

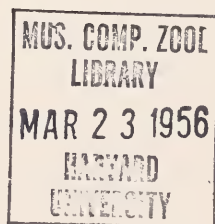
TRANSACTIONS
OF THE
SAN DIEGO SOCIETY OF NATURAL HISTORY

VOLUME XII. No. 7, pp. 103-152. PLATES 8-11

A REVISION OF THE PACIFIC COAST PHYTOSI
WITH A REVIEW OF THE FOREIGN GENERA
(COLEOPTERA: STAPHYLINIDAE)

BY

IAN MOORE
El Cajon, California



SAN DIEGO, CALIFORNIA
PRINTED FOR THE SOCIETY
MARCH 1, 1956

COMMITTEE ON PUBLICATION

LAURENCE M. KLAUBER, *Chairman*

JOSHUA L. BAILY

CHARLES C. HAINES

CARL L. HUBBS

JOHN A. COMSTOCK, *Editor*

TABLE OF CONTENTS

	Page
Introduction	107
Acknowledgments	108
Material Examined	108
Subtribe Phytosi	108
Ecology	110
Characters of Generic Value.....	110
Key to the Genera of the Subtribe Phytosi.....	115
Systematic Treatment of the Pacific Coast Genera.....	116
<i>Liparocephalus</i>	116
<i>Diaulota</i>	119
<i>Amblopusa</i>	127
<i>Bryobiota</i>	129
<i>Bryothinusa</i>	131
<i>Thinusa</i>	132
The Foreign Genera	135
<i>Phytosus</i>	135
<i>Cameronium</i>	137
<i>Baeostethus</i>	137
<i>Antarctophytosus</i>	139
Bibliography	140
Index of Figures.....	145

A REVISION OF THE PACIFIC COAST PHYTOSI WITH A REVIEW OF THE FOREIGN GENERA (COLEOPTERA: STAPHYLINIDAE)

by IAN MOORE

INTRODUCTION

The present study is an effort to assemble in one paper as much as could be discovered about one small group of genera of the Aleocharinae, a poorly organized subfamily of staphylinid beetles. The very large number of minute insects which are grouped together in this subfamily are represented in a great variety of environmental situations by an almost innumerable number of individuals. In spite of their abundance, the members of this subfamily are probably the least known of any large group of insects. Blackwelder stated that "Many thousands of species have been described, but comparatively few generic revisions have been published, and no adequate key to the genera has been proposed," and characterizes the situation as ". . . what appears now to be a hopeless chaos. . .".* From the foregoing remarks it would seem that any effort to assemble material and redescribe even a small number of these genera would be of some help toward a later reclassification of the subfamily. In the present study, this appears to be particularly true, because a number of characters have been discovered in the material at hand that are not recorded in the literature.

Whether the association of the genera treated here is a true phylogenetic one is open to question, and is beyond the scope of the present paper. This problem can be attacked only in a much more comprehensive study than the present available collection and library permit.

The ten genera discussed in this paper have in the past been associated by various authors in the subtribe Phytosi of the tribe Bolitocharini of the subfamily Aleocharinae. I was first introduced to this interesting group of marine insects by the late Edwin C. Van Dyke during a collecting trip to Moss Beach, California, in the fall of 1950. Later, while attempting to identify some species of *Diaulota* from Southern California, considerable difficulty was encountered which led eventually to the assembling of the material which forms the basis for this review of the group. Due to lack of material, it is not possible to present a complete revision of the foreign genera. However, for comparative purposes, these genera are included and some discussion of the species is attempted.

*Blackwelder, R. E. 1943. Monograph of the West Indian beetles of the family Staphylinidae. U. S. Nat. Mus. Bull. 182, pp. 1-658.

ACKNOWLEDGMENTS

The opportunity to examine the material in the collections of the California Academy of Sciences at San Francisco was generously extended by Hugh B. Leech, Curator of Coleoptera of that institution. Through the kindness of C. M. F. Von Hayek and E. B. Britton, I have been able to borrow a number of specimens from the British Museum. I wish particularly to acknowledge my indebtedness to Mildred H. Meeder, librarian of the San Diego Scientific Library, for very considerable aid in obtaining publications and photostats of publications not available in San Diego, and to Arthur H. Fischer, Director, and Charles Harbison, Curator of Insects of the San Diego Museum of Natural History, for allowing me unlimited use of the facilities of that institution. Richard E. Blackwelder of the United States National Museum has kindly compared specimens of one species with Casey's type and has given other aid. Samuel G. Harter has been of very considerable help and a very congenial companion on several collecting trips, on one of which he found the first specimens of one of the new species described here. Helen Moore has spent a great deal of time typing the manuscript. Above all else, I will always be indebted to the late Edwin C. Van Dyke for encouragement and assistance on many occasions.

MATERIAL EXAMINED

The very excellent series lent to me by Leech from the collections of the California Academy of Sciences contains all the material in this group from the Fenyes, Van Dyke, Blaisdell and Martin collections, as well as some slide preparations by E. S. Ross and by F. L. Rodgers. This material has been augmented by a fairly large series of a number of the California species collected by myself since 1950 and, except for the types and certain designated paratypes, at present in my own collection. Additional specimens which were lent by the British Museum brought the total number of specimens studied to about one thousand.

SUBTRIBE PHYTOSI

Phytosus was the first described of the ten genera now placed in this subtribe. It was first recorded by Curtis from England in 1838. A number of species of *Phytosus* have since been described from widespread localities in the northern hemisphere. None is known from the Pacific Coast of North America.* Two species of *Cameronium* are known from the east coast of

*The name *Phytosus opacus* LeConte is listed in the Leng catalogue and is retained in the supplements, although the species is also listed there, correctly as *Pontamalota opaca* (LeConte). This error has been copied in the supplement to the Coleopterorum Catalogus.

Africa. The genera *Antarctophytosus* Waterhouse and *Baeostethus* Broun are known only from the antarctic area. Three species of *Liparocephalus* Mäklin have been described from the north Pacific. The remaining four genera described by Casey are all known only from the pacific coast of North America. The species of this subtribe have in common the fact that they are all closely associated with the marine environment, either living on the seashore or in the intertidal belt. The following characters are common to all the genera examined, but have not been verified in *Baeostethus*.

1. Middle coxae contiguous, the mesosternal and metasternal processes acute and their apices separated from each other by about one-third of the length of the coxal cavities.

2. Labial palpi either two- or three-segmented, short, never as long as the mandibles.

3. Mandibles simple at tip.

4. Tarsi short. Anterior and middle tarsi four-segmented, posterior tarsi five-segmented. Last tarsal segment as long at least as the preceding two together. First segment usually no longer than the second but never longer than the second and third together.

The character of the contiguous middle coxal cavities appears to separate these genera from most other bolitocharids.* Not all authors define this character in the same manner. I consider the cavities separated only if the mesosternal process meets or nearly meets the metasternal process or if the apices of these processes are separated only by a distinct intercoxal plate. In the Phytosi both processes are acute and distinctly separated from one another by about one-third of the length of the coxal cavities. The two coxal cavities are in reality divided only by a sharp ridge which is usually not visible.

Fenyès did not follow previous workers but divided the tribe in a different way so that these genera fell into two separate subtribes, the Liparocephali (including *Actocharis*, *Amblopusa*, *Antarctophytosus*, *Diaulota*, and *Liparocephalus*) and the Phytosi (including *Arena*, *Baeostethus*, *Bryobiota*, *Bryothinusa*, *Phytosus*, *Polypea*, and *Thinusa*). He based this division on the supposed segmentation of the labial palpi. The inclusion of *Actocharis* and *Polypea* is not in accordance with the classification of Bernhauer and Scheerpeltz, who placed the former with the Oxytelinae and the latter with the Mylaenini. As these two genera have not been seen, no attempt is

*The only exceptions known to me are certain species of *Placusa*, which can be separated by the structure of the posterior tarsi.

made here to determine their true relationships. Cameron has demonstrated that *Arena* belongs with the Myrmedoniini.

ECOLOGY

It is of interest that at least four of the Pacific Coast genera of this subtribe, *Amblopusa*, *Bryothinusa*, *Liparocephalus*, and *Diaulota*, are among the very few insects which inhabit the intertidal belt of the ocean. The remaining genera apparently occur only on the seashore, largely in decaying seaweed. Detailed illustrations of the larvae of *Liparocephalus* and *Diaulota* were published by Chamberlin and Ferris and by Saunders. Keen gave some information about the habits of *Liparocephalus* at the Queen Charlotte Islands. Nothing is known of the early stages of *Bryobiota*, *Thinusa*, *Bryothinusa*, *Amblopusa* and *Baeostethus*, but the larva of *Phytosus* was described by Fauvel and that of *Antarctophytosus* by Enderlein.

CHARACTERS OF GENERIC VALUE

To anyone reviewing the literature of this group of insects, it will be apparent that of the few characters which have been given generic value, several have been interpreted in different ways by different workers. In order to avoid confusion in the use of this paper, it seems worthwhile to discuss these characters and explain their use by the present author.

Labrum.—The anterior margin of the labrum may be rounded, arcuate, truncate, emarginate, or bilobed. When it is rounded, it is evenly so; when it is arcuate, the sides turn rather abruptly back from the apex. It is considered truncate if there is a considerable straight central edge, even if the outer angles are slightly rounded. It is emarginate if the outer angles are produced anteriorly to the central edge. When it is bilobed, the central edge is acutely notched in the middle. In *Thinusa*, this notch is filled with a dark membrane on a slightly more ventral plane.

Mandibles.—The mandibles may be in one plane, or they may be arched gradually downward in the apical half, a condition I have referred to as "curved ventrally." Often, on one or on both mandibles, there is a median tooth at the inner edge about halfway between the base and the apex. In *Amblopusa*, *Bryothinusa*, and *Liparocephalus* there are also serrations between the median tooth and the tip. *Baeostethus* is said to have three inner teeth on each mandible.

Maxillae.—The very striking variations in the inner and outer lobes of the maxillae are probably constant generically. When better known, these parts may prove to be quite useful in the classification of the genera. Unfortunately, these characters could not be fully investigated in the present

study, because some of the genera have been seen only in loan material which could not be dissected.

Labial palpi.—It has been pointed out by several authors that the number of segments of the labial palpi in many groups of Staphylinidae is an inconstant and unreliable character, variable even within some species. However, this character has been used extensively in separating genera and even higher groups. Within the Phytosi, as pointed out by Chamberlin and Ferris, the genus *Diaulota* shows considerable variation: some specimens of a species have only 2 segments, whereas in others the basal segment is divided into two, making 3 segments in all. I have observed that in the genera in which the labial palpi are always three-segmented, the basal segment is always the widest as well as the longest. In the genera in which either condition may exist, the three-segmented condition is brought about by a division of the basal segment of the two-segmented palpus, so that segments one and two are of nearly equal width, and segment one is always the shorter. If the relative widths and lengths of the segments are recorded, a great deal of confusion can be avoided. The labial palpi of *Antarctophytosus*, *Bryothinusa* and *Liparocephalus* are similar in structure to those of *Diaulota*. Although I have observed only the three-segmented condition in *Antarctophytosus*, Dr. Cameron describes the palpi as two-segmented in *Paraphytosus*, a synonym of that genus. In *Liparocephalus* I know only the two-segmented condition but have seen both types in *Bryothinusa*. In the remaining genera the labial palpi are apparently always three-segmented. Casey described *Amblopusa* as having two-segmented labial palpi, but his descriptions of the widths and lengths of the segments leads me to believe that the third segment was broken off his specimen (see accompanying illustration of *A. borealis* Casey from the Fenyes Collection).

Ligula.—The ligula is often difficult or impossible to observe in museum specimens. In most of the phytosids it is moderately developed and slender. In some species of *Diaulota* it is so small that it might be considered wanting. In *Thinusa* and *Cameronium* the ligula is bifid (perfectly Y-shaped), a condition found in many other aleocharinids but unknown in the other phytosids.

Mentum.—The mentum is trapezoidal, widest at its base, and either truncate anteriorly or moderately or deeply emarginate.

Eyes.—The eyes are never prominent, seldom interrupting the side margin of the head. They vary greatly in size. They are minute in *Amblopusa* and *Baeostethus* (with as few as 3 separate facets in *Amblopusa brevipes* Casey). In *Thinusa* they occupy more than half the side of the

head. In most of the genera setae are interspersed with the facets. In others, *Liparocephalus* for example, there are no such setae.

Antennae.—The antennae present some differences in the relative lengths and widths of the segments. The most useful of these characters are the very short third segment in *Amblopusa* and the very long tenth segment in *Bryothinusa*. The relative length of the antennae, as compared with that of the head, pronotum, and elytra, is often used to separate species and sometimes even genera. Because the antennae do not usually lie straight back over these parts, and it is very difficult to so arrange them, such estimates can be inaccurate and should therefore be used with care.

Infraorbital ridge.—This ridge is quite variable in the Phytosi, and, although apparently always lacking in some genera and always well developed in others, in some species of *Diaulota* it may be either entirely lacking or moderately developed basally. The phrase "temples margined beneath" is often used to refer to the presence of this ridge.

Pronotum.—The differences in the shape of the pronotum are largely only specific in value and often not that. In the center of the disc *Bryobiota* has a longitudinal impression that is not found in the other genera.

Hypomera.—The hypomera is always visible from the side in the Phytosi but in *Liparocephalus* it is extremely small and hard to see. Casey used its shape for separating some genera, but I am unable to make such an application.

Prosternum.—This is difficult to observe in museum specimens. The small differences I have been able to observe do not seem to have much generic value.

Elytra.—The numerous minor variations in shape and size seem to be largely specific differences. In *Thinusa* the outer edge is much longer than the suture.

Tibiae.—In most of the genera, the tibiae are clothed by a long sparse pubescence. In *Phytosus* (*Phytosus*), *Phytosus* (*Actosus*), and *Thinusa* the anterior and middle tibiae possess, in addition to the usual pubescence, several series of long setae. The setae, although usually referred to as spines, are not direct extensions of the chitinous integuments and each has a distinct articulation at the base. They are several times the diameter of the pubescence which is interspersed with them.

Tarsi.—Any discussion of the tarsi brings up the problem of the major classification of the Aleocharinae. The present classification is based largely on the number of segments possessed by the tarsi. In the tribe Bolitocharini, of which the Phytosi is treated as constituting a subtribe, the tarsal seg-

ments are supposed to number 4 on the anterior and middle legs and 5 on the posterior. By many authors, this tarsal classification is considered not to indicate true relationships but merely to be a matter of convenience. Actually, it is often a matter of great inconvenience. The very small size of the insects, coupled with the peculiar structure and often dense vestiture of the tarsi, makes the counting of the segments difficult and often very doubtful. Many genera have been switched back and forth from one tribe to another by different students because of the different counts arrived at. This situation undoubtedly accounts for some of the confusion surrounding the classification of the subfamily. It seems likely that a truly phylogenetic classification will be arrived at only when other characters are utilized in conjunction with the tarsal structure. Another difficulty is indicated by the observation of Chamberlin and Ferris that in one species of *Diaulota* the posterior tarsi in the majority of specimens studied are reduced to 4 segments. They state that "The proportions of the segments and the arrangement of the setae indicate that the four-segmented condition arises from a fusion of the normal fourth and fifth segments." The following characteristics seem to be of value in distinguishing the genera of the Phytosi. The anterior tarsi are short and compact in *Amblopusa*. In *Baeostethus* they are said to be so compact and so densely setose that the basal segments are not readily visible. The unique spatulate plantar setae of the posterior tarsi of *Liparocephalus* have been pointed out by Chamberlin and Ferris. Variations in the relative lengths of the tarsal segments have been used to separate some genera of the tribe. In *Thimusa* certain such variations were given specific value by Casey, but according to Fenyès' synonymy of that genus, these variations would be intraspecific.

Metasternum.—In Phytosus and some of the other genera the metasternum is long, so that there is a considerable separation of the middle from the hind coxae. In *Diaulota*, *Liparocephalus*, and *Baeostethus* the metasternum is so reduced in length that the coxae are placed together in a compact group. This is a very distinctive character which indicates, along with other structural similarities, the close relationship between *Diaulota* and *Liparocephalus*.

Basal impressions of the tergites.—In the key that follows, considerable use has been made of the presence or absence of transverse impressions near the bases of certain tergites. The number of tergites having such impressions is fairly constant within the limits of the genera, with some exceptions (the two known exceptions in this subtribe are *Thimusa* and *Diaulota*). My understanding of this character is as follows. A tergite is said to

be impressed at the base if, at the anterior margin, there is an unbounded transverse groove which extends nearly to the lateral edge. The impression will be just posterior to a raised line (the antecostal suture) which delineates the portion of the tergite (the acrotergite) that normally is beneath the free posterior edge of the preceding tergite. The impression should not be confused with the antecostal suture or with the acrotergite. When present, the impressions are visible only in the proper light, so that often a specimen must be rotated in the light in order to cast a shadow in the impression. The impressions are not ordinarily visible in slide preparations. When present, it seems to be invariable that all visible anterior tergites will be impressed up to a certain number, so that if, for example, tergite number three is impressed, tergites number one and two will also be impressed. These basal impressions seem to be of wide occurrence in the Aleocharinae. The number of segments impressed has been used extensively in classification and is usually given generic significance. However, sometimes the last impressed tergite is so faintly impressed as to be easily overlooked in a count and the number is subject to variation within some species. In *Diaulota densissima* Casey the fourth tergite is definitely not impressed in some specimens, whereas in others there is a faint impression. Under these circumstances this character even though very convenient and often easily used, must be employed with care.

Constriction of the sternites.—This character is difficult to observe, since it is very similar to the basal impressions of the tergites. The first four visible sternites are constricted on *Phytosus*, *Amblopusa*, and *Bryobiota*. The first two of these genera have five impressed tergites, and the last one four so impressed. When the insect is viewed from the side, it will be seen that the constriction of the base of the sternite is exactly opposite the impression on the tergite, so that together they form, around the segment, a ring that is interrupted only by the paratergites. In *Amblopusa* the paratergites are obviously affected also. These two structural modifications very likely have a common cause or function, possibly allowing greater flexibility of the abdomen. I have not observed this constriction in any of the remaining seven genera, although some have strong basal impressions of the tergites.

Sexual characters.—External differences between the sexes are very weak in this group of insects. No differences have been observed in *Bryothinusa*, *Bryobiota* and *Thinusa*. In *Diaulota* and *Liparocephalus* a modification of the apical margin of the sixth sternite offers some characters of specific value. In the female of *Liparocephalus brevipennis* Mäklin I have discovered some very striking modifications of the fifth and sixth tergites. These are

shown in the drawing of that species. Various degrees of enlargement of the head in males of some species of *Diaulota* and *Liparocephalus* are apparently intraspecific variations.

The following key is presented in the hope that it may be of aid to students, in spite of the fact that characters could not always be chosen that are most readily visible in museum specimens. The fact that *Baeostethus* has not been seen and that certain characters have not been recorded in the original description of it has added to the difficulty of composing the key. Only two subgenera of *Phytosus* have been included. The characterization of *Phytosus s. s.* and *Actosus* are based entirely on *P. (Phytosus) spinifer* Curtis, *P. (Actosus) nigriventris* (Chevrolat) and *P. (Actosus) balticus* Kraatz. The other two proposed subgenera of *Phytosus*, *Euphytosus* Bernhauer and Scheerpeltz and *Anopsisus* Bernhauer have not been seen and probably do not belong here. The former is too incompletely described to permit its inclusion. If *Anopsisus* is actually a *Diglotta*, as Koch says it probably is, then the original description is certainly very poor.

KEY TO THE GENERA OF THE SUBTRIBE PHYTOSI

- A. Anterior and middle tibiae spinose externally.
 - B. Fifth tergite impressed at base; ligula simple.
 - C. Elytra considerably longer than pronotum; metasternum long *Phytosus (Phytosus)*
 - CC. Elytra not or very little longer than pronotum; metasternum short *Phytosus (Actosus)*
 - BB. Fifth tergite not impressed at base; ligula bifid; metasternum short. *Thinusa*
- AA. Tibiae not spinose externally; ligula simple.
 - D. Anterior tarsi short, compact, so densely setose that the basal segments are not visible; mandibles with three internal teeth *Baeostethus*
 - DD. Anterior tarsi usually as long as middle tarsi, not densely setose.
 - E. No tergites impressed at base.
 - F. Right mandible very minutely serrate between median tooth and tip, left simple; mentum truncate; body slender, parallel. *Bryothinusa*
 - FF. Both mandibles coarsely serrate between median tooth and tip; mentum emarginate; abdomen inflated, sides arcuate. *Liparocephalus*
 - EE. At least three tergites impressed at base.
 - G. Fifth tergite impressed at base. *Amblopusa*
 - GG. Fifth tergite not impressed at base.
 - H. Fourth tergite strongly impressed at base. *Antarctophytosus*
 - HH. Fourth tergite not (or very faintly) impressed at base.
 - I. Base of head longitudinally impressed. *Bryobiota*
 - II. Base of head not longitudinally impressed.
 - J. Metasternum long, hind coxae distant from middle coxae *Cameronium*
 - JJ. Metasternum short, hind and middle coxae very approximate *Diaulota*

LIPAROCEPHALUS Mäklin

Liparocephalus Mäklin, 1853, p. 191; Casey, 1893, p. 353; Fenyès, 1918, p. 106; Chamberlin and Ferris, 1929, p. 143; Blackwelder, 1936 (various figures to parts of adult).

Generitype.—*Liparocephalus brevipennis* Mäklin.

Diagnosis.—Body broad, inflated, somewhat convex. Head variable. Labrum wide, truncate or very shallowly emarginate. Mandibles with coarse serrations between median tooth and tip, not curved ventrally at tip. Mentum deeply emarginate in central third, the emargination straight at bottom. Third segment of maxillary palpi subconical, widest at apex; fourth narrow and short. Inner lobe of maxilla broad at base, pointed at apex, densely setose within; outer lobe broad with a dense brush of setae internally at tip. Labial palpi two-segmented; first segment four times as long as wide; second half as wide as first and little more than half as long; palpi separated at base by width of first segment. Ligula simple, slender, a little less than half as long as first segment of labial palpi. Eyes moderately large, occupying about one-third of side of head; hairless between facets. Antennae with all segments elongate. Pronotum variable. Anterior margin of prosternum straight. Hypomera very small but visible from the side. Elytra short, not more than half the length of pronotum; internal apical angles rounded. Tibiae pubescent. Plantar setae of posterior tarsi spatulate. Abdomen inflated, arcuate at sides; without impressions at base of tergites; sternites not constricted at base.

Remarks.—This genus is recognizable at a glance by the inflation of the abdomen. It differs from all but *Amblopusa* and *Bryothinusa* in the serrate mandibles, but it is indicated by a number of more important characters to be most closely allied to *Diaulota*. The spatulate plantar setae of the hind tarsi have been observed in none of the other genera. Three species have been described; *brevipennis* Mäklin from Alaska, *cordicollis* LeConte from California and *takunagai* Sakaguti from Japan. The latter is apparently very similar to *cordicollis* but is said to differ in the non-dehiscent sutural margin of the elytra. Judging from an illustration given by Sakaguti it also differs from our species in the male secondary sexual characters. *Cordicollis* has been variously considered a full species, a subspecies of *brevipennis*, and a synonym of that species. In the material examined by me I find two quite distinct species, one from Alaska and the other ranging from British Columbia south to San Luis Obispo County, California. I believe these to be the two previously described North American species, although my determinations do not agree with those of most former students. In former keys, color

has been used to separate the species. My series shows that the color is quite variable and is completely unreliable in separating the species. The size and shape of the head is also extremely variable. The secondary sexual characters provide such positive means of identification in both sexes that these have been chosen for the new key.

KEY TO THE NORTH AMERICAN SPECIES OF LIPAROCEPHALUS MÄKLIN

- A. Median lobe of sixth sternite of male shorter than lateral lobes; apical margin of fifth tergite of female broadly emarginate *brevipennis*
 AA. Median lobe of sixth sternite of male longer than lateral lobes; apical margin of fifth tergite of female straight *cordicollis*

Liparocephalus brevipennis Mäklin

Liparocephalus brevipennis Mäklin, 1853, p. 192.

Description.—Densely piceous to dark reddish brown; integuments densely granulose; clothed in a short dense pubescence which is densest on the head; distinctly and rather closely punctured throughout. HEAD about as wide as long; narrower than pronotum. Eyes moderate in size, occupying not more than one-third of side of head. Temples margined beneath the eyes. Antennae about as long as head and pronotum; segments one to eight elongate, nine and ten very little longer than wide, eleventh elongate. Labrum broadly and feebly emarginate in a continuous arc. PRONOTUM a little wider than long, widest at apical third; sides arcuate to hind angles which are not sinuate; base narrower than apex. Each elytron about as wide as long and about half the length of pronotum; internal apical angles broadly rounded. ABDOMEN broadly inflated, with arcuate sides; no tergites impressed at base; sternites not constricted. MALE with sixth sternite produced apically in three rounded lobes, the median lobe shortest; fifth tergite straight at apex. FEMALE with sixth sternite arcuate apically; apical margin of fifth tergite strongly emarginate with a small, broad arcuate lobe in the center of the emargination; sixth tergite with a longitudinal ridge for its full length. LENGTH about 3.5 mm.

Type locality.—"In insula Chtaguluk ad castellum Constantinovsk," Alaska. J. B. Tompkins of the Bancroft Library at Berkeley, California, has kindly located that island for me under the present name of Hinchinbrook Island in Prince William Sound in southern Alaska.

Additional published records.—Unalaska, Alaska. Other records are doubtful because most identifications have been based on color.

Material examined.—Nine specimens of both sexes in the Blaisdell Collection (C.A.S.) from Dutch Harbor, Unalaska, Alaska, and five from the same series in the Fenyes Collection.

Remarks.—This species is quite distinct from the one I identify as *cordicollis* LeConte and can easily be separated from it by the secondary sexual characters of both sexes. The specimens collected by Blaisdell at Dutch Harbor are the only ones I have seen. If this is not *brevipennis*, it is unnamed.

Liparocephalus cordicollis LeConte

Liparocephalus cordicollis LeConte, 1880, p. 177; Chamberlin and Ferris, 1929, p. 154 (figures of adult, part).

Liparocephalus brevipennis Keen, 1897, Fig. 35; Saunders, 1928, p. 542 (figures of adult and larva), Chamberlin and Ferris, 1929, p. 143.

Description.—Densely piceous to dark brown; integuments densely granulose throughout; clothed in a short dense pubescence, which is less apparent on the head; distinctly and rather closely punctured throughout. HEAD broader than or as broad as long, subquadrate to round; sides behind the eyes subparallel and straight for most of the length or gently arcuate. Eyes moderate, occupying about one-fourth of side of head. Antennae about as long as head and pronotum; all segments elongate. Labrum truncate. Mentum emarginate for central third; the emargination straight at bottom. Temples bordered beneath the eyes only at base of head. PRONOTUM a little wider than long, widest at apical third; sides arcuate to basal angles where they sometimes become sinuate; base narrower than apex. Each ELYTRON about as long as wide and about half as long as pronotum. ABDOMEN broadly inflated, with sides arcuate; tergites not impressed; sternites not constricted. MALE with sixth sternite produced apically in three lobes, the median lobe longest. FEMALE with sixth sternite arcuate. LENGTH about 4.0 mm.

Type locality.—Mendocino, California.

Recorded distribution.—Masset, Queen Charlotte Island, British Columbia, to San Mateo County, California.

Material examined.—I have examined 156 specimens: 17 from Massett, Queen Charlotte Island, British Columbia (Fenyes Collection, C.A.S.); 1 from Tofino, Vancouver Island, British Columbia, collected by Spencer (C.A.S.); 4 from Indian River, British Columbia, H. B. Leech (C.A.S.); 8 from Vancouver, British Columbia, H. B. Leech (C.A.S.); 7 from Cannon Beach, Oregon, E. C. Van Dyke (C.A.S.); 2 from DePoe Bay, Oregon, E. S. Ross (C.A.S.); 1 from Bodega Bay, California, C. H. Hanna (C.A.S.); 1

from San Francisco, California, F. L. Rodgers (C.A.S.); 7 from Moss Beach, San Mateo County, California, F. E. Blaisdell (Fenyès Collection, C.A.S.), and 4 from the same locality, Ian Moore; 4 from Pigeon Point, San Mateo County, California, Ian Moore; 99 from Pacific Grove, Monterey County, California, Ian Moore; 1 from Piedras Blancas Point, San Luis Obispo County, California, Ian Moore. My specimens were all collected in October and the others from May to July.

Remarks.—It is possible that all records for this genus south of Alaska are based on this species. The great variability in color and in the shape and size of the head leads me to believe that most identifications as *brevipennis* are incorrect. Chamberlin and Ferris describe what they believe to be two species from Moss Beach based on "obvious differences" in the male genitalia. My own experience is that the male genitalia of *cordicollis* will appear similar to either drawing given by them if viewed from different angles.

DIAULOTA Casey

Diaulota Casey, 1893, p. 354; Fenyès, 1918, p. 105; Chamberlin and Ferris, 1929, p. 155.

Generitype.—*Diaulota densissima* Casey.

Diagnosis.—Body elongate, subparallel with slightly inflated abdomen, subdepressed. Head variable. Labrum rounded. Mandibles asymmetrical, each with a median tooth, not curved ventrally. Mentum broadly, shallowly emarginate. Maxillary palpi with third segment subovoid; fourth segment moderately elongate, slender. Inner lobe of maxilla narrowed toward the tip, strongly setose within; outer lobe with dense brush of setae at tip. Labial palpi two- or three-segmented; first segment, or first two conjointly, four times as long as wide; last segment half as long and half as wide as first, or first two together; first segment, when palpus three-segmented, only half as long as second. Ligula minute, hardly visible between the palpi. Eyes small, occupying less than one-third of side of head. Antennae with first three segments elongate, ninth and tenth transverse. Pronotum variable. Anterior margin of prosternum arcuate. Elytra short, not more than half the length of pronotum. Tibiae pubescent. Tarsi with basal segments short, equal to second; last segment elongate. Abdomen slightly inflated posteriorly; first three or four visible tergites impressed at base; sternites not constricted basally.

Remarks.—As will be pointed out in the remarks following *Amblopusa*, that genus is quite distinct from *Diaulota*. *Diaulota* seems most closely

allied to *Liparocephalus* in the very short metasternum, the short elytra, and particularly in the very close similarity of the labial palpi and the maxillae. It differs from *Liparocephalus* in the form of the mandibles, the impressed tergites, the very short ligula and many other characters, as pointed out by Chamberlin and Ferris. Until now, only one species of *Diaulota* has been known, *D. densissima* Casey, with its synonym, *D. insolita* Casey. There are in my collection four other species, which are described now.

KEY TO THE SPECIES OF DIAULOTA CASEY

- A. Head densely piceous.
 - B. Each elytron as long as wide; in each sex, head narrower than pronotum and antennae one-third longer than head. *densissima*
 - BB. Each elytron wider than long; in male, head as wide as pronotum and antennae almost as long as head and pronotum. *fulviventris*
- AA. Head translucent, ferruginous.
 - C. Head small, elongate, narrower than pronotum, narrowest near apex *barteri*
- CC. Head large, as wide as or wider than pronotum.
 - D. Each elytron shorter than wide; third antennal segment as long as second, very long and slender. *megacephala*
 - DD. Each elytron longer than wide; third antennal segment shorter than second, stout *randykei*

Diaulota densissima Casey

Diaulota densissima Casey, 1893, p. 354; Saunders, 1928, p. 542 (figures of adult and larva);

Chamberlin and Ferris, 1929, p. 157 (figures of adult and larva).

Diaulota insolita Casey, 1893, p. 355.

Description.—Body densely piceous above, beneath sometimes faintly paler; densely granulose, not shining; clothed in a short dense pubescence; finely densely punctured throughout, more coarsely on the abdomen. HEAD narrower than pronotum in both sexes, sides evenly arcuate. Antennae one-third longer than head in each sex. Eyes of about 35 facets. Temples strongly margined beneath the eyes. PRONOTUM a little longer than wide, widest near apical third; sides evenly arcuate to base and hardly sinuate; base definitely narrower than apex. ELYTRA nearly as long as wide and nearly half as long as pronotum. ABDOMEN subparallel but inflated slightly posteriorly. First three tergites impressed at base, fourth sometimes with a very faint suggestion of an impression. MALE with sixth sternite produced in the middle in a rounded triangular lobe and at the sides produced nearly as far posteriorly, the intervening areas deeply arcuate. FEMALE with the sixth sternite arcuate posteriorly. LENGTH 2.0-2.9 mm.

Type locality.—Mainland opposite Fort Wrangel, Alaska.

Additional published records.—Moss Beach, San Mateo County, California; Nanaimo, Vancouver Island, British Columbia; Yakutat, Alaska. The male, a unique, was described as *D. insolita* by Casey from Queen Charlotte Islands, British Columbia.

Material examined.—Two females from Dutch Harbor, Unalaska (C.A.S.); 1 male and 1 female from Massett, Queen Charlotte Island, British Columbia (C.A.S.); 2 specimens in the British Museum from Metlakatla, "British Columbia" [Metlakatla is in southeastern Alaska], taken by J. H. Keen, labeled *D. insolita*; 6 females from Moss Beach, San Mateo County, California (C.A.S.); 1 female and 5 males from Moss Beach (Ian Moore); 7 females and 11 males from Pigeon Point, San Mateo County, California (Ian Moore); 110 females and 89 males from Pacific Grove, Monterey County, California (Ian Moore). My specimens were all taken in November, 1954.

***Diaulota fulviventr*is new species**

Description of male holotype.—Densely piceous above, dark fulvous beneath; integuments densely granulose; clothed in a short, fine, dense pubescence throughout; very finely, densely punctured, more coarsely on the abdomen. HEAD round, as wide as pronotum; sides evenly arcuate. Antennae nearly as long as head and pronotum; first three segments elongate, each narrower and shorter than the preceding, fourth to seventh ovoid, eighth to tenth transverse, eleventh obconical. Eyes of about 35 facets. Temples strongly margined beneath the eyes. PRONOTUM as wide as long; sides evenly arcuate to hind angles which are slightly sinuate. ELYTRA considerably shorter than wide and very much less than half the length of pronotum. ABDOMEN somewhat inflated posteriorly; apex of sixth sternite produced medially in a small, rounded, triangular lobe; apical edge lateral to lobe hardly sinuate. Lateral lobe of GENITALIA with enlarged apex produced at right angle to a short narrow stalk; median lobe with a small hook-like process at extremity. LENGTH 1.7 mm.

Allotype (female).—Head elongate, narrower than pronotum. Antennae one-third longer than head. Abdomen somewhat inflated but sides more arcuate posteriorly; apex of sixth sternite arcuate posteriorly.

Type locality.—La Jolla Shores, San Diego, California.

Types.—Holotype, male, allotype, female, paratypes, 6 males and 10 females taken at the type locality November 9, 1950 by Samuel G. Harter and Ian Moore, and 7 males and 14 females taken at the same locality on November 22, 1950 by Ian Moore. All specimens were collected in fine well-

drained cracks in rocks which had to be pried apart with a wrecking bar, between +4 and +6 foot tide levels in association with *Thalassotrechus barbarae* (Horn) at the higher level and with the two following species at the lower level.

Disposition of types.—Holotype, allotype, and 4 paratypes deposited in the collection of the California Academy of Sciences. Two paratypes are deposited with each of the following: San Diego Museum of Natural History; American Museum of Natural History; Museum of Comparative Zoology; Canadian National Collection; Chicago Natural History Museum; British Museum (Natural History); United States National Museum. The remaining paratypes are at present retained in my collection.

Additional material.—Thirteen specimens from the type locality taken in September and October, 1953; 16 males and 37 females from Sunset Cliffs, San Diego, California, November 21, 1950; 7 males and 4 females from Pigeon Point, San Mateo County, California, October, 1954; 6 males and 1 female from Shell Beach, San Luis Obispo County, California, October, 1950; 4 males and 5 females from Descanso Bay, Baja California, Mexico, in April, 1951, and the others in October, 1953; 7 males and 8 females from Sauzal, Baja California, Mexico, May, 1951; 1 male and 1 female from Punta Morro, north of Ensenada, Baja California, in April, 1951, and 2 males and 4 females from the same locality in November, 1954. Larvae that probably belong to this species were taken on various dates in the spring and fall at San Diego and at Punta Morro.

Remarks.—This species closely resembles *D. densissima* and might have been considered that species had it not been for the differences in the male genitalia. The females of the two species are so similar that only a very careful examination will distinguish them. The male of *fulviventris* can be separated from that of *densissima* by a number of characters such as the wider head, longer antennae, and differences in the apical margin of the sixth sternite. There are some noticeable variations in series taken from different parts of the range, but the male genitalia show no differences in specimens from Shell Beach, San Diego, and Punta Morro. The specimens from Pigeon Point and Shell Beach are darker beneath, those from Sauzal very much lighter, both above and beneath and in addition have more delicate antennae. These differences appear in the majority of the specimens but not in all, and possibly indicate enough differentiation to warrant the recognition of a slightly different "race" to the south.

***Diaulota harteri* new species**

Description of male holotype.—Testaceous, with fourth dorsal segment a little darker; integuments finely and densely granulose except on the abdomen; pubescence fine, short, dense; very finely, rather closely punctured throughout; the abdomen with a network of fine lines connecting the punctures. HEAD distinctly longer than wide, widest at posterior fourth, very distinctly narrower than apex of pronotum; sides of head behind the eyes distinctly sinuate. Eyes of about 16 facets. Antennae nearly as long as head and pronotum; first three segments elongate, decreasing in length, third narrower than second, fourth to sixth hardly elongate, seventh and eighth round, ninth and tenth transverse, eleventh elongate, obconical. Temples strongly margined below the eyes. PRONOTUM about as wide as long, widest at apical third; sides evenly arcuate and slightly sinuate at hind angles; base narrower than apex. ELYTRA conjointly about as wide as pronotum and about half as long, each elytron nearly square except for the broadly rounded humeral angle. ABDOMEN gradually expanded posteriorly to the fifth segment; apex of sixth sternite produced in its central third in a broad, pointed triangle; margins from the base of the triangle to the sides, straight. LENGTH 1.8 mm.

Allotype (female).—Similar to male, but with sixth sternite rounded posteriorly.

Type locality.—Descanso Bay, Baja California, Mexico.

Types.—Holotype, male, allotype, female, and 26 paratypes taken at the type locality on October 11, 1953.

Disposition of types.—Holotype, allotype, and 4 paratypes deposited in the collection of the California Academy of Sciences. Two paratypes are deposited with each of the following: San Diego Museum of Natural History; American Museum of Natural History; Museum of Comparative Zoology; Canadian National Collection; Chicago Natural History Museum; British Museum (Natural History); United States National Museum. The remaining paratypes are at present retained in my collection.

Additional material.—Seventeen specimens were taken at La Jolla Shores, San Diego, California, in September, October and November. All were collected from very narrow, well-drained cracks in rocks between +4 foot tide level and mean low water, in association with the following species. It has not been determined if they extend below mean low water, but at that point they would occasionally be submerged for as long as 16 hours at a

time. It seems likely that a film or bubble of air is retained in the cracks where they are found.

Remarks.—This species is easily distinguished from *densissima* and *fulviventris* by its very pale, translucent, yellow or red integuments and from *megacephala* by the very narrow head. The color is variable. The type is the palest specimen seen. The usual color is ferruginous with one to three abdominal segments black. This species is named for Samuel G. Harter, who assisted on numerous collecting trips and who collected the first specimens of *Diaulota fulviventris*.

***Diaulota megacephala* new species**

Description of male holotype.—Ferruginous, with fourth and part of fifth abdominal segments and eleventh antennal segment black; integuments translucent, minutely and densely granulose except on the abdomen, which is rather distinctly reticulate; pubescence short, fine and dense; puncturation fine, rather dense. HEAD trapezoidal, very large, wider and longer than pronotum, wider than long, widest at the anterior margin; the sides slightly and evenly arcuate to the base, which is as wide as apex of pronotum. Eyes of about 22 facets, occupying about one-sixth of side of head. Antennae nearly as long as head and pronotum; segments one to seven elongate, one longest and widest, more than twice as long as wide, two very little narrower, about twice as long as wide, three as long as two and very slender, little more than half as wide as two, four barely wider than three and twice as long as wide, five to ten increasing gradually in length and width, tenth about as long as wide, eleventh longer than wide, obconical. Temples not margined beneath the eyes. PRONOTUM a little wider than long, widest at apical third; sides arcuate from apex to near basal angles; basal angles slightly sinuate; base distinctly narrower than apex. ELYTRA almost as long as wide, conjointly as wide as pronotum. ABDOMEN inflated posteriorly; first three visible tergites deeply, fourth shallowly impressed at base; sixth sternite produced medially in a rounded triangular lobe with the apical margin slightly sinuate to the side. Lateral lobe of male GENITALIA slender, with the expanded tip produced at a little more than a right angle. LENGTH 2.4 mm. FEMALE unknown.

Type locality.—Descanso Bay, Baja California, Mexico.

Types.—Holotype, male, and 29 paratypes, apparently all males, from the type locality, on October 11, 1953.

Disposition of types.—The holotype and four paratypes deposited in the collection of the California Academy of Sciences. Two paratypes are

deposited with each of the following: San Diego Museum of Natural History; American Museum of Natural History; Museum of Comparative Zoology; Canadian National Collection; Chicago Natural History Museum; British Museum (Natural History); United States National Museum. The remaining paratypes are at present retained in my collection.

Additional material.—Thirteen specimens from La Jolla Shores, San Diego, California, in October and November, all taken in company with *D. barteri* under the same circumstances.

Remarks.—It is assumed that all the specimens taken are males because of the condition of the sixth sternite. The discovery of a single male of *D. barteri* disposes of the likelihood that the two species are opposite sexes of one species. *Megacephala* is distinct from all other species but *vandykei* by its very large, trapezoidal head. It can be distinguished from *vandykei* by the very long, slender third antennal segment and by the shorter elytra. The head varies in size from slightly larger than the pronotum to very much larger (as in the holotype). The holotype shows no intraorbital ridge but some other specimens have a trace of it basally. The color is about as variable as in *barteri*. The antennae are the most slender of the genus.

***Diaulota vandykei*, new species**

Diaulota brevipes Chamberlin and Ferris, 1929, p. 155 (not *Amblopusa brevipes* Casey).

Description of male holotype.—Dark ferruginous, with elytra and outer antennal segments tinged with piceous; abdominal segments one to four and part of five dense-piceous; integuments minutely and densely granulose except on abdomen, which is densely reticulate; pubescence short, fine, and dense; puncturation fine and very dense, much denser on the abdomen than in *megacephala*. HEAD nearly round, very large, wider and longer than pronotum, about as wide as long, widest near the middle; sides evenly arcuate from behind the eyes to base, which is as wide as base of pronotum. Eyes of about 20 facets, occupying about one-eighth of side of head. Antennae about as long as head plus one-half of pronotum; segments one to three elongate, segment one more than twice as long as wide, two wider than one and very little longer than wide, three very little more than half as wide as two and distinctly shorter than two, a little longer than wide, four to six oval, increasing very gradually in size, seven to ten transverse, ten half again as wide as long, eleven elongate, obconical. Temples faintly margined beneath the eyes at base only. PRONOTUM very little wider than long, widest near apical third, sides arcuate from apex to base, base distinctly narrower than apex. Each ELYTRON a little longer than wide, elytra conjointly as wide as pronotum. ABDOMEN slightly inflated posteriorly, first

three visible tergites deeply, fourth shallowly impressed at base; sixth sternite produced medially in a rounded triangular lobe, sides not sinuate. LENGTH 2.8 mm.

Allotype (female).—Similar to male but head smaller, about as wide as pronotum; sixth sternite rounded posteriorly.

Type locality.—Pacific Grove, Monterey County, California.

Types.—Holotype, male, allotype, female, and 25 paratypes (12 males and 13 females) taken at the type locality on November 24 and 28, 1954, and 10 paratypes (5 males and 5 females) taken at Pigeon Point, San Mateo County, California, on November 25, 1954. All specimens were collected from cracks in the rocks in company with *Diaulota densissima* and *Liparocephalus cordicollis* at or near the +3 to +4 foot tide level on the exposed reefs. The specimens were all taken just above the line of dense seaweed, as no suitable place to search for them could be found below this mark.

Disposition of types.—The holotype, allotype, and four paratypes deposited in the collection of the California Academy of Sciences. Two paratypes are deposited with each of the following: San Diego Museum of Natural History; American Museum of Natural History; Museum of Comparative Zoology; Canadian National Collection; Chicago Natural History Museum; British Museum (Natural History); United States National Museum. The remaining paratypes are at present retained in my collection.

Additional material.—More than 100 specimens, males, females and larvae, of this species (or one which is very similar) were taken from the reef at about +2 tide level at Shell Beach, San Luis Obispo County, California. This series is quite variable in the shape and size of the head of the male and is much lighter in color than the type series. The abdominal punctuation is not quite so dense, particularly beneath. However, I am unable to find any consistent character that will separate the two series with certainty. The antennae, the secondary sexual characters, and other characters are very similar.

Remarks.—This species is more likely to be confused with *megacephala* than with any other. It can readily be separated from that species by the very thick second antennal segment and by the much shorter and stouter third antennal segment, as well as by the longer elytra. This is the species that Chamberlin and Ferris identified as *Amblopusa brevipes* Casey, an identification that led them to synonymize the two genera. It differs from that species, however, in many fundamental structural characters, as explained in the remarks following the description of *Amblopusa*. This species is named in memory of the late Edwin C. Van Dyke.

AMBLOPUSA Casey

Amblopusa Casey, 1893, p. 355; Fenyes, 1918, p. 104.

Amblyopusa Eichelbaum, 1909, p. 209 (emendation).

Generitype.—*Amblopusa brevipes* Casey.

Diagnosis.—Body elongate, parallel, depressed. Head ovoid. Labrum rounded. Mandibles symmetrical, with 2 or 3 serrations between median tooth and tip; not curved ventrally at tip. Mentum emarginate, the emargination flat at bottom. Maxillary palpi with third segment distinctly ovoid, fourth long and slender. Inner lobe of maxilla slender, with a long blunt tooth at tip, 3 or 4 shorter teeth close to the tip, and 2 larger median teeth well separated from each other; outer lobe slender with a brush of long setae at the tip and another toward the middle. Labial palpi distinctly three-segmented; basal segment twice as long as wide; second a little narrower than first, a little longer than wide; third narrower than second and as long as first, four times as long as wide. Ligula simple, a little longer than first segment of labial palpi, truncate at tip. Eyes minute, with from 3 to 18 facets. Antennae with first two segments elongate, third to seventh slightly elongate, eighth to tenth ovoid. Pronotum faintly impressed longitudinally. Anterior margin of prosternum straight. Elytra more than half as long as pronotum. Tibiae pubescent. Anterior tarsi short and compact. Abdomen with first five tergites impressed at base; first four sternites constricted at base.

Remarks.—Chamberlin and Ferris stated that in their opinion, based on the identification of the species at hand, *Amblopusa* is congeneric with *Diaulota*. Examination of specimens of *Amblopusa brevipes* from British Columbia reveals that the specimens which they identified as that species were actually *Diaulota vandykei*, described here. It is my opinion that the two genera are quite distinct from one another. *Amblopusa* differs from *Diaulota* in many characters, including the very small eyes, the structure of the labial palpi (Casey's specimen obviously had the last segments missing), the serrate mandibles, the longer elytra, the longer metasternum, the structure of the maxillae, the impressed fourth and fifth tergites and the constricted sternites. Casey had described three species of *Amblopusa*, one of which, *A. pallida*, has been reduced to a synonym of *A. brevipes* by Fenyes. The two species appear to be quite similar but probably are distinct.

KEY TO THE SPECIES OF AMBLOPUSA CASEY

- A. Eyes of 3 to 5 facets, elytra three-fourths as long as pronotum *brevipes*
 AA. Eyes of 12 to 18 facets, elytra two-thirds as long as pronotum *borealis*

Amblopusa brevipes Casey

Amblopusa brevipes Casey, 1893, p. 356 (not Chamberlin and Ferris, 1929).

Amblopusa pallida Casey, 1911, p. 212.

Description.—Ferruginous, with the legs paler; integuments very minutely and densely granulose, except on abdomen, which is very minutely reticulate, shining; pubescence moderately long and fine, rather sparse, particularly on the abdomen; puncturation fine, not dense, more noticeable on the elytra. HEAD oval, very little wider than pronotum, a little longer than wide, widest near basal third, sides evenly arcuate. Eyes minute, of 3 to 5 facets, near the insertion of the mandibles. PRONOTUM roughly trapezoidal, a little longer than wide, with sides rounded at the anterior fifth which is the widest point, and thence nearly straight to the obtuse basal angles; base and apex both arcuate; base narrower than apex. ELYTRA conjointly nearly square, not quite as wide as pronotum and about three-fourths as long, outer edges slightly arcuate, particularly at the humeral angles. ABDOMEN nearly parallel, as wide as pronotum; first five visible tergites strongly impressed at base; first four sternites somewhat constricted at base. MALE with sixth sternite produced medially in a very short broad rounded triangular lobe. FEMALE with sixth sternite rounded. LENGTH 2.4 mm.

Type locality.—Fort Wrangel, Alaska.

Additional published record.—Metlakatla, "British Columbia" [Metlakatla is in Alaska].

Material examined.—I have seen 4 specimens from Massett, British Columbia, and 1 from Fort Wrangel, Alaska, all in the Fenyes collection (C.A.S.). The last specimen is labeled "Dupl. No. 131 Casey 1891."

Remarks.—This species differs from *A. borealis* in the smaller eyes and longer elytra. A previous record of this species from Moss Beach, California, was based on *Diaulota vandykei*.

Amblopusa borealis Casey

Amblopusa borealis Casey, 1906, p. 354.

Description.—Ferruginous; the abdomen sometimes partially piceous; integuments very minutely and densely granulose except on abdomen, which is very minutely reticulate, shining; pubescence moderately long and fine, rather sparse, particularly on the abdomen; puncturation fine, not dense, most noticeable on the elytra. HEAD round, wider than pronotum, widest near the middle; vertex nearly flat; eyes of 12 to 18 facets located at anterior fourth. Pronotum roughly trapezoidal, a little longer than wide;

sides rounded at anterior fifth, which is the widest point, and thence nearly straight, but slightly sinuate just before the obtuse basal angles; base and apex both arcuate; base narrower than apex. ELYTRA conjointly wider than long; two-thirds as long as pronotum; apex very little wider than base; sides slightly arcuate, particularly at the humeral angles. ABDOMEN nearly parallel, as wide as pronotum; first five visible tergites strongly impressed at base; first four sternites strongly constricted at base. MALE with sixth sternite produced medially in a short broad rooded triangular lobe. FEMALE with sixth sternite rounded. LENGTH 3.3 mm.

Type locality.—Massett, Queen Charlotte Island, British Columbia.

Recorded distribution.—Metlakatla, "British Columbia" [Metlakatla is in Alaska].

Material examined.—I have seen 6 specimens from Massett, Queen Charlotte Island, British Columbia, and 1 collected by E. C. Van Dyke at Dutch Harbor, Unalaska, Alaska. These are in the Fenyes collection (C.A.S.). I collected 2 specimens at Pacific Grove, Monterey County, California, in November, in company with *Diaulota vandykei*, *D. densissima*, and *Liparocephalus cordicollis*.

Remarks.—Differs from *brevipes* in the larger eyes and shorter elytra, as well as in the shape and size of the head.

BRYOBIOTA Casey

Bryobiota Casey, 1893, p. 367; Fenyes, 1920, p. 130.

Generitype.—*Bryobiota bicolor* (Casey).

Diagnosis.—Body elongate, parallel, subdepressed. Head subquadrate, deeply impressed longitudinally along the midline, particularly at the base. Labrum truncate. Mandibles asymmetrical, left simple, right with a small blunt median tooth, not curved ventrally at tip. Mentum broadly, shallowly, arcuately emarginate. Third segment of maxillary palpi oval; fourth narrow, elongate. Inner lobe of maxillae spinose apically with a setose membranous expansion at base; outer lobe one-fourth as broad as long, with an expanded membranous ball at tip. Labial palpi three-segmented; basal segment twice as long as wide, second a little narrower and two-thirds as long, third half as wide as first and as long as second. Ligula simple, narrow, as long as basal segment of labial palpus. Eyes very small, occupying less than one-fifth of side of head. Antennae with first five segments elongate, tenth slightly transverse. Pronotum ovoid. Anterior margin of prosternum

slightly arcuate anteriorly. Elytra as long as pronotum. Tibiae pubescent. Posterior tarsi with basal segment longer than second. Abdomen with first four tergites impressed at base; first four sternites constricted at base.

Remarks.—This genus shares a number of characters with *Antarctophytosus* and with *Amblopusa*. It is easily recognized by the longitudinal impression of the head and pronotum as well as by the rather quadrate head. The generitype is the only species known.

Bryobiota bicolor (Casey)

Phytosus bicolor Casey, 1885, p. 311.

Bryobiota bicolor (Casey), 1893, p. 368.

Description.—Ferruginous, with the first five abdominal segments black; integuments very finely granulose, shining; pubescence short, moderately sparse; moderately shallowly punctured throughout. HEAD a very little wider than pronotum, subquadrate; sides nearly straight and nearly parallel from the eyes to a sharply rounded hind angle, thence almost straight in to the neck, which is half as wide as head. Head barely widest at hind angle; divided longitudinally by a rather strong impression which is deepest posteriorly, giving on the dorsal posterior surface the appearance of low mound-like elevations. Eyes small, inserted at the anterior angles of the head. PRONOTUM ovoid, a little longer than wide, widest near anterior third; sides arcuate; hind angles not sinuate; anterior and posterior margins evenly, gently arcuate; base narrower than apex. ELYTRA a little wider and about as long as pronotum, conjointly about as wide as long; sides evenly arcuate; apices nearly straight; hind angles hardly rounded. ABDOMEN nearly parallel but with fifth segment the widest; 4 tergites impressed at base, impressions strong. No SEXUAL DIFFERENCES have been observed. LENGTH about 2.4 mm.

Type locality.—San Diego, California.

Additional published records.—San Diego, California. Scheerpeltz, 1934, p. 1557, gave British Columbia as a locality record without citation to any authority. I am unable to locate this record.

Material examined.—Seven specimens from San Diego County, California, collected by Blaisdell (C.A.S.); 1 from San Diego, California, A. Fenyes (Brit. Mus.); 5 from San Diego, California, Fenyes (C.A.S.); 1 taken by myself at San Diego, California; 1 from Moss Beach, San Mateo County, California, by J. O. Martin (C.A.S.).

Remarks.—In 1885 Casey appended the following note to his description of the species. "This species is extremely abundant under the densely

packed seaweed thrown up on the shores of the inner harbor in the spring of the year; occurring with it and also in great abundance, were *Cafius* (*Remus*) *decipiens* Lec., *Motschulskium sinuaticolle* Matth., and *Phyco-coetes testaceus* Lec., and in less number, *Cafius* (*Remus*) *opacus* Lec.” I have collected in the area of San Diego Bay for many years and have never seen masses of seaweed cast up on the shores of the inner harbor. I have never taken *Cafius decipiens* LeConte, only one specimen of *Cafius opacus* LeConte, and only one specimen of *Bryobiota bicolor* (Casey). The conditions in the bay are so changed since 1885 that it is unlikely that these species will ever be found there in abundance again.

BRYOTHINUSA Casey

Bryothinusa Casey, 1904, p. 312; Fenyès, 1920, p. 131.

Generitype.—*Bryothinusa catalinae* Casey.

Diagnosis.—Body elongate, parallel, depressed. Head oval, shallowly concave centrally. Labrum transverse, with anterior margin gently arcuate. Mandibles asymmetrical, the right with a median tooth and with very minute serrations between the median tooth and tip, the left simple; not curved ventrally. Mentum broadly trapezoidal, truncate. Second and third segments of maxillary palpi ovoid, fourth shorter than width of third. Inner lobe of maxillae slender, acutely pointed and hooked at tip with a row of evenly placed, short, stout, pointed setae at inner margin; outer lobe as long as inner, very slender, particularly at apical fourth, with tip hooked and finely pointed, and inner edge simple. Labial palpi either two- or three-segmented; when three-segmented, first segment shorter than second and wider only at base, and third segment narrower than second and a little longer than first. Ligula short, no longer than width of basal segment of labial palpus; simple. Eyes small, occupying about one-fourth of side of head; composed of about 20 facets interspersed with short hairs. Antennae long, with all segments elongate; first segment widest, third narrowest and a little longer than wide, the remainder each a little longer and a little wider than the preceding, the tenth distinctly elongate, eleventh more than twice as long as wide and gradually pointed at apex, nearly equal to first in size. Pronotum transverse, quadrate, widest at apical fifth. Anterior margin of prosternum slightly emarginate in a gentle arc. Elytra about as long and as wide as pronotum, longest at outer edge. Tibiae pubescent. Posterior tarsi with basal segment longer than second. Abdominal segments not impressed at base; sternites not constricted.

Remarks.—*Bryothinusa* is at once distinguished from all other phyto-

sids by the very elongate antennal segments and the very slender, curved, simple outer lobe of the maxillae. Only one species is known, the generitype.

This genus would be placed in the Myllaenini by those following present classification, but it probably is not closely related to members of that tribe. It may be closely related to *Polypea* Fauvel, which, as has already been pointed out, was placed in the Myllaenini by Bernhauer and Scheerpeltz and in the Phytosi by Fenyès. It appears to be the most discordant element in the present group.

Bryothinusa catalinae Casey

Bryothinusa catalinae Casey, 1904, p. 312.

Description.—Fulvous, with abdomen slightly darker; integuments clothed in a dense short pubescence; finely, densely punctate, the abdomen with a network of fine lines around the punctures. HEAD nearly round, vertex broadly concave. PRONOTUM subquadrate, widest at anterior third, sides evenly arcuate, base slightly narrower than apex. ELYTRA about as wide and about as long as pronotum; apex slightly sinuate at outer angle. ABDOMEN nearly parallel. NO SEXUAL DIFFERENCES observed. LENGTH about 2.0 mm.

Type locality.—Catalina Island, California.

Recorded distribution.—Catalina Island, California.

Material examined.—I have seen 2 specimens in the Fenyès collection from Catalina Island, California, one collected by Fall and the other by Baker, as well as 2 specimens from San Diego, California, in the Fenyès collection (C.A.S.). Nine specimens were taken together from a crack in a large wet stone near high tide mark on a stony beach at La Jolla, California, in September, 1953. They were much more agile than any other phytosids collected by me, running rapidly downward when the stone was split open. I believe that several of the colony escaped. Two of these specimens were kindly compared with Casey's type by R. E. Blackwelder.

THINUSA Casey

Thinusa Casey, 1893, p. 371; Fenyès, 1920, p. 134.

Generitype.—*Thinusa maritima* (Casey).

Diagnosis.—Body elongate, parallel, somewhat depressed. Head oval, slightly pointed anteriorly. Labrum bilobed, with the central emargination filled with a dark, depressed membrane. Mandibles curved ventrally at tip; right mandible with a median tooth, left simple. Mentum truncate. Maxillary palpi with third segment evenly conical, narrow, widest at apex; fourth

segment very slender, and longer than in *Phytosus*. Inner lobe of maxillae spinose internally, with a membranous expansion at the base through which run several long spines; outer lobe with a membranous finger-like process at tip. Labial palpi three-segmented, the basal segment longest, second shortest; segments decreasing in width apically. Ligula deeply bifid, the two processes forming a Y; half as long as first segment of labial palpi. Eyes large, occupying more than one-half the side of head. Antennae with first 3 segments elongate, sixth to tenth transverse, eleventh with a brush of short setae at tip. Anterior margin of prosternum straight. Elytra extending more posteriorly at the sides than at the suture, so that the apex, although straight, is oblique. Anterior and middle tibiae externally with long spines, which are interspersed with pubescence. Posterior tarsi with first segment variable, either shorter, equal to or longer than second but never longer than second and third together. Abdomen with either 3 or 4 segments impressed at base; sternites not constricted.

Remarks.—Casey stated that *Thinusa* so closely resembles *Actosus* that it might be considered a subgenus of it. He apparently did not observe the bifid ligula, by which it differs from all other phytosids except *Cameronium*. Besides the spinose tibiae, *Thinusa* resembles *Phytosus* in the form of the maxillae and in the pubescence on the pronotum, which streams out laterally from the mid-line in a most striking manner. It is an interesting and puzzling fact that several very abundant species of the tribe Myrmedoniini which are found in the seaweed in association with *Thinusa* so closely resemble it in many structural characters (i.e. the spinose tibiae, the arrangement of the pubescence; the shape of head and size of eyes, the structure of the mouth parts) that it is a great task to collect *Thinusa* and to segregate the few specimens from their many cousins. The similarities are so great as to make one wonder about our tarsal system of classification which separates these forms so widely.

Of the 6 species of *Thinusa* that Casey described from California, Fenyes considered only *maritima* and *fletcheri* valid. One of the main characters mentioned by Casey for the separation of the species was the relative length of the basal segment of the posterior tarsi. According to Fenyes' synonymy, this character would be variable intraspecifically. All the specimens examined by me have the first tarsal segment a little longer than the second; but, because of the overlapping structure of the segments, the first may appear shorter if viewed other than directly from the side. Casey's original description of *maritima* states that the first and second segments are equal; but following his description of *obscura* he states that the first segment of that species is longer, not shorter, than the second, as in *maritima*.

I believe the synonymy given by Fenyès to be correct. The rather good series I have seen from various localities indicates that there is considerable variations in the characters chosen by Casey. Even *fletcheri* and *maritima* are difficult to separate with certainty and future studies may show that the former is merely a geographic race of *maritima*.

KEY TO THE SPECIES OF THINUSA CASEY

- A. Abdomen shining, very finely reticulate *maritima*
 AA. Abdomen dull, densely granulose *fletcheri*

Thinusa maritima (Casey)

Phytosus maritimus Casey, 1885, p. 312.

Thinusa maritima Casey, 1893, p. 371.

Thinusa obscura Casey, 1906, p. 354.

Description.—Ferruginous, head brown; abdomen sometimes piceous; integuments densely and finely granulose, except on abdomen, which is finely reticulate; clothed in a moderately long, even, pale pubescence, which is sparse on the abdomen; moderately punctured throughout. HEAD about as wide as long, pointed anteriorly, widest just behind the large eyes. Antennae not as long as head and pronotum. PRONOTUM widest at anterior third, sides arcuate in front and straighter to the slightly rounded posterior angles. ELYTRA three-fourths as long as pronotum at sides, two-thirds as long at suture, conjointly not as wide as pronotum. ABDOMEN narrower than pronotum; sides straight and nearly parallel. No SEXUAL DIFFERENCES observed. LENGTH 2.4 mm.

Type locality.—Oakland, Alameda County, California.

Additional published records.—Santa Barbara, Santa Barbara County, California (as *T. obscura* Casey). This species was reported from four localities in New Jersey by Morse, 1909, but I believe on the basis of a misidentification, or, more likely, on an error in transcription, as it is listed as "*Thinusa maritima* Casey (*Polystoma*)."

Material examined.—One specimen from Ilwaco, Washington, collected by Hubbard and Schwarz (Fenyès collection, C.A.S.); 6 collected in May at San Francisco, California, by Blaisdell (C.A.S.); 15 from Rockaway Beach, San Mateo County, California, in October (Ian Moore); 6 from Redondo Beach, Los Angeles County, California, by Fenyès (5 C.A.S.; 1 Brit. Mus.); 3 from Balboa, Orange County, California (Fenyès, C.A.S.); 5 from La Jolla in San Diego, California, in November (Ian Moore).

Remarks.—If *obscura* is actually distinct from *maritima*, the above specimens must all be the former and *maritima* not seen by me. There is considerable variation in color, in shape and size of the antennal segments, particularly the eleventh, and in some other characters.

***Thinusa fletcheri* Casey**

Thinusa fletcheri Casey, 1906, p. 353.

Thinusa divergens Casey, 1911, p. 213.

Thinusa nigra Casey, 1911, p. 214.

Thinusa robustula Casey, 1911, p. 214.

Description.—Dark brown, with abdomen piceous; integuments densely granulose throughout; clothed in a moderately long, pale pubescence which is sparser on the abdomen; moderately punctured throughout. HEAD a little wider than long, hardly pointed in front, widest just behind the eyes; antennae not as long as head and pronotum. PRONOTUM a little wider than long, widest at anterior third, sides arcuate anteriorly and slightly sinuate before the hind angles. ELYTRA two-thirds as long as pronotum, a little longer at the sides. ABDOMEN parallel, almost as wide as pronotum. NO SEXUAL DIFFERENCES observed. LENGTH 3.0 mm.

Type locality.—Masset, Queen Charlotte Island, British Columbia.

Recorded distribution.—British Columbia.

Material examined.—I have seen 2 specimens from the type locality (Fenyès collection, C.A.S.) and 3 from Nazan Bay, Atka, Aleutians, Alaska, collected by E. C. Van Dyke in August (Fenyès collection, C.A.S.).

Remarks.—Although this may eventually prove to be only a geographic race of *maritima*, the specimens examined are quite noticeably larger, stouter, darker, and with a duller, more strongly granulose surface. I can find no other consistent characters to separate the species.

PHYTOSUS Curtis

Phytosus Curtis, 1838, pl. 718; Erichson, 1840, p. 177; Kraatz, 1853, p. 257, t. 3; Kraatz, 1856, p. 41; Kraatz, 1857, t. 1; Jacquelin DuVal, 1856, p. 5, pl. 3; Fauvel, 1862, p. 82; Thomson, 1859, p. 207; Mulsant and Rey, 1872, p. 381; Ganglbauer, 1895, p. 285; Fenyès, 1920, p. 131; Bernhauer, 1941, p. 96.

Paraphytosus Bernhauer, 1922, p. 236 (not Cameron, 1917).

Phytosus Kiessenswetter, 1850, p. 385.

Subgenus *Actosus* Mulsant and Rey, 1872, p. 391.

Subgenus *Euphytosus* Bernhauer and Scheerpeltz, 1926, p. 552.

Subgenus *Anopsisus* Bernhauer, 1929, p. 187.

Generitypes.—of *Phytosus*, *Phytosus spinifer* Curtis; of *Actosus*, *Actosus nigriventris* (Chevrolat); of *Euphytosus*, *Euphytosus schenklengi* (Bernhauer); of *Anopsisus*, *Anopsisus microphthalmus* Bernhauer.

Diagnosis.—Body elongate, parallel, somewhat depressed. Head oval. Labrum variable, truncate or slightly emarginate. Mandibles each with a median tooth, with the tip curved ventrally. Mentum truncate. Maxillary palpi with second segment ovoid, larger than first. Outer lobe of maxillae with a membranous finger-like process at tip; inner lobe setose internally at apex. Labial palpi distinctly three-segmented; the segments of about equal length; the last segment narrowest. Ligula simple, slender, little more than half as long as first segment of labial palpi. Eyes moderate in size, but less than one-half the length of side of head. Antennae with first three segments elongate, seventh to tenth transverse, eleventh elongate obconical. Anterior margin of prosternum straight. Anterior and middle tibiae with several series of long thick setae externally which are interspersed with the pubescence. Elytra in *P. spinifer* longest observed in the subtribe, considerably longer than pronotum; in *nigriventris* not as long as pronotum. Abdomen with first four tergites impressed at base; first four sternites constricted at base.

Remarks.—The diagnosis is based entirely on *Phytosus* (*Phytosus*) *spinifer* Curtis, the generic type, *Phytosus* (*Actosus*) *nigriventris* (Chevrolat), and *Phytosus* (*Actosus*) *balticus* Kraatz. *Phytosus*, the first genus described in the subtribe, has been a catch-all for numerous doubtful sea-shore species, some of which were later removed to other genera. There still remain in the genus several species which will have to be re-examined before an adequate diagnosis of the genus can be given. I have seen too few of the species listed for the genus to be able to give it a satisfactory evaluation. The descriptions of most of these species are inadequate. To judge from the descriptions, two of the subgenera, *Anopsisus* Bernhauer and *Euphytosus* Bernhauer and Scheerpeltz (= *Paraphytosus* Bernhauer, not Cameron), probably do not belong here. The former, according to Koch, is probably a *Diglossa*. The latter probably does not belong to this subtribe either.

Material examined.—*Phytosus spinifer* Curtis: 16 specimens from France (Fenyès, C.A.S.), 1 from Spain (Fenyès, C.A.S.), 1 from Crete (Fenyès, C.A.S.), 1 from Senegal (Brit. Mus.), 3 from the Canary Islands, labeled *P. dimidiatus* Wollaston (Brit. Mus.) and 2 which appear to be this species labeled "*Phytosus littoralis* Horn" from "Gaudel I." (Fenyès C.A.S.). *Phytosus nigriventris* (Chevrolat): 9 from France (Fenyès, C.A.S.). *Phytosus balticus* Kraatz: 5 from France, 1 from Crete and 2 from Tunis (Fenyès, C.A.S.). *Phytosus fenyesi* Bernhauer: one specimen in very poor condition from Senegal, identified by Bernhauer (Fenyès, C.A.S.).

CAMERONIUM Koch

Cameronium Koch, 1936, p. 202.

Generitype.—*Cameronium obockianum* (Fauvel).

Diagnosis.—Body elongate, parallel, subdepressed. Head oval. Infra-orbital ridge entire. Labrum rounded at apex. Mandibles not curved ventrally; simple. Third segment of maxillary palpi oval; fourth narrow, short. Inner lobe of maxillae with fine, evenly spaced, internal spines at apical half and a group of long setae at base; outer lobe a little longer than inner with a brush of setae at tip. Labial palpi apparently two-segmented. Ligula short, bifid at tip in the form of a blunt Y. Eyes not prominent, occupying a little less than half the side of head, with setae between the facets. Antennae with first three segments elongate, tenth transverse. Pronotum quadrate. Elytra conjointly nearly square, a little wider and considerably longer than pronotum. Tibiae pubescent with three or four very short, stout setae on the anterior pair. Posterior tarsus with the first four segments subequal, fifth as long as the preceding two together. Abdomen with the first three tergites impressed at base, the first three sternites faintly constricted.

Remarks.—The type species was originally described as a *Phytosus* which it resembles rather closely, but differs in the lack of long spines on the front and middle tibiae. The bifid ligula it shares with *Thinusa*, which, however, has spinose tibiae. My description of the inner and outer lobes of the maxillae differs somewhat from the figure given by Koch. These parts, often difficult to see, were very clearly visible on one specimen I examined.

Material examined.—I have seen seven specimens of *Cameronium obockianum* (Fauvel) from the type locality, Perim, at the mouth of the Red Sea, collected by Fauvel (Fenyès Coll., C.A.S.). Another species, *C. flavipenne* Cam. which was described from Zanzibar is said to be smaller, more shining and differently colored.

BAEOSTETHUS Broun

Baeostethus Broun, 1909, p. 96; Fenyès, 1920, p. 130.

Generitype.—*Baeostethus chiltoni* Broun.

No specimens of this genus have been seen, so the original description is repeated here. Only one species, the generitype, is known.

"Body very elongate. HEAD subrotundate, with a short narrow muzzle. THORAX cordate-quadrate. ELYTRA very short. HIND-BODY very elongate. EYES minute. MENTUM very large, slightly emarginate in front. Labial

PALPI rather short; basal 2 joints cylindric, equally elongate; 3rd slender and nearly the length of the penultimate. Maxillary PALPI setose; basal joint small; 2nd stout and elongate, gradually thickened; 3rd inserted at apex of the preceding one but so as to be at a right angle to it, rather longer than 2nd, gradually incrassate towards and truncate at the apex; 4th joint small, aciculate. MANDIBLES stout, rather short, acutely curvate at the extremity, with 3 inner teeth. ANTENNAE inserted at the sides of the forehead, in front of the eyes; basal 3 joints stout and elongate, narrowed towards the base; 2nd articulation a little shorter than 1st, but slightly longer than 3rd; 4th oblong; 5th and 6th oviform; 7th and 8th slightly broader than preceding one; 9th and 10th subquadrate; 11th oblong-oval. TARSI filiform, the posterior pentamerous, intermediate quadriarticulate, the anterior seemingly also 4-jointed but so short and compact and thickly setose that the basal joints cannot be distinguished separately. CLAWS elongate, simple. All the COXAE elongate, prominent, and contiguous. PROSTERNUM corneous across the middle, membranous elsewhere. The LIGULA appears to be simple and aciculate.

"Notwithstanding the elongation of the body, the metasternum is so excessively reduced that the intermediate and posterior coxae are in actual contact. This character of itself is distinctive.

"Baeostethus chiltoni, sp. nov.

"*Subopaque*, finely pubescent; head and elytra obscure infusate red; thorax, legs and antennae fusco-testaceous; hind-body fuscous or nigrescent, the segments with a short pallid basal membrane. HEAD broadly rounded, somewhat depressed on the middle, closely and very minutely punctate, with 2 small indistinct median foveae. FOREHEAD rather abruptly narrowed, short, medially convex, nearly smooth and shining, with a setigerous fovea at each side, truncate and with a short grey membrane in front. LABRUM prominent, rounded and bearing fine yellow setae in front. EYES minute, situated at the sides in front, depressed, hardly discernible. There is no NECK. THORAX widest in front, gradually narrowed backwards; base truncate, apex feebly and broadly curvate; it is without definite lateral margins; the angles are nearly rectangular; there is a feebly median impression behind; its surface is finely and closely punctured, and bears slender greyish and infusate pubescence. Scutellum large and broad. ELYTRA abbreviated, shorter than thorax, each strongly rounded and finely margined at the base so as to be oblique towards the suture, apices subtruncate yet almost oblique inwardly, their sides curvedly narrowed towards the base; their surface dull, the sculpture concealed by the pubescence, but consist-

ing apparently of very minute distant granules. HIND-BODY very elongate, broadly marginated, the basal 5 segments transversal, each however becoming rather longer than its predecessor, 6th with short styles, 7th narrow and testaceous, all finely and moderately closely punctured and pubescent. LEGS slender. FEMORA and TIBIAE ciliated with fine greyish setae.

"Length, $2\frac{1}{2}$ lines; breadth, quite $\frac{3}{8}$ line.

"Campbell Island.

"Named in honour of Professor Chilton, to whom we are indebted for the discovery of this and some other species."

Judging from the above description, this genus would appear to resemble *Amblopusa* in most characters except for the very short metasternum (a character which it shares with *Diaulota* and *Liparocephalus*) and the densely setose anterior tarsae. The mention of three internal teeth on the mandible could be interpreted to mean the same as serrations between the median tooth and the tip, particularly if only the end of the mandible was visible in the specimen examined. No mention is made of dorsal impressions on the tergites.

ANTARCTOPHYTOSUS Enderlein

Antarctophytosus Enderlein, 1909, p. 377; Fenyès, 1918, p. 105.

Paraphytosus Cameron, 1917, p. 125.

Austromalota Brèthes, 1925, p. 170.

Generitype.—*Antarctophytosus atriceps* (Waterhouse).

Diagnosis.—Body elongate, subparallel, depressed. Head oval; the clypeal area depressed on each side but not on the midline, so that there is a broadly triangular raised area with its apex at the anterior margin of the head and its base just anterior to the anterior margins of the eyes. Infra-orbital ridge very strong. Labrum broadly rounded. Mandibles not curved ventrally; asymmetrical, the left simple, the right with a very short median tooth. Mentum rather deeply, arcuately emarginate in its central two thirds. Third segment of maxillary palpi slightly ovoid; fourth narrow, elongate. Inner lobe of maxillae spinose internally. Labial palpi two- or three-segmented, first a little longer than wide, second as wide as first and twice as long, third narrower than second and nearly as long. Ligula, slender, simple; twice as long as first segment of labial palpi. Eyes flat, not interrupting the contour of head; large, occupying more than one-third of the side of head. Antennae with the first three segments elongate, third shorter than second, segments nine and ten transverse. Pronotum ovoid; widest at anterior fourth; sides evenly arcuate; hind angles broadly rounded into the arcuate

base. Anterior margin of prosternum bisinuate. Elytra about as long and as wide as pronotum; apices emarginate at outer angle. Tibiae setose. Posterior tarsi with first four segments subequal, fifth as long as preceding two together. Abdomen with first four tergites impressed at base; sternites not constricted.

Remarks.—Rather closely resembles *Bryobiota* in many characters but not in appearance. Can be distinguished at once from *Bryobiota* by the evenly convex dorsal surface of the basal half of the head.

Material examined.—I have seen 2 specimens of *A. atriceps* (Waterhouse), 1 from Kerguelen Island in the Antarctic-Indian Ocean determined by Jeannel and 1 from Cape of Good Hope; a specimen of *A. darwini* Waterhouse from the Falkland Islands, determined by Dr. Cameron, and two specimens of *A. darwini* from the Falkland Islands (in the Fenyés collection). I am unable to distinguish between the two species.

BIBLIOGRAPHY

The following is a selected bibliography intended to include all the important references to the genera and subgenera of the Phytosi and to the species of the Pacific Coast of North America. Catalogues, local lists, manuals, etc., which merely repeat earlier records are not included. Those references preceded by an asterisk have not been seen. Of those which have been seen, several were seen only in photostats of the pertinent pages.

Bernhauer, Max.

1915. Neue Staphyliniden des tropischen Afrika (10. Beitrag).
Verh. zool.-bot. Ges. Wien, vol. 65, pp. 287-321.

1922. Sauter's Formosa Ausbeute: Staphylinidae (I. Teil).
Arch. Naturg., vol. 88, Abt. A., Heft. 7, pp. 220-237.

1929. Neue Kurzflügler des paläarktischen Gebietes. Kol. Rundsch.,
vol. 14, pp. 177-195.

1938. Voyage de M. Aubert de la Rue aux îles Kerguelen die Gattung
Antarctophytosus Enderlein (Coleoptera Staphylinidae). Rev.
Fran. Ent., vol. 5, pp. 91-94.

*1941. [Key to the species of *Actosus*].
Koleopt. Rdsch., vol. 26, pp. 95-96.

Bernhauer, Max, and Scheerpeltz, Otto.

1926. Coleopterorum catalogus, pars 82, Staphylinidae VI, pp. 499-
988. Berlin.

Blackwelder, Richard E.

1936. Morphology of the coleopterous family Staphylinidae. Smithsonian Misc. Coll., vol. 94, No. 13, pp. 1-102, 30 pls.
1952. The generic names of the beetle family Staphylinidae with an essay on genotypy. U. S. Nat. Mus. Bull. 200, pp. 1-483.

Brèthes, Juan.

1925. Un coléoptère et un diptère nouveaux de la Georgie du Sud. Commun. Mus. Nac. Hist. Nat. Bernardino Rivadavia, vol. 2, No. 16, pp. 169-173.

Broun, Thomas.

1909. Descriptions of Coleoptera from the subantarctic islands of New Zealand; with remarks on the affinities of the genera, etc. Subantarctic Isl. New Zealand, vol. 1, pp. 78-122. Wellington.

Cameron, Malcolm.

1917. Description of a new genus of Staphylinidae. Ent. Monthly Mag., vol. 53, p. 125.
1917. The genus *Paraphytosus* mihi: Synonymical note. Ent. Monthly Mag., vol. 53, pp. 233-234.
1919. *Paraphytosus*, a correction. Ent. Monthly Mag., vol. 55, p. 32.
1936. Note on the genus *Arena* Fauv. Ent. Monthly Mag., vol. 72, p. 108.
1944. New oriental Staphylinidae (Col.). An. Mag. Nat. Hist., ser. 11, vol. 11, pp. 312-322.

Casey, Thomas Lincoln.

1885. New genera and species of Californian Coleoptera. Bull. California Acad. Sci., vol. 1, pp. 285-336.
1892. Coleopterological notices IV, appendix. Ann. New York Acad. Sci., vol. 6, p. 708-712.
1893. Coleopterological notices, V. Ann. New York Acad. Sci., vol. 7, pp. 281-606.
1904. On some new Coleoptera, including five new genera. Can. Ent., vol. 36, pp. 312-324.
1906. Observations on the Staphylinid groups Aleocharinae and Xantholinini chiefly of America. Trans. Acad. Sci. St. Louis, vol. 16, pp. 125-435.
1911. New American species of Aleocharinae and Myllaeninae. Memoirs on the Coleoptera, vol. 2, pp. 1-245.

Chamberlin, J. S., and Ferris, G. F.

1929. On *Liparocephalus* and allied genera. Pan-Pac. Ent., vol. 5, pp. 137-143, 153-162, 5 figs.

Chevrolat, Louis Alexandre Auguste.

- *1843. Description d'une nouvelle espèce due genre *Myrmedonia*. Revue Zoologique, vol. 6, pp. 42-43.

Curtis, John.

1838. British entomology . . . , vol. 15, pls. 674-721. London.

Eichelbaum, Felix.

- *1909. Katalog der Staphyliniden-Gattungen Mem. Soc. Ent. Belgique, vol. 17, pp. 71-280.

Enderlein, Günther.

1909. Die Insekten des Antarktischen Gebietes. Deutsche Südpolar-Exp., vol. 10, Zool. II, 1908 (1909), pp. 361-518.

Fauvel, Albert.

1862. Notice sur quelques aléochariens nouveaux ou peu connus et description de larves de *Phytosus* et *Leptusa*. Ann. Soc. Ent. France, ser. 4, vol. 2, pp. 81-94.
1863. Notice sur quelques aléochariens nouveaux ou peu connus (suite I). Ann. Soc. Ent. France, ser. 4, vol. 3, pp. 211-222.
- *1877. Les staphylinides de l'Australie et de la Polynésie. Ann. Civ. Stor. Genova, vol. 10, pp. 168-298.
- *1905. Staphylinides exotique nouveaux, pt. 3. Revue d'Ent., vol. 24, pp. 113-147.

Fenyés, Adelbert.

1918. Coleoptera: Fam. Staphylinidae, subfam. Aleocharinae. Genera Insectorum, fasc. 173a, pp. 1-110.
1920. Coleoptera: Fam. Staphylinidae, subfam: Aleocharinae. Genera Insectorum, fasc. 173b, pp. 111-414.

Ganglbauer, Ludwig.

1895. Die Käfer von Mitteleuropa . . . , vol. 2, pt. 1, 880 pp. Wien.

Hamilton, John.

1894. Catalogue of the Coleoptera of Alaska. Trans. Amer. Ent. Soc., vol. 21, pp. 1-38.

Holdhaus, Karl.

1932. Über die Insektenfauna der Insel Süd-Georgien. Zool.-Jahrb., vol. 63, pp. 163-182.

Horn, George Henry

1871. Descriptions of new Coleoptera of the United States, with notes on known species. Trans. Am. Ent. Soc., vol. 3, pp. 325-344, 1 pl.

Jacquelin Du Val, Pierre Nicolas Camille.

1856. Genera des coléoptères d'Europe . . . , vol. 2, pp. 1-95, 28 pl., Paris.

Keen, J. H.

1895. List of Coleoptera collected at Massett, Queen Charlotte Islands, B. C. Can. Ent., vol. 27, pp. 164-172, 217-220.
1897. Three interesting Staphylinidae from Queen Charlotte Islands. Can. Ent., vol. 29, pp. 285-287.

Koch, Carlos.

1936. Wissenschaftliche Ergebnisse der entomologischen Expeditionen Seiner Durchlaucht des Fürsten Alessandro C. Della Torre e Tasso nach Aegypten und auf die Halbinsel Sinai, XIII: Staphylinidae. Pubbl. Mus. Ent. Pietro Rossi, vol. 1, pp. 115-232.

Kraatz, Gustav.

1853. Bemerkungen über Staphylini, Stett. Zeit., vol. 14, pp. 257-259, pl. 3.
1856. Naturgeschichte den Insecten Deutschlands, Abt. 1, Coleoptera, vol. 2, Lief 1-2, pp. 1-376. Berlin.
1857. Genera Aleocharinorum illustrata, Linnaea Ent., vol. 11, pp. 1-43, pl. 1.
1859. In Schaum, Beitrag zur Europäischen Käferfauna, Berl. Ent. Zeit., vol. 3, pp. 52-53.

LeConte, John Lawrence.

1861. New species of Coleoptera inhabiting the Pacific district of the United States. Proc. Acad. Nat. Sci. Philada., vol. 13, pp. 338-359.
1880. Short studies of North American Coleoptera. Trans. Amer. Ent. Soc., vol. 8, pp. 163-218.

Mäklin, Fredrico Guilielmo.

1853. In Mannerheim, Dritter Nachtrag zu Käfer-Fauna der Nord-Amerikanischen Länder des Russischen Reiches. Bull. Soc. Imp. Nat. Moscou, vol. 26, No. 3, pp. 95-269.

Morse, Silas R.

1909. The insects of New Jersey. Ann. Report of the N. J. State Museum. p. 1-888.

Motschulsky, T. Victor von.

- *1860. Enumération des nouvelles espèces de coléoptères rapportées de ses voyages. Bull. Soc. Imp. Nat. Moscou, vol. 33, pp. 539-588.

Mulsant, M. E., and Rey, Claudius.

- *1870. Description d'un genre nouveaux de l'ordre des coléoptères, tribu des brachélytres, famille des aléochariens. Oposc. Ent., vol. 14, pp. 194-199.

1872. Tribu des brévipennes: Famille des aléochariens: Huitieme Branche: Bolitocharaires. Ann. Soc. Linn. Lyon, ser. 2, vol. 19, pp. 91-413, 426.

Ross, Edward S.

1953. Insects close up. Univ. Calif. Press. pp. 1-80 (figure lower left, p. 46, is an excellent photograph of *Liparocephalus cordicollis* LeConte).

Sakaguti, Kohei.

1944. A new intertidal rove-beetle from the Pacific Coast of Japan. Trans. Kansai Ent. Soc., vol. 14, pp. 20-21, pl. 1, fig. 1-2.

Saunders, L. G.

1929. Some marine insects of the Pacific Coast of Canada. Ann. Ent. Soc. Amer., vol. 21, pp. 521-545, 1 fig.

Scheerpeltz, Otto.

1934. Coleopterorum catalogus . . . , pars 130, Staphylinidae VIII, supplementum II, pp. 1501-1831. Berlin.

Schwarz, E. A.

1910. Coleoptera of the expedition. Harriman Alaska Ser., Smith. Inst., vol. 8, pp. 169-185.

Thomson, Carl Gustaf.

- *1859. Skandinaviens Coleoptera . . . , vol. 1, 290 pp. Lund.

Waterhouse, Charles Owen.

1875. On the Coleoptera of Kerguelen's Island. Ent. Monthly Mag., vol. 12, pp. 54-57.

Waterhouse, Frederick H.

1879. Descriptions of new Coleoptera of geographical interest, collected by Charles Darwin, Esq. Jr. Linn. Soc. London, vol. 14, pp. 530-534.

Wendeler, Hans.

1930. Neue exotische Staphyliniden (17. Beitrag zur Kenntniss der Staphyliniden). Neue Beitr. syst. Insektenk., vol. 4, pp. 181-192, 248-252.

Wollaston, Thomas Vernon.

- 1857. Catalogue of the Coleopterous insects of Madeira in the collection of the British Museum, 648 pp. London.
- 1864. Catalogue of the coleopterous insects of the Canaries in the British Museum, 648 pp. London.
- 1865. Coleoptera Atlantidum . . . , 526+140 pp. London.

EXPLANATION OF FIGURES

PLATE 8

- Figure 1. *Liparocephalus brevipennis* Mäklin, apical margin of labrum.
- Figure 2. *Liparocephalus brevipennis* Mäklin, labial palpi and ligula.
- Figure 3. *Liparocephalus brevipennis* Mäklin, apical margin of mentum.
- Figure 4. *Liparocephalus brevipennis* Mäklin, outline of the body of female, dorsal view.
- Figure 5. *Liparocephalus cordicollis* LeConte, apical margin of labrum.
- Figure 6. *Liparocephalus cordicollis* LeConte, labial palpi and ligula.
- Figure 7. *Liparocephalus cordicollis* LeConte, apical margin of mentum.
- Figure 8. *Liparocephalus cordicollis* LeConte, maxilla.
- Figure 9. *Liparocephalus cordicollis* LeConte, outline of body of male, dorsal view.
- Figure 10. *Diaulota densissima* Casey, apical margin of labrum.
- Figure 11. *Diaulota densissima* Casey, labial palpi.
- Figure 12. *Diaulota densissima* Casey, apical margin of mentum.
- Figure 13. *Diaulota densissima* Casey, apex of abdomen of male, ventral view.
- Figure 14. *Diaulota densissima* Casey, outline of body of female, dorsal view.
- Figure 15. *Diaulota fulviventrīs* Moore, apical margin of labrum, male.
- Figure 16. *Diaulota fulviventrīs* Moore, apical margin of mentum, male.
- Figure 17. *Diaulota fulviventrīs* Moore, apex of abdomen of male, ventral view.
- Figure 18. *Diaulota fulviventrīs* Moore, apex of abdomen of male with genitalia extruded, lateral view.
- Figure 19. *Diaulota fulviventrīs* Moore, labial palpi, male.
- Figure 20. *Diaulota fulviventrīs* Moore, labial palpi, male.

PLATE 9

- Figure 21. *Diaulota fulviventrīs* Moore, apical margin of labrum, female.
- Figure 22. *Diaulota fulviventrīs* Moore, labial palpi, female.

- Figure 23. *Diaulota fulviventris* Moore, apical margin of mentum, female.
Figure 24. *Diaulota fulviventris* Moore, maxilla.
Figure 25. *Diaulota fulviventris* Moore, outline of body of female, dorsal view.
Figure 26. *Diaulota barteri* Moore, anterior margin of labrum.
Figure 27. *Diaulota barteri* Moore, labial palpi.
Figure 28. *Diaulota barteri* Moore, apical margin of mentum.
Figure 29. *Diaulota barteri* Moore, apex of abdomen of male, ventral view.
Figure 30. *Diaulota barteri* Moore, apex of abdomen of female, ventral view.
Figure 31. *Diaulota barteri* Moore, outline of body of female, dorsal view.
Figure 32. *Diaulota megacephala* Moore, apex of labrum.
Figure 33. *Diaulota megacephala* Moore, labial palpi and ligula.
Figure 34. *Diaulota megacephala* Moore, apex of mentum.
Figure 35. *Diaulota megacephala* Moore, apex of abdomen of male, ventral view.
Figure 36. *Diaulota megacephala* Moore, lateral lobe of male genitalia.
Figure 37. *Diaulota megacephala* Moore, first three antennal segments.
Figure 38. *Diaulota megacephala* Moore, outline of body of male, dorsal view.
Figure 39. *Diaulota vandykei* Moore, apical margin of labrum.
Figure 40. *Diaulota vandykei* Moore, labial palpi.
Figure 41. *Diaulota vandykei* Moore, apical margin of mentum.
Figure 42. *Diaulota vandykei* Moore, apex of abdomen of male, ventral view.
Figure 43. *Diaulota vandykei* Moore, first three antennal segments.
Figure 44. *Diaulota vandykei* Moore, outline of body of male, dorsal view.

PLATE 10

- Figure 45. *Amblopusa brevipes* Casey, apical margin of labrum.
Figure 46. *Amblopusa brevipes* Casey, apical margin of mentum.
Figure 47. *Amblopusa brevipes* Casey, labial palpi and ligula.
Figure 48. *Amblopusa brevipes* Casey, apical margin of sixth sternite of male.
Figure 49. *Amblopusa brevipes* Casey, outline of body, dorsal view.
Figure 50. *Amblopusa borealis* Casey, apical margin of labrum.
Figure 51. *Amblopusa borealis* Casey, labial palpi and ligula.
Figure 52. *Amblopusa borealis* Casey, inner and outer lobes of maxilla.

- Figure 53. *Amblopusa borealis* Casey, apical margin of sixth sternite of male.
- Figure 54. *Amblopusa borealis* Casey, outline of body, dorsal view.
- Figure 55. *Bryobiota bicolor* (Casey), apical margin of labrum.
- Figure 56. *Bryobiota bicolor* (Casey), labial palpi and ligula.
- Figure 57. *Bryobiota bicolor* (Casey), apical margin of mentum.
- Figure 58. *Bryobiota bicolor* (Casey), inner and outer lobes of maxilla.
- Figure 59. *Bryobiota bicolor* (Casey), outline of body, dorsal view.
- Figure 60. *Bryothinusa catalinae* Casey, apical margin of labrum.
- Figure 61. *Bryothinusa catalinae* Casey, labial palpi and ligula.
- Figure 62. *Bryothinusa catalinae* Casey, apical margin of mentum.
- Figure 63. *Bryothinusa catalinae* Casey, ends of mandibles.
- Figure 64. *Bryothinusa catalinae* Casey, ends of outer and inner lobes of maxilla.
- Figure 65. *Bryothinusa catalinae* Casey, outline of body, dorsal view.

PLATE 11

- Figure 66. *Thinusa maritima* (Casey), apical margin of labrum.
- Figure 67. *Thinusa maritima* (Casey), labial palpi and ligula.
- Figure 68. *Thinusa maritima* (Casey), apical margin of mentum.
- Figure 69. *Thinusa maritima* (Casey), maxilla.
- Figure 70. *Thinusa maritima* (Casey), outline of body, dorsal view.
- Figure 71. *Phytosus* (*Phytosus*) *spinifer* Curtis, apical margin of labrum.
- Figure 72. *Phytosus* (*Phytosus*) *spinifer* Curtis, labial palpi and ligula.
- Figure 73. *Phytosus* (*Phytosus*) *spinifer* Curtis, apical margin of mentum.
- Figure 74. *Phytosus* (*Phytosus*) *spinifer* Curtis, outline of body, dorsal view.
- Figure 75. *Phytosus* (*Actosus*) *nigriventris* (Chevrolat), outline of body, dorsal view.
- Figure 76. *Phytosus* (*Actosus*) *balticus* Kraatz, outline of body, dorsal view.
- Figure 77. *Antarctophytosus atriceps* (Waterhouse), apical margin of labrum.
- Figure 78. *Antarctophytosus atriceps* (Waterhouse), labial palpi and ligula.
- Figure 79. *Antarctophytosus atriceps* (Waterhouse), apical margin of mentum.
- Figure 80. *Antarctophytosus atriceps* (Waterhouse), outline of body, dorsal view.

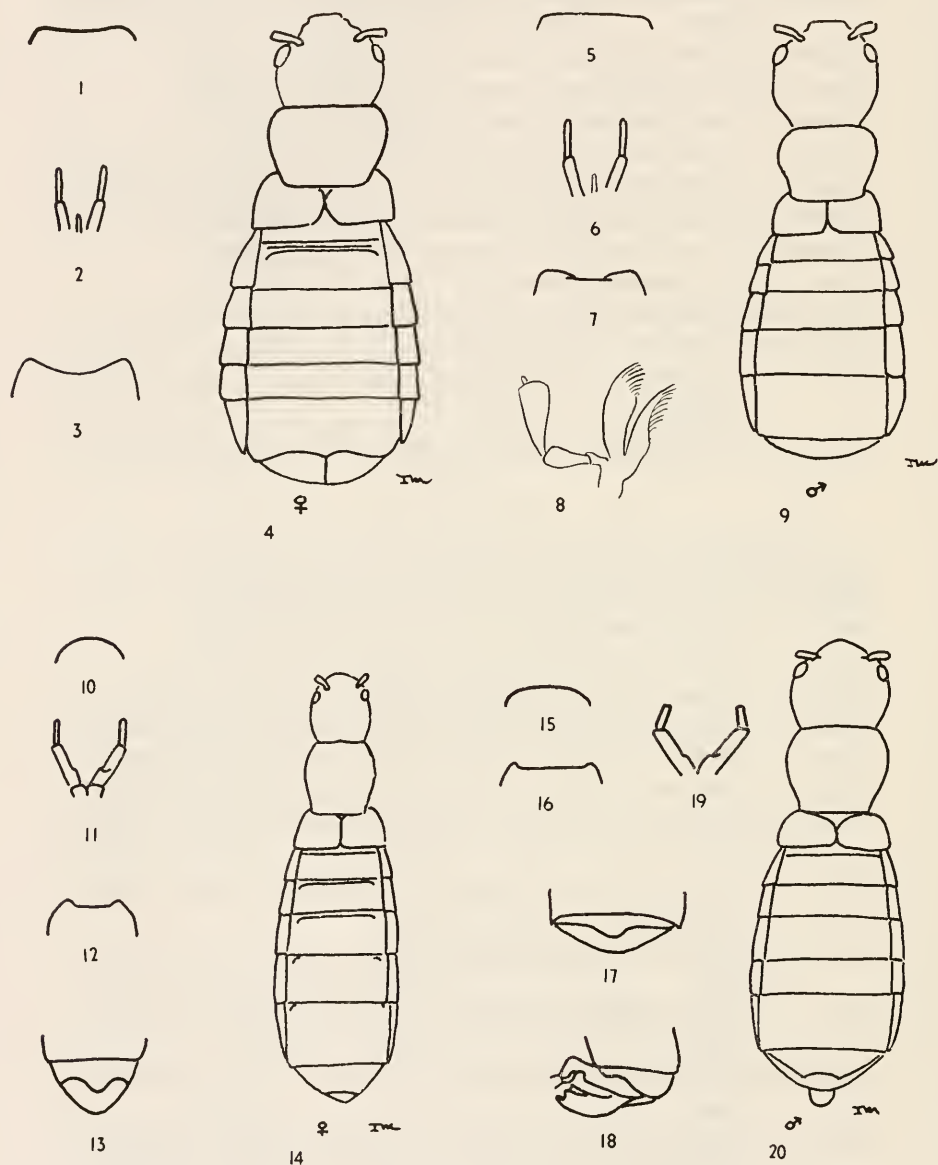


PLATE 8

FOR EXPLANATION OF FIGURES SEE PAGE 145

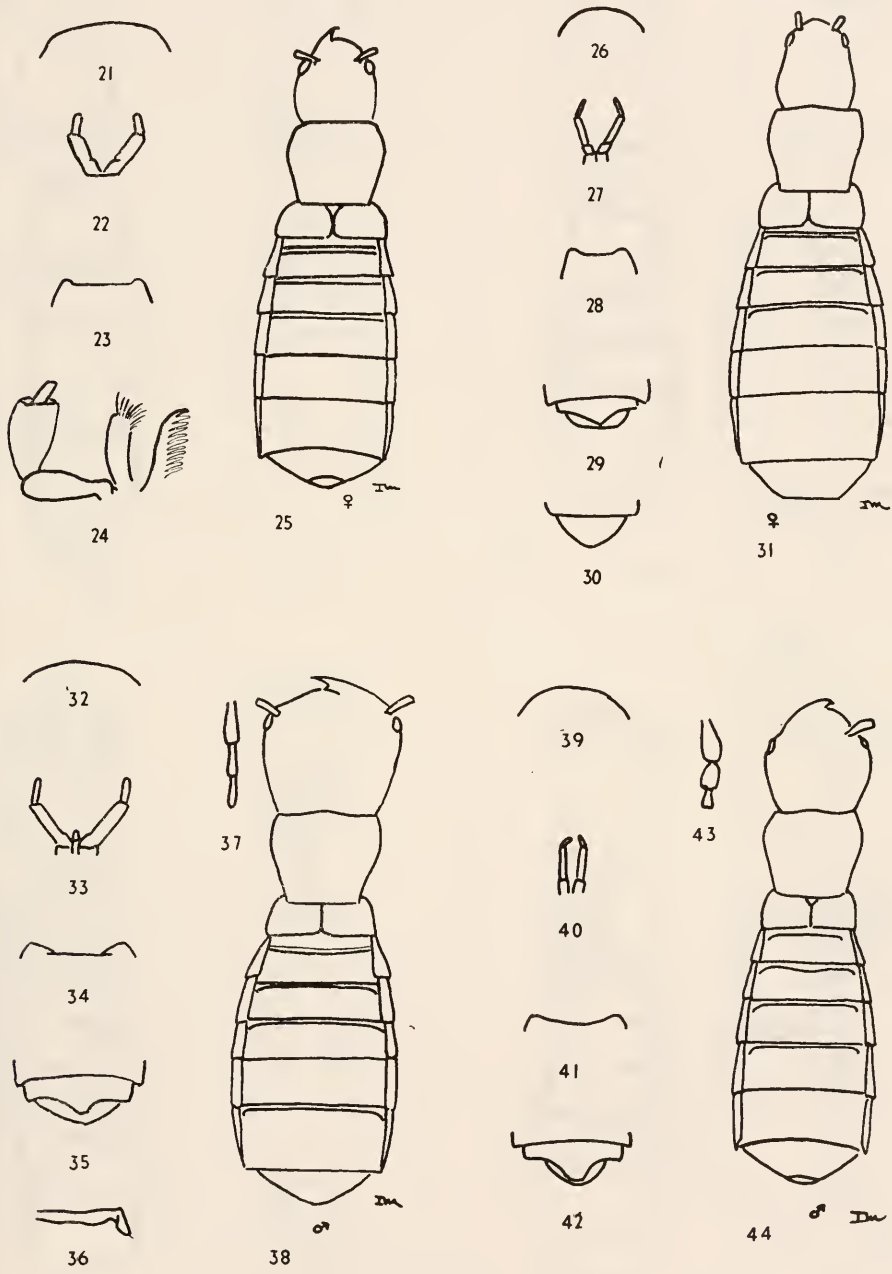


PLATE 9

FOR EXPLANATION OF FIGURES SEE PAGES 145 - 146

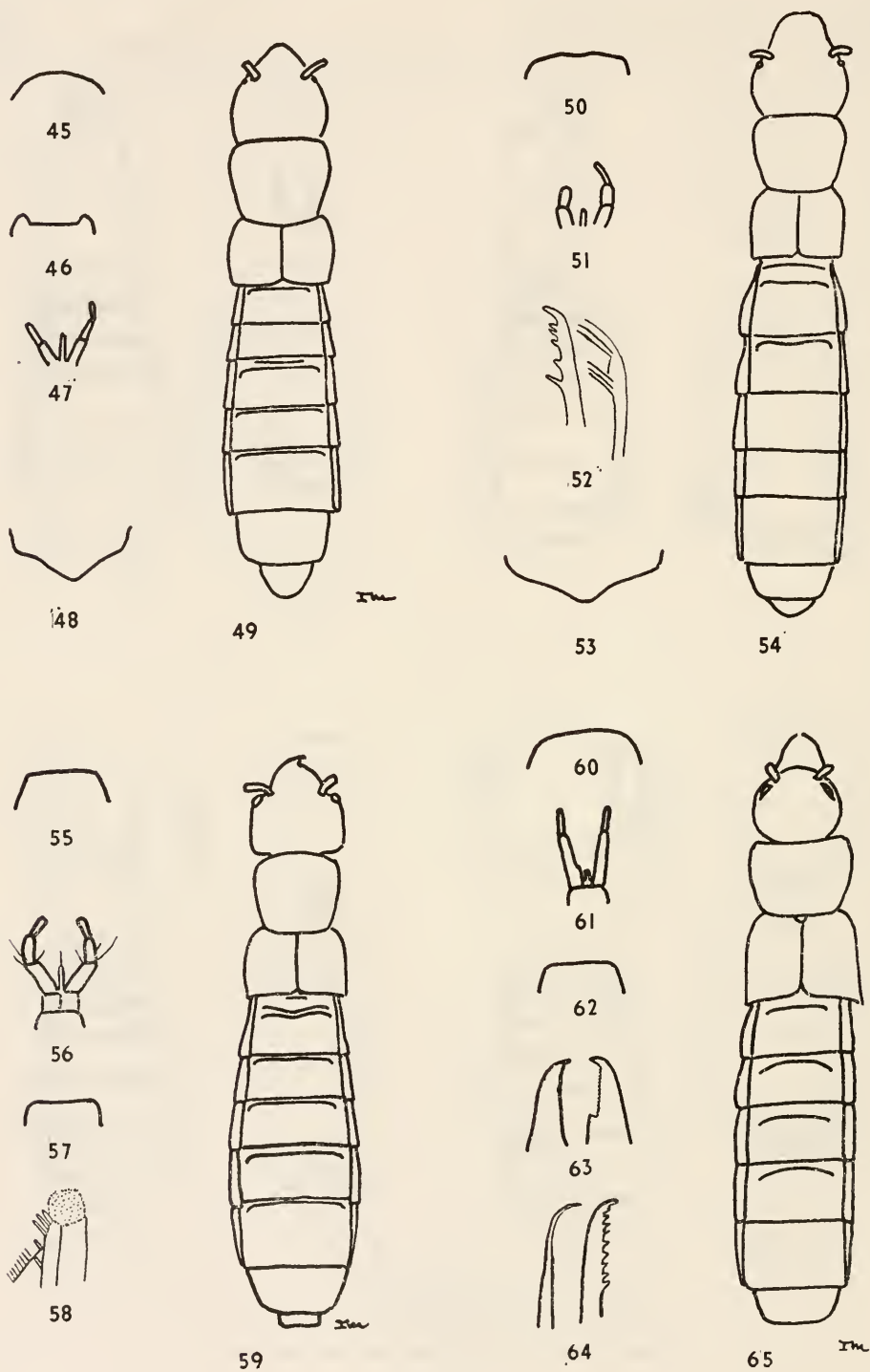


PLATE 10

FOR EXPLANATION OF FIGURES SEE PAGES 146 - 147

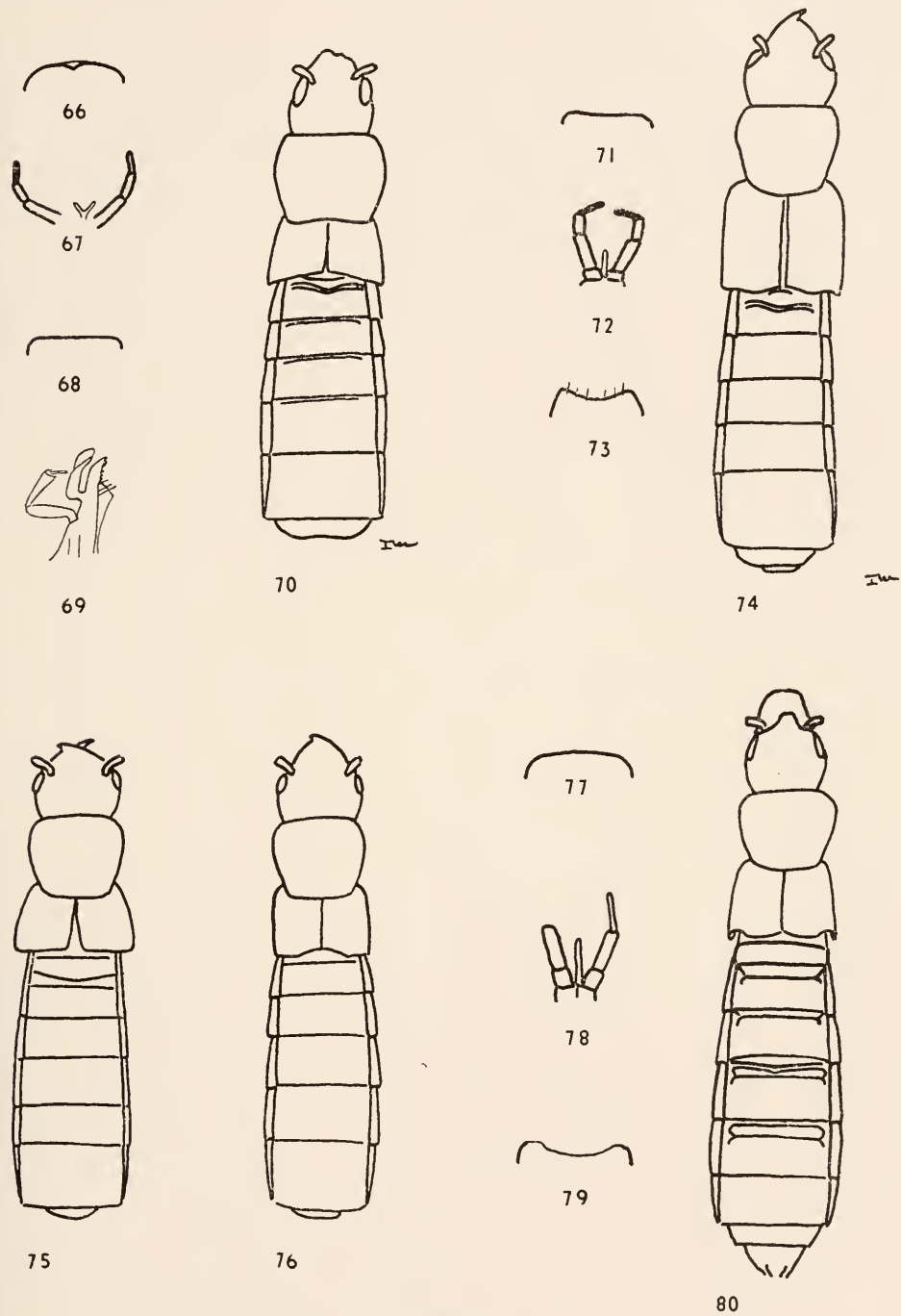


PLATE 11

FOR EXPLANATION OF FIGURES SEE PAGE 147

