length of pronotum.....	9.3	8.8-11.3	9.3	8.5-10.3
Width of pronotum ¹³⁹	7.3	6.4- 8.9	7.1	6.6- 8.3
Length of tegmen.....	14.7	14.6-17.8	15.2	15-19.2
Length of wing.....	19.6	19.6-24.3	21.7	20.5-26.1
Longest tibial dactyl.....	3.6	3.3- 4	3.1 ¹⁴⁰	3.1- 4.1
Length of caudal femur.....	10.3	10-11.7	10.6	10.2-12
Length of terminal tarsal joint of caudal tibia.....	2.6	2.3- 2.7	2.7	2.6- 2.8
Width of same.....	.8	.7- 1	.8	.8-.9

Coloration.—Normal condition (*type, allotype*). General coloration pinkish buff. Head with occiput including raised portion of inter-ocular space blackish brown, a brief space of the same color back of the eyes, but separated from them by a narrow interval of the pale general coloration. Pronotum with dorsum marked with an oval of blackish brown, this interrupted cephalad and mesad by rounded incursions from each side of the general pinkish buff coloration, these cephalic indentations weakly connected, the margins of the dark area concave in their caudal fifth. Tegmina and wings buffy with veins darker. Caudal femora of general coloration, but with all except the proximal fourth of dorso-external portion suffused with a darker shade. Abdomen dark above, pale below (in life shining grayish below, contrasting strongly with *vicinus*, which in life has this portion of the body shining cinnamon buff).

An intensive coloration is found in numerous specimens in which the darker markings are all deeper and more extensive, the whole dorsal surface of the pronotum being blackish brown, with the exception of four small pale spots in apposition to the rounded incursions of paler coloration as found in the normal condition.

¹³⁹ Owing to the impossibility of determining the lateral margins of the dorsum of the pronotum in the present genus, this measurement indicates the absolute width of the pronotum.

¹⁴⁰ The minimum measurements for these dactyls represent specimens in which these claws are worn down and blunted by much use. This is true of the present specimen.

All gradations are found, however, to a recessive condition in which the dark markings are much reduced, the incursions of pale coloration being considerable, leaving only narrow projections of the dark color laterad between them.

The large series of immature examples taken with the typical series are, with few exceptions, in the instars immediately preceding maturity. In these the coloration averages slightly more recessive than in the adults.

Biological Notes.—At the type locality the species was found in great numbers in sandy soil. Tunnels recently made were everywhere apparent. Digging into these and the flooding of such areas revealed few examples, but a row of lettuce in a dying condition was investigated, and beneath the wilted leaves, resting on the ground at the base of these plants, many specimens were found. The roots of the lettuce and other garden plants, such as tomatoes and beets, were found to have been extensively damaged by the present insect, in many cases all but the main tap root having been completely devoured.

When disturbed individuals always sought, if possible, to escape under the ground, disappearing in the sandy soil with astonishing rapidity; on the surface they could run very nimbly, occasionally giving a short hop, but not attempting to fly. There is no doubt, however, that both this species and *vicinus* can fly vigorously, and during migrations, which undoubtedly occur, probably resort almost wholly to this method of locomotion.

At night the rich guttural “grrrrr” of the insect could be heard on all sides, but no individuals were found on the exposed surface of the ground.

Specimens Examined: 83; 28 males, 30 females and 25 immature individuals.

Jesup, Georgia, V, 15, 1915, (H.; in burrow under board in grassy field), 1 ♀; X, 1, 1910, 1 ♀, [Ga. State Cln.].

Hebardville, Ga., V, 15, 1915, (H.; in sandy soil of garden), 19 ♂, 18 ♀, TYPE, *allotype*, paratypes, 13 juv.; V, 15 to 31, 1915, (Wm. Walker), 7 ♂, 9 ♀, paratypes, 12 juv., [all Hebard Cln.].

White Oak, Ga., III, 23 and IV, 1904, (A. S. Barnwell), 2 ♂, 1 ♀, [U. S. N. M. and Hebard Cln.].

Scapteriscus abbreviatus Scudder. Pl. XIV, figs. 16, 17, 18, 19.

White Oak, Georgia, IV, 1904, (A. S. Barnwell), 1 ♂, 1 ♀, [U. S. N. M. and Hebard Cln.].
Lemon City, Florida, (E. J. Brown), 2 juv., [U. S. N. M.].

The specimens from Georgia, in addition to three from the same locality previously recorded by us,¹⁴¹ constitute the only record of this species from the United States outside of extreme southern Florida.

Tridactylus apicalis Say.

1862. *T[ridactylus] terminalis* Scudder, Bost. Jour. Nat. Hist., VII, p. 425.
[Cambridge, Massachusetts; Maryland; southern Illinois.]

District of Columbia.

Washington, IX, 1883, 1 ♂, [Hebard
Cln.].
Rock Creek, 1 ♀, [U. S. N. M.].

Virginia.

Stafford County opposite Fredericks-
burg, VII, 20, 1913, (R. & H.); wet sand
near Rappahannock River), 3 juv.

Georgia.

Bainbridge, IX, 17 to X, 19, 1910,
(J. C. Bradley), 1 ♂.
Spring Creek, Decatur County, V, 7
to 23, 1911, 1 ♀, 3 juv.; VII, 16 to
29, 1912, 74 ♂, 31 ♀, 5 juv.; VIII,
26 to 28, 1913, 1 ♂, 1 ♀, (all J. C.
Bradley).

We are convinced, after study of the literature and all of the material in our collections, that *terminalis* of Scudder is an absolute synonym of the present species, based solely upon large specimens of pale coloration. We are also satisfied that Scudder has correctly synonymized under these two names the following: *tibialis* Guérin, 1844; *Xya mixta* Haldemann, 1853; *illinoiensis* Thomas, 1863; *fissipes* Saussure, 1874, and *incertus* Saussure, 1896. The great variation in the form of the cephalic limbs in the males of the species discussed by Morse has in part caused this multiplicity of synonyms.

The large series of males before us from Spring Creek, Georgia, shows the same variability of the cephalic tibiae which Morse has remarked, and we find every gradation between the extremes; roughly grouped, sixteen have the tibiae of the normal (♀) form, eight have them very slightly cleft; sixteen have them decidedly and thirty-five very strongly bifurcate. A further interesting feature is apparent in this series, for with scarcely an exception the specimens having these tibiae least specialized are the smallest (averaging in length 7 mm.), and throughout the series a distinct size increase accompanies the greater specialization of the tibiae to its maximum development (these specimens averaging in length 9 mm.).

When compared with the males, the females of this series are found to average noticeably paler in general coloration.

The material before us shows that the wings normally reach a little beyond the apex of the abdomen; occasional series have the wings falling slightly short of this point.

¹⁴¹ PROC. ACAD. NAT. SCI. PHILA., 1912, p. 272, (1912).

Ellipes minuta (Scudder).

District of Columbia.

Washington, (Aldrich), 3 ♀, [Hebard Cln.].

Virginia.

Stafford County opposite Fredericksburg, VII, 20, 1913, (R. & H.; wet sand near Rappahannock River), 1 ♂, 2 ♀, 1 juv.

North Carolina.

Weldon, VII, 24, 1913, (R. & H.; on ground in heavy forest near stream), 1 ♀.

Goldsboro, VII, 25, 1913, (R. & H.; damp ground in short-leaf pine woods), 1 ♂.

Greensboro, VII, 26, 1913, (R. & H.; on wet and almost bare clayey ground), 2 ♂, 5 ♀, 4 juv.

Balsam, VII, 23, 1903, (A. P. Morse), 2 adults.

South Carolina.

Spartanburg, VIII, 10, 1903, (A. P. Morse), 1 adult, 2 juv.

Manning, V, 30, 1914, (W. Stone), 1 ♂, 1 ♀, [A. N. S. P.].

Georgia.

Burton, 1,800 feet, V, 21, 1911, (J. C. Bradley), 1 ♀.

Rabun County, VII, 1910, (W. T. Davis), 1 ♀.

Jasper, VII, 25, 1903, (A. P. Morse), 1 adult.

Vicinity of Stone Mountain, VIII, 3, 1913, (H.; few on damp sand at edge of bog at base of cliff), 1 juv.

Waycross, VIII, 11, 1903, (A. P. Morse), 1 adult.

Albany, VIII, 1, 1913, (R. & H.; swampy spot on edge of Flint River), 1 ♀.

Spring Creek, Decatur County, VII, 16 to 29, 1912, (J. C. Bradley), 2 ♂.

We are certain that Scudder has correctly synonymized *Tridactylus histrionicus* and *T. histrio* of Saussure, 1896, under the present species. All of the large series before us show the presence or absence of minute subapical natatory lamellæ on the dorsal margins of the caudal tibiæ to be due to individual variation. The maximum number of these in the present species is two on the external and one on the internal margin, a feature noted by Saussure in his description of *histrio*, while his *histrionicus* represents material lacking these rather rudimentary appendages; *minuta* was at that time overlooked by Saussure.

But one specimen in the series here recorded, from Spring Creek, Georgia, is macropterous; the larger series before us show occasional specimens in this condition, some which are semi-macropterous, while many, as in the present series, have the wings wholly concealed by the tegmina.

This insect is found on wet sand near water, often in great numbers, over the entire territory at present under consideration.

Myrmecophila pergandei Bruner.

Retreat, North Carolina, VIII, 6, (H. G. Hubbard), 1 ♂, [U. S. N. M.].

Balsam, N. C., VII, 23, 1903, (A. P. Morse), 1 ♂, 1 juv. ♀; 4,500 to 5,700 feet, VII, 24, 1903, (A. P. Morse),

1 ♂, 1 ♀.

Clayton, Georgia, VI, 1909, (W. T. Davis), 1 juv. ♂, 1 juv. ♀.

Crescent City, Florida, 1 juv ♂, [Hebard Cln.].

This species was described from the "Atlantic States, from Maryland southward," it has since been recorded from Washington, District of Columbia, and Georgia, over the area here considered.

The study of the present genus by Schimmer¹⁴² is by far the most complete work on the subject to be found in the literature.

Paratypes from Washington were taken with *Cremastogaster lineolata* Say and *Formica pallidefulva* Latreille. The specimens from Balsam were with *Camponotus herculeanus* Linnæus subspecies *pennsylvanicus* De Geer, and those from Clayton with *Cremastogaster lineolata* Say variety near *pilosa* Pergande.¹⁴³

Cryptoptilum antillarum (Redtenbacher).

South Carolina.

Isle of Palms, VIII, 15, 1913, (R.; beaten from bayberry, *Myrica cerifera*), 1 ♂, 1 ♀, 2 juv. ♀.

Georgia.

Montgomery, VII, 27, 1913, (J. C. Bradley), 1 ♂.

Tybee Island, VII, 26, 1913, (J. C. Bradley), 11 ♂, 1 ♀, 1 juv. ♂, 1 juv. ♀.

St. Simon's Island, VIII, 5, 1912, (J. C. Bradley), 1 ♂.

Billy's Island, V, 28 to VII, 2, 1912, (J. C. Bradley), 1 ♂.

This species has been fully treated by the present authors;¹⁴⁴ in that paper the records from Miami (under bark of fallen trees) and Lake Worth (on sand), Florida,¹⁴⁵ were overlooked.

Cryptoptilum trigonipalpus Rehn and Hebard.

Virginia.

Petersburg, VII, 23, 1913, (R. & H.; undergrowth in heavy oak woods), 1 juv. ♂.

North Carolina.

Weldon, VII, 24, 1913, (R. & H.), 1 juv. ♀.

South Carolina.

Columbia, VII, 28, 1913, (H.; beaten from heavy green undergrowth in short-leaf pine forest on hillside), 1 juv. ♀.

Georgia.

Vicinity of Stone Mountain, VIII, 3, 1913, (R. & H.; beaten from tangled undergrowth of short-leaf pine forest), 2 juv. ♀.

Augusta, VII, 29, 1913, (R. & H.; beaten from undergrowth near stream in flat short-leaf pine woods), 3 juv. ♀.

Savannah, VIII, 14, 1903, (A. P. Morse), 1 ♂, 3 ♀.

Warm Springs, 850 to 1,200 feet, VII, 9 and 10, 1913, (R.), 2 juv. ♂, 4 juv. ♀.

Albany, VIII, 1, 1913, (R. & H.; rather common in tangles of small bushes and vines in open forest along banks of Flint River), 4 juv. ♂, 6 juv. ♀.

Spring Creek, VIII, 26 to 28, 1913, (J. C. Bradley), 3 ♂, 1 ♀.

Billy's Island, IX, 1 to 5, 1913, (J. C. Bradley), 2 ♀.

The known distribution of the present species is carried considerably inland, westward and northward, by the above records.

¹⁴² *Zeitschr. Wissensch. Zool.*, XCIII, pp. 409-534, (1909).

¹⁴³ The identifications of the ant hosts given here have been most kindly furnished by Professor Wm. M. Wheeler. Bruner, with the original description of the present species, gives the ant hosts as *Camponotus pennsylvanicus*, *Formica rufa* and *Cremastogaster lineolata*. His *Formica rufa* determination is based on the specimens correctly recorded above as *Formica pallidefulva*.

¹⁴⁴ *PROC. ACAD. NAT. SCI. PHILA.*, 1912, pp. 196-201, figs. 5-8, (1912).

¹⁴⁵ Mrs. A. T. Slosson, as *Mogosoplistus slossoni*. *Ent. News*, XII, p. 11, (1901).

The insect reaches maturity about the middle of August over a large portion of its range.

Cycloptilum squamosum Seudder.

North Carolina.

Goldsboro, VII, 25, 1913, (R. & H.),
1 juv. ♀.

South Carolina.

Spartanburg, VIII, 6, 1913, (H.;
undergrowth of mixed deciduous and
pine forest), 2 juv. ♀.

Columbia, VII, 28, 1913, (R. & H.;
immature individuals very abundant
among pine needles in long-leaf
pine woods), 1 juv. ♂, 2 juv. ♀.

Georgia.

Toccoa, 1,094 feet, VIII, 4-5, 1913,
(H.), 2 juv. ♀.

Jasper, 1,550 feet, VIII, 5, 1913, (R.;
undergrowth of pine woods), 1
juv. ♀.

Vicinity of Stone Mountain, VIII, 3,
1913, (R. & H.; beaten from tangled
undergrowth of pine forest), 1
juv. ♂.

Macon, VII, 30-31, 1913, (R. & H.;
few immature individuals in oak
leaves on edge of oak and short-leaf
pine woods), 2 juv. ♂, 1 juv. ♀.

Warm Springs, 850 to 1,200 feet, VIII,
9-10, 1913, (R.; beaten in pine and
oak woods), 1 ♂, 3 ♀, 2 juv. ♀.

Albany, VIII, 1, 1913, (R. & H.),
1 juv. ♂.

This species has been fully treated by the present authors,¹⁴⁶ it is now known to range northward to East Marion, Long Island, New York.¹⁴⁷

NEMOBIUS Serville.

The species of the present genus found in North America north of the Isthmus of Panama have been fully treated by the present junior author.¹⁴⁸ In that paper nearly all of the material in the collections now before us, taken previous to 1913, was recorded. The localities for these series are first given below, then the subsequent records are given in full with whatever comments appear of interest.

Nemobius fasciatus fasciatus (De Geer).

Chestertown, Beltsville, Montgomery County, Plummer's Island and Hyattsville, Maryland; Washington, District of Columbia; Fairfax County, Falls Church, Rosslyn and Bayville, Virginia; Jefferson, Cranberry, Grandfather Mountain, Blowing Rock, Black Mountain, Asheville, Mount Pisgah, Balsam and Waynesville, North Carolina, and Atlanta and Thompson's Mills, Georgia.

Virginia.

Fredericksburg, VII, 20, 1913, (R. &
H.), 5 ♂, 7 ♀, 2 juv. ♂.

Orange, VII, 21, 1913, (R. & H.),
1 juv. ♂.

Lynchburg, VII, 22, 1913, (R. & H.),
1 juv. ♂.

Petersburg, VII, 23, 1913, (R. & H.),
1 juv. ♀.

¹⁴⁶ PROC. ACAD. NAT. SCI. PHILA., 1912, pp. 209-214, figs. 17-19, (1912).

¹⁴⁷ Davis, *Jour. N. Y. Ent. Soc.*, XXII, p. 171, (1914).

¹⁴⁸ PROC. ACAD. NAT. SCI. PHILA., 1913, pp. 394-492, (1913).

North Carolina.

Greensboro, VII, 26, 1913, (R. & H.),
2 juv. ♂.
Charlotte, VII, 27, 1913, (R. & H.),
1 ♂, 1 ♀.

South Carolina.

Spartanburg, VIII, 6, 1913, (H.),
1 juv. ♀.

Georgia.

Rabun County, VII, 1910, (W. T. Davis), 1 juv. ♀.
Toccoa, VIII, 4-5, 1913, (H.), 1 juv. ♀.
Jasper, VIII, 5, 1913, (R.), 1 ♀,
1 juv. ♂.
Atlanta, VIII, 2 and 6, 1913, (Bradley and R. & H.), 3 ♂. 1 ♂ macropterous.

In late July, 1913, immature individuals of the species were found everywhere very numerous in fields in the Piedmont region of Virginia and North Carolina.

Immature individuals of the races of this species are easily separable from those of other southeastern species of the genus, as they alone have a medio-longitudinal dorsal dark stripe on the abdomen, down the centre of which an often well-defined very narrow pale line is usually found. In addition, the lateral lobes of the pronotum are usually heavily marked with a broad dark band, which is often continued on the sides of the abdomen.

***Nemobius fasciatus socius* Scudder.**

Raleigh, Newbern, Fayetteville, Hamlet, Lake Waccamaw, Wilmington, Winter Park, Southport and Smith Island, North Carolina; north end of Sullivan Island and Yemassee, South Carolina; Tybee Island, Brunswick, Cumberland Island, Billy's Island, Homer-ville, Thomasville and Bainbridge, Georgia, and Atlantic Beach, Pablo Beach and Jacksonville, Florida.

Goldsboro, North Carolina, VII, 25,
1913, (R. & H.), 1 ♂, 1 ♀.
Augusta, Georgia, VII, 29, 1913, (R. & H.; common, untilled field among grasses), 3 ♀.

Macon, Ga., VII, 30-31, 1913, (R. & H.), 1 ♂, 4 ♀.
Albany, Ga., VIII, 1, 1913, (R. & H.),
5 ♂, 2 ♀, 1 juv. ♂. 1 ♂ macropterous.

***Nemobius maculatus* Blatchley.**

Cabin John Run and Plummer's Island, Maryland; Washington, District of Columbia; Fairfax County, Alexandria County, Cherrydale and Dead Run, Virginia, and Raleigh, North Carolina.

Cabin John Run, Maryland, IX, 1911,
(W. T. Davis), 1 ♀, [Hebard Cln.].
Fredericksburg, Virginia, VII, 20, 1913,
(R. & H.), 1 juv. ♂, 2 juv. ♀.
Petersburg, Va., VII, 23, 1913, (R. & H.), 4 juv. ♂, 1 juv. ♀.

Weldon, North Carolina, VII, 24, 1913,
(R. & H.), 1 juv. ♂.
Pinnacle Peak, Rabun County, Georgia,
VIII, 20, 1913, (J. C. Bradley), 1 ♀.
Vicinity of Stone Mountain, Ga.,
VIII, 3, 1913, (H.), 1 juv. ♀.

Immature individuals of this species are readily separable from those of other forms found in this territory. They are brownish, somewhat mottled with a paler color, and have the lateral lobes of the pronotum occasionally darkened. Confusion with material of the early instars

of *N. carolinus* would alone be possible, and the unequal dorsal pair of distal spurs of the caudal tibiae readily separates them from these.

The series recorded above was found scarce on banks of stream in woods (Fredericksburg), not scarce in boggy spot of grasses in woods (Petersburg), along stream in heavy forest (Weldon) and in bog at foot of precipice (vicinity of Stone Mountain).

The species was not previously correctly recorded¹⁴⁹ from the southeastern United States south of the vicinity of Washington, except from Raleigh, North Carolina.

***Nemobius griseus funeralis* Hart.**

Macon, Georgia, VII, 30, 31, 1913, (R. & H.), 1 ♀.

It is with great satisfaction that we find a specimen of this distinctive insect, known previously from the unique female type taken at College Station, Texas, in the material from Georgia before us. We find, moreover, a male, taken at Winslow, Arkansas, September 3, 1905, by Morse, in the Morse Collection.

Measurements (in millimeters).

	♂ Winslow, Ark.	♀ Macon, Ga.
Length of body.....	8.9	9.2
Length of pronotum.....	2	1.9
Caudal width of pronotum.....	2.6	2.4
Length of tegmen.....	5.8	3.8
Length of caudal femur.....	6.6	6
Greatest width of caudal femur.....	2.3	2
Length of ovipositor.....	4.4

***Nemobius ambitiosus* Scudder.**

Florence, South Carolina; Thompson's Mills, Jesup, Spring Creek, Thomasville, Homerville, Suwannee Creek, Billy's Island, Honey Island, St. Simon's Island and Cumberland Island, Georgia, and Jacksonville, Atlantic Beach, Pablo Beach, San Pablo, Live Oak and Georgia State Line of Leon County, Florida.

Georgia.

Rabun County, VII, 1910, (W. T. Davis), 1 ♂.	Billy's Island, IX, 1-5, 1913, (J. C. Bradley), 2 ♀.
Toccoa, VIII, 4-5, 1913, (H.), 2 juv. ♂.	Albany, VIII, 1, 1913, (R. & H.), 5 ♂, 6 ♀.
Hebardville, V, 15, 1915, (H.), 1 ♂, 1 ♀, 1 juv. ♂.	Spring Creek, VIII, 26-28, 1913, (J. C. Bradley), 2 ♂, 1 ♀.
Mixon's Hammock, V, 16, 1915, (H.), 1 ♀.	<i>Florida.</i>
	Ortega, IX, 6, 1913, (W. T. Davis), 1 ♀.

¹⁴⁹ Specimens of *N. fasciatus* from Jefferson, North Carolina, now before us, were incorrectly recorded by Sherman and Brimley as *N. maculatus* (*Ent. News*, XXII, p. 391, (1911)).

A female from Billy's Island and one from Albany are black in general coloration. Immature individuals are brown in general coloration, often tinged with reddish and flecked with darker brown; the distinctive cephalic markings are as well defined as in the adult condition.

The series recorded above was found in the undergrowth of the long-leaf pine woods (Hebardville, Albany), in dry leaves under live oak (Mixon's Hammock) and immature individuals were found occasional in oak leaves (Toccoa).

The records given above include the northernmost localities known for the species.

Nemobius bruneri Hebard.

Cabin John Run and Plummer's Island, Maryland; Washington, District of Columbia, and Glencarly, Virginia.

Virginia.

Rosslyn, X, 14, (A. N. Caudell), 3 ♂,
[U. S. N. M.]

Arlington, VII, 9, 1914, (H.), 1 juv. ♂,
1 juv. ♀.

Fredericksburg, VII, 20, 1913, (R. &
H.), 4 juv. ♂, 2 juv. ♀.

Orange, VII, 20, 1913, (R. & H.),
2 juv. ♂.

North Carolina.

Greensboro, VII, 26, 1913, (R. & H.),
2 juv. ♂.

Charlotte, VII, 27, 1913, (R. & H.),
4 juv. ♂.

Immature individuals of this species are very striking, being pale reddish brown in general coloration speckled with much darker brown, by which dark color the lateral lobes of the pronotum and first and fifth abdominal segments are heavily suffused. These latter markings give a distinctive barred appearance in very young individuals, which becomes less strongly defined in successive instars to those preceding maturity, in which these markings are not strongly indicated.

The species was found abundant in damp leaves in and along the border of a deciduous woodland on high ground near a stream (Fredericksburg) and scarce in leaves on edge of a deciduous forest (Orange).

No other records, other than those given above, have been published for the species in the territory at present under consideration.

Nemobius cubensis cubensis Saussure.

Montgomery County, Maryland; Washington, District of Columbia; Raleigh, North Carolina; Florence, South Carolina; Jesup, Georgia, and Jacksonville, Florida.

Albany, Georgia, VIII, 1, 1913, (R. &
H.), 2 ♂, 2 ♀. All brachypterous.

Bainbridge, Ga., VII, 15-27, 1909,
(J. C. Bradley), 1 ♂. Macropterous.

The species was found occasional in swampy spots (Albany).

The above records include all the localities known for the species over the territory at present considered. The species has been found as far north as Staten Island, New York, and southward appears to reach its greatest abundance in the United States in peninsular Florida.

Nemobius palustris palustris Blatchley.

Washington, District of Columbia, and Fayetteville, Lake Waccamaw and Wilmington, North Carolina.

These, the southernmost-known records for this insect, include all the localities known for it over the area now being studied.

Nemobius carolinus carolinus Scudder.

Cabin John Run and Plummer's Island, Maryland; Washington, District of Columbia; Alexandria County, Dead Run, Rosslyn, Fairfax County and Falls Church, Virginia; Raleigh, Blowing Rock, Newton, Black Mountain, Balsam, Highlands, Fayetteville and Lake Waccamaw, North Carolina; Florence, Swansea and north end of Sullivan Island, South Carolina; Thompson's Mills, Brunswick, Thomasville and Bainbridge, Georgia, and Daytona, Florida.

Virginia.

Fredericksburg, VII, 20, 1913, (R. & H.), 2 juv. ♂.

Charlotte, VII, 27, 1913, (R. & H.), 1 juv. ♂, 1 juv. ♀.
 Goldsboro, VII, 25, 1913, (R. & H.), 2 ♂, 3 ♀.

North Carolina.

Jefferson, IX, 1912, (F. Sherman), 1 ♂, [N. C. State Dept. Agr. Cln.].
 Grandfather Mountain, 4,000-5,000 feet, IX, 1915, 1 ♂, [Hebard Cln.].
 Blowing Rock, IX, 1915, (F. Sherman), 1 ♂, [N. C. State Dept. Agr. Cln.].

Georgia.

Pinnacle Peak, VIII, 20, 1913, (J. C. Bradley), 2 ♀.
 Jasper, VIII, 5, 1913, (R.), 1 juv. ♂.
 Billy's Island, IX, 1-5, 1913, (J. C. Bradley), 1 ♂.
 Spring Creek, VII, 16 to VIII, 26, 1912 and 1913, (J. C. Bradley), 1 ♂, 3 ♀.

Immature individuals of this species and of *N. confusus* are more glabrous in general appearance than any others found in the area here considered. The general color is dark brown, the four rows of large pale spots on the dorsal abdominal segments first appearing in the instars immediately preceding maturity.

The present common insect is found everywhere over the region now being studied.

Nemobius confusus Blatchley.

Cabin John Run and Plummer's Island, Maryland; Dead Run, Falls Church and Alexandria County, Virginia, and Raleigh, North Carolina.

Rabun County, Georgia, VII, 1910, (W. T. Davis), 2 juv. ♂, 1 juv. ♀.

Buckhead, Ga., VIII, 2, 1913, (H.; undergrowth in mixed oak and pine forest), 1 juv. ♀.

The very dark general coloration of immature examples of this species and the bone white maxillary palpi, make them readily separable from those of any other species found in the regions here treated.

In the southeastern United States the species was not previously known except from Raleigh, North Carolina.

A single immature specimen was found in woods of oak and pine (Buckhead).

Anurogryllus muticus (DeGeer).¹⁵⁰

New Jersey.

Ocean View, VI, 11 and 17, 1911 and 1912, (H. Fox), 2 ♂, [A. N. S. P.].

District of Columbia.

Washington, (Chittenden), 2 ♀, [U. S. N. M.].

Virginia.

Clarendon, VI, 8, 1914, (H. A. Allard), 4 ♂, [U. S. N. M.].
Falls Church, VIII, 1 ♀, [U. S. N. M.].
Charlottesville, V, 26, 1914, (H. Fox), 1 ♂, [Hebard Cln.].

North Carolina.

Raleigh, V, 30, 1905, 1 ♂, [U. S. N. M.]; VI, 1911 to 1915, (C. S. Brimley), 4 ♂, 1 ♀, [Brimley Cln. and N. C. State Dept. Agr.].

South Carolina.

Beech Island, V, 14, 1903, (Hammond), 1 ♀, [U. S. N. M.].¹⁵¹

Georgia.

Hebardville, V, 15, 1915, (H.), 4 ♂.

Florida.

Jacksonville, IV, 1885, (W. H. Ashmead), 1 ♀, [Hebard Cln.]; winter of 1880-1881, (W. H. Ashmead), 1 ♀, [U. S. N. M.].
Lawtey, X, 12 and 28, 1886, (M. Venickerbocker), 2 juv. ♂, 3 juv. ♀, [U. S. N. M.].
Gulf Hammock, Levy County, IV, 7, 1903, (P. Laurent), 3 juv. ♀, [Hebard Cln.].
De Land, 2 juv. ♀, [U. S. N. M.].

Alabama.

Auburn, V, 6, 1911, (W. E. Hinds), 1 ♀, [U. S. N. M.].
Daphne, VI, 9, 1894, (L. Sauterre), 2 ♀, [U. S. N. M.].

Louisiana.

Jena, La Salle Parish, V, 7, 1887, (M. Dempsey), 1 ♀, [U. S. N. M.].¹⁵²

Texas.

Victoria, IV, 24, 1915, (J. D. Mitchell), 2 ♀, 1 juv. ♀, [U. S. N. M.].

This insect is one of the very plastic and widely distributed American species of the group Gryllites. We find not only *guadeloupensis*, *angustulus* and *caribeus* to be synonyms of this species, as indicated by Kirby,¹⁵³ but also *Gryllodes clarazianus* of Saussure,¹⁵⁴ which form was later placed in the present genus by its author. This Argentinian variant, of which we have material before us, has been

¹⁵⁰ This species has twice been recorded by Caudell from the United States in error as *A. antillarum*. See footnote 152 and *Proc. Entom. Soc. Wash.*, VI, p. 49, (1904), [Southern United States].

¹⁵¹ Correctly recorded by Hammond (*Bull. 44, Bur. of Entom., U. S. Dept. of Agr.*, p. 94, (1904)).

¹⁵² Recorded as *antillarum* with Florida, South Carolina, Virginia and Alabama state records by Caudell (*Bull. 44, Bur. of Entom., U. S. Dept. of Agr.*, p. 88, (1904)).

¹⁵³ *Syn. Cat. Orth.*, II, p. 24, (1906).

¹⁵⁴ *Miss. Sci. Mex.*, *Rech. Zool.*, VI, p. 412, pl. VIII, fig. 31, (1874). [Bahia Blanca, Argentina.]

separated from *muticus* as found in the Guianas,¹⁵⁵ by the head being marked with four pale longitudinal lines and the caudal metatarsus being shorter and broader with dorsal margin more distinctly arcuate. The head marking appears often, though usually not strongly defined, being particularly apparent in immature examples or adults of pale general coloration, over nearly the entire distribution of the species.¹⁵⁶ Various series show that the metatarsal length and heaviness is extremely variable in the species, though often uniform in large series from the same general region.¹⁵⁷ Variations in tegminal and wing length, and in the caudal metatarsus, are principally the cause of the above synonymy, though other variations, decidedly puzzling without large series being available for comparison, also occur.

Within the boundaries of the United States the species shows appreciable differences from material from the Guianas; these differences due, in our opinion, to an adaptation to the differences in environment and climate, but, considering the plasticity of the species, neither sufficiently constant or well marked to warrant the recognition of a geographic race. The most noteworthy of these are: the somewhat more evenly rounded and protuberant occiput; slightly weaker inter-antennal protuberance; slightly less prominent eyes; more nearly quadrate dorsum of the pronotum, with caudal margin straight or weakly convex (never weakly bisinuate as in typical *muticus*); color frequently decidedly paler, with the pale marking at the ventro-cephalic angle of the lateral lobes of the pronotum (usually conspicuous in typical *muticus*) subobsolete.

Along the Atlantic coast of the United States the species is usually found to have the metatarsus very slightly longer than is typical, but of similar proportions; specimens from Alabama westward, however, have the metatarsus distinctly shorter and slightly heavier.

The examples from Victoria, Texas, have the occiput more distinctly striped than in any but Argentinian material before us. Great variation in intensity of coloration is shown in the series here recorded; although these specimens average decidedly paler than tropical material of the species, the four adults from Hebardville,

¹⁵⁵ A large series now before us from British Guiana appears to be in every way typical.

¹⁵⁶ This marking being less apparent in adults of intensive coloration, it is not surprising to find few of these in tropical series which are usually dark in general coloration.

¹⁵⁷ We are able to ascertain this fact from very large series now before us from the West Indies, Central and South America.

Georgia, are as dark as any specimens before us, but have the lateral lobes of the pronotum entirely pale.

In the United States the males have the tegmina reaching to, or falling slightly short of, the apex of the abdomen; the females have the tegmina never less than half the abdominal length, frequently about two-thirds that length, though more variable than the males in this feature. Of the above series two females (Washington) are macropterous, one female (Victoria) has a single caudate but imperfect wing, while one female (Falls Church) has long tegmina but aborted wings.

It might seem that geographic races could be recognized, but careful study, of this and much larger tropical American series, shows that variation such as discussed above occurs in an endless complexity, and that intermediates of every sort occur between conditions which might easily be supposed, without sufficient material for comparison, to represent geographic races or even closely related species. The form of the male titillatores is the same in all of the material of the species examined.

In the United States adults of the species appear in April, May and June, later than this individuals are scarcely ever encountered.

The present insect has long been known to be very destructive in the southeastern United States, damaging cotton, tobacco, sweet and white potatoes, strawberries, peas and other farm products. The series here recorded was taken: in fence corner and in truck patch (Ocean View), in cotton field (Beech Island and Auburn), on fences and walls of yard of bermuda grass, stridulating at dusk (Hebardville) and injuring strawberries (Lawtey).

The records given above define the known range of the species in the United States.

Gryllus assimilis Fabricius.

Recent studies have shown this to be the only native representative of the genus found in America.¹⁵⁸ Great variation, however, exists and we have found the variants to be best represented by symbols.¹⁵⁹ Of these, the following four are found in the regions at present under consideration:

B, suffused Z, (normally d or e, w), (45 to 2, the latter weakly 0); *scudderianus*.

AU, (normally ax), 4; *neglectus*.

¹⁵⁸ Rehn and Hebard, PROC. ACAD. NAT. SCI. PHILA., 1915, pp. 293-322, (1915).

¹⁵⁹ See PROC. ACAD. NAT. SCI. PHILA., 1915, pp. 299, 300, (1915).

AV, (normally a or b but ranging to f, x but often u), 3; *pennsylvanicus*.

AW, (normally d but ranging from a to f, w but often u), 3; *luctuosus*.

Of these, *scudderianus* is apparently an adaptation to an arenaceous surrounding, it is found locally as far north as Indiana, at the more northern points showing an average less robust form and smaller size (such material constituting the bases of the names *scudderianus*, *rubens* and *arenaceus*), while in southern Florida and on the Gulf coast an average more robust form and larger size is developed (upon such material *firmus* was in part founded).

The other three variants intermingle more generally, though individuals of each occasionally show the transition toward the *scudderianus* variant. The darkest of these, *neglectus*, is found in the north, only appearing well defined, in the area here considered, in the Appalachian mountains south as far as their highest points in north Georgia. Over the entire region *pennsylvanicus* appears generally, but is the most frequent condition met with on the Piedmont plateau, while *luctuosus* is the normal condition everywhere on the coastal plain in the regions here considered.¹⁶⁰

Material can be grouped for convenience under these variant designations, but in such treatment it must be remembered that nearly every specimen of each series will show different degrees of coloration, femoral and ovipositor length and every other feature, excepting those diagnostic qualities common to all of the variants of *G. assimilis*.

In the paper in which these facts are fully treated, the exact condition of the material from the collections at present being studied is given,¹⁶¹ the localities being: Chestertown, Glen Echo and Jennings, Maryland; Washington, District of Columbia; Roslyn, Virginia; Winter Park and Lake Waccamaw, North Carolina; Florence, Sullivan Island and Yemassee, South Carolina; Rabun Bald, Black Rock Mountain, Tuckoluge Creek, Clayton, Atlanta, vicinity of Stone Mountain, Augusta, Jesup, Waycross, Hebardville, Billy's Island, St. Simon's Island, Cumberland Island, Fargo, Chester, Bainbridge and Spring Creek, Georgia, and Atlantic Beach, Pablo Beach, Burnett's Lake and Live Oak, Florida.

¹⁶⁰ It is this condition which the present authors had frequently recorded as *G. rubens* from the southeastern United States.

¹⁶¹ PROC. ACAD. NAT. SCI. PHILA., 1915, pp. 305-307, (1915).

Gryllus domesticus Linnæus.

This species, accidentally introduced by man from Europe, has been recently recorded by us¹⁶² from "Carolina" and Roswell, Albany, and Thomasville, Georgia, within the territory at present under consideration.

Miogryllus verticalis (Serville).

The American species of this genus have recently been fully studied and reported upon by the junior author.¹⁶³

Material from the present collections from College Park and Plummer's Island, Maryland; Washington, District of Columbia; Falls Church, Virginia; Raleigh and Goldsboro, North Carolina; Columbia, South Carolina; Clayton, Sand Mountain, Trenton, Augusta, Tybee Island, Mixon's Hammock in Okefenokee Swamp and Billy's Island, Georgia, and Jacksonville, Atlantic Beach and Marianna, Florida, is treated in that paper. In addition we now have the following specimens:

Raleigh, North Carolina, late VI, 1911,
(C. S. Brimley), 2 ♀, 1 macropterous,¹⁶⁴ [Brimley Cln.]

Hebardville, Georgia, V, 15, 1915, (H.),
1 juv. ♀, 1 very small juv. ♀.
Billy's Island, Ga., V, 16, 1915, (H.),
1 juv. ♀.

Grylloides sigillatus (Walker).

Though not as yet known from Florida as far north as the region treated in the present paper, this species is apparently rapidly extending its distribution northward.

It has been reported by Davis from as far north in Florida as Lakeland, and recently the junior author found it widely distributed in that town, particularly about grocery stores, where, on May 21, 1915, a single male was taken to verify this observation.

Oecanthus niveus (DeGeer).

Cranberry, North Carolina, VIII, 1896, (H. Skinner), 1 ♂, [A. N. S. P.]

This species has been very widely discussed in past literature, principally owing to its economic importance, but very general confusion with both *O. exclamationis* and *O. angustipennis* prevents the use of the majority of these records in distributional studies.

¹⁶² PROC. ACAD. NAT. SCI. PHILA., 1915, pp. 320-322, (1915).

¹⁶³ Jour. N. Y. Ent. Soc., XXIII, pp. 101-121, (1915).

¹⁶⁴ This specimen is of particular interest in being the first macropterous example of the species to be reported from temperate regions. Four other macropterous specimens are known from the tropics, the type and three individuals of the series of one hundred and twenty-two examples which were before the junior author at the time the genus was revised. In the present example the internal face of the cephalic tibiæ bears a but weakly defined tympanum; the measurements are: length of body 13.7, of pronotum 2.3, of tegmen 6, of wing 16.7, of caudal femur 9, of ovipositor 10.3 mm.

We know it to be found on the Atlantic coast as far north as Windsor, Connecticut. Thompson's Mills, Georgia, is the only previous definite record for the southeastern United States. The species is both dendrophilous and thamnophilous, appearing usually in greatest numbers in shrubs with pithy branches, in which the females deposit their eggs.

Æcanthus angustipennis Fitch.

North Carolina.

- Raleigh, X, 18, 1905, 1 ♀; XI, 2, 1904, (G. M. Bentley), 1 ♀, [both N. C. Dept. Agr. Cln.].
 Southern Pines, XI, 1908, (A. H. Mancee), 2 ♀, [N. C. Dept. Agr. and Hebard Cln.].
 Mount Airy, XI, 16, 1904, (G. M. Bentley), 1 ♀, [N. C. Dept. Agr. Cln.].
 Saluda, VIII, 17, 1903, (A. P. Morse), 1 juv. ♀.
 Balsam, about 4,000 feet, IX, 15-18, 1908, (Z. P. Metcalf), 1 ♀, [N. C. State Dept. Agr. Cln.].

South Carolina.

- Florence, IX, 6, 1911, (R. & H.; in forest foliage), 1 ♀.

Georgia.

- Pinnacle Peak, Rabun County, VIII, 20, 1913, (J. C. Bradley), 1 ♀.
 Currahee Mountain, VIII, 5, 1913 (H.; beaten from luxuriant vegetation, vines, oak shoots, etc., in black-jack woods), 1 juv. ♂.
 Buckhead, VIII, 2, 1913, (R. & H.), 1 juv. ♂.
 Isle of Hope, IX, 3, 1911, (R. & H.; heavy undergrowth of gray-bark pine forest), 1 ♀.
 Albany, VIII, 1, 1913, (R. & H.), 1 juv. ♀.
 De Witt, VII, 25, 1912, 1 ♀, [Ga. State Cln.].
 Spring Creek, VII, 16-29, 1912, (J. C. Bradley), 1 ♀.

Hartford, Connecticut, is the most northern location on the Atlantic coast at which we know the species to occur. Past confusion with other species makes distributional studies from the literature, in almost every case, impossible. The species has been taken and recorded by us from as far south as Lakeland, Florida. It has been correctly recorded in the regions under consideration from Bayville, Virginia; Raleigh and Asheville, North Carolina, and Toccoa and Thompson's Mills, Georgia. Like *O. niveus*, the species is both dendrophilous and thamnophilous.

Æcanthus quadripunctatus Beutenmüller.

Virginia.

- Fredericksburg, VII, 20, 1913, (R. & H.; occasional, especially juv., in weeds in open), 1 ♂, 1 ♀.
 Cape Henry, VII, 2 and IX, 7, 1903, (A. P. Morse), 2 ♀.
 Virginia Beach, VII, 4, 1903, (A. P. Morse), 3 ♂.
 Appomattox, IX, 6, 1903, (A. P. Morse), 1 ♀, 3 juv. ♀.
 Wytheville, IX, 5, 1903, (A. P. Morse), 3 ♀.

North Carolina.

- Weldon, VII, 24, 1913, (R. & H.), 1 ♂.
 Tarboro, VII, 7, 1903, (A. P. Morse), 3 ♂, 2 ♀.
 Raleigh, VII, 9, 1903, (A. P. Morse), 1 ♂, 5 ♀.
 Goldsboro, VII, 25, 1913, (R. & H.), 1 ♂.
 Jefferson, IX, 1912, (F. Sherman), 1 ♀, [N. C. State Dept. Agr.].
 Morganton, VII, 12, 1903, (A. P. Morse), 3 ♂, 2 ♀.

Saluda, VIII, 17, 1903, (A. P. Morse),
1 ♀.
Asheville, VII, 21, 1903, (A. P. Morse),
1 juv. ♀.
Balsam, 4,000 feet, IX, 15-18, 1908,
(Z. P. Metcalf), 1 ♀, [N. C. State
Dept. Agr.].
Wrightsville, IX, 7, 1911, (R. & H.),
6 ♂, 3 ♀.
Winter Park, IX, 7, 1911, (R. & H.),
2 ♂, 3 ♀.
Lake Waccamaw, IX, 8, 1911, (R. &
H.), 1 ♂, 2 ♀.

Tennessee.

Roan Mountain Station, IX, 3, 1903,
(A. P. Morse), 6 ♂, 1 ♀.

South Carolina.

Florence, IX, 6, 1911, (R. & H.), 1 ♀.
Columbia, VII, 28, 1913, (R. & H.),
2 ♂, 4 ♀.

Georgia.

Rabun County, VII, 1910, (W. T.
Davis), 1 juv. ♂.
Currahee Mountain, VIII, 5, 1913,
(H.), 1 ♂.
Augusta, VII, 29, 1913, (R. & H.;
waste field), 1 ♂, 1 ♀.
Stone Mountain, VII, 28, 1903, (A. P.
Morse), 1 juv. ♂.
Bolton, VII, 29, 1903, (A. P. Morse),
2 ♂.
Jasper, VIII, 5, 1913, (R.), 1 juv. ♂,
1 juv. ♀.

Chickamauga, VII, 10, 1898, (H. L.
Viereck), 1 ♂, [A. N. S. P.].
Trenton, VII, 10, 1905, (A. P. Morse),
1 ♂, 1 ♀.
Macon, VII, 30-31, 1913, (R. & H.),
1 ♂, 5 ♀.
West Point, VII, 30, 1903, (A. P.
Morse), 1 ♂.
Oglethorpe, VII, 1, 1910, (J. C. Brad-
ley), 1 ♂, 1 ♀.
Isle of Hope, IX, 3, 1911, (R. & H.),
1 ♂.
Tybee Island, VII, 26, 1913, (J. C.
Bradley), 1 ♀; VIII, 13, 1903,
(A. P. Morse), 1 juv. ♂.
Billy's Island, VI, 1912, (J. C. Brad-
ley), 2 ♀.
Albany, VIII, 1, 1913, (R. & H.;
undergrowth in long-leaf pine forest),
2 ♀.
Bainbridge, IX to X, (J. C. Bradley),
1 ♀.

Florida.

Jacksonville, XI, 3, 1911, (W. T.
Davis), 1 ♂.
Ortega, IX, 27-28, 1913, (W. T.
Davis), 5 ♂, 1 juv. ♂.
Newberry, XI, 18, 1911, (W. T.
Davis), 1 ♂.
Live Oak, VIII, 26, 1911, (R. & H.),
1 ♂, 1 ♀.
Tallahassee, VIII, 8, 1903, (A. P.
Morse), 1 ♂.

This, the most abundant species of the present genus in the eastern United States, is found almost everywhere over the regions here considered, it has been correctly recorded from as far south in the eastern United States as Fort Myers, Florida. The insect has been frequently recorded in past literature as other species of the genus. The species is more nearly terrestrial than any other of the genus here considered; it is usually found in the open, in weeds and grasses, where it occurs frequently in considerable numbers.

In the above series one specimen, from Live Oak, Florida, has the inner antennal marking greatly reduced, while the outer markings have disappeared. This is very unusual in this species, in which these markings are normally well defined with outline sharp and even.

Ecanthus nigricornis Walker.*Tennessee.*

Roan Mountain Station, IX, 3, 1903,
(A. P. Morse), 12 ♂, 13 ♀.

North Carolina.

Jefferson, IX, 1912, (F. Sherman;
C. L. Metcalf), 2 ♂, 1 ♀, [N. C.
State Dept. Agr.].

Blowing Rock, VIII, 1905-1906, (R. S. Wolgum; F. Sherman), 2 ♂, 1 ♀, [N. C. State Dept. Agr.].
Grandfather Mountain, 4,000 feet, IX, 11, 1908, (Z. P. Metcalf), 3 ♀, [N. C. State Dept. Agr.].

Linville, VIII, 28, 1906, (R. S. Wolgum), 1 ♂, [N. C. State Dept. Agr.].
Waynesville, IX, 14, 1909, (Z. P. Metcalf), 2 ♂, [N. C. State Dept. Agr. and Brimley Cln.].
Montreat, 3,000 feet, IX, 21-22, 1908, (Z. P. Metcalf), 1 ♀, [Brimley Cln.].

In addition to the normally very distinctive coloration of this insect, it may be further distinguished from the allied *O. quadripunctatus* by the heavier pronotum, the greatest width of which more closely approximates the length of the same than in that species, while the head between the eyes is weakly but distinctly depressed, a condition not at all or rarely very weakly indicated in *quadripunctatus*.

Only a few specimens in the present series do not exhibit the very strongly defined normal type of coloration, these have the dark markings slightly paler, while in a single female the color pattern is still more decidedly recessive and only in part indicated.

We believe the present species to be confined to the Appalachian portion of the regions at present under consideration. It is widely distributed over the north-central and central-eastern portions of the United States and is the most abundant species of the genus in southern Ontario. Numerous records of *nigricornis* and the synonymous *fasciatus* are, however, erroneous. On the Atlantic coast it is known to occur over but a comparatively limited area north of the territory here studied. The insect is found in weeds and low plants in the open, but particularly in tangles of raspberry vines; it is usually locally distributed, but very abundant.

***Oecanthus pini* Beutenmüller.**

1911. *Oecanthus nigricornis* Rehn and Hebard, (not of Walker, 1869), Proc. Acad. Nat. Sci. Phila., 1910, p. 649. [Raleigh, North Carolina.]

Raleigh, N. C., IX, 7 and 22, 1904, (C. S. Brimley; upland field and alders in pine woods), 2 ♀, [Hebard Cln.].

This species shows nearest relationship to *O. nigricornis*, but is somewhat more robust, with coloration and color pattern distinctive and wholly different, with pronotum normally slightly heavier and more nearly quadrate, and with the head between the eyes even more decidedly depressed. The antennal markings are much as in specimens of that species in which such markings are apparent; in *O. quadripunctatus* these markings are very similar, but with outline more abruptly and evenly defined.

The present species, we believe, is wholly arboreal and only found

in pine trees, except when moving from one to another. Its distribution is as yet very imperfectly known; the species was described from [West Woodstock], Windham County, Connecticut. Other records from Riverton and Anglesea, New Jersey; Chestertown, Maryland, and Brownsville, Texas, do not apply to this species, but several from the pine-barrens region of New Jersey we know to be correct.

Ecanthus latipennis Riley.

Virginia.

Fredericksburg, VII, 20, 1913, (R. & H.; weeds in corner of field near deciduous forest), 2 juv. ♂.

Orange, VII, 21, 1913, (R. & H.; very scarce in undergrowth of chestnut woods), 1 juv. ♂.

Petersburg, VII, 22, 1913, (R. & H.; scarce in undergrowth of pine woods), 2 juv. ♂.

Appomattox, IX, 6, 1903, (A. P. Morse), 1 ♀.

North Carolina.

Weldon, VII, 24, 1913, (R. & H.; undergrowth in low pine woods), 2 juv. ♂, 1 juv. ♀.

Goldsboro, VII, 25, 1913, (R. & H.; vegetation in damp places of short-leaf pine woods), 2 juv. ♂, 1 juv. ♀.

Fayetteville, IX, 9, 1911, (R. & H.; beaten from low oaks in short-leaf pine woods), 1 ♂, 1 ♀.

Greensboro, VII, 26, 1913, (R. & H.), 1 juv. ♂.

Saluda, VIII, 17, 1903, (A. P. Morse), 1 juv. ♂.

South Carolina.

Florence, IX, 6, 1911, (R. & H.; scrub oaks in short-leaf pine forest), 3 ♂, 5 ♀.

Ashley Junction, VIII, 15, 1913, (R.; beaten from undergrowth in long-leaf pine woods), 1 juv. ♂.

Georgia.

Toccoa, VIII, 4, 1913, (H.; beaten from heavy, low scrub oaks), 1 juv. ♂.

Jasper, VIII, 5, 1913, (R.; beaten from scrub), 1 juv. ♀.

Sharp Mountain near Jasper, VIII, 6, 1913, (R.; beaten from blackberry and oak shoots), 1 juv. ♂.

Buckhead, VIII, 2, 1913, (R. & H.; oak shoots in oak woods), 1 juv. ♂, 1 juv. ♀.

Dalton, VIII, 7, 1913, (R.; beaten, on hillside), 1 juv. ♀.

Sand Mountain, VIII, 25, 1903, (A. P. Morse), 1 juv. ♂, 1 juv. ♀.

Warm Springs, VIII, 9-10, 1913, (R.), 2 juv. ♂, 1 juv. ♀.

Augusta, VII, 29, 1913, (H.; oak shoots in sand area, one seen), 1 juv. ♂.

Isle of Hope, IX, 3, 1911, (R. & H.), 1 juv. ♀.

Among the eastern representatives of the genus the present species is distinctive in size, form of pronotum in the males, coloration, color pattern and tegminal proportions; in the male the tegmina are very wide for the genus.

Over the area under consideration the present species has been recorded only from Bayville, Virginia; Raleigh, North Carolina, and Thompson's Mills, Georgia. It is, however, widely distributed, though local, our experience having found it to prefer low oaks and oak shoots in woodlands. Adults of the species are not present until late in the season.

Neoxabea bipunctata (DeGeer).

Chestertown, Maryland, VIII, 25, 1899, (E. G. Vanatta), 1 ♀, [A. N. S. P.]
 Rabun County, Georgia., VII, 1910, (W. T. Davis), 2 juv. ♂.
 Billy's Island, Ga., VII, 1912, (J. C. Bradley), 1 ♀.

The remarkable proximal antennal joints, pronotum, callosities of the dorsum of the male abdomen, caudal femora with margins unarmed and supplied distad with two and two very small spurs, cerci and subgenital plate in both sexes, constitute only in part the distinctive characters of this extraordinary and, though scarce, widely distributed species.

On the Atlantic coast it is known from as far north as Portland, Connecticut, the above records being the first for the regions at present under consideration. The species is extremely retiring, living only in the densest tangles of heavy forest undergrowth, where solitary examples can be found only after long-continued and vigorous beating.

The Genera of the Group Anaxiphites.

In 1873,¹⁶⁵ Brunner erected the genus *Cyrtoxipha*, but failed to designate by name any species; the following year Saussure used the name and placed in the genus five species,¹⁶⁶ one of which, *gundlachi*, Kirby¹⁶⁷ has selected as genotype. The characters upon which Saussure separated the genera *Cyrtoxipha* and *Anaxipha*¹⁶⁸ have been proven invalid,¹⁶⁹ but we find that two species of the former, *gundlachi* and *columbiana*, possess characters of generic value to separate them from the other species which have been assigned to these genera. We are consequently obliged to restrict the genus *Cyrtoxipha* to these two species and to place all the other American forms, hitherto included in this genus, in the genus *Anaxipha*. This latter genus is as a result found to be very large, the species of which may be divided into several well-marked groups, none of which, however, we feel to be sufficiently differentiated to warrant at present the erection of other genera or subgenera. The type of this genus is *pulicaria* Burmeister as designated by Kirby,¹⁷⁰ who, however, is in error in synonymizing *exigua* and *pulicaria*. The former is a very distinct

¹⁶⁵ *Mittheil. Schweiz. Ent. Gesellsch.*, IV, p. 168, (1873).

¹⁶⁶ *Miss. Sci. Mex.*, Rech. Zool., VI, p. 373, (1874).

¹⁶⁷ *Syn. Cat. Orth.*, II, p. 80, (1906).

¹⁶⁸ Described by that author in the same study. *Miss. Sci. Mex.*, Rech. Zool., VI, p. 370, (1874).

¹⁶⁹ Rehn and Hebard, *Ent. News*, XXIII, p. 411, (1912).

¹⁷⁰ *Syn. Cat. Orth.*, II, p. 86, (1906).

form and cannot be considered in the fixation of the type of the genus *Anaxipha* as it was not one of the originally included species.

The genus *Falcicula*¹⁷¹ is monotypic and shows close relationship to *Anaxipha*, but it possesses very distinctive characters in the complete absence of auditory foramina on the cephalic tibiae and in the structure of the male tegmina. The ovipositor is similar to that of certain species of *Anaxipha* and has the margins minutely serrulate distad. This feature can scarcely be seen with a hand lens and was missed in the original description.

CYRTOXIPHA Saussure.

Genotype: *Cyrtoxipha gundlachi* Saussure.

Head longitudinal, dorsal surface from behind eyes to dorsal apex of inter-antennal protuberance strongly flattened and but little declivent. Eyes longitudinal, much longer than deep, with dorsal margin not raised above plane of flattened portion, more prominent distad than proximad. Last joint of maxillary palpi not as long as penultimate joint, expanding very strongly distad from base with distal truncation transverse, when flattened out nearly forming an equilateral triangle. Cephalic tibiae with auditory foramen open on both faces. (In the two species known, the color is immaculate and delicate, pale green, but this fades almost invariably in drying to a pale brown, which is the same as the general coloration in a number of species of *Anaxipha*. The spines of the dorsal margins of the caudal tibiae are in these species extremely delicate and little longer than the spaces intervening between their bases. A wingless condition apparently does not occur, the wing length, however, is never more than one and one-half times the tegminal length.)

ANAXIPHA Saussure.

Genotype: *Anaxipha* [*Gryllus*] *pulicaria* (Burmeister).

Head vertical, dorsal surface not strongly flattened, strongly declivent from occiput to inter-antennal protuberance. Eyes vertical, much deeper than long, evenly protuberant. Last joint of maxillary palpi elongate, longer than penultimate joint, distal truncation transverse or oblique. Cephalic tibiae with auditory foramen open on both faces in winged individuals, in wingless examples normally present, but rarely open, on outer face only, as in winged material. (Distinctive color patterns are developed

¹⁷¹ Rehn, *Ent. News*, XIV, p. 258, (1903).

in numerous species. The spines of the caudal femora are shorter than, to much longer than, the spaces intervening between their bases. The majority of the species are winged, with wing length more than twice the tegminal length. Numerous species, however, develop a wingless condition, in several this being the normal state.)

FALCICULA Rehn.

Genotype: *Falcicula hebardii* Rehn.

Agrees with *Anaxipha*, but the cephalic tibiae possess no auditory foramen and the stridulating area of the male tegmina is minute. (In the one species known the general coloration is uniform pale brown, the size is very small to minute, a winged condition is never developed and the caudal tibiae are more swollen than in any known species of *Anaxipha*.)

Anaxipha exigua (Say).

Maryland.

Rockville, VIII, 16, (F. Knab), 1 ♀,
[U. S. N. M.].

Hyattsville, VIII, 2, 1908, (F. Knab),
1 ♂, [U. S. N. M.].

Plummer's Island, VIII, 16 to IX, 15,
1907 to 1909, (Caudell, Fisher,
Knab), 2 ♂, 1 ♀, [U. S. N. M.].

Cabin John Run, VIII, 7, 1902, (T.
Pergande), 1 ♀, [U. S. N. M.].

District of Columbia.

Washington, VIII to X, 1878 to 1883,
2 ♂, 10 ♀, [Hebard Cln. and U. S.
N. M.].

Virginia.

Glencarlyn, VIII, 12, (A. N. Caudell),
1 ♂, [U. S. N. M.].

Falls Church, IX, 4, 1906, (A. N.
Caudell), 1 ♂, 2 ♀, [U. S. N. M.].

Fredericksburg, VII, 20, 1913, (R. &
H.), juv. seen.

Petersburg, VII, 22, 1913, (H.), 1 ♂.

North Carolina.

Weldon, VIII, 24, 1913, (R. & H.),
2 juv. ♂.

Raleigh, VIII, 16 to X, 14, 1904 to
1906, (Sherman and Brimley), 5 ♂,
8 ♀, [N. C. State Dept. Agr.].

Fayetteville, IX, 9, 1911, (R. & H.), 3 ♀.

Wilmington, IX, 8, 1911, (H.), 1 ♀.

Lake Waccamaw, IX, 8, 1911, (H.), 1 ♂.

South Carolina.

Florence, IX, 6, 1911, (R. & H.), 2 ♂,
7 ♀.

Georgia.

Toccoa, VIII, 28, 1909, (J. C. Brad-
ley), 1 ♂.

Lavender, 1 ♂, 1 ♀, [Ga. State Cln.].

Thompson's Mills, X, 1909, (H. A.
Allard), 1 ♀, [U. S. N. M.].

Savannah, VIII, 14, 1903, (A. P.
Morse), 1 ♂, 3 ♀.

Albany, VII, 31, 1913, (H.), 1 ♀.

Florida.

Jacksonville, (T. J. Priddey), 1 ♂,
1 ♀, [Hebard Cln.].

The larger size, heavy facial markings and narrow but decided dark, longitudinal stripe of the caudal femora readily distinguish this species from any other found in the United States.

Of the present series five females are long winged (Rockville, Washington, Raleigh, Albany and Jacksonville). These and two females with long tegmina and no wings (Virginia near Washington and Thompson's Mills) have the cephalic tibiae with open auditory foramina on both faces, all of the others have this only on the external

face, though a few show a slight depression on the internal face. Considerable size variation is shown, this having no geographic significance.

The species is usually found in luxuriant grasses or weedy tangles, particularly near water, and is often locally very abundant. It was found immature in great numbers in weeds, both along the river and streams in woods (Fredericksburg), very scarce in short grasses in boggy spot in woods (Petersburg), in undergrowth near stream in forest (Weldon), in rank weedy undergrowth on wet ground on edge of pine forest (Fayetteville, Wilmington, Lake Waccamaw), common on or near the ground in low green vegetation growing on edge of "branch" filled with deciduous trees (Florence) and attracted to light in hotel room (Albany).

This species is known on the Atlantic coast as far north as Westbrook, Connecticut; it has been correctly recorded westward to Brownsville, Texas. Numerous records of *pulicaria* from as far northwest as Cuming County, Nebraska, and the Mississippi River, Minnesota, apply to this species.

Anaxipha pulicaria (Burmeister). Pl. XIV, fig. 20.

North Carolina.

Raleigh, VII, 8, 1903, (A. P. Morse),
1 ♂, 1 ♀.

Miami, 1887, (E. A. Schwarz), 1 ♀,
[U. S. N. M.]; (Mrs. A. T. Slosson),
1 ♂, [M. C. Z.].

South Carolina.

Florence, IX, 6, 1911, (R. & H.), 1 ♀.
Yemassee, IX, 4, 1911, (R. & H.),
1 ♂, 2 ♀.

Texas.

Doucette, VII, 24, 1912, (H.), 1 ♂,
1 ♀.

Georgia.

Tybee Island, IX, 2, 1911, (H.), 8 ♂,
4 ♀.

Beaumont, VII, 23, 1912, (H.), 10 ♂,
4 ♀.

Thomasville, IV, 9, 1904, (H.), 1 ♂.¹⁷²

Dickinson, VII, 20, 1911, (H.), 2 ♂,
2 ♀, 2 juv. ♂, 2 juv. ♀.

Florida.

Gainesville, VIII, 16, 1905, (R. & H.),
1 ♂.¹⁷³

Brownsville, VI, 23, 1908, (C. A. Hart;
at light), 7 ♂, 7 ♀, [Ill. State Lab.
N. H.]; VII, 31 to VIII, 5, 1912,
(R. & H.), 2 ♂, 1 ♀; XI, 21 and 23,
1910, (C. A. Hart), 1 ♂, 2 ♀, [Ill.
State Lab. N. H.].

Fort Reed, IV, 23, 1876, 1 ♀, TYPE of
Cyrtoxipha delicatula Scudder,
[M. C. Z.].

This species is smaller, more compact and robust than *A. exigua*, and is immaculate pale brown in coloration. No cephalic markings are found, except in the Brownsville series, where weakly defined darker markings similar to those of *exigua* appear (figured).

In this series, those from Fort Reed and Miami and the specimens taken at Brownsville in June are long winged; these have open

¹⁷² Misidentified as *A. exigua* by Rehn and Hebard, PROC. ACAD. NAT. SCI. PHILA., 1904, p. 801, (1905).

¹⁷³ Misidentified as *A. exigua* by Rehn and Hebard, PROC. ACAD. NAT. SCI. PHILA., 1907, p. 318, (1907).

auditory foramina on both faces of the cephalic tibiae, while all of the other specimens have this organ only present on the external face of these members.

Wingless females of this species are very similar to the largest females before us of *Falculica hebardi*, but are readily distinguished by the presence of auditory foramina on the external face of the cephalic tibiae and, though distinctly more compact than *exigua*, are not as compact as *hebardi*. Some variation in the proportions of the caudal tibiae is found, and though the length appears to vary chiefly with the size of the insect, long-winged individuals indicate that in these this measurement proportionately averages slightly greater. Extremes in length of caudal femora in material before us: wingless, ♂ 4.1 to 5, ♀ 4 to 4.9; winged, ♂ 4.7 to 5, ♀ 5 to 5.2 mm.

This insect does not appear to climb up in high grasses and weeds as much as *exigua* does, but prefers low grasses, particularly in wet locations. It was taken in undergrowth near a "branch" (Florence), in wet undergrowth of pine woods (Yemassee, Gainesville), in moderate numbers in low grass on edge of salt marsh (Tybee Island), in "hammock" near stream (Thomasville), common on swampy ground in tangles of low weeds and some raspberry vines, in woods composed mainly of deciduous trees (Beaumont) and not common in undergrowth of pine woods (Dickinson).

The above records define the known limits¹⁷⁴ of the species' distribution in the United States.¹⁷⁵ Numerous records in the literature, of this species from more northern localities, apply without exception to *exigua*, which name was for a long time incorrectly referred to the genus *Nemobius*.

Anaxipha vittata (Bolivar). Pl. XIV, fig. 21.

Albany, Georgia, VIII, 1, 1913, (H.; forest undergrowth along edge of Flint River), 1 ♀.

Atlantic Beach, Florida, VIII, 24, 1911, (H.; in tangles of raspberry vines in jungle of cabbage palmetto and live oak), 1 ♂.

Punta Gorda, Fla., (Mrs. A. T. Slosson), 1 ♀, [M. C. Z.].

Key West, Fla., III, 15, 1910, (H.; in short, heavy grasses growing in open, on scant soil beside a wet depression in the Key West oolitic limestone), 1 ♀.¹⁷⁶

¹⁷⁴ The authors' previous record of a single specimen from Key West, Florida, was based on the specimen here correctly recorded under *A. vittata*.

¹⁷⁵ We have thought best to record here all of the material of the species before us from the United States, in order to correct and define as fully as possible the distribution of the species in this country.

¹⁷⁶ Misidentified as *A. pulicaria* by Rehn and Hebard, PROC. ACAD. NAT. SCI. PHILA., 1912, p. 274, (1912).

This insect agrees with *A. pulicaria* in many respects, but is a smaller, more delicate species. A distinctive color pattern is developed which, when present, readily distinguishes the species.¹⁷⁷ This is strongly marked in the specimens from Atlantic Beach (figured) and Punta Gorda, but very weakly indicated and only by the marking of the occiput and dorsum of the pronotum in the other two specimens.

The specimens here recorded are wingless, numerous long-winged examples are present, however, in the exotic series before us. All of the winged individuals have open auditory foramina on both faces of the cephalic tibiae; in the wingless examples this organ is missing on the inner face of these members.

This tiny species was not previously known to exist within the United States, a large series now before us shows it to be probably the most abundant and widely distributed species of the genus in Cuba and on the Gulf coast of Mexico.

Falcicula hebardii Rehn.

New Jersey.

Reega, Atlantic County, VII, 31 and VIII, 10, 1914, (H.), 4 ♀.

Maryland.

Near Plummer's Island, VI, 17, 1913, (W. L. McAtee), 1 ♀, [U. S. N. M.].

Virginia.

Near Washington, D. C., V, 30, 1883, 1 ♀, [Hebard Cln.].

Petersburg, VII, 22, 1913, (R. & H.), 4 ♀, 3 ♀.

Cape Henry, VII, 2, 1903, (A. P. Morse), 1 ♀.

North Carolina.

Goldsboro, VII, 25, 1913, (R. & H.), 1 ♂, 4 ♀.

Raleigh, VII, 8, 1903, (A. P. Morse), 2 ♂, 8 ♀.

Greensboro, VII, 26, 1913, (H.), 1 ♂.

South Carolina.

Florence, IX, 6, 1911, (R.), 1 ♀.
Yemassee, IX, 4, 1911, (R. & H.), 1 ♂, 2 ♀.

Georgia.

Isle of Hope, IX, 3, 1911, (R. & H.), 1 ♀.

Hebardville, V, 15, 1915, (H.), 1 ♀, 2 juv. ♀.

Suwannee Creek, VIII, 28, 1911, (H.), 1 ♂.

Cumberland Island, VIII, 31, 1911, (R. & H.), 1 ♂, 1 ♀.

Texas.

Doucette, VII, 24, 1912, (H.), 2 ♂, 2 ♀.

Beaumont, VII, 23, 1912, (H.), 2 ♂.

Dickinson, VII, 20, 1912, (H.), 22 ♂, 21 ♀.

Individuals of this minute species are distinguishable from any others of the Group Anaxiphitès, not only by the absence of auditory foramina on the cephalic tibiae, but also the remarkable reduction

¹⁷⁷ Large exotic series before us show that the species develops an unusual complexity of markings. Certain examples, in the Mexican series, are exceptional in having the caudal femora suffused dorsad and narrowly banded mesad on the outer face with very dark brown, while rare individuals have the dorsal field of the tegmina fuscous. Other specimens have no dark markings whatever and can only with difficulty be separated from small individuals of *A. pulicaria*, which species is, however, appreciably more robust.

of the tegminal stridulating apparatus in the male sex. The general coloration is immaculate pale yellowish brown, with no trace of cephalic markings. The species does not appear ever to develop wings and the tegmina have a more regularly convex contour than in the species of the allied genera.

The species is usually found in greatest numbers in the dry wire-grass and dead needles of the pine woods. It has twice been found in considerable numbers in such situations (Thomasville, Georgia; Dickinson, Texas). The above series was found very rare in heavy grasses of pine forest, *Pinus rigida* (Reega), occasional in grasses in boggy opening in woods (Petersburg), few in number in dry grasses under short-leaf pines, *Pinus echinata* (Goldsboro), in short grass on edge of forest (Greensboro), undergrowth of pine woods (Yemassee), undergrowth of gray-bark pine forest, *Pinus* sp. (Isle of Hope), in dry wire-grass and dead pine needles of long-leaf pine woods, *Pinus palustris* (Cumberland Island) and in heavy undergrowth of same (Hebardville, Suwannee Creek).

The present species has been previously correctly recorded only from the type locality, Thomasville, Georgia, and from Gainesville, Florida.¹⁷⁸

Cyrtoxipha gundlachi Saussure.

Silver Springs, Florida, XI, 25, 1911, (G. P. Englehardt), 1 ♀, [Hebard Cln.].

This species is only known in the United States from peninsular Florida and has not been previously correctly recorded north of Punta Gorda;¹⁷⁹ it is widely distributed in the West Indies and is known from Central and northern South America.

The present specimen is no larger than the average individuals from Key West, Florida.

Cyrtoxipha columbiana Caudell.

North Carolina.

Stem, end of X, 1908, 1 ♀, [N. C. State Dept. Agr.].

Raleigh, VIII, 24, 1905, X, 3, 1908, (C. S. Brimley), 1 ♂, 1 ♀, [Brimley Cln.].

South Carolina.

Florence, IX, 6, 1911, (R. & H.), 1 ♂.

Georgia.

Hoschton, VII, 26, 1909, (H. A. Allard), 3 ♂, [U. S. N. M. and Hebard Cln.].

¹⁷⁸ As the distribution of the species has been found to be so much more extensive than was previously known, we have here recorded all of the material before us in order to define as fully as possible its range. The records of this species (♀), and *Anaxipha exigua* (♂), from Cabañas, Cuba, are incorrect, the material being properly referable to *Anaxipha vittata*. Rehn, *2d Rept. Cent. Exp. Sta. Repub. Cuba*, pp. 223, 224, (1909).

¹⁷⁹ Ashmead's record from Utica, Mississippi, applies properly to *C. columbiana*. *Inns. Life*, VI, p. 25, (1894).

Brunswick, VIII, 30, 1911, (H.), 1 ♀.
 De Witt, VII, 24, 1912, (J. C. Bradley), 3 ♂.
 Spring Creek, VII, 16 to VIII, 28, 1912
 and 1913, (J. C. Bradley), 2 ♂, 2 ♀.

Florida.

Atlantic Beach, VIII, 25, 1911, (R. & H.), 4 ♀.

Mississippi.

Hattiesburg, VII, 17, 1905, (A. P. Morse), 1 ♀.

Texas.

Dallas, (J. Boll), 2 ♀, [M. C. Z. and U. S. N. M.].
 Doucette, VII, 24, 1912, (H.), 2 ♂, 2 ♀.

This species is very closely related to *C. gundlachi*. It may be distinguished by its greater size, more specialized and elongate titillatores of the male, which normally extend well beyond the distal margin of the subgenital plate, heavier and longer ovipositor with heavier serrulations (in this character, however, only showing a proportionate size increase in the larger species) and tegmina which usually show a few weak and irregularly placed transverse veinlets. The beautiful and brilliant, though pale, green coloration of both these species in life, almost entirely disappears in dried material.

In the series before us the following extremes in length are found: tegmen, ♂ 5.6 to 6.8, ♀ 6.3 to 7; wing, ♂ 7.3 to 9.2, ♀ 8.8 to 9.4; caudal femur, ♂ 5 to 5.7, ♀ 5.3 to 5.8; ovipositor 3.2 to 3.6 mm.

The species is thamnophilous and dendrophilous and has never been found in the least abundant. Its small size and retiring habits make it a very difficult insect to collect. The present material was taken in a deep forest of gum, sweet gum, etc. (Florence), beaten from bayberry bushes, *Myrica cerifera*, near stream in forest (Brunswick) and from the same on edge of pine woods (Atlantic Beach), and was found scarce in low bushes, particularly in shoots of sweet gum, along stream in forest (Doucette).

The insect was described from Washington, District of Columbia, and Falls Church, Virginia, the northernmost localities from which it is known, and has been previously recorded from Raleigh, North Carolina, and Bainbridge, Georgia. The present records considerably extend the known range of the species westward.¹⁸⁰

Phylloscyrtus pulchellus* (Uhler).Maryland.*

Chestertown, VIII, 17 to 26, 1899, (E. G. Vanatta), 1 ♂, 4 ♀, [A. N. S. P.].

Virginia.

Fredericksburg, VII, 20, 1913, (H.), 1 juv. ♂.
 Petersburg, VII, 22, 1913, (R. & H.), 2 juv. ♂, 1 juv. ♀.

North Carolina.

Alamance County, VII, 1905, (F. Sherman, Jr.), 1 juv. ♂, [N. C. State Dept. Agr.].
 Weldon, VII, 24, 1913, (R. & H.), 1 juv. ♂.
 Goldsboro, VII, 25, 1913, (R. & H.), 3 juv. ♀.
 Fayetteville, IX, 9, 1911, (R. & H.), 1 ♂, 1 ♀.

¹⁸⁰ We have thought best to record here all of the material of this little-known species before us. See additional record for species. footnote 179.

South Carolina.

- Florence, IX, 6, 1911, (R. & H.),
10 ♂, 10 ♀.
Columbia, VII, 28, 1913, (H.), 1 ♂.
Ashley Junction, VIII, 15, 1913, (R.),
1 ♀.

Georgia.

- Clayton, VI, 1909, (W. T. Davis),
1 juv. ♀, [Davis Cln.].
Lavender, VIII, 23, 1910, (J. C.
Bradley), 1 ♀.
Buckhead, VIII, 2, 1913, (R. & H.),
1 juv. ♂, 1 juv. ♀.
Macon, VII, 30 and 31, 1913, (R. &
H.), 1 ♂.
Columbus, VIII, 9, 1913, (J. C. Brad-
ley), 2 ♂, 2 ♀.

- Savannah, VII, 31, 1913, (J. C. Brad-
ley), 1 ♀; VIII, 14, 1903, (A. P.
Morse), 8 ♂, 14 ♀.
Sandfly, IX, 3, 1911, (H.), 1 ♂, 1 ♀.
Isle of Hope, IX, 3, 1911, (R. & H.),
1 ♂, 1 ♀.
Billy's Island, VI, 12, 1912, (J. C.
Bradley), 1 juv. ♂; IX, 1 to 5,
1913, (J. C. Bradley), 1 ♂.
Albany, VIII, 1, 1913, (R. & H.),
19 ♂, 26 ♀, 3 juv. ♀.
Thomasville, VI, 29, 1903, (for
Hebard), 1 juv. ♂, [Hebard Cln.].

Florida.

- Jacksonville, (T. J. Priddey), 1 ♂,
1 ♀, [Hebard Cln.].
Sanford, (G. B. Frazer), 1 ♂,
[M. C. Z.].

The large series before us shows little size variation. The majority of specimens from the more southern points average darker in coloration, with colors more intense and brilliant. In this species the wings are always present and nearly as long as, but wholly concealed by, the tegmina.

The material here studied was taken: in weeds near Rappahannock River (Fredericksburg), in green undergrowth of heavy forest near stream (Weldon), common in low green undergrowth of "branch" and beaten from heavy green undergrowth in short-leaf pine forest (Columbia), beaten from undergrowth of long-leaf pine woods (Ashley Junction), scarce in tall weeds near stream in oak and short-leaf pine woods (Buckhead), in small clump of sweet gum shoots in gray-bark pine forest (Sandfly), in heavy undergrowth of gray-bark pine forest (Isle of Hope) and common in tangles of small bushes and vines along Flint River (Albany). The species has been recorded as far north on the Atlantic coast as Staten Island, New York; westward its distribution extends far beyond the regions here under consideration.

Hapithus agitator agitator Uhler.*District of Columbia.*

- Washington, X, 1883, 1 ♂, 2 ♀,
[Hebard Cln.].

Virginia.

- Fredericksburg, VII, 20, 1913, (R. &
H.; common in undergrowth of
deciduous forest), 2 juv. ♀.

- Orange, VII, 21, 1913, (R. & H.; very
scarce in undergrowth of deciduous
forest), 1 juv. ♂.
Petersburg, VII, 23, 1913, (H.; in
vegetation of boggy spot near
woods), 1 juv. ♀.
Norfolk, IX, 8, 1903, (A. P. Morse),
1 ♂, 3 ♀.

We have a large series of adults before us from more northern points on the Atlantic coast, where the species has been recorded as far north as Tottenville, Staten Island, New York.

This geographic race is found to merge with the more southern race, *agitator quadratus*, along the fall line in North Carolina, this being shown by intermediate material before us from Raleigh. These races show little definite differentiation, but typical *agitator* may be said to differ from *agitator quadratus* in the average smaller size; tegmina which normally do not quite reach the distal extremity of the abdomen, in the male with speculum normally lacking a transverse vein and with length of same more nearly approximating its width, in the female with veins normally more irregular and not affording a pattern as generally longitudinal; the caudal femora in length also average proportionately slightly less.

A large series before us from other points in the southeastern United States, particularly those on the Piedmont plateau, are immature, and we are consequently unable to assign the individuals properly. We believe, however, that *agitator agitator* occurs on the Piedmont plateau at least as far south as Atlanta, Georgia. This race is known to occur as far westward as the timbered portions of eastern Nebraska.

Hapithus agitator quadratus Scudder.

North Carolina.

Wrightsville, IX, 7, 1911, (R. & H.),
10 ♂, 15 ♀, 1 juv. ♂.
Wilmington, IX, 8, 1911, (H.), 1 ♂,
1 ♀.
Lake Waccamaw, IX, 8, 1911, (R. &
H.), 4 ♂, 4 ♀, 1 juv. ♀.

South Carolina.

Florence, IX, 6, 1911, (R. & H.), 1 ♂,
2 ♀, 1 juv. ♀.
Ashley Junction, VIII, 15, 1913, (R.),
2 ♂, 3 juv. ♂, 5 juv. ♀.

Georgia.

Savannah, VIII, 14, 1903, (A. P.
Morse), 6 ♂, 8 ♀, 2 juv. ♀.
Isle of Hope, IX, 3, 1911, (R. & H.),
9 ♂, 10 ♀, 1 juv. ♂, 2 juv. ♀.
St. Simon's Island, VIII, 30, 1911,
(R. & H.), 2 ♂, 5 ♀.
Albany, VIII, 1, 1913, (R. & H.),
1 juv. ♂.

Florida.

Jacksonville, (T. J. Priddey), 4 ♂,
1 ♀, [Hebard Cln.].
Atlantic Beach, VIII, 24 and 25, 1911,
(R. & H.), 4 ♂, 5 ♀.
Grant, VII, 1898, 1 ♂, 1 ♀, [Davis
Cln.].
Miami, (Mrs. A. T. Slosson), 1 ♂,
1 ♀, [M. C. Z.].

Texas.

Doucette, VII, 24, 1912, (H.), 1 ♀.
Dallas, (J. Boll), 1 ♂, 1 ♀, [M. C. Z.].
Kerrville, VIII, 17, 1912, (H.), 1 ♀.
Flatonia, VIII, 20, 1912, (H.), 2 ♂.
San Antonio, VIII, 16, 1912, (R. &
H.), 2 ♂.
Victoria, VII, 27, 1912, (H.), 8 ♂,
1 ♀, 1 juv. ♀.
Brownsville, VII, 31, 1912, (H.), 4 ♂,
3 ♀.
Piper Plantation, near Brownsville,
VIII, 3, 1912, (R. & H.), 1 ♂, 6 ♀.

We have recorded above all of the previously unrecorded material of this geographic race from within the United States before us, in order to define more fully its known distribution.

There is considerable variation in the coloration of the form. Occasional specimens have the caudal femora strongly infuscated

medio-longitudinally, the exposed portion of the limb below this being very pale, often cream color; a similar condition is often weakly indicated, while in many series the caudal femora are concolorous with the general coloration. The intermediate channel in the tegmina is also occasionally strongly defined in yellowish white, often this is weakly indicated, while many individuals have this portion concolorous with the rest of the tegmen.

The present material was found common in low vegetation under live oaks on barrier beach (Wrightsville), on low wet ground in undergrowth of pine woods (Wilmington, Yemassee), in green undergrowth of deep forest (Florence), young numerous, but few adults in undergrowth of dry woods (Ashley Junction), common in heavy undergrowth of gray-bark pine forest (Isle of Hope), scarce in tangle of vines and bushes along Flint River (Albany), in heavy undergrowth of jungle "hammock" and in bayberry bushes (Atlantic Beach), in stream bottom choked with deciduous trees (Kerrville, Flatonia), young common, few adults, in scant undergrowth of mixed pine and deciduous forest (Doucette), in rank, high green grasses and nettles along wooded stream (San Antonio), in stream bottom in tangles of vines growing in high weeds (Victoria), by beating tall green weeds in river bottom tangles (Brownsville) and in low heavy jungle tangles (Piper Plantation).

We have found this race abundant in extreme southern Florida and on the Florida Keys.

Hapithus brevipennis Saussure.

Georgia.

- Savannah, VII, 31, 1913, (J. C. Bradley), 1 juv. ♀.
 Isle of Hope, IX, 3, 1911, (R. & H.),
 2 ♂, 1 ♀.
 Sandfly, IX, 3, 1911, (R. & H.), 2 ♂,
 3 ♀.
 Jesup, IX, 1, 1911, (H.), 1 ♀.
 St. Simon's Island, VIII, 30, 1911,
 (R. & H.), 1 ♂, 2 ♀.

- Billy's Island, IX, 1 to 15 and XII,
 23, 1913, (J. C. Bradley), 2 ♂, 2 ♀,
 1 juv. ♀.

Florida.

- Jacksonville, VIII, 1885, (W. H. Ashmead), 1 ♂, 1 ♀; (T. J. Priddey),
 1 ♂, [all Hebard Cln.].
 Atlantic Beach, VIII, 24, 1911, (R. &
 H.), 1 ♂, 1 ♀.
 Live Oak, VIII, 26, 1911, (H.), 1 ♂.

Some size variation, irrespective of geographic distribution, is shown by the material before us.

The material taken by us was beaten from luxuriant undergrowth of gray-bark pine forest (Isle of Hope, Sandfly), found scarce under live oaks in area of *Helianthemum coralinianum* (St. Simon's Island), beaten from tangles of grape, raspberry and other vines in jungle "hammock" (Atlantic Beach) and one found on sandy soil among wire-grass (Live Oak).

The type localities, Georgia and Louisiana, our previous records from Thomasville, Georgia, and Pablo Beach, San Pablo and Gainesville, Florida, with those given above, define the known distribution of this beautiful and interesting species.

Orocharis saltator Uhler.

Orocharis grylloides Saussure (not *Gryllus grylloides* Pallas, 1772). (In part.)

Maryland.

Point of Rocks, VIII, 19, 1883, 1 ♂,
[Hebard Cln.]

Washington, D. C., X, 1883, 2 ♂, 2 ♀,
[Hebard Cln.]

Virginia.

Fredericksburg, VII, 20, 1913, (R. &
H.), 1 juv. ♂.

Petersburg, VII, 23, 1913, (R. & H.),
1 juv. ♀.

North Carolina.

Weldon, VII, 24, 1913, (R. & H.),
2 juv. ♀.

Goldsboro, VII, 25, 1913, (R. & H.),
1 juv. ♂.

Charlotte, VII, 27, 1913, (R. & H.),
1 juv. ♀.

South Carolina.

Florence, IX, 6, 1911, (R.), 1 ♀.

Columbia, VII, 28, 1913, (R. & H.),
1 juv. ♀.

Isle of Palms, VIII, 15, 1913, (R.),
1 juv. ♀.

Ashley Junction, VIII, 15, 1913, (R.),
3 juv. ♂, 3 juv. ♀.

Georgia.

Rabun County, VII, 1910, (W. T.
Davis), 4 juv. ♂, 4 juv. ♀.

Isle of Hope, IX, 3, 1911, (R. & H.),
1 juv. ♀.

Macon, VII, 31, 1913, (R. & H.),
1 juv. ♂, 1 juv. ♀.

St. Simon's Island, VIII, 30, 1911,
(R.), 1 ♀.

Billy's Island, VI and VII, 1912, (J. C.
Bradley), 3 juv. ♂.

Florida.

Jacksonville, (Priddey; Ashmead), 2 ♀,
[Hebard Cln.]; XI, 3, 1911, (W. T.
Davis), 1 juv. ♀.

Pablo Beach, XI, 4, 1911, (W. T.
Davis), 2 ♂.

Silver Springs, XI, 25, 1911, (G. P.
Englehardt), 2 ♂, 1 ♀, [B. I. and
Hebard Cln.].

West Indian material before us and study of the literature has shown that *Orocharis saulcyi* (Guérin) is a synonym of *Orocharis grylloides* (Pallas);¹⁸¹ that West Indian form is known in the United States only from extreme southern Florida.

The present species was in part correctly recorded by Saussure, but material from the southern States was referred by him to *grylloides*. We have now sufficient material before us to determine that *saltator* and, in part, *grylloides* of Saussure¹⁸² (but not of Pallas) are conspecific.

It is true that material of the present species from the southern United States often shows a somewhat heavier development with pronotum proportionately more ample, and in such specimens the mediastine vein of the tegmina frequently bears a greater number of branches. These features are, however, by no means constant;

¹⁸¹ See Hebard, *Ent. News*, XXVI, p. 468, (1915).

¹⁸² See Saussure, *Mélang. Orth.*, II, p. 755, (1878). That author has evidently also placed West Indian specimens of the group to which *vaginalis* belongs (which group probably merits generic distinction) under this name. The present species never develops a green phase as described by that author.

in specimens from the same locality a remarkable difference in pronotal amplitude in the same sex is often present,¹⁸³ while the branching of the mediastine vein is extremely irregular and cannot be relied upon as in any way diagnostic.¹⁸⁴

The normal coloration of this insect is pale and immaculate reddish brown. Some specimens have the occiput, post-ocular portions of the genæ and dorsal portions of the lateral lobes of the pronotum infuscated; in others these markings are very dark and the dorsum of the pronotum and the tegmina and limbs are mottled and speckled with the same shade. Frequently in such maculate individuals the general coloration is grayish.

The species is known on the Atlantic coast as far north as Matawan, New Jersey; it is found far westward of the regions here considered.

Of the present series we found the young common in undergrowth of deciduous forest (Fredericksburg), young in undergrowth of pine woods (Petersburg), few immature examples in green undergrowth of heavy forest near stream (Weldon), few young in green grasses and weeds in short-leaf pine woods (Goldsboro), on green sprouts in "branch" filled chiefly with gums (Florence), young beaten from bayberry (Isle of Palms), young numerous in undergrowth of dry pine woods (Ashley Junction), young in luxuriant undergrowth of gray-bark pine woods (Isle of Hope) and in bushes apparently killed by a remarkable hymenopterous parasite, *Rhopalosoma poeyi* Cresson (St. Simon's Island).

¹⁸³ In material before us we find the following contrasts in these dimensions: Silver Springs, ♂, 2.3 by 3.4 and 2.7 by 3.9; Thomasville, Georgia, ♀, 2.4 by 3.6 and 2.9 by 3.8 mm.

¹⁸⁴ All or part of the free veins of the lateral field of the tegmina sometimes merge with the mediastine vein at its base, and can then scarcely be distinguished from the normal branches of that vein. The branches of the mediastine vein also bifurcate, though rarely, while distad the vein itself frequently assumes abnormal positions which, in themselves, bring about further differences in the number of branches. The branches of this vein Saussure gives: for *saltator*, ♂ 7 to 8, ♀ 4 to 6; for *gryllodes*, ♂ 10 to 11, ♀ 7 to 10. In our series are males showing 8-9, 9-9 and 8-10 and females showing 5-7 and 6-7 of these branches, such material not being from areas where intergradation would be likely to occur, were geographic races present.

Fig. 18.—Same. Male (TYPE). Lateral outline of cercus.

Fig. 19.—*Melanoplus strumosus* Morse. Currahee Mountain, Georgia. Male. Dorsal figure of supra-anal plate and furcula.

Fig. 20.—Same. Currahee Mountain, Georgia. Male. Lateral outline of cercus.

Fig. 21.—Same. Currahee Mountain, Georgia. Male. Lateral outline of subgenital plate.

PLATE XIV.—Fig. 1.—*Melanoplus querneus* new species. Thomasville, Georgia. Male (TYPE). Lateral outline of cercus ($\times 5$)

Fig. 2.—Same. Male (TYPE). Lateral outline of cercus and subgenital plate. ($\times 3\frac{1}{2}$)

Fig. 3.—Same. Male (TYPE). Dorsal figure of supra-anal plate. ($\times 5$)

Fig. 4.—*Scapteriscus vicinus* Scudder. St. Simon's Island, Georgia. Female. Lateral outline (internal) of dactyls of cephalic tibia. ($\times 4\frac{1}{2}$)

Fig. 5.—Same. St. Simon's Island, Georgia. Female. Dorsal figure of pronotum. ($\times 2$)

Fig. 6.—Same. St. Simon's Island, Georgia. Female. Lateral outline (external) of distal joint of caudal tarsus and claws. ($\times 4$)

Fig. 7.—Same. St. Simon's Island, Georgia. Female. Lateral outline (internal) of spatula. ($\times 4\frac{1}{2}$)

Fig. 8.—*Scapteriscus aletus* new species. Hebardville, Georgia. Male (TYPE). Lateral outline (internal) of dactyls of cephalic tibia. ($\times 4\frac{1}{2}$)

Fig. 9.—Same. Male (TYPE). Dorsal figure. ($\times 2$)

Fig. 10.—Same. Male (TYPE). Lateral outline (external) of distal joint of caudal tarsus and claws. ($\times 4$)

Fig. 11.—Same. Male (TYPE). Lateral outline (internal) of spatula. ($\times 4\frac{1}{2}$)

Fig. 12.—*Scapteriscus mexicanus* (Burmeister). Durango, Mexico. Female. Lateral outline (internal) of dactyls of cephalic tibia. ($\times 4\frac{1}{2}$)

Fig. 13.—Same. Durango, Mexico. Female. Dorsal figure of pronotum. ($\times 2$)

Fig. 14.—Same. Durango, Mexico. Female. Lateral outline (external) of distal joint of caudal tarsus and claws. ($\times 4$)

Fig. 15.—Same. Durango, Mexico. Female. Lateral outline (internal) of spatula. ($\times 4\frac{1}{2}$)

Fig. 16.—*Scapteriscus abbreviatus* Scudder. Musa Isle near Miami, Florida. Female. Lateral outline (internal) of dactyls of cephalic tibia. ($\times 4\frac{1}{2}$)

Fig. 17.—Same. Musa Isle near Miami, Florida. Female. Dorsal figure of pronotum. ($\times 2$)

Fig. 18.—Same. Musa Isle near Miami, Florida. Female. Lateral outline (external) of distal joint of caudal tarsus and claws. ($\times 4$)

Fig. 19.—Same. Musa Isle near Miami, Florida. Female. Lateral outline (internal) of spatula. ($\times 4\frac{1}{2}$)

Fig. 20.—*Anaxipha pulicaria* (Burmeister). Beaumont, Texas. Male. Cephalic figure of head. (Nearly $\times 5$)

Fig. 21.—*Anaxipha vittata* (Bolivar). Atlantic Beach, Florida. Male. Cephalic figure of head. (Nearly $\times 5$)

