

Vol. 9

JULY 1949

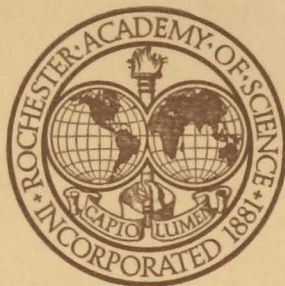
No. 3

PROCEEDINGS
OF THE
ROCHESTER ACADEMY OF SCIENCE

THE PHALANGIDA (OPILIONES) OF NEW YORK

With special reference to the species of
The Edmund Niles Huyck Preserve
Rensselaerville, N. Y.

by
SHERMAN C. BISHOP



PUBLISHED BY THE ACADEMY
ROCHESTER, NEW YORK

ROCHESTER ACADEMY OF SCIENCE

Officers for 1949-50

President: DR. ROBERT L. ROUDABUSH
709 Landing Road North

Vice-President: DAVID E. JENSEN
199 East Brook Road
Pittsford, New York

Secretary: DR. JOHN RUSSELL
16 Meadow Lane
Rochester, New York

Corresponding

Secretary: MRS. DAVID E. JENSEN
199 East Brook Road
Pittsford, New York

Treasurer: DR. ROBERT E. STAUFFER
353 Oakridge Drive
Rochester, New York

Librarian: JOHN R. RUSSELL
Rush Rhees Library
The University of Rochester

Council

The Council consists of the officers of the Academy, six elected Councillors, and the chairman of each Section

Elected Councillors

SHERMAN C. BISHOP (1950)

WALTER A. SWAN (1950)

H. LOU GIBSON (1951)

PAUL W. STEVENS (1951)

EDWARD T. BOARDMAN (1952)

EDWIN G. FOSTER (1952)

Section Officers

ASTRONOMY

Chairman: WM. R. CROSBY
Vosburgh Road
Webster, New York

Recorder: MRS. RALPH BACON
Bushnell Basin
Pittsford, New York

BOTANY A

Chairman: DR. GRACE A. B. CARTER
30 Vassar Street

Recorder: MRS. JOSEPHINE EDSON
54 Fairview Avenue

BOTANY B

Chairman: DR. BABETTE I. BROWN
29 Eastman Building
Prince Street Campus

Recorder: BERNARD HARKNESS
3 Castle Park

MINERALOGY

Chairman: HENRY B. HANLEY
20 Seneca Parkway

Recorder: CYRIL LADOUX
41 Penhurst Street

ORNITHOLOGY

Chairman: DIRCK BENSON
183 Cherry Road

Recorder: MRS. GERTRUDE DAVIS
203 Collingsworth Drive

PHOTOGRAPHY

Chairman: JOHN J. BEITER
169 Rugby Avenue

Recorder: ELEANOR C. FAIRBANKS
435 E. Henrietta Road

PHYSICAL ANTHROPOLOGY

Chairman: DR. ROBERT J. BLOOR
University of Rochester
School of Medicine and
Dentistry

Recorder: W. S. CORNWELL
1951 Penfield Road

WEATHER SCIENCE

Chairman: JOHN M. WILLIAMS
200 Curlew Street

Recorder: MRS. DOROTHY H. WARREN
807 Avenue D

THE PHALANGIDA (OPILIONES) OF NEW YORK

With special reference to the species of
The Edmund Niles Huyck Preserve,
Rensselaerville, New York

by
SHERMAN C. BISHOP *

CONTENTS

PART I

Introduction and acknowledgments	160
List of collectors	160
Relationships and general structure	161
Where to look for phalangids and how to collect them	162
Preservation of specimens	163

PART II

Notes on the biology of Phalangida	163
--	-----

PART III

Synopsis of genera and species	167
Key to the species of New York Phalangida	168
Accounts of genera and species	170
Synonymy	
Description of species	
Distribution records	
Literature cited	217
Explanation of figures	220

* Professor of Vertebrate Zoology, University of Rochester

PART I

INTRODUCTION

In 1928 we included the Phalangida in "A List of the Insects of New York" edited by Dr. M. D. Leonard (Mem. 101, Cornell Univ. Agr. Exp. Sta. pp. 1074-1076). Since that time new material has accumulated in various institutions, much of which has been studied. The original list of nineteen species has been extended to twenty-four, a number which probably represents the majority of species to be found in the state. In addition to my own collections, critical materials have been examined from Cornell University, the Museum of Comparative Zoology, Cambridge, Mass., the American Museum, New York, the New York State Museum, Albany and the extensive private collection of Mr. Roy Latham of Orient, Long Island, New York. For the use of these collections I am greatly indebted to the several museum authorities and to Mr. Latham.

For convenience, I have listed the distribution records of the various species under New York counties arranged alphabetically, except those from Long Island which are considered separately. As a small tribute to those naturalists who have spent time and effort in making collections, I have indicated their contributions by enclosing their initials in parentheses and by including a list of names to identify them.

The drawings accompanying the report were made by Mr. Hugh P. Chrisp of Albany, New York and Miss Carolyn Fallon, staff artist, Department of Zoology, University of Rochester, their contributions being indicated by their monograms.

It is a pleasure to acknowledge my indebtedness to the directors of the Edmund Niles Huyck Preserve, at Rensselaerville, New York, for a fellowship which made it possible for me to study phalangids during the summer of 1948. Conditions at the preserve were found to be ideal for field study of phalangids and most of the observations on life histories, habits and ecology were made during the two months' tenure of the fellowship.

Finally, I would express my appreciation to Dr. Donald R. Charles, Chairman, Department of Biology, University of Rochester, whose interest and support has made it possible for me to complete this study.

LIST OF COLLECTORS

Alexander, Charles P.	C. P. A.	Funkhouser, W. D.	W. D. F.
Banks, Nathan	N. B.	Gertsch, W. J.	W. J. G.
Blauvelt, Helen	H. B.	House, Homer D.	H. D. H.
Bradley, J. Chester	J. C. B.	Hubbell, T. H.	T. H. H.
Britcher, Horace W.	H. W. B.	Jacot, Arthur	A. J.
Chadwick, George H.	G. H. C.	Latham, Roy	R. L.
Chrisp, Hugh P.	H. P. C.	Leonard, M. D.	M. D. L.

Cleaves, Howard H.	H. H. C.	Paulmier, Frederick C.	F. C. P.
Cooley, R.	R. C.	Post, Richard L.	R. L. P.
Cooper, Kenneth W.	K. W. C.	Schoonmaker, Walter J. ...	W. J. S.
Crosby, C. R.	C. R. C.	Schmidt, Karl P.	K. P. S.
Davis, Norman W.	N. W. D.	Smith, H. H.	H. H. S.
Dearoff, Kenneth	K. D.	Ward, F. H.	F. H. W.
Dietrich, Henry	H. D.	Widmer, Charleen	C. W.
Emerton, J. H.	J. H. E.	Wolf, Augusta	A. W.
Fetcher, Frank C.	F. C. F.	Zorsch, Charles P.	C. P. Z.
Forbes, W. T. M.	W. T. M. F.	Zorsch, Helen	H. Z.

RELATIONSHIPS AND GENERAL STRUCTURE

The Phalangida constitute one of the orders of the class Arachnida which includes, among others, the spiders, mites, ticks and scorpions. Like the spiders, the body of phalangids consists of a cephalothorax (fused head and thorax) and abdomen. They differ from the spiders in that the cephalothorax is broadly attached to the segmented abdomen while in the spiders these structures are joined by a slender pedicel and, in all but one small group, the abdomen is unsegmented. Both spiders and phalangids possess four pairs of legs and a pair of leg-like palpi, one on either side of the head.

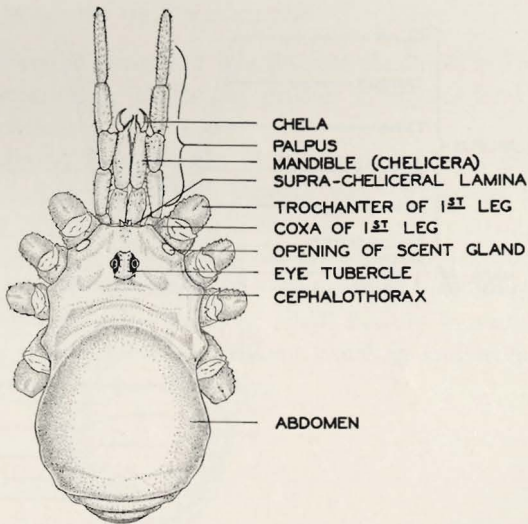


Fig. 1. Dorsal aspect of *Leioibunum flavum*, male, to show structures used in classification. In many species the segmentation of the abdomen is much more evident.

The drawings of dorsal and ventral aspects of *Leioibunum flavum* (Figs. 1 and 2) show the external structures commonly used in the identification of phalangids. Because of their extreme length, the terminal segments of the legs have not been shown. The legs in their entirety consist

of seven segments i. e. coxa, trochanter, femur, patella, tibia, metatarsus and tarsus, named in order from the point of attachment to the body. The segments of the palpus are like those of the legs except that the metatarsus is lacking. A pair of three-jointed chelicerae, or mandibles, is attached to the ventral side of the head in front and serve as grasping organs, being provided with apposable claws at the tip. The number and character of the claws which, in some species, terminate the tips of the tarsi of both legs and palpi, are of significance in classification.

In many species of phalangids, the sexes may be recognized by differences in size, proportions and color of the body and appendages. In some, however, these differences are not pronounced and recourse must be had to dissection. To determine the sex in doubtful cases, it is necessary to expose the genital organs by cutting along each side of the flap-like genital operculum and turning this structure backward toward the tip of the abdomen. The penis or ovipositor will then be exposed and may be withdrawn from the membranous or chitinized sheath which encloses it. If, when adult specimens are collected, the abdomen of the phalangid is squeezed between the tips of the thumb and forefinger, the genital organs will be extruded and may be kept exposed by plunging the specimen in 75% alcohol.

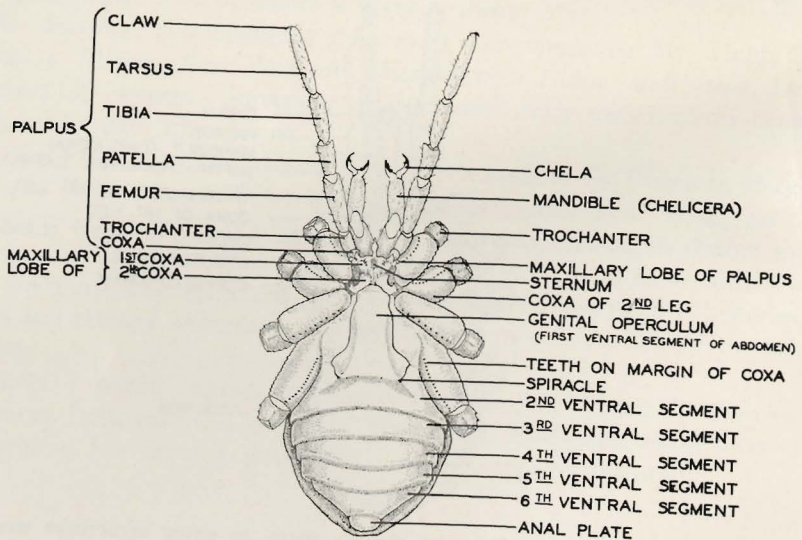


Fig. 2. Ventral aspect of *Leioibunum flavum*, male.

WHERE TO LOOK FOR PHALANGIDS AND HOW TO COLLECT THEM

Phalangids live in many different kinds of places. The larger diurnal species may be found crawling on the ground or on trees, buildings, fences, walls and other structures. They are most abundant where there is evi-

dence of moisture and should be looked for following warm rains when many may be observed foraging in the open. Some species are partial to caves and other dark places, *Leiobunum bicolor*, for example. Others, particularly the smaller species, live among the debris to be found on shaded banks, or in bogs, the moss that covers rotting logs, or in the leaf mold that accumulates on the ground beneath forest trees, both evergreen and broad-leaved types. The species of the genus *Caddo* are often taken by sifting sphagnum moss, or the rubbish beneath stands of tall ferns in boggy places.

One of the most effective pieces of apparatus for collecting small phalangids can be made by removing the bottom from a canvas wash-basin and replacing it with wire screen having a mesh of about three-eighths of an inch. Leaves, moss and other surface debris may then be sifted over a piece of light-colored cloth, and the specimens collected as they reveal themselves by movement.

Some nocturnal species are attracted to the substances used by entomologists when collecting moths by the process called "sugaring." Molasses, sugar syrup, stale beer, or mixtures of these substances, are sometimes employed effectively when smeared on the surface of trees or buildings.

PRESERVATION OF PHALANGIDS

Phalangids may be preserved in a more or less flexible condition in 75% grain alcohol. Formalin solution or alcohol of greater strengths tend to make the specimens very brittle.

When collecting I have found it convenient to use small, wide-mouthed jars so that the specimens could be poked beneath the surface of the alcohol with the tip of the finger. The specimens will cease to struggle very quickly and will remain in a relaxed condition. Before permanent storage, the legs of the larger specimens should be straightened and brought together, much as one would gather the stems of small flowers in making a bouquet. This treatment will facilitate subsequent handling and storage and help in keeping the legs attached to the body.

PART II

THE BIOLOGY OF THE PHALANGIDA

Many writers have commented on the scarcity of information dealing with the biology of the group but few have contributed anything to correct the situation. Such minor contributions as have appeared abound in errors. For example, the statement is made repeatedly that phalangids are nocturnal and hence difficult to study. As a matter of fact, some species are strictly diurnal. Commentating on the food of phalangids, some writers

repeat the old contention that they feed mainly on aphids or other small, soft-bodied insects when, in truth, aphids are avoided by species that will eat almost every other kind of food that may be found or captured, including animal and vegetable scraps from the table. It has been maintained that phalangids feed only on dead insects but a few hours' observation of caged specimens will demonstrate their ability to capture and kill dozens of kinds of insects, spiders and other small animals. It is probably true that, in the north, most species die in the fall of the year in which they are hatched; but more species winter over, either as adults or as partly grown young, than is indicated in the literature. Species known to winter as adults include *Leiobunum formosum* and *L. bicolor*, the latter often in caves or dark crevices. Those wintering as partly grown individuals are *Leiobunum ventricosum* and *Hadrobunus maculosus*. Occasionally, adults of *Phalangium opilio* and *Opilio parietinus* will survive a mild winter. Some individuals of *Sabacon crassipalpe*, which are only half grown in September, very likely require another season to reach maturity.

Two European writers, T. H. Savory and Mitja Roters (see bibliography) have given interesting accounts of the behavior of phalangids and the notes which follow will serve to supplement their accounts.

Light. While it is true that nocturnal species of phalangids usually avoid strong light and may be found during daylight hours hiding beneath bark, logs or other debris, they soon become adapted to direct light and may be studied in glass cages. Diurnal species, like *Leiobunum longipes*, will continue all normal activities, feeding, mating, drinking, etc., while directly in the beam of a strong light.

Water. Water is of primary importance in the economy of phalangids and they do not long survive without it. They may fast for a week or ten days without serious difficulty but many will die in a couple of days if deprived of water. After a warm rain many species, both diurnal and nocturnal, may be found abroad but during a period of drouth almost all kinds will avoid direct light and forage only at twilight or early in the morning.

Food. Observations made in the field and supplemented by the study of caged specimens, indicate that the diet of phalangids is an extremely varied one. I have found *L. longipes* feeding on various insects, spiders, bits of earthworm and slugs. In captivity I have fed them with dozens of kinds of insects and spiders and with bits of meat, fruit, and vegetables. Hard-shelled insects, such as ants and beetles, and large spiders, grasshoppers, dragon-flies, plant bugs, moths and butterflies have to be crushed before they can be eaten; but a surprising number of the smaller forms are captured and eaten avidly. A few species of phalangids are

reported to be cannibalistic. The sensitive second legs are perhaps of prime importance in the recognition of prey.

When eating, the chelicerae, the palpi and the legs may all be brought into use. Legs and palpi help in subduing living prey and the pinchers of the chelicerae serve to tear it into bits. On several occasions I have observed two or more phalangids pulling and tugging at the same bit of food.

Mating. Mating among the phalangids is as casual an affair as eating or drinking. Mature males and females that encounter one another in the field ordinarily mate briefly, separate and continue their wanderings. A short time later they may again mate with one another or with different individuals. The necessity for frequent matings may perhaps be found in the fact that the eggs mature a few at a time and are deposited at intervals throughout the summer.

So far as I have observed there is no courtship preceding mating nor is any attention given the eggs after they have been deposited. As noted elsewhere, the eggs of the majority of our species pass the winter in the soil or rotted wood and hatch in the spring. The young, so far as they have been studied, are entirely lacking in pigment at hatching.

Oviposition. The female phalangid may start to deposit her eggs immediately after mating if she happens to be in a situation where there are suitable conditions of soil or well rotted wood. The long flexible ovipositor is out-thrust beneath her body, the tip exploring the surface until proper conditions are encountered. The soil or wood must be soft and moist to permit penetration of the ovipositor; or a crevice must be found. If mating has taken place where conditions for egg-laying are not suitable, the female will often seek a particular spot the location of which she seems to have prior knowledge. Observing many matings in the field, I have followed individual females to watch egg-laying in a well-rotted hemlock root where it broke the surface of the ground some distance from the place of mating.

Egg-laying may be limited to a few seconds or continued for a minute or more depending, apparently, upon the number of eggs ready to be laid. Often the female is accompanied by a male who takes up a protective position above her and spreads his long legs over her body, like the ribs of an umbrella. In this position he attempts to drive off rival males who seek to usurp his position and prerogatives.

The eggs are tiny, .3 to .5 mm. in diameter, pale yellow or pale green spheres, and an individual female, depending on the species, may deposit a hundred or more.

External parasites. Small red mites are often found attached to the legs of phalangids but, so far as I am aware, the American species has not been identified. Savory (1938, p. 4) reports the presence of pseudo-

scorpions on specimens of *Opilio parietinus* in England but regards them as merely travellers.

Tonic Immobility. Savory (1938, p. 6) noticed that when a number of phalangids were confined in limited quarters they seemed to be anaesthetized, intoxicated or narcotized by each other and remained for long periods in the state of insensibility. When thrown out upon the floor of a cage they promptly recovered and ran about normally. While studying phalangids in small glass boxes, I have several times observed the same phenomenon. The specimens lay in a tangled mass of legs and bodies, apparently without life, but when disturbed, by shaking the box, they recovered and assumed normal activities.

Loss of legs. Unlike most arachnids, the phalangids fail to regenerate lost appendages. Specimens are often found which have fewer than the normal number of legs and when the loss involves the second pair they are indeed handicapped. In species that reach maturity and die in a single season, most specimens that survive until late summer or fall will have lost one or more of the legs. They apparently lack the ability to rid themselves of damaged members and will continue to drag a crippled leg until it severs itself.

"Silk." The shed skins of Harvestmen are often found hanging from a thread which many have assumed to have been made by spiders and adapted to the use of the phalangid. Th. Savory, however, (1938, p. 1) believes that at least some Harvestmen produce a kind of "silk" the origin of which remains a mystery. Specimens confined in boxes produced very fine lines on the floor and sides of the container and in one instance used these lines to suspend the remains of an insect.

I have tried many times to find evidence of this "silk" in glass boxes used to confine a number of different American species of Harvestmen but so far without success.

Moulting. Harvestmen shed their skins from time to time to accommodate their changing dimensions. Hanging themselves by the hind legs they twist and jerk until a split occurs in the skin and from this opening the chelicerae and basal segments of the legs are withdrawn. The body proper then appears followed by the terminal segments of the legs.

PART III

Synopsis of genera and species of New York Phalangida

Order Phalangida

SUBORDER LANIATORES

FAMILY PHALANGODIDAE SIMON

Genus Erebomaster Cope

E. flavescens Cope

SUBORDER PALPATORES

FAMILY NEMASTOMATIDAE SIMON

Genus Crosbycus Roewer

C. dasyncnemus (Crosby)

FAMILY ISCHYROPSALIDAE SIMON

Genus Sabacon Simon

S. crassipalpe (L. Koch)

FAMILY PHALANGIIDAE SIMON

Genus Caddo Banks

C. agilis Banks

C. boöpis Crosby

Genus Mitopus Thorell

M. morio (Fabricius)

Genus Odiellus Roewer

O. pictus (Wood)

Genus Phalangium Linnaeus

P. opilio Linnaeus

Genus Opilio Herbst

O. parietinus De Geer

Genus Leiobunum C. L. Koch

L. bicolor (Wood)

L. calcar (Wood)

L. flavum Banks

L. formosum (Wood)

L. longipes longipes Weed

L. nigripes Weed

L. nigropalpi (Wood)

- L. politum* Weed
L. serratipalpi Roewer
L. speciosum Banks
L. uxorium Crosby and Bishop
L. ventricosum (Wood)
L. verrucosum (Wood)
L. vittatum (Say)

Genus *Hadrobunus* Banks

- H. maculosus* (Wood)

KEY TO THE PHALANGIDA (OPILIONES) OF NEW YORK

1. Coxae of 4th legs free at tips; palpi armed on all segments beyond coxae with very long, strong, spine-tipped tubercles (Phalangodidae) *Erebomaster flavescens* p. 170
- Coxae of 4th legs fused to venter; palpi variable but never armed on all segments beyond coxae with very long, strong, spine-tipped tubercles .. 2
2. Tarsus of palpus with a claw at tip (Phalangidae) 4
- Tarsus of palpus without a claw at tip 3
3. Palpi large and stout; tibia and tarsus swollen and armed with bristles, like a teasel-burr; species of moderate size, to 5 mm. (Ischyropsalidae) *Sabacon crassipalpe* p. 173
- Palpi very long and slender; tibia and tarsus not swollen and covered only with fine hair; species very small, to 1 mm. (Nemastomatidae) *Crosbycus dasyxenus* p. 172
4. Eye-tubercle relatively very large, extending the entire width of the thorax; eyes very large (Caddini) 5
- Eye-tubercle normal, not extending width of thorax; eyes of normal size 6
5. Trochanter of palpus with one or two large spines below; femur of palpus with three large spines below, two close together at base, one near middle of length; tibia of palpus with two large spines below *Caddo boöpis* p. 176
- Trochanter of palpus without large spines below; femur of palpus with three large spines on basal half; no spines below on tibia .. *Caddo agilis* p. 175
6. Claw of palpus denticulate at base below; a row of small denticles on sides of coxae, at least on coxa I; legs long except in *Hadrobunus* (Leiobuninae) 10
- Claw of palpus smooth; no rows of denticles on coxae; legs usually short 7
7. Proximal segment of chelicera with a basally stout, apically slender and pointed spine at base below (Oligolophinae) 8
- Proximal segment of chelicera without such a spine below; legs with series of spines arranged in regular rows (Phalanginae) 9
8. Femur of palpus with a ventro-lateral series of long, strong spines; three large spines at margin of carapace in front at mid line *Odiellus pictus* p. 180
- Femur of palpus without a ventro-lateral series of long, strong spines; a group of small tubercles just behind margin of carapace at mid line .. *Mitopus morio* p. 178
9. Supra-cheliceral laminae prominent, each with a large spine on mesal side; 2nd segment of chelicera of male with a prominent spur above ... *Phalangium opilio* p. 183
- Supra-cheliceral laminae inconspicuous and without a spine on the mesal side; no spur on the 2nd segment of chelicera of male .. *Opilio parietinus* p. 185

10. Femur of 1st leg shorter than width of body; tibia II of adults, without false articulations; tarsus of palpus not armed with a meso-ventral series of small dark denticles *Habrobunus maculosus* p. 215
 Femur of 1st leg longer than width of body; usually longer than length of body; tibia II with false articulations; tarsus of palpus of male armed with a meso-ventral series of small, dark denticles (*Leiobunum*) 11
11. Base of tibia of palpus of male swollen and protuberant below and armed with a cluster of black denticles; trochanters either concolorous or contrasting in color; female, when known, with femur of palpus armed ventrally with a series of short, sharp denticles, tibia with a ventro-lateral series of denticles 12
 Base of tibia of palpus of male not at all or (*nigropalpi*) slightly swollen below and sometimes armed with small denticles; femur of palpus of female without a ventro-lateral series of denticles, tibia with or without a ventro-lateral series of denticles 13
12. Femur of palpus of male with a large, ventro-lateral spur which may be apposed to swollen base of tibia; male generally light tan or light brown above with central figure lightly developed; female with central figure developed on anterior two-thirds of abdomen .. *Leiobunum calcar* p. 189
 Femur of palpus of male without a large ventro-lateral spur but armed with a ventro-lateral group of short black denticles on distal third; general color above yellow; female unknown ... *Leiobunum serratipalpi* p. 203
13. Coxae and trochanters of legs concolorous; or trochanters no darker than dorsum 14
 Coxae and trochanters of legs contrasting in color, the trochanters brown or black 17
14. Legs with white bands more or less well developed at the articulations *Leiobunum bicolor* p. 187
 Legs not so marked 15
15. Legs light to dark brown, sometimes darker distally, male; femora and tibiae usually shaded distally in legs I, III, IV in female; tip of tibia of 2nd legs with a white band sometimes faint in females; denticles on anterior surface of coxae poorly developed or absent, except on coxa I; penis not alate, compressed near tip; size small, male to 4 mm., female to 5 mm. *Leiobunum politum* p. 201
 Patellae of legs usually darker than other segments; denticles well developed on anterior surface of coxae I to IV; penis alate; size large, male to 8 mm., female to 10 mm. 16
16. Eye-tubercle smooth or at most with a few low rounded tubercles; legs slender; abdomen long, pointed behind, especially in the male *Leiobunum ventricosum* p. 207
 Eye-tubercle armed with well developed denticles on carinae; abdomen rounded behind in female, bluntly pointed in male .. *Leiobunum flavum* p. 192
17. Legs very long and slender; tip of tibia of 2nd legs, in both sexes, banded with white; male small, orange *Leiobunum longipes* p. 195
 Tip of 2nd tibiae *not* banded with white 18
18. Legs banded in female; in male sometimes faintly banded; usually tips of femora, tibiae and patellae dark brown or black 19
 Legs uniformly colored or, rarely, (*verrucosum*) yellow, with patellae light brown and femora and tibiae shaded distally 21
19. Central figure of dorsum very strongly developed in both sexes; femur of palpus of male long, slender and curved, extending above surface of carapace a distance equal to six or eight times the height of eye-tubercle *Leiobunum vittatum* p. 211
 Central figure of dorsum poorly developed or at most limited to the anterior half of abdomen; femur of palpus of male long or short; penis not alate near tip 20
20. Eye-tubercle nearly smooth, at most with only one or two tubercles on carinae; dorsal side of trochanters blotched with yellow, at least faintly in females; femur of palpus of male short; legs moderately stout in female; tip of femur and the patella of palpus dark or at least shaded faintly *Leiobunum formosum* p. 193

- Eye-tubercle armed with numerous tubercles on carinae; femur of palpus of male long; palpus yellow *Leiobunum speciosum* p. 204
21. Palpus with some segments brown or black, at least above; dorsum of male yellow, of female tan or light to dark brown 22
Palpus yellow or tan 23
22. Femur, patella and tibia of palpus dark brown or black, at least above; tibia of palpus of male slightly swollen at base below and armed with tubercles; penis not alate; female with central figure developed on anterior half of abdomen *Leiobunum nigropalpi* p. 199
Femur and patella of palpus of male and femur, patella and tibia of palpus of female light brown or mottled above; base of tibia not swollen below and armed with stout denticles; dorsal figure of female limited to basal half; penis alate *Leiobunum nigripes* p. 198
23. Penis not alate; size, male to 4 mm., female to 6 mm.; legs nearly uniformly brown; male yellow; female with central figure moderately well developed on anterior half *Leiobunum uxorium* p. 206
Penis alate; size, male to 6 or 7 mm., female to 6 or 8 mm.; male pale yellow to brown above, whitish below; female with central figure faintly developed; legs, northern specimens, faintly banded, southern specimens nearly uniformly colored *Leiobunum verrucosum* p. 209

Accounts of Genera and Species

EREBOMASTER COPE

This genus was established by Cope for *E. flavescens* Cope from Wyandotte Cave, Indiana. Related forms have been recorded from caves in Virginia and Kentucky and given subspecies status by Roewer (1923, p. 107). I have not had specimens of these forms for comparison and for the present regard *E. flavescens* as a distinct species.

Erebomaster flavescens Cope

Pl. 1, figs. 1-5.

Erebomaster flavescens Cope, Amer. Nat. 6(7):420, figs. 114-115. 1872.*

Phalangodes flavescens, Simon, Arach. France, 7:156. 1879.

Phalangodes flavescens, Packard, Mem. Nat. Acad. Sci. 4(1):49-50, pl. 12, figs. 1-3; pl. 14, fig. 1. 1888.

Scotolemon flavescens, Banks, Amer. Nat. 35(416):672. 1901.

Scotolemon flavescens, Comstock, The Spider Book, pp. 62-63. 1912.

Erebomaster flavescens flavescens, Roewer, Weberknechte der Erde, p. 107. 1923.

Erebomaster flavescens, Comstock, The Spider Book, rev. ed. p. 63. 1940.

Female, length 2 mm.; width 1.25 mm.

Legs, I, 4.25 mm.; II, 5.5 mm.; III, 4 mm.; IV, 6 mm.

Dorsal integument finely granular; eye tubercle conical, broad at base, pointed at tip; eyes small, black, widely separated at base of tubercle; abdomen broadly rounded at the sides, bluntly pointed at tip, from above with four segments evident.

* No attempt has been made to give a complete synonymy of any species. References cited are those most useful and generally available or of importance in determining distribution.

Venter with coxae and genital operculum slightly granular; coxae armed at distal ends behind with a few low, rounded tubercles; coxa II longest, its tip extending well beyond edge of carapace; coxa IV widest, free at tip. Legs, 3-1-2-4 in order of length from the shortest; trochanters short, more or less globular; femora slender; patellae short, somewhat thicker than femora; tibia plus patella about as long as femur; metatarsi slender, longer than tibiae; tarsi slender. Abdomen from below with six or seven segments evident.

Palpus very large and stout, longer than body and armed with very long tubercles bearing long, strong spines; femur of palpus strongly arched above and armed with a series of four stout tubercles each directed forward and bearing a short, sharp spine, below armed with three very large and several smaller tubercles bearing at their tips long, slender spines; armed mesally, near the tip, with a single long tubercle and spine; patella short, arched above and armed with two or three low tubercles, mesally with one or two very long, strong, spine-tipped tubercles and ventro-laterally at tip with a single long, spine-tipped tubercle; tibia about as long as femur, rounded above, from side to side, flattened below, armed ventro-laterally with three and mesally with four large, spine-tipped tubercles; tarsus depressed, bluntly pointed or truncate at tip, armed mesally and laterally with three large and several small, spine-tipped tubercles; claw very large, curved downward. Chelicera with basal segment cylindrical, slightly widened distally; second segment thicker, armed in front with low, rounded tubercles, claws directed mesally.

Color, uniformly yellow above and below except integument between abdominal segments, which is white.

The sexes are essentially similar.

Type locality, Wyandotte Cave, Indiana.

Distribution.—New York. ULSTER: Sam's Point, May 24, 1920. A single specimen was collected in a deep rock crevice at the summit of the ridge. The species has also been recorded from caves and dark situations in Kentucky and Virginia.

For specimens from the type locality I am indebted to Dr. Clarence J. Goodnight.

CROSBYCUS ROEWER

This genus was erected by Roewer (1914, p. 168) to include the species described by Crosby (1911, p. 20) as *Nemastoma dasyncnemum*. So far as I am aware, no other species have been described.

Crosbycus dasyncnemus (Crosby)

Pl. 1, fig. 6.

Nemastoma dasyncnemum Crosby, Can. Ent. 43:20, fig. 1. 1911.*Nemastoma dasyncnemum*, Comstock, Spider Book, pp. 78-79. 1912.*Crosbycus dasyncnemum*, Roewer, Arch. Naturg. 80(3):168. 1914.*Crosbycus dasyncnemum*, Roewer, Arch. Naturg. 83(2):160. 1917.*Crosbycus dasyncnemus*, Roewer, Weberknechte der Erde, p. 678. 1923.*Crosbycus dasyncnemus*, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1074. 1928.*Crosbycus dasyncnemus*, Comstock, Spider Book, rev. ed., pp. 78-79. 1940.

Male, length 1 mm.

Male, dorsal integument studded with small, dark brown denticles forming indistinct patches on either side of the thorax; a conspicuous narrow band, convex anteriorly, on the first abdominal segment, a broad patch covering the anterior second and third abdominal segments and narrower bands which do not reach the lateral margins on the succeeding posterior segments; anterior margin of carapace with a group of small, black, sharp-pointed spines at center just in front of eye-tubercle; eyes small, black, on a broad, low tubercle, separated by about the diameter of one of them. Coxae armed below with two or three longitudinal bands of small brown tubercles; trochanters covered generally with similar tubercles, sternites, but not the genital operculum, with similar brown denticles forming transverse bands.

Palpus extremely long and slender, nearly as long as first pair of legs, the segments nearly straight, cylindrical and of uniform diameter; coxae, trochanters, femora and tibiae light brown, distal segments yellowish; femora, patellae and tibiae of legs somewhat thickened and armed with pale hairs and short, black, sharp-tipped spines; femora in particular with long, fine hairs.

Color. Above light to dark brown, appearing darker where covered with denticles; posterior lateral angles of abdomen with flange-like projections pale, yellowish white, in some nearly transparent; legs pale yellow to brownish; venter light brown, yellowish in transverse bands between abdominal segments in a fully adult specimen; some individuals much paler, juveniles very pale.

Female similar to male in form in the single specimen I have seen; colors much paler, the tubercles less well developed, particularly on the venter of the abdomen.

Type locality, Columbia, Mo.

Distribution.—New York. ONTARIO: Hemlock lake, Apr. (A. J.). TOMPKINS: Freeville, Oct. (C. R. C.); Ithaca, Apr. (A. J.). YATES: Keuka lake, Sept. (C. R. C.); Egleston Glen, Apr., Jly., Oct. (C. R. C.). Long Island, SUFFOLK: Montauk Point, Je. (C. R. C.)

Specimens also seen from Ill., Urbana, Oct. (V. G. S.); Minn., Lake Minnetonka, Aug. (F. C. P.)

SABACON SIMON

The genus *Sabacon* was established by Simon (1879, p. 266, pl. 24, figs. 5, 5a) with *S. paradoxus* as the type. In this genus the tibia of the palpus is greatly enlarged, the tarsus is short and turned back upon the tibia and both tibia and tarsus are provided with stout bristles so that they resemble a teasel-burr or bottle-brush.

Sabacon crassipalpe (L. Koch)

Pl. 1, figs. 7-8.

- Nemastoma crassipalpis* L. Koch, Svenska-Akad. Handl. 16(5):111-112, pl. 3, fig. 19. 1879.
- Phlegmacera cavicolens* Packard, Amer. Nat. 18(2):203. 1884.
- Phlegmacera cavicolens* Packard, Mem. Nat. Acad. Sci. 4(1):54, pl. 14, figs. 5, 5a-5g. 1888.
- Sabacon spinosus* Weed, Amer. Nat. 27(318):575, fig. 1. 1893.
- Phlegmacera cavicoleus* (sic), Banks, Psyche 7:52. 1894.
- Phlegmacera occidentalis* Banks, *ibid.*, p. 51.
- Phlegmacera cavicoleus* (sic), Banks, Jour. N. Y. Ent. Soc. 2:40. 1894.
- Phlegmacera cavicoleus* (sic), Banks, Amer. Nat. 35(416):677. 1901.
- Phlegmacera cavicoleus* (sic), Banks, Ent. News. 13:308. 1902.
- Phlegmacera cavicolens*, Comstock, Spider Book, p. 78. 1912.
- Sabacon crassipalpis*, Roewer, Arch. Naturg. 80(3):125, fig. 16a-c. 1914.
- Sabacon crassipalpe*, Roewer, Weberknechte der Erde, pp. 694-695, fig. 869. 1923.
- Sabacon cavicolens*, Crosby and Bishop, Jour. Elisha Mitchell Sci. Soc. 40:23, fig. 16. 1924.
- Sabacon cavicolens*, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1074. 1928.
- Sabacon crassipalpe*, Comstock, Spider Book, rev. ed. p. 77. 1940.

Male, length 3 mm.; width 1.5 mm.

Legs, I, 10 mm.; II, 16.75 mm.; III, 10 mm.; IV, 15 mm.

Dorsal integument moderately soft, shining; anterior margin of carapace nearly straight and armed with a few short, dark hairs; eye tubercle low, broader than long, shallowly canaliculate, the carinae unarmed, the eyes directed dorso-laterally; openings of scent glands small, placed opposite space between base of palpus and first pair of legs; transverse ridge behind eye tubercle with a row of short dark hairs; abdominal segments above each with a slightly chitinized, broadly oval patch bearing a transverse row of short dark hairs; coxae and genital operculum with numerous, moderately long, dark, brown bristles; sternites each armed, along the anterior margin, with a row of short dark hairs.

Palpus stout, the trochanter short, cylindrical, armed with a few very short hairs distally above; femur about one and one half as long as trochanter, slender at base, widened distally, armed above with short dark hairs and ventrally and mesally with longer dark bristles; patella a little shorter than femur but wider, armed with dark bristles except ventromesally where there is a sharp-pointed, black-tipped tooth at the distal end; tibia large, gourd-shaped, swollen on basal half, curved mesally at

tip where it is slightly excavated to receive the folded back tarsus, armed densely with bristles to resemble a teasel burr except on the excavation; tarsus short, covered densely with bristles and turned back to lie along the excavated part of tibia.

Chelicerae stout, armed above with dark bristles, the claws bent mesally. Femora, patellae and tibiae of legs armed with scattered, short, dark bristles; the patellae, tibiae, metatarsi and tarsi in addition clothed with very short brown hairs.

Color. Carapace dull yellowish-white margined with pale, purplish brown; eye-tubercle black, notched in front with yellow; transverse ridge back of eye-tubercle and the abdominal segments above with transverse tapering blotches of purplish brown, the interspaces on the sides dull yellowish-white; appendages all dull yellowish-white; abdominal sternites with tinges of purplish brown laterally.

Female, length 4 mm.; width 2.5 mm.

Legs, I, 9.5 mm.; II, 13 mm.; III, 8 mm.; IV, 12 mm.

The female resembles the male closely in general appearance but the patella of the palpus lacks the black tooth distally below and the tibia is larger and more strongly swollen on the basal half; abdominal sternites usually darker than in the male.

Type locality, Siberia.

Distribution.—New York. MONROE: Forest Lawn, Feb. STEUBEN: Prattsburg, Jly., juv. (C. R. C.). TOMPKINS: Enfield Glen, May, juv. (C. R. C.); Ithaca (N. B.) Jly., Aug., ad. male (C. R. C.). YATES: Potter Swamp, Jly., juv. (C. R. C.) Long Island. SUFFOLK: Montauk Point, Je., juv.

I have also examined specimens from N. C., Grandfather Mt., Oct. (C. and B.); Mt. Mitchell, Sept. (N. B.); Blowing Rock, Oct., juv. (C. and B.); Oregon, Winchester Beach, Je. (C. R. C.); Canada. B. C., Prince Rupert, Je. (C. R. C.); Alert Bay, Je. (C. R. C.) The species has been recorded from Alaska, California, Kentucky, Maine, New Hampshire, and Washington.

Most specimens of this species have been taken by sifting leaf mold and the rubbish beneath ferns. Since both adults and half-grown young have been taken at the same time in September, the species may require more than one season to reach maturity.

CADDO BANKS

The genus *Caddo* was established by Banks (1892, p. 250) for *Caddo agilis*, described from Long Island, New York. In 1904 (pp. 253–255) Crosby described *C. glaucopis* and *C. boöpis*. *Caddo agilis* had been described from immature specimens so Crosby did not realize his adult *glaucopis* was the same species. The error was corrected by Crosby (1907,

p. 161) but the note was overlooked by Roewer who continued to recognize *glaucopis* as a distinct species in his 1912 and 1923 reports. (See synonymy under *C. agilis*.) In 1924, Bishop and Crosby recognized *Platybunus dentipalpus* Koch and Berendt (1854, p. 101, pl. 15, fig. 125) as an undoubted representative of the genus *Caddo*, closely related to *C. agilis*, from early Tertiary Baltic amber. Goodnight and Goodnight (1948, p. 201) have described another species, *C. chomulae*, from San Cristobal de las Casas, Chiapas.

Caddo agilis Banks

Pl. 1, figs. 9-14.

- Caddo agilis* Banks, Proc. Ent. Soc. Wash. 2:249. 1892.
Caddo agilis Banks, Can. Ent. 25 (8):207. 1893.
Caddo agilis Banks, Jour. N. Y. Ent. Soc. 2:40. 1894.
Caddo agilis Banks, Amer. Nat. 35 (416):674. 1901.
Caddo agilis Banks, Ent. News 13:308. 1902.
Caddo agilis Banks, Jour. N. Y. Ent. Soc. 12:256. 1904.
Caddo glaucopis Crosby, Jour. N. Y. Ent. Soc. 12(4):253-255. 1904.
 (fig. 4 applies to *Caddo boöpis*)
Caddo glaucopis Crosby, Ent. News 18(4):161. 1907.
Caddo agilis, Comstock, The Spider Book, 1st ed. p. 68, figs. 50, 56. 1912.
Caddo agilis, Roewer, Abhandl. a Gebiete Naturw. Hamburg 20(1):34 pl. 1, fig. 9; pl. 2, figs. 3, 10, 12. 1912.
Caddo glaucopis, Roewer, Abhandl. a Gebiete Naturw. Hamburg 20(1):34-35. 1912.
 (pl. 1, fig. 3 applies to *Caddo boöpis*)
Caddo agilis, Roewer, Die Weberknechte der Erde, p. 713, fig. 889 a-b. 1923.
Caddo glaucopis, Roewer, Die Weberknechte der Erde, p. 713-714. 1923.
Caddo agilis, Bishop and Crosby, N. Y. State Mus. Bull. No. 253, pp. 83-84, fig. 3. 1924.
Caddo agilis, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1074. 1928.
Caddo agilis, Comstock, The Spider Book, rev. ed. p. 68, figs. 50, 56. 1940.

Male, length 1.4 mm.

Legs, I, 10.5 mm.; II, 13 mm.; III, 11.5 mm.; IV, 13 mm.

Integument of male above soft, that of the thoracic part smooth and shining, abdomen dull; no spines, tubercles or denticles on any part of the body proper above or below; eye tubercle large, occupying nearly the whole width of thorax; ratio of length of eye tubercle to length of body as 1 to 3; the eyes essentially the size of those of some species of phalangids having a body length of 10 to 12 mm.; eye-tubercle with a broad longitudinal canal, the carinae unarmed; coxae and genital operculum smooth, armed with a few short, scattered brown hairs; sternites smooth. Palpus stout, trochanter short, thick and unarmed except for a few short hairs; femur a little longer than trochanter, slightly curved above and armed below on the basal half with three large, sharp-pointed, brown-tipped spines; patella short and thick, nearly as long as femur, armed disto-mesally with a patch of stout spines; tibia about as long as patella and with spines on the mesal surface; tarsus nearly twice as long as tibia, armed mesally with a band of stout spines and laterally with a few scattered spines. Chelicera with

basal segment short and cylindrical, the distal segment large, swollen at base.

Color. Thoracic part bright silvery tinged with dusky laterally; eye tubercle silvery at center of groove, dusky yellowish to the broad, black rim around each eye; palpus and chelicera, except claws of latter, silvery white; abdomen above purplish brown with a median series of connected silvery spots having narrow lateral extensions to a sublateral series of silvery spots on each side; below silvery white.

Female, length 2.6 mm. A fully adult female from Boonville differs from the male in its much larger size and longer abdomen, the ratio of length of eye tubercle to that of body as 1 to 3.7. The colors are strikingly developed. The thoracic part is pale yellowish with bright, silvery reflections, the eyes only being surrounded by a broad black band; palpi and chelicerae pale yellowish, the claws of both dark tipped. Abdomen above purplish-grey with a broad median band and narrow cross bands, widened laterally, bright silver. In some individuals, the widened ends of silvery cross bands fuse to form definite lateral bands.

In juveniles, the femur of the palpus bears a large, blunt protuberance on the distal mesal angle.

Type locality, Long Island, New York.

Distribution.—New York. ALBANY: E. N. Huyck Preserve, Rensselaerville, Jly. DELAWARE: Delhi, May (C. R. C.). HERKIMER: Big Moose lake, Je. NIAGARA: Olcott, Sept. (H. D.). ONEIDA: Boonville, Jly. (L. C. K.). SENECA: Covert, Jly. (J. C. B.). TOMPKINS: Ithaca, Aug. (C. R. C.); Woodwardia swamp, Freeville, Aug. Long Island, Jly. (N. B.). QUEENS: Jamaica, Je. (A. W.). SUFFOLK: Cold Spring Harbor, Je. (J. W. G.). Great Pond, Riverhead, May; Montauk Point, May.

Specimens also examined from D. C., Washington (N. B.); Maine, Mt. Katahdin (H. W. B.); N. J., Princeton, Jly. Aug. (K. W. C.); N. C. Swannanoa Valley. Canada. Ontario: Sanford, Je. (C. R. C.); Quebec: Bagotville, Jly. (C. R. C. & H. Z.); St. Joseph d'Alma, Jly. (C. R. C. & H. Z.).

Caddo agilis has been taken in a great variety of situations, on and under logs in woods, under leaves, in sphagnum moss, crawling on trees and on a house, and under logs in woods near the sea shore. It is most easily found by sifting sphagnum moss and leaves in boggy situations.

Caddo boöpis Crosby

Pl. 1, figs. 15-18.

Caddo boöpis Crosby, Jour. N. Y. Ent. Soc. 12(4):255, fig. 4. 1904.

Caddo boöpis Crosby, Ent. News, 18(4):161. 1907.

Caddo boöpis, Comstock, The Spider Book, 1st ed. p. 68. 1912.

Caddo boöpis, Roewer, Abhandl. a Gebiete Naturw. Hamburg 20(1):35-36, pl. 1, fig. 3. 1912.

Caddo boöpis, Roewer, Weberknechte der Erde, p. 714, fig. 890. 1923.

Caddo boöpis, Bishop and Crosby, N. Y. State Mus. Bull. No. 253, pp 83-84, fig. 2. 1924.

Caddo boöpis, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1074. 1928.

Caddo boöpis, Comstock, The Spider Book, rev. ed. p. 68. 1940.

Male, length 1 mm.

Legs, I, 2.2 mm.; II, 3 mm.; III, 2.5 mm.; IV, 3.7 mm.

Integument of male above soft, that of thoracic part smooth and shining, abdomen dull; no spines or tubercles present on body proper above or below; eye tubercle, relative to body size enormous, as wide as thorax; ratio of length of tubercle to that of body as 5 to 13; eye tubercle with a broad, shallow, longitudinal canal, widest behind, the eyes diverging posteriorly. Venter. Coxae and genital operculum smooth, unarmed except for a few short hairs; sternites smooth. Palpus not as stout as in *C. agilis* but relatively longer; trochanter short, about one third as long as femur, armed below distally with one large and one small spine which arise from a common base; femur slender, evenly rounded above, armed disto-mesally with a large, ventro-mesally directed spine and below with two (rarely three) large spines at base of segment and a single large spine at the middle; patella a little more than half as long as femur, armed ventro-laterally with one or two small spines and mesally with short hairs; tibia a little shorter than patella, armed ventro-laterally with two large and one small spine, mesally with a band of hairs; tarsus a little shorter than tibia, armed with short hairs. Chelicera with basal segment short, the distal segment swollen proximally.

Color. Thoracic part, palpi and chelicerae yellow; claws of chelicerae black-tipped; a broad, oval black rim around each eye; coxae and genital operculum yellow, tinged with dusky; abdomen above light purplish grey crossed by narrow light lines between the segments, below lighter; legs yellowish tinged with dusky.

Female. Essentially similar to male but slightly larger.

Type locality, Ithaca, New York.

Distribution.—New York. ALBANY: Voorheesville, Aug. (Mrs. M. D. L.). FULTON: East Caroga lake, Jly. ORLEANS: West Barre, Sept. SARATOGA: Ballston lake, Aug. (A. W.). TOMPKINS: Ithaca, Aug. type (C. R. C.). Long Island. QUEENS: Flushing, spring 1938 (K. W. C.).

Most specimens of this species have been taken by sifting white pine needles, the type by sifting leaves on a wooded bank.

MITOPUS THORELL

The genus *Mitopus* includes relatively few species but the type, *M. morio*, is very widely distributed in Europe, Asia, North Africa and North America, and has appeared in the literature under a great variety of names. In this genus the femur of the first legs is shorter than the width of the body.

Mitopus morio (Fabricius)

Pl. 2, figs. 19-22.

- Phalangium morio* Fabricius, Reise nach Norwegen, p. 340. 1779.
Oligolophus montanus Banks, Can. Ent. 25:252-253. 1893.
Mitopus montanus Banks, Amer. Nat. 35(416):674. 1901.
N (sic) itopus montanus Banks, Ent. News 13:308. 1902.
Mitopus montanus, Comstock, Spider Book, p. 70. 1912.
Mitopus morio, Roewer, Abhandl. a Gebiete Naturw. 20(1):45-48. 1912.
Mitopus morio, Roewer, Weberknechte der Erde, pp. 718-719, fig. 892. 1923.
Mitopus morio, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1074. 1928.
Mitopus montanus, Comstock, Spider Book, rev. ed. p. 70. 1940.

Male, length 4 mm.; width 3 mm.

Legs, I, 21 mm.; II, 35 mm.; III, 23 mm.; IV, 35 mm.

Carapace with a cluster of four or five small tubercles at center just back of anterior margin and a row along margin of pigmented area back of anterior margin; lateral margins of carapace with one or two small tubercles between coxae I-II and II-III; dorsum of abdomen smooth except for small widely spaced tubercles in a transverse series on each segment; openings of scent glands at the edge of the carapace, opposite trochanters of first legs; eye-tubercle with a shallow canal, the carinae with a few small, low, rounded tubercles; nine or ten small tubercles in a transverse row behind eye-tubercle, this row followed by a transverse groove and fold, nearly straight at the center but with the ends turned backward. Abdomen widest at about the middle of the length, bluntly rounded behind and turned downward at tip.

Venter. Coxae smooth with sparse, short, brown hairs; genital operculum similarly clothed; posterior distal angle of coxa II with a tubercle bearing one black-tipped spine; coxa IV with a broad, flat, pointed tubercle on the anterior, distal angle; trochanters short, globose, armed laterally and ventrally at distal margin with short dark hairs; femora III and IV nearly rectangular in cross section, the ridges on III and IV armed with short, black, curved spines, forming regular series; femora I and II more nearly cylindrical, armed with short hairs only; patellae short, curved above and armed sparsely with short hairs and with a few short, black sharp-pointed spines on the distal margin above; all tibiae more or less rectangular in cross-section and armed with short hairs on the angles; metatarsi slender, cylindrical, armed with fine, short hairs and with short black spines forming a single series below at the false articulations; tarsi slender, the single claw simple, sickle-shape.

Femur of palpus from above slender, slightly widened distally and with blunt apophyses on the disto-mesal angle, from the side slightly curved above and below; patella short and thick, widened distally, armed dorso-mesally with a dense patch of short hairs; tibia short, slightly longer than patella, armed dorso-mesally with short dense hairs; tarsus slender, about twice as long as tibia, armed beneath on basal two-thirds, with a narrow

band of very small black denticles and distally with a single curved claw. Proximal segment of chelicera below at base with a distinct spur.

Color. Ground color above chalky white to dull yellow, marked laterally with transverse rows of small, dark brown to black spots and larger irregular blotches of brown; a broad central marking in strong contrast to adjacent light parts; the central figure light tan to brown, spotted and mottled with darker on the thoracic part, dark brown to black on the abdomen, somewhat lighter in the center; the dark figure widest at the suture between third and fourth abdominal segments, narrowing on the two following segments, slightly widened on the next behind, then narrowing to the tip of the abdomen; eye-tubercle light tan; chelicerae mottled brown and yellow on the basal segment above; claws yellow at base, black-tipped.

Femur of palpus brown, lighter distally; patella mottled brown, light on the sides and with a wedge-shape light mark above the apex directed backward; tibia variable, in some marked with alternating light and dark, longitudinal lines; tarsus generally light. Legs short, light in color with coxae lightly clouded with brown; trochanters light, mottled with pale brown; femora shaded distally; patellae brown; tibiae brown with a lighter band at center, metatarsi and tarsi light.

Female, length 4.5 to 6.25 mm.; width, 3.25 to 3.5 mm.

Legs, I, 20 mm.; II, 35 mm.; III, 21 mm.; IV, 34 mm.

Similar to male but larger and stouter; in general, the pattern above is the same in both sexes but the female is usually duller and with markings in less contrast than in male; tip of abdomen not turned downward as in male; venter irregularly and lightly mottled with brown and white on coxae and abdomen.

Type locality, Sweden.

Distribution.—New York. Adirondack Mountains. ESSEX: Artist Brook, Je. juv.; Avalanche lake, Jly. juv.; Lake Tear, Jly. juv. (W. T. M. F.); Mt. Marcy, summit, Jly. juv., Aug. Sept. ad.; Mt. MacIntyre, summit, Jly. juv.; Mt. Whiteface, 4000 ft., Aug. (C. R. C.); Uphill brook and Opalescent river, Jly. (C. R. C.).

Specimens also examined from Nova Scotia, Truro, Oct.; P. Q., Natashquan, Aug. (H. H. C.).

Mitopus morio is a mountain form, all New York specimens having been recorded from the Adirondacks, usually at elevations in excess of 4000 feet. The species should be looked for on the higher peaks of the Catskills.

ODIELLUS ROEWER

The genus *Odiellus* was proposed by Roewer (1923, p. 724) to include a considerable number of species formerly placed in *Oliogolphus*, *Phalangium*, *Odius*, and several other genera. It is characterized by the presence

of three prominent spines on the anterior margin of the carapace in front of the eye-tubercle and the carinae of the eye-tubercle are armed with pointed tubercles; the femur of the palpus has a ventral row of prominent spines. I have included in this genus the phalangids from the north which have been recognized in the literature as *Lacinius ohioensis*. All the specimens of this supposed species I have seen are immature or mature individuals of *Odiellus pictus*. Whether or not the genus *Lacinius* is a valid one will have to be determined by a study of more adequate material than I possess. *Lacinius* is supposed to be distinguished by the lack of false articulations in the metatarsus of the first legs but many immature specimens of *Odiellus pictus* also lack these structures.

Odiellus pictus (Wood)

Pl. 2, figs. 23-28.

- Phalangium pictum* Wood, Commun. Essex Inst. 6(1):30-31, 1 fig. 1870.
Oligolophus pictus, Weed, Bull. Ill. St. Lab. Nat. Hist. 3:95-97, 1 fig. 1889; *ibid.* p. 106.
Oligolophus pictus, Weed, Amer. Nat. 24(286):917. 1890.
Oligolophus ohioensis Weed, Amer. Nat. 23(276):1102-1104, pl. 42, figs. 1-2. 1889.
Mitopus pictus, Weed, Proc. U. S. Nat. Mus. 16:557-558, pl. 62, fig. 2. 1893.
Mitopus ohioensis Weed, *ibid.*, pp. 558-559, pl. 68, figs. 1-2. 1893.
Lacinius ohioensis, Banks, Can. Ent. 25:207. 1893.
Lacinius ohioensis, Banks, Jour. N. Y. Ent. Soc. 2:40. 1894.
Lacinius ohioensis, Banks, Amer. Nat. 35(416):674. 1901.
Oligolophus pictus, Banks, *ibid.*
Oligolophus pictus, Banks, Ent. News. 13:308. 1902.
Odius pictus, Roewer, Abhandl. a Gebiete Naturw. 20(1):70-71. 1912.
Lacinius ohioensis, Roewer, *ibid.*, pp. 80-81.
Oligolophus pictus, Comstock, Spider Book, pp. 70-71. 1912.
Lacinius ohioensis, *ibid.*, p. 70.
Odiellus pictus, Roewer, Weberknechte der Erde, pp. 734-735. 1923.
Lacinius ohioensis, Roewer, *ibid.*, p. 743.
Odiellus pictus, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1074. 1928.
Odiellus pictus, Comstock, Spider Book, rev. ed. pp. 70-71. 1940.
Lacinius ohioensis, *ibid.*, p. 70.

Male, length 5 mm., width 3.5 mm.

Legs, I, 11 mm.; II, 23 mm.; III, 13 mm.; IV, 16 mm.

Dorsum of thorax finely granular, that of abdomen relatively smooth between transverse rows of tubercles; anterior margin of carapace armed at the lateral angles with one or two small pointed tubercles and at the center with a series of three larger and longer spine-like tubercles; the center one largest; lateral margins of carapace with one or two small pointed tubercles between the coxae I-II and II-III; eye-tubercle shallowly canaliculate and armed with a row of tubercles on each carina; a single transverse row of small tubercles behind the eye-tubercle and this followed by a broadly marginate, transverse, impressed line; abdomen widest at about the middle of its length, pointed behind; a transverse row of small

white tubercles across each abdominal segment above; coxae smooth or nearly so, armed anteriorly and ventrally with short dark hairs, the 2nd, 3rd and 4th progressively with finer hairs; sternites smooth; genital operculum smooth, armed with scattered short dark hairs; posterior lateral angle of coxa II armed with a single stout spine and anterior lateral angle of coxa IV with a broad tubercle tipped with two or three short spines.

Femur of palpus slender, gently curved, slightly thickened distally and armed on the disto-mesal side with a rounded hump, armed ventro-laterally with a single irregular row of eight to ten slender tubercles, each tipped with a sharp black hair; patella short, widened distally, strongly arched above, nearly straight below, the disto-mesal angle produced into a blunt lobe; tibia slightly longer than patella, the disto-mesal angle somewhat swollen, hairy above and armed ventrally, in some, with a few elongate, hair-tipped tubercles; tarsus slender, slightly curved ventrally, armed ventro-mesally with a narrow band of small, black denticles and ventro-laterally with an irregular series of stout black hairs; claw of tarsus simple, curved.

Color. Dorsum with light areas silvery, mottled and spotted with brown and with transverse series of small light spots marking the position of tubercles on abdominal segments; a broad central figure, light to very dark brown, widest on the 3rd segment and narrowing on alternate segments to tip of abdomen; eye-tubercle light above; chelicerae yellow with a few dark tubercles on base above; claws with black edges. Palpus yellow, clouded above; patella and tibia with a dusky band above; venter silvery with sides of abdominal segments mottled with dark brown and a narrow dark midline; legs with distal and hind margin of coxae with small rounded brown spots; trochanters yellow; femora with a broad dark band near base and distally; patellae dark; tibiae mottled with dusky or dark at both ends and light between; metatarsus I mostly light in color with at least one false articulation; tarsi light.

Female, length 6 to 6.5 mm.; width 3.5 mm.

Legs I, 9 mm.; II, 22 mm.; III, 11 mm.; IV, 16 mm.

Similar to male but generally larger and stouter and with the abdomen more bluntly rounded behind; tibia of palpus strongly swollen disto-mesally; tarsus slender, not armed ventro-mesally with a narrow band of small, black denticles.

Large females with eggs were taken at Allegany State Park, Aug. 10 and 19, one 6.5 mm. carrying 58 large eggs and many small ones.

Type locality, near Salem, Mass.

Distribution.—New York. ALBANY: E. N. Huyck Preserve, Rensselaerville, Jly., Aug., Sept.; Kenwood, Oct. (F. C. P.); Thompson lake, Je. (F. H. W.); Voorheesville, Je., Jly. (A. W.). ALLEGANY: Richburg, Sept.; Wellsville, Sept. CATTARAUGUS: Allegany State Park, Aug.; Barcelona, Sept.; Silver creek, Sept.; Stow, Sept.; Rock City, Olean, Aug.,

Sept. CLINTON: Plattsburg, Sept. (F. C. P.); Valcour Island, Aug. ERIE: Spring Brook, Sept. ESSEX: Chapel pond, Je., Jly.; Elizabethtown, Aug. (C. R. C.); Lake Placid, Sept. (F. C. P.); Mt. MacIntyre, Je., Jly.; Marble Mt., Aug. (C. R. C.); Mt. Marcy, Sept., 3500 feet; Mt. Whiteface, Aug.; Newcomb, Sept. (H. D. H.); Upper Jay, Sept. (F. C. P.); Wilmington Notch, Aug. (C. R. C.). FRANKLIN: Saranac lake, Sept. (F. C. P.). FULTON: Pinnacle Mt. (C. R. C.); Gloversville, Sept. (F. C. P.); Woodworth's lake, Aug. (C. P. A.). HAMILTON: Raquette lake, Sept. (F. C. P.). HERKIMER: Big Moose, Aug. (F. C. P.); Little Falls, Jly.; Wilmurt, Aug. (F. C. P.). JEFFERSON: Brownsville, Sept. (F. C. P.); Watertown, Sept. (F. C. P.). LIVINGSTON: Hemlock lake, Aug. MONROE: Charlotte, Sept. (F. C. P.); Glen Haven, Sept. (F. C. P.); Mendon Ponds Park, Nov. NIAGARA: Lewiston, Sept. (F. C. P.); Olcott, Sept. RENSSELAER: Nassau lake, Sept. (A. W.); Rensselaer, Aug. (F. C. P.). SCHUYLER: Montour Falls, Sept.; Watkins, Oct. SENECA: Interlaken, Nov.; Covert, Aug. (C. R. C.). STEUBEN: Hornell, Sept.; Painted Post, Sept. TOMPKINS: Connecticut Hill, Aug. (C. R. C.); Enfield, Aug.; Ithaca, May to Sept., Nov. (C. R. C.); McLean, Jly.; Taughannock Falls, Aug., Oct. WASHINGTON: Pearl Point, Jly. WAYNE: Lake Bluff, Sept. YATES: Crosby, Sept., Oct. (C. R. C.); Keuka lake, Oct. (C. R. C.). Long Island. SUFFOLK: Mattituck, Aug. (R. L.); Napeague, Sept. (R. L.); Quogue, Sept. (R. L.); Sag Harbor, Sept. (R. L.); Shelter Island, Sept., Oct. (R. L.); Southold, Oct. (R. L.).

Specimens have also been examined from Ga., Summerville, Aug.; Maine, Isle-au-Haut, Sept.; N. C., Blowing Rock, Oct.; Grandfather Mt., Oct.; Pa., Shawanese lake, Sept. (F. C. P.); Tenn., Mt. Le Conte, Oct.; Va., Covington, Sept. Canada, P. Q., Bagotville, Jly. (C. R. C.); St. Joseph d'Alma, Jly. (C. R. C.); Ontario, Bay of Quinte, Aug. (A. W.).

PHALANGIUM LINNAEUS

Phalangium is the only phalangid genus recognized by Linnaeus in the 10th edition of the *Systema Naturae* (1758, p. 618). Under that generic name the species *opilio* is listed and a number of references to the literature cited. In spite of this, many references in the literature give Linnaeus, *Fauna Suec.* ed. 2 (1761, p. 485), as the type description of *P. opilio*.

In *Phalangium* the distal segment of the palpus is longer than the one immediately before it and the femur of the palpus lacks prominent spines. There are spines on the anterior margin of the carapace, at the angles, and others form a small group in front of the eye-tubercle. In our only New York species, the males are easily recognized by the development, on the second segment of the chelicera, of a prominent, dorsally produced spur.

Phalangium opilio Linnaeus

Pl. 2, figs. 29-33.

- Phalangium opilio* Linnaeus, Systema Naturae, 10th ed. 1:618. 1758.
Phalangium opilio Linnaeus, Fauna Suec. ed. 2, p. 485. 1761.
Phalangium longipalpis Weed, Amer. Nat. 24(284):783-785, pl. 27, figs. 1-3. 1890.
Phalangium longipalpis Weed, Amer. Nat. 24(286):918. 1890.
Phalangium longipalpis, Banks, Can. Ent. 25:207. 1893.
Phalangium longipalpis, Banks, Amer. Nat. 35(416):674. 1901.
Phalangium longipalpis, Crosby, Ent. News, 18(4):161. 1907.
Phalangium longipalpis, Crosby, Ent. News, 21(9):420. 1910.
Phalangium cornutum, Roewer, Abhandl. a Gebiete Naturw. 20(1):91-94, pl. 2, fig. 28. 1912.
Phalangium longipalpis, Comstock, Spider Book, p. 69. 1912.
Phalangium opilio, Roewer, Weberknechte der Erde, pp. 751-752, fig. 927. 1923.
Phalangium opilio, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1075. 1928.
Phalangium opilio, Comstock, Spider Book, rev. ed. p. 69. 1940.

Male, length 6 mm.; width 3.5 mm.

Legs, I, 24 mm.; II, 40 mm.; III, 27 mm.; IV, 34 mm.

Dorsum of carapace armed with numerous black-tipped tubercles disposed as follows: a cluster closely aggregated at each anterior lateral angle, a group behind the anterior margin in front of the eye-tubercle, a few at the anterior edge of the openings of the scent glands and one or two at the posterior edge, a few widely separated at the lateral margins and a straight row on the ridge back of the eye-tubercle. Abdomen widest at about the distal third, bluntly rounded at tip; the dorsal surface smooth except for definite transverse rows of slender, black-tipped tubercles across the segments; eye-tubercle with a broad shallow canal, the carinae each with a row of prominent tubercles; openings of scent glands oval, directed laterally and placed opposite the trochanters of the first legs.

Venter relatively smooth, clothed sparsely with black hairs; no tubercles along the margins of the coxae or on genital operculum. Palpus leg-like, long and slender; femur cylindrical, widest at distal end, armed with scattered black hairs; patella half as long as femur and similarly armed and swollen distally; tibia two thirds as long as femur but with fewer hairs; tarsus about as long as femur, the claw simple. Chelicera with the second segment produced dorsally into a large, strong, pointed horn which varies in size considerably becoming very prominent with age; claw of chelicera black. Trochanters of legs armed distally and on anterior and posterior margins with short spines and hairs; femora armed with five longitudinal rows of prominent, black-tipped tubercles; patellae short, widened distally and armed below with a row of spines and hairs; tibiae with longitudinal bands of very short, dark hairs; metatarsi and tarsi clothed generally with very short, dark hairs and pairs of spines ventrally at the articulations.

Ground color above yellowish, tan or grayish, the central figure usually faintly developed in the male, narrow on the second abdominal segment, somewhat widened on the third segment and again narrowed on the fourth

and fifth segments; sutures between segments of abdomen marked laterally by series of three to five small, round dark spots continued across the full width of the abdomen only at the posterior end; eye-tubercle light, slightly darkened around the eyes; chelicerae yellow, the claws black-tipped and margined; femur of palpus light at the extremities, dark brown to black between, remaining segments light; legs I, III, IV tan to brown, darker distally, legs II, lighter.

Female, length 7.5 mm.; width, 3.75 mm.

Legs, I, 21 mm.; II, 38 mm.; III, 22 mm.; IV, 31 mm.

The female is larger than the male but with shorter and more slender legs. The colors, however, are often brighter and the pattern much more distinct. Second segment of chelicera normal, not produced above to form a spur; palpus a little heavier than in male and with shorter segments; disto-mesal angle of the patella produced into a blunt lobe armed with short black hairs.

Type locality, Europe, America.

Distribution.—New York. ALBANY: E. N. Huyck Preserve, Myosotis lake, Rensselaerville, Jly. Albany, Aug.; Dormansville, Jly.; Normanskill, Jly.; Normansville, Jly.; Watervleit, Aug. CAYUGA: Fairhaven, Aug. (H. Z.). CHAUTAQUA: Silver Creek, Sept. (M. D. L.). CLINTON: Plattsburg, Sept. (C. R. C.). COLUMBIA: Kinderhook, Sept. ERIE: Hamburg, Sept. (C. R. C.); Newfane, Oct. (C. R. C.); Spring Brook, Sept. FRANKLIN: Malone, Oct. GENESEE: Bergen swamp, Sept. JEFFERSON: Evans Mills, Oct. Watertown, Sept. (F. C. P.). MADISON: Canastota. MONROE: Charlotte, Sept. (F. C. P.); Honeoye Falls, Jly., Sept., Nov. (C. R. C.); Mendon Ponds Park, Nov.; Rochester, Sept., Oct. (C. R. C.); Oct., Nov. (K. W. C.). NEW YORK: Central Park, Je., Jly. NIAGARA: Lewiston, Sept. (F. C. P.); Lockport, Aug. ONEIDA: Boonville, Jly.; Trenton Falls, Je. ONONDAGA: Syracuse, Sept. (C. R. C.). ONTARIO: Geneva, Nov.; Stanley, Sept. (C. R. C.); Woodville, Je., Jly., Sept. ORLEANS: Carleton Station, Jly., Sept. (C. R. C.); Holley, Oct. (C. R. C.); West Barre, Sept. RENSSELAER: Rensselaer, Jly., Nov. (W. J. S.); South Rensselaer, Jly. SCHUYLER: Cinnamon lake, Jly. STEUBEN: Hornell, Sept. ST. LAWRENCE: Norwood, Oct. TOMPKINS: Ithaca, Jly., Sept., Oct., Nov. (C. R. C.); McLean, Sept. (C. R. C.). WASHINGTON: Elizabeth Island, Lake George, Jly. WAYNE: East Bay, Sept. (F. C. P.); Lake Bluff, Sept. YATES: Lake Keuka, Nov. (C. R. C.). Long Island. KINGS: Brooklyn, Sept., Oct. NASSAU: Manhasset, Je. QUEENS: Jamaica, Sept. SUFFOLK: Calverton, Aug. (R. L.); Cold Spring Harbor, Je. (W. J. G.); East Marion, Oct. (R. L.); Eastport, May (R. L.); East Quogue, Sept. Oct. (R. L.); Flanders, Aug., Sept., Oct. (R. L.); Greenport, Aug. (R. L.); Hampton Bays, Sept. (R. L.); Jamesport, Oct. (R. L.); Manorville, Sept. (R. L.); Mattituck, Aug. (R. L.); Moriches, Nov. (R. L.); Napeague, Sept., Oct. (R. L.);

Northsea, Sept. (R. L.); Northwest, Je., Sept. (R. L.); Orient, Oct. (R. L.); Peonic, Je. (R. L.); Pine Neck, May (R. L.); Riverhead, Sept. (R. L.); Sag Harbor, Sept., Oct. (R. L.); Shelter Island, Sept., Oct. (R. L.); Shinnecock Hills, Sept. (R. L.); Southampton, Sept. (R. L.); Southold, Oct. (R. L.); Speonk, May (R. L.).

Specimens also examined from Mass., Marblehead, Je.; Mich., Washenaw, Nov.

OPILIO HERBST

The species of *Opilio* resemble those of *Phalangium* in the possession of regular rows of sharp-tipped tubercles on the femora of the legs, and in having the last segment of the palpus longer than the penultimate but differ in that the supra-cheliceral laminae are inconspicuous and do not have a spine-tipped tubercle on the disto-mesal angles. Males of *Opilio parietinus* lack the large spur on the second segment of the chelicera which is so prominent in *Phalangium opilio*.

The members of the genus are widely distributed in Europe and are found in North and East Africa, Asia and North America.

Opilio parietinus (De Geer)

Pl. 3, figs. 34-37.

Phalangium parietinum De Geer, Mem. Hist. Ins. 7:166-172, pl. 10, figs. 1-11. 1778.

Phalangium cinereum Wood, Commun. Essex Inst. 6(1):25-26, fig. 5 a-c. 1870.

Phalangium cinereum, Weed, Bull. Ill. State Lab. Nat. Hist. 3:93-94. 1889.

Phalangium cinereum, Weed, *ibid.*, p. 104.

Phalangium cinereum, Weed, Amer. Nat. 24(286):916-917. 1890.

Phalangium cinereum, Weed, Amer. Nat. 26(301):32-36, pl. 1, figs. 1-2. 1892.

Phalangium cinereum, Weed, Trans. Amer. Ent. Soc. 20:292, pl. 5, figs. 1-2. 1893.

Phalangium cinereum, Weed, Proc. U. S. Nat. Mus. 16:560-561, pl. 69, figs. 1-2. 1893.

Phalangium cinereum, Banks, Can. Ent. 25:207. 1893.

Phalangium cinereum, Banks, Jour. N. Y. Ent. Soc. 2:40. 1894.

Phalangium cinereum, Banks, Amer. Nat. 35(416):674. 1901.

Phalangium cinereum, Comstock, Spider Book, p. 69. 1912.

Opilio parietinus, Roewer, Abhandl. a Gebiete Naturw. 20(1):124-127. 1912.

Opilio parietinus, Roewer, Weberknechte der Erde, pp. 770-771, fig. 944. 1923.

Opilio parietinus, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1075. 1928.

Phalangium parietinus, Comstock, Spider Book, rev. ed., p. 69. 1940.

Male, length 5 mm.; width 3 mm.

Legs, I, 22 mm.; II, 38 mm.; III, 23 mm.; IV, 30 mm.

Carapace above strongly sculptured, broadly emarginate anteriorly, armed with sharp tubercles in two short series in front of eye-tubercle, on ridge behind opening of scent gland, and on an oblique ridge which is parallel to lateral margin of thorax half the distance to the eye-tubercle and on the straight, transverse ridge behind the eye-tubercle; a large sharp-pointed tubercle on either side of eye-tubercle; eye-tubercle broader than long, narrowly canaliculate, the carinae armed with prominent tubercles,

the eyes directed dorso-laterally and separated by less than the diameter of one of them; openings of scent glands small, oval, opposite trochanters of first legs. Abdomen broadly oval, widest near the middle of its length and tapering to a point behind; abdominal segments each armed with an irregular, transverse row of small sharp-pointed tubercles.

Venter. Coxae smooth, unarmed except for a very few, short, dark hairs on coxa I; genital operculum smooth and with a few, short, dark hairs anteriorly; sternites smooth, generally unarmed except for sparse, short, dark hairs.

Femur of palpus from above widened distally, armed dorso-laterally on distal half with a group of dark tubercles, dorso-mesally with two rows of smaller tubercles and short dark hairs; patella about half as long as femur, armed dorsally with a single row and dorso-mesally with two rows of short tubercles; tibia short, a little longer than patella, armed dorsally with a row of small tubercles and with a few hairs and tubercles dorso-mesally; tarsus slender, cylindrical, armed with a few small hairs above and a ventral band of very fine dark denticles; claw simple. Legs. Femora of all legs armed with sharp, black-tipped tubercles forming regular rows; patellae short, widened distally, armed with less regularly disposed tubercles; tibiae cylindrical, those of legs I and II shorter and stouter and armed with more tubercles than those of legs III and IV; tibia plus patella about as long as femur; metatarsi and tarsi, slender and tapering, claws simple.

Ground color above light tan, grayish, or yellowish mottled with whitish and light brown blotches on the cephalothorax; abdomen with a wide but faintly developed central figure crossed by transverse lines of light spots marking the position of rows of tubercles and, in some, with an irregular median dorsal light band; sides of abdomen mottled; palpi and chelicerae yellow, brown mottled, claws of the latter black tipped; legs yellow to tan or pale brown without conspicuous bands or shading. Venter generally light, the coxae with round or oval brown spots, forming a median line on many, the abdomen with faint brown spots and transverse series of pale whitish or yellowish spots mainly along the anterior margins of the segments.

Female, length to 8.5 mm.; width 4.5 mm.

Legs, I, 25 mm.; II, 46 mm.; III, 26 mm.; IV, 30 mm.

Similar to male but larger and with the abdomen broadly oval and bluntly pointed behind.

Type locality, Sweden.

Distribution.—New York. CATTARAUGUS: Otto, Sept. (G. H. C.). CLINTON: Plattsburg, Sept. (F. C. P.). HAMILTON: Indian lake, Aug. (W. J. S.). HERKIMER: Wilmurt, Aug. (F. C. P.). MONROE: Mendon Ponds Park, Oct., Nov.; North Greece (R. L. P.); Rochester, Oct. TOMPKINS: Ithaca, Aug., Oct., Nov. (C. R. C.). Long Island. SUFFOLK: Quogue, Sept. (R. L.).

Specimens also examined from Idaho, Pocatello; Mich., Ann Arbor, Oct.; Montana, Missoula, Jly. (C. R. C.); Canada. Quebec: Montreal, Aug. (F. C. P.).

LEIOBUNUM C. L. KOCH

Leiobunum includes the majority of the species of phalangids found in the State. The body is generally soft but in some species it is dorsally somewhat roughened and hardened. Anterior and lateral margins of the carapace smooth; eye-tubercle usually armed with small tubercles on the carinae; coxae usually with marginal rows of denticles or, denticles restricted to anterior row on coxa I and posterior row on coxa IV; terminal claw of palpus with teeth at base below; tarsus of palpus of male with a longitudinal band of small denticles meso-ventrally; legs usually long and slender, the second pair always longest; femora of legs I usually longer than body.

Leiobunum bicolor (Wood)

Pl. 3, figs. 38-42.

- Phalangium bicolor* Wood, Commun. Essex Inst. 6(1):28, 39, 1 fig. 1870.
Phalangium bicolor, Underwood, Can. Ent. 17(9):168. 1885.
Liobunum bicolor, Weed, Amer. Nat. 21(10):935. 1887.
Liobunum elegans Weed, Bull. Ill. State Lab. Nat. Hist. 3:102. 1889.
Liobunum bicolor, Weed, Bull. Ill. State Lab. Nat. Hist. 3:103. 1889.
Liobunum elegans Weed, Amer. Nat. 24(286):918. 1890.
Astrobus bicolor, Weed, Amer. Nat. 24(286):917. 1890.
Liobunum bicolor, Weed, Proc. U. S. Nat. Mus. 16:552-553, pl. 64, figs. 1-2; pl. 65, figs. 1-2. 1893.
Liobunum bicolor, Weed, Trans. Amer. Ent. Soc. 20:290. 1893.
Liobunum bicolor, Banks, Can. Ent. 25:211. 1893.
Liobunum bicolor, Banks, Jour. N. Y. Ent. Soc. 2(4):145. 1894.
Liobunum bicolor, Banks, Amer. Nat. 35(416):676. 1901.
Liobunum bicolor, Roewer, Abhandl. a Gebiete Naturw. 19(4):223-224, pl. 5, fig. 23. 1910.
Leiobunum bicolor, Comstock, Spider Book, p. 75. 1912.
Liobunum bicolor, Roewer, Weberknechte der Erde, pp. 901-902. 1923.
Liobunum annulatum Walker, Ohio Biol. Surv. Bull. 19, 4(4):167, pl. 2, fig. 15. 1928.
Leiobunum bicolor, Davis, Amer. Midland Nat. 15(6):667-668, pl. 32, fig. 18. 1934.
Leiobunum bicolor, Comstock, Spider Book, rev. ed. p. 75. 1940.

Male, length 5.5 mm.; width 4 mm.

Legs, I, 42 mm.; II, 68 mm.; III, 44 mm.; IV, 57 mm.

Dorsal integument very finely granular, no tubercles except two or three very small ones near scent glands; eye-tubercle slightly broader than long, shallowly canaliculate, the carinae armed with a few low tubercles; openings of scent glands small, oval, directed upward opposite trochanters of first legs; abdomen with sides nearly parallel then abruptly tapering to the blunt tip which is turned under; paired muscle impressions of abdomen conspicuous.

Venter. Coxae rugose, anterior margins of coxae I and II each with a row of small, square-tipped denticles; other coxae without definite rows

either in front or behind; genital operculum slightly roughened at center; sternites smooth; penis, simple, not alate near tip.

Femur of palpus from above slightly widened distally, the dorsal surface smooth on basal two-thirds, lateral, ventral and mesal sides armed with sharp, pointed tubercles, from the side evenly curved; patella short, widened distally, one half as long as femur, armed, except for a smooth dorsal band, with short dark denticles; tibia slightly longer than patella, sides parallel, armed with short brown hairs above, except for a longitudinal band on basal two-thirds, tubercles on sides; tarsus long, slender, armed with hairs above and ventro-mesally with a row of very small, black denticles; claw with a few teeth at base below.

Color. Ground color light yellow, tan or light brown with irregular silvery white blotches on the thorax disposed as follows: a pair in front of eye-tubercle, on each side a diagonal series of three spots decreasing in size posteriorly and lying midway between side of thorax and eye-tubercle; on the abdomen above, transverse rows of light spots which are largest at the sides both anteriorly and posteriorly, all light spots often fading out entirely in preservatives; sides of thorax dark margined; a broadly triangular dark blotch which encloses the eye-tubercle at its apex, dark blotches surrounding light spots at the sides of the abdomen above and narrow transverse bands along anterior margins of abdominal segments; tip of abdomen, dark brown; eye-tubercle dark brown to black, notched with yellow before and behind; palpus brown on the sides, light above in a longitudinal band except tarsus which is yellow; chelicerae yellow, claws black-tipped; legs light brown with light bands at the extremities of femora, tibia, base of metatarsi and at the false articulations of metatarsi and tarsi; patellae usually dark; trochanters light, concolorous with coxae. Venter lighter than dorsum, coxae and genital operculum yellowish, sternites pale or some with a few pale, brown spots in transverse series.

Female, length 6 mm.; width 3.25 mm.

Legs, I, 35 mm.; II, 62 mm.; III, 37 mm.; IV, 52 mm.

Similar to male but larger and with the tip of the abdomen bluntly pointed and not turned under.

Type locality, Haverford College, Delaware County, Pa.

Distribution.—New York. ALBANY: E. N. Huyck Preserve, Rensselaerville, Jly., Aug.; Indian Ladder, Thacher Park, May; Meadowdale, May; Thompson's lake, Sept.; Voorheesville, Je. ALLEGANY: Richburg, Sept. CATTARAUGUS: Allegany State Park, Oct.; Rock City, Olean, Sept. CHEMUNG: Elmira, Jly. COLUMBIA: Craryville, Aug. (A. W.). ESSEX: Je. (C. R. C.); Artist Brook, Je.; Chapel pond, Jly.; Lake Placid, Sept. (F. C. P.); Newcomb, Sept.; Wilmington, Aug. FRANKLIN: Saranac lake, Sept. GREENE: Haines Falls, Je. LEWIS: Michigan Mills, Sept. (C. R. C.); Whetstone Gulf, Sept. (C. R. C.). ONTARIO: Coy Point, Canandaigua lake, Sept., Nov. SCHUYLER: Montour Falls, Sept. STEU-

BEN: Hornell, Sept. TOMPKINS: Caroline, May (C. R. C.); Enfield Center, May (Rea); Enfield Glen, May, Aug., Sept. (N. W. D.); Ithaca, Jan., Aug., Dec. (C. R. C.); McLean, Apr., May. (C. R. C.). YATES: Crosby, Aug. (C. R. C.); Italy Hill, Sept.

Specimens also examined from Ky., Quicksand, Je. La., Chastine, May (K. P. S.). N. C., Blowing Rock, Oct. (C. R. C.); Grandfather Mt., Oct.; Linville Cave, Apr. Ohio, Cantwell Cliffs, May (C. R. C. and N. W. D.). Pa., Orangeville, Aug. (N. W. D.); Shelter cave, Nov., Dec. (K. D.); Veiled Lady cave, Nov. (K. D.). W. Va., Preston Co., May.

This species is often found in caves where it may hibernate during the colder months. It also frequents dark crevices, the shelter of deep woods and the little excavations beneath pond and stream banks. During the warmer months, it forages at night and may be found on the trunks of trees and crawling on the ground.

Leiobunum calcar (Wood)

Pl. 3, figs. 43-50

- Phalangium calcar* Wood, Commun. Essex Inst. 6(1):26-27, fig. 6a-b. 1870.
Leiobunum (?) *calcar*, Weed, Amer. Nat. 21(10):935. 1887.
Leiobunum (?) *calcar*, Weed, Bull. Ill. State Lab. Nat. Hist. 3:90-91. 1889.
Leiobunum (?) *calcar*, Weed, Bull. Ill. State Lab. Nat. Hist. 3:102-103. 1889.
Leiobunum (?) *calcar*, Weed, Amer. Nat. 24(286):918. 1890.
Leiobunum calcar, Weed, Proc. U. S. Nat. Mus. 16:553-554. 1893.
Leiobunum (?) *calcar*, Weed, Trans. Amer. Ent. Soc. 20:290-291. 1893.
Leiobunum calcar, Banks, Can. Ent. 25:211. 1893.
Leiobunum calcar, Banks, Jour. N. Y. Ent. Soc. 2:41. 1894.
Leiobunum calcar, Banks, Amer. Nat. 35(416):675. 1901.
Leiobunum calcar, Crosby, Jour. N. Y. Ent. Soc. 12(4):256. 1904.
Leiobunum calcar, Roewer, Abhandl. a Gebiete Naturw. 19(4):219. 1910.
Leiobunum calcar, Comstock, Spider Book, p. 73. 1912.
Leiobunum calcar, Roewer, Weberknechte der Erde, p. 899, fig. 1054. 1923.
Leiobunum calcar, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1075. 1928.
Leiobunum calcar, Walker, Ohio Biol. Surv. Bull. 19, 4(4):163, pl. 1, fig. 9. 1928.
Leiobunum brunnea Walker, Ohio Biol. Surv. Bull. 19, 4(4):167, pl. 2, fig. 12. 1928.
Leiobunum calcar, Davis, Amer. Midland Nat. 15(6):670-672, pl. 32, figs. 16-17, pl. 33, fig. 31. 1934.
Leiobunum calcar, Comstock, Spider Book, rev. ed., p. 73. 1940.
Leiobunum calcar, Bishop, Ent. News, 60(1):10-11, fig. 1. 1949.

Male, length 6 mm.; width 3 mm.

Legs, I, 26 mm.; II, 52 mm.; III, 28 mm.; IV, 40 mm.

Carapace lightly sculptured, the surface otherwise fairly smooth except for a few small tubercles along anterior margin, a line of tubercles in front of eye-tubercle, and a few along inner margins of openings of scent glands. Abdomen pointed behind, dorsum finely granular; eye-tubercle a little longer than broad, shallowly canaliculate, the carinae with a few low tubercles; openings of scent glands oval, opposite trochanters of the first legs. Venter of coxae and genital operculum nearly smooth, the anterior

margin of coxa I only with a row of square-tipped denticles; all coxae with a few, short, dark hairs; sternites smooth and shining.

Femur of palpus from above very stout, armed ventro-laterally with a very large, strong spur and disto-laterally with small black denticles, from the side, evenly and broadly arched; patella very short, stout, armed above with small black denticles and distally, at the upper margin, with a few longer denticles, from the side, sharply curved; tibia from above slightly swollen basally, armed with short, dark hairs, from the side evenly rounded above, below with a broad hump at base, the distal part strongly curved, armed on the hump with many dark denticles and a ventro-mesal row extending to the tip of the segment; tarsus slender, curved, and armed with dark hairs and a band of small black denticles ventro-mesally; claw with small teeth at base below; legs armed with numerous, small black-tipped spines.

Ground color above light brown, tan or yellowish marked with slightly darker blotches and reticulations and small light spots; darker markings form transverse bands on the abdomen and a faint central, vase-shaped figure which is bordered laterally with whitish blotches; the light spots form a diagonal line or bar on either side of the eye-tubercle, a regular transverse line on the ridge back of the eye-tubercle and irregular rows across the dark portions of the abdominal segments; eye-tubercle black, slightly lighter in front.

Venter lighter than dorsum, yellowish or pinkish-yellow in life; coxae and genital operculum same as venter of abdomen; trochanters dark brown to black in striking contrast to coxae or, in some individuals, concolorous with coxae; bases of femora black, rest of leg segments brown or, in specimens with yellow trochanters, then base of femora yellow. Femur and patella of palpus dark brown to black, tibia lighter brown; tarsus yellow; Chelicera yellow, the basal segment sometimes with a dark blotch above, the chelae black-tipped. Penis simple, not alate, from the side strongly curved.

Female, length 7 mm.; width 3.5 mm.

Legs, I, 26 mm.; II, 53 mm.; III, 27 mm.; IV, 40 mm.

The female attains a larger size than the male and the abdomen is bluntly rounded behind; the femur of the palpus lacks the ventro-lateral spur and is more slender than in the male, armed ventrally at base with small, sharp-pointed denticles and distally on the ventro-lateral side with a more prominent cluster of large denticles; legs slenderer than in the male.

General color above, chocolate brown to reddish brown, the central figure usually highly developed but limited laterally with silvery-white blotches as in the male. Femur and patella of palpus blotched with brown; legs as in the male but shorter.

Type locality, Mountains of southwestern Virginia.

Distribution.—New York. ALBANY: E. N. Huyck Preserve, Rensselaerville, Jly., Aug.; Lawson's lake, Je. CATTARAUGUS: Allegany State Park, Aug. CHAUTAUQUA: Chautauqua, Jly., Aug. (C. W.). CLINTON: Valcour Island, Lake Champlain, Aug. ESSEX: Chapel pond, Jly.; Wilmington Notch, Aug. (C. R. C.). FULTON: Gloversville, Jly. (C. P. A.); Woodworth's lake, Je. GREENE: Purling, Jly., Sept. HAMILTON: Long lake, Aug. (C. R. C.). HERKIMER: Big Moose lake, Aug. (F. C. P.); Little Falls, Jly.; Wilmurt, Aug. (F. C. P.). LEWIS: Highmarket, Aug. (Needham). LIVINGSTON: Letchworth State Park, Jly. MADISON: DeRuyter, Jly. (C. R. C.). ONEIDA: Trenton Falls, Jly. (F. C. P.). ONTARIO: Factory Hollow, Aug. (C. R. C.); Coy Point, Canandaigua lake, Je., Jly. ORLEANS: Medina, Jly. SARATOGA: Ballston lake, Aug. (A. W.). SCHENECTADY: High Mills Gorge, Aug. (A. W.). SCHUYLER: Cinnamon lake, Jly. SULLIVAN: Callicoon, Jly. TIoga: Spencer, Aug. TOMPKINS: Enfield, Jly.; Ithaca, Je., Jly., Aug. (C. R. C.); McLean, Jly.; Ringwood, Jly.; Slaterville, Aug.; Taughannock Falls, Jly.; Woodwardia, Aug. WASHINGTON: Black Mt., Aug. (C. R. C.).

Specimens also examined from Conn., Storrs, Jly.; N. C., Blowing Rock, Oct. (C. R. C.). Canada: Perth Road, Buck lake, Ontario.

This was one of the most abundant species at the E. N. Huyck Preserve, during the summer of 1948, and could be collected in large numbers from the trunks of trees and from the ground in a beech-hemlock forest bordering Lincoln pond.

It is a voracious form, definitely diurnal, and when found at night is usually in the resting position. During the daylight hours, when temperature and humidity permit, it forages openly and will attack and eat anything it can overcome. In the field it was found with bits of earthworm and well chewed ants and other insects in its jaws. In captivity it fed readily and accepted house flies, deer flies, syrphids, dragon flies, crane flies, damsel flies, lace-wing flies, young grasshoppers, spiders, moths, jassids, plant bugs and bits of fresh meat. It usually rejected smooth green caterpillars, beetles, membracids and plant lice.

Many pairs were found mating in the field and the operation could be observed in cages. The male grasps the female so that the spur on the femur of the palpus of the male is apposed to the swollen base of the tibia and forms a grasping organ to hold the trochanter of the first leg of the female. The curved disto-ventral side of the tibia of the male fits the mesal side of the trochanter of the second leg of the female while the tarsus of the male is pressed against the posterior side of the coxa of the second leg of the female. (Bishop, pp. 10-11, 1949)

Occasionally when males encounter one another in the field, they rush together, assume the mating position and, after struggling violently for a short time, come to rest and remain attached for several minutes.

Leiobunum flavum Banks

Pl. 4, figs. 51-54.

- Leiobunum flavum* Banks, Can Ent. 26(6):164. 1894.
Leiobunum flavum Banks, Proc. Acad. Nat. Sci. Phila. 52:541. 1900.
Leiobunum flavum Banks, Amer. Nat. 35(416):676. 1901.
Leiobunum flavum, Roewer, Abhandl. a Gebiete Naturw. 19(4):227-228, pl. 5, fig. 15. 1910.
Leiobunum flavum Banks, Proc. Acad. Nat. Sci. Phila. 63:456. 1911.
Leiobunum flavum, Comstock, Spider Book, p. 75. 1912.
Leiobunum flavum, Roewer, Weberknechte der Erde, p. 904. 1923.
Leiobunum flavum, Crosby and Bishop, Jour. Elisha Mitchell Sci. Soc. 40:20-21. 1924.
Leiobunum flavum, Walker, Ohio Biol. Surv. Bull. 19, 4(4):166-167, pl. 3, fig. 22. 1928.
Leiobunum flavum, Davis, Amer. Midland Nat. 15(6):676-678, pl. 32, fig. 20. 1934.
Leiobunum flavum, Comstock, Spider Book, rev. ed. p. 75. 1940.

Male, length 5 to 6 mm., average, 5.2 mm., width 3.75 mm.

Legs, I, 29 mm.; II, 50 mm.; III, 28 mm.; IV, 41 mm.

Dorsal integument of male very finely granular and moderately hardened, anterior margin of carapace with a few minute tubercles at the midline and opposite the insertion of the first legs; eye-tubercle scarcely canaliculate and armed with a few small, low tubercles on each low carina; opening of scent glands directed upwards; no tubercles on thoracic parts behind eye-tubercle or on dorsum of abdomen. Coxae and genital operculum with very small tubercles, the former each armed anteriorly and posteriorly with a definite row of square-tipped tubercles; a submarginal row of similar tubercles on either side of the genital operculum. Femur of palpus from above slightly widened distally; a few scattered tubercles dorso-mesally and laterally; patella short, widened distally, the anterior median angle produced into a short, blunt lobe, armed laterally with a few tubercles; tibia very slightly longer than patella, somewhat thickened, widest at the basal third, the tip squarely truncate; tarsus slender, cylindrical, ratio of length of tibia to tarsus as 13 to 21. Viewed from the side, femur of palpus slightly arched above, nearly straight below and armed ventrally with two rows of small tubercles which converge at the basal third, armed ventro-mesally, on basal half, with a row of about eight small tubercles; patella from the side, strongly arched above and below, armed basally, dorsally and laterally with small tubercles; tibia swollen at base below, nearly straight above and with scattered, short black hairs; tarsus very slightly curved ventrally, armed dorsally and laterally with numerous short black hairs, the mid-ventral line without hairs and margined mesally by a row of very small, black, sharp-pointed denticles. Claw of palpus, dentate, light at base, remainder black.

Color. Above bright golden yellow with slightly darker mottlings on the thoracic part. Abdominal segments indicated by light transverse lines between which the integument is marked with faint light spots on a very slightly darker ground. A central figure is very slightly indicated on

some specimens, particularly behind the eye-tubercle and on first and second abdominal segments; eye-tubercle light yellow with black encircling the eyes; chelicera yellow, the claw with tip and margins black; palpus yellow, slightly darker basally. Sternites and genital operculum yellow, slightly paler than coxae. Legs yellow-orange, the patellae and distal part of femora slightly darker; femora, patellae and tibiae armed with short, black-tipped spines. Penis alate near tip. fig. 53.

Female, length 8.5 to 10 mm.; width 5 mm.

Legs, I, 28 mm.; II, 52 mm.; III, 34 mm.; IV, 41 mm.

Similar to male but larger and with the abdomen more bluntly rounded behind. Markings on dorsum essentially similar, ground color sometimes in greater contrast with venter than in the male.

In 1934, Davis (p. 677) described *leiopenis* as a subspecies of *Leiobunum flavum* mainly on the basis of similarity in general appearance, and differences in the form of the penis and character of the armature of the femur of the palpus. In *leiopenis* the tibia of the palpus is long and slender, in *flavum*, thickened. His distribution records, given under the account of *L. flavum leiopenis*, include both *flavum* and *leiopenis*. The type locality of *leiopenis* is given as Shreveport, Louisiana which is the same as for *flavum*, as indicated by Banks and restricted by Crosby and Bishop.

The concept that two or more subspecies of the same species are to be found occupying the same areas is scarcely a tenable one unless evidence is forthcoming that they are segregated in some way, perhaps ecologically. No such evidence has been presented. In this report *L. flavum* is regarded as a distinct species.

Type locality, Shreveport, La., as restricted by Crosby and Bishop, Jour. Elisha Mitchell Sci. Soc. 40:20. 1924.

Distribution.—New York. SUFFOLK: Greenport, Aug. (R. L.); Montauk, Je. (R. L.); Riverhead, Long pond, Je. (C. R. C.).

This species has also been reported from Cayuga, Cayuga Co., Ithaca, Tompkins Co.; and from Axton, Franklin Co., in the Adirondacks. But this is decidedly a southern species which reaches the northern limits of its distribution at Woods Hole, Mass., and the Coastal Plain of Long Island.

Specimens also examined from Ala., Talladega, Aug. (T. H. H.); La., Chastine, May (K. P. S.); Miss., Aug. (T. H. H.), Lucedale, Sept. (H. D.); Mo., Columbia, Je. (C. R. C.), Waynesville, Aug. (E. B. W.), Hollister, Aug.; Okla., Wichita Nat. Forest (T. H. H.); Tenn., Fulton, Aug. (T. H. H.), Obion, Aug. (T. H. H.)

Leiobunum formosum (Wood)

Pl. 4, figs. 55-58.

Phalangium formosum Wood, Commun. Essex Inst. 6(1):30, 40, 1 fig. 1870.

Phalangium formosum, Underwood, Can. Ent. 17(9):168. 1885.

Liobunum formosum, Weed, Amer. Nat. 21(10):935. 1887.

Liobunum (?) *formosum*, Weed, Bull. Ill. State Lab. Nat. Hist. 3:91-92, 1 fig. 1889.

- Liobunum* (?) *formosum*, Weed, Bull. Ill. State Lab. Nat. Hist. 3:103. 1889.
Forbesium formosum, Weed, Amer. Nat. 24(286):916, 918, pl. 30, fig. 103. 1890.
Liobunum ventricosum, Weed, Proc. U. S. Nat. Mus. 16:551-552, pl. 63. 1893.
 (*juv. formosum*)
Liobunum formosum, Banks, Jour. N. Y. Ent. Soc. 2(4):145-146. 1894.
Liobunum formosum, Banks, Amer. Nat. 35(416):676. 1901.
Liobunum formosum, Roewer, Abhandl. a Gebiete Naturw. 19(4):214-215. 1910.
Leiobunum formosum, Comstock, Spider Book, p. 74. 1912.
Liobunum formosum, Roewer, Die Weberknechte der Erde, p. 897. 1923.
Liobunum formosum, Walker, Ohio Biol. Surv. Bull. 19, 4(4):164-165, pl. 1, fig. 7. 1928.
Leiobunum formosum, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1075. 1928.
Leiobunum formosum, Davis, Amer. Midland Nat. 15(6):678-679, pl. 32, fig. 28. 1934.
Leiobunum formosum, Comstock, Spider Book, rev. ed. p. 74. 1940.

Male, length 7 mm.; width 4 mm.

Legs, I, 43 mm.; II, 61 mm.; III, 43 mm.; IV, 60 mm.

Dorsum smooth or at most very finely granular; a group of small tubercles at center of margin of carapace and very small scattered tubercles along lateral margins; openings of scent glands small, oval, at margin of carapace opposite trochanters of first legs; eye-tubercle as broad as long, very shallowly canaliculate and usually armed with a few low, blunt tubercles along the carinae; abdomen widest at about the sixth segment, bluntly pointed behind. Venter. Surface of coxae and genital operculum with small tubercles, coxae I-IV armed with square-tipped tubercles along anterior margins, coxae I, II, and IV similarly armed along posterior margins; genital operculum armed laterally with a definite row of tubercles; sternites smooth or with a few small tubercles; legs with sharp-pointed denticles on femora, patellae and tibiae.

Femur of palpus from above long, slender, slightly widened distally, from the side gently curved, armed dorsally with a few hairs and small tubercles, ventrally, on the mesal side, with larger black-tipped denticles; patella one half as long as femur, widened distally, the disto-mesal angle slightly produced, armed with a few hairs and denticles, especially around the distal margin; from the side, strongly curved, armed disto-ventrally with a few denticles; tibia a little longer than patella, cylindrical, armed with a few small denticles at base and tip below; tarsus slender, armed with brown hairs and with a meso-ventral band of small, black denticles; claw with very small teeth on basal half below.

Ground color above golden yellow; eye-tubercle dark brown; carapace lightly blotched with brown, the margins darker; dorsum of abdomen with central figure obsolete or very faintly developed; segments of abdomen indicated by faint crossbands slightly darker than intervening spaces; venter of abdomen very slightly lighter than dorsum and genital operculum slightly darker; trochanters deep brown to black; femora black at base and tip; patellae black; tibiae black at base and narrowly at tip; metatarsi

and tarsi yellow; chelicerae yellow, the claws black-tipped. Femur of palpus yellow, marked distally with brown; patella brown, other segments yellow. Penis simple, not alate at tip.

Female (Long Island, N. Y.), length 7 mm.; width 4 mm.

Legs, I, 24 mm.; II, 41 mm.; III, 23 mm.; IV, 32 mm.

Female duller and darker than male and with the central figure of abdomen usually more evident; abdomen broadly rounded on the sides, bluntly pointed behind; legs usually banded with black as in male but trochanters sometimes blotched with yellow above; eye-tubercle with yellow above in some individuals.

Type localities, District of Columbia, Philadelphia, Pa.

Distribution.—New York. WESTCHESTER: Peekskill, Je. (F. C. P.) Long Island. NASSAU: Sea Cliff (N. B.). SUFFOLK: Greenport, Je., Oct. (R. L.); Manorville, Sept. (R. L.); Riverhead, Sept. (R. L.); Sag Harbor, Aug., Sept. (R. L.)

It has also been recorded from Ithaca, Tompkins County, N. Y., by N. Banks.

Specimens also examined from Ga., Tallulah Falls; Fla., Camp Torreya, May (N. W. D.), Chattahoochee, Je., Marianna, Apr., Jly. (N. W. D.); Ky.; Quicksand, Aug.; N. J., Bargaintown, Aug., Sept. (N. W. D.); Ohio Clear Creek, Hocking Co., Sept. (T. H. H.); S. C., Greenwood, Oct. (T. H. H.)

This is another southern species that reaches the northern limits of its distribution on Long Island, N. Y. Records of specimens taken in other parts of the State are probably in error.

Leiobunum longipes longipes Weed

Pl. 4, figs. 59-64.

- Leiobunum nigropalpi*, Weed, Amer. Nat. 21(10):935. 1887.
Leiobunum nigropalpi, Weed, Bull. Ill. State Lab. Nat. Hist. 3:87-88. 1889.
Leiobunum longipes Weed, Amer. Nat. 24(285):866-867, pl. 29, figs. 1-2. 1890.
Leiobunum longipes Weed, Amer. Nat. 24(286):918. 1890.
Leiobunum longipes Weed, Trans. Amer. Ent. Soc. 19:265, pl. 14, fig. 1. 1892.
Leiobunum longipes Weed, Proc. U. S. Nat. Mus. 16:550, pl. 62, fig. 1. 1893.
Phalangium longipes, Banks, Can. Ent. 25(8):207. 1893.
Leiobunum longipes, Banks, Jour. N. Y. Ent. Soc. 2(4):145. 1894.
Leiobunum longipes, Banks, Amer. Nat. 35(416):676. 1901.
Leiobunum longipes, Banks, Ent. News, 13:308. 1902.
Leiobunum longipes, Roewer, Abhandl. a Gebiete Naturw. 19(4):224, pl. 6, fig. 11. 1910.
Leiobunum longipes, Comstock, Spider Book, p. 74. 1912.
Leiobunum longipes longipes, Roewer, Weberknechte der Erde, p. 902. 1923.
Leiobunum longipes, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1075. 1928.
Leiobunum longipes, Walker, Ohio Biol. Surv. Bull. 19, 4(4):164, pl. 1, fig. 3. 1928.
Leiobunum longipes, Davis, Amer. Midland Nat. 15(6):679-681, pl. 31, fig. 10. 1934.
Leiobunum longipes, Comstock, Spider Book, rev. ed. p. 74. 1940.

Male, length 4 mm.; width 2.5 mm.

Legs, I, 39 mm.; II, 73 mm.; III, 40 mm.; IV, 54 mm.

Dorsum very finely granular, no tubercles; openings of scent glands small, oval, at margin of carapace opposite trochanters of first legs; eye-tubercle slightly broader than long, with a shallow canal, the carinae armed with a few small, sharp-pointed tubercles; abdomen short, widest at about the middle of the length, tapering to a blunt point behind and usually turned under.

Coxae and genital operculum generally smooth, sometimes with a few fine granulations; anterior distal margins of coxae I, II, and IV with a row of small pale tubercles, coxa IV armed similarly posteriorly; sternites smooth; legs very long, slender, with short, sparse, dark denticles on femora and tibiae, a very few on patellae.

Femur of palpus slender, cylindrical, nearly straight, with a very few hairs and fine denticles; patella one half as long as femur, slightly widened distally, curved ventrally and armed ventro-laterally with a few small denticles; tibia slender, a little longer than patella; tarsus slender, nearly straight, armed ventro-mesally with a row of fine denticles; claw with one or two slender teeth at base below; penis alate.

Ground color above in life varies from pale, pinkish-yellow through yellowish grey to bright orange with markings forming transverse lines of silver; central figure of abdomen poorly developed; eye-tubercle brown to black; venter lighter than dorsum, nearly white in some individuals; coxae and genital operculum light; trochanters brown to black, contrasting with the coxae; legs brown, base of femora, patellae and distal ends of tibiae, I, III and IV often darker; a broad white band at distal ends of tibiae II and, rarely, a whitish tip on femora II; chelicerae yellow; palpus yellow; penis alate.

Female, length 4.5 mm.; width 2.5 mm.

Legs, I, 33 mm.; II, 64 mm.; III, 32 mm.; IV, 49 mm.

The female is a little larger than the male but with shorter legs; the abdomen is longer and more pointed behind; the central figure is well developed, brown to black, bordered with silvery-white and crossed by incomplete rows of small, silvery-white spots; venter whitish.

Type locality, southern Illinois.

Distribution.—New York. ALBANY: E. N. Huyck Preserve, Rensselaerville, Jly., Aug.; Albany, Aug. (M. D. L.); Delmar, Aug.; Kenwood, Jly., Aug. (F. C. P.); Normanskill, Jly. (C. R. C.); Normansville, Jly.; Thacher Park, May; Thompson's lake, Sept.; Voorheesville, Je., Jly.; Watervleit Res., Aug. (M. D. L.) ALLEGANY: Richburg, Sept.; Wellsville, Sept. CATTARAUGUS: Allegany State Park, Aug., Oct.; Red House, Aug.; Rock City, Olean, Sept. CAYUGA: Cayuga, Aug. (C. R. C.); Fairhaven,

Jly. CHAUTAUQUA: Barcelona, Sept.; Chautauqua, Jly., Aug. (C. W.); Silver Creek, Sept.; Stow, Sept. CHEMUNG: Elmira, Aug. CLINTON: Plattsburg, Sept. (C. R. C.); Valcour Island, Lake Champlain, Aug. COLUMBIA: Mt. Merino, Aug. (M. D. L.). ESSEX: Ausable Chasm, Sept. (M. D. L.); Chapel Pond, Jly.; Lake Placid, Sept. (F. C. P.); Upper Jay, Sept. (F. C. P.); Wilmington, Aug. FRANKLIN: Saranac lake, Sept. (F. C. P.) FULTON: Woodworth's lake, Aug. (C. R. C.) GENESEE: Bergen swamp, Jly. GREEN: Catskill, Jly. (F. C. P.) ONONDAGA: East Onondaga, Sept. (F. C. P.). SARATOGA: Ballston lake, Aug. SCHENECTADY: High Mills Gorge, Aug. (A. W.). SCHUYLER: Montour Falls, Sept. STEUBEN: Hornell, Sept. TOMPKINS: Caroline, May (C. R. C.); Enfield Center, May; Ithaca, Jan., Aug., Dec. (C. R. C.); McLean, Apr., May. ULSTER: Highlands, Aug. (A. W.); West Park, Aug. WARREN: Hague, Sept. (M. D. L.). WASHINGTON: Black Mt., Lake George, Aug. (C. R. C.); Pearl Point, Lake George, Jly. (C. R. C.). YATES: Penn Yan, Aug. (C. R. C.)

Specimens have also been examined from La., Chastine, Apr. (C. R. C.); Mass., Sheffield, Jly. (F. C. P.); Mo., Columbia, Je. (C. R. C.), Rockport Cave, Nov. (C. R. C.) Canada, British Columbia, Selkirk Mts. (J. C. B.)

The species has also been recorded from Arkansas; Ga., Tallulah Falls, Je.; Ill., Chicago; Ind., Madison, Sept., Salt Petre Cave; Ky., Bee Springs, Je., Brooklyn Bridge, Je., Mammoth Cave, Jly., Quicksand, Je., Aug.; Me., Warwick; Mich., Douglas Lake, Jly., Huron Co., Jly., Milford, Sept.; N. C., Owens Gap, Aug., Winston-Salem, Oct.; Ohio, Buckeye lake, Starke Co., Jly.; Pa., Hazelton, Lehigh, Orangeville, Aug.; Tenn., Laurel creek, Oct., Lookout Mt.; Va., Falls Church, Sept., Great Falls, Sept., Pennington Gap; W. Va., Harpers Ferry, Williamsport; and Washington, D. C.

This species was particularly abundant on the east side of Lincoln Pond, Huyck Preserve, where, after rains, it could be collected literally by the hundreds. It is a very active form with excellent vision for detecting movement at distances up to three or four feet. On trees, chiefly hemlocks, they would run around the trunk like squirrels, the males in particular exhibiting great speed. Mated pairs were observed frequently and, on occasion, a second male would be standing nearby and bouncing up and down vigorously. To escape capture they will drop from considerable heights or take to the water and run across the surface.

L. longipes feeds avidly on almost any kind of small animal life it can find or capture.

The subspecies, *L. l. aldrichi*, described by Weed from South Dakota, is said to be distinguished from the typical form by having shorter legs and a strong tendency toward melanism, the palpus, the margin of the cephalothorax and the eye-tubercle being black.

Leiobunum nigripes Weed

Pl. 5, figs. 65-68.

- Leiobunum verrucosum*, Weed, Amer. Nat. 21(10):935. 1887.
Leiobunum verrucosum, Weed, Bull. Ill. State Lab. Nat. Hist. 3:88-89, 102. 1889.
Leiobunum verrucosum, Weed, Amer. Nat. 24(286):918. 1890.
Leiobunum nigripes Weed, Trans. Amer. Ent. Soc. 19:190-191, pl. 7, figs. 1-2. 1892.
Leiobunum nigripes Weed, Proc. U. S. Nat. Mus. 16:547, pl. 60, figs. 1-2. 1893.
Leiobunum nigripes, Banks, Can. Ent. 25(8):211. 1893.
Leiobunum nigripes, Banks, Amer. Nat. 35(416):676. 1901.
Leiobunum nigripes, Banks, Ent. News, 13:308. 1902.
Leiobunum nigripes, Roewer, Abhandl. a Gebiete Naturw. 19(4):220-221. 1910.
Leiobunum nigripes, Comstock, Spider Book, p. 74. 1912.
Leiobunum nigripes, Roewer, Weberknechte der Erde, p. 900. 1923.
Leiobunum nigripes, Walker, Ohio Biol. Surv. Bull. 19, 4(4):164, pl. 2, fig. 13. 1928.
Leiobunum nigripes, Davis, Amer. Midland Nat. 15(6):681-682, pl. 32, fig. 26. 1934.
Leiobunum nigripes, Comstock, Spider Book, rev. ed. p. 74. 1940.

Male, length 6 mm.; width 4 mm.

Legs, I, 27 mm.; II, 47 mm.; III, 27 mm.; IV, 37 mm.

Dorsal integument of male finely granular and moderately hardened; anterior margin of carapace without a patch of tubercles but with three very small teeth; eye-tubercle shallowly canaliculate and with only a few poorly developed tubercles on the carinae; scent glands, broadly oval in outline, opening upwards; no transverse series of tubercles on thorax back of eye-tubercle or on abdomen.

Coxae and genital operculum finely granular, sternites smooth; coxae I and IV armed both anteriorly and posteriorly with a definite row of square tubercles; coxae II and III armed only anteriorly. Femur of palpus from above slightly widened distally, a few small tubercles on both mesal and lateral sides distally; tibia rather thick, slightly longer than patella, armed only with short brown hairs; tarsus slender; ratio of length of tibia to tarsus as 12 to 20; femur from side only slightly arched above, ventrally with small tubercles; patella strongly arched above, ventrally with small tubercles; tibia thick, slightly swollen at base; tarsus slightly arched above, armed ventro-mesally with a definite row of small, black-tipped tubercles; tarsal claw denticulate; penis alate.

Color above bright golden yellow mottled lightly with darker and with a narrow dark margin on the carapace opposite insertion of the legs; central figure of thorax and abdomen lightly outlined and only slightly darker than adjacent areas; small yellow spots in transverse series on the abdominal segments. The central figure narrowest on the 2nd abdominal segment, widest on the 3rd, 4th and 5th and obsolete behind; eye-tubercle with black around the eyes, the canal brown; chelicera yellow, tips of claws black. Femur and patella of palpus brownish, tibia and tarsus yellow. Venter of abdomen yellow, coxae and genital operculum slightly darker; trochanters and extreme base of femora dark brown to black; distal fourth

of femora, the patellae, and distal third of tibiae dark brown to black, rest of these segments brown; metatarsi and tarsi lighter, dull yellow; penis alate.

Female, length 9 mm.; width 4.5 mm.

Legs, I, 28 mm.; II, 54 mm.; III, 27 mm.; IV, 41 mm.

The female is larger than the male and noticeably darker above and with the colors in greater contrast; abdomen bluntly rounded behind; venter light, sternites yellow, contrasting with the dorsum; coxae slightly darker; trochanters dark brown, usually with lighter blotches dorsally; base of femora dark brown, other segments colored as in the male.

The relatively short legs of this species of *Leiobunum* and the dark trochanters have led to its being confused with *Hadrobunus*. The general coloration of the males is quite different, however, and the similarity of the females is only superficial. In the male of *Leiobunum nigripes*, femur I is nearly as long as the body, in *Hadrobunus*, less than one half as long. In the female of *L. nigripes*, femur I is three-fourths as long as the body, in the female *Hadrobunus*, only about one-third as long.

Type localities, Champaign Co., Illinois and Clermont, Franklin and Warren Counties, Ohio.

Distribution.—New York. JEFFERSON: Thousand Islands (Kingsley). ROCKLAND: Bear Mt., Jly. (Malkin); Orangeburg, Je. (Giles); Palisades, Je. Long Island. NASSAU: Flushing (K. W. C.); Sea Cliff (N. B.). KINGS: Brooklyn, Forest Park, Je. (Barnum). SUFFOLK: Cold Spring Harbor, Je.; Greenport, Jan. (R. L.); Manorville, Sept. (R. L.); Montauk, Je., Jly. (R. L.).

Specimens also examined from N. J., Princeton, Oct. (K. W. C.).

Leiobunum nigropalpi (Wood)

Pl. 5, figs. 69-73.

- Phalangium nigropalpi* Wood, Commun. Essex Inst. 6(1):22-23, fig. 3 a-c. 1870.
Liobunum nigropalpi, Weed, Amer. Nat. 21(10):935. 1887.
Liobunum nigropalpi, Weed, Bull. Ill. State Lab. Nat. Hist. 3:87-88. 1889; *ibid.*, p. 101.
Liobunum nigripalpis, Weed, Amer. Nat. 24(286):918. 1890.
Liobunum nigropalpi, Weed, Trans. Amer. Ent. Soc. 19:187-188. 1892.
Liobunum nigropalpi, Weed, Proc. U. S. Nat. Mus. 16:547, pl. 59, figs. 1-2. 1893.
Liobunum nigropalpi, Banks, Can. Ent. 25(8):211. 1893.
Liobunum nigropalpi, Banks, Jour. N. Y. Ent. Soc. 2:41. 1894.
Liobunum nigripalpi, Banks, Amer. Nat. 35(416):675. 1901.
Liobunum nigropalpi, Roewer, Abhandl. a Gebiete Naturw. 19(4):213-214. 1910.
Leiobunum nigropalpi, Comstock, Spider Book, p. 73. 1912.
Liobunum nigropalpi, Roewer, Weberknechte der Erde, pp. 896-897. 1923.
Liobunum nigropalpi, Walker, Ohio Biol. Surv. Bull. 19, 4(4):163-164, pl. 2, fig. 14. 1928.
Leiobunum nigropalpi, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1075. 1928.
Leiobunum nigropalpi, Davis, Amer. Midland Nat. 15(6):682-684, pl. 31, fig. 6. 1934.
Leiobunum nigropalpi, Comstock, Spider Book, rev. ed., p. 73. 1940.

Male, length 6 mm. ; width 3 mm.

Legs, I, 42 mm. ; II, 80 mm. ; III, 42 mm. ; IV, 58 mm.

Dorsum very finely granular ; no tubercles on anterior margin of carapace ; openings of scent glands small, oval, directed upwards at base of trochanters of first legs ; eye-tubercle black, nearly circular in outline, canaliculate, the carinae armed with low tubercles ; abdomen widest at the basal third, pointed behind.

Venter. Coxae smooth, sparsely haired ; coxae I and IV armed along anterior margin with a row of small denticles and coxae I, III and IV with an incomplete row on posterior margin ; genital operculum smooth ; sternites smooth ; legs very long, armed sparsely with small denticles on femora, patellae and tibiae.

Femur of palpus nearly cylindrical, only slightly widened distally, from the side slightly curved, armed ventro-laterally on distal half with a row of sharp-pointed teeth ; patella short, one half as long as femur, rounded above, armed distally above with a few teeth at margin ; tibia from above with the sides nearly straight, from the side with a blunt protuberance at base, armed ventrally, on the protuberance, with a short row of small tubercles and ventro-mesally on the distal half with a similar row ; tarsus a little longer than tibia, slender, armed ventro-mesally with a definite row of small, black evenly spaced denticles ; claw with a few teeth at base below. Ground color above yellow or golden fading to light grey in some preserved specimens ; lightly mottled and spotted with tan and brown ; central figure poorly developed ; abdominal segments, latered of central figure with transverse series of small, pale, brown spots ; sides of abdomen lighter ; eye-tubercle dark brown to black.

Venter lighter than dorsum, coxae and genital operculum nearly white in some, sternites slightly darker ; trochanters of legs brown to black ; femora dark brown or black at base, lighter brown distally ; patellae dark brown ; tibiae dark brown ; metatarsi and tarsi light brown ; chelicerae yellow. Femur of palpus light at base, dark brown to black distally ; patella brown or black ; tibia brown but lighter than patella ; tarsus pale ; penis slender, not alate.

Female, length 6 to 7 mm. ; width 3.25 mm.

Legs, I, 33 mm. ; II, 63 mm. ; III, 34 mm. ; IV, 46 mm.

Generally similar to male but a little larger and with brighter pattern ; central figure usually better developed, especially on the basal half of abdomen ; colors often silvery and light to dark brown ; abdomen pointed posteriorly. Femur of palpus more widened distally than in the male, light at base, brown distally ; patella brown, the disto-mesal angle produced into a blunt lobe ; tibia yellow, not produced ventrally at base ; tarsus yellow ; legs generally as in the male but lighter.

Type locality, Huntington Co., Pa.

Distribution.—New York. ALBANY : E. N. Huyck Preserve, Rensselaer-

ville, Jly. Aug.; Albany, Je. (N. B.), Jly.; Kenwood, Jly. (G. H. C.); Normansville, Jly. (C. R. C.). CHAUTAUQUA: Chautauqua, Jly., Aug. (C. W.). CAYUGA: Fairhaven, Jly. (H. B.). CHEMUNG: Elmira, Jly. CLINTON: Valcour Island, Lake Champlain, Aug. ESSEX: Wilmington, Aug. (C. R. C.). GENESEE: Bergen swamp, Jly. LIVINGSTON: Hemlock lake, Aug. ONTARIO: Coy Point, Canandaigua lake, Je.; Naples, Jly. SARATOGA: Ballston lake, Aug. (A. W.). SCHUYLER: Reynoldsville, Aug. TOMPKINS: Ellis Hollow, Jly.; Enfield Glen, Aug.; Ithaca, Je., Jly., Aug. (C. R. C.) Taughannock, Aug.; Turkey Hill, Jly. WYOMING: Letchworth Park, Jly. YATES: Italy Hill, Sept.; Lake Keuka, Sept. (C. R. C.). Long Island. QUEENS: Jamaica, Je. (A. W.). SUFFOLK: Montauk Point, Jly. (R. L.).

Specimens have also been examined from Ga., Tallulah Falls (J. C. B.); Conn., Storrs, Jly.; Ill., Chicago; Ky., Quicksand, Aug. (W. D. F.); Mich., Port Austin, Huron Co., Sand Point, Jly.; N. J., Caldwell, Je., Lake Verona, Je., Madison, Jly. (A. W.); Ohio, Buckeye lake, Cedar Point, Sept., Starke Co., Jly.; Pa., Cumberland Valley, Aug., Leighton, Hazleton, Orangeville, Aug., President, Jly., Sunbury, Jly.

Leiobunum politum Weed

Pl. 5, figs. 74-79.

- Leiobunum politus* Weed, Bull. Ill. State Lab. Nat. Hist. 3:89-90. 1889; *ibid*, p. 102.
Leiobunum politus Weed, Amer. Nat. 24(286):918. 1890.
Leiobunum politum Weed, Trans. Amer. Ent. Soc. 19:266-267, pl. 15, figs. 1-2. 1892.
Leiobunum politum Weed, Proc. U. S. Nat. Mus. 16:548-550, pl. 61, figs. 1-2. 1893.
Leiobunum politum Weed, Psyche, 6:428, pl. 15. 1893.
Leiobunum politum, Banks, Can. Ent. 25(8):211. 1893.
Leiobunum politum, Banks, Jour. N. Y. Ent. Soc. 2:41. 1894.
Leiobunum politum, Banks, Proc. Acad. Nat. Sci. Phila., 52:541. 1900.
Leiobunum politum, Banks, Amer. Nat. 35(416):676. 1901.
Leiobunum politum, Roewer, Abhandl. a Gebiete Naturw. 19(4):219. 1910.
Leiobunum politum, Comstock, Spider Book, p. 75. 1912.
Leiobunum politum Weed, Life Histories of American Insects, pp. 261-262, fig. 93. 1917. Original ed. 1897.
Leiobunum politum politum, Roewer, Weberknechte der Erde, p. 900. 1923.
Leiobunum politum, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1075. 1928.
Leiobunum politum, Walker, Ohio Biol. Surv. Bull. 19, 4(4):165, pl. 1, fig. 5. 1928.
Leiobunum politum, Davis, Amer. Midland Nat. 15(6):686-688, pl. 32, figs. 27, 30. 1934.
Leiobunum politum, Comstock, Spider Book, rev. ed. p. 75. 1940.

Male, length 3.5 to 4.5 mm.; width 2.5 to 2.75 mm.

Legs, I, 27 mm.; II, 57 mm.; III, 28 mm.; IV, 43 mm.

Dorsum very finely granular; no tubercles on surface of carapace; eye-tubercle canaliculate, the carinae with a few sharp-pointed tubercles; scent gland openings broadly oval in outline, opposite trochanters of first legs; abdomen widest at about mid-length then abruptly tapering to a blunt point behind. Venter. Surface of coxae and genital operculum smooth; coxae

I to III with a row of very fine teeth along anterior margin; genital operculum with a row of similar teeth on each side; sternites smooth; femora of legs with many small, sharp-pointed denticles, other segments nearly smooth.

Femur of palpus from above nearly cylindrical or slightly swollen on basal half, armed ventro-mesally at base with a row of four or five small, black teeth; patella short, widened distally, armed with a few denticles at distal end above; tibia a little longer than patella, from above slightly swollen on basal half, from the side, produced ventrally at base; tarsus slender, about as long as femur, slightly curved ventrally and armed ventro-mesally with a row of small black teeth; claw with a few fine teeth at base below.

Ground color above, golden yellow, the central figure of abdomen very faintly developed; eye-tubercle dark along the carinae, light in front; coxae, genital operculum and sternites yellow, the coxae slightly darker; trochanters and femora yellow; remaining segments light to dark brown; tibia of second legs with false articulations and banded distally with yellow or white; chelicerae yellow; palpi golden-yellow; the femora sometimes shaded distally. Penis compressed dorsally near tip.

Female, length 5.5 mm.; width 3 mm.

Legs, I, 24 mm.; II, 47 mm.; III, 24 mm.; IV, 34 mm.

Larger than the male and with the abdomen broader and more bluntly pointed behind. The pattern is more strongly developed so that the central figure is usually discernible, limited laterally with silvery-white blotches; tibia II white-tipped distally, as in *Leiobunum longipes*; venter in some, silvery.

Type locality, Champaign Co., Illinois.

Distribution.—New York. ALBANY: E. N. Huyck Preserve, Rensselaerville, Jly., Aug.; Kenwood, Aug. (F. C. P.); Normanskill, Jly. (C. R. C.); Voorheesville, Jly., Aug.; Watervleit Res., Aug. (M. D. L.). BRONX: Van Cortland Park, Sept. (F. C. P.). CATTARAUGUS: Allegany State Park, Aug. CAYUGA: Fairhaven, Jly. CLINTON: Valcour Island, Aug. COLUMBIA: Craryville, Aug. (A. W.); Hillsdale, Sept. DELAWARE: Meredith, Aug. DUTCHESS: Rhinebeck, Jly. ESSEX: Mt. Whiteface, Aug. (C. R. C.). FULTON: Woodworth's lake, Aug. GREENE: Hunter, Aug. HERKIMER: Wilmurt, Aug. (F. C. P.). LEWIS: Lowville, Aug. ONTARIO: Naples, Jly., Aug. ORANGE: Mountainville, Aug. (A. W.). RENSSELAER: Nassau lake, Sept. (A. W.); Rensselaer, Jly., Aug. (W. J. S.). SARATOGA: Ballston lake, Aug. (A. W.). SCHUYLER: Montour Falls, Sept. (C. R. C.). SCHENECTADY: High Mills Gorge, Aug. (A. W.) TIOGA: Spencer, Aug. TOMPKINS: Enfield Glen, Aug.; Etna, Nov.; Ithaca, Jly. (W. J. S.), Aug., Sept. (C. R. C.), Oct. (W. J. H.); Renwick, Ithaca, Jly. (C. R. C.); Taughannock, Jly., Aug. (C. R. C.). ULSTER: Highland, Aug.; West Park, Aug. (A. W.). WARREN: Hague, Aug. (M. D. L.). WASHINGTON:

Black Mt., Aug. (C. R. C.); Pearl Point, Jly. (C. R. C.). WAYNE: Clyde, Jly. YATES: Penn Yan, Aug. (C. R. C.) Long Island. QUEENS: Forest Hills, Sept. (C. R. C.). NASSAU: Sea Cliff, Sept. (N. B.). SUFFOLK: Amityville, Aug. (F. C. P.); Riverhead, Sept.

Specimens have also been examined from Fla., Camp Torreya, Jly.; Ga., Athens, Je. (C. R. C.), Bainbridge, Jly. (J. C. B.), Oglethorpe, Jly. (J. C. B.); Me., Orono, Jly. Aug.; Mass., Quincy, Jly.; Mo., Columbia, Jly. (C. R. C.); Pa., Hazelton. Canada, N. S., Truro, Jly.

Weed (1893, p. 428) described *L. politum magnum* as a subspecies of *politum* on the basis of some specimens from Mississippi with legs longer than those possessed by northern specimens. In species common to both the north and south, the southern specimens have longer legs and, in the case of some forms, there is a well defined cline. We prefer to regard *L. politum* as a distinct species.

Leiobunum serratipalpe Roewer

Pl. 6, figs. 80-83.

Leiobunum serratipalpe Roewer, Abhandl. a Gebiete Naturw. 19(4):222. 1910.

Leiobunum serratipalpe Roewer, Weberknechte der Erde, p. 901, fig. 1055. 1923.

Leiobunum serratipalpe, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1075. 1928.

Leiobunum serratipalpe, Davis, Amer. Midland Nat. 15(6):689-690, pl. 31, figs. 3-4, pl. 33, fig. 32. 1934.

Male, length 7 mm.; width 3.75 mm.

Legs, I, 33 mm.; II, 59 mm.; III, 32 mm.; IV, 45 mm.

Integument finely granular, moderately hardened; anterior margin of carapace with a cluster of small denticles at the center and on either side opposite the coxae of the first legs; eye-tubercle shallowly canaliculate and with three or four small tubercles on the carinae; openings of scent glands oval, directed upward opposite base of first trochanters; no transverse row of tubercles back of eye-tubercle or across abdomen.

Venter. Coxae and genital operculum granular, the latter also with scattered light hairs; sternites smooth or very finely granular; marginal row of tubercles on genital operculum present; coxae I to IV armed anteriorly along margin with a row of low tubercles, coxa III with an incomplete row posteriorly, and coxa IV armed more completely posteriorly. Femur of palpus from above slightly narrowed at base, somewhat widened distally and armed distally above with a cluster of black tubercles, from the side strongly arched above, swollen below, and armed ventro-laterally and at distal, lateral margin with a few conspicuous black denticles and mesally, at base, with a row of five to seven black denticles; patella short, one half as long as femur, arched above, widened distally and with the disto-mesal angle slightly produced, armed above with a few scattered denticles and at the distal end above with larger black denticles; tibia from above with the sides straight, from the side rather strongly curved,

the ventral side at base swollen and armed with a cluster of black denticles and distally, on the mesal side, with a row of three or four small, sharp-pointed denticles; tarsus slender, slightly curved ventrally and armed ventro-mesally with a single row of small black denticles; tarsal claw with a few slender teeth at base below.

Above golden or silvery yellow with slightly darker mottlings forming irregular patches on the carapace and transverse lines of dark dots, sometimes interrupted mesally, marking the sutures between segments of the abdomen; very pale, light spots form transverse series across the abdominal segments and across the ridge back of eye-tubercle; central figure of abdomen very poorly defined, when present narrowest at the second segment and extending only to the sixth segment; eye-tubercle black around eyes, dusky orange on the front and along the groove; chelicerae and palpi yellow; venter yellow; trochanters and base of femora light brown, remaining segments of legs yellow in a specimen from Connecticut, light brown in New York specimens but dark brown, except trochanter and base of femora, which are light brown, in a specimen from Kentucky. Penis simple, not alate.

Female not known.

Type localities, Long lake, Adirondack Mts., N. Y.; Cold river, North America.

Distribution.—New York. HAMILTON: Long lake. Long Island (N. B.). NASSAU: Mineola, Jly. (R. L.).

Specimens also examined from Ala., Talladega Co., Je. (T. H. H.), Walker Co., Oct. (T. H. H.); Conn., Storrs, Jly.; Fla., Liberty Co., Jly. Nov. (T. H. H.); Ga., Decatur Co., Jly., Tallulah Falls, Jly.; Ky., Quick-sand, Je. (W. D. F.), Pine Mt., Bell Co., Aug. (W. D. F.); Ohio, Clear Creek, Hocking Co., Sept. (T. H. H.); S. C., Greenwood, Oct. (T. H. H.)

Leibunum speciosum Banks

Pl. 6, figs. 84-88.

Liobunum speciosum Banks, Proc. Acad. Nat. Sci. Phila. 52:541. 1900.

Liobunum speciosum Banks, Amer. Nat. 35(416):676. 1901.

Liobunum speciosum, Roewer, Abhandl. a Gebiete Naturw. 19(4):228-229, pl. 6, fig. 15. 1910.

Liobunum speciosum, Comstock, Spider Book, p. 75. 1912.

Liobunum speciosum, Roewer, Weberknechte der Erde, pp. 904-905, fig. 1057. 1923.

Liobunum speciosum, Crosby and Bishop, Jour. Elisha Mitchell Sci. Soc. 40:15-16, fig. 10. 1924.

Liobunum speciosum, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1076. 1928.

Liobunum speciosum, Walker, Ohio Biol. Surv. Bull. 19, 4(4):166, pl. 2, fig. 17. 1928.

Liobunum speciosum, Davis, Amer. Midland Nat. 15(6):690-691, pl. 32, fig. 21. 1934.

Liobunum speciosum, Comstock, Spider Book, rev. ed., p. 75. 1940.

Male, length 5.5 mm.; width 4 mm.

Legs, I, 46 mm.; II, 90 mm.; III, 39 mm.; IV, 65 mm.

Dorsum very finely granular but entirely lacking in tubercles except on carinae of eye-tubercle and at front of carapace where there are three small ones at the center; eye-tubercle with a shallow canal; scent glands opening laterally opposite base of first trochanters, abdomen widest at about the middle of length, tapering to a blunt point behind. Coxae I to IV with anterior rows of square denticles; coxae I and IV with incomplete series posteriorly, generally lacking on rear of coxa III; genital operculum with numerous small denticles.

Femur of palpus long and slender extending above carapace three or four times the height of the eye-tubercle, from above slightly widened distally, armed mesally at base with a few small tubercles and ventro-laterally with a series of rather widely spaced, sharp-pointed teeth, from the side strongly curved ventrally; patella shorter than femur, widened distally, armed ventro-laterally with a row of teeth; tibia about as long as patella, cylindrical from above, armed with a few short teeth ventro-mesally on distal half and with a ventro-lateral series of teeth continuous with those of the femur and patella; tarsus slender at base, swollen distally and with a mesal series of small dark teeth; claw with a few slender teeth at base below; chelicerae slender, margins and tip of chela black.

Color above tan to brown with bright silvery blotches on the thorax and transverse lines of small, silvery spots back of eye-tubercle and multiple rows of these spots across abdominal segments; central figure of abdomen vase-shaped, faintly to well developed, when dark then sides of abdomen above silvery, mottled with tan or brown; eye-tubercle dark above, light in front; chelicerae and palpi yellow. Venter silvery-white or with tinges of tan or yellow; genital operculum and coxae silvery to light tan; trochanters dark brown to black, contrasting strongly in color with coxae; base of femora black, rest of legs light to dark brown without distinct annulations although sometimes shaded distally. Penis simple, not alate.

Female generally similar to male but larger, specimens from the southern part of range measuring to 7 mm. or longer.

Legs, I, 47 mm.; II, 92 mm.; III, 47 mm.; IV, 65 mm.

Type locality, vicinity of Auburn, Alabama.

Distribution.—New York. Long Island, SUFFOLK: Orient, Sept. (R. L.); Peconic, Sept. (R. L.); Sound Avenue, Aug. (R. L.).

Other specimens examined from Ala., Warrior river, Oct. (H. H. S.), Lauderdale Co. (H. H. S.); Ark., St. Clair Co., Oct. (H. H. S.); Fla., Liberty Co., Jly., Nov. (T. H. H.); Ga., Decatur Co., Je., Jly. (J. C. B.), Spring creek, Jly., Tallulah Falls, Jly. (J. C. B.); Ky., Quicksand, Aug. (W. D. F.); S. C., Greenwood, Oct. (T. H. H.).

This is another species which reaches the northern limits of its distribution on Long Island where all known New York specimens were collected by Mr. Roy Latham of Orient.

Leiobunum uxorium Crosby and Bishop

Pl. 6, figs. 89-92.

Leiobunum uxorium Crosby and Bishop, Jour. Elisha Mitchell Sci. Soc. 40:13, 18-19, pl. 2, figs. 13-14. 1924.*Leiobunum uxorium*, Davis, Amer. Midland Nat. 15(6):692-693, pl. 32, fig. 19; pl. 33, fig. 35. 1934.

Male, length 4.5 mm.; width 3 mm.

Legs, I, 41 mm.; II, 77 mm.; III, 43 mm.; IV, 56 mm.

Dorsum finely granular, usually a few very small tubercles at center of anterior margin of carapace; opening of scent glands very small, at margin of carapace opposite trochanters of first legs; eye-tubercle canaliculate, the carinae armed with small, sharp-pointed denticles; abdomen widest near tip, abruptly tapering to a blunt point behind. Coxae coarsely granular, genital operculum and sternites smooth or at most, finely granular; anterior margin of coxae I to IV armed with a row of small denticles.

Femur of palpus long and slightly curved, armed ventro-mesally, and sometimes ventro-laterally, with incomplete rows of small denticles; patella about one half as long as femur, widened distally, armed laterally at base with a few small denticles; tibia a little longer than patella, from above nearly cylindrical, from the side slightly swollen at base, armed ventro-laterally at base with a few small tubercles and ventro-mesally, on the distal half, with a row of about ten small denticles; tarsus slender, slightly curved ventrally, and armed ventro-mesally with a single row of small black denticles; claw with one or two small teeth at base below.

Ground color above orange-yellow, sometimes mottled with lighter on the thorax; central figure poorly developed, in some individuals scarcely evident; abdominal segments I to III marked on the sides with pale spots and segment IV with a complete row; in preservatives these spots usually disappear and the color above is mostly clear orange-yellow; eye-tubercle black. Venter of abdomen and genital operculum slightly lighter than dorsum, the coxae dusky orange to greyish brown, remaining segments of legs dark brown to black; palpus in some mottled orange-yellow, lighter below, in preservatives often fading to nearly uniform orange-yellow; chelicerae, orange-yellow; penis simple, not alate.

Female, length 7 mm.; width 4 mm.

Legs, I, 41 mm.; II, 73 mm.; III, 46 mm.; IV, 60 mm.

Female stouter than the male and with the abdomen bluntly pointed behind; dorsum mottled dark and light brown, the central figure more distinctly developed than in the male, interrupted on the posterior segments; coxae orange-yellow; trochanters brown to black; base of femora, the patellae and tips of tibiae dark brown to black; palpus, in some, mottled dark and light brown above.

Type locality, Oteen, N. C.

Distribution.—New York. Long Island, 3 ads. (N. B.).

Specimens also examined from Ala., Auburn, Sept. (H. G. G.); N. C., Aquone, Oct., Lake Waccamaw, Oct., Macon Co., Wayah creek, Oct., Oteen, Oct.; Ohio, Hocking Co., Clear Creek, Sept. (T. H. H.); Pa., Gettysburg, Oct.; S. C., Beaufort Co., Oct. (T. H. H.), Berkeley Co., Oct. (T. H. H.); Tenn., Gatlinburg, Oct.; Va., Buchanan Co., Oct., Strassburg, Oct.

This species is common in the southeastern states and ranges northward to Ohio and Long Island, New York.

Leiobunum ventricosum ventricosum (Wood)

Pl. 7, figs. 93-96.

- Phalangium ventricosum* Wood, Commun. Essx. Inst. 6(1):32-34, 39, figs. 7-7a. 1870.
Liobunum ventricosum, Weed, Amer. Nat. 21(10):935. 1887.
Liobunum ventricosum, Weed, Bull. Ill. State Lab. Nat. Hist. 3:104. 1889.
Liobunum ventricosum, Weed, Amer. Nat. 24(286):918. 1890; *ibid*, pp. 264-265, 1 fig.
Liobunum ventricosum, Weed, Proc. U. S. Nat. Mus. 16:550-551, pl. 63, figs. 1-2, text fig. 1. 1893.
Liobunum ventricosum, Banks, Can. Ent. 25(8):211. 1893.
Liobunum ventricosum, Banks, Jour. N. Y. Ent. Soc. 2:41. 1894; *ibid*, p. 146.
Liobunum ventricosum, Banks, Amer. Nat. 35(416):677. 1901.
Liobunum ventricosum, Roewer, Abhandl. a Gebiete Naturw. 19(4):225, pl. 3, fig. 23. 1910.
Liobunum ventricosum, Banks, Proc. Acad. Nat. Sci. Phila. 63:456. 1911.
Liobunum ventricosum, Comstock, Spider Book, p. 75. 1912.
Liobunum ventricosum, Weed, Life Histories of American Insects, pp. 262-264, pl. 21, fig. 94. 1917.
Liobunum ventricosum ventricosum, Roewer, Weberknechte der Erde, p. 903. 1923.
Liobunum ventricosum, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1076. 1928.
Liobunum ventricosum, Walker, Ohio Biol. Surv. Bull. 19, 4(4):165-166, pl. 2, fig. 21. 1928.
Liobunum ventricosum, Davis, Amer. Midland Nat. 15(6):693-695. 1934.
Liobunum ventricosum, Comstock, Spider Book, rev. ed., p. 75. 1940.

Male, length 7 mm.; width 3.75 mm.

Legs, I, 33 mm.; II, 64 mm.; III, 32 mm.; IV, 44 mm.

Dorsal integument finely granular, the surface moderately hardened; three small tubercles at the anterior margin of carapace in front of eye-tubercle; carapace excavated opposite bases of legs, the angles each with a small tubercle; openings of scent glands at margin of carapace opposite insertion of first legs, oval, with raised edge; eye-tubercle slightly longer than wide, without a canal, tubercles when present, very poorly developed; abdomen long and pointed behind, widest opposite the trochanters of fourth leg.

Coxae with small scattered tubercles on surface; marginal rows of denticles on anterior side of coxae I to IV and posterior margin of coxae II and IV; genital operculum with a few scattered tubercles on surface and a marginal row on each side; sternites very finely granular; legs only moderately long in northern specimens, the femora, patellae and basal half

of tibiae with small, black-tipped tubercles; distal ends of tibiae, metatarsi and tarsi clothed with very short, fine, brown hairs.

Femur of palpus moderately stout, from above nearly straight, armed with short black hairs mesally and small, sharp-pointed tubercles disto-laterally and across the distal end of segment above; from the side slightly curved ventrally with numerous small denticles and scattered short black hairs; patella short, widened distally, armed around distal margin with small dark denticles and short dark hairs mesally and laterally, from the side, thickened distally; tibia one and one half as long as patella, cylindrical, armed with short dark hairs and fine, soft under-hairs; tarsus as long as femur, slender, slightly curved ventrally, armed ventro-mesally with a definite row of small black denticles; claw with one or two small teeth at base below.

Ground color above golden-yellow to golden-brown mottled with lighter, silvery-yellow blotches on the carapace and sides of central figure anteriorly; central figure a little darker than adjacent areas, usually restricted to the first six abdominal segments and the transverse ridge back of eye-tubercle; eye-tubercle brown to black, lighter through center; abdominal segments with irregular transverse lines of light dots. Venter of abdomen, coxae and genital operculum silvery-yellow; trochanters concolorous with coxae; legs yellow to light brown, the distal ends of femora, patellae and distal third of tibiae slightly darker; palpi yellow to light brown; chelicerae yellow, the tips and margins of claws black. Penis alate.

Female, length 10 mm.; width 4.5 mm.

Legs, I, 32 mm.; II, 63 mm.; III, 31 mm.; IV, 43 mm.

The female attains a much larger size than the male and the abdomen is wider and less pointed posteriorly. The colors tend to be slightly darker, golden-brown, and the central figure better developed.

A southern representative of this species, *Leiobunum ventricosum hylemale*, attains a larger size and has longer legs.

Type locality, near Philadelphia, Pa., female.

Distribution.—New York. ALBANY: E. N. Huyck Preserve, Rensselaerville, Jly. (S. C. B. and R. C.); Karners, Aug. (F. C. P.); Kenwood, May, Jly. (F. C. P.); Thacher Park, May; Voorheesville, Je., Jly. (A. W.). BRONX: Bronx Park, Jly.; Van Cortland Park, Je. CATTARAUGUS: Allegany State Park, Je.; Otto, Jan. Aug. (J. H. C.); Rock City, Olean, Je. CAYUGA: Fairhaven, Jly. (H. B.); Howlands Island, Nov. CHAUTAUQUA: Chautauqua, Jly., Aug. (C. W.). COLUMBIA: Lake Charlotte, Je.; Queechy lake, May (W. J. S.); Riders Mills, May (H. P. C.). ESSEX: Adirondack Lodge, Jly.; Artist Brook, Je.; Chapel pond, Jly.; Sanford Club, Je. (C. R. C.); Upper Jay, Sept. FRANKLIN: Jly. (C. R. C.). FULTON: Johnstown, Je. GREENE: Haines Falls, Je.; Hunter Mt., Je., Jly. (F. C. P.). HAMILTON: Indian lake, Je.; Long lake, Aug. (C. R. C.). HERKIMER:

Old Forge, Jly. (F. C. P.). LIVINGSTON: Portage, Je. (C. R. C.).
 ONTARIO: Coy Point, Canandaigua lake, Je., Jly. ORANGE: Durlandville;
 Goshen, May. ORLEANS: Oak Orchard swamp, Je. (C. R. C.). PUTNAM:
 Tompkins Corners, Jly. (A. W.). RENSSELAER: Central Nassau, Jly.;
 East Greenbush, Je. (F. C. P.); Mill creek, May (F. C. P.); Rensselaer,
 Aug. (W. J. S.); Schodak Landing, Je. SCHUYLER: Cinnamon lake, Je.
 SULLIVAN: Callicoon, Jly.; Handsome Eddy, Je. ST. LAWRENCE: Os-
 wegatchie, Je. TOMPKINS: Ithaca, May, Jly. Aug. Sept. (C. R. C.); Mc-
 Lean, May; Taughannock, Jly.; Taughannock Falls, Aug. (C. R. C.).
 ULSTER: Big Indian, Je.; Kingston, Je. WASHINGTON: Sleeping Beauty
 Mt., Jly. WAYNE: Clyde, Jly. WYOMING: Letchworth Park, Je. (C. P.
 Z.). YATES: Lake Keuka, Je. (C. R. C.). Long Island. KINGS: Brooklyn,
 Forest Park, May, Je. QUEENS: Flushing (K. W. C.). SUFFOLK: Cold
 Spring Harbor, Je. (W. J. G.); Greenport, Je. (R. L.); Montauk, Je.,
 Jly. (R. L.); Orient, May (R. L.); Riverhead, Sept. (C. R. C.); Sag
 Harbor, Sept. (R. L.)

Specimens also examined from Ala., Roberts Rocks, University, Je.
 (H. H. S.); Shelby, Apr. (H. H. S.) Ga., Mountain City, Aug. (C. R. C.);
 Tallulah Falls (J. C. B.) Mass., Cambridge. Mo., Columbia, Je. (C. R. C.)
 N. H., Pike (P. H.) N. J., Madison, Jly. Pa., Hazelton. Va., Olney, Je.
 (C. R. C.).

Leiobunum verrucosum (Wood)

Pl. 7, figs. 97-100.

- Phalangium verrucosum* Wood, Commun. Essex Inst. 6(1):29, 1 fig. 1870.
Liobunum verrucosum, Weed, Trans. Amer. Ent. Soc. 19:189-190, pl. 6. 1892.
Liobunum verrucosum, Banks, Can. Ent. 25(8):211. 1893.
Liobunum verrucosum, Banks, Jour. N. Y. Ent. Soc. 2:41. 1894.
Liobunum verrucosum, Banks, Amer. Nat. 35(416):676. 1901.
Liobunum verrucosum, Roewer, Abhandl. a Gebiete Naturw. 19(4):217. 1910.
Leiobunum verrucosum, Comstock, Spider Book, p. 75. 1912.
Liobunum verrucosum, Roewer, Weberknechte der Erde, pp. 898-899. 1923.
Leiobunum verrucosum, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem.
 101, p. 1076. 1928.
Liobunum verrucosum, Walker, Ohio Biol. Surv. Bull. 19, 4(4):166, pl. 2, fig. 19
 1928.
Leiobunum verrucosum, Davis, Amer. Midland Nat. 15(6):695-696, pl. 31, fig. 9
 1934.
Leiobunum verrucosum, Comstock, Spider Book, rev. ed., p. 75. 1940.
 nec *Liobunum verrucosum*, Weed, Amer. Nat. 21(10):935. 1887. (equals *nigripes*)
 nec *Liobunum verrucosum*, Weed, Bull. Ill. State Lab. Nat. Hist. 3:88-89. 1889
 (equals *nigripes*)
 nec *Liobunum verrucosum*, Weed, Amer. Nat. 24(286):918. 1890. (equals *nigripes*)

Male, length 5 mm.; width 3 mm.

Legs, I, 36 mm.; II, 44 mm.; III, 37 mm.; IV, 35 mm.

Dorsum granular, somewhat hardened, a group of small tubercles at
 anterior edge of carapace in front of eye-tubercle; sides of carapace
 noticeably notched opposite insertions of the legs; openings of scent glands

oval, at edge of carapace opposite trochanters of first legs; eye-tubercle nearly circular in outline, more than its diameter from the front edge of carapace, canal when present very shallow, the carinae armed with a few low, round tubercles; abdomen widest just beyond middle of its length, bluntly pointed posteriorly.

Surface of coxae and genital operculum studded with numerous, sharp-pointed tubercles; coxae I and IV each with a regular row of tubercles along anterior margin, a row of sharp-pointed tubercles on posterior margin of coxa IV; sternites smooth except for a few low tubercles forming irregular transverse rows; legs moderately long; femora, patellae and tibiae with numerous small, dark sharp-tipped tubercles, metatarsi and tarsi clothed densely with very short, dark hairs.

Femur of palpus long, nearly straight, slightly widened distally, armed mesally and ventro-laterally with a few low tubercles; patella two-thirds as long as femur, widened distally, the disto-mesal angle slightly produced, armed laterally, mesally and dorsally, at the distal end, with a few sharp-pointed denticles; tibia a little longer than patella, stout, armed at distal margin above with two or three sharp-pointed tubercles; tarsus slender, nearly straight from above, as long as patella plus tibia, the ventro-mesal series of teeth small or nearly lacking; claw with numerous small teeth on basal two-thirds below.

Ground color above golden, the carapace mottled with irregular silvery-yellow blotches; central figure moderately well developed, slightly darker than adjacent sides; eye-tubercle brown to black; transverse ridge back of eye-tubercle with a series of small, silvery spots; abdominal segments with irregular silvery spots mostly confined to the central figure; venter silvery-white, coxae and genital operculum very light greyish-white; trochanters and bases of femora black, remaining segments of legs golden-yellow, slightly darker distally, so that there is a general banded appearance; chelicerae white or mottled pale yellow and white; claws black along the margins and at tip; palpi yellow; penis alate.

Female, length 8 mm.; width 4.5 mm.; specimens from southern parts of range, larger.

Legs, I, 33 mm.; II, 64 mm.; III, 34 mm.; IV, 49 mm. New York.
I, 48 mm.; II, 75 mm.; III, 48 mm.; IV, 67 mm. Georgia.

The female is larger and generally stouter than the male; when distended with eggs, the abdomen broadly rounded on the sides and pointed behind; when not carrying eggs, the tip of the abdomen may be broadly rounded, the color tends to be darker and the central figure obscure.

Type locality, unknown.

Distribution.—New York. NEW YORK: New York city, Aug. (R. L.). RICHMOND: Staten Island, Jly. (Burns). LONG ISLAND. QUEENS: Flushing, spring (K. W. C.). SUFFOLK: Calverton, Oct. (R. L.); East Quogue, Oct. (R. L.); Greenport, Sept. (R. L.); Manorville, Sept.

(R. L.) ; Montauk Point, Aug. (R. L.) ; Northwest, Je. (R. L.) ; Noyack, Sept. (R. L.) ; Orient, Aug., Sept. (R. L.) ; Ronkonkoma, Sept. (R. L.) ; Sag Harbor, Aug., Sept. (R. L.) ; Sound Avenue, Aug. (R. L.) ; Watchogue, Jly. (Barnes) ; Yaphank, Jly.

Specimens also examined from Ga., Spring Creek, Jly. ; Mass., Wellfleet, Aug. (N. B.), Nantucket, Sept. ; N. J., Great Notch ; N. C., Fort Fisher, Oct. ; S. C., Berkeley Co., Sept. (T. H. H.), Darlington Co., Oct. (T. H. H.).

Although this species was earlier recorded from some up-state localities, it is definitely a southern species and mainly confined, in New York, to the extreme southern parts of the State and Long Island.

Leiobunum vittatum (Say)

Pl. 7, figs. 101-104.

Phalangium vittatum Say, Jour. Acad. Nat. Sci. Phila. 2(2) :65-66. 1821 ; *ibid.*, pp. 66-67, *Phalangium dorsatum* Say.

Phalangium dorsatum, Wood, Commun. Essex Inst. 6(1) :18-19, fig. 1 a-c. 1870 ; *ibid.*, pp. 20-21, figs. 2 a-d, *L. vittatum*.

Leiobunum vittatum, Weed, Amer. Nat. 2(10) :935. 1887.

Liobunum dorsatum, Weed, Bull. Ill. State Lab. Nat. Hist. 3:83-84, 1 fig. 1889 ; *ibid.*, pp. 85-87, *Liobunum vittatum* ; *ibid.*, p. 100, *L. dorsatum* ; *ibid.*, p. 101, *L. vittatum*.

Leiobunum vittatum dorsatum, Weed, Trans. Amer. Ent. Soc. 19:263-264. 1892.

Liobunum dorsatum, Weed, Amer. Nat. 24(286) :918. 1890 ; *ibid.*, *L. vittatum*.

Liobunum vittatum, Weed, Amer. Nat. 26(312) :999-1008, pls. 27-28. 1892 ; *ibid.*, *Leiobunum vittatum dorsatum*.

Leiobunum vittatum, Weed, Proc. U. S. Nat. Mus. 16:545-546, pl. 57, figs. 102 ; pl. 58, figs. 1-2. 1893 ; *ibid.*, pp. 546-547, pl. 57, fig. 3, *L. vittatum dorsatum*.

Liobunum vittatum, Banks, Can. Ent. 25(8) :211. 1893.

Liobunum vittatum, Banks, Proc. Acad. Nat. Sci. Phila. 52:541. 1900.

Liobunum vittatum, Banks, Amer. Nat. 35(416) :675. 1901.

Leiobunum vittatum-dorsatum, Roewer, Abhandl. a Gebiete Naturw. 19(4) :212-213. 1910.

Leiobunum vittatum, Comstock, Spider Book, p. 74. 1912.

Liobunum vittatum, Weed, Life Histories of American Insects, pp. 260-261, fig. 92, pl. 20. 1917.

Leiobunum vittatum, Walker, Ohio Biol. Surv. Bull. 19, 4(4) :163, pl. 2, figs. 16, 18. 1928 ; *ibid.*, *L. vittatum dorsatum*.

Leiobunum vittatum, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1076. 1928.

Leiobunum vittatum, Davis, Amer. Midland Nat. 15(6) :696-699, pl. 31, fig. 5 ; pl. 33, fig. 34. 1934.

Leiobunum vittatum, Comstock, Spider Book, rev. ed. p. 74. 1940.

Male, length 6 mm. ; width 3 mm.

Legs, I, 35.5 mm. ; II, 75 mm. ; III, 37 mm. ; IV, 51 mm.

Dorsal integument smooth or, at most, very finely granular, somewhat hardened ; a cluster of small tubercles at center of anterior margin of carapace ; eye-tubercle scarcely canaliculate, the carinae with a few small tubercles ; openings of scent glands small, oval, directed upward at margin of carapace opposite trochanters of first legs ; no tubercles on ridge back of eye-tubercle or across abdominal segments ; surface of coxae with

scattered, low, rounded tubercles; denticles well developed along anterior margin of coxae I to IV and at posterior margin of coxa IV; genital operculum with a few scattered tubercles, marginal series not developed; sternites smooth, unarmed.

Femur of palpus very long, extending above surface of carapace six to eight times the height of the eye-tubercle, from above slightly thickened distally, slightly curved laterally, armed distally above with an oblique row of six to eight small black, sharp-pointed denticles; from the side femur strongly curved ventrally, armed ventro-laterally with several rows of sharp-pointed denticles, mostly confined to distal half, armed mesally with a few small, black denticles at base; patella one half as long as femur, swollen distally, slightly curved ventrally, armed laterally with a single row of black-tipped denticles; tibia a little longer than patella, from above with the sides nearly straight, from the side, slightly swollen ventrally at base, armed laterally and ventro-laterally with numerous small, black-tipped denticles; armed mesally on the distal half with a single row of similar denticles; tarsus slender, slightly curved ventrally, a little longer than tibia, armed ventro-mesally with a single row of black denticles; claw dentate at base below.

Femora of legs armed with small scattered denticles; patellae with one or two denticles above at distal margin and a few on the dorsal surface; tibiae with only a suggestion of denticles but clothed with very fine hairs; metatarsi and tarsi with fine hairs over the surface and spines only at the articulations.

Ground color above silvery or golden yellow to deep red brown with brownish blotches and circular spots on the carapace and on each side of central figure of abdomen, on or between segments; central figure dark brown to black very well defined and extending anteriorly to involve eye-tubercle and posteriorly to the end of the abdomen, usually with a constriction on the second abdominal segment; transverse ridge back of eye-tubercle and segments of abdomen within the central figure with transverse rows of silvery-yellow dots; eye-tubercle golden-yellow in front, eyes encircled with black, the canal dark; palpus light to dark yellow; chelicerae yellow, the claws black-tipped. Venter yellow to yellowish orange, the coxae and margins of genital operculum often slightly darker; trochanters of legs and base of femora dark brown to black; remaining segments from light brown, often with brown or black patellae and dark tips to tibiae, to uniform dark brown. Penis slender, not alate.

Female, length 6 to 7.5 mm.; width 3 to 3.25 mm.

Legs, I, 37 mm.; II, 76 mm.; III, 37 mm.; IV, 51 mm.

Similar to male in general pattern but larger and with abdomen rounded posteriorly; legs lighter and often more strongly banded with black. Femur of palpus not greatly elongate as in male, extending above surface of carapace not more than the height of eye-tubercle; venter light in strong contrast to dorsum.

Type locality, Southern States.

Distribution.—New York. ALBANY: E. N. Huyck Preserve, Rensselaerville, Jly., Aug.; Albany, Jly. (S. C. B.), Aug. (H. P. C.); Normanskill, Jly. (C. R. C.); Voorheesville, Jly., Aug.; Watervleit Res., Aug. (M. D. L.). ALLEGANY: Richburg, Sept.; Wellsville, Sept. BRONX: Van Cortland Park, Sept. (F. C. P.). CATTARAUGUS: Allegany State Park, Aug., Sept., Nov. CAYUGA: Fairhaven, Jly. CHAUTAUGUA: Chautauqua, Jly., Aug. (C. W.); Silver Creek, Sept. CLINTON: Plattsburg, Sept. (C. R. C.); Valcour Island, Lake Champlain, Aug. COLUMBIA: Crayville, Aug. (A. W.); Kinderhook, Aug. (W. J. S.); Kinderhook lake, Aug. (W. J. S.). DUTCHESS: Beacon, Aug. (A. W.); Fishkill, Sept. (F. C. P.). ESSEX: Ausable Chasm, Sept. (M. D. L.); Upper Jay, Sept. (F. C. P.); Wilmington, Aug. (C. R. C.). FULTON: Gloversville, Apr. (C. P. A.); Johnstown, Aug.; Mountain lake, Sept. (A. W.); Sacandaga Park, Aug.; Woodworth's lake, Aug. (C. R. C.) GREENE: Hunter, Aug. JEFFERSON: Brownsville, Sept. (F. C. P.). MONROE: Charlotte, Sept. (F. C. P.); Glen Haven, Sept. (F. C. P.). NEW YORK: New York, Aug. (R. L.). ONONDAGA: East Onondaga, Sept. (F. C. P.). ONTARIO: Coy Point, Canandaigua lake, Je., Jly.; Naples, Jly., Aug. ORANGE: Cornwall, Aug. (A. W.); Mountainville, Aug. (A. W.). RENSSELAER: Nassau lake, Sept. (A. W.); Rensselaer, Aug. (F. C. P.). ROCKLAND: Bear Mt., May. SARATOGA: Ballston lake, Aug. (A. W.). SCHENECTADY: High Mills Gorge, Aug. (A. W.). SCHUYLER: Montour Falls, Sept. (C. R. C.). STEUBEN: Hornell, Sept. TOMPKINS: Ithaca, Jly., Aug., Sept. (C. R. C.); McLean, Sept. (C. R. C.). ULSTER: Highland, Aug. (A. W.); Kingston; Saugerties, Jly., Aug.; West Park, Aug. (A. W.); West Shokan, Jly. WARREN: Hague, Aug., Sept. (M. D. L.). WASHINGTON: Elizabeth island, Jly.; Juanita island, Jly.; Pearl Point, Jly. (C. R. C.); Shelving Rock Mt., Jly. (C. R. C.). WAYNE: Clyde, Jly., Aug.; Lake Bluff, Sept. YATES: Lake Keuka (C. R. C.). Long Island. KINGS: Brooklyn, Sept. QUEENS: Forest Hills, Sept. (C. R. C.); Forest Park, Sept., Oct.; North Beach, Jly. SUFFOLK: Amityville, Aug. (F. C. P.); Cold Spring Harbor, Je.; East Marion, Sept. (R. L.); East Port, Sept. (R. L.); East Quogue, Sept. (R. L.); Greenport, Oct. (R. L.); Hampton Bays, Sept. (R. L.); Montauk, Jly. (R. L.); Napeague, Oct. (R. L.); North Sea, Sept. (R. L.); Northwest, Sept. (R. L.); Orient, Sept. (R. L.); Peconic, Je. (R. L.); Pine Neck, May (R. L.); Riverhead, Sept. (C. R. C.); Sag Harbor, Sept. (R. L.); Shinnecock Hills, Sept. (R. L.); Sound Avenue, Aug. (R. L.); Southampton, Sept. (R. L.); Three-mile Harbor, Aug. (R. L.); Westhampton, Sept. (R. L.); Yaphank, Jly. (von Krockow).

Specimens also examined from Ala., Killen, Oct. (H. H. S.); Ark., Murfreesboro (C. R. C.); Ga., Tallulah Falls, Jly. (J. C. B.); Ill., Urbana, Jly.; Iowa; Ky., Brooklyn Bridge, Je., Lexington, Je., Nelson Co., Aug.;

La., Jennings; Mo., Columbia, Jly., Sept., Oct. (C. R. C.), Darlington, Aug. (C. R. C.), Maryville, Aug. (C. R. C.); N. J., Madison, Jly., Sept. (F. C. P.), Ridgewood, Aug. (M. D. L.); Ohio, Castalia, Sept. (C. R. C.), Cedar Point, Sept. (C. R. C.); Okla., Newkirk (P. H.); N. C., Raleigh, Je., Oct., Whitakers, Oct.; Va., Pannunky creek, Oct.

Canada. ONTARIO: Unionville, Sept. (M. D. L.); Perth Road, Buck lake, 35 miles north of Kingston.

Leiobunum vittatum is probably the most widely distributed species in the north. Although it has been collected in only about one half of the counties of New York State, it undoubtedly occurs in all of them.

Various authors have recognized *vittatum* and *dorsatum* as distinct species and as subspecies, based on differences in size and length of appendages. Weed (1892, p. 999) presented measurements of many specimens from various parts of the United States which seemed to indicate, by and large, that specimens from the south attained a larger size and had longer legs than individuals from the north. On the other hand, he also pointed out that, "the progressive lengthening from the north to the south is in no case greater than has been shown . . . to occur in a single locality." Since no structural differences have been pointed out, only the single species is recognized here.

The secretion of the scent glands is particularly offensive in this species and may have considerable protective value. Although the openings of the glands are on the dorsal side of the carapace, the fluid often immediately drains to the ventral side and hangs as a drop.

This is one of the many species that apparently pass the winter in the egg, the young appearing in May.

HADROBUNUS BANKS

The genus *Hadrobunus* was established by Banks (1900, p. 199) with *Phalangium grande* Say as the type. Two of the species, *grandis* and *maculosus*, have hitherto been confused because Banks (1901, p. 677) listed the former as from the eastern states and the latter from southern states. Say (1821, pp. 67-68) definitely stated that *Phalangium grande* "Inhabits the Southern states." In 1870 Wood (pp. 31-32, fig.) described *Phalangium maculosum* from Pennsylvania and recorded additional specimens from West Virginia. As a result of this confusion, most specimens in collections from the northern states have been labeled *H. grandis*. *H. maculosus*, however, is the northern species and reaches the southern limits of its distribution in Kentucky, Ohio and West Virginia. *H. grandis*, on the other hand, is apparently limited to the southeast and is particularly abundant in the Atlantic coastal states.

In our 1928 list of Opiliones from New York (p. 1076) we listed *H. grandis* from a number of localities. All these records apply to *H. maculosus*.

Hadrobunus maculosus (Wood)

Pl. 8, figs. 105-110.

- Phalangium maculosum* Wood, Commun. Essex Inst. 6(1):31-32, 1 fig. 1870.
Phalangium maculosum, Underwood, Can. Ent. 17(9):168.
Liobunum maculosum, Weed, Proc. U. S. Nat. Mus. 16:554-555, pl. 66, figs. 1-2. 1893.
Leptobunus grande, Banks, Jour. N. Y. Ent. Soc. 2:41. 1894.
Hadrobunus maculosum, Banks, Amer. Nat. 35(416):677. 1901 (not from "Southern States").
Hadrobunus maculosus, Roewer, Abhandl. a Gebiete Naturw. 19(4):256. 1910.
Hadrobunus maculosus, Comstock, Spider Book, p. 76. 1912.
Hadrobunus maculosus, Roewer, (part) Weberknechte der Erde, p. 919. 1923.
Hadrobunus grandis, Crosby, Wolf and Bishop, Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1076. 1928.
Hadrobunus maculosus, Comstock, Spider Book, rev. ed., p. 76, 1940.

Male, length 9 mm.; width 4.5 mm.

Legs, I, 19 mm.; II, 32 mm.; III, 20 mm.; IV, 27 mm.

Dorsal integument finely granular; anterior margin of carapace with a cluster of small denticles at the midline and lines of very small denticles curving inside the scent glands and diagonally back from the center to the base of the 3rd legs; a transverse row of denticles on ridge back of eye-tubercle and a small series on first abdominal segment. Eye-tubercle without a median groove but armed with small, light-tipped tubercles forming a row above each eye; eyes separated by less than the diameter of one of them. Abdomen moderately hardened but without denticles as in *H. grandis*, often finely granular.

Venter. Coxae strongly granular, anterior margins of all coxae armed with a regular series of tubercles and hind margins of coxae I and IV. Genital operculum with a row of denticles along each lateral margin and scattered tubercles over the ventral surface. Sternites relatively smooth.

Palpus. From above, femur stout, slightly thickened distally and with a few black hairs forming faint lines dorso-mesally and dorso-laterally and scattered denticles distally above, distal lateral and mesal angles produced into sharp points; patella short, stout, the distal half widened, armed with short hairs and a few scattered denticles; tibia short, only slightly longer than patella, with sides nearly parallel and armed with short hairs; tarsus slender with hairs but no denticles, ratio of length of tarsus to tibia as 22 to 15, tarsal claw denticulate. Femur of palpus from the side, evenly and broadly rounded above; patella strongly arched and thickened distally; tibia thicker at base than distally and with a few black denticles below; tarsus slightly curved ventrally and with a regular row of small black denticles ventro-mesally.

Color. Above golden yellow to deep brown with the central figure darker at margins and usually well defined except in old, dark individuals. Central figure narrow at the center of the 2nd abdominal segment, gradually widening over the 3rd, 4th and 5th segments, then narrowing again toward the tip of the abdomen. Transverse ridge back of eye-tubercle

and abdominal segments with transverse lines of golden yellow dots on broad brownish bands and brownish spots on the narrower, lighter interspaces. Eye-tubercle black, slightly lighter over the center and behind. Chelicerae, yellow with a large, irregular blotch of brown above on basal segment; distal segment yellow, brown mesally at base; claws black tipped. Palpus. Femur brown, mottled distally; patella light brown, tibia and tarsus yellow; in old individuals palpus may be very dark.

Venter of abdomen whitish or yellowish to brown in old individuals and with transverse rows of light brown spots at the anterior edge of segments; coxae and genital operculum yellowish, somewhat darker than venter of abdomen; trochanters deep brown to black, mottled above with yellow and with the anterior and posterior margins bearing sharp-pointed teeth; base of femora black, remaining segments light to dark brown, darker distally; patellae somewhat swollen, brown; tibiae light on basal half, darker distally; tarsi yellowish, darker distally. All legs with sharp-pointed denticles on femora, patellae and tibiae. Femur I short, less than half the length of the body, femur III very slightly longer than I. Penis broad at base, tapering distally.

Female, length to 12 mm.

Legs, I, 21 mm.; II, 36 mm.; III, 22 mm.; IV, 32 mm.

Similar to male but often paler; femur of first leg about one-third length of body.

Hadrobunus maculosus differs from *H. grandis* in being generally lighter in color, in lacking conspicuous, sharp-pointed denticles on the dorsal surface of the body, in having the legs with a banded appearance rather than mottled or blotched, and in having more prominent transverse rows of light spots on the dorsal surface of the abdomen.

Type localities, Pennsylvania, West Virginia.

Distribution.—New York. ALBANY: E. N. Huyck Preserve, Rensselaerville, Aug.; Albany, Je.; Voorheesville, Jly. CATTARAUGUS: Otto, Aug. CAYUGA: Fairhaven, Aug. (H. Z.). COLUMBIA: Ancram, Je.; Lake Charlotte, Je. DUTCHESS: Poughkeepsie, (von Ingen). GREENE: Catskill, Jly. (F. C. P.); Hunter, Je. (F. C. P.). HERKIMER: Crooked lake, Je. (F. H. W.). SCHUYLER: Cinnamon lake, Je. SULLIVAN: Handsome Eddy, Je. TOMPKINS: Covert, Aug.; Enfield, Jly.; Ithaca, Jly., Aug. (C. R. C.); Ringwood, May (H. D.); Slaterville, Aug.; Taughannock Falls, Jly. ULSTER: Saugerties, Apr., Aug. Long Island. Doubtfully reported from SUFFOLK county, Cold Spring Harbor, Je.; Long Pond, Je.; Shinnecock Hills, Je.

We have also seen specimens from Ky., Quicksand, Aug. (W. D. F.); Mass., Boston, Salem (J. H. E.); N. J., Madison, Mar., Jly.; Ohio, Clear Creek, Hocking Township, Sept. (T. H. H.); Pa., Arendtsville, Aug.; Hazelton, Nov.; Palmerton, Jly.

LITERATURE CITED

- BANKS, NATHAN. 1892. A New Genus of Phalangidae. Ent. Soc. Wash. 2(2) :249-251, 6 figs.
- BANKS, NATHAN. 1893. The Phalanginae of the United States. Can. Ent. 25(8) : 205-211.
- BANKS, NATHAN. 1893. A New Species of Ologolophus. Can. Ent. 25(8) :252-253.
- BANKS, NATHAN. 1894. Washington Phalangida, with Description of a New Southern Liobunum. Can. Ent. 26(6) :160-164.
- BANKS, NATHAN. 1894. The Phalangida of New York. Jour. N. Y. Ent. Soc. 2:40-41.
- BANKS, NATHAN. 1894. Notes on Phalangidae. Jour. N. Y. Ent. Soc. 2(4) :145-146.
- BANKS, NATHAN. 1894. The Nemastomatidae and Troglulidae of the United States. II. Psyche, 7:51-52.
- BANKS, NATHAN. 1900. Some Arachnida from Alabama. Proc. Acad. Nat. Sci. Phila 52:529-543.
- BANKS, NATHAN. 1900. New Genera and Species of American Phalangida. Jour. N. Y. Ent. Soc. 8:199-201.
- BANKS, NATHAN. 1901. Synopses of North-American Invertebrates—The Phalangida. Amer. Nat. 35(416) :669-679, figs. 1-6.
- BANKS, NATHAN. 1902. Daddy-long-legs from Mt. Katahdin, Maine. Ent. News, 13:308-309.
- BANKS, NATHAN. 1911. Some Arachnida from North Carolina. Proc. Acad. Nat. Sci. Phila. 63:440-456, pls. 34-35.
- BISHOP, SHERMAN C. 1949. The Function of the Spur on the Femur of the Palpus of the Male, *Leiobunum calcar* (Wood). Ent. News, 60(1) :10-11, fig. 1.
- BISHOP, S. C. and C. R. CROSBY. 1924. A Fossil Species of Caddo (Opiliones) from the Baltic Amber, and its Living Relatives. N. Y. State Mus. Bull. No. 253, pp. 83-84, figs. 1-3.
- COMSTOCK, J. H. 1912. The Spider Book, Order Phalangida, pp. 53-81, figs. 49-59.
- COMSTOCK, J. H. 1940. The Spider Book, rev. ed. by W. J. Gertsch. Order Phalangida, pp. 53-81, figs. 49-59.
- COPE, E. D. 1872. On the Wyandotte Cave and its Fauna. Amer. Nat. 6(7) :406-422, figs. 109-116.
- CROSBY, C. R. 1904. Notes on Some Phalangids collected near Ithaca, N. Y. Jour. N. Y. Ent. Soc. 12(4) :253-256, fig. 4.
- CROSBY, C. R. 1907. Phalangid Notes. Ent. News, 18(4) :161.
- CROSBY, C. R. 1910. Phalangium longipalpis, Weed, in New York. Ent. News, 21(9) :420.
- CROSBY, C. R. 1911. A New Species of Phalangida from Missouri. Can. Ent. 43:20-22, fig. 1.
- CROSBY, C. R. and S. C. BISHOP. 1924. Notes on the Opiliones of the Southeastern United States with Descriptions of New Species. Jour. Elisha Mitchell Sci. Soc. 40:8-26, pls. 1-2, figs. 1-24.
- CROSBY, C. R., A. WOLF, and S. C. BISHOP. 1928. Orders Araneae and Opiliones in, A List of the Insects of New York by M. D. Leonard. Cornell Univ. Agr. Exp. Sta. Memoir 101, pp. 1074-1076.
- DAVIS, N. W. 1934. A Revision of the Genus *Leiobunum* (Opiliones) of the United States. Amer. Midland Nat. 15(6) :662-705, pls. 31-33, figs. 1-38.
- DE GEER, CHARLES. 1778. Memoires pour Servir a L'Histoire des Insectes, 7:i-ix, 1-950, pls. 1-49.

- FABRICIUS, J. C. 1779. *Reise nach Norwegen*, pp. 1-388 plus 12.
- GOODNIGHT, C. J. and MARIE L. GOODNIGHT. 1948. A New Member of the Genus *Caddo* (Phalangida). *Jour. N. Y. Ent. Soc.* 56:201-203, pl. 6.
- KOCH, C. L. 1839. *Uebersicht des Arachnidensystems*, 2:1-38.
- KOCH, C. L. 1879. *Arachniden aus Sibirien und Novaja Semlja*. *Svenska-Akad. Handl.* 16(5):1-136, pls. 1-7.
- KOCH, C. L. and G. C. BERENDT. 1854. *Die im Bernstein Organischen Reste*. 1(2):101, pl. 15, fig. 125.
- LINNAEUS, CAROLUS. 1758. *Systema Naturae*, ed. 1, Vol. 1, pp. 1-824.
- LINNAEUS, CAROLUS. 1761. *Fauna Svecica*, ed. 2, Stockholm, pp. 1-578, 2 pls.
- PACKARD, A. S. 1884. *New Cave Arachnids*. *Amer. Nat.* 18(2):202-204, 1 fig.
- PACKARD, A. S. 1888. *The Cave Fauna of North America, with Remarks of the Anatomy of the Brain and Origin of the Blind Species*. *Mem. Nat. Acad. Sci.* 4(1):1-156, pls. 1-27.
- ROEWER, C. FR. 1910. *Revision der Opiliones Plagiostethi*, Pt. 1. *Abhandl. a Gebiete Naturw. Hamburg.* Vol. 19, Heft. 4, pp. 1-294, pls. 1-6.
- ROEWER, C. FR. 1912. *Revision der Opiliones Palpatores*, Pt. 2. *Abhandl. a Gebiete Naturw. Hamburg.* Vol. 20, Heft. 1, pp. 1-295, pls. 1-4.
- ROEWER, C. FR. 1914. *Die Familien der Ischyropsalidae und Nemastomatidae der Opiliones-Palpatores*. *Arch. für Naturg.* 80(3):99-169, figs. 1-34.
- ROEWER, C. FR. 1917. *Über Nemastomatiden und ihre Verbreitung*. *Arch. für Naturges.* 83(2):140-160, 3 figs.
- ROEWER, C. FR. 1923. *Die Weberknechte der Erde*, pp. i-v, 1-1116, figs. 1-1212.
- ROTTERS, MITJA. 1944. *Observations on British Harvestmen*. *Jour. Quekett Micros. Club.* Ser. 4, 2(1):23-25.
- SAVORY, T. H. 1938. *Notes on the Biology of Harvestmen*. *Jour. Quekett Micros. Club.* Ser. 4, 1(2):1-6.
- SAY, THOMAS. 1821. *An Account of the Arachnides of the United States*. *Jour. Acad. Nat. Sci. Phila.* 2(2):59-82, Phalangideae, pp. 65-69.
- SIMON, E. 1879. *Les Arachnides de France*, 7:1-330, Opiliones, pp. 116-311, pls. 21-24.
- UNDERWOOD, L. M. 1885. *A Preliminary List of the Arthrogastra of North America (Excluding Mexico)*. *Can. Ent.* 17(9):162-169.
- WALKER, M. E. 1928. *A Revision of the Order Phalangida of Ohio*. *Ohio Biol. Surv. Bull.* 19, 4(4):149-175, pls. 1-3.
- WEED, C. M. 1887. *The Genera of North American Phalangiinae*. *Amer. Nat.* 21(10):935.
- WEED, C. M. 1889. *A New Harvest-Spider*. *Amer. Nat.* 23(276):1102-1104, pl. 42, figs. 1-2.
- WEED, C. M. 1889. *A Descriptive Catalogue of the Phalangiinae of Illinois*. *Bull. Ill. State Lab. Nat. Hist.* 3:79-97, 3 figs.
- WEED, C. M. 1889. *A Partial Bibliography of the Phalangiinae of North America*. *Bull. Ill. State Lab. Nat. Hist.* 3:99-106.
- WEED, C. M. 1890. *A New Phalangium*. *Amer. Nat.* 24(284):783-785, pl. 27, figs. 1-3.
- WEED, C. M. 1890. *The Long-Legged Harvest-Spider*. *Amer. Nat.* 24(285):866-867, pl. 29, figs. 1-2.

- WEED, C. M. 1890. The Harvest-Spiders of North America. *Amer. Nat.* 24(286) : 914-918, pls. 30-31.
- WEED, C. M. 1892. Descriptions of New, or Little-Known North American Harvest-Spiders (Phalangiidae). *Trans. Amer. Ent. Soc.* 19:187-194, pls. 5-10.
- WEED, C. M. 1892. A Preliminary Synopsis of the Harvest-Spiders (Phalangiidae) of New Hampshire. *Trans. Amer. Ent. Soc.* 19:261-272, pls. 12-16.
- WEED, C. M. 1892. The Ash-Gray Harvest-Spider. *Amer. Nat.* 26(301) :32-36, pl. 1, figs. 1-2.
- WEED, C. M. 1892. The Striped Harvest-Spider: A Study in Variation. *Amer. Nat.* 26(312) :999-1008, pl. 28.
- WEED, C. M. 1893. A Synopsis of the Harvest-Spiders (Phalangiidae) of South Dakota. *Trans. Amer. Ent. Soc.* 20:285-292, pl. 5.
- WEED, C. M. 1893. The Cinnamon Harvest-Spider and its Variations. *Amer. Nat.* 27(318) :534-541, pls. 13-14, 1 fig.
- WEED, C. M. 1893. A Preliminary Synopsis of the Harvest-Spiders (Phalangiidae) of Mississippi. *Psyche* 6(204) :425-429, pls. 11-15.
- WEED, C. M. 1893. An American Species of Sabacon. *Amer. Nat.* 27(318) :574-576, fig. 1.
- WEED, C. M. 1917. Life Histories of American Insects. pp. iv-xii, 1-272, pls. 1-21, figs. 1-94.
- WOOD, H. C. 1870. On the Phalangeae of the United States of America. *Communications Essex Inst.* 6(1) :10-40, 17 figs.

PLATE 1.

Fig.

1. *Erebomaster flavescens* Cope. Female, dorsal view.
2. Same, ventral view.
3. Same, lateral view, with ovipositor extended.
4. Same, right palpus, dorso-lateral view.
5. Same, coxae and trochanters.
6. *Crosbycus dasyncnemus* (Crosby) Male, dorsal view.
7. *Sabacon crassipalpe* (L. Koch) Female, dorsal view.
8. Same, lateral view.
9. *Caddo agilis* Banks. Male, dorsal view.
10. Same, lateral view.
11. Same, right palpus, lateral view.
12. Same, female, dorsal view.
13. Same, juvenile, dorsal view.
14. Same, juvenile, lateral view.
15. *Caddo boöpis* Crosby. Male, lateral view.
16. Same, dorsal view.
17. Same, female with ovipositor extended (after Bishop and Crosby)
18. Same, right palpus, lateral view.

PLATE 1

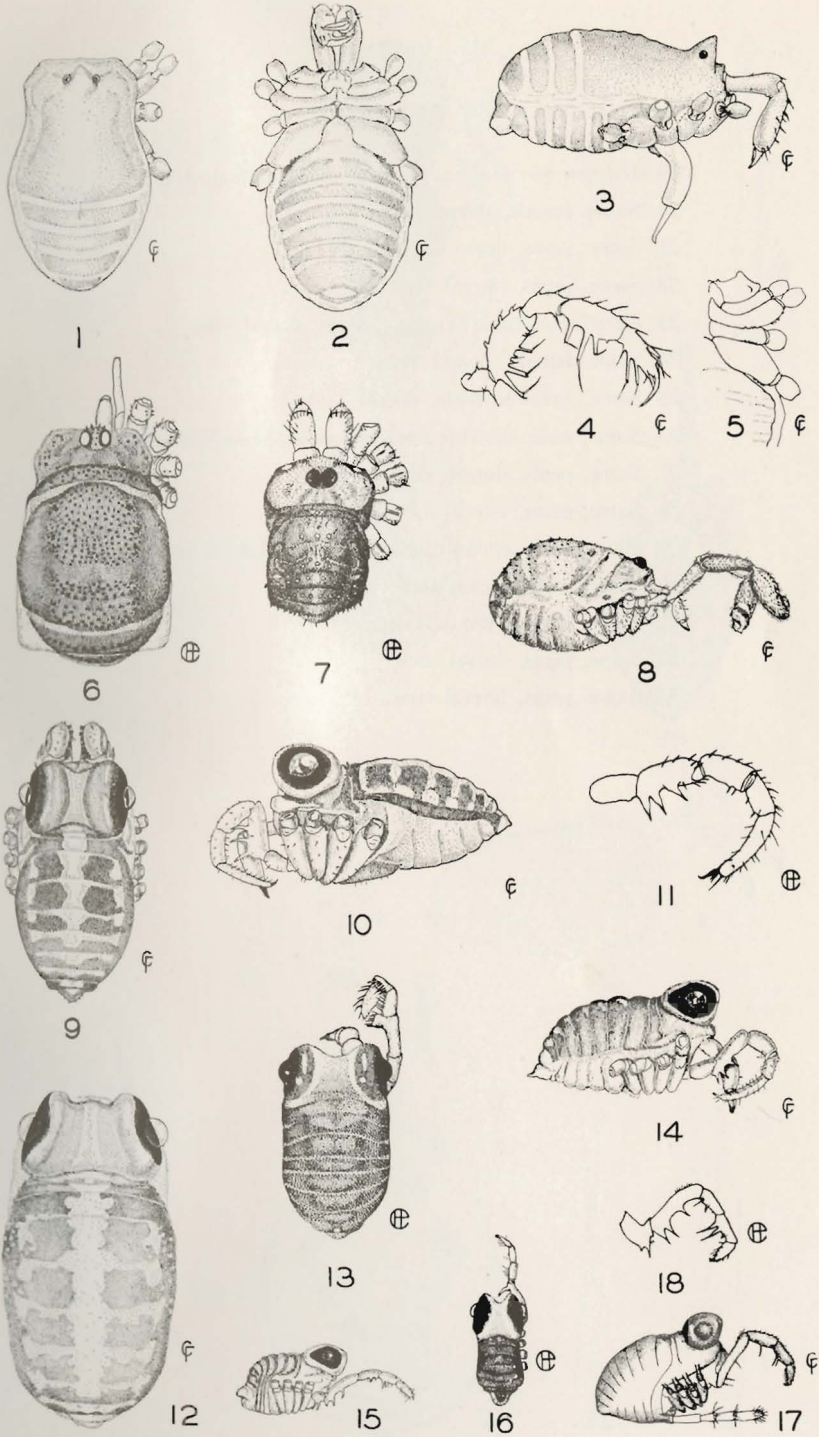
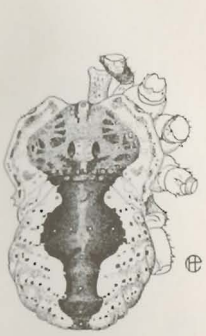


PLATE 2.

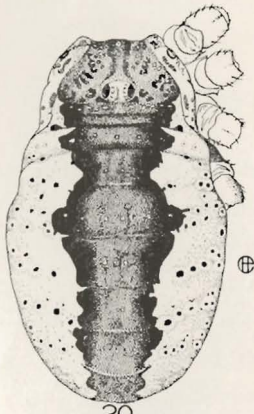
Fig.

19. *Mitopus morio* (Fabricius). Male, dorsal view.
20. Same, female, dorsal view.
21. Same, penis, dorsal view.
22. Same, penis, lateral view.
23. *Odiellus pictus* (Wood). Male, dorsal view.
24. Same, female, dorsal view.
25. Same, juvenile male, dorsal view.
26. Same, male showing variation in shape and pattern.
27. Same, penis, dorsal view.
28. Same, penis, lateral view.
29. *Phalangium opilio* Linnaeus. Male, lateral view.
30. Same, male, dorsal view.
31. Same, female, dorsal view.
32. Same, penis, dorsal view.
33. Same, penis, lateral view.

PLATE 2



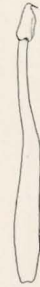
19



20



21



22



23



24



25



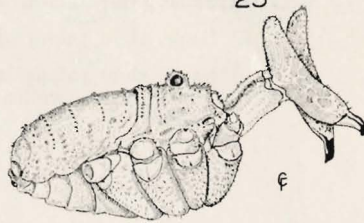
26



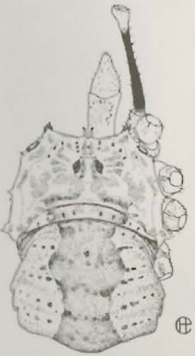
27



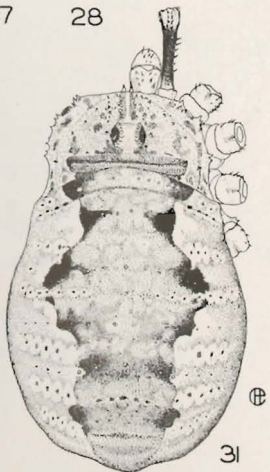
28



29



30



31



32



33

PLATE 3.

Fig.

34. *Opilio parietinus* De Geer. Male, dorsal view.
35. Same, female, dorsal view.
36. Same, penis, dorsal view.
37. Same, penis, lateral view.
38. *Leiobunum bicolor* (Wood). Male, dorsal view.
39. Same, female, dorsal view.
40. Same, juvenile, dorsal view.
41. Same, juvenile, ventral view.
42. Same, penis, dorsal view.
43. *Leiobunum calcar* (Wood). Male, dorsal view.
44. Same, female, dorsal view.
45. Same, male, ventral view showing exerted penis with basal haematodocha.
46. Same, male, lateral view, showing exerted penis and haematodocha.
47. Same, penis, dorsal view.
48. Same, penis, lateral view.
49. Same, right palpus of male, lateral view.
50. Same, right palpus, lateral view, showing spur of femur apposed to swollen base of tibia to form grasping organ.

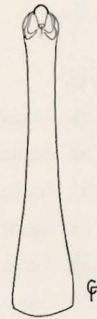
PLATE 3



34



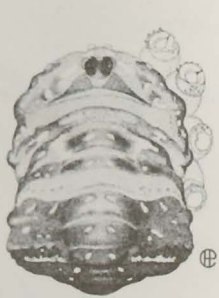
35



36



37



38



39

35



40



41



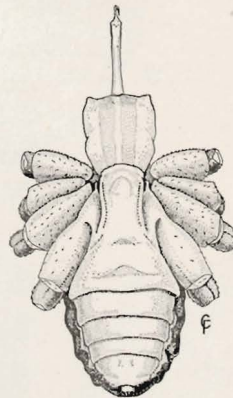
42



43



44



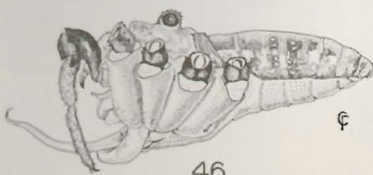
45



47



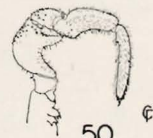
48



46



49



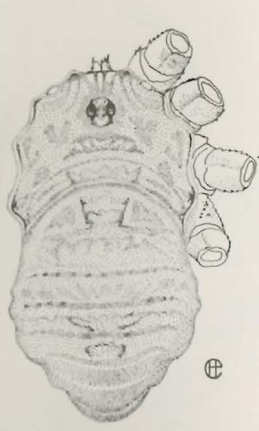
50

PLATE 4.

Fig.

51. *Leiobunum flavum* Banks. Male, dorsal view.
52. Same, female, dorsal view.
53. Same, penis, dorsal view.
54. Same, penis, lateral view.
55. *Leiobunum formosum* (Wood). Male, dorsal view.
56. Same, female, dorsal view.
57. Same, penis, dorsal view.
58. Same, penis, lateral view.
59. *Leiobunum longipes longipes* Weed. Male, dorsal view.
60. Same, male, dorsal view showing variation in pattern.
61. Same, female, dorsal view.
62. Same, male, lateral view showing penis extended and basal haematodocha.
63. Same, penis, dorsal view.
64. Same, penis, lateral view.

PLATE 4



51

♀



52

♀



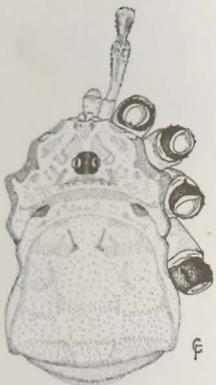
53

♀



54

♀



55

♀



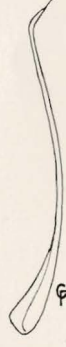
56

♀



57

♀



58

♀



59

♀



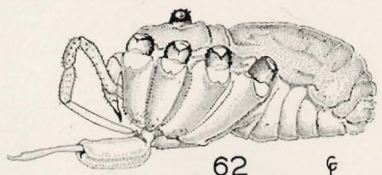
60

♀



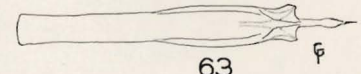
61

♀



62

♀



63

♀



64

♀

PLATE 5.

Fig.

65. *Leiobunum nigripes* Weed. Male, dorsal view.
66. Same, female, dorsal view.
67. Same, penis, dorsal view.
68. Same, penis, lateral view.
69. *Leiobunum nigropalpi* (Wood). Male, dorsal view.
70. Same, female, dorsal view.
71. Same, palpus.
72. Same, penis, dorsal view.
73. Same, penis, lateral view.
74. *Leiobunum politum* Weed. Male, dorsal view.
75. Same, female, dorsal view.
76. Same, penis, dorsal view.
77. Same, penis, lateral view.
78. Same, female, lateral view showing ovipositor extended.
79. Same, male, lateral view showing penis extended.

PLATE 5

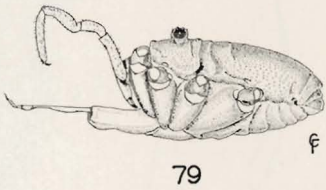
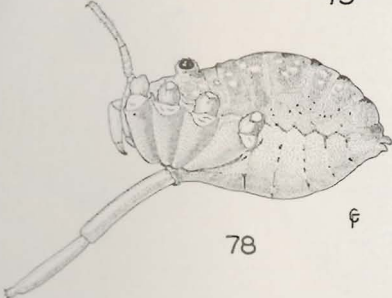
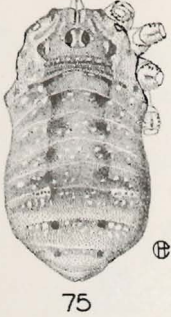
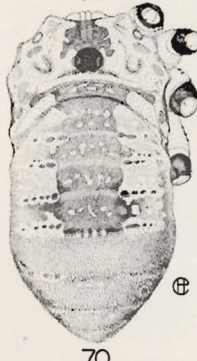
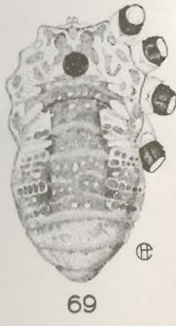
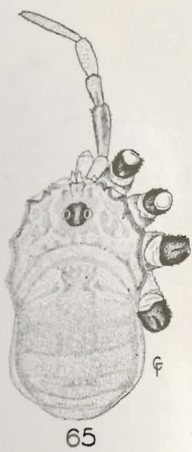
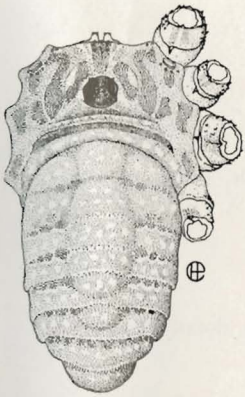


PLATE 6.

Fig.

80. *Leiobunum serratipalpi* Roewer. Male, dorsal view.
81. Same, right palpus, lateral view.
82. Same, penis, dorsal view.
83. Same, penis, lateral view.
84. *Leiobunum speciosum* Banks. Male, dorsal view.
85. Same, female, dorsal view.
86. Same, penis, dorsal view.
87. Same, penis, lateral view.
88. Same, male, lateral view to show long palpi.
89. *Leiobunum uxorium* Crosby and Bishop. Male, dorsal view.
90. Same, female, dorsal view.
91. Same, penis, dorsal view.
92. Same, penis, lateral view.

PLATE 6



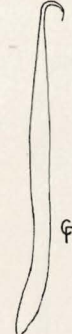
80



81



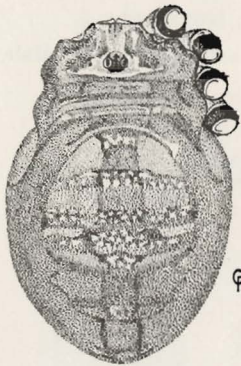
82



83



84



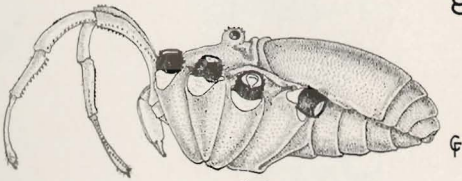
85



86



87



88



89



90



91



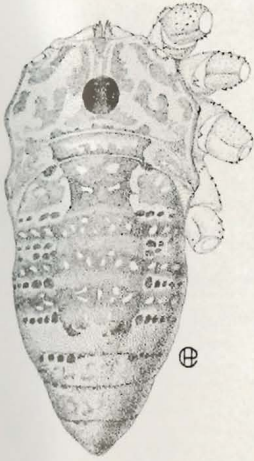
92

PLATE 7.

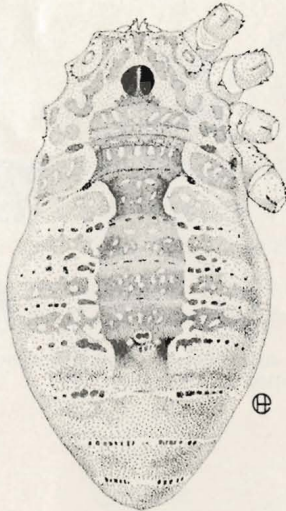
Fig.

93. *Leiobunum ventricosum* (Wood). Male, dorsal view.
94. Same, female, dorsal view.
95. Same, penis, dorsal view.
96. Same, penis, lateral view.
97. *Leiobunum verrucosum* (Wood). Male, dorsal view.
98. Same, female, dorsal view.
99. Same, penis, dorsal view.
100. Same, penis, lateral view.
101. *Leiobunum vittatum* (Say). Male, dorsal view.
102. Same, female, dorsal view.
103. Same, penis, dorsal view.
104. Same, penis, lateral view.

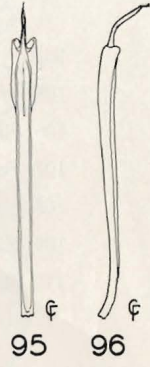
PLATE 7



93

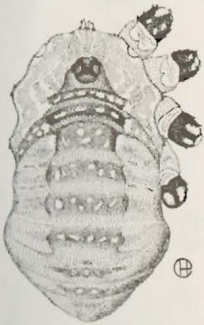


94

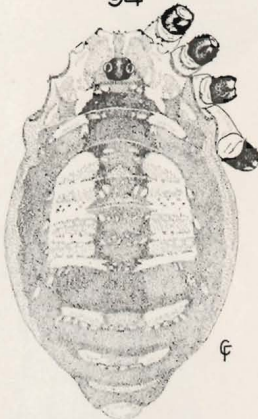


95

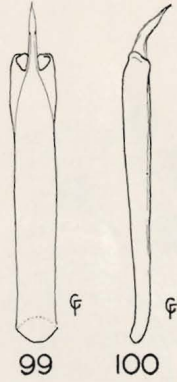
96



97



98

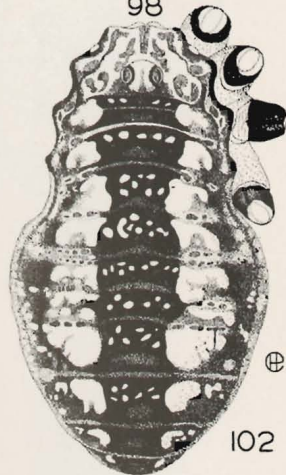


99

100



101



102



103

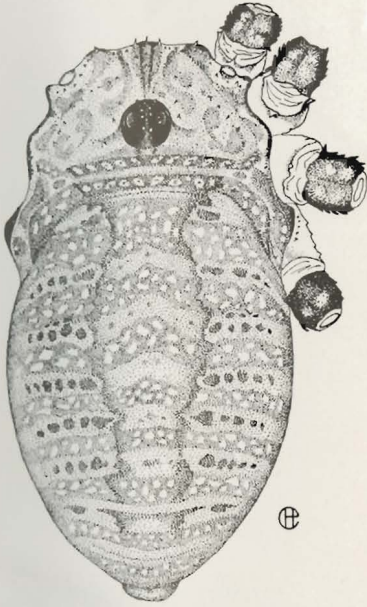
104

PLATE 8.

Fig.

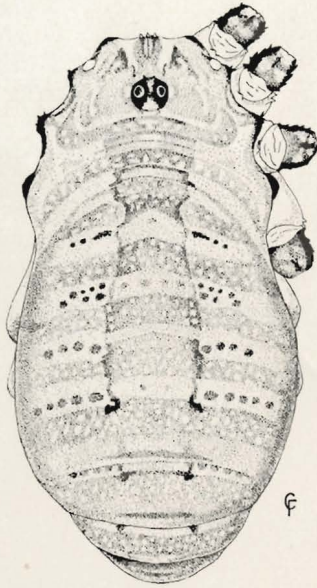
105. *Hadrobunus maculosus* (Wood). Male, dorsal view.
106. Same, female, dorsal view.
107. Same, penis, dorsal view.
108. Same, male, to show variation in size and proportions.
109. Same, female, dorsal view, light colored individual.
110. Same, male, dorsal view of another individual to show variation in pattern.

PLATE 8



105

♂



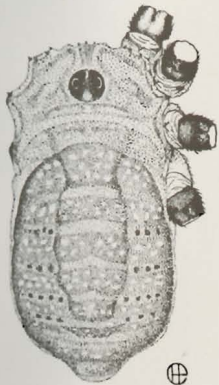
106

♀



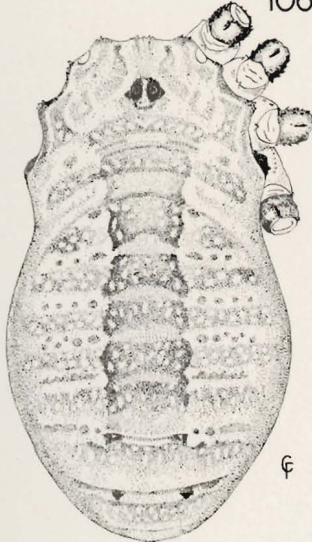
107

♀



108

♂



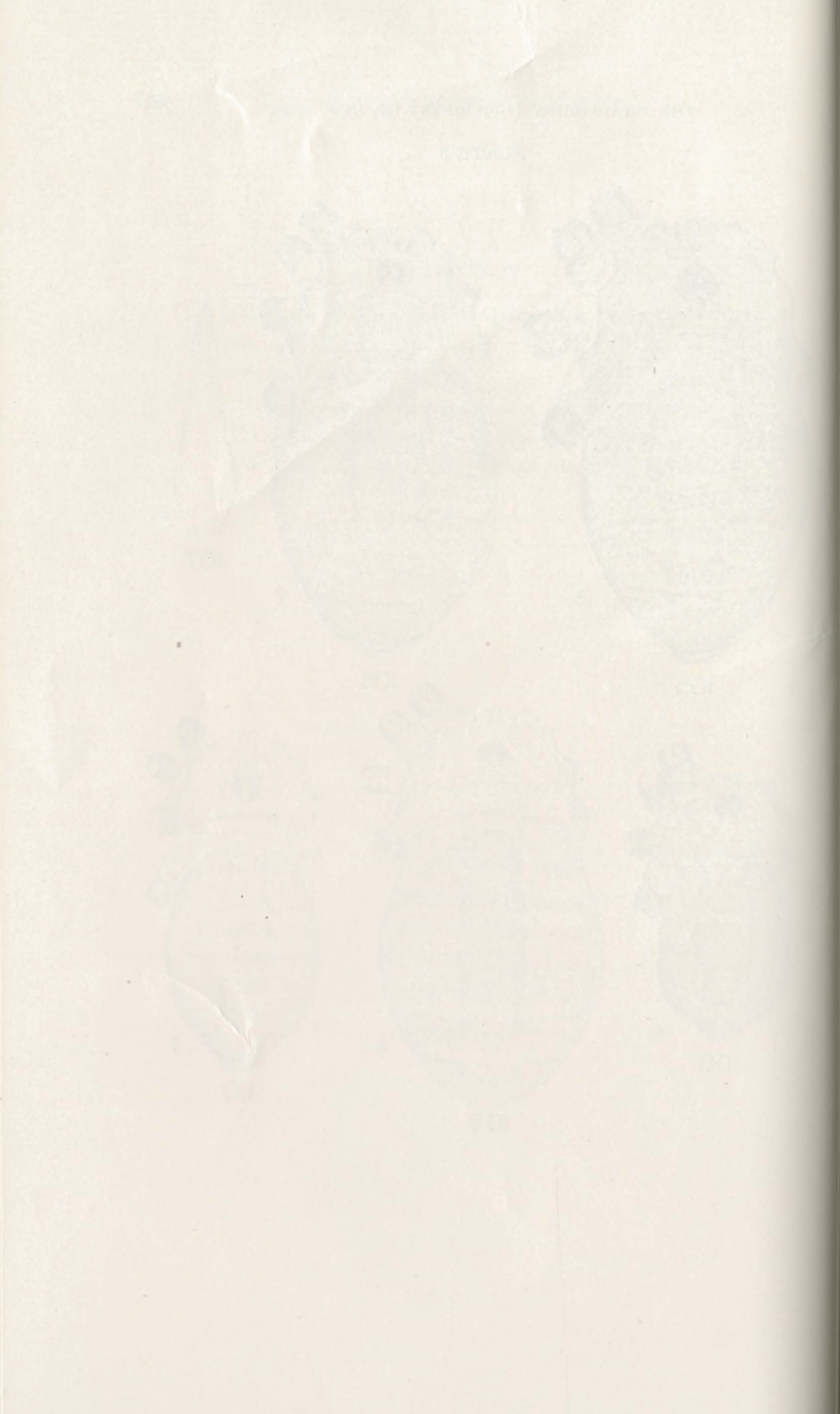
109

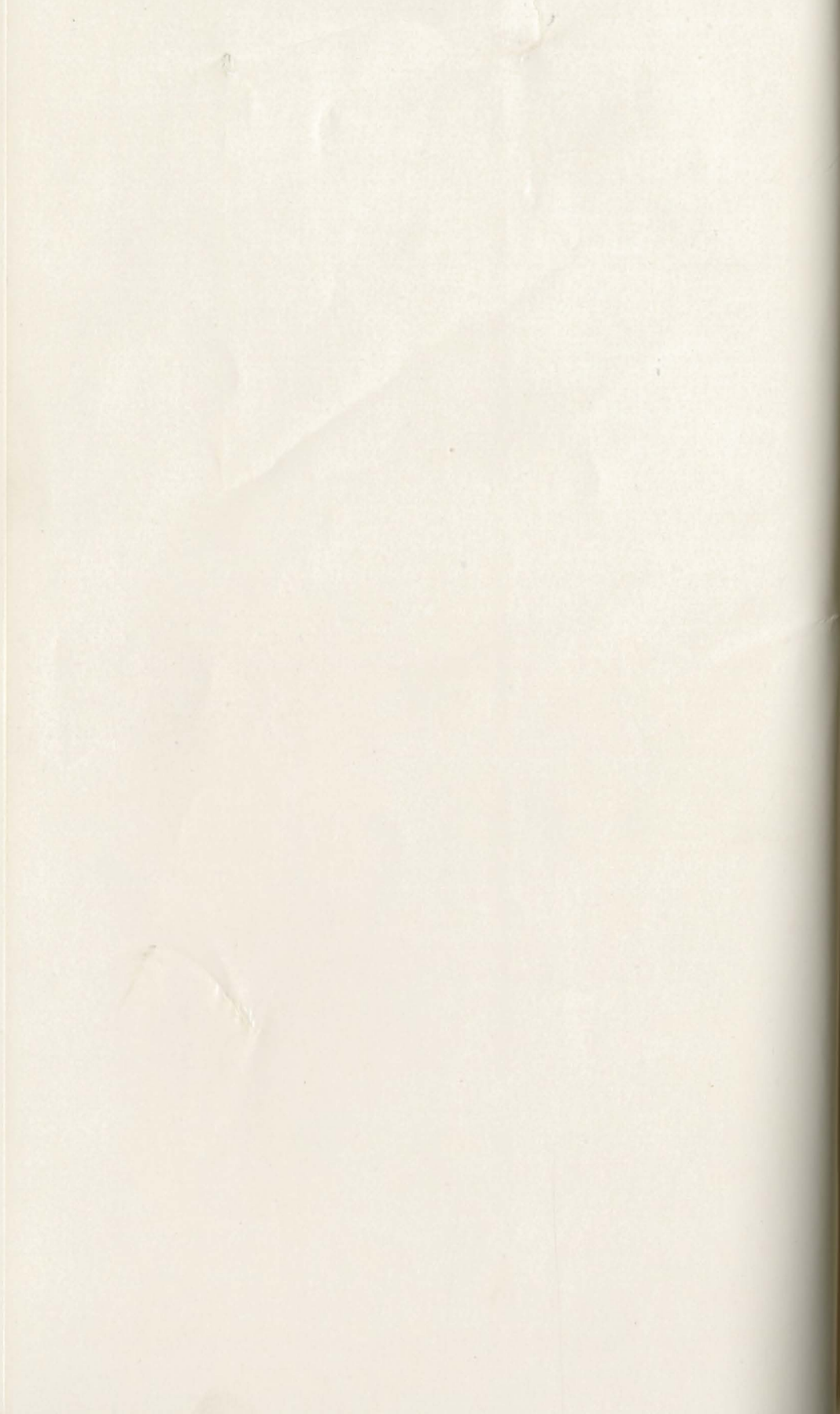
♀



110

♀





PROCEEDINGS OF THE ROCHESTER ACADEMY OF SCIENCE
ESTABLISHED 1881

Publications Committee

PROF. SHERMAN C. BISHOP, *Chairman*
The University of Rochester

DR. DEAN L. GAMBLE
Ward's Natural Science Establishment

JOHN R. RUSSELL
The University of Rochester

DR. HAROLD C. HODGE
University of Rochester School of Medicine and Dentistry

The pages of the Proceedings are open mainly for the publication of original articles on any aspects of the Natural Sciences of Western New York and the adjacent areas; for the publication of articles by the scientists of the region; and for biographical articles on the scientists of this area or those who have contributed to our knowledge of the Natural History of Western New York. Other articles will be considered by the Publications Committee. Further, the Proceedings will publish the official news, notes and activities of the Academy, its Sections and Members. Authors are requested to submit their articles to any member of the Publications Committee. Members should submit News and Notes to the Secretary of the Academy or the Secretaries of the various sections. Authors may obtain reprints by placing the order when returning proofs. In the case of articles of 25 pages or less, reprints are furnished at less than cost; on articles of more than 25 pages, the author obtains reprints at cost.

The Proceedings are published irregularly, but it is intended to publish approximately one volume of six numbers (about 300 pp.) every two years. Subscription price \$5.00 per volume and \$1.00 per number. Correspondence concerning subscriptions, single numbers, missing issues, and exchanges should be addressed to:

LIBRARIAN, *Rochester Academy of Science*
Rush Rhees Library
University of Rochester
Rochester, New York

