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THE UNIVERSITY OF ALBERTA

A REVISION OF THE TROGOSITIDAE OF AMERICA NORTH OF MEXICO (COLEOPTERA, CLEROIDEA)

by

© JOHN ROBERT BARRON

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF DOCTOR OF PHILOSOPHY

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EDMONTON, ALBERTA

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled A Revision of the Trogositidae of America North of Mexico (Coleoptera, Cleroidea), submitted by John Robert Barron in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

Supervisor

External Examiner

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ABSTRACT

The species and genera of the family Trogositidae in America north of Mexico are revised. Two subfamilies are recognized: Peltinae and Trogositinae. The Peltinae include: Calitys Thomson (2 species), Eronyxa Reitter (3 species), Ostoma Laicharting (3 species), Grynocharis Thomson (2 species), Lophocateres Olliff (1 species), and Thymalus Latreille (1 species). The Trogositinae include: Nemosoma Latreille (5 species), Cylidrella Sharp (1 species), Corticotomus Sharp (6 species), Euschaefferia Leng (2 species), Airora Reitter (3 species), Temnochila Westwood (10 species), and Tenebroides Piller and Mitterpacher (18 species). Pseudocotomus Schaeffer is placed in synonymy with Euschaefferia Leng and Parafilumis Casey with Corticotomus Sharp. New species are Temnochila omolopha from Arizona and New Mexico and Temnochila rhyssa from California and Idaho. Synonymies, keys, descriptions, collecting and locality data, and illustrations are included. A checklist places all the species and genera in the proposed classification. Interpretation of relationships of the genera and species is included. The North American taxa are associated with the trogositid taxa from other parts of the world, and with groups within the other families of Cleroidea. Relationships among the taxa are postulated. The inclusion of peltines and trogositines in a single family is upheld.

AUTOBIOGRAPHY

John Robert Barron was born December 23, 1932, at Niagara Falls, Ontario, Canada, son of Floribel Lena Brown and Robert Armour Barron. He attended elementary and secondary schools in Niagara Falls, Ontario. In December, 1955, he married Marion Ruth Burton, in Niagara Falls, Ontario.

From the spring of 1956 to the fall of 1957 he was employed as a student assistant by the Department of Agriculture in Belleville, Ontario. While there he worked under the direction of Dr. A. P. Arthur on many technical aspects of research on hymenopterous parasites of the European pine snoot moth, Rhyacionia bouliana (Schiff).

He began studies toward a B.Sc. (Agr.) degree at Macdonald College in the autumn of 1957. During this period, 1957-1961, he was also employed as a technical assistant by Dr. R. S. Bigelow, performing technical aspects of research on taxonomy and speciation of field crickets (Orthoptera: Gryllidae). This included laboratory rearing under various conditions of light, temperature, humidity, and crowding. His undergraduate project was of a physiological nature, a comparative study of the effects of desiccation on eggs of three species of field crickets.

A daughter, Catherine Elizabeth, was born May 7, 1961.

Immediately after receiving the degree of B.Sc. in May 1961, he began a study of variation in two populations of Gryllus bimaculatus De Geer (Orthoptera: Gryllidae) under the direction of Dr. R. S. Bigelow. This study was primarily of a genetic nature. He received his M.Sc. from McGill University in the fall of 1962.

In 1962 he began a revision of the North American Trogositidae under the direction of Dr. G. E. Ball. At the same time he took up duties as Research Assistant (Extension) at the University of Alberta, Edmonton.

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The contributions of my colleagues was certainly an addition to this study.

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INTRODUCTION

Fabricius (1801) first recognized the members of the family Trogositidae as a group in the suprageneric sense and proposed the name Trogositae. However, a comprehensive review of the members of the family occurring in America north of Mexico has not previously been made. Horn (1862) revised the genus Tenebroides, primarily on the basis of the few specimens in the LeConte collection and he described a few new nominal species. Van Dyke (1915, 1944) reviewed the species of Nemosoma and Corticotomus, and Casey provided a key to nominal species of Airora which he based on a few specimens collected from the western United States. Otherwise literature concerning the North American members of the family consists mainly of widely scattered single species descriptions.

The object of this study was to define, taxonomically, the members of the family in America north of Mexico and to present the results as an integrated whole with complete synonymy, keys, descriptions, discussion, collecting data, and illustrations pertaining to individuals of the genera and species.

It was necessary to interpret relationships among North American members, and the relationships of these members to the world fauna and to groups within the other families of Cleroidea in order to test the validity of the

concept of the Trogositidae as one family and to define the limits of the family. Thompson (1859) and Crowson (1964) divided the group into two families primarily on the basis of mouth part structures. Other observers of the group have noted differences in mouth part structures and general form.

MATERIAL

Over 15,000 specimens of the family Trogositidae, collected in America north of Mexico, were examined and data pertaining to these comprise a major part of this paper. Type material was examined at the Museum of Comparative Zoology, Harvard University, the United States National Museum and the Philadelphia Academy of Natural Sciences. Type specimens, loaned by the California Academy of Science, were also studied. In addition a few hundred individuals of Trogositidae collected from Mexico, Central and South America were examined and data associated with individuals of species also inhabiting areas north of Mexico are included in this paper.

Individuals of representative genera of Cleridae and Melyridae collected in North America and of Trogositidae from various parts of the world were also examined and mouth part, wing venation, and genital structures of these were associated with North American trogositid material.

METHODS

General

Type material deposited in North American institutions was seen unless otherwise indicated; other type material was not seen unless otherwise indicated.

Synonymy sections only include names of authors who provided a definite concept of the particular taxon.

Terminology for wing venation, male and female genitalia is that of Forbes (1922), Sharp and Muir (1912) (except median lobe is replaced by aedeagus and lateral lobe by paramere), and Tanner (1927) respectively.

Descriptions are based on all specimens examined.

Measurements were made by means of an ocular micrometer scale and at magnifications of 6x, 12x, and 25x. At a magnification of 25 diameters the scale interval represented 0.04 mm. Measurements of total length refer to the linear distance between the apex of the head, excluding mandibles, and the apical margin of the elytron or the apex of the abdomen in the case of the few brachyelytrous individuals. Measurements of length and width were made from the longest and widest part of the particular structure, except length of the elytron was determined from the inner margin and width with the specimen in horizontal plane and focused at the inner margin of the elytron. Measurements of length and width, also used to form ratios, are abbreviated as follows: length = L, width = W.

Variation is not discussed unless significantly different among individuals of a particular species.

Dissections were made by first placing the specimen in hot water for several minutes. Genitalia were extracted by first removing and soaking the abdomen in five per cent KOH for a few minutes to avoid breakage, otherwise common, when pulling these structures through the eighth segment of females and eighth and ninth segments of males.

Drawings were made with the aid of a camera lucida attached to a Wild M5 stereoscopic microscope.

'Collecting data' were taken only from labels associated with specimens seen unless otherwise indicated because of difficulty in associating data in the literature with the correct nominal species unless those data pertained to type material.

References to periodicals are abbreviated according to the 1965 edition of the World List of Scientific Periodicals; those cited in full are not included in that list.

Taxonomic Categories and Taxa

Evidence of specific identity was interpreted as follows: forms which overlap geographically but show no intergradation in diagnostic characters in the overlap area or allopatric forms of which geographically intermediate specimens do not show intermediate characteristics of the

two forms. It is assumed that maintenance of reproductive isolation and consequent genetic isolation prevents intergradation and this is the generally accepted criterion for recognition of a species (Mayr, 1963; Simpson, 1961).

The criteria for recognition of supraspecific taxa are based on degrees of separation (gaps), amount of divergence, and monophyly, as defined by Mayr, Linsley, and Usinger (1953) and Simpson (1961). As a working principle gap size corresponds to degrees of dissimilarity between taxa (Mayr, Linsley, and Usinger, 1953; Simpson, 1961). The divergence criterion was defined by Simpson (1961) as follows: Within any one higher taxon the higher taxa next below it in rank should be approximately equally divergent in the absence of indications to the contrary such as polyphyly. Consistency of application of these criteria for separation and ranking of higher taxa depends on the principle that characters in common tend to be proportional to recency of common ancestry and degrees of divergence tend to be proportional to remoteness of common ancestry. Gap size alone, the quantitative aspect, is not an adequate criterion but must include the criterion of monophyly, the qualitative aspect. Monophyly alone, as detailed by Hennig (1966), is not adequate since phylogenetic divergence is not necessarily related to gap size because of various degrees of possible divergence, parallelism, or convergence (Simpson, 1961). According to Hennig (1966) all species of a natural

group share a common ancestral species which is not ancestral to any forms outside the group. It follows that sister groups are classified by Hennig in the same taxon. This principle assumes an equal amount of evolutionary change in all lines and omits amount of divergence. As expressed by Mayr (1965), relationship has two distinct meanings, genetic relationship and genealogical relationship. The latter concept is followed here and is expressed by Simpson (1961) in his definition of monophyly as "the derivation of a taxon through one or more lineages (temporal successions of ancestral - descendant populations) from one immediately ancestral taxon of the same or lower rank." This definition takes into account the dual nature of the phylogenetic process, namely, branching and divergence, and does not require that all descendents of a common ancestor be included in a single taxon. On the basis of these principles and the above criteria the trogositid taxa are ranked and made comparable. Thus the groups are arranged in a pattern that is as consistent as possible with their probable phylogeny.

FAMILY TROGOSITIDAE

Trogositae Fabricius, 1801:150.

Trogossitarii Latreille, 1802:159; 1825:397.

Peltides Latreille, 1807b:8; Erichson, 1845:237; Bach, 1849: 224; Jacquelin du Val, 1858:161; 1859:108.

Trogositides Westwood, 1838:145, 12.

Trogossitites Castelnau, 1840:382.

Trogositidae Hope, 1840:131; LeConte, 1861a:86; 1863b:31 (list); Gemminger and Harold, 1868:838 (cat.); Crotch, 1873:47 (list); Redtenbacher, 1874:LXXXVI; Reitter, 1876:7; 1877c:175; 1882:142; Rupertsberger, 1880:130; 1894:138, 284 (biology); LeConte and Horn, 1883:152; Marseul, 1885:145; Fowler, 1889:5, 267; Sharp, 1891: 388; Blatchley, 1910:661; Crowson, 1955:82.

Trogositinae Erichson, 1842:150; 1843:227, 361.

Trogositen Erichson, 1842:103; 1844:442.

Trogositae Redtenbacher, 1845:126.

Trogosites Cuvier, 1849:460.

Trogositidas Blanchard, 1851:438.

Trogositaires Mannerheim, 1852:534; Lacordaire, 1854:332; Motschulsky, 1858:135.

Trogositarii Kraatz, 1858:136.

Peltidae + Trogositidae Thomson, 1859:70, 84.

Trogostidae Redtenbacher, 1867:37 (misspelling).

Trogositides Redtenbacher, 1872:372.

Peltidae Seidlitz, 1875:33, 153; 1891a:51; 1891b:239.

Ostomidae Des Gozis, 1886:11; Ganglbauer, 1899:416; Reitter, 1911:5; Schaeffer, 1920:193 (cat.); Winkler, 1924:687 (cat.); Van Emden, 1932:204 (larva); Balduf, 1935:164 (biology); Arnett, 1962:593; Vogt, 1967:14.

Temnochilides Léveillé, 1888b:429 (cat.); 1889c:167; Fauvel, 1891:158.

Temnochilidum Léveillé, 1900:1 (cat.).

Ostomatidae Jacobson, 1905:890; Böving and Craighead, 1931:56 (larva); Leng and Mutchler, 1933:32; Lepesme and Paulian, 1944:136; Grensted, 1954:71 (etymology); Basilewsky, 1956:388; Hatch, 1962:185.

Temnochilidae Léveillé, 1910:1 (cat.); Blackwelder, 1945:391 (cat.).

Peltidae + Trogossitidae Crowson, 1964:285, 296.

Classification of Trogositidae and Relationships of the Higher Taxa of Cleroidea

Association of Trogositidae and Cleridae and removal of the former from Cucujoidea was considered by Sharp and Muir (1912) and Forbes (1922, 1926). The superfamily Cleroidea was established by Böving and Craighead (1931) and redefined by Crowson (1955). Jeannel (1955), on the basis of the male genitalia, continued with the traditional placement of Trogositidae in Cucujoidea and was followed by Vogt (1967), although Jeannel described the male genitalia of both Trogositidae and Cleridae as "le type d'édeage, vaginé, à tegmen en gaîne sternale." Crowson (1955)

assigned the family Trogositidae along with Chaetosomatidae (from Cucujidae), Cleridae, Melyridae and Phloiophilidae to his redefined Cleroidea, and retained the two major subdivisions, Peltinae and Trogositinae of Trogositidae. A major contribution to the definition and relationships of the higher taxa of Cleroidea was that of Crowson (1964), based to a considerable extent on adult mouth part and larval characters and associated with newly discovered New Zealand material. Another family, Phycosecidae, was removed from Cucujoidea and added to the Cleroidea. The trogositid group was redefined and divided into two families based on mouth part characters. Egoliinae was transferred from Trogositidae to Peltidae and Lophocateres from Peltidae to Trogositidae. The Trogositidae were divided into subfamilies Lophocaterinae and Trogositinae, and the Peltidae into subfamilies Decamerinae, Peltinae, and Egoliinae. In 1966, Crowson, on the basis of additional material, revised his subfamilies of Peltidae and added a new subfamily, Rentoniinae, which he divided into the tribes Protopeltini and Rentoniini. Latreille, Erichson, Sharp, Reitter, Lacordaire, and Thomson were among the principal early authors who considered the phylogeny of the family Trogositidae and their studies were reviewed by Crowson (1964).

Crowson's studies (1955, 1964, 1966) marked the establishment of the trogositid complex within the superfamily Cleroidea though problems remain regarding family relationships within the latter. Underlying patterns are difficult

to detect because of the great structural diversity within the group, no doubt due to antiquity and the resultant divergence, extinction, parallelism, and convergence that is generally correlated with time.

Mouth part characters have been considered by Thomson (1859, 1862) and Crowson (1964, 1966) of sufficient importance to treat the groups Peltinae and Trogositinae as separate families. Crowson (1964) states "the basic features of Trogositidae that distinguish them from Peltidae particularly concern the mouth-parts in which the adult mandibles are without a definite molar part, and the lacinia without an apical hook, larval mandibles with a different 'lacinia mandibulae' and maxillary mala with a pedunculate seta" (Figs. 1-7, 9-11). The lacinia mandibulae of Böving and Craighead (1931) applies to the heavy spines on the mandibles as in Trogositinae rather than fine hairs as in Peltinae. Crowson (1964) adds that "these features are common to all Cleroidea, except Phloiophilidae and Peltidae, and would seem to be strongly correlated with carnivorous habits." But the only group within which these characters are common is the Trogositinae; in the Peltinae neither mouth part characters nor habit are constant throughout the group (Tables I, II). Trogositinae may be basically carnivorous in habits and Peltinae basically fungivorous but the amount of variation in both groups is considerable. Individuals of Phloiophilidae, represented by one species in Europe, are fungivorous and similar in adult structures to Protopeltini but they

lack a mandibular mola and spines on the tibia (Crowson, 1964). Larvae of Diontolobus (Decamerinae) lack teeth on the maxillary mala (present in Protopeltini) and a pedunculate seta. The feeding habits of members of the group are different--the three species of North American Eronyxa live under bark but visit flowers of Ceanothus. The Chilean Diontolobus feed on lichens and the Central American Decamerus visit flowers of various bushes. Larvae of Decamerinae have a mandibular mola, absent in all other Cleroidea. The tarsal claws of Eronyxa are simple whereas those of Decamerus and Diontolobus are toothed (Crowson, 1964, 1966). Individuals of the Tasmanian and Chilean Egoliinae are at least partly carnivorous. Individuals of the trogositine Leperina have mouth part features typical of that subfamily but their habits are carnivorous, detrital, and fungivorous (Crowson, 1964).

Crowson (1964) associated the genus Lophocateres, formerly placed in Peltinae, with Promanus Sharp and two species of Grynoma Sharp within his trogositine Lophocaterinae, and distinguished lophocaterine adults with front coxal cavities open behind and lacinia well developed, extending at least to middle of galea; in the Trogositinae the front coxal cavities are closed behind and the lacinia is small or vestigial (Figs. 5, 6). The North American representative of Lophocateres is L. pusillus (Klug) = (L. nanus Olliff, type species of the genus). The type specimen of pusillus agrees with compared material. Individuals are characteristically peltine and with a strongly protuberant

and ridged mola, elongate lacinia with two spines, one on the outer edge and one at the apex, and this combination does not agree with any one of the numerous combinations, each represented by a subfamily (Table II). The question arises--do these mouth part characters indicate relationship, and the corollary--are they of value in interpreting phylogeny and thus of use in classification? The mouth parts of carnivorous forms are correlated and variation is minimal; those of the peltine subfamily show less correlation and variation is considerable. In many cases where mouth part structures vary, there is a corresponding variation in feeding habits in the peltine group.

It was primarily on the basis of the characters of the mouth parts (Crowson, 1955, 1964) and presumably on the basis of recency of common ancestry (Crowson, 1964) that Crowson based his classification of the families of Cleroidea and the division of Trogositidae. According to Crowson (1966) ". . . the system of families in Cleroidea is thereby brought into closer conformity with the canons of the phylogenetically based systematics of Hennig (1950)." But despite the possible early bifurcation of the trogositid - peltid stock the amount of divergence is less between Trogositinae-Peltinae than between any other combination of the other families or of the latter to Trogositinae or Peltinae. If presence of a mandibular mola and associated structures is primitive then it may simply have been retained in the Peltinae and lost in the other groups in which case the Trogositidae are also, and "phylogenetically,"

a monophyletic group.

The sum of shared primitive (plesiomorphous) and shared derived (apomorphous) characters between each of two 'families of Cleroidea' were compared in all combinations of 'families'. Trogositinae-Peltinae share many more derived characters than any other combination of families when mouth part structures are considered as one character (Table I).

Characters tend to be adaptive or correlated with adaptive characters because all species and higher taxa occupy a specific (in the case of species) to a more general (the higher the taxon) habitat. The basic structural pattern becomes more generalized the higher the taxon and the basic adaptation becomes overlain with a diversity of others (for example, Simpson, 1959, 1961). The high degree of diversity in mouth parts of the peltine group, usually correlated with diverse feeding habits, and the high degree of constancy in the trogositine group indicates that the adaptive value of these associated mouth part characters in the family is considerable and thus phylogenetically important, as appreciated by Crowson. But the basic structural pattern of mouth part characters in the trogositine group has remained constant while feeding habits varied and in the peltine group mouth part characters have varied in correlation with habit. The generalized, and probably more advanced, mouth part structures of the Trogositinae have, no doubt, allowed the group a greater potential for success over a broader range of environmental conditions than was possible in the

secondarily specialized, and probably more primitive, character-correlated adaptations of the peltine group.

The general evolutionary pattern seems to have been in the form of rapid diversification from the family to the generic level inclusive along with progression, splitting, and extinction, followed by comparatively much less diversification at the species level. The center of distribution of Trogositidae seems to have been the central land mass of the Old World with the Trogositinae presently successful in the tropical and subtropical regions of the world and the predominantly Holarctic Peltinae generally represented by widely diversified smaller groups in the latter areas and extremities of southern continents.

TABLE I

COMPARISON OF CHARACTERS OF THE FAMILIES OF CLEROIDEA

Adult	Pelt-inae	Trogos-itinae	Cler-idae	Phloio-philidae*	Chaeto-somatidae*	Melyr-idae*	Phyco-secidae*
habits [1] carnivorous, [2] fungivorous, [3] floricolous, [4] detrital, [5] seaside refuse	1,2,3,4	1,2	1,3	2	1	1,3	5
number articles antennal club	3	3	3,0	3	0	0	1
labrum distinct	-	-	+			+	
mandible with mola	+	-	-	-	-	-	-
maxillary lacinia with hooks or spines	±	-	-	+	-	-	-
gular sutures widely separated	-	-	±	+	-	-	+
front coxae distinctly projecting	-	-	+	+	+	+	-
front coxal cavities open behind	±	-	±		+	+	-
legs with trochantins exposed	+	+	±			+	-
tibia spinous	±	±	-	-	+	-	-
tarsal claws simple	±	+	±	+	+	±	+
wing at r-m with arrowhead-shaped sclerite	+	+	+	-	-	-	apterous

*Data taken from literature, including Crowson (1964, 1966); also Cleridae and Melyridae in part.

+refers to presence, - to absence of the condition.

TABLE I (continued)

Adult	Peltinae	Trogositinae	Cleridae	Phloiophilidae*	Chaetosomatidae*	Melyridae	Phycosecidae*
wing with anal veins degenerate	-	-	-		+	+	apterous
Malphigian tubules hidden	6	6	6			4 or 5 free	
number visible abdominal sterna	5	5	5-6			5-6	5
male tegmen divided	±	+	-	-	-	±	-
Larva*							
mandible with mola	±	-	-	-	-	-	-
mandible with lacinia mandibulae	-	+	+	-	+	+	+
maxillary mala with pedunculate seta	-	+	+	-	+	+	+
maxillary mala with teeth	±	-	-	+	-	-	-
ventral mouth parts retracted	+	+	-		-	+	+
number abdominal segments	9	9	10			9	9
urogomphi branched	-	-	±			-	-

*Data taken from literature, including Crowson (1964, 1966); also Cleridae and Melyridae in part.

+refers to presence, - to absence of the condition.

TABLE II

COMPARISON OF CHARACTERS OF THE FAMILY PELTIDAE AUCT.

Adult	Egoliinae auct.	Decamerinae auct.	Peltinae auct.	Rentoniinae auct.	Lophocateres[b]
habits carnivorous[1], fungivorous[2], floricolous[3]	1	3 and on lichens	2	2	2[c]
number antennal articles	not >10	10-11	11	11	11
mandibular mola smooth	+	asperate	+	+ or ridged	ridged
maxillary lacinia with hook[y], spine[z]	2[y]	1[z]	2[y]	1[y]+1[z] or no[y+z]	2[z]
gular sutures convergent	+	+	+	-	+
labial ligula bilobed	+	+	-	-	-
front coxal cavities closed behind	+	±	±	±	-
middle coxal cavities closed behind	+	-	-	-	-
tibia spinous	-	+	±	-	+
tarsus with 2 basal segments connate	-	-	-	+	-
tarsal claws toothed or split	-	±	-	-	-
male tegmen divided	-	-	+	±	+
Larva[a]					
frontal sutures distinct	undescribed	+	+	±	undescribed
mandible with mola		+	-	-	
maxillary mala with teeth		-	+	+	

[a] Data from literature, including Crowson (1964, 1966); also Decamerinae in part.

[b] Lophocateres as recognized in this paper.

[c] L. pusillus in rice, etc.

+ refers to presence, - to absence of the condition.

HISTORICAL REVIEW OF CLASSIFICATION OF NORTH AMERICAN TROGOSITIDAE

Casey, Fall, Horn, LeConte, Melsheimer, and Schaeffer made the most significant contributions to a knowledge of North American members of the family. Horn's (1862) review of species of Tenebroides was based on specimens in the LeConte collection. A few new nominal species were described. LeConte (1861a) provided family and subfamily descriptions and a key to the genera, and this paper was revised in 1883 by LeConte and Horn. Van Dyke (1915, 1944) added new species descriptions and keys to species of Nemosoma and Corticotomus. Casey (1916) studied the species of Airora occurring in western United States and provided a descriptive key. Other papers regarding the group contain descriptions of a few species of various genera. Among these are the following: Melsheimer (1844) on Tenebroides and (1846) on Airora, Schaeffer (1918) on various species and genera including a key to genera, Fall (1910) on a new nominal genus, Pseudalindria, as well as various species. The most important studies of local material were those of Mutchler and Weiss (1929) on the New Jersey fauna and Hatch (1962) on the Pacific North West fauna. Before Schaeffer's (1920) contribution, the North American species and genera were listed by LeConte (1863b) and Crotch (1873). Other papers regarding the group are widely scattered in the literature and many contain only a description of one North American nominal species.

THE NORTH AMERICAN TROGOSITIDAE

In addition to the definition of the family given below see Table I, Arnett (1962), and Crowson (1964). Larval characters were discussed by Crowson (1964).

Head prognathous or slightly deflexed. Antenna with eleven (usually) or ten articles; apical three articles in form of loose club (Figs. 12-29). Labrum small and indistinct. Mandibles prominent, arcuate (Figs. 9-11). Maxillary palpus with four articles (Figs. 2-7). Gular sutures strongly convergent, partially confluent. Mentum usually transverse and subquadrate. Labial palpus with three articles.

Prothorax with front coxae conical and prominent, indistinctly projecting, strongly transverse, cavities open or closed behind. Middle coxae subtransverse, flat, separate. Hind coxae transverse, almost contiguous. Legs, front and middle, with trochantins exposed; front tibiae, at least, usually spinous; tarsal formula 5-5-5; tarsi simple, slender, each tarsus with basal segment much shorter than second, tarsal claws simple, each tarsus with bisetose empodium between claws. Elytra usually entire. Wing venation with r-m region sclerotized, with arrowhead-shaped mark as in Cleridae (Figs. 113, 119, 120), apex of M distinct, anal region prominent, folding pattern as in Helodidae.

Abdomen with five visible sterna, sutures entire; specialized glands on segments 1 to 8. Six Malphigian tubules hidden. Eighth sternum of female with median, basal

flagellum or apodeme (Figs. 150-157). Male genitalia with tegmen in form of sheath (en gaîne sternale of Jeannel), distal prolongation of tegmen ventral to median lobe, tegmen usually divided (Figs. 8, 158-162) as in the melyrid genus Acanthocnemus (see Crowson, 1964); aedeagus long, flattened laterally, inverted when retracted or extruded, internal sac undifferentiated except ejaculatory duct terminally with flagellum (Fig. 163). Female genitalia with paraprocts and valvifers reduced to baculi, coxite of two articles, with small basal piece; stylus small, with setae (Figs. 164, 165).

Discussion. According to King (1962) change in the venation in the anal area of the wing takes place as follows: (1) loss of the wedge cell by atrophy of the anterior margin of 2A, (2) alignment of the cross vein 2a-3a with the base of 2A and the apex of $2A_3$ and $3A_1$ to produce a three-part vein, (3) flattening of the Y - branching of $2A_{1+2}$ and $2A_3$ and the combining of these segments with another cross vein into a new stem for $2A_{1+2}$ and 1A. King found that on the basis of this pattern the genera formed a series as follows: Temnochila, Calitys (as Thymalus), Eronyxa, Nemosoma, Ostoma (as Airora), Corticotomus, and Tenebroides. Although an elongation and realignment of $2A_{1+2}$ and $2A_3$ is evident in members of Trogositinae to form a new fork with branches 1A and $2A_{1+2}$ as noted by King, in Peltinae there appears to be, instead, an alignment of $2A_3$ and the cross vein between $2A_{1+2}$ and 1A (Figs. 108, 109, 111-116), and following this step the cross vein becomes no longer evident (Figs. 108,

111, 113-115).

The various conditions can be outlined as shown in Table III. The Figures 108, 109, 111, 112, 116-118 of Nemosoma, Calitys and Ostoma demonstrate the variation in combinations of these conditions present within one genus and even within one species. The general tendency is toward simplification but in different combinations of conditions within each genus. As noted by King, no phylogenetic pattern is demonstrated.

Differences between genera in the form of the tegmen of the male are considerable but the variation forms patterns as indicated by the following: Basal piece prominent, separated from parameres, with basal unpaired apophysis, as in Temnochila (Fig. 161); basal piece reduced, separated from parameres, with basal unpaired apophysis, as in Tenebroides (Fig. 162), and Airora; basal piece reduced, not separated from parameres, with basal unpaired apophysis divided apically, as in Corticotomus (Fig. 8), and Nemosoma; basal piece large, separated from parameres, as in Ostoma, Calitys, Thymalus (Figs. 158-160); parameres united almost to apex, as in Thymalus (Fig. 160); tegmen with paired apophyses united basally, as in Thymalus and Calitys (Figs. 158, 160), separated basally, as in Ostoma (Fig. 159). In general, the basal piece of Trogositinae is more reduced and simplified, sometimes united with the parameres, and this is presumably a derived condition, whereas in Peltinae the basal piece is more prominent and not united with the parameres.

TABLE III

INTERGENERIC VARIATION IN ANAL AREA OF WING OF TROGOSITIDAE

	Figure Number	Condition					
		1*	2*	3*	4*	5*	6*
Calitys	108, 109, 116	±	+	+	-	+	±
Ostoma	111, 112	±	+	+	-	+	±
Grynocharis	113	+	+	+	-	+	+
Thymalus	114	+	+	+	-	+	+
Eronyxa	115	+	+	+	-	+	+
Nemosoma	117, 118	+	+	+	+	-	+
Corticotomus	120	+	+	+	+	-	+
Airora	110	+	+	+	+	-	+
Temnochila	119	-	-	-	-	-	-
Tenebroides	121	+	+	+	+	-	+

1* wedge cell lost by atrophy of 2A

2* cross vein 2a-3a aligned with base of 2A and apex of $2A_3$ + $3A_1$

3* Y-branching of $2A_{1+2}$ and $2A_3$ flattened

4* elongation of $2A_{1+2}$ and $2A_3$

5* alignment of $2A_3$ and cross vein between $2A_{1+2}$ and 1A

6* cross vein between $2A_{1+2}$ and 1A not evident

\+ refers to presence of each of the above conditions

\- refers to absence of each of the above conditions

Key to subfamilies and genera of North American Trogositidae

1 Front coxal cavities open behind OR dorsal surface of body tuberculate. Ratio width head/width pronotum about 0.5. Elytra at sides explanate. Form broad-oval (Peltinae) 2

- Combination of front coxal cavities closed behind and dorsal surface of body not tuberculate. Ratio width head/width pronotum near 1.0. Elytra at sides narrowly marginate. Form narrow-elongate (Trogositinae) 7

2(1) Front coxal cavities closed behind. Head and pronotum tuberculate. Elytron with four tuberculate carinae . . . . . Calitys Thomson, p. 40

- Front coxal cavities open behind. Head and pronotum not tuberculate. Elytron without four tuberculate carinae 3

3(2) Elytra with costae or carinae. Body dorsally sparsely pubescent 4

- Elytra without costae or carinae. Body distinctly pubescent 6

4(3) Elytron with four discal carinae . . . . Grynocharis Thomson, p. 78

- Elytron with six discal carinae or costae 5

5(4) Body small, oblong-oval. Sides narrowly explanate. Hind tibia with row of apical spines produced partly over first tarsal segment. Lacinia with spine on

outer margin and another near apex . . . . . .
. . . . . Lophocateres Olliff, p. 109

- Body larger, broad-oval. Sides broadly explanate. Hind tibia not as above. Lacinia without spines, with two apical hooks . . . Ostoma Laicharting, p. 55

6(3) Head partly concealed by apical margin of pronotum. Mentum oval, minute. Metasternum between basal margin of mesocoxal cavity and episternal suture with distinct curved line separating apical angle. Lacinia with apical hook, without spine on inner margin . . . . . Thymalus Latreille, p. 88

- Head not concealed by pronotum. Mentum transverse. Metasternum not as above. Lacinia without apical hook, with spine on inner margin . . . . . Eronyxa Reitter, p. 95

7(1) Anterior margins of pronotum and prosternum not continuous, interrupted by projecting apical angles. Combination of front tibiae on outer margin with spines, elytron without subhumeral impression, antennal club unilaterally dilated . . . 8

- Anterior margins of pronotum and prosternum continuous, not interrupted by projecting apical angles. Combination not as above 10

8(7) All tibiae on outer margin with spines; antennae very short . . . . . Airora Reitter, p. 170

- Front tibiae on outer margin with spines; antennae elongate 9

9(8) Pronotum with lateral margins behind middle angularly deflexed. Labium at apex deeply triangularly emarginate. Submentum of male with median fulvous pit . . . . Temnochila Westwood, p. 188

- Pronotum with lateral margins behind middle not angularly deflexed. Labium at apex shallowly emarginate. Submentum of male without fulvous pit . . . Tenebroides Piller and Mitterpacher, p. 238

10(7) Head dorsally with median longitudinal groove; apex strongly emarginate, each side of emargination produced into subacute lobe. Mandibles deflexed. Antennal club bilaterally dilated 11

- Head dorsally without median longitudinal groove; apex trisinuate. Mandibles porrect. Antennal club unilaterally or bilaterally dilated 12

11(10) Elytron entire, without subhumeral impression. Prosternum between coxae scarcely compressed. Pronotum with distinctly raised lateral margins . . . . . Nemosoma Latreille, p. 115

- Elytron not reaching apex of abdomen, with subhumeral impression. Prosternum between coxae strongly compressed. Pronotum without distinctly raised lateral margins . . . . . Cylidrella Sharp, p. 136

12(10) Elytron with subhumeral impression. Pronotum with distinctly raised lateral margins. Submentum distinctly separated from gula in front, outer angles not prominent. Front tibia towards middle with spine . . . . . Corticotomus Sharp, p. 139

\- Elytron without subhumeral impression. Pronotum without distinctly raised lateral margins, apical angles obliterated. Submentum not distinctly separated from gula in front, outer angles prominent and produced apically at least to base of mandibles. Tibiae without spines . . . . . Euschaefferia Leng, p. 164

SUBFAMILY PELTINAE

Gymnochilides + Peltides Lacordaire, 1854:344, 347; Motschulsky, 1858:136.

Peltites Jacquelin du Val, 1858:164; 1859:108.

Peltidae Kraatz, 1858:136; Thomson, 1859:70; 1862:186; LeConte, 1861a:88; 1863b:31; Crowson, 1964:287; 1966:119.

Leperini + Peltini Reitter, 1876:29, 44.

Leperini + Ostomini Reitter, 1882:145, 146; Hatch, 1962:185

Peltini LeConte and Horn, 1883:154; Léveillé, 1889c:168.

Leperinini + Thymalini Léveillé, 1888b:440, 444; 1900:15, 19.

Peltina Fowler, 1889:267.

Temnochilae + Leperinae Fauvel, 1891:158.

Leperinini + Peltini Seidlitz, 1891a:51.

Ostomini Ganglbauer, 1899:420; Schaeffer, 1918:200; 1920:194.

Ostomatini Jacobson, 1905:892.

Leperininae + Ostominae Léveillé, 1910:20, 24; Blackwelder, 1945:395.

Leperini + Calityni + Ostomini Winkler, 1924:688.

Ostomatinae Boving and Craighead, 1931:56.

Ostomatitae Lepesme and Paulian, 1944:137.

Peltinae Crowson, 1955:82.

Egoliinae + Decamerinae + Peltinae Crowson, 1964:287.

Egoliinae + Decamerinae + Peltinae + Rentoniinae Crowson, 1966:119, 120.

Form more or less broad, not cylindrical, margins explanate. Head small, about one-half as wide as pronotum at apex; eyes prominent. Antenna with eleven articles. Mandible with molar part, incisor lobe with two sharp incisor points deeply notched (Figs. 1, 9, 10). Maxilla with lacinia elongate, at least reaching middle of galea, terminal part usually an incisor point with two apical hooks (Figs. 2-4), or one or two spines (Fig. 7), inner margin fringed with long hairs; cardo smaller than stipes, as broad as long; stipes not appearing divided. Gular sutures not as strongly convergent as in Trogositinae.

Prothorax with front coxal cavities open behind, except Calitys. Elytra entire, with broad lateral margins and epipleura. Wings with radial cell (R) closed (Fig. 113) as in Cleridae.

Abdomen of male with eighth tergum more or less globose, apex broader than base, base shallowly, irregularly, emarginate, at middle more strongly; lateral lobes broadly, irregularly, rounded (Fig. 125). Eighth sternum of male bowl-shaped, lateral margins strongly divergent to broad base (Figs. 129-131). Ninth sternum in general more complex than in Trogositinae, central pocket with sclerotized margin incomplete basally, with two basal apophyses usually separated, lateral margins prominent apically; apical margin lobed, narrowly, strongly arcuate, medially almost to or reaching apical margin of tergum (Figs. 144-146), lateral margins produced dorsally and

strongly medially on ninth tergum (Figs. 136, 137, 139). Aedeagus often with a small sclerite on dorsal side near base, also present in the melyrid Haplocneminae (Crowson, 1964). Abdomen of female with eighth tergum as in male, globose, with base shallowly emarginate, lateral lobes broad and irregularly rounded (Fig. 127). Female genitalia somewhat shorter, broader and valvifer more elongate than in Trogositinae (Fig. 164). Also see Tables I,II. Larval characters are discussed by Crowson (1964, 1966).

Generic Relationships and Geographical Distribution of Peltinae

Statements regarding relationships of the peltine genera would not only be conjectural but hazardous since North American representatives of the group are merely samples of the many and widely divergent Old World genera. It is only clear that North American representatives of Ostoma, Calitys, Thymalus, and Grynocharis seem to share many characters, whereas Eronyxa and Lophocateres appear less closely associated with these genera or with each other (Table IV). The genera are not grouped into tribes on the basis of differences in mouth part structure and correlated variation in habit since these differences represent a small sample of the many combinations exhibited by the peltine group, as discussed above (also, see Table II). On the basis of the closed front coxal cavities of Calitys some early workers treated this group separately but such

single variants are not uncommon, particularly among genera of Peltinae (Tables II, IV). A sclerite is present on the dorsal side near the base of the aedeagus in males of two genera (Table IV), similar to that in the melyrid Haplocneminae (Crowson, 1964).

Members of the subfamily Peltinae are predominantly Holarctic (Table VI). North American species of Calitys, Grynocharis, and Ostoma are mainly in the northern United States and Canada, except in the west where their ranges extend southward. Individuals of Calitys scabra and Ostoma ferruginea are also distributed throughout Europe. The distribution pattern of the peltines, with many small, widely scattered, Old World genera, indicates that the group is an old one. Calitys minor and Ostoma columbiana are endemic to North America and probably originated from some C. scabra-like and O. ferruginea-like ancestor, respectively. Eronyxa is closely related to Diontolobus and Decamerus according to Crowson (1964) and members are found on the Pacific coast of the United States, in Chile, and in Central America, respectively, and, as noted by Crowson demonstrate a relict distribution pattern. One species of Lophocateres occurs in Penang (Olliff, 1883b) and one in Brazil (Léveillé, 1905); the economically important L. pusillus (Klug) is world-wide, as a result of dispersal by commerce, mainly from the tropical regions of the world.

TABLE IV

GENERIC CHARACTERS OF THE SUBFAMILY PELTINAE

	Calitys	Ostoma	Grynocharis	Thymalus	Eronyxa	Lophocateres
body pubescent	+	±	-	+	+	sparsely
mandibular mola smooth	+	+	+	+	asperate	ridged
maxillary lacinia	2 hooks	2 hooks	2 hooks	2 hooks	1 spine	2 spines
mentum transverse	+	+	+	-	+	+
pronotal margins	serrate	scarcely crenulate	crenulate	smooth	serrate	smooth
front coxal cavities open	-	+	+	+	+	+
prosternum between coxae narrow	-	-	+	+	+	-
tibia marginate	+	+	+	-	+	+
number elytral costae	4 tuberculate carinae	7 carinae	5 carinae	-	-	7 costae
elytral intervals regular	-	+	±	-	-	+
male sternum 8 with apodeme	+	-	+	-	+	
aedeagus with sclerite	-	-	+	-	+	
habits fungivorous[1], floricolous[2]	1	1	1	1	2	rice,etc.

SUBFAMILY TROGOSITINAE

Egoliides + Trogositides Lacordaire, 1854:334, 336.

Trogositides Motschulsky, 1858:135.

Trogositites Jacquelin du Val, 1858:161; 1859:108.

Trogositidae Kraatz, 1858:136; Thomson, 1859:84; 1863:103; LeConte, 1861:87; 1863b:31.

Nemozomini + Trogositini Reitter, 1876:7, 17; 1882:142, 143.

Trogositini LeConte and Horn, 1883:153.

Nemozomi + Trogositi Marseul, 1885:145.

Nemosomatini + Temnochilini L'eveille', 1888b:431, 432; 1900:1, 3.

Nemosomini + Temnochilini L'eveille', 1889c:167, 168; Winkler, 1924:687.

Trogositina Fowler, 1889:267.

Nemosomatinae + Temnochilinae Sharp, 1891:388, 390; L'eveille', 1910:1, 6; Blackwelder, 1945:391, 392.

Nemosomini + Trogositini Seidlitz, 1891a:51.

Tenebrioidini Ganglbauer, 1899:420; Jacobson, 1905:891.

Tenebroidini Schaeffer, 1918:190; 1920:193.

Tenebroidinae Boving and Craighead, 1931:56.

Temnochilitae Lepesme and Paulian, 1944:137.

Trogositinae Crowson, 1955:82.

Nemozomini + Temnochilini Hatch, 1962:185.

Lophocaterinae + Trogossitinae Crowson, 1964:296, 297.

Trogossitidae Crowson, 1964:296.

Form more or less elongate, semicylindrical, margins not explanate. Head relatively large, about as wide as pronotum at apex, eyes not prominent. Antenna with eleven (usually) or ten articles. Mandible without a molar part, with a single apical tooth and another behind it on cutting edge, incisor lobe with two cutting edges not deeply notched (Fig. 11). Maxilla with lacinia reduced or vestigial, same size as galea, for example, Tenebroides (Fig. 6), or smaller, for example, Temnochila (Fig. 5); not nearly reaching middle and usually only to base of galea, terminal part a blunt lobe without hook or spine; cardo larger than stipes, elongate; stipes with posterior surface marked by internal ridge and appearing divided. Gular sutures more strongly convergent than in Peltinae.

Prothorax with front coxal cavities closed behind. Elytra usually entire, with narrow lateral margins and epipleura. Wings with radial cell (R) open (Figs. 119, 120).

Abdomen of male with eighth tergum more or less bell-shaped, apex narrower than base, base deeply emarginate, lateral lobes narrow, regularly rounded (Fig. 126). Eighth sternum of male kettle-shaped, apex about as broad as base (Figs. 132-135). Ninth sternum generally less complex than in Peltinae, central pocket with sclerotized margin complete or incomplete basally; with basal apophysis, sometimes divided apically; lateral margins not prominent apically; apical margin almost straight, medially not nearly reaching apical margin of tergum (Figs. 143, 147-149), lateral margins

produced dorsally but not strongly medially on ninth tergum (Figs. 138, 140-142). Aedeagus without small sclerite on dorsal side near base. Abdomen of female with eighth tergum as in male, bell-shaped, base deeply emarginate, lateral lobes narrow, regularly rounded (Fig. 128). Female genitalia somewhat more elongate, valvifer shorter than in Peltinae (Fig. 165). Also see Table I. Larval characters are discussed by Crowson (1964).

Generic Relationships and Geographical Distribution of Trogositinae

On the basis of number of shared characters members of North American trogositine genera appear to be about equally related (Table V). But characters such as the elongate head with emarginate front, porrect mandibles, and subhumeral impression of the elytron are unique, shared in various combinations by members of Nemosoma, Cylidrella, Corticotomus, and Euschaefferia and absent among members of Tenebroides, Temnochila, and Airora (Table V). The elongate head with emarginate front is shared by Nemosoma and Cylidrella; the porrect mandibles are shared by Corticotomus and Euschaefferia, and the elytron with a subhumeral impression is shared by Cylidrella and Corticotomus (Table V). Because these characters are present in various combinations among members of Nemosoma, Cylidrella, Euschaefferia, and Corticotomus and absent among members of Tenebroides, Temnochila, and Airora

it may be assumed that Nemosoma, Cylidrella, Euschaefferia, and Corticotomus share a more recent common ancestor that possessed these characters and that they are, therefore, more closely related to each other than to Tenebroides, Temnochila, or Airora.

Members of Euschaefferia, represented by two species, occur only on the Pacific coast. One species of Cylidrella is in Guatemala and the other is in the western United States. The distribution of Corticotomus is Nearctic and Neotropical whereas that of Nemosoma is, in addition, Palaearctic (Table VI). The groups Temnochila and Tenebroides are probably old. They are predominant in the New World tropics and represented by only a few widely scattered species and genera in the Old World (Table VI). Airora, also, is predominantly tropical, and closely related to the Old World Tropical Alindria. The scattered distribution of numerous, small, Old World, trogositine genera suggests that the subfamily probably originated in the Old World.

Several North American species of Tenebroides represent samples of Mexican and Central American species groups, for example, collaris, bimaculatus, the closely related americanus and laticollis, and corticalis. Each of these species is associated with, and no doubt closely related to, a group of about three or four species of more southern distribution. The same situation occurs in the Temnochila virescens, omolopha, aerea, chlorodia, acuta complex of which several closely related species occur throughout Mexico and

Central America. Closely related representatives of *Airora cylindrica* and *aequalis* occur far south of the United States. Most species of North American *Tenebroides* are well established north of Mexico, whereas the southern United States represents the northern limit of the range of many North American species of *Temnochila*.

TABLE V

GENERIC CHARACTERS OF THE SUBFAMILY TROGOSITINAE

	Nemosoma	Cylidrella	Corticotomus	Euschaefferia	Airora	Temnochila	Tenebroides
head elongate	+	+	-	-	-	-	-
-dorsally convex	+	+	-	+	+	+	+
-with longitudinal impressed line dorsally	+	+	-	-	±	±	-
front emarginate, not trisinuate	+	+	-	-	-	-	-
number antennal articles	10-11	11	11	11	11	11	11
antennal club bilaterally dilated	+	+	-	±	-	-	-
eyes transverse	+	+	-	+	+	+	+
mandibles deflexed	+	+	-	-	+	+	+
labium triangularly emarginate	-	-	-	-	-	+	-
submentum-gula separate,not expanded apically	+	+	+	-	+	+	+
submentum of male with pit	-	-	-	-	-	+	-
pronotal apical angles projecting	-	-	-	-	+	+	+
sides pronotum deflexed behind middle	-	-	-	-	-	+	-
pronotal lateral margins raised	+	-	+	-	+	+	+
prosternum compressed between coxae	-	+	-	-	-	-	-
tibia spinous	I+II	I+II	I	0	I+II+III	I	I
elytron with subhumeral impression	-	+	+	-	-	-	-
-entire	±	-	+	+	+	+	+
-with punctures serial	-	-	+	±	+	+	+

TABLE VI

GEOGRAPHICAL DISTRIBUTION PATTERN OF NEARCTIC GENERA OF TROGOSITIDAE

	Palae-arctic	Neo-tropical	Ethiopian	Oriental	Austra-lian
Calitys	x(1)[a]		x(2)		
Ostoma	x		x		x(1)
Grynocharis	x				
Thymalus	x				
Eronyxa					
Lophocateres[b]	x	x	?	x	
Nemosoma	x	x			
Cylidrella		x			
Corticotomus		x			
Euschaefferia					
Airora		x	Alindria	Alindria	Alindria
Temnochila	x(1)	x		x(1)	
Tenebroides[c]		x			x(1)

[a]Numbers refer to number of species.

[b]Lophocateres is represented in North America only by the economically important pusillus (Klug), distributed by commerce, primarily from the tropical areas of the world.

[c]The economically important Tenebroides mauritanicus (Linnaeus), also, at least in major part distributed by commerce, is not included.

SYSTEMATICS OF GENERA AND SPECIES OF NORTH AMERICAN TROGOSITIDAE

Subfamily Peltinae

The following characters are diagnostic: Form broad, oval; head about one-half as wide as pronotum; lacinia of maxilla near apex with hook or spine. The front coxal cavities are open behind in all members of the subfamily except Calitys. Members of Calitys can be separated from those of Trogositinae, also with closed front coxal cavities, by the tuberculate dorsal surface of the body.

See pages 28-31 for synonymy, description, and discussion of the subfamily and page 24 for key to genera.

Calitys Thomson

Peltidea Motschulsky, 1858:136 (nomen oblitum).

Type-species: Peltidea dentata (Fabricius), by monotypy.

Calitys Thomson, 1859:71; 1862:191; LeConte and Horn, 1883: 154; Seidlitz, 1891a:51; 1891b:240; Ganglbauer, 1899: 429; Schaeffer, 1915:68; 1918:200; 1920:194; Hatch, 1962:188; Crowson, 1964:296.

Type-species: Silpha dentata Fabricius, 1787 (= Hispa scabra Thunberg, 1784), by original designation and monotypy. Later citation: Peltis dentata Fabricius by Pascoe, 1872:319.

Calytis; Reitter, 1911:6,7 (misspelling).

Nosodes LeConte, 1861a:88 (without species); 1863b:31; Pascoe, 1872:319; Reitter, 1876:43; 1882:145, 146; Marseul, 1885:140, 152.

Type-species: Peltis dentata Fabricius, by subsequent designation and monotypy (Pascoe, 1872:319).

Peltis (pars); Redtenbacher, 1872:373; Seidlitz, 1875:153.

Four species are included in this genus; two in Africa, C. minor Hatch of North America and the common scabra (Thunberg) of Europe and America north of Mexico. The distribution pattern indicates a Palaearctic, or possibly an earlier Ethiopian, origin of the group rather than a New World origin as in the case of the Trogositinae. Divergence to the minor pattern most probably took place in northern America, less probably in Europe, from a scabra prototype.

The head and pronotal callosities, tuberculate elytra, and closed front coxal cavities are unique, separating this genus from others in the subfamily.

Description. Form subdepressed, oval, broad; scabrous, strongly, coarsely punctate; dorsal surface tuberculate, each tubercle with a setiferous puncture; with elevated callosities of coalescent tubercles. Pronotum and elytra with sides explanate, margins serrate, regularly spinose.

Head small, not concealed by pronotum; front

anterolateral to eye tumescent, anteriorly declivous. Lacinia with two apical hooks on inner margin (Fig. 2). Mandibles truncate, mola not ridged or asperate (Fig. 9). Mentum transverse, apically emarginate. Antenna elongate, robust, with eleven articles; interstices distinct, shallow.

Pronotum broad, with disc strongly elevated, tuberculate; with two pairs of prominent callosities of coalescent tubercles; margins broadly explanate, narrowly reflexed, dorsoventrally side elevations from disc strongly oblique, apical and basal angles obtuse, apical margin at sides strongly emarginate; lateral margins immediately before basal angles strongly emarginate, basal margin before angles sinuate, bead complete. Front coxal cavities closed behind; prosternum between coxae very broad, marginate, at apex broadly expanded laterally. Metasternum between basal margin of mesocoxal cavity and episternal suture without distinct curved line separating apical angle. Tibia with upper edge marginate, with row of numerous very small, stout spines; front tibia at apex with small hook.

Elytra broad, with distinct, tuberculate carinae, interrupted or not; tubercles each with setiferous puncture. Each interval with three somewhat irregular rows of coarse punctures. Sides broadly explanate, margin somewhat reflexed; convergent slightly posteriorly except apical third convergent strongly to suture; dorsoventrally side elevations from disc strongly oblique, almost vertical.

Abdominal sternum 8 as in Figs. 129, 150; segment 9 as in Figs. 136, 144.

Key to North American species of Calitys

1 Pronotum with callosities prominent, elevated; elytral carinae with prominent, elevated, coalescent tubercles, particularly apically; second and third carinae at apex coalescent, fifth at sides present . . . . . scabra (Thunberg), p. 43

\- Pronotum with callosities much less prominent; elytral carinae with tubercles scarcely elevated; second and third not coalescent apically, fifth at sides not evident . . . . . minor Hatch, p. 51

Calitys scabra (Thunberg)

Peltis scabra Müller, 1776:63 (not binomial).

Hispa scabra Thunberg, 1784:15. TYPE LOCALITY: "Svecia."

Peltis scabra; Fourcroy, 1785:30.

Silpha scabra; Herbst, 1793:197.

Calitys scabra; Crotch, 1873:47; Hubbard and Schwarz, 1878a: 634; 1878b:653; Léveillé, 1888b:443; 1900:19; Seidlitz, 1891b:240; Ganglbauer, 1899:430; Blatchley, 1910:666; Reitter, 1911:8; Casey, 1916:285; Schaeffer, 1920:194; Hatch, 1962:189.

Nosodes scabra; Reitter, 1882:146.

Silpha dentata Fabricius, 1787:50. TYPE LOCALITY: "Europa." Paykull, 1798:338 (not binomial); Fabricius, 1801:342; Thomson, 1859:71; 1862:191.

Peltis dentata; Illiger, 1798:372, 375; 1807:338; Sturm, 1807:84; Gyllenhal, 1808:255; Schönherr, 1808:134; Duftschmid, 1825:124; Castelnau, 1840:8; Küster, 1844:24; Erichson, 1845:248; Bach, 1849:226; Redtenbacher, 1849:176, 840; 1858:341; 1872:373; Lacordaire, 1854:349; Jacquelin du Val, 1859:108; Thomson, 1859:71; 1862:191; Seidlitz, 1875:153.

Peltidea dentata; Motschulsky, 1858:136.

Nosodes dentata; Pascoe, 1872:319; Marseul, 1885:152.

Bolitophagus silphides Newman, 1838:378. HOLOTYPE: labelled as follows: "type (BM circular type label); silphides Newman Ent. Mag. V 378 (black label)"; BM. TYPE LOCALITY: "Trenton Falls, N. Y."

Nosodes silphides; LeConte, 1863b:31.

Peltis serrata LeConte, 1859:84. LECTOTYPE (here designated): labelled as follows: "(blue disc); Type 7039 (white and red label); Nosodes serrata Lec."; MCZ. TYPE LOCALITY: "Washington Territory."

Nosodes serrata; Casey, 1916:285; LeConte, 1863b:31; Hatch, 1962:189.

Individuals of scabra are easily separated from those of minor by the characters given under the latter.

Description. Form subdepressed, oval, scabrous, tuberculate, each tubercle with a puncture containing one scale-like seta. Colour dark brown to black. Length 6.6 - 12.2 mm; ratio pronotum L/W as in Table VII; number of

spines on margin of elytron from base to suture as in Table VII.

Head small, densely tuberculate; front lateroapical to eye tumescent; medially with prominent subtriangular callosity, declivous apically, basally surrounded by narrow, semicircular, smooth concavity without tubercles, posteriorly elevated, with tubercles. Antenna elongate, robust, with eleven articles, each much broader than long; club short, compact, much shorter than articles 1 - 8; funiculus with interstices large, prominent.

Pronotum with disc apically and laterally strongly elevated, with two pairs of prominent callosities at sides; first apical callosity obliquely projecting over base of head, second at basal third vertical, further apart than first; medially from apical third to base narrowly longitudinally concave, without callosities or tubercles. Apical margin between angle and callosity deeply emarginate, with prominent bead; apical angles obtuse, almost right, narrowly rounded; sides broadly emarginate, broadly concave, very coarsely, not closely, punctate, each puncture with one seta; obliquely elevated towards disc, tuberculate, at basal third with broad shallow callosity. Lateral margins serrate, strongly, regularly spinose, broadly obliquely arcuate, immediately before basal angles deeply, narrowly emarginate. Basal margin strongly, broadly sinuate before basal angles; bead prominent.

Elytron with sutural and three discal carinae; sutural

entire, not tuberculate; discal prominent, tuberculate, with prominent elevations of coalescent tubercles; first interrupted, except basally, at apex strongly elevated, vertical or obliquely projecting posteriorly; second interrupted at basal quarter; third entire, second and third coalescent at apex where prominent, elevated, obliquely, posteriorly projecting. Fifth carina interrupted at sides, somewhat obscure, without prominent elevation. Between carinae transversely, strongly rugose, not or scarcely tuberculate, punctures coarse, in three somewhat irregular rows, each puncture with a scale-like seta. Side elevation between disc and margin strongly oblique, almost vertical; between base of elevation and margin narrowly explanate, at apical half shallowly concave; margin serrate, strongly, regularly spinose, narrowly reflexed. Laterobasal margin angulate, anteriorly projecting strongly; lateral margin at basal third broadly emarginate; from apical third convergent strongly to suture.

Remarks. The type specimen of serrata LeConte is dark grey in colour, one of the many intermediate conditions within the colour range of the group. It is similar to other individuals seen, in all essential respects. Specimens of serrata, determined by Casey, are dark grey to black, and of scabra dark brown in colour.

The type specimen of Bolitophagus silphides Newman was examined by R. B. Madge (B.M.) (pers. comm.). The second elytral carina was more noticeably interrupted and

the pronotum was more strongly notched immediately before the apical angles than in the specimen compared. Many individuals correspond to the type in these characters which are among the most variable within the group.

Variation. Colour varies from dark brown to black; eastern individuals are predominantly brown, western ones predominantly black; those in the broad central part of the range are intermediate, brown, or black. The ratio L/W of pronotum and the number of spines on the side of the elytron from base to suture of scabra and minor are significantly different (Table VII).

Collecting notes. Collected from Fomes pinicola July (Glenn, Lassen, Mariposa, San Bernardino, Tulare Co., California), on tree fungus (Klamath Co., Oregon), under bark of dead pine log (Klamath Lake, Oregon), from lake drift (Duparquet, Quebec).

Distribution. Generally distributed in west, in east and middle North America predominantly northern. Also widely distributed in Europe. Eight hundred and thirty-two specimens were examined from the following localities:

CANADA

ALBERTA: Banff (UASM); Beaverlodge (UASM); Calgary (UASM); Edmonton (UASM); 2 mi. S. Elkwater (UASM); Kananaskis (CAS, UASM); Laggan (AMNH, CAS); Lake Minnewanka (UASM); Waterton (UASM); Waterton Lake (CNC, UASM).

BRITISH COLUMBIA: Adams Lake (INHS); Anyox (CAS); Aspen Grove (CAS); 15 mi. NW. Beaton River (CAS); Beaverfoot Range Rocky Mountains (AMNH); Blue River (INHS); Brookmere (CNC, UW); Creston (CNC); Diamond Head Trail, Garibaldi Park, Squamish (CNC); Emerald Mine (CAS); Enderby (CNC); Fairmont Hot Springs (UASM); Fernie (CAS); Forestry Station, New Westminster (CNC); Hosmer (CAS); Kaslo (CNC); Laidlaw (INHS); Midday Valley, Merritt (CU, INHS); Monashée Mine (CAS); Mount Cheam (CNC); Nelson (UW); North Bend (CNC); Paradise Mountain (CNC); Peachland (CNC, CU); Pender Harbor (CAS, CNC); Princeton (INHS); Salmon Arm (CAS, CU, MCZ); Steelhead (CAS, CNC); Terrace (CU, MCZ, UASM); Trinity (CNC, UW); Vancouver (INHS, MCZ); Vernon (CAS, CNC); Whiteman's Creek (CAS); Wyndel (CNC).

MANITOBA: Riding Mountain Park (CNC).

NORTHWEST TERRITORIES: Deep Bay, Great Slave Lake (DJL).

ONTARIO: Arnprior (CNC); Constance Bay (CNC); Ottawa (CNC); Sudbury (CNC); Toronto (CU).

QUEBEC: Duparquet (CAS); Kazubazua (CNC); Queen's Park, Aylmer (CNC); Val Morin (MCZ).

UNITED STATES

ALABAMA: Cheaha St. Pk. (CAS).

ALASKA: Skagway (CAS).

ARIZONA: Apache Co., White Mts. (CAS, UKL); Cochise Co., Chiricahua Mts. (UKL), Rustler Park, Chiricahua Mts. (UKL); Gila Co., Globe (CU); Graham Co., Graham Mts. (CAS); Pima Co., Santa Catalina Mts. (CAS).

CALIFORNIA: Amador Co., T+N Rise (CAS); Calaveras Co., Camp Connell (CAS), Mokelumne Hill (CAS), 3 mi. E. West Point (CAS); El Dorado Co., Echo Lake, 7400 ft. (CAS), Fallen Leaf (CAS), Lake Tahoe (CAS), Tallac (CAS); Fresno Co., Camp 6 (CAS), Dalton Creek (CU), Huckleberry Meadow (CAS), Huntington Lake (CAS), King's River Canyon (CAS), Lakeshore (MCZ); North Fork (CAS); Glenn Co., Plaskett Meadows, 6200 ft. (MCZ); Humboldt Co., Green Point (CAS); Lassen Co., Chester (CAS, OSU), Facht (CAS), Grassy Lake (CAS, CNC), Janesville (MCZ), Lassen N.F. (CNC); Madera Co., Bass Lake (CAS,CNHM), Biledo Meadow (CAS), Chiquito (CU); Mariposa Co., Beehive, Yosemite (CAS); Carl Inn, Yosemite (CAS); 5 mi. ENE., Fish Camp (CAS), 7 mi. ENE. Fish Camp (CAS), 6 mi. NW. Fish Camp (CAS), Miami Ranger Station (CNHM), Pinecrest, 10 mi. NW. Yosemite (CAS); Mendocino Co., Hullville (CNHM); Mono Co., Mammoth (CAS), Twin Lakes (CNHM); Nevada Co., Soda Springs (CAS); Placer Co. (AMNH, MCZ); Plumas Co., Meadow Valley (CAS); Riverside Co., Idyllwild, 13 mi. NW. Keen Camp (MCZ, OSU); San Bernardino Co., Black Canyon, San Jacinto Mts. (MCZ), Dark Valley, San Jancinto Mts. (CAS), Forest Home (CAS), 4 mi. E. Running Springs (MCZ); Santa Cruz Co. (CAS); Shasta Co. (CAS, CNHM), Hat Creek R.S. (CAS), Summit Lake (CAS), Thousand Lakes (CAS), Viola (CAS, UKL); Sierra Co., Truckee (MCZ); Siskiyou Co. (CAS), Mount Shasta (CNHM, MCZ); Sonoma Co. (CU); Tehama Co., 10 mi. SE. Mineral (MCZ), 13 mi. W. Mineral (OSU); Trinity Co. (CNHM), Carrville (CAS, CNHM, MCZ); Tulare Co.

(CNHM, CU, USNM), Camp Nelson (CU), Colony Mill (CAS), Marble Bridge (CAS), Round Meadow, Giant Forest (CAS), Scaffold Meadow (CAS), Sequoia National Forest (CAS); Tuolumne Co. (AMNH, MCZ), Crane Flat (MCZ), Dardanelle (MCZ), Sonora (WHT); Yuba Co., Brownsville (CAS); Deer Park Inn (AMNH); Frog Lake (CAS, UASM).

COLORADO: Clear Creek Co., Idaho Springs (CAS), Leavenworth Valley ab. Georgetown, 9000 - 10,000 ft. (MCZ); Dolores Co., vicinity of Rico, 85 - 1000 ft. (MCZ); La Plata Co., vicinity of Durango, 5500 - 7000 ft. (MCZ); Lake Co., Leadville (AMNH); Routt Co., Steamboat Springs (CAS); Summit Co., Breckenridge (CAS, MCZ).

IDAHO: Benewah Co., Saint Maries (CAS); Shoshone Co., Kellogg (UW), Wallace (AMNH, CNHM); Valley Co., Priest Lake (CNHM), Smith's Ferry (UW).

MARYLAND: (ANSP)

MICHIGAN: Cheboygan Co. (UKL).

MINNESOTA: Saint Louis Co., Duluth (MCZ).

MONTANA: Flathead Co., Columbia Falls (CU).

NEVADA: Lake Tahoe (CAS).

NEW HAMPSHIRE: Hillsboro Co., Temple (MCZ).

NEW MEXICO: Otero Co., Cloudcroft (CU, MCZ); Sandoval Co., Calveras Creek Camp, Jemez Mts. (AMNH); Santa Fe Co., Santa Fe (CAS); Tres Ritos (CAS).

NEW YORK: Allegany Co., Allegany Park (CU); Erie Co., Buffalo (OSU); Herkimer Co., Newport (MCZ); Orange Co., Greenwood Lake (CAS); Queens Co., Central (CAS).

OREGON: Baker Co., Pine Creek (UW); Benton Co., Corvallis

(MCZ, UW); Clackamas Co., Colton (CAS); Coos Co., Winchester Bay (CNHM); Deschutes Co., Elk Lake (UW); Douglas Co., south fork Umpqua River, 14 mi. N. Tiller (CNC); Grant Co., Canyon Creek, S. Canyon City (UW); Jackson Co., Green Springs (CAS); Klamath Co., 2 mi. S. Four Mile Lake (UW), Klamath Lake (CAS), Upper Klamath Lake (UW); Lincoln Co., Taft (CAS); Multnomah Co., Mount Taber, Portland (MCZ); Tillamook Co., Manzanita (UW); Wasco Co., Boyd (UW), Maupin (UW).

PENNSYLVANIA: Monroe Co., Delaware Water Gap (AMNH).

SOUTH DAKOTA: Custer Co., Custer (CAS).

WASHINGTON: King Co., Baring (CAS), Black Diamond (UW), Seattle (UW); Klickitat Co., Mount Adams, 3000 ft. (AMNH); Pierce Co., Eatonville (UW), Carbon River, Mount Rainier, 2000-3000 ft. (CNHM), Paradise Valley, Mount Rainier (CAS); Snohomish Co., Darrington (UW); Thurston Co., Olympia (UW); Walla Walla Co., Blue Mts. E. Dixie, 4000 ft. (UW); Whatcom Co., Ferndale (UW); Whitman Co., Pullman (AMNH); First Creek (CNC); Lake Quiniault (CAS); Mount Washington (AMNH).

WISCONSIN: Oconto Co., Mountain (CNHM).

Calitys minor Hatch

Calitys minor Hatch, 1962:189. HOLOTYPE: not seen.

PARATYPES: six specimens, collected 10-12 July, 1935, Miner's Ridge, Mt. Baker Nat. For., Washington, 12 Aug., 1938, 12 Sept., 1938, Crater Lake, Oregon, summer 1936, Sunset Park, 5000-6400 ft., Wallace, Idaho, UW; one specimen collected 1 Aug., 1915, Emerald Mine, British Columbia, B. Hopping

collection, CAS. TYPE LOCALITY: "Crater Lake, Ore."

Individuals of this species are similar to those of scabra except as follows:

Colour reddish brown, sides paler, somewhat translucent; less scabrous; setae finer, not scale-like; pronotal and elytral margins more strongly explanate and complanate; spines smaller; size smaller, length 6.1 - 8.1 mm; ratio L/W pronotum, number of spines on side of elytron from base to suture as in Table VII.

Head less tuberculate; median callosity less prominent. Antennal club longer, articles 1 - 8 combined shorter, club less compact, interstices larger.

Pronotum less convex, disc less strongly elevated, less tuberculate; with two pairs of callosities much less elevated, less prominent; without median, longitudinal, smooth concavity; apical margin at sides between angle and discal callosity more broadly emarginate; sides between base of elevation and margin less strongly concave; lateral margin immediately before basal angles more broadly, shallowly emarginate; basal margin at middle more strongly arcuate.

Elytron with all carinae interrupted, without prominent elevations of coalescent tubercles; first and second discal at apex with two enlarged, moderately elevated tubercles; second and third at apex not coalescent; fifth at sides not evident.

Remarks. Most individuals of minor can be separated from those of scabra by the ratio L/W pronotum and the number of spines on the side of the elytron from base to suture (Table VII).

Collecting notes. Specimens were collected from Polyporus fragilus (Lamoille, Nevada; nr. Lakeshore, California), two paratypes in fungus 12 Aug., 12 Sept. (Crater Lake, Oregon).

Distribution. Western; Yukon to California; northeastern, north to Quebec. Forty-three specimens were examined from the following localities:

CANADA

BRITISH COLUMBIA: Emerald Mine (CAS).

QUEBEC: Duparquet (CAS); Great Whale River (CNC).

YUKON: Ross River (CNC).

UNITED STATES

CALIFORNIA: Fresno Co., 4 mi. NE. Lakeshore (MCZ); Mono Co., Mammoth Lakes (CAS); Tuolumne Co., Tuolumne Meadows (CU).

COLORADO: Pitkin Co., Aspen (AMNH); Rabbit Ears Pass, 9000 ft. (CAS).

IDAHO: Shoshone Co., Sunset Park, Wallace, 5000-6400 ft. (UW).

NEVADA: Elko Co., Lamoille (MCZ), 14 mi. SE. Ruby Mts. (MCZ); Ormsby Co. (CNHM).

OREGON: Klamath Co., Crater Lake (UW).

WASHINGTON: Klickitat Co., Mount Adams, 6000 ft. (AMNH); Pierce Co., Sunrise Park, Rainier National Pk. (CAS); Miner's Ridge, Mt. Baker Nat. For. (UW).

TABLE VII

VARIATION IN RATIO L/W PRONOTUM AND IN NUMBER OF SPINES ON MARGIN OF ELYTRON AMONG POPULATION SAMPLES OF SPECIES OF *Calitys*

Species	Locality	N	Range	Mean	± SD
				Pronotum L/W	
scabra	B.C.	48	0.46 - 0.53	0.49	0.017
scabra	Que.	22	0.44 - 0.51	0.47	0.020
scabra	Colo.	32	0.46 - 0.51	0.48	0.012
minor	Colo.	17	0.39 - 0.46	0.42	0.020
				Number of Spines	
scabra	Que.	22	32 - 39	35.5	1.92
scabra	Colo.	32	34 - 46	38.7	2.88
minor	Colo.	15	45 - 60	53.9	4.10

Ostoma Laicharting

Ostoma Laicharting, 1781:102; Des Gozis, 1886:11; Reitter, 1911:6, 8; Schaeffer, 1918:200; 1920:194; Crowson, 1964:286, 295.

Type-species: Pelris ferruginea (Linnaeus)(= Silpha ferruginea Linnaeus), by subsequent designation (Stephens, 1830:368) (Pelris, misspelling of Peltis).

Later citations: Ostoma ferrugineum (Linnaeus) by Des Gozis, 1886:11; Ostoma ferruginea (Linnaeus) by Crowson, 1964:286.

Ostoma (pars); Reitter, 1876:61; 1882:146, 147; Semenow, 1898:286; Ganglbauer, 1899:430; Hatch, 1962:186.

Ostoma (subgenus); Reitter, 1882:147 (misapplied); Ganglbauer, 1899:432; Hatch, 1962:187.

Silpha (pars); Fabricius, 1787:49; Herbst, 1793:195; Paykull, 1798:339.

Peltis (pars); Kugelann, 1793:508; Illiger, 1798:370; Fabricius, 1801:343; Gyllenhal, 1808:252; Schönherr, 1808:132; Curtis, 1824:pl.39; Duftschmid, 1825:123; Gebler, 1830:96; Audouin and Brullé, 1835:408; Sturm, 1839:75; Castelnau, 1840:7; Erichson, 1844:456; 1845:245; Redtenbacher, 1845:75; 1849:20, 176; 1858:LXXIX, 341; 1872:373; 1874:LXXXVI; Bach, 1849: 226; Lacordaire, 1854:349; Jacquelin du Val, 1858: 164; LeConte, 1861a:88; 1863b:31; Seidlitz, 1875:34, 153; 1891a:51; 1891b:240; LeConte and Horn 1883:154;

Marseul, 1885:146.

Peltis; Stephens, 1830:29, 44.

Thymalus; Latreille, 1807b:8.

Gaurambe Thomson, 1859:70 (misapplied).

Gaurambe Thomson, 1862:189; Léveille, 1888b:447; 1900:24. Type-species: Silpha ferruginea Linnaeus, by monotypy.

Gaurambe (subgenus of Peltis); Seidlitz, 1891b:240.

Gaurambe (subgenus of Ostoma) (pars); Reitter, 1882:148.

Thomson (1859:70) designated Peltis oblonga (Linnaeus) as type-species of Gaurambe Thomson, gen. n., as follows: "Gaurambe . Peltis Gyll. Typus G. oblonga (Lin.): Gyll. I. 253.2" and immediately following, page 71, designated P. oblonga as type-species of Gryncharis Thomson, gen. n., as follows: "Grynocharis . Peltis Gyll. Typus G. oblonga (Lin.): Gyll. I. 254.3." Number 253.2 refers to P. ferruginea, 254.3 to oblonga (Gyllenhal, 1808:253, 254). In 1862, Thomson referred to his 1859 paper, listed ferruginea under Gaurambe and oblonga under Grynocharis, pages 190, 191, respectively. Thomson's 1859 reference of oblonga to Gaurambe is obviously misapplied and is thus considered here as an invalid designation.

The distribution of North American species of Ostoma is predominantly northern and as in the case of Calitys their origin is undoubtedly Old World. One North American species, ferruginea, occurs throughout Europe. About twelve

species are included in the predominantly Holarctic Ostoma and Zimioma.

This group is similar in overall appearance to Calitys, differing, among other characters, by the open front coxal cavities; and distinct from other genera of the subfamily, except Lophocateres, by the elytron with sutural and six discal carinae. Members of Ostoma differ from Lophocateres by the larger, broader form and by the two apical hooks on the inner margin of the lacinia instead of two spines, one apical and one on the outer margin near the apex.

Description. Form subdepressed, oval, broad; dorsal surface glabrous except elytral tubercles (pippingskoeldi) setose; strongly, coarsely punctate. Size larger, length 5 - 10 mm. Pronotum and elytra with sides explanate.

Head small, not concealed by pronotum, densely, coarsely punctate. Front lateral to eyes tumescent, anteriorly declivous, broadly bitumerose. Lacinia with two apical hooks on inner margin (Figs. 3, 4). Mandibles truncate, mola not ridged or asperate (Fig. 10). Mentum transverse, apically emarginate. Antenna elongate, moderately robust; with eleven articles, interstices large, shallow; last article ovate, narrowed toward apex (Figs. 12, 13).

Pronotum broad; coarsely punctate; margins smooth or scarcely crenulate; apex strongly emarginate; apical angles acute, strongly produced, narrowly rounded, interior margin straight; disc irregularly, shallowly convex; sides broadly explanate; before angles shallowly, obliquely arcuate;

margins reflexed, scarcely or strongly; dorsoventrally side elevations from disc strongly oblique; basal angles acute, broadly rounded; basal marginal bead complete. Front coxal cavities open behind; prosternum between coxae flat, marginate. Metasternum between basal margin of mesocoxal cavity and episternal suture without distinct curved line separating apical angle. Tibia with upper edge marginate; with numerous small, stout spines; front pair at apex anteriorly with prominent hook, posteriorly with smaller hook.

Elytra broad, each elytron with one sutural and six discal costae, smooth, convex, entire or with tuberculate, setiferous, interrupted carinae; with two rows of coarse, usually transversely confluent, punctures between carinae; sides broadly explanate, punctures serially arranged, margins strongly reflexed, smooth or scarcely crenulate, slightly convergent to suture posteriorly except strongly convergent from basal two-thirds, dorsoventrally side elevations from disc strongly oblique.

Abdominal sternum 8 as in Figs. 130, 151; segment 9 as in Figs. 137, 145.

Key to North American species of Ostoma

1 Elytra with carinae tuberculate, interrupted; disc with several rufotestaceous spots. Scutellum coarsely, densely punctate . . . pippingskoeldi (Mannerheim), p. 59

- Elytra with costae not tuberculate, regularly convex, entire; uniformly coloured. Scutellum finely, sparsely punctate 2

2(1) Pronotum with margins strongly reflexed, forming shallow, broad concavity between disc and margin; narrower; with basal margin at sides emarginate; apex between angles narrow, strongly reflexed (Fig. 66). . . . . columbiana Casey , p. 72

\- Pronotum with margins not or scarcely reflexed, not forming concavity between disc and margin; broader; with basal margin at sides straight; apex between angles broad, regularly, shallowly convex (Fig. 65). . . . . ferruginea (Linnaeus), p. 66

Ostoma pippingskoeldi (Mannerheim)

Peltis pippingskoeldi Mannerheim, 1852:333. TYPE LOCALITY: "Sitkhae." Mannerheim, 1852:349.

Peltis pippingskoeldi; LeConte, 1863b:31.

Ostoma pippingskoeldi; Crotch, 1873:47; Reitter, 1876:62; Schaeffer, 1920:194; Casey, 1924:186.

Gaurambe (Gaurambe) pippingskoeldi; Léveillé, 1888b:448; 1900:24.

Ostoma (Ostoma) pippingskoeldi; Hatch, 1962:188.

The elytra, with rufotestaceous spots and tuberculate carinae, are unique.

Description. Form subdepressed, broad. Colour reddish brown, sides paler; opaque; elytral disc with about seven prominent, irregular, rufotestaceous spots. Pronotal disc and elytral tubercles shiny. Dorsal surface except

elytral tubercles without setae. Length 5.3 - 10.5 mm; ratios pronotal L/W and W/L elytron as in Table VIII.

Head coarsely, closely, punctate. Antenna elongate; funiculus much longer than club; articles 3 - 5 elongate, 6 - 8 broad as long, interstices shallow (Fig. 12).

Pronotum with disc closely, moderately coarsely punctate, with four median calli forming a square; sides explanate, less closely, more coarsely punctate; strongly, broadly reflexed forming shallow broad concavity between disc and margin; margin crenulate, at angles more strongly, at apex reflexed, between angles strongly; apical and basal angles acute, broadly rounded; basal margin shallowly, irregularly arcuate, before angles emarginate. Scutellum coarsely, densely punctate, oval, apically arcuate. Prosternum between coxae relatively broad. Legs, particularly tibiae, relatively short.

Elytra almost as broad as long, with carinae serially arranged, of shiny tubercles, each with few very small setae; rows 2, 3, 4 with double, 1, 5, 6, 7 with single row of tubercles; rows 1, 2, 3, 5 complete, 4 obsolete except basally, 6 complete at humeral callus, 7 complete except basally; intervals opaque, with double row coarse punctures, transversely rugose. Laterobasal margin crenulate. Sides between disc and margin broadly explanate to apex; strongly, broadly reflexed, coarsely punctate, transversely rugose; convergent slightly from base, more strongly from basal two-thirds to suture.

Collecting notes. Specimens were collected from Fomes pinicola on Pseudotsuga taxifolia (Marin, Mendocino, and Santa Cruz Co., California), Fomes pinicola on Abies concolor (15 mi. NE. Arnold, Calaveras Co., California), Polyporus abietinus on Abies concolor (Lakeshore, Fresno Co., California), Abies magnifica and Pinus jeffreyi (Plumas Co., California).

Distribution. West of Great Plains, north to Alaska. Nine hundred and thirty-seven specimens were examined from the following localities:

CANADA

BRITISH COLUMBIA: Anyox (CAS, MCZ); Bowser (CNC); 8 mi. N. Clinton, 3800 ft. (REL); Courtenay (UASM); Creston (CNC); Diamond Head Trail, Garibaldi Park (CNC); Forbidden Plateau, Vancouver Island (UASM); Inverness (MCZ); Kamloops (CAS); Laidlaw (INHS); Lillooet Dist. (INHS); Merville, Vancouver Island (CNC); Metlakatla (MCZ); Midday Valley (INHS); Oliver (CAS, CNC); Oyster River (CU); Peachland (CNC); Princeton (INHS, CAS); Prospect Lake, Vancouver Island (UASM); Salmon Arm (CAS); Salmon River, Glenemma (CAS); Sandspit, Queen Charlotte Is. (CAS, CNC); S. Gabriola (UW); Squamish, Diamond Head Trail (CNC); Steelhead (CAS, CNC); UBC Forest, near Haney, 1100 ft. (CNC); Terrace (CU, MCZ, UASM); Union Bay (CNC); Vancouver (CAS, CNC, INHS, UASM); Vernon (CAS); Victoria (INHS); Wellington, Vancouver Is. (UW).

UNITED STATES

ARIZONA: Apache Co., White Mts. (CAS, UKL); Cochise Co., Chiricahua Mts. (AMNH, CAS), Rustler Camp, Chiricahua Mts., 8500 ft. (AMNH), Rustler Camp, Chiricahua Mts. (CAS), Rustler Park, Chiricahua Mts. (AMNH, CAS, UKL); Coconino Co., Oak Creek Canyon (UKL), Snow Bowl, San Francisco Peaks (CU); Graham Co., Graham Mts. (CAS); Pima Co., Bear Wallow, Santa Catalina Mts., 7600 ft. (AMNH), Santa Catalina Mts. (CAS). CALIFORNIA: Butte Co., Butte Creek, near Chico (CAS), Butte Springs (CAS); Calaveras Co., 15 mi. NE. Arnold (MCZ), Mokelumne Hill (CAS), 3 mi. E. West Point (CAS); El Dorado Co., Echo Lake (CAS), Fallen Leaf (CAS), Fallen Leaf Lake (AMNH, CAS), Snowline Camp (CAS), Strawberry Valley (CAS); Fresno Co. (AMNH), Camp 6 (CAS, UASM), Dalton Creek, 4800 ft. (CU), Huckleberry Meadow, 6500 ft. (CAS), Huntington Lake (CAS, MCZ), Independence Lake, 7000 ft. (CAS), Lakeshore (MCZ), Millwood (CAS), North Fork (CAS, CU), 3 mi. E. Shaver Lake (MCZ), Summit Meadow, 7500 ft. (CAS); Glenn Co., Plaskett Meadow (CAS, MCZ); Humboldt Co., Blocksburg (CAS), Green Point (CAS); Inyo Co., Deep Creek (CAS); Lassen Co., Black's Mt. (MCZ), Chester (CNHM, OSU), Facht (CAS), Mineral (CAS), Norval Flats (CAS); Los Angeles Co., Jackson Lake (MCZ), Mount Wilson (CAS); Madera Co., Arnold Meadow (CAS), Bass Lake (ANSP, CAS, CNHM), Biledo Meadow (CAS), Chiquito Creek (CAS); Marin Co., Alpine Lake (MCZ), 5 mi. N. Bolinas (WHT), Lagunitas (CAS), Occidental (WHT), Taylor State Park (CAS); Mariposa Co., 5 mi. ENE. Fish Camp

(CAS), Fish Camp (MCZ), Glacier Point, Yosemite (AMNH, CNHM, INHS), Mariposa Grove, 6150 ft. (INHS), Mariposa Meadow, 7750 ft. Ten Lake Trail, Yosemite (CAS), Pothole Meadow, 7750 ft. (CAS), Yosemite (CAS), Yosemite Valley (AU, CAS, INHS, UW); Mendocino Co., Hullville (CNHM), 1 mi. S. Pier Cy. (MCZ), Yorkville (CAS); Modoc Co., Buck Creek (CAS); Mono Co., Mammoth (CAS), Twin Lakes (CNHM); Napa Co., Bluff Lake (CAS), Mount Saint Helena (AMNH); Nevada Co., Nevada City (CAS); Orange Co., Atwoods Mill (CU); Placer Co. (AMNH), Angora Lake, Tahoe (CAS), Lake Tahoe (CAS, INHS), Tahoe (AMNH, TAM); Plumas Co. (CAS, TLE), Last Chance Creek (TLE), Mohawk (CAS, MCZ); Riverside Co., Hemet Reservoir, San Jacinto Mts. (CAS); Sacramento Co., Camp Sacramento (CAS); San Bernardino Co., Big Bear Lake, 7500 ft. (CNC), Lake Arrowhead (CAS), 4 mi. E. Running Springs (MCZ), San Bernardino Mts., 7500 ft. (CAS), Stockton Flat (CAS); San Diego Co., Alpine Dam (CAS); San Francisco Co., Berkeley (AMNH), San Francisco Bay Area (CAS); San Mateo Co. (CNHM, USNM), Big Basin (CU), Los Gatos (MCZ); Santa Barbara Co., Figueroa P.C. (CAS); Santa Cruz Co., Ben Lomond (MCZ), 9 mi. NE. Big Basin, 2500 ft. (CAS); Shasta Co. (CNHM), Burney (UKL), Cayton (CAS), Grassy Lake, Lassen National Forest (CAS), McCloud (CAS), Manzanita Lake, Lassen National Park (CAS, UKL), Summit Lake (CAS); Sierra Co., Gold Lake (CU), Summit, Sierra Nevada (MCZ), Truckee (CNHM, MCZ); Siskiyou Co., Mount Shasta (CAS, MCZ, UW), Tate Creek, 5000 ft. (CAS); Sonoma Co. (CNHM, MCZ); Trinity Co.,

Carrville (CAS), Coffee Creek (CAS), Plummer Springs (CAS), Trinity Dam (WHT); Tulare Co. (CNHM, CU), Giant Forest (CAS), Kaweah (CAS), Portugese Pass, 7 mi. SE. Pine Flat (MCZ), Round Meadow, 6400 ft. (CAS), Scaffold Meadow (CAS), Sentinel Dome, Kings Canyon National Park, 3117 ft. (CAS), Sequoia National Park (CAS, CNC); Tuolumne Co., Big Tree Grove (CAS), Crane Flat (MCZ), Dardanelle (MCZ), Grouse Meadow (AMNH), Pinecrest (CAS), Sheepranch (WHT), Strawberry (MCZ), 7, 10, 19 mi. NE. Strawberry (MCZ), Tributary Niagara Creek, Niagara Creek Forest Camp Ground (CAS), Twain Harte (AMNH, CAS, WHT); Frog Lake (CAS); Miami (CU); Riverton (UASM).

IDAHO: Benewah Co., Saint Maries (CAS); Bonner Co., Priest Lake (CNHM); Kootenai Co., Coeur d' Alene (MCZ); Latah Co., Cedar Mt., Moscow (AMNH); Shoshone Co., Wallace (AMNH), Wallace, Sunset Park, 5000 - 6000 ft. (UW); Valley Co., McCall (CU), Smith's Ferry (UW).

NEVADA: Lake Tahoe, 8000 ft. (CAS).

NEW MEXICO: Bernalillo Co., E. side Sandia Mts. along road to Sandia Crest, 9200 ft. (INHS); Otero Co., Cloudcroft (ANSP, MCZ, UKL); Sandoval Co., Calaveras Creek Camp, Jemez Mts., 8000 ft. (AMNH); Santa Fe Co., Santa Fe (CAS); Torrance Co., Tajique (UKL).

OREGON: Benton Co., Blodgett (MCZ), Corvallis (AMNH, UW), Mary's Peak, 4000 ft. (UW); Clatsop Co., Cannon Beach (CAS, UW); Curry Co., Pistol River (UW); Douglas Co., Winchester Bay (CNHM, UW); Grant Co., Canyon Creek S. Canyon City (UW), Dixie Pass, Blue Mts. E. Prairie City (CNHM); Hood River Co;

Bear Springs R.S., Mount Hood N.F. (CNHM, UW), Mount Hood (CAS, CNHM, MCZ), Salmon River Camp, Mount Hood (UW); Jackson Co., Ashland Park, Siskiyou Mts., 7000 ft. (UW), Siskiyou (CNHM, UW); Klamath Co., Lake of the Woods, 5300 ft. (CNHM); Lane Co., Glenada (CNHM); Lincoln Co., Taft (CAS); Tillamook Co., Manzanita (CAS), Sandlake (UKL); Washington Co., Dilley (AMNH, CU), Forest Grove (AMNH); Yamhill Co., McMinnville (CAS); Cascade Head Exp. Forest (UKL); Heccta (CNHM); Pine Creek (UW); Ruch (UW); Sulphur Springs (AMNH).

UTAH: Grand Co., 3 mi. W. Geyser Pass, La Sal Mountains (AMNH); Kane Co. (OSU); Salt Lake Co., Brighton (ANSP); Indian Canyon (CNC).

WASHINGTON: Grays Harbor Co., Humptulips (CAS); Jefferson Co., Dabop B. (UW); King Co., Baring (CAS), Bothell (UW), Illahee (UW), Issaquah (UW), Lake Sammish (UW), Lester (UW), Seattle (AMNH, UW); Kitsap Co., Manchester (UW); Kittitas Co., Cle Elum (UW), Ellensberg (UW); Klickitat Co., Blackhouse (UW), Mount Adams, 3000 ft. (AMNH); Mason Co., Spillman Camp (CNC); Pierce Co., Carbon River, 2000 - 3000 ft., Mount Rainier (CNHM), Eatonville, Mount Rainier (UW), Mount Rainier (CAS, MCZ, UW), Nisqually Entrance, Mount Rainier (UW), Nisqually Glacier, Mount Rainier (MCZ), Paradise, Mount Rainier, 5500 ft. (CAS), Paradise Park, Mount Rainier, 6000 ft. (CAS), Paradise Valley, Mount Rainier (CAS, MCZ); San Juan Co., Orcas Island, San Juan Island (CNC); Snohomish Co., Sultan (UW); Thurston Co.,

Olympia (CAS), Olympia National Park (CAS); Whitman Co., Palousa (ANSP), Quillayute (UW).

Ostoma ferruginea (Linnaeus)

Silpha ferruginea Linnaeus, 1758:361. TYPE LOCALITY: "Europa." Degeer, 1774:183; Fabricius, 1787:49; Olivier, 1790:20; Herbst, 1793:195; Cederhielm, 1798:47; Paykull, 1798: 338 (not binomial); Panzer, 1801:17.

Ostoma ferruginea; Laicharting, 1781:102; Motschulsky, 1858: 136; Crotch, 1873:47; Reitter, 1876:62; 1911:9; Des Gozis, 1886:11; Semenow, 1898:283, 285; Jacobson, 1905: 894; Casey, 1916:285; 1924:186; Schaeffer, 1920:194.

Peltis ferruginea; Kugelann, 1793:509; Illiger, 1798:372, 375, 376; Fabricius, 1801:344; Sturm, 1807:80; Gyllenhal, 1808:253; Schönherr, 1808:132; Curtis, 1824:pl.39; Duftschmid, 1825:125; Gebler, 1830:96; Stephens, 1830: 29, 30, app. :368 (p. 44); Audouin and Brullé, 1835: 409; Randall, 1838:17; Castelnau, 1840:8; Erichson, 1844:457; 1845:246; Küster, 1844:22; Bach, 1849:226; Redtenbacher, 1849:176, 840; 1858:341; 1872:373; Lacordaire, 1854:349; Jacquelin du Val, 1859:108; LeConte, 1863b:31; Seidlitz, 1875:154; Hubbard and Schwarz, 1878a:634; Marseul, 1885:154; Blatchley, 1910:666.

Cassida ferruginea; Thunberg, 1794:104.

Thymalus ferruginea; Latreille, 1807b:9.

Ostoma (Gaurambe) ferruginea; Thomson, 1862:190.

Gaurambe (Gaurambe) ferruginea; Reitter, 1882:148; Léveillé, 1888b:447; 1900:24.

Ostoma oblongum var. ferrugineum; Schilsky, 1889:350.

Peltis (Gaurambe) ferruginea; Seidlitz, 1891b:240.

Ostoma (Ostoma) ferruginea; Ganglbauer, 1899:432; Hatch, 1962:187.

Silpha cimicoides Degeer, 1774:183 (not binomial). "TYPE LOCALITY:" Not given. Paykull, 1798:339 (not binomial).

Ostoma cassidoides Lepechin, 1774:312. TYPE LOCALITY: "Provinzen des Russischen."

Ostoma rubicunda Laicharting, 1781:102. TYPE LOCALITY: "Germania."

Peltis fraternus Randall, 1838:17. TYPE LOCALITY: "Maine." Lacordaire, 1854:350; LeConte, 1863b:31.

Peltis septentrionalis Randall, 1838:17. TYPE LOCALITY: "Maine." Lacordaire, 1854:350.

Ostoma nigricans Dalla Torre, 1879:32. TYPE LOCALITY: "Oberösterreich."

Ostoma ferrugineum var. nigricans; Schilsky, 1889:350.

Ostoma nigrina Casey, 1916:284. LECTOTYPE (here designated): labelled as follows: "Br.C.; CASEY bequest 1925; TYPE USNM 49181 (red label); nigrina Csy."; USNM. TYPE LOCALITY: "British Columbia (Aldermere)." Schaeffer, 1920:194; Casey, 1924:186. NEW SYNONYMY.

Ostoma (Ostoma) nigrina; Hatch, 1962:187.

The key characters readily separate individuals of this species from members of other species of Ostoma.

Description. Form subdepressed, broad. Colour uniformly dark reddish brown, except sides and ventral surface paler. Shiny. Pronotum and elytra with sides broadly explanate; dorsal surface without setae, ventral with sparse setae. Size larger; length 6.8 - 12.3 mm; ratios L/W pronotum and W/L elytron as in Table VIII.

Head closely, moderately coarsely punctate. Antenna relatively elongate, club short relative to articles 1 - 8 combined; funiculus with articles about as broad as long; interstices large but shallow (Fig. 13).

Pronotum much broader than long (Fig. 65), closely, moderately coarsely punctate except sides more coarsely, not closely punctate; disc broadly, regularly, shallowly convex; apex between angles broad (Fig. 65), margin not reflexed; apical angles acute, narrowly rounded; sides broadly explanate, not or scarcely reflexed, not forming distinct concavity between disc and margin; lateral margin not or scarcely crenulate; laterobasal margin broadly, more or less regularly rounded, basal margin adjacent to humeral callus emarginate, at middle slightly arcuate, at sides more or less straight. Scutellum finely, sparsely punctate, subtriangular, apicomedially bluntly pointed. Prosternum between coxae moderately narrowly constricted. Legs, particularly tibiae, relatively elongate.

Elytra distinctly longer than broad; costae without

tubercles, regularly convex, entire, in seven longitudinal rows, one sutural, six discal, each with single row of fine punctures, between costae with two rows of coarse punctures usually transversely confluent; between disc and margin costae obsolete or absent, coarsely, not closely, serially punctate. Sides obliquely, not abruptly, sloping, broadly explanate, apically more narrowly, margin distinctly, not strongly reflexed, not dentate, laterobasal margin crenulate.

Remarks. The type specimen of nigrina Casey is a colour variant, a condition seen in other individuals of this group. The sides of the pronotum and elytra are dark in colour, similar to the discs. Two other specimens determined by Casey and alongside the type are both with the sides lighter in colour than the discs, but all three specimens are on the dark side of the colour range although within the limits of variation of the group.

Collecting notes. Specimens were collected under bark of dead spruce 10, 19 June (nr. Cheyenne Crossing, South Dakota) and 4 May (Alberta); Fomes pinicola 5 July (nr. Pine Flat, Tulare Co., California) and 13 June (Dardanelle, Tuolumne Co., California); Fomes pinicola on Abies concolor 26 June (nr. Strawberry, Tuolumne Co., California), 30, 31 Aug. (Lakeshore and Huntington Lake, Fresno Co., California); Polyporus fragilis (Lamoille, Nevada).

Distribution. West of Great Plains, north to Alaska,

Yukon, Northwest Territories; northern middle and eastern United States, and across Canada. Also widely distributed throughout Europe. Two hundred and twenty-one specimens were examined from the following localities:

CANADA

ALBERTA: Banff (CAS, MCZ, UASM); Bilby (CAS); Edmonton (UASM); George Lake (UASM); Laggan (AMNH); Lake Minnewanka (UASM); Waterton (UASM); Whitford Lake (CAS).

BRITISH COLUMBIA: Aldermere (USNM); Brookmere (UW); Coldwater Creek (UW); Copper Mt. (CAS); Diamond Head Trail, Garibaldi Park, Squamish (UW); Kimberley (CAS); Manson Creek, 3020 ft. (REL); Midday Valley, Merritt (CAS, INHS, UW); Purrell Mts. (CU); Terrace (CU, INHS, MCZ, UASM); Trinity Valley (CAS, CU, UASM); Vernon (CAS).

NORTHWEST TERRITORIES: Aklavik (CAS, CNC).

NOVA SCOTIA: Boisdale, Cape Breton (CAS).

ONTARIO: Macdiarmid (CU); Sudbury (CNC).

QUEBEC: Duparquet (CAS); Great Whale River (CNC); Mistassini (CNC).

YUKON: Dawson (MCZ); Snag (CNC); Swim Lakes (CNC).

UNITED STATES

ALASKA: 25 mi. N. Palmer (UASM), Savage River, Mount McKinley District (CAS).

ARIZONA: Apache Co., White Mts. (UKL); Coconino Co., Flagstaff (AMNH); Graham Co., Graham Mountain (CAS); Greenlee Co., U.S. 666, 1.8 mi. N. Hannegan Meadows (UASM).

CALIFORNIA: El Dorado Co., Tallac (CAS); Fresno Co.,

Huntington Lake (MCZ), Lakeshore (MCZ); Lassen Co., Facht (CAS); Mariposa Co. (CNHM); Plumas Co., Mohawk (MCZ); Tulare Co., Portugese Pass, 7 mi. SE. Pine Flat (MCZ); Tuolumne Co., Dardanelle (MCZ), 10 mi. NE. Strawberry (MCZ).

COLORADO: Clyde Co. (MCZ); El Paso Co., Colorado Springs (MCZ); Gunnison Co., Canon of Big Blue, 8500 ft. (MCZ); La Plata Co., vicinity of Durango 5500-7000 ft. (MCZ); Park Co., Alma (CAS); Saguache Co., Cochetopa Pass, 8 - 1000 ft. (MCZ); San Juan Co., 4 mi. S. Silverton (MCZ); Summit Co., Breckenridge (MCZ); Gore Pass (CAS); Longs Peak Inn, 9000 ft. (ANSP, MCZ); Pingree Peak (CAS).

IDAHO: (OSU).

MICHIGAN: Delta Co., Saint Jacques (CU).

MINNESOTA: Saint Louis Co., Duluth (AMNH).

NEVADA: Elko Co., Lamoille, 14 mi. SE. Runby Mts. (MCZ).

NEW HAMPSHIRE: Coos Co., Mount Washington (CAS); Strafford Co., Oyster River (CAS); Sullivan Co., Claremont (CU).

NEW MEXICO: Sandoval Co., Jemez Mts. (CAS).

NEW YORK: Orange Co., West Point (AMNH); Saint Lawrence Co., Cranberry Lake (CAS, UW); Warren Co., Chateaugay Lake, Adirondack Mts. (MCZ), Mount Marcy, Adirondack Mts. (CU).

OREGON: Grant Co., Lunch Creek, Dixie Pass, Blue Mts. (CNHM); Tillamook Co., Tillamook (UW).

PENNSYLVANIA: Monroe Co., Delaware Water Gap (AMNH).

SOUTH DAKOTA: Lawrence Co., 3 mi. S. Cheyenne Crossing (DRW).

UTAH: Kane Co. (OSU); Washington Co., St. George (AMNH).

WASHINGTON: King Co., Black Diamond (UW); Pierce Co., Mount Rainier (MCZ), Paradise Valley to 1000 ft., Mount Rainier (MCZ); Whitman Co., Palouse (ANSP).

Ostoma columbiana Casey

Ostoma columbiana Casey, 1924:186. LECTOTYPE (here designated):labelled as follows: "Br.C.; CASEY bequest 1925; TYPE USNM 49182 (red label); columbiana Csy"; USNM. PARALECTOTYPE: labelled as follows: "Br.C.; CASEY bequest 1925; columbiana - 2 PARATYPE USNM 49182"; USNM. TYPE LOCALITY: "British Columbia (Terrace)." Leng and Mutchler, 1927:31.

Individuals of columbiana are similar to those of ferruginea except as follows:

Body narrower. Colour light reddish brown. Smaller, length 6.0 - 9.7 mm; ratios L/W pronotum and W/L elytron as in Table VIII.

Head with antenna shorter, funiculus elongate relative to club, with articles as broad as long except third slightly elongate; interstices deep.

Pronotum narrower (Fig. 66), apical and lateral margins strongly reflexed forming shallow, but distinct, concavity between disc and margin; apex between angles narrow (Fig. 66), strongly reflexed, forming horizontal ridge before margin, basal margin at sides broadly emarginate; sides more strongly oblique, laterobasally more

narrowly, irregularly rounded. Prosternum between coxae narrower. Scutellum usually transversely oval, apicomedially rounded.

Elytra with side elevations between disc and margin almost vertical; sides, particularly apically, more broadly explanate, from basal two-thirds to suture convergent more strongly, less rounded; apical angles more strongly acute.

Remarks. One of the principal characters on which Casey based his concept of the species was the strongly reflexed sides of the pronotum forming a distinct concavity between the margin and the disc. The pronotum of the two type specimens is not as strongly reflexed as in some other specimens seen, this being a variable character.

The range of variation of specimens of ferruginea and columbiana is significantly different in values for the ratios L/W pronotum, W/L elytron (Table VIII).

Collecting notes. Specimens were collected under bark of dead white spruce 11 Aug. (nr. Calmar, Alberta), spruce (George Lake, Alberta); Polyporus alboluteus 7 Aug. (G. Teton Mts., 7000 ft., Wyoming), 14 Aug. (Heart Lake, 8000 ft., Yellowstone N.P., Wyoming).

Distribution. Similar to ferruginea; western United States, north to Alaska, Yukon, and Northwest Territories, northern middle and eastern United States, and across Canada. Five hundred and four specimens were examined from the following localities:

CANADA

ALBERTA: Banff (ANSP, CAS, CNC, UASM); Beaverlodge (UASM); Calgary (CAS); Conjuring Creek 1 mi. W. 3½ mi. N. Calmar (UASM); Cypress Hills (CAS); Cypress Hills, Reesor Lake area (TLE); Edmonton (CAS, CU, UASM); 15 mi. S. Elkwater Rte. 48 (UASM); George Lake (DJL); Gorge Creek (UASM); Kananaskis (CAS); Laggan (AMNH); Leduc (UASM); McMurray (CNC); Millarville (CNC); W. Pembina River near Fawcett (UASM); Waterton (UASM); Waterways (CNC).

BRITISH COLUMBIA: Blue River (INHS); Burn Lake (INHS); 8 mi. N. Clinton, 3800 ft. (REL); Cranbrook (CNC); Emerald Mine (CAS); Fernie (CAS); Forbidden Pl., Vancouver Island (CNC); Hosmer (CAS); Lavington (CNHM); Lillooet (CNC); Little White Mt., Lorna (CAS); Lorna (CAS, CNC, INHS); Lumby (CAS); McBride (UW); Monashee Mine (CAS); 6 mi. N. Oliver (CNC); Peachland (CNC); 36 mi. N. Radium, Kootenay National Park (MCZ); Salmon Arm (AMNH, CAS, CNHM, CU, MCZ); Stanley (CAS); Summit Lake, Hart Highway, N. Prince George (UASM); Swift Creek (INHS); Terrace (CU, MCZ, USNM); Trail (CAS); Trinity (CAS, CNC, UASM); Vancouver (CAS, CNC); Vernon (CAS).

LABRADOR: Goose Bay (CNC).

MANITOBA: Aweme (MCZ); Riding Mount Park (CNC).

NEW BRUNSWICK: Tabusintac (CNC).

NORTHWEST TERRITORIES: Norman Wells (CNC); Simpson Island, Great Slave Lake (DJL, UASM).

ONTARIO: Macdiarmid (CU); Nipigon (CAS); Smoky Falls,

Mattagami River (CNC); Sudbury (CNC).

QUEBEC: Duparquet (CAS, MCZ); Gaspé Co. (CNC); Great Whale River (CNC); Mount Lyall (CNC); Trois Rivières (CNC).

SASKATCHEWAN: Waskesin (CNC).

YUKON: Dawson (CU); Stewart River (CAS); Yukon River (CAS).

UNITED STATES

ALASKA: Skagway (CAS).

CALIFORNIA: Alpine Co., Carson Pass (AMNH); Calaveras Co., Big Trees (CAS), West Point (WHT); El Dorado Co., Pacific (MCZ); Fresno Co., Dalton Creek (CU); Humboldt Co. (AMNH); Lassen Co., Facht (CAS), 13 mi. W. Mineral (OSU), Norval Flats (CAS); Madera Co., Bass Lake (CAS), Chiquito Creek (CU), Logan Meadow (CU); Nevada Co. (TLE); Placer Co. (AMNH, MCZ); Shasta Co., Castle Crags (CAS), Viola (CAS); Sierra Co., Truckee (MCZ); Siskiyou Co., Mount Shasta (MCZ), Upper Soda Spring (CAS); Sonoma Co (CNHM); Trinity Co., Carrville (CAS, MCZ), Coffee Creek (CAS, CNHM); Tulare Co., Marble Bridge (CAS); Tuolumne Co., Twain Harte (AMNH).

COLORADO: Routt Co., Clark (CAS), Rabbit Ears Pass (CAS), Steamboat Springs (CAS).

IDAHO: Benewah Co., Saint Maries (CAS); Bonner Co., Coolin, Priest Lake (CAS); Idaho Co., Orogrande Creek (UW); Latah Co., Moscow Mt. (AMNH); Shoshone Co., Wallace (AMNH); Valley Co., McCall (CU).

MAINE: Kennebec Co., Monmouth (MCZ); Piscataquis Co.,

Mount Katahdin (MCZ).

NEW HAMPSHIRE: Carroll Co., Glenn, N.H. Mts. (MCZ); Grafton Co., Franconia (AMNH); Profile (MCZ).

NEW YORK: Clinton Co., Redford (CU); Essex Co., Keene Valley (CU).

OREGON: Benton Co., Blodgett (MCZ); Crook Co., Ochoco Creek, 15 mi. E. Prineville (UW); Douglas Co., Winchester Bay (CNHM); Grant Co., Canyon Creek S. Canyon City (UW), Dixie Pass, Blue Mts. E. Prairie City (CNHM), Lunch Creek, Dixie Pass, Blue Mts. (UW); Hood River Co., Mount Hood (CAS, UW); Lincoln Co., Neotsu (UW); Multnomah Co., Mount Tabor, Portland (MCZ), Portland (AMNH); Bear Springs (UW); Pine Creek (UW).

UTAH: Salt Lake Co., Brighton (ANSP).

VERMONT: Caledonia Co. (CU).

WASHINGTON: Clallam Co., Port Angeles (CAS); King Co., Snoqualmie Falls (UW); Klickitat Co., Mount Adams (AMNH); Mason Co., Spillman Camp (CNC); Pierce Co., Mount Rainier (MCZ); Whitman Co., Pullman (AMNH); Dosewallips River, Mascot Camp, Olympic National Park (UW); N. Mount Washington (AMNH).

WYOMING: Heart Lake, 8000 ft., Yellowstone N.P. (MCZ); Lake Marie (OSU); Paintbrush Canyon, 7000 ft., G. Teton Mts. (MCZ).

TABLE VIII

VARIATION IN RATIOS L/W PRONOTUM AND W/L ELYTRON AMONG POPULATION SAMPLES OF SPECIES OF *Ostoma*

Species	Locality	N	Range	Mean	± SD
			L/W Pronotum		
ferruginea	B. C.	24	0.32 - 0.36	0.34	0.012
ferruginea	Duparquet, Que.	31	0.33 - 0.37	0.35	0.006
ferruginea	Ariz.	16	0.34 - 0.36	0.35	0.009
ferruginea	Calif.	5	0.33 - 0.36	0.35	0.011
ferruginea	N. Mex.	13	0.34 - 0.36	0.34	0.007
ferruginea	N. Y.	9	0.32 - 0.36	0.34	0.013
columbiana	B. C.	34	0.35 - 0.40	0.37	0.013
columbiana	Duparquet, Que.	27	0.35 - 0.39	0.37	0.010
columbiana	Madera Co., Calif.	21	0.36 - 0.38	0.37	0.008
pippingskoeldi	B. C.	35	0.33 - 0.36	0.34	0.010
pippingskoeldi	Bass Lake, Calif.	39	0.32 - 0.36	0.34	0.009
pippingskoeldi	Wash.	6	0.32 - 0.36	0.34	0.013
			W/L Elytron		
ferruginea	B. C.	24	0.42 - 0.46	0.44	0.012
ferruginea	Duparquet, Que.	31	0.43 - 0.47	0.45	0.012
columbiana	B. C.	34	0.41 - 0.45	0.43	0.009
columbiana	Duparquet, Que.	47	0.43 - 0.46	0.44	0.008

Grynocharis Thomson

Gaurambe Thomson, 1859:70 (misapplied).

Grynocharis Thomson, 1859:71; 1862:190; LeConte and Horn, 1883:154; Reitter, 1911:6, 9; Crowson, 1966:127.

Type-species: Silpha oblonga Linnaeus, by original designation and monotypy.

Grynocharis (subgenus of Ostoma); Des Gozis, 1886:11; Ganglbauer, 1899:433; Hatch, 1962:187.

Grynocharis (subgenus of Peltis); Seidlitz, 1891b:240.

Grynocharis (pars); Van Dyke, 1916:73.

Peltis (pars); Redtenbacher, 1872:373; Seidlitz, 1875:153; Marseul, 1885:153.

Ostoma (pars); Reitter, 1876:61; 1882:142; Schaeffer, 1915:68; 1918:200; 1920:194.

This genus is predominantly Old World and includes the well known European oblonga, two species in the Caucasus, two in Japan, as well as two in North America, both north of Mexico.

The following combination of characters is diagnostic: lacinia with two apical hooks, front coxal cavities open, elytron with four discal carinae. Members of this group are superficially similar to those of Ostoma but the more elongate form and presence of four discal carinae instead of six, distinguishes them from the latter.

Description. Form subdepressed, oblong-oval; dorsal surface glabrous, ventral finely, sparsely setose.

Pronotum and elytra with sides narrowly explanate.

Head small, not concealed by pronotum; moderately finely, closely punctate. Front lateral to eyes slightly tumescent, anteriorly slightly declivous. Lacinia with two apical hooks on inner margin. Mandibles truncate, mola not ridged or asperate. Mentum transverse, emarginate. Antenna elongate, robust, with eleven articles, club with interstices prominent, shallow; terminal article ovate, narrowed apically; funiculus with articles wider than long, globose, interstices scarcely evident.

Pronotum much broader than long, widest at basal third; apex emarginate; apical angles moderately strongly produced, rounded; sides obliquely arcuate, margin reflexed, crenulate, towards base more strongly; disc regularly, shallowly convex; sides relatively narrowly explanate, reflexed; in apical two-thirds divergent posteriorly, in basal third convergent to base; basal angles obtuse; basal margin shallowly arcuate, at middle narrowly, slightly emarginate; bead entire. Front coxal cavities open behind; prosternum between coxae elongate, strongly compressed, marginate, strongly convex, at apex somewhat expanded laterally. Metasternum between basal margin of mesocoxal cavity and episternal suture without distinct curved line separating apical angle. Tibia with upper edge marginate, with numerous very small, stout spines, front pair at apex with prominent terminal hook, smaller hook at posterior margin.

Elytra oblong; each elytron with one sutural and four discal carinae, prominent, regular, entire; sides smooth; between carinae with three or four rows of coarse punctures, row next to carina regular; median one or two rows irregular. Sides explanate, reflexed; in basal two-thirds almost straight; from apical third convergent strongly to suture.

Abdominal sternum 8 of male with short apodeme, segment 9 as in Calitys.

Key to North American species of Grynocharis

1 Elytral intervals with three irregular rows of large punctures; costae prominent; sides broadly explanate. West of Great Plains. . . oregonensis (Schaeffer), p. 83

- Elytral intervals with four irregular rows of small punctures; costae less prominent; sides narrowly explanate. East of Great Plains . . . . . quadrilineata (Melsheimer), p. 80

Grynocharis quadrilineata (Melsheimer)

Peltis quadrilineata Melsheimer, 1844:104. TYPE: not found. TYPE LOCALITY: "Pennsylvania." LeConte, 1863b:31.

Ostoma quadrilineata; Reitter, 1876:63; Schaeffer, 1920:194.

Gaurambe Grynocharis quadrilineata; Léveillé, 1888b:448; 1900:25.

Grynocharis quadrilineata; Crotch, 1873:47; Hubbard and Schwarz, 1878a:634; Olliff, 1883b:58; Casey, 1890:494; 1916:284; Ulke, 1902:19, 46; Blatchley, 1910:666; Van Dyke, 1916:73.

Peltis marginata Melsheimer, 1844:104. TYPE: not found. TYPE LOCALITY: "Pennsylvania." Lacordaire, 1854:350.

The diagnostic characters given under oregonensis readily separate individuals of the two species.

Description. Form subdepressed, oblong. Colour piceous to black, mouth parts and ventral surface lighter piceous. Somewhat shiny. Dorsal surface without, ventral with, sparse setae. Length 4.9 - 10.4 mm; ratios pronotal L/W and elytral W/L as in Table IX. Analysis by Student's t - Distribution of mean pronotal L/W and mean elytral W/L between population samples of quadrilineata and oregonensis indicated a significant difference between means at the five per cent level.

Head moderately finely, closely punctate. Maxilla with terminal article ovate; epistome at basal margin angulate; antenna elongate, robust, terminal article elongate, ovate, narrowed apically; club, not funiculus, with interstices prominent.

Pronotum subconvex, much broader than long; disc shallowly convex, near base across middle with shallow, transverse impression; apex emarginate, between angles straight; angles relatively strongly produced, acute, narrowly rounded; disc finely, closely, sides more coarsely punctate, finely, transversely rugose, narrowly explanate, margin scarcely reflexed, indistinctly crenulate, towards

base more strongly; obliquely arcuate; in apical two-thirds scarcely rounded, divergent posteriorly, in basal third more strongly, convergent to base; basal margin at sides straight, between sides broadly, towards middle more strongly arcuate, except at middle distinctly, narrowly, emarginate; basal angles obtuse. Scutellum finely, closely, punctate.

Elytron with sutural and four discal carinae distinct but shallow, not sharp, between carinae transversely rugose, with four rows of coarse punctures; row next to carinae regular, median two rows irregular. Margin narrowly explanate, scarcely reflexed.

Collecting notes. Specimens were collected from dead Populus (Rumney, New Hampshire); recorded from Libocedrus decurrens.

Distribution. Northeastern United States, Ontario, Quebec. Ninety-one specimens were examined from the following localities:

CANADA

MANITOBA: Gillan (CNC).

ONTARIO: Prince Edward Co. (CU); Ottawa (CNC); Tiner's Bay (CNC); Sudbury (CAS); Toronto (CU).

QUEBEC: Aylmer (CNC); Chelsea (CNC); Covey Hill (CNC); Duparquet (CAS); Kazubazua (CNC); Nicolat (CU); Old Chelsea (CNC); Quebec (CAS); Rigaud (UASM).

UNITED STATES

IOWA: (USNM).

MAINE: Kennebec Co., Monmouth (MCZ).

MASSACHUSETTS: (ANSP, INHS, MCZ).

NEW HAMPSHIRE: Carroll Co., Tamworth (MCZ); Grafton Co., Franconia (AMNH), Rumney (MCZ).

NEW YORK: Erie Co., Chafee (CU); Essex Co., Heart Lake (CU); Greene Co., Catskill Mts. (CU); New York Co., Mosholu (CU); Queens Co., Central (MCZ); Tomkins Co., Ithaca (CU).

OHIO: (MCZ).

PENNSYLVANAIA: Allegheny Co. (CU), Wall (AMNH); Beaver Co., New Brighton (CU); Cambria Co., Patton (INHS); Westmoreland Co., Jeannette (CAS).

VERMONT: Lamoille Co., Stowe (CU).

VIRGINIA: (MCZ).

WISCONSIN: Oconto Co., Mountain (CNHS).

Grynocharis oregonensis (Schaeffer)

Grynocharis oregonensis (nomen nudum) Crotch, 1873:47; Casey, 1916:284; Van Dyke, 1916:73.

Gaurambe (Grynocharis) oregonensis (nomen nudum) Léveillé, 1888b:448; 1900:25.

Ostoma oregonensis Schaeffer, 1918:200. HOLOTYPE: labelled as follows: "Dilley, Oreg.; HOLOTYPE (red label); Ostoma oregonensis Type Schffr.; Cornell U., Lot 908, Sub, 97, Schaeffer Coll.; HOLOTYPE, Cornell U., No. 1573 (red label)"; CU. TYPE LOCALITY: "Dilley, Oregon." Schaeffer, 1920:194.

Ostoma (Grynocharis) oregonensis; Hatch, 1962:187.

The following combination of characters and geographical distribution separate individuals of this species from those of quadrilineata: elytral carinae more prominent, intervals with three rows of larger punctures, sides broadly explanate, pronotum narrower and longer with sides more strongly rounded.

Description. Form subdepressed, oblong. Colour castaneous, mouth parts, antennae, lateral margins of pronotum and elytra, ventral surface paler. Somewhat shiny. Dorsal surface without, ventral surface with a few setae. Length 6.3 - 10.4 mm; ratios pronotal L/W and elytral W/L as in Table IX.

Head moderately finely, closely punctate. Maxilla with terminal article spatulate; epistome at basal margin regularly, shallowly arcuate; antenna elongate, robust; terminal article as broad as long, ovate, narrowing toward apex; club, not funiculus, with interstices distinct.

Pronotum subconvex, broader than long, disc shallowly convex; apex emarginate, between angles straight; angles moderately strongly produced, acute, broadly rounded; disc finely, not closely punctate; sides more coarsely punctate, finely, transversely rugose, narrowly explanate, margin relatively strongly reflexed, crenulate, more strongly towards base, obliquely arcuate, in apical two-thirds divergent posteriorly; basal third regularly arcuate, convergent to base; basal margin at sides straight,

between sides broadly, very shallowly arcuate, at middle narrowly, vaguely, very shallowly emarginate; basal angles obtuse. Scutellum finely, not closely punctate.

Elytron with sutural and four discal carinae prominent, distinctly raised, more or less acute; three rows of coarse punctures between each pair of carinae; row next to carina regular, median row with punctures more distant, irregular. Margin broadly explanate, moderately strongly reflexed.

Remarks. The specimen upon which Crotch presumably based his name oregonensis was examined. It is labelled as follows: "oregonensis Crotch orig. TYPE," in the LeConte collection (MCZ).

Collecting notes. Specimens have been recorded from Libocedrus decurrens.

Distribution. British Columbia, Washington, Idaho, Nevada, and California. Sixty-five specimens were examined from the following localities:

CANADA

BRITISH COLUMBIA: Salmon Arm (CAS).

UNITED STATES

CALIFORNIA: Fresno Co., Camp 6 (CAS), Dalton Creek (CU); Lassen Co., Facht (CAS), Norval Flats (CAS); Mariposa Co., Carl Inn, Yosemite (CAS), Yosemite (AU); Mono Co., Bishop (CAS), Mammoth (CAS); Nevada Co., Donner Lake (CAS), Peter Grub [illegible] (CAS); Plumas Co., Chester (OSU); Siskiyou Co.,

McCloud (CAS), Mount Shasta (CAS); Tulare Co., Middle Fork, Kaweah R. (CAS).

IDAHO: Shoshone Co., Wallace, Sunset Park (UW).

NEVADA: (ANSP).

OREGON: Washington Co., Dilley (CU).

WASHINGTON: King Co., Seattle (UW).

TABLE IX

VARIATION IN RATIOS PRONOTAL L/W AND W/L ELYTRON AMONG POPULATION SAMPLES OF SPECIES OF Grynocharis

Species	Locality	N	Range	Mean	± SD
			L/W Pronotum		
quadrilineata	Que.	11	0.48 - 0.53	0.50	0.015
quadrilineata	Pa.	19	0.46 - 0.53	0.50	0.022
oregonensis	Facht, Calif.	39	0.50 - 0.58	0.53	0.017
oregonensis	Calif.	18	0.50 - 0.57	0.53	0.019
			W/L Elytron		
quadrilineata	Pa.	19	0.30 - 0.35	0.32	0.014
oregonensis	Facht, Calif.	39	0.30 - 0.35	0.32	0.013

Thymalus Latreille

Thymalus Latreille, 1802:133; 1804:22; Curtis, 1824:pl 39; Duftschmid, 1825:126; Stephens, 1830:31; Gray, 1832: 400; Audouin and Brullé, 1835:405, 407; Sturm, 1839: 86; Castelnau, 1840:8; Erichson, 1844:457; 1845:249; Redtenbacher, 1845:75; 1849:20, 176; 1858:LXXIX,341; 1872:373; 1874:LXXXVI; Bach, 1849:226; Lacordaire, 1854:350; Jacquelin du Val, 1858:165; Thomson, 1859: 70; 1862:187; LeConte, 1861a:88; 1863b:31; Reitter, 1876:64; 1882:147, 149; 1889:277; 1911:6, 9; Seidlitz, 1875:34, 154; 1891a:52; 1891b:241; LeConte and Horn, 1883:154; Marseul, 1885:146; Fowler, 1889:269; Ganglbauer, 1899:435; Schaeffer, 1918:200; 1920:194; Hatch, 1962:186; Crowson, 1964:296.

Type-species: Peltis brunnea: Paykull, 1798 (= Cassida limbata Fabricius, 1787 = Cassida brunnea Thunberg, 1794), by monotypy. Later citations: Peltis ferruginea Fabricius by Latreille, 1810:427; by Samouelle, 1819; by Iablokoff-Khnzorian, 1962:421; Cassida limbata Fabricius by Curtis, 1824:pl 39; by Westwood, 1838:12; Thymalus limbatus (Fabricius) by Jacquelin du Val, 1858:165; by Thomson, 1859:70; by Crotch, 1870:216.

Peltis (pars); Gyllenhal, 1808:252, 256; Schönherr, 1808:132, 134.

Thymalops Iablokoff-Khnzorian, 1962:424.

Type-species: Thymalops limbatus (Fabricius), by original designation.

This genus is represented by nine species, one in North America, the rest in Europe and Asia. The head in part concealed by the apical pronotal margin and the dorsally strongly convex form characterize this group.

Description. Form strongly, regularly convex, oval, broad; dorsal surface with long sericate setae. Pronotum and elytra with sides explanate, reflexed.

Head bulbous; dorsally partly concealed by explanate apical pronotal margin; ventrally prominent, strongly convex. Lacinia with two apical hooks on inner margin. Mandibles truncate, not ridged or asperate. Mentum oval, minute. Eyes prominent except concealed above by pronotum. Antenna with eleven articles; club prominent, compact; funiculus very slender, fine, interstices deep.

Pronotum broad; disc very strongly, regularly convex; angles not evident. Apex emarginate, explanate. Lateroapical and laterobasal margins obtuse, scarcely produced. Sides narrowly explanate, reflexed, smooth, broadly arcuate; basal margin broadly, strongly arcuate, at middle narrowly, more strongly. Front coxal cavities open behind; prosternum very short, between coxae flat, marginate, narrow but not strongly constricted. Metasternum between basal margin of mesocoxal cavity and episternal suture with distinct curved line separating lateroapical margin of pronotum. Tibia with upper edge not marginate, with numerous, very small spines; front tibia with very small, indistinct, terminal hook.

Elytron broad, smooth, irregularly punctate, except near suture somewhat regularly, serially punctate.

Abdominal sternum 8 as in Figs. 131, 153; segment 9 as in Figs. 139, 146.

Thymalus marginicollis Chevrolat

Thymalus americanus Sturm, 1826:202 (nomen nudum). "TYPE LOCALITY": "Amer. bor."

Thymalus marginicollis Chevrolat, 1842:62. TYPE LOCALITY: not given. Léveillé, 1888b:448; 1900:25; Schaeffer, 1920:194; Hatch, 1962:188.

Thymalus fulgidus Erichson, 1844:458. TYPE LOCALITY: not given. Lacordaire, 1854:351; LeConte, 1863b:31; Crotch 1873:47; Reitter, 1876:64; 1880:508; Hubbard and Schwarz, 1878a:634; 1878b:653; Beutenmueller, 1890:57 (larva); Ulke, 1902:19, 46; Weiss, 1920:1 (biology and larva).

Thymalus aubei Léveillé, 1877:CXI. TYPE LOCALITY: "Arménie: Batoum." Reitter, 1889:277.

Thymalus fulgidus var. aubei; Reitter, 1880:508.

Description. Form dorsally strongly, regularly convex, oval, broad. Colour pale to dark brown, margins rufous; ventral surface paler. Smooth, shiny. Dorsal surface with distinct, long, sericate setae; ventral surface with sparser, short, decumbent, sericate setae. Length 4.3 - 6.2 mm.

Head bulbous, finely, closely punctate; dorsally scarcely evident, ventrally prominent. Eyes prominent,

bulbous, in dorsal view concealed by explanate apical pronotal margin. Maxilla with terminal segment cone-shaped, narrowed apically. Antenna elongate; club large, prominent, compact, globose, strongly setose; funiculus very slender, fine, interstices well defined, first article elongate, second article short, globose, third elongate, fourth very short, broader than long, fifth, sixth somewhat elongate (shorter than third), seventh short, as broad as long, eighth short, very small, much broader than long.

Pronotum coarsely, closely punctate; disc moderately strongly, regularly convex. Angles not evident. Apical margin explanate, broadly reflexed, moderately strongly, regularly emarginate; lateroapical margin broadly rounded, obtuse; sides smooth, broadly explanate, broadly reflexed, forming concavity between disc and margin; broadly, shallowly, somewhat obliquely arcuate; laterobasal margin broadly rounded; basal margin broadly, strongly arcuate, except at middle narrowly more strongly; bead narrow, at middle vaguely interrupted. Scutellum finely, not closely punctate. Prosternum very short, between front coxal cavities narrow but scarcely constricted.

Elytra broad, smooth, irregularly coarsely, not closely punctate, more coarsely punctate than pronotum, at sides more coarsely, less closely punctate; towards suture punctures vaguely serially arranged. Pubescence longer, denser than pronotum, still longer at sides. Disc very strongly, regularly convex; sides distinctly, obliquely,

not strongly explanate; smooth. Laterobasal margin obtuse, narrowly rounded, slightly produced; lateral margin in basal two-thirds broadly, shallowly, obliquely arcuate, slightly convergent posteriorly; from apical third gradually convergent more strongly to suture; apical angle right.

Abdomen short, sterna with short, relatively sparse, decumbent setae.

Collecting notes. Specimens were collected from Polyporous betulinus 29 May (Concord, Massachusetts) and 20 May (Franconia, New Hampshire); Daedalea confragosa 13 Sept. (Lexington, Massachusetts); D. unicolor (nr. Detroit Lakes, Minnesota) and 3 July (Lapeer Co., Michigan); D. confragosa 6 June and Polyporous versicolor 5 June (East Dorset and Dorset, Vermont); wild flowers in plant press (Slaterville, New York). Beutenmueller (1890) reported "larvae in a large species of white fungus growing on trunks of prostrated white birch trees."

Distribution. Canada, coast to coast, and eastern, northern, and middle United States. Five hundred and sixteen specimens were seen from the following localities:

CANADA

ALBERTA: Fort McMurray (CNC).

BRITISH COLUMBIA: Salmon Arm (CNC, CNHM); Trinity (CAS); Vernon (CAS).

MANITOBA: Aweme (MCZ).

NEWFOUNDLAND: Little River (MCZ).

NOVA SCOTIA: Dartmouth (CNC).

ONTARIO: Prince Edward Co. (CAS); Arnprior (CNC); Gananoque (CNC); Hawk Lake (CNC); Ottawa (CAS); Toronto (CU).

QUEBEC: Gaspé Co. (CNC); Coney Hill (CNC); Duparquet (CAS); Joliette (MCZ); Knowlton (CNC); Lake Memphremagog (MCZ); Montreal (CU, MCZ); Mount Albert (CNC); Mount Lyall, 1500 ft. (CNC).

UNITED STATES

ARKANSAS: (AMNH).

CONNECTICUT: Fairfield Co., New Canaan (CAS); Litchfield Co., Colebrook (MCZ), Cornwall (CAS, CU, MCZ, UASM), Salisbury (MCZ), Sharon (MCZ); New Haven Co., Hamden (CU).

ILLINOIS: Adams Co., Quincy (INHS); Kankakee Co., Momence (CNHM).

INDIANA: La Porte Co., Beverly Shores (CNHM), Michigan City (CNHM), Smith Station (CNHM).

IOWA: (CNHM).

MAINE: Cumberland Co., Casco (CU); Franklin Co., Weld, Mount Blue, 2500 ft. (MCZ); Lincoln Co., Christmas Cove (MCZ); Oxford Co., Bethel (MCZ), Paris (MCZ).

MASSACHUSETTS: Berkshire Co., Monterey (MCZ); Bristol Co., Fall River (MCZ), Westport (MCZ); Essex Co., Beverly (AMNH), Lawrence (CU); Franklin Co., Mount Toby (UW), Northfield (MCZ); Hampden Co., Springfield (MCZ), Wilbraham (CU); Middlesex Co., Concord (ANSP, MCZ), Framingham (MCZ, UASM), Natick (MCZ); Norfolk Co. (MCZ); Plymouth Co., Marion (MCZ); Suffolk Co., Belmont (MCZ), Blue Hills (UW), Boston (MCZ),

Brookline (MCZ), Cambridge (MCZ), Dorchester (MCZ), Lexington (MCZ), Milton (MCZ, UW), Stoneham (CAS, CNC), Wellesley (MCZ), West Roxbury (MCZ); Worchester Co., Petersham (MCZ).
MICHIGAN: Lapeer Co., Lapeer St. Game Area (MCZ); Marquette Co., Marquette (CAS, CNHM, USNM); Oakland Co. (CNC).
MINNESOTA: Becker Co., 10 mi. E. Detroit Lakes (MCZ).
NEW HAMPSHIRE: Carroll Co., Mount Madison (CAS); Coos Co., Mount Washington (MCZ); Grafton Co., Franconia (AMNH, MCZ), Rumney (MCZ), White Mts. (MCZ); Rockingham Co., Exeter (MCZ); Strafford Co., Durham (INHS).
NEW JERSEY: Bergen Co., Alpine (AMNH), Fort Lee (CU), Oradell (CNHM); Essex Co., Montclair (AMNH), South Orange (CU); Middlesex Co., Dunellen (CU), Milltown (AMNH); Monmouth Co., Clarksburg (CU), Highlands (AMNH); Ocean Co., Lakehurst (CAS); Orange Co., Orange Mts. (CU, MCZ); Sussex Co., Hopatcong (AMNH).
NEW YORK: Clinton Co., Redford (CU); Delaware Co., Davenport Center (OSU); Erie Co., Buffalo (CAS, INHS); Essex Co., Heart Lake (CU); Kings Co., Brownsville (AMNH), Columbia Heights, Brooklyn (AMNH), Cypress Hills (CU); New York Co., Mosholu (AMNH), Pelham (AMNH); Niagara Co., Olcott (CU); Onondaga Co., Elbridge (INHS); Orange Co., West Point (AMNH); Putnam Co., Patterson (CU); Queens Co., Central (MCZ), Long Is. (ANSP); Richmond Co., Staten Island (AMNH); Saint Lawrence Co., Cranberry (UW); Suffolk Co., Oakdale (AMNH); Tompkins Co., Dryden (CSU), Ithaca (CU, OSU), McLean (CU), Slaterville (CU); Ulster Co., Slide Mt. (CU).

NORTH CAROLINA: Buncombe Co., Black Mountain (CAS, AMNH); Graybeard (AMNH).

OHIO: Ashtabula Co., Ashtabula (OSU).

PENNSYLVANIA: Allegheny Co. (CU); Delaware Co., Broomall (ANSP); Monroe Co., Delaware Water Gap (AMNH), Mount Pocono (CAS), Pocono Lake (CAS, OSU); Pike Co., Milford (CNHM); Westmoreland Co., Jeannette (AMNH).

RHODE ISLAND: Providence Co., Providence (MCZ).

SOUTH CAROLINA: Oconee Co., Clemson (CNC).

VERMONT: Bennington Co., East Dorset (MCZ), Dorset (MCZ), Chittenden Co., Essex Centre (UASM); Orange Co., Williamstown (CU).

VIRGINIA: Lee Co., Jones Creek (MCZ), Pennington Gap (MCZ).

Eronyxa Reitter

Eronyxa Reitter, 1876:57; Léveillé, 1889a:XLV; Schaeffer, 1920:194; Hatch, 1962:186.

Type-species: Eronyxa lagrioides Reitter (= Ostomodes dohrni Reitter, 1877b; Peltis pallida Motschulsky, 1863; Grynocharis pilosula Crotch, 1874), by monotypy.

Ostomodes Reitter, 1877b:174; Schaeffer, 1915:69; 1918:200; Casey, 1916:284; Crowson, 1964:290; 1966:125.

Type-species: Ostomodes dohrni Reitter, by monotypy.

Grynocharis (pars); Van Dyke, 1916:73.

Three species are included in the genus, all restricted to the west coast of North America. The combination

of oblong form, transverse mentum, and smooth pubescent elytra distinguishes members of this genus.

Description. Form subconvex to subdepressed, oblong, narrow; distinctly pubescent, with sericate setae, decumbent or few erect, usually one per puncture. Lateral margins of pronotum with several and elytra with few erect setae.

Head small, not concealed by pronotum, front antero-lateral to eye somewhat tumescent, anteriorly slightly declivous. Lacinia without apical hook, with spine on inner margin near apex (Fig. 7). Mandibles rounded, with molar part ridged (Fig. 1). Mentum transverse, apically emarginate. Antenna relatively short, fine, with eleven articles, last ovate, narrowed toward apex, interstices shallow.

Pronotum broad, subconvex to subdepressed; sides broadly explanate, margin finely serrate; apical angles produced or not, acute or obtuse, narrowly or broadly rounded; apical margin straight or emarginate; sides obliquely or regularly arcuate; basal margin at middle narrowly arcuate; disc shallowly or strongly convex, moderately or strongly elevated from margins. Front coxal cavities open behind; prosternum between coxae convex, strongly, narrowly, constricted. Metasternum between basal margin of mesocoxal cavity and episternal suture without distinct curved line separating apical angle. Sterna with moderate to sparse pubescence. Tarsus and tibia elongate, narrow; tibia with upper edge marginate, with numerous, very small, indistinct spines; front tibia with small terminal hook.

Elytra broader than pronotum, without costae; irregularly punctate; subdepressed to subconvex; disc flat to strongly convex, moderately to strongly elevated from margins; sides narrowly to broadly explanate, margin slightly to strongly reflexed; finely serrate; slightly divergent posteriorly to apical third where strongly convergent to suture.

Abdomen of female with sternum 8 apically broadly, shallowly arcuate (Fig. 154); of male narrowly, strongly arcuate, with short apodeme; sternum 9 with apophysis divided apically.

Key to North American species of Eronyxa

1 Pronotum with apical margin deeply, broadly emarginate. Form depressed. Elytral margin broad, as pronotal margin . . . . . expansus (Van Dyke), p. 97

\- Pronotum with apical margin more or less straight. Form subconvex. Elytral margin much narrower than pronotal margin 2

2(1) Elytral pubescence dense, decumbent, except several long, erect setae. Pronotum widest behind middle . . . . . pallidus (Motschulsky), p. 100

\- Elytral pubescence fine, decumbent, except some individuals with few short, erect setae. Pronotum widest at middle . . angustus (Casey), p. 105

Eronyxa expansus (Van Dyke)

Grynocharis expansa Van Dyke, 1916:72. TYPE: not found.

TYPE LOCALITY: "Mt. San Jacinto in Southern California."

Ostomodes expansa; Casey, 1916:284.

Eronyxa expansus; Schaeffer, 1920:194.

The form of expansus individuals is quite distinct from that of the closely associated pallidus and angustus and specimens are easily distinguished by the key characters.

Description. Form subdepressed, oblong. Colour uniformly brown, sides paler. Moderately shiny. Pubescence fine, relatively sparse, with short, curved, decumbent, fulvous setae. Length 4.3 - 5.7 mm.

Head moderately coarsely, closely punctate. Antenna relatively short, funiculus length subequal to club; article 3 elongate, 4 - 8 broader than long, interstices well defined, short; articles 3 - 8 gradually increased in width towards apex.

Pronotum subdepressed; apical margin deeply, broadly emarginate, at sides narrowly reflexed. Sides broadly explanate, complanate, broadly reflexed, widest at apical two-thirds, margin finely serrate; disc finely, sparsely punctate, shallowly convex; sides more coarsely, closely punctate, regularly arcuate to apical two-thirds where more strongly divergent and rounded. Apical angles strongly produced, acute, narrowly rounded; basal angles obtuse, broadly rounded; basal margin at middle narrowly arcuate, at sides sinuate. Sterna very finely pubescent, moderately finely, not closely punctate.

Elytra subdepressed; disc broadly flattened; densely,

coarsely, irregularly punctate, not all punctures with seta; sides broadly explanate, broadly reflexed, almost as wide as those of pronotum, margin very finely serrate; epipleura horizontal except in basal third slightly oblique, sides gradually divergent to apical third, posteriorly arcuately convergent to apex.

Remarks. Two specimens of expansus, a male and a female, in the R. Hopping collection (CAS), were described comparatively by Van Dyke (1916) with the type and were considered by that author to belong to the species. Each bears the label "Spec. listed in orig. desc." It is these specimens in addition to others collected by Van Dyke and in his collection that form the concept of the group given here. Because of the clarity of Van Dyke's description and the uniqueness of the group there is little doubt that these specimens correspond to the type.

Collecting notes. The two specimens of expansus compared by Van Dyke (1915) with the type were collected June 1 under the bark of Libocedrus decurrens Torr. at Cascada, Sierra National Forest, Fresno County, California. Specimens were also collected from L. decurrens at Placerville, California.

Distribution. Sierra Nevada of California. Ten specimens were examined from the following localities:

UNITED STATES

CALIFORNIA: El Dorado Co., Placerville (CAS); Fresno Co., Cascada, Sierra National Forest (CAS); Inyo Co., Panamint Mts. (CAS); Mono Co., Mono Lake (CAS); Placer Co., Alta (CAS); Tehama Co., Mineral (CAS); Tulare Co., Sequoia Natl. Park, 2000 - 5000 ft. (CAS); Tuolumne Co., Long Barn (CAS).

Eronyxa pallidus (Motschulsky)

Peltis pallida Motschulsky, 1863:508. HOLOTYPE: labelled as follows: "(green square); type; Peltis pallida Mots. Californie"; USSR. TYPE LOCALITY: "Californie."

Ostomodes pallida; Léveillé, 1888b:446; 1889a:XLV; 1900:23; Casey, 1916:284.

Eronyxa pallidus; Schaeffer, 1920:194; Hatch, 1962:186.

Grynocharis pilosula Crotch, 1873:47 (nomen nudum).

Grynocharis pilosula Crotch, 1874:77. Type: not found. TYPE LOCALITY: "Oregon and Vancouver." Schaeffer, 1915:68; Van Dyke, 1916:73.

Ostomodes pilosula; Hopping, 1899:163.

Eronyxa pilosulus; Schaeffer, 1920:194.

Eronyxa lagrioides Reitter, 1876:58. TYPE LOCALITY: "California."

Ostomodes dohrni Reitter, 1877b:174. TYPE LOCALITY: "Californien."

Individuals are easily separated from those of expansus (see Key) and less easily from angustus (see Key and angustus diagnosis).

Description. Form subconvex, oblong. Colour brown except head, pronotal disc and sterna black. Pubescence moderately dense, with pale, curved, short, decumbent, sericate setae, except margins of pronotum and elytra, and elytral disc with some intermixed long, erect setae. Some males black except funiculus, legs, and abdomen at apex somewhat testaceous; all females brown and much more common than brown plus black males; frequency distribution of colour groups as in Table X. Length 2.9 - 6.0 mm; ratio pronotal L/W as in Table XI.

Head moderately finely, densely, indistinctly punctate, less pubescent than pronotum and elytra. Antenna relatively elongate, articles 3 - 7 narrow, elongate, 8 broader than long, interstices somewhat elongate, shallow.

Pronotum subconvex; apical margin almost straight, sides narrowly rounded, finely serrate, broadly explanate, complanate, broadly reflexed; widest behind middle; disc moderately coarsely, not closely, punctate; sides more closely punctate. Pubescence moderately dense, decumbent except apical margin at sides and lateral margin with intermixed long and short erect setae. Lateroapical margin broadly rounded, obtuse, not produced, basal margin at middle narrowly arcuate, at sides sinuate, laterobasal margin obtuse, broadly rounded. Sterna finely pubescent, moderately finely, not closely, punctate.

Elytra subconvex, coarsely, densely, irregularly punctate; each puncture with one seta; margin narrowly

explanate, in basal third slightly more broadly explanate; finely serrate, narrowly reflexed; epipleura oblique, in basal third strongly; sides almost parallel except at apical two-thirds slightly rounded, divergent posteriorly, arcuate to apex; disc with short, decumbent, curved setae except some intermixed long, erect, slightly curved setae; margins with short, erect, curved setae and fewer intermixed long, erect setae.

Remarks. The type specimen of pallidus Motschulsky was examined by G. E. Ball. Only the pterothorax, elytra, and three legs were present, but these include the characters necessary for determination.

Variation. Black forms are all males, and much smaller in size than brown females or males. The same condition occurs in angustus.

Collecting notes. Specimens were collected from Ceanothus cuneatus (Mt. Diablo, Contra Costa Co., California), wild cucumber (Alum Rock Park, Santa Clara Co., California), flowers of dogwood (Ted Inlet, California), on flowers of Aruncus sylvester (British Columbia), from gopher nest (Danville, Contra Costa Co., California), and tanglefoot screen (Forest Grove, Washington Co., Oregon). Adults recorded frequenting flowers of Ceanothus and reared from dead Ceanothus stem (H. B. Leech, in Litt.)

Distribution. Mountain systems of California;

British Columbia, Oregon, and Washington. Six hundred and seventy-two specimens were examined from the following localities:

CANADA

BRITISH COLUMBIA: Bevan (CNC); Bowser (CNC); Cobble Hill (CNC); Lake Errock near Deroche (CNC); Genoa Bay, Duncan (CAS); Harrison Mills (CNC); 5 mi. N. Hope (CAS); Indian River (CAS); McNab Creek, Howe Sound, Vancouver (CAS, UASM); Nanaimo (CAS); Pender Harbor (CAS); Sprout Lake (CNC); Steelhead (CAS); Sumas Prairie (CAS); Vancouver (CAS); Victoria (INHS).

UNITED STATES

CALIFORNIA: Alameda Co., Arroyo Mocho (WHT); Amador Co., Waterman Canyon (CAS); Butte Co., Chico (CAS), Paradise Valley, King's River (MCZ), Pentz (CAS); Calaveras Co., Mokelumne Hill (CAS); Contra Costa Co., Danville (CAS), Mt. Diablo (CAS); El Dorado Co., Lake Tahoe (CAS), Mt. Tallac, Tahoe (CAS), Tahoe (CAS); Fresno Co., Camp Greely, 2800 ft. (CAS), North Fork (CAS); Humboldt Co. (CNHM, OSU), Blocksburg (CAS), Dyerville (CAS), Fort Seward (CAS), Garberville (CAS), Green Point (CAS), S. Anita Canyon (CAS), S. Madre (CAS), Willow Creek (CNHM), Zenia (CAS); Kern Co., Caliente (CAS); Lake Co. (USNM), Blue Lake (CAS); Lassen Co., Blue Canyon (OSU), Chester (OSU), Mt. Lassen N.P. (OSU), 5 mi. E. Mineral (OSU); Los Angeles Co., Los Angeles (CU), Malibu (CAS), Mount Wilson (CAS, CU, MCZ), Palmdale (CAS), Pasadena (CAS, CU); Marin Co. (CAS), Cypress Ridge (CAS),

Fairfax (CAS), Lagunitas (CAS), L. Lagunitas (CAS), Mill Valley (CAS), Mount Tamalpals (CAS), Muir Woods (CAS), Phoenix Lake (CAS), Ross (CAS), Woodacre (CAS); Mariposa Co. (CNHM), Yosemite, 4000 ft. (CAS); Mendocino Co. (AMNH), Hopland (CAS), Hullville (CNHM), Ukiah (CAS, CNHM), Willits (CAS), Yorkville (CAS); Monterey Co., Jamesburg (CAS), Paraiso Springs (CAS), 1.5 mi. S. Partington Cyn. at Hwy. 1 (CAS), Tassajara (CAS); Napa Co. (CNHM), Middletown (CAS), 11 mi. W. Oakville (TLE); Orange Co., Atwoods Mill (CU); Riverside Co., Keen Camp (CAS, OSU); San Bernardino Co., San Bernardino Mts., 3000 ft. (CAS); San Diego Co. (CAS), Boulevard (OSU); San Francisco Co., Berkeley (UASM), San Andreas Lake (CAS), San Francisco (CAS, CU, OSU, UASM); San Luis Obispo Co., Atascadero (CAS), La Panza (CAS); San Mateo Co. (AMNH, ANSP, MCZ), Crystal Lake (CAS), La Honda (CAS), Redwood, Corralitos, Santa Cruz Mts. (CU, USNM), San Bruno (MCZ); Santa Barbara Co., Figueroa Park, Santa Barbara N.F. (CAS); Santa Clara Co., Almaden (AMNH), Alum Rock Park (TLE), Glenwood, 2 mi. N. Scott's Valley (TLE), Palo Alto (CAS); Santa Cruz Co. (AMNH, CAS), Felton (MCZ), Santa Cruz (AMNH, CAS); Shasta Co., Castella, Shasta Cr. (CAS), Shasta Springs (CAS); Siskiyou Co. (CNHM), Mt. Bradley (CAS); Sonoma Co. (MCZ), Fort Ross (CAS); Trinity Co., Carrville (CAS), Plummer Springs (CAS); Tulare Co. (USNM), Camp Nelson (CAS), Colony Mill (CAS), Hospital Rock, 2000 ft. (CAS), Kaweah (CAS, MCZ), Lincove, near Wood Lake (CAS), Sequoia Nat'l Park (MCZ), Watsons Spring (CAS); Tuolumne Co. (CNHM), Sheepranch (WHT),

Sonora (WHT); Alpine Dam (CAS); Columbia Highway (CAS); Corralitos (CAS); Hantah (AMNH); Sierra Nevada (AMNH); Ted Inlet (MCZ).

OREGON: Baker Co., Baker Cr. (CAS); Benton Co., Corvallis (AMNH, CAS); Douglas Co., Canyonville (CAS); Jackson Co., Medford (CAS); Josephine Co., O'Brien (CNHM); Lane Co., Spencers Creek Valley, Eugene (CNHM), Eugene (CNHM), Lowell (CNHM), Oakbridge (CAS, CNHM), middle fork of Willamette R. (CNHM); Linn Co., Cascadia (AMNH); Washington Co., Dilley (AMNH, CU), Forest Grove (AMNH); Yamhill Co. (CAS), Dayton (CNHM), McMinnville (MCZ); Illinois River (CAS, CNC).

WASHINGTON: King Co., Baring (CAS), Silver Springs (AMNH); Pacific Co., Ilwaco (OSU); Thurston Co., Olympia (MCZ).

Eronyxa angustus (Casey)

Ostomodes angustus Casey, 1916:284. LECTOTYPE (here designated): labelled as follows: "Coeur d'Alene, Id.; CASEY bequest 1925; TYPE USNM 49184 (red label); angustus Csy."; USNM. TYPE LOCALITY: "Idaho (Coeur d'Alene)."

Eronyxa angustus; Schaeffer, 1920:194; Hatch, 1962:186.

Individuals of angustus are similar to those of pallidus except as follows:

Form less convex; pubescence finer and sparser, with short, curved, decumbent setae except pronotum at side margins and elytra near base with a few long, erect setae;

head and pronotum more shiny black; frequency distribution of colour groups as in Table X. Length 3.0 - 5.4 mm; ratio pronotal L/W as in Table XI.

Antenna with funiculus length subequal to club instead of longer; article 9 narrower than 10 instead of subequal.

Pronotum with sides widest at middle instead of behind middle.

Elytral disc with short, curved, decumbent setae except a few individuals with few short, curved, erect setae. Epipleura more or less flat, horizontal except at base and apex less strongly oblique than in pallidus.

Remarks. Casey's type specimen is brown in colour and without erect setae on the elytra.

Collecting notes. Specimens were collected from ash blossoms (El Portal, Mariposa Co., California) and Pinus ponderosa (Hayfork, Trinity Co., California).

Distribution. Nevada, Oregon; Cascade Range, Sierra Nevada, Transverse and Peninsular Ranges of California. One hundred and forty-eight specimens were examined from the following localities:

UNITED STATES

CALIFORNIA: Alpine Co. (CAS); El Dorado Co. (CNHM), Fallen Leaf, 6500 ft. (CAS), Fallen Leaf (CAS), Glen Alpine, Tahoe (CAS); Amador Co., Waterman Canyon (CAS); Fresno Co., Camp 6 (CAS), Huntington Lake (CAS, CNHM), Mount Tom, Sierra Nat'l

Forest (CAS), Sierra N. F. (CAS), Stevenson Cr. (CAS); Inyo Co., Round Valley (CAS); Kern Co., Caliente (CAS); Lassen Co., Blue Canyon (OSU), Chester (OSU), 5 mi. E. Mineral (OSU), Mount Lassen N. P. (OSU), Norval Flats (CAS); Los Angeles Co., Mount Wilson (CU), Pasadena (CAS, CU); Madera Co., Ahwahnee (MCZ); Mariposa Co. (CAS, CNHM), Bear Lake(CAS), El Portal (AMNH), Lake Tahoe (CAS, OSU), Tahoe (CAS), Tenaya Lake, Yosemite Nat'l. Park (CAS), Yosemite Valley (CAS), Yosemite, 4000 ft. (CAS); Modoc Co., Warner Mts. (CAS); Orange Co., Atwoods Mill (CU, MCZ); Placer Co. (CAS), 6 mi. NW. Chester on Benner Creek (TLE), Mt. Tallac (CAS); Plumas Co., Meadow Valley, 3500 - 5000 ft. (CAS); Riverside Co., Coachella (CAS); San Bernardino Co., San Bernardino Mts. (CAS); San Diego Co., Boulevard (OSU); Shasta Co. (CAS); Sierra Co., Truckee (CAS); Siskiyou Co., Dunsmuir (MCZ);Trinity Co., Hayfork (CAS); Tulare Co. (CNHM), Giant Forest (CAS), Kaweah, 1000 ft. (CAS), Kaweah (CAS), Marble Fork Bridge, Sequoia Nat'l. Park (CAS), Marble Fork, Sequoia Nat'l. Park (CAS), Wolverton, Sequoia Nat'l. Park (CAS); Tuolumne Co. (CNHM , MCZ).

IDAHO: Kootenai Co., Coeur d' Alene (USNM).

NEVADA: Lake Tahoe (OSU).

OREGON: Jackson Co., Medford (CAS).

TABLE X

FREQUENCY DISTRIBUTION OF COLOUR GROUPS AMONG POPULATION SAMPLES OF *Eronyxa pallidus* AND *angustus* IN MOUNTAIN SYSTEMS OF CALIFORNIA

	angustus		*pallidus*	
Mountain System	Brown	Black	Brown	Black
Cascade Range	26	0	28	0
Sierra Nevada	84	17	32	27
North Coast Ranges	0	0	144	22
South Coast Ranges	0	0	80	16
Transverse Ranges	8	0	19	1
Peninsular Ranges	2	0	6	4

TABLE XI

VARIATION IN RATIO L/W PRONOTUM AMONG POPULATION SAMPLES OF *Eronyxa pallidus* AND *angustus*

Species	Locality	N	Range	Mean	±SD
pallidus	La Honda, Calif.	43	0.51 - 0.60	0.56	0.020
pallidus	Calif.	27	0.52 - 0.59	0.56	0.018
angustus	Bear Lake, Calif.	11	0.50 - 0.56	0.54	0.017
angustus	Calif.	48	0.50 - 0.60	0.55	0.025

Lophocateres Olliff

Lophocateres Olliff, 1883a:180; 1883b:58; Ganglbauer, 1899: 433; Alluaud, 1900:122; Reitter, 1911:6, 9; Schaeffer, 1918:200; 1920:194; Hatch, 1962:186; Crowson, 1964:299.

Type-species: Lophocateres nanus Olliff, by monotypy.

Three species are included in the genus, the economically important and widely distributed pusillus Klug, pilosus Olliff, type locality Penang, and gounellei Léveillé, type locality Brasil. The lacinia with an apical spine rather than hook and another on the outer margin distinguishes members of this genus.

Description. Form subdepressed, oblong-oval; sparsely pubescent. Size smaller, length 2.0 - 3.0 mm.

Head small, not concealed by pronotum, front antero-laterally, above eyes tumescent, anteriorly declivous; epistomal suture prominent, strongly, broadly emarginate. Lacinia with apical spine and another on outer margin near apex. Mandible robust, inner margin straight, apically slightly incurved, molar part asperate. Mentum transverse, apically emarginate. Antenna with eleven articles, gradually increased in width to apex, except between eighth and ninth abruptly; interstices shallow, scarcely evident, except between second and third articles elongate. Eyes small.

Pronotum subdepressed, broad, sides narrowly explanate,

smooth, scarcely reflexed; apex emarginate, angles produced, narrowly rounded, sides shallowly arcuate, base shallowly sinuate before angles. Pubescence inconspicuous, sparse, decumbent; disc broadly flattened, sides moderately oblique. Front coxal cavities open behind; prosternum between coxae short, relatively broad, scarcely constricted, convex, medially, longitudinally more strongly, sides strongly marginate, apex distinctly expanded laterally, triangular. Prosternum and mesosternum finely, sparsely punctate; metasternum more so, between basal margin of mesocoxal cavity and episternal suture without distinct, curved line separating apical angle. Sternum sparsely pubescent. Legs relatively short, slender; tibia on outer margin with row of conspicuous, short spines; front tibia with prominent apical hook; posterior tibia with row of apical spines produced partly over first tarsal segment.

Elytra subdepressed, oblong, subparallel, glabrous, each elytron with sutural and six discal costae fine, entire, each interval with two regular rows of fine punctures; sides moderately oblique, without distinct separation between disc and margin; margin narrowly explanate, not strongly complanate, narrowly reflexed, in basal two-thirds slightly convergent, in apical third arcuately, more strongly, convergent to suture.

Abdomen finely, sparsely punctate, pubescence conspicuous but sparse. Female sternum 8 with elongate, median, basal flagellum.

Lophocateres pusillus (Klug)

Peltis pusillus Klug, 1833:159. TYPE LOCALITY: "Madagascar."

Lophocateres pusillus; Léveillé, 1888b:446; 1900:22; 1908: 325; Ganglbauer, 1899:434 (larva); Alluaud, 1900:122; Jacobson, 1905:895; Arrow, 1909:192; Reitter, 1911:9; Schaeffer, 1920:194; Basilewsky, 1956:393; Hatch, 1962:188; Halstead, 1968:197 (biology).

Ostoma pusillus; Rey, 1888:38 (larva).

Peltis Grynocharis pusilla; Seidlitz, 1891b:240.

Peltis yvani Allibert, 1847:12. TYPE LOCALITY: "China and Brésil."

Ostoma yvani; Reitter, 1877a:132; Rey, 1888:38 (larva).

Gaurambe (Gaurambe) yvany; Reitter, 1882:149.

Lophocateres yvani; Olliff, 1883b:58, 59.

Lophocateres ivani; Masters, 1896:95 (misspelling).

Peltis africanus Motschulsky, 1863:508. HOLOTYPE: labelled as follows: "Peltis africana Mots. Algérie (blue square); (blue disc); Motsch; type"; USSR. TYPE LOCALITY: "Algérie."

Lophocateres nanus Olliff, 1883a:181. HOLOTYPE: BM. TYPE LOCALITY: "Borneo."

Description. Form oblong, subparallel, subdepressed. Colour rufotestaceous. Somewhat shiny. Sparsely pubescent. Length 2.6 - 3.2 mm.

Head moderately coarsely, closely punctate; antero-laterally above eyes distinctly tumescent. Clypeus large, distinctly separated from front by broadly, strongly

emarginate epistomal suture; front apically strongly declivous. Antenna with eleven articles, first large, angulate, second somewhat elongate, 3 - 8 broader than long; apically gradually increased in width; interstices scarcely evident except between second and third elongate; club prominent, compact, apically increased in width; last article globose.

Pronotum subdepressed, broader than long, broadest at basal third, moderately finely and closely punctate, with rather inconspicuous, sparse, decumbent setae. Disc medially broadly flattened, at sides moderately oblique to margin so disc and margin not distinctly separated. Apex emarginate, at middle straight, at sides narrowly arcuate; angles relatively strongly produced, narrowly rounded; sides shallowly, somewhat obliquely arcuate, narrowly explanate, apically more broadly, scarcely complanate, margin slightly, narrowly reflexed, in apical two-thirds gradually divergent posteriorly, in basal third slightly convergent posteriorly; basal angles broadly rounded, obtuse, slightly produced posteriorly; basal margin shallowly sinuate before angles, bead at middle broadly interrupted. Scutellum prominent, transverse, posteriorly rounded, moderately finely, not closely punctate. Prosternum and mesosternum finely, sparsely punctate; metasternum much more finely, sparsely, shallowly punctate.

Elytra subdepressed, oblong, subparallel, glabrous; each elytron with sutural and six discal costae fine, but

distinct, entire, regular; each interval with two rows of regular, fine punctures, one each side of costae; disc medially broadly flattened, containing costae 1 - 5; sides relatively narrow, moderately oblique (about 45 degrees), containing costa 6; lateral to costa 6 with three rows of coarse punctures, serially arranged. Laterobasal margin obtuse, broadly rounded. Sides narrowly explanate, basally more broadly, moderately complanate, narrowly reflexed and broadly marginate, apically more strongly and broadly; in basal two-thirds posteriorly very slightly convergent, in apical third convergent strongly, arcuately to suture.

Abdomen relatively elongate, sterna finely, sparsely punctate, pubescence conspicuous but relatively sparse, decumbent.

Notes on synonymy. The type specimen of africanus Motschulsky was examined by G. E. Ball. The antennae, elytral carinae, and punctation were similar to compared specimens of pusillus. The pronotum of the type specimen is slightly more densely punctate than that of the compared specimens but well within the range of variation of the species; the metasternum is distinctly punctate, as in all individuals of pusillus. The two nominal species are no doubt conspecific, as was noted by Léveillé and several later authors.

The type specimen of nanus was compared with a determined specimen of pusillus by R. B. Madge (pers. comm.)

and no essential differences were found between the two. The antennal club is composed of three articles and not four as suggested by Olliff in his generic description. Jacobson and Arrow were no doubt correct in placing the names nanus and pusillus in synonymy.

Collecting notes. Individuals of this species occur in stored cereal products and feed, at least in part, on these materials.

Distribution. Cosmopolitan. Forty-five specimens were examined from the following localities:

CANADA

BRITISH COLUMBIA: Kamloops, in lima beans from Madagascar (CAS), Vancouver, in rice from China (CNC).

QUEBEC: Montreal, in cocoa beans in warehouse (CNC).

UNITED STATES

DISTRICT OF COLUMBIA: In beans from Curacao DWI (USNM), in rice from Philippines (CU, USNM).

FLORIDA: Crescent City, in sealed jar of ginger from Canton (USNM), De Funiak Springs, in milled corn in feed mill (FDA).

LOUISIANA: East Baton Rouge Co., Baton Rouge, from rice.

Specimens from the following localities were also examined:

Java, in rice (CAS); C.Z., Fort Clayton (CAS); Liberia (ANSP); Nigeria, Iseri, Lagos (CAS); Norway (CAS);

Siam, rice boat on Pasak River (CAS); voyage from Lima, Peru to San Francisco in box of insects carried aboard freighter (CAS); no locality data, in rice (USNM); no data (CU); Calix seed from Ceylon (USNM).

Subfamily Trogositinae

The following characters are diagnostic: Form narrow, elongate; head nearly as wide as pronotum; lacinia of maxilla near apex without hook or spine; combination of front coxal cavities closed and dorsal surface of body not tuberculate. The front coxal cavities of members of the peltine genus Calitys are also closed behind but the tuberculate dorsal surface of the body separates members of the genus from all members of Trogositinae.

See pages 33 - 37 for synonymy, description, and discussion of the subfamily and page 25 for key to genera.

Nemosoma Latreille

Nemozoma Latreille, 1804:239; 1807a:157; 1807c:12; Reitter, 1876:13; 1882:143; Marseul, 1885:145; Schaeffer, 1920:193; Van Dyke, 1944:147, 149; Hatch, 1962:193. Type-species: Dermestes elongatus Linnaeus, by monotypy. Later citations: Nemosoma elongatus (L.) by Curtis, 1830:pl. 327; Dermestes elongatus L. by Westwood, 1838:12; Nemosoma elongatum (L.) by Lacordaire, 1854:339; Dermestes elongatus L. by

Lepesme and Paulian, 1944:140; Nemozoma elongatum (L.) by Van Dyke, 1944:150.

Nemosoma Latreille, 1809:381 (emendation of Nemozoma Latreille); Stephens, 1830:94; Erichson, 1844:447; 1845:237 (larva), 238; Redtenbacher, 1845:126; 1849:20, 175; 1858:LXXIX, 340; 1872:372; 1874: LXXXVI; Bach, 1849:225; Lacordaire, 1854:339; Jacquelin du Val, 1858:162; LeConte, 1861a:88; 1863b:31; Thomson, 1863:106; Seidlitz, 1875:33, 153; 1891a:51; 1891b:239; LeConte and Horn, 1883:153; Fowler, 1889:268; Sharp, 1891:388; Ganglbauer, 1899: 421; Reitter, 1911:5, 6; Schaeffer, 1915:68; 1918: 190; Van Dyke, 1915:25; Crowson, 1964:299.

Nemosoma (pars); Lepesme and Paulian, 1944:136, 140.

Nemosoma (subgenus) (pars); Lepesme and Paulian, 1944:140.

Nemozoma (subgenus); Hatch, 1962:193.

Sturmia (subgenus) (preocc.) Ragusa, 1892:194.

Type-species: Nemosoma cornutum Sturm, by monotypy.

Later citations: Nemosoma cornutum Sturm by Lepesme and Paulian, 1944:141.

Monesoma (subgenus) Léveillé, 1894:CXLIV; Hatch, 1962:193.

Type-species: Nemosoma cornutum Sturm, by Léveillé, 1894:CXLIV, through objective synonymy with Sturmia.

Pseudalindria Fall, 1910:126.

Type-species: Pseudalindria fissiceps Fall, by monotypy.

Aponemosoma (subgenus) Lepesme and Paulian, 1944:141.

Type-species: Nemosoma caucasicum Ménétriès, by original designation.

Ragusa (1892) described the subgenus Sturmia for N. cornutum, type species by monotypy, characterized by antenna with eleven articles instead of ten. Léveillé (1894) proposed the name Monesoma for the preoccupied name Sturmia. Sturm (1826) figured, Léveillé (1910), Reitter (1882), and Lepesme and Paulian (1944) noted N. cornutum with ten antennal articles. N. elongatum, type-species of Nemosoma, is characterized by antenna with ten articles. Lepesme and Paulian (1944) proposed the name Aponemosoma for species with eleven antennal articles and the head bilobed anteriorly, but placed in the subgenus Nemosoma the North American species N. punctulata and schwarzi with eleven articles as well as N. cornutum and attenuatum plus some species of Corticotomus. This character is not considered here of sufficient importance to warrant separation of the species by subgenera.

Latreille (1804) proposed the generic name Nemozoma with one included species, Dermestes elongatus L. In 1809 he referred to his name as follows: "Genus Nemozoma; lege Nemosoma." (Presumed derivation - nema, - tos, Gr., thread; soma, Gr., body). Authors of subsequent publications, except Reitter (1876, 1882), referred to the genus as Nemosoma auct., presumably not noting that Latreille was the first author of the second spelling. Reitter used the original spelling. Casey (1916) commented on the spelling

and suggested retention of the original form of the name. Noting that the change was made by the author of the original name and in the manner cited above it is here regarded as a "justified emendation" (International code of zoological nomenclature, 1961, Art. 33 (a)).

The group has been divided into several genera and subgenera and in various combinations by different authors. Thus, the limits of the genus are not well defined but Nemosoma in the strict sense occurs in both the Old and New World. Distribution in North America appears to be limited to the Pacific coast.

The following combination of characters is diagnostic: head dorsally with longitudinal impressed median line produced into linear sulcus, mandibles deflexed, elytron without subhumeral impression.

Description. Body elongate, subcylindrical, bicoloured.

Head elongate, convex dorsally, with deep, longitudinal, impressed line at middle produced into linear sulcus, shallowly impressed basally, terminating at vertex; apex strongly emarginate, impressed, each side of emargination produced anteriorly into subacute lobe over base of mandible; in female acute angular emargination anteriorly with apex of each lateral boundary slightly but distinctly everted (except attenuatum), in male not everted. Labial palpus with terminal article much longer than others. Mandibles

deflexed. Antenna with ten to eleven articles, club enlarged, loose, bilaterally dilated, distinctly developed interiorly but less so than exteriorly. Eyes broadly, transversely oval, not emarginate. Submentum distinctly separated from gula in front.

Prothorax longer than broad, sides moderately convergent posteriorly; with distinctly raised lateral margins, less prominent toward apex and not reaching anterior angles; pronotum continuous with prosternum at anterior angles; basal angles slightly obtuse; basal marginal bead entire. Prosternum between coxae to posterior margin strongly convex, not compressed. Legs in length moderate, tibiae slender; fore and middle tibia on outer margin with two or three distinct, small spines; fore tibia with regular, slender, curved, apical spur; tarsi slender, as long as tibiae, last segment shorter than preceding united.

Elytron at base without subhumeral impression; basal marginal bead evident only laterally; punctures not serially arranged except traces near base, irregular; not or obscurely striate; apex near suture with short, relatively deep, linear depression (except schwarzi); distinctly maculate. In some species arrangement of cuticular fibre bundles ('Balken') visible through elytra and appearing as relatively large, profuse, round spots.

Abdomen with sternal punctures scarce, fine, except first visible sternum of male anterolaterally more distinctly punctate. Seventh sternum of male with posterior margin subtruncate, of female obtuse; eighth of female as in Fig. 156. Male segments 8, 9 as in Corticotomus.

Key to North American species of Nemosoma

1 Antenna with ten articles. Body narrow (W/L pronotum 0.75 ± 0.024; W/L elytron 0.12 ± 0.009). Elytron regular, with apical depression, unimaculate . . . . . attenuatum Van Dyke, p. 120

\- Antenna with eleven articles. Body broad (W/L pronotum more than 0.80; W/L elytron more than 0.18) OR elytron short, without apical depression, bimaculate 2

2(1) Elytron not reaching apex of abdomen, without apical depression, bimaculate . . . . . schwarzi Schaeffer, p. 123

\- Elytron regular, with apical depression, unimaculate 3

3(2) Pronotum orange-red. . . . fissiceps (Fall), p. 125

\- Pronotum piceous 4

4(3) Elytron at base with rufous patch extending to or near lateral margin. Head in front narrowly sulcate. Elytra with cuticular fibre bundles evident . . . . . punctulata Van Dyke, p. 128

\- Elytron at base with smaller rufous patch not nearly reaching lateral margin. Head in front broadly sulcate. Elytra with cuticular fibre bundles not evident . . cupressi Van Dyke, p. 132

Nemosoma attenuatum Van Dyke

Nemosoma attenuatum Van Dyke, 1915:26, 27. HOLOTYPE: CAS

Type No. 3252, labelled as follows: "Carmel Cal. V. 19. 1913; Coll. by E. C. Van Dyke; Van Dyke Collection; Type Nemosoma attenuatum Van Dyke (red and white label)"; CAS. PARATYPE: same locality and date, CU. TYPE LOCALITY: "Carmel, California." Van Dyke, 1916:72.

Nemosoma (Nemosoma) attenuatum; Schaeffer, 1918:192; Lepesme and Paulian, 1944:140.

Nemozoma attenuatum; Casey, 1916:105; Schaeffer, 1920:193.

Nemozoma (Monesoma) attenuatum; Van Dyke, 1944:148-150.

The antenna with ten articles, instead of eleven, and the combination of body small, narrow, and attenuate, elytron regular and with an apical depression, separate specimens of this species from others in the genus.

Description. Body subcylindrical, elongate, narrow, attenuate. Length 3.7 - 5.1 mm.; ratios W/L pronotum and W/L elytron as in Table XII. Colour piceous, except basal third of elytron with oblique rufous patch extending inwards from humerus; mouth parts, antennae, and legs rufous.

Head convex, elongate, relatively narrow, finely, not closely punctate, anterior punctures elongate, posterior round; front moderately broadly, deeply sulcate; vertex with fine, median, unimpressed line, continuous from near sulcus, posteriorly, to base; sides convergent moderately posteriorly. Female with acute angular emargination anteriorly without apex of each lateral boundary everted.

Male with front more broadly sulcate and expanded laterally than female; lobes slightly more prolonged. Antenna with ten articles; tenth much larger than ninth. Labium with anterior margin more or less straight.

Pronotum convex, elongate, narrow, relatively finely, not closely punctate; apical margins slightly, narrowly, arcuate; basal margin broadly arcuate. Apical angles obliterated; lateroapical margin in profile truncate; laterobasal margin narrowly rounded, in profile obtuse; lateral marginal bead not continuous with basal; sides convergent moderately posteriorly. Prosternum and metasternum finely, sparsely punctate.

Elytron regular, attenuate, elongate, narrow; punctures irregular, rather fine, sparse; serial arrangement not evident except vaguely near suture; humerus narrowly rounded, in profile truncate; apex near suture with short, moderately deep, linear depression.

Abdomen with sterna finely, sparsely punctate; first visible sternum of male more distinctly punctate than female.

Remarks. The form of the holotype is distinctly attenuate, the elytra distinctly broader at apical third, convergent basally; the abdomen extends beyond the apices of the elytra.

Collecting notes. Specimens were collected from "Wilt Pine" 19 May and Pinus radiata (Carmel, California),

Picea (Hoquiam, Washington) and paratype recorded from Pinus radiata 19 May (Carmel, California) (Van Dyke, 1915).

Distribution. Western coast of United States, from Washington to California. Sixty specimens were examined from the following localities:

UNITED STATES

CALIFORNIA: Monterey Co., Carmel (CAS, CU, UASM).
OREGON: Clatsop Co., Cannon Beach (CAS).
WASHINGTON: Grays Harbor Co., Hoquiam (CU, USNM).

Nemosoma schwarzi Schaeffer

Nemosoma (Monesoma) schwarzi Schaeffer, 1918:191. HOLOTYPE: USNM Type No. 70383, labelled as follows: "Ft. Yuma, Ar.; Coll. Hubbard and Schwarz; Cylidrella mollis S.Z. Sharp; Nemosoma schwarzi Schaef. Type"; USNM. PARATYPE: Same locality, Cornell U. No. 1564, CU. TYPE LOCALITY: "Fort Yuma, Arizona."

Nemozoma schwarzi; Schaeffer, 1920:193.

Nemosoma (Nemosoma) schwarzi; Lepesme and Paulian, 1944:140.

Nemozoma (Monesoma) schwarzi; Van Dyke, 1944:148-150.

The short, quadrimaculate elytron and without an apical depression as well as the small, relatively narrow body, separate this species from the others in the genus.

Description. Body subcylindrical, elongate, narrow, small. Length 4.3 mm.; ratios W/L pronotum and W/L elytron

as in Table XII. Colour dark castaneous to piceous, except elytron with rufous patch near apex as well as at base, at basal third from inner margin not reaching lateral margin, at apical third from inner margin not reaching lateral or apical margins. Antennae, mouth parts and legs rufous.

Head convex, elongate, relatively narrow; moderately finely, not closely punctate; anterior punctures elongate, posterior round. Front relatively narrowly, shallowly sulcate. Vertex with fine, relatively elongate, median line, extending towards but not reaching base of sulcus. Sides almost parallel. Antenna with eleven articles, finely formed; eleventh article much larger than ninth. Labium with anterior margin trisinuate.

Pronotum convex, elongate, narrow, not distinctly marginate; punctures moderate in size, regular, not close. Apical margin at middle distinctly, narrowly arcuate; basal margin almost straight. Lateroapical margin interrupted, narrowly rounded; in profile truncate; slightly, broadly everted; sides moderately convergent posteriorly, laterobasal margin indistinct, narrowly rounded; in profile slightly obtuse; lateral marginal bead indistinctly continuous with basal. Prosternum with punctures relatively large, not close, but regular, well impressed. Metasternum with punctures relatively large, not close, scarcely impressed.

Elytra convex, short, not nearly reaching apex of abdomen; each elytron without apical impression; punctures

basally moderate in size, apically scarcely evident; serial arrangement not evident. Sides subparallel. Humeri broadly rounded; in profile truncate.

Abdomen with sternal punctures very fine, scarcely evident, except first visible sternum of male anteriorly more distinctly evident.

Remarks. The head and prothorax (attached) of the holotype, are glued on a point beside the rest of the body.

Collecting notes. Specimens were reared from Cercidium sp. 15 June (Mecca, California), preying on Hylocorus (Ft. Yuma, Arizona), collected from dead Parkinsonia (Ray, Arizona).

Distribution. Southeastern California, southwestern Arizona. Seven specimens were examined from the following localities:

UNITED STATES

ARIZONA: Pinal Co., Ray (USNM); Yuma Co., Fort Yuma (CU, USNM).
CALIFORNIA: Riverside Co., Mecca (CAS).

Nemosoma fissiceps (Fall)

Pseudalindria fissiceps Fall, 1910:127. LECTOTYPE (here designated): labelled as follows: "Placer Co., Cal., Van Dyke; fissiceps TYPE; M.C.Z. Type 24476 (red label)"; MCZ. TYPE LOCALITY: "Forest Hill, Placer County, California."

Nemosoma fissiceps; Schaeffer, 1915:68; Van Dyke, 1915:25, 26; 1916:72.

Nemozoma fissiceps; Casey, 1916:105; Schaeffer, 1920:193.

Nemosoma (Monesoma) fissiceps; Schaeffer, 1918:192.

Nemozoma (Monesoma) fissiceps; Van Dyke, 1944:148, 149.

The orange-red colour of the pronotum characterizes individuals of this species.

Description. Body subcylindrical, relatively broad. Length 4.54 - 6.64 mm; ratios W/L pronotum and W/L elytron as in Table XII. Colour piceous, except pronotum and elytron at basal third orange-red; antennae, mouth parts, and legs rufous or orange-red. Basal patch on elytron extending close to side margin.

Head convex, relatively broad, moderately finely, not closely, punctate; punctures anteriorly elongate, posteriorly round; front relatively broadly, deeply sulcate; vertex near base with fine, median, unimpressed line. Antenna with eleven articles; club relatively robust. Labium with anterior margin more or less straight.

Pronotum convex, relatively broad, distinctly, but narrowly marginate, moderately finely, not closely punctate; disc relatively, narrowly, flat. Apical margin at middle slightly, narrowly arcuate; basal margin almost straight. Lateroapical margin interrupted, narrowly rounded. Lateral margin near apex somewhat everted. Sides moderately convergent posteriorly; laterobasal margin

angulate, slightly obtuse; lateral marginal bead continuous with basal. Prosternum and metasternum with punctures moderate in size, regular but not close.

Elytron convex, relatively broad, distinctly broader apically than basally; punctures irregular, not close; serial arrangement not evident, except near base indistinctly. Cuticular fibre bundles ('Balken') visible as more or less round spots. Apex near suture with distinct, short, linear impression. Humerus narrowly rounded with margins pronounced, somewhat reflexed; in profile slightly obtuse.

Abdomen with sterna finely, sparsely punctate; first visible sternum of male more distinctly punctate than female.

Collecting notes. Specimens were collected from limbs of Juniperus occidentalis 10 Aug. (Redmond, Oregon), Libocedrus decurrens 20 June (Siskiyou Co., California), Pseudotsuga menziesii (Foresthill, California), Fraxinus oregona 15 March (North Fork, California), Pinus 1 March (Ventura Co., California), reared from Juniperus 18 Jan., 31 March (Yosemite Nat'l. Park, California), recorded from Pseudotsuga taxifolia (Foresthill, California) (Fall, 1910).

Distribution. Inland and coastal regions of California and Oregon. Seventy-seven specimens were examined from the following localities:

UNITED STATES

CALIFORNIA: Fresno Co., Camp 6 (CAS); Madera Co., North Fork (CAS, CU, MCZ); Mariposa Co., Yosemite National Park (USNM), Yosemite Valley (CAS); Mendocino Co., Ukiah (ANSP); Nevada Co., Nevada City (CAS); Placer Co. (CAS, CU, MCZ), Foresthill (CAS, MCZ, USNM); Siskiyou Co., McCloud (CAS), Yreka (CU, MCZ); Tulare Co., Sequoia National Park, 2000-9000 ft. (CAS, CNC); Ventura Co. (USNM).

OREGON: Columbia Co., Scappoose (MCZ); Deschutes Co., Redmond (UW).

Nemosoma punctulata Van Dyke

Nemosoma punctatum Van Dyke, 1916:71, 72. (Junior homonym of Nemosoma punctatum Léveillé, 1888a:411). HOLOTYPE: CAS Type No. 3253, male, labelled as follows: "Ashland, Oregon, H.G.C., May 5, 1915:507; Van Dyke Collection; Type, Nemosoma punctulata Van Dyke (red and white label); Type, Nemosoma punctatum Van Dyke (red and white label)"; CAS. TYPE LOCALITY: "Ashland, Oregon."

Parafilumis punctata; Casey, 1916:283.

Nemosoma (Monesoma) punctatum; Schaeffer, 1918:192.

Nemozoma punctatum; Schaeffer, 1920:193.

Nemosoma punctulata Van Dyke, 1920:85.

Nemozoma punctulata; Leng and Mutchler, 1927:31.

Nemosoma (Nemosoma) punctulatum; Lepesme and Paulian, 1944: 140.

Nemozoma (Monesoma) punctulata; Van Dyke, 1944:148, 149.

Specimens of this species can be distinguished from those of attenuatum by the number of antennal articles, from those of schwarzi by larger size and broader form, and from those of fissiceps by the black pronotum. Specimens can be separated from those of cupressi by the elytron with a larger rufous patch reaching the lateral margins, the head in front less broadly sulcate, and the elytron with visible fibre bundles. The rufous patch on the elytron of specimens of cupressi does not reach the side margin, the head in front is more broadly sulcate and the cuticular fibre bundles of the elytron are not visible. The lateral and basal margins of the pronotum of specimens of punctulata are more prominent than those of cupressi. The rufous patch on the elytron of punctulata is usually somewhat testaceous and of cupressi usually somewhat piceous.

Description. Body subcylindrical. Length 4.62 - 5.99 mm.; ratios W/L pronotum and W/L elytron as in Table XII. Colour piceous, except elytron at apical third rufous, extending to or near side margin; antennae, mouth parts and legs somewhat rufous.

Head convex, moderately finely, not closely punctate; punctures anteriorly elongate, posteriorly round; front relatively narrowly, not deeply sulcate. Vertex near base with short, fine, unimpressed median line. Antenna with eleven articles; eleventh article much larger than tenth.

Labium with anterior margin more or less straight.

Pronotum convex, not distinctly marginate, moderately finely, not closely punctate; apical and basal margins almost straight. Lateroapical margin interrupted, broadly rounded; lateral margins near apex scarcely evident; sides at apical two-thirds scarcely convergent, almost parallel; at basal third moderately convergent; laterobasal margin angulate, slightly obtuse, almost right; lateral marginal bead continuous with basal. Prosternum and metasternum with punctures moderate in size, regular, but not close.

Elytra convex, relatively finely, irregularly punctate; serial arrangement not evident. Cuticular fibre bundles ('Balken') not evident. Each elytron at apex near suture with short, distinct, linear impression. Humeri narrowly rounded, in profile truncate. Sides slightly broader apically than basally.

Abdomen with sterna finely, sparsely punctate except first visible sternum of male more distinctly punctate.

Remarks. Van Dyke (1916) based his description of punctatum on a single specimen. On comparison with a second specimen he noted the secondary sexual character of the head, namely the apical emargination with each lateral boundary everted or not everted, but incorrectly determined the sexes by associating the type specimen (actually a male) with the former and the second specimen (a female) with the latter.

The rufous patch on each elytron of the type specimen is tinged testaceous and distinctly reaches the side margin; cuticular fibre bundles ('Balken') of the elytra are clearly evident.

Collecting notes. Specimens were collected from Libocedrus decurrens in the burrows of Phloeosinus sp. (Klamath River near Hamburg, Siskiyou Co., California), Libocedrus decurrens (Yreka, Siskiyou Co., California), predatory on Phloeosinus punctatus 13 May (Pender Harbor, British Columbia), collected from aerial trap 8 June (Oregon).

Distribution. Southern coast of British Columbia, northern coast of Washington, Oregon, northern California. Twenty-six specimens were examined from the following localities:

CANADA

BRITISH COLUMBIA: Nanaimo (CAS); Pender Harbor (CAS, MCZ, UASM); Steelhead (CAS).

UNITED STATES

CALIFORNIA: Siskiyou Co., Klamath River near Hamburg P.O. (CAS), Yreka (MCZ); Trinity Co., Carrville, 2400 - 2500 ft. (CAS).

OREGON: Baker Co., Baker Creek (UW); Jackson Co., Ashland (CAS); Washington Co., Forest Grove (MCZ, UW).

WASHINGTON: Clallam Co., Sequim (MCZ).

Nemosoma cupressi Van Dyke

Nemozoma (Monesoma) cupressi Van Dyke, 1944:147, 149.

HOLOTYPE: CAS Type No. 5426, female, labelled as follows: "Occidental, Cal. VIII-I-1939; A. T. McClay Collector; sargent cypress; Holotype, Nemozoma cupressi Van Dyke (red and white label)"; CAS. TYPE LOCALITY: "Occidental, Sonoma County, California."

Nemozoma cupressi; Blackwelder and Blackwelder, 1948:23.

Specimens of this species can be separated from attenuatum by the number of antennal articles, from schwarzi by larger size and broader form and from fissiceps by the black pronotum. Specimens can be separated from punctulata by the elytron with a smaller, and oblique, rufous patch, not reaching the lateral margin; the head in front more broadly sulcate, and the elytron without visible fibre bundles.

Description. Body larger, subcylindrical, relatively broad. Length 5.67 - 7.45 mm.; ratios W/L pronotum and W/L elytron as in Table XII. Colour piceous, except elytron at basal third with oblique rufous patch extending inward from humerus, not reaching close to side margin; antennae, mouth parts, and tarsi somewhat rufous.

Head convex, relatively broad, finely, not closely punctate; anterior punctures elongate, posterior round;

front relatively broadly, deeply sulcate; vertex near base with fine median line, not impressed. Antenna with eleven articles, club relatively robust. Labium with anterior margin more or less straight.

Pronotum convex, relatively broad, distinctly, but narrowly, marginate; moderately finely, not closely punctate; disc regularly convex. Apical and basal margins slightly, broadly, arcuate. Lateroapical margin incomplete, in profile truncate, sides convergent moderately basally, laterobasal margin slightly obtuse, narrowly rounded; lateral marginal bead continuous with basal. Prosternum and metasternum coarsely, distantly punctate.

Elytra convex, regular, relatively broad; sides subparallel; punctures irregular, fine, numerous, but not close; each elytron with serial arrangement not evident except near base indistinctly. Cuticular fibre bundles ('Balken') not visible. Base at rufous area with wing visible through cuticle; humerus distinctly marginate, narrowly rounded. Apex near suture with short, moderately deep, linear depression.

Abdomen with sterna sparsely, finely punctate except male with first visible sternum more distinctly punctate.

Collecting notes. Specimens were collected from Cupressus sargentii, feeding on Phloeosinus sp. in March (N. Occidental, California). The holotype and paratype

were "beaten from Sargent cypress 1 Aug. at Occidental, Sonoma County, California" (Van Dyke, 1944).

Distribution. Northern coast of California. Nine specimens were examined from the following locality:

UNITED STATES

CALIFORNIA: Sonoma Co., 3 mi. N. Occidental (CAS, TLE, WHT).

TABLE XII

VARIATION IN RATIOS W/L PRONOTUM AND W/L ELYTRON AMONG POPULATION SAMPLES OF SPECIES OF *Nemosoma*

Species	Locality	N	Range	Mean	± SD
			W/L Pronotum		
attenuatum	Carmel, Calif.	26	0.70 - 0.78	0.75	0.024
schwarzi	Ariz., Calif.	3	0.67 - --	0.67	0.0
fissiceps	Calif.	27	0.81 - 0.93	0.87	0.029
punctulata	B. C.	16	0.84 - 0.96	0.88	0.034
cupressi	Calif.	9	0.85 - 0.91	0.88	0.022
			W/L Elytron		
attenuatum	Carmel, Calif.	26	0.10 - 0.14	0.12	0.009
schwarzi	Ariz., Calif.	3	0.16 - 0.20	0.18	0.020
fissiceps	Calif.	27	0.18 - 0.22	0.20	0.009
punctulata	B. C.	16	0.16 - 0.21	0.19	0.012
cupressi	Calif.	9	0.18 - 0.22	0.20	0.011

Cylidrella Sharp

Cylidrella Sharp, 1891:389; Wickham, 1916:146; Schaeffer, 1918:190; 1920:193.

Type-species: Cylidrella mollis Sharp, by monotypy.

Members of this genus can be distinguished from those of Corticotomus by the head dorsally with median, longitudinal, impressed line; mandibles deflexed; from members of Euschaefferia and Nemosoma by the subhumeral impression of the elytron. Specimens of Cylidrella can be separated from the above genera by the prosternum strongly compressed between coxae.

Description. Body elongate, narrow, subcylindrical; punctures relatively fine, sparse, obscure.

Head elongate, convex dorsally, narrowed behind eyes, anterodorsally at middle with deep longitudinal groove to middle of vertex, continued as fine line over posterior half; front emarginate, each side of emargination strongly produced into large anteriorly projecting subacute lobe covering mandibular base. Antenna with eleven articles, club bilaterally dilated, less developed interiorly than exteriorly; funiculus not well developed, articles not completely distinct, eleventh article larger than tenth, second much larger than third. Labial palpus with terminal article longer than others. Mandibles large, prominent, deflexed. Submentum distinctly separated from

gula in front. Eyes transversely oval, not emarginate, not projecting.

Prothorax without distinctly raised lateral margins, pronotum continuous with prosternum towards apex, convergent posteriorly. Prosternum strongly compressed and narrow between coxae. Legs, particularly tarsi, slender, relatively flat, femora short, broad; fore tibia with regular, small, curved apical spur; fore and middle tibia on outer margin with spines.

Elytron short, exposing four abdominal segments, indistinctly maculate, at base with subhumeral impression short, linear, oblique, not in form of perforate foramen, lateral margins distinctly inflexed, not striate, punctures not serially arranged, obscure, irregular.

Abdomen elongate, relatively narrow; sterna finely, obscurely punctured; four terga exposed behind apices of elytra.

A New World genus represented by one species in North America and one from Guatemala.

Cylidrella championi Wickham

Cylidrella championi Wickham, 1916:147. HOLOTYPE: USNM Type No. 70386, labelled as follows: "TYPE; Ouray, Colo., 7500-8000 ft., July 1-15, '97, HF Wickman; Cylidrella championi TYPE. Wickh. (white label bordered with red)"; USNM. TYPE LOCALITY: "San Juan range of the Rockies, near Ouray, Colo."

Schaeffer, 1918:192; 1920:193.

Description. Form elongate, narrow, subcylindrical; brachelytrous. Colour castaneous, head nearly black, elytra lighter with yellowish patch, not well defined, near centre, not reaching lateral margins. Antennae, palpi, and legs yellowish. Length 4.5 - 6.0 mm.

Head moderately finely, not closely punctate. Antenna with eleven articles, second much larger than third, eleventh much larger than tenth, funiculus with articles small, almost indistinct. Eyes round, not prominent, not projecting.

Pronotum slightly narrower than head, gradually narrowed posteriorly, punctures moderately fine, sparse, irregular. Prosternum moderately finely, sparsely punctate. Metasternum very finely, sparsely punctate. Legs rather slender, femora and tibiae flat; tarsi quite slender; front tibia wider, denticulate. Femora very broad, almost as broad as long, much shorter than tibiae. Fore and middle tibia much longer than tarsi, outer margin with spines. Fore tibiae and tarsi with numerous long setae.

Elytra short, not covering apical abdominal segments; each elytron near base strongly declivous anteriorly, outer margin rounded; outer lateral margin inflexed, particularly apically; inner margin towards apex inflexed; apical margin almost angulate. Punctation arranged in indistinct rows, not striate; punctures fine, not close;

apex with punctation fine, obscure, very sparse. Elytron near middle with yellowish, indistinct, transverse, elliptical spot, not reaching lateral margins.

Abdomen with four apical terga exposed, shining, scarcely punctate. Sterna with punctures very sparse, fine, irregular.

Collecting notes. Specimens were bred from Picea engelmanni Feb., May, Nov. (Capitan Mts., New Mexico) and collected from Picea engelmanni 12 Nov. (Newcastle, Colorado).

Distribution. Colorado and New Mexico. Schaeffer (1918) states that this species occurs also in Arizona. Seven specimens were examined from the following localities:

UNITED STATES

COLORADO: Garfield Co., Newcastle (USNM); Ouray Co., Ouray (USNM).

NEW MEXICO: Lincoln Co., Capitan (CU, USNM); Capitan Mts. (USNM).

Corticotomus Sharp

Corticctomus Sharp, 1891:390; Schaeffer, 1915:68; 1918:191; 1920:193; Van Dyke, 1915:25; 1944:150, 152; Casey, 1916:105; Hatch, 1962:190.

Type-species: Corticotomus basalis Sharp, 1891:390, new designation.

Parafilumis Casey, 1916:107; Schaeffer, 1918:191; 1920:193; Van Dyke, 1944:150; Hatch, 1962:190. NEW SYNONYMY.

Type-species: Parafilumis estriata Casey, by original designation and monotypy.

Van Dyke (1915) noted that the genus was founded upon the Guatemalan species C. basalis Sharp, probably on the basis that it, and not gracilis, was the figured species and also the first named, but this is not a valid type designation. C. basalis is here designated as type-species of Corticotomus on the basis of the 1961 Code, Recommendation 69 A - preference for figured species.

Van Dyke (1915) placed parallelus (Melsheimer), cylindricus (LeConte), caviceps Fall, and a new species, attenuatum (later correctly moved to Nemosoma) in the genus Corticotomus Sharp along with basalis and gracilis from Guatemala and Panama, respectively. The species parallelus (Melsheimer) and cylindricus (LeConte) had formerly stood as representatives of the genus Nemosoma in North America and N. elongatum L. represented the genus in Europe. Three other species of Corticotomus, bicolor Léveillé, 1895, quadrimaculatus Léveillé, 1895, and sharpi Léveillé, 1905, were described under the genus Airora. Léveillé (1910), in the Coleopterorum Catalogus, placed the species of Corticotomus partly in Nemosoma and partly in Corticotomus; in the Leng catalogue they were properly placed by Schaeffer (1920).

This is a New World genus, found in both North and South America, represented by six species in North America. Members are readily distinguished by the combination of elytron with subhumeral impression present and in the form of a perforate

foramen and the mandibles porrect.

Description. Body subconvex, elongate.

Head not elongate, dorsally flattened or somewhat concave; at base almost as broad as pronotum, without longitudinal median impressed line, at apex declivous in most species; apical margin trisinuate. Clypeofrontal area with shallow, triangular, depressed or flattened, excavation. Mandibles porrect. Eyes rounded, not prominent. Antenna eleven - articled, with enlarged, loose three - articled club, dilated only internally; last article not greatly expanded; funiculus well developed, articles quite distinct. Submentum distinctly separate from gula in front.

Prothorax with distinctly raised lateral margins, prominent to apex, interrupting anterior margins of pronotum and prosternum; apical angles not produced. Prosternum flat, not compressed between coxae. Legs short; femora elongate, slender, slightly shorter than tibiae. Front tibia on outer margin towards middle with small, indistinct spine. Middle and hind tibiae externally not spinous.

Elytron at base with subhumeral impression in form of perforate foramen; punctures arranged serially.

Abdomen with sterna of males more densely, closely punctate than females, particularly first visible sternum anteriorly. Segment 8 as in Figs. 132, 155; 9 as in Figs. 138, 143.

Key to North American species of Corticotomus

1 Head with clypeofrontal area flat, dorsal surface scarcely impressed posteriorly. Elytra distinctly punctate (Figs. 36, 37). East of Great Plains 2

- Head with clypeofrontal area broadly concave, dorsal surface transversely impressed posteriorly. Elytra distinctly or not distinctly punctate (Figs 38-41). Eastern or western . . . 3

2(1) Body depressed. Pronotum with disc flat, sides arcuate, not parallel (Figs. 101, 102). Colour uniformly castaneous or piceous . . . . . depressus Schaeffer, p. 143

- Body not depressed. Pronotum convex, sides parallel (Fig. 103). Colour piceous with rufous area along sides of elytron . . . . . parallelus (Melsheimer), p. 146

3(1) Elytra distinctly punctate; striae prominent; inner row of punctures on intervals complete, continuous (Figs. 38, 39). Eastern or western 4

- Elytra finely, scarcely punctate, punctures faintly impressed, striae represented only by punctures, intervals with punctures scarce or absent (Figs. 40, 41). West of Great Plains 5

4(3) Pronotum with basal angles abruptly rounded (Fig. 104). Elytral striae evident towards apex. East of Great Plains . . . . . cylindricus (LeConte), p. 148

\- Pronotum with basal angles gradually rounded (Fig. 105). Elytral striae evident only towards base. West of Great Plains . . . . . caviceps (Fall), p. 153

5(3) Pronotum with apical angles broadly rounded, sides not parallel, convergent from apex (Fig. 106). Head and pronotum black, basal two-thirds of elytron testaceous, apex piceous . . . . . apicalis Van Dyke, p. 157

\- Pronotum with apical angles abruptly rounded, sides parallel (Fig. 107). Colour uniformly castaneous or testaceous . . . . . californicus Van Dyke, p. 159

Corticotomus depressus Schaeffer

Corticotomus depressus Schaeffer, 1918:192. HOLOTYPE: male, labelled as follows: "TYPE; Daphne, Ala., VI - 22; BROOKLYN MUSEUM COLL. 1929; Paratype 42605 USNM (red label); Corticotomus depressus Schaef."; USNM. PARATYPES: three specimens, Cornell U. Nos. 1565.1, 1565.2, 1565.3, localities N. J.; Daphne, Ala.; Lakehurst, N. J., respectively, CU. TYPE LOCALITY: "Alabama." Schaeffer, 1920:193; Van Dyke, 1944:152.

The following characters separate individuals of this species from others in the genus: body depressed; coarsely, densely punctate and punctures well impressed (Fig. 36). Head with clypeofrontal area flat; dorsal surface scarcely impressed posteriorly (as parallelus) except front, and vertex anteriorly, with feeble yet distinct triangular excavation in some specimens. The pronotal disc of depressus individuals is flat, the inner row of punctures of elytral intervals is continuous but fewer in number than outer row (Fig. 36). The pronotum of parallelus individuals is convex, the inner row of punctures of elytral intervals sparse, appearing discontinuous or adventitious (Fig. 37). Specimens of C. depressus are uniformly castaneous or rufous whereas those of parallelus are piceous with a rufous area along sides of elytron, except teneral specimens. The ratio W/L pronotum separates most specimens from other species of Corticotomus except parallelus (Table XIII).

Description. Body depressed. Colour uniformly castaneous or rufous, antennae, palpi, and legs paler. Length 3.1 - 4.4 mm; ratios W/L pronotum and W/L elytron as in Table XIII.

Head relatively coarsely, densely punctate; clypeofrontal area flat; posteriorly not or scarcely impressed except frons, and vertex anteriorly, with feeble, yet distinct flattened, triangular area in some specimens.

Pronotum relatively very densely, coarsely punctate, punctures deeply impressed; disc flat; sides arcuate, towards

middle more strongly; apical angles obtuse; basal angles gradually rounded (Figs. 101, 102). Prosternum and metasternum coarsely punctate, punctures deeply impressed (Fig. 30).

Elytra with sides slightly arcuate; each elytron with striae prominent to apex, intervals with outer row of punctures prominent to apex, inner row with punctures fewer than outer but continuous (Fig. 36). Striae and outer row of intervals with punctures distinct, deeply impressed, towards apex less strongly. Strial punctures in most specimens larger and more prominent than punctures of outer row of intervals (Fig. 36).

Abdomen with sterna moderately coarsely punctate, punctures deeply impressed.

Collecting notes. Specimens were collected by beating (Massachusetts) and at light 6 April (Florida), from Pinus echinata 9 Dec. (Durham, North Carolina).

Distribution. Eastern United States. Twenty-three specimens were examined from the following localities:

UNITED STATES

ALABAMA: Daphne (CU, USNM).

FLORIDA: Duval Co., Jacksonville (CAS); Sarasota Co., Myakka River State Park (MCZ).

GEORGIA: De Kalb Co., Dunwoody (OSU).

MASSACHUSETTS: Boston Co., Brookline (MCZ), Wellesley (MCZ); Middlesex Co., Wayland (MCZ).

NORTH CAROLINA: Durham Co., Durham (USNM).

NEW JERSEY: Ocean Co., Lakehurst (CU), Waretown (OSU).
SOUTH CAROLINA: Aiken Co., Aiken (CNC).
PENNSYLVANIA: (ANSP, MCZ).
VIRGINIA: Elizabeth City Co., Fort Monroe (USNM).

Corticotomus parallelus (Melsheimer)

Rhyzophagus parallelus Melsheimer, 1844:108. TYPE: not found. TYPE LOCALITY: "Pennsylvania."
Nemosoma parallelum; LeConte, 1863b:31; Crotch, 1873:47; Léveillé, 1888b:432; 1900:2.
Nemozoma parallelum; Reitter, 1876:14.
Corticotomus parallelus; Van Dyke, 1915:25, 29; 1944:152; Casey, 1916:105; Schaeffer, 1920:193.
Nemosoma (Nemosoma) parallelum; Lepesme and Paulian, 1944:140.

The following characters separate individuals of this species from others of the genus, except depressus: Head with clypeofrontal area flat; dorsal surface posteriorly not or scarcely impressed; elytral striae and outer rows of intervals prominent to apex, punctures prominent and deeply impressed (Fig. 37). In C. parallelus the vertex of the pronotum is relatively convex whereas in depressus it is relatively flat. The body is flat, and relatively much deeper in parallelus, depressed in depressus. Individuals of depressus are uniformly castaneous or rufous whereas the elytra of parallelus are

bicoloured. The ratio W/L pronotum separates most specimens from other species of the genus, except depressus (Table XIII).

Description. Colour piceous with rufous area along sides of elytron confined to base, not including margins, to covering entire elytron except inner margin. Length 3.3 - 4.5 mm; ratios W/L pronotum and W/L elytron as in Table XIII.

Head relatively densely, coarsely punctate; clypeofrontal area flat; posteriorly not or scarcely impressed except frons, and vertex anteriorly, with triangular excavation.

Pronotum relatively coarsely, densely punctate, punctures well impressed; sides parallel, truncate apically and basally; basal angles broadly rounded (Fig. 103). Prosternum with punctures moderately deeply impressed; metasternum with punctures prominent and deeply impressed (Fig. 31).

Elytron with punctures prominent and deeply impressed; striae and outer row of intervals prominent to apex; inner row of punctures indistinct, sparse, discontinuous or adventitious (Fig. 37).

Abdomen with sternal punctures relatively dense, well impressed.

Collecting notes. One specimen reared from Rhus L. 6 April (Kanawha, West Virginia); recorded under bark of coniferous trees (Van Dyke, 1915); collected from Pinus sp. (Webster, New Hampshire).

Distribution. Eastern United States; south to North Carolina. Forty-seven specimens were examined from the following localities:

UNITED STATES

DISTRICT OF COLUMBIA: Washington (ANSP).

ILLINOIS: Cook Co., Willow Springs (MCZ).

MARYLAND: Princes Georges Co., Bladensburg (CU).

MASSACHUSETTS: Barnstable Co., Chatham (CU).

MICHIGAN: Wayne Co., Detroit (USNM).

NEW HAMPSHIRE: Webster (USNM).

NEW JERSEY: Essex Co., Newark (ANSP), Orange Mts. (CU, MCZ), South Orange (CU); Gloucester Co., Westville (OSU); Sussex Co., Hopatcong (AMNH); Warren Co., Phillipsburg (CAS); Anglesea (MCZ).

NEW YORK: Erie Co., Buffalo (MCZ); New York Co., Mosholu (CU); Queens Co., Jamaica L. I. (CU).

NORTH CAROLINA: (MCZ).

OHIO: Delaware Co. (OSU); Perry Co. (OSU); Scioto Co. (OSU).

PENNSYLVANIA: Allegheny Co. (CU); Delaware Co., Upper Darby (OSU); Northampton Co., Easton (CAS).

WEST VIRGINIA: Kanawha Co., Kanawha (CU); Kanawha Sta. (USNM).

Corticotomus cylindricus (LeConte)

Nemosoma cylindricum LeConte, 1863a:65. LECTOTYPE (here

designated): labelled as follows: "D. C.; TYPE 7035 (red label); N. cylindricum Lec."; MCZ. TYPE LOCALITY: "Middle States." LeConte, 1863b:31; Crotch, 1873:47; Léveillé, 1888b:432; 1900:2; Fall, 1910:127.

Nemozoma cylindricum; Reitter, 1876:14.

Corticotomus cylindricus; Van Dyke, 1915:26, 28; 1944:152; Casey, 1916:105, 106; Schaeffer, 1918:192, 193; 1920:193.

Nemosoma (Nemosoma) cylindricus; Lepesme and Paulian, 1944:140.

Corticotomus cylindricus var. texanus Schaeffer, 1918:193. LECTOTYPE (here designated): labelled as follows: "TYPE; Esper Rch, Brownsville, Tex., VI; BROOKLYN MUSEUM COLL. 1929; Cotype No. 42606 USNM (red label); Corticotomus cylindricus texanus Schffr."; USNM. PARALECTOTYPES: all labelled Esper. Rch., Brownsville, Texas or Brownsville, Texas; four specimens, Cotype No. 42606 USNM, at USNM; nine specimens, Cornell U., Nos. 1566.1 to 1566.9, at CU. TYPE LOCALITY: "Brownsville, Texas."

Corticotomus cylindricus texanus; Schaeffer, 1920:193; Van Dyke, 1944:152.

This species is similar to caviceps except as follows: Colour piceous, to rufous in immature specimens; antennae, palpi, and legs, paler. Length 2.3 - 4.9 mm.; ratios W/L pronotum and W/L elytron as in Table XIII.

Pronotum with basal angles abruptly rounded; elytral striae evident towards apex. C. cylindricus occurs east of the Great Plains, whereas caviceps is found west of the Great Plains. In caviceps, the basal angles of the pronotum are gradually rounded (Fig. 105), and the elytral striae are evident only basally. See pronotum (Fig. 104), elytral punctures (Fig. 38), metasternal punctures (Fig. 32).

Variation. Specimens vary in size, depth, and width of the dorsal concavity of the head, and in convexity and shape of the body, particularly the pronotum, apparently both geographically and within populations but not according to a pattern determined here. Some specimens from Texas and Florida are uniformly piceous. The inner row of punctures on the elytral intervals of some Texas individuals is not prominent. Schaeffer (1918) considered these Texas specimens, which are also generally smaller in size, as variety texanus. Variation between populations in the ratios W/L pronotum and W/L elytron is not significant (Table XIII). Specimens from Mount Dora and Key West, Florida, as well as Texas (Table XIII) correspond to those of Schaeffer's variety texanus.

Relationships. The closely related caviceps and cylindricus appear to be separated geographically by the Great Plains. The two groups are thought to be related because of overall similarity and vicariance in distribution.

Collecting notes. Specimens were collected from Pinus sp. (North Carolina), 17 May (Spring Hill, Alabama), sticky traps on loblolly pine with Ips avulsus larvae 20 Sept. (Elizabeth, Louisiana), from under bark of loblolly pine 34, 54 ft. with Dendroctonus frontalis eggs 27 Sept., larvae 6 Oct., 24 Nov., and pupae 24 Nov. (Meadville, Liberty, Mississippi), from Pinus echinata (Spartanburg, South Carolina) and at 34 ft. with D. frontalis larvae and Ips sp. pupae 13 Nov. (Mississippi); reared with D. frontalis 3 July (Talladega Co., Alabama), with D. frontalis and Ips spp. in loblolly and shortleaf pine 17 - 69 ft. Oct. to March (Mississippi); reared from Quercus L. 7 Jan. (Roosevelt, West Virginia), Celtis mississipi (Brownsville, Texas), Celtis L. (Florida) and 24 Jan. (Plummer Is., Maryland), Cercis canadensis (Durham, North Carolina), Acacia berlandieri, Mimosa lindheimeri (Brownsville, Texas), branch of Rhus metopium summer (Key West, Florida), Rhus L. 26 Apr. (Montell, Texas), Morus rubra 11 Oct., Fraxinus americana (Durham, North Carolina), Sumac 28 May (Montell, Texas).

Distribution. Eastern United States; west to Iowa, eastern Texas. Two hundred and nineteen specimens were examined from the following localities:

UNITED STATES

ALABAMA: Mobile Co., Spring Hill (CU); Talladega Co. (LFS).
DISTRICT OF COLUMBIA: (MCZ).
FLORIDA: Charlotte Co., Cleveland (CU), Punta Gorda (CAS);

Dade Co., Homestead (CU), Miami (CU, OSU); Duval Co., Jacksonville (CAS); Hillsborough Co., Tampa (MCZ, USNM); Jackson Co., Marianna (USNM); Lake Co., Mount Dora (CU); Marion Co. (ANSP); Monroe Co., Key West (CU); Orange Co., Orlando (CAS); Pinellas Co., Dunedin (CU); Polk Co., Bartow (USNM); Putnam Co., Welaka (CU); Saint Johns Co., Saint Augustine (CAS).

GEORGIA: Chatman Co., Tybee Island (MCZ, OSU); De Kalb Co., Dunwoody (OSU); Liberty Co., Saint Catherines Island (CU).

ILLINOIS: Mason Co., Havana (INHS).

IOWA: Johnson Co., Iowa City (USNM).

LOUISIANA: Allen Co., Elizabeth (LFS).

MARYLAND: Montgomery Co., Plummer Island (CU, USNM); Princes Georges Co., Bladensburg (USNM).

MICHIGAN: Wayne Co., Detroit (AMNH).

MISSISSIPPI: Amite Co., Crosby (LFS), Gloster (LFS), Liberty (LFS); Franklin Co., Bude (LFS), Meadville (LFS).

NEW YORK: (CU).

NORTH CAROLINA: Columbus Co., Boardman (USNM), Chadbourn (CU); Durham Co., Durham (USNM); Polk Co., Tryon (CU, USNM).

OHIO: Franklin Co., Columbus (OSU); Pickaway Co. (OSU).

PENNSYLVANIA: Dauphin Co., Harrisburg (AMNH, CAS, CU, MCZ), Hummelstown (OSU); McKean Co., Mount Alton (CAS).

SOUTH CAROLINA: Spartanburg Co., Spartanburg (USNM).

TEXAS: Colorado Co., Columbus (MCZ); Cameron Co. (OSU), Brownsville (CAS, CU, OSU, USNM), Esperanza Ranch, Brownsville (CU, USNM); Hidalgo Co. (OSU); Uvalde Co.,

Montell (USNM).

WEST VIRGINIA: Wood Co. (USNM); Roosevelt (CU); Kanawha Sta. (USNM).

Corticotomus caviceps (Fall)

Nemosoma caviceps Fall, 1910:127. HOLOTYPE: labelled as follows: "Huachuca Mts., VII-29, Ariz.; 9000 ft.; caviceps TYPE; M.C.Z. TYPE 24477 (red label)"; MCZ. TYPE LOCALITY: "Huachuca Mountains, Arizona, 9000 ft."

Corticotomus caviceps; Van Dyke, 1915:25, 29; 1944:152; Casey, 1916:105, 106; Schaeffer, 1918:192; 1920:193.

Nemosoma (Nemosoma) caviceps; Lepesme and Paulian, 1944:140.

Corticotomus laeviventris Casey, 1916:105. LECTOTYPE (here designated): labelled as follows: "Boulder Co., Col.; CASEY bequest 1925; TYPE USNM 49179; laeviventris Csy."; USNM. TYPE LOCALITY: "Colorado (Boulder Co.)."

The following combination of characters distinguish individuals of this species from others, except cylindricus: clypeofrontal area broadly concave; elytral striae depressed, distinctly and relatively coarsely punctate; intervals with punctures present, including inner row (Fig. 39); generally bicoloured. Individuals of caviceps and cylindricus can be separated as follows: Pronotum with basal angles gradually rounded (Fig. 105), elytral striae

generally evident to apex, distribution west of Great Plains (caviceps); pronotum with basal angles abruptly rounded (Fig. 104), elytral striae generally evident only basally, distribution east of Great Plains (cylindricus).

Description. Colour piceous with rufous patch at base of elytron; antennae, palpi, and legs paler. Length 3.2 - 5.3 mm; ratios W/L pronotum and W/L elytron as in Table XIII.

Head moderately coarsely and densely punctate, punctures moderately impressed; clypeofrontal area concave; front, and vertex anteriorly, with flat, triangular excavation.

Pronotum convex, sides parallel, truncate apically and basally; basal angles gradually rounded (Fig. 105). Prosternum moderately closely and coarsely punctate, metasternum coarsely, less closely; both with punctures moderately impressed (Fig. 33).

Elytron with punctures moderately impressed; striae basally prominent, punctures moderately impressed; intervals with inner row of punctures complete (about same number as strial punctures) and continuous; outer row with punctures complete, continuous; strial punctures large, more prominent than those of intervals (Fig. 39).

Abdomen with sternal punctures regular.

Variation. Specimens vary in depth and width of dorsal concavity of head and in amount of pigmentation.

Notes on synonymy. The clypeofrontal area of Casey's type specimen of laeviventris is distinctly, broadly concave and not "strongly flattened" -- behind "the transverse subapical impression" as noted by Casey (1916). It was on the basis of the latter that Casey characterized his species, though suggesting that it is "evidently allied to caviceps Fall." Schaeffer (1918) correctly noted the variation in concavity of the head of caviceps individuals and placed laeviventris in synonymy.

Relationships. See cylindricus Relationships.

Collecting notes. Specimens were reared from Pinus edulis 10 Aug. (Manitou, Colorado), collected from Pinus edulis (Chiricahua Mts., Arizona), P. sabiniana 20 April (Battusons, California), P. ponderosa in Feb., March, May, July (west of Rocky Mts.), Pinus murrayna (Delglades, California), reared from P. ponderosa 30 June (Centerville, Idaho), collected from Pseudotsuga menziesii in June (Lowman, Idaho), Pseudotsuga taxifolia (Capitan Mts., New Mexico), Salix (Ventura Co., California), recorded in high Southern Sierras of Mariposa Co., California on Pinus lambertiana, and Trinity Mts., near Carrville at over 7000 ft., beaten from Pinus ponderosa (Van Dyke, 1915).

Distribution. Western United States; east to South Dakota, Colorado, New Mexico, western Texas. One hundred and fifty-four specimens were examined from the following localities:

CANADA

BRITISH COLUMBIA: Aspen Grove (CAS); Kamloops (CAS); Midday Valley, Merritt (INHS); Sanca (MCZ); Summerland (UW); Vernon (CAS).

UNITED STATES

ARIZONA: Cochise Co., Chiricahua Mts. (OSU, USNM), Huachuca Mts., 9000 ft. (MCZ); Pinal Co., Pinal Mts. (CAS); Yavapai Co., Prescott (OSU); Santa Catalina Mts. (USNM).

CALIFORNIA: El Dorado Co., Fallen Leaf, Lake Tahoe (CAS); Los Angeles Co., Crystal Lake, Angeles National Forest (USNM); Modoc Co., Warner Mts. (CAS); Plumas Co., Chester (OSU); Plumas-Shasta Co., Mount Lassen National Park (USNM); Trinity Co., Carrville (CAS), Hayfork (CAS); Tulare Co., Sequoia National Park, 7000-9000 ft. (CAS); Ventura Co. (USNM), Battusons (CAS); Delglades (USNM).

COLORADO: Boulder Co. (USNM); Douglas Co., Larkspur (USNM); El Paso Co. (MCZ, USNM), Colorado Springs (CU, USNM), Manitou (USNM); Pueblo Co., Rye (USNM); Teller Co., Florissant, 8000 ft. (MCZ).

IDAHO: Boise Co., Centerville (CU, USNM), Cedar Mt. (USNM), Lowman (USNM).

MONTANA: Ravalli Co., Sula (CAS).

NEW MEXICO: Colfax Co., Vermejo (CU, USNM); Lincoln Co., Capitan (USNM), Capitan Mts. (USNM); Otero Co., Cloudcroft (USNM); San Miguel Co., El Porvenir (CU, USNM), Las Vegas (CU), Las Vegas Hot Springs (MCZ); Beula (CU); Meeks (CU).

OREGON: Deschutes Co., Deschutes National Forest (CU, USNM);

Lake Co., Warner Mts. (CAS); Union Co., Mts. W. La Grande (CAS).

SOUTH DAKOTA: Black Hills (CU); Elmore (USNM).

TEXAS: Jeff Davis Co. (OSU), Davis Mts. (OSU).

UTAH: Garfield Co., Panguitch (USNM).

WASHINGTON: Whitman Co., Palouse (CU).

WYOMING: Albany Co., Buckeye (CU).

Corticotomus apicalis Van Dyke

Corticotomus apicalis Van Dyke, 1944:151. HOLOTYPE: CAS Type 5428, labelled as follows: "Mt. Wilson, Calif., VIII-5-1924; Taken by Warwick Benedict; 313, 8-5-24; Blaisdell Collection; Holotype, Corticotomus apicalis Van Dyke (red and white label)"; CAS. PARATYPE: labelled as follows: "Anderson Valley, 3-12-14; Pinus lambertiana Lot 52; Van Dyke Collection; Paratype, Corticotomus apicalis Van Dyke (red and white label)"; CAS. TYPE LOCALITY: "Mt. Wilson, California." Blackwelder and Blackwelder, 1948:23.

Individuals of this species can be separated from others in the genus, except *californicus*, by the following combination of characters: striae not depressed, represented only by relatively few punctures, scarcely impressed; intervals with punctures scarce or absent (Fig. 40). Specimens of *apicalis* differ from those of *californicus* by the

pronotum with the sides convergent from apex and the broadly rounded apical angles (Fig. 106), the black head and pronotum, and the basal two-thirds of the elytron testaceous, the apex piceous. The shallow, vertical sulcus one-third from apex of the pronotum is more prominent in this species than in other species of Corticotomus. Specimens of californicus are uniformly castaneous or testaceous, the sides of the pronotum are parallel and the apical angles are abruptly rounded (Fig. 107).

Description. Head and pronotum black, elytron at basal two-thirds testaceous, apex piceous; antennae, palpi, and legs testaceous. Length 3.6 - 3.8 mm; ratios W/L pronotum and W/L elytron as in Table XIII.

Head dorsally coarsely punctate with punctures well impressed; ventrally finely, scarcely punctate. Clypeofrontal area concave; front, and vertex anteriorly, with distinct triangular excavation.

Pronotum convex; punctures moderately coarsely and deeply impressed; sides not parallel, convergent from apex; about one-third from apex with distinct, shallow, vertical sulcus; apical angles broadly rounded, acute; basal angles rounded (Fig. 106). Prosternum moderately coarsely punctate with few punctures and not relatively deeply impressed. Metasternum with punctures few in number, relatively fine, not deeply impressed (Fig. 34).

Elytral striae represented only by punctures, not

depressed; punctures few in number; intervals with punctures scarce or absent (Fig. 40).

Abdomen with sterna finely, sparsely punctate.

Collecting notes. Specimens (including paratypes) were collected from Pinus lambertiana 12 March (Anderson Valley, California), Pinus sabiniana 11 Apr. (Figueroa Mt., California), and by Van Dyke from the burrows of Cryphalus in Douglas fir 29 March (Mt. St. Helena, California).

Distribution. California. Seven specimens were examined from the following localities:

UNITED STATES

CALIFORNIA: Los Angeles Co., Mount Wilson (CAS); Mariposa Co., Anderson Valley (CAS); Santa Barbara Co., Figueroa Mt. (USNM).

Corticotomus californicus Van Dyke

Corticotomus californicus Van Dyke, 1915:28. HOLOTYPE: CAS Type 3254, labelled as follows: "Carrville, Trinity Co., Cal., VI-27-1913; Coll. by E. C. Van Dyke; Van Dyke Collection; Type, Corticotomus californicus Van Dyke (red and white label)"; CAS. TYPE LOCALITY: "Carrville, Trinity County, Cal." Casey, 1916:107, 108; Schaeffer, 1920:193; Van Dyke, 1944:152.

Parafilumis estriata Casey, 1916:107, 283. LECTOTYPE (here designated): labelled as follows: "Or.; CASEY

bequest 1925; TYPE USNM 49180 (red label); Parafilumis estriata Csy."; USNM. TYPE LOCALITY: "Oregon (locality unrecorded)." Schaeffer, 1918:191; 1920: 193; Van Dyke, 1944:150. NEW COMBINATION and SYNONYMY.

The following combination of characters separate individuals of this species from others of the genus, except apicalis: Elytral striae represented only by punctures, not depressed, punctures not impressed; intervals with punctures scarce or absent (Fig. 41). Specimens can be separated from apicalis as follows: Colour uniformly castaneous or testaceous (californicus), head and pronotum black, basal two-thirds of elytron testaceous, apex piceous (apicalis); sides of pronotum parallel and apical angles abruptly rounded (californicus), sides of pronotum convergent from apex and apical angles broadly rounded (apicalis). The vertical sulcus on the sides of the pronotum is not prominent in individuals of californicus.

Description. Colour uniformly castaneous or testaceous; antennae, palpi, and legs paler. Length 2.3 - 3.3 mm.; ratios W/L pronotum and W/L elytron as in Table XIII.

Head dorsally moderately coarsely, densely punctate, punctures moderately impressed; ventrally finely, scarcely punctate. Clypeofrontal area concave; front and vertex anteriorly with shallow but distinct, flat, triangular excavation.

Pronotum convex, moderately coarsely, densely punctate, punctures moderately impressed; sides parallel, truncate apically and basally; basal angles gradually rounded (Fig. 107). Prosternum and metasternum with punctures moderately coarsely, scarcely punctate, punctures not deeply impressed (Fig. 35).

Elytra with striae represented only by punctures, not depressed; punctures relatively scarce, finely impressed; intervals with punctures scarce or absent (Fig. 41).

Abdomen with sterna finely, scarcely punctate.

Notes on synonymy. Van Dyke (1944) suggested possible synonymy of Casey's Parafilumis estriata with californicus by his statement that "the genus Parafilumis Casey with a single species, estriata Casey, is very closely related to Corticotomus and apparently only differing from californicus Van Dyke by having the elytra diffusedly punctured, not with the punctures more or less regularly arranged in rows." It was on the basis of this character, primarily, that Casey (1916) established his genus, aware of a close relationship with Corticotomus but not having seen a specimen of californicus. Casey's type specimen of estriata is probably teneral, with eyes very lightly pigmented, and body colour more rufous than usual. The sides of the pronotum are subparallel, slightly divergent posteriorly, and the sides of the elytra are somewhat more strongly arcuate than general but in all characters the variation is well within the range of variation of

californicus individuals. The elytral punctures of californicus individuals vary from vaguely to more or less distinctly serially arranged; in Casey's specimen the punctures are somewhat vaguely, yet definitely in a serial arrangement.

Collecting notes. Specimens were collected from Pinus edulis (Las Vegas, New Mexico), P. ponderosa in April (Flagstaff, Arizona), Quercus sp. (Paradise, Arizona). Type and paratype collected by beating dead boughs of Pinus ponderosa in June (nr. Carrville, California), and 1 June (McCloud, California) (Van Dyke, 1915).

Distribution. Oregon, California, Arizona, New Mexico. Seventeen specimens were examined from the following localities:

UNITED STATES

ARIZONA: Coconino Co., Flagstaff (USNM); Br't Angel (USNM); Paradise (CU).

CALIFORNIA: Siskiyou Co., McCloud (CAS); Trinity Co., Carrville (CAS, CU).

NEW MEXICO: San Miguel Co., Las Vegas (CU).

OREGON: (USNM).

TABLE XIII

VARIATION IN RATIOS W/L PRONOTUM AND W/L ELYTRON AMONG POPULATION SAMPLES OF SPECIES OF Corticotomus

Species	Locality	N	Range	Mean	± SD
			W/L Pronotum		
depressus	all localities	16	0.91 - 1.00	0.97	0.028
parallelus	all localities	39	0.92 - 1.04	0.97	0.024
cylindricus	Fla.*	7	0.71 - 0.76	0.74	0.021
cylindricus	Fla.	24	0.77 - 0.87	0.82	0.028
cylindricus	Pa.	12	0.76 - 0.86	0.82	0.025
cylindricus	Tex.	23	0.74 - 0.88	0.80	0.044
caviceps	Calif.	10	0.83 - 0.96	0.87	0.037
caviceps	N. Mex.	7	0.83 - 0.91	0.88	0.030
californicus	Calif.	9	0.78 - 0.86	0.82	0.026
			W/L Elytron		
depressus	all localities	16	0.20 - 0.27	0.25	0.016
parallelus	all localities	39	0.21 - 0.27	0.24	0.012
cylindricus	Fla.*	7	0.18 - 0.23	0.21	0.016
cylindricus	Fla.	24	0.18 - 0.26	0.21	0.016
cylindricus	Pa.	12	0.20 - 0.23	0.21	0.010
cylindricus	Tex.	23	0.19 - 0.23	0.21	0.012
caviceps	Calif.	10	0.20 - 0.27	0.23	0.022
caviceps	N. Mex.	7	0.22 - 0.25	0.24	0.009
californicus	Calif.	9	0.18 - 0.25	0.23	0.021

*Mount Dora, Lake Co.; Key West, Monroe Co.

Euschaefferia Leng

Stenodema Schaeffer, 1918:191, 193 (preocc.).

Type-species: Stenodema hicoriae Schaeffer, by original designation and monotypy.

Euschaefferia Leng, 1920:193.

Type-species: Stenodema hicoriae Schaeffer, by monotypy and through objective synonymy with Stenodema.

Pseudocotomus Van Dyke, 1944:152. NEW SYNONYMY.

Type-species: Pseudocotomus mclayi Van Dyke, by original designation.

Members of this genus can be distinguished from those of Nemosoma and Cylidrella by the following characters: head dorsally without longitudinal impressed median line, apex trisinuate, without subacute lobes, mandibles porrect. Individuals can be separated from members of Corticotomus by the elytron without a subhumeral impression. Two species represent the genus, both occurring in North America.

Description. Form subcylindrical, very small.

Head dorsally convex, broader than long; at middle without impressed longitudinal line; towards apex obliquely declivous; frontal margin trisinuate, not produced into subacute lobes. Mandibles porrect, prominent. Antenna with eleven articles; last article subquadrate, much larger than tenth; club bilaterally or unilaterally dilated.

Submentum subconvex, trisinuate, prominent, not distinctly separated from gula in front; outer angles prominent, produced anteriorly to base of mandibles or covering base of mandibles. Eyes broadly, transversely, oval; slightly projecting.

Pronotum convex; sides parallel; apical angles obliterated; base laterally rounded. Scutellum indistinct. Prothorax without distinctly raised lateral margins; at apex pronotum continuous with prosternum. Prosternum between coxae not strongly compressed and narrow. Metasternum convex, at sides slightly depressed. Tibia on outer margin without spines. Front tibia with apical spur elongate, almost half length of tarsus. Tarsi elongate, longer than tibiae.

Elytron at base without subhumeral impression; punctures in obscurely regular or irregular rows.

Abdomen elongate; sternal punctures relatively fine, obscure, sparse.

Remarks. The principal characters that distinguish the two species, mclayi and hicoriae, are as follows: form of the antennal club, presence or absence of carinae on the frons, and presence or absence of setae on the apical margin of the elytron. These characters, relative to species' characters in general within the subfamily, appear to represent the most prominent differences between the two species and are consistent with specific similarities and differences within other genera of Trogositinae. The two

species combined provide a generic concept consistent with these other genera and are thus treated as a group here (see generic relationships).

Key to North American species of Euschaefferia

1 Antennal club bilaterally dilated. Frons smooth. Apical margin of elytron with row of setae . . . . . mclayi (Van Dyke), p. 166

- Antennal club dilated only internally. Frons near middle with rows of longitudinal carinae. Apical margin of elytron without row of setae . . . . . hicoriae (Schaeffer), p. 168

Euschaefferia mclayi (Van Dyke), new combination

Pseudocotomus mclayi Van Dyke, 1944:153. HOLOTYPE: CAS Type 5429, labelled as follows: "Westwood Hills, L. A. Co., Cal., V-1-1937; Reared Malvastrom; A. T. McClay Collector; Host Scolytid: Pseudothysanous bartoni Bruck; Holotype, Pseudocotomus mclayi Van Dyke (red and white label)"; CAS. PARATYPES: five specimens, collected at Westwood Hills, L. A. Co., Cal., dated IX. 22. 1936, V. I. 1937, II. 26.38, reared from Malvastrom, one bearing label "Note gular horns," at CAS. TYPE LOCALITY: "Westwood Hills, Los Angeles County, California." Blackwelder and Blackwelder, 1948:23.

The bilaterally dilated antennal club and setae on the apical margin of the elytron distinguish individuals from those of hicoriae.

Description. Form very small, subcylindrical, convex. Colour testaceous, antennae, palpi, and legs paler. Punctures sparse, obscure. Length 2.0 mm.

Head dorsally convex, moderately finely punctate. Antennal club bilaterally dilated, less developed interiorly than exteriorly; eleventh article slightly larger than tenth; funiculus with articles small. Eyes in size moderate, slightly projecting. Submentum with outer angles each anteriorly produced as prominent, acute, tooth-like process partly overlapping base of mandible.

Pronotum sparsely setose, ratio length/width about 1.5; rounded at base, sides convergent slightly posteriorly. Legs short, tarsi longer than tibiae, very slender; front tarsus with elongate spur, almost half length of tibia. Prosternum and metasternum finely, obscurely punctate except a few distinct punctures, particularly on metasternum laterally.

Elytra convex; sides parallel; punctures sparse, fine, distinctly but shallowly impressed, arranged in irregular, obscure rows, indistinctly alutaceous; each elytron without striae except at disc obscurely; apex almost truncate and at margin with row of setae. Arrangement of cuticular fibre bundles ('Balken') visible and appearing as round spots.

Abdomen with sterna finely, sparsely, obscurely

punctate.

Collecting notes. Holotype and eleven paratypes reared from the burrows of a Scolytid, Pseudothysanoes bartoni Bruck, in Malvastrom, Westwood Hills, Los Angeles County, California.

Distribution. One specimen (CAS) was seen other than the holotype and paratypes and from the same locality.

Euschaefferia hicoriae (Schaeffer)

Stenodema hicoriae Schaeffer, 1918:193. HOLOTYPE: USNM Type No. 70382, labelled as follows: "3192d Hopk. U. S.; Tryon, N. C.; Hicoria; W. F. Fiske, x. 19. 05; Bred; Stenodema hicoria Schffr. type"; USNM. PARATYPES: labelled "3192d," collected by W. F. Fiske at Tryon, N. C. and reared from Rhytometopi hicoriae, 5 specimens, dated June 7, 19, at USNM; 2 specimens, Cornell U. Nos. 1567.1, 1567.2, at CU. TYPE LOCALITY: "Tryon, North Carolina."

Euschaefferia hicoriae; Leng, 1920:193.

Individuals of this species can be distinguished by the characters given in the key. The outer angles of the submentum are less produced anteriorly and less acute and tooth-like than in specimens of mclayi.

Description. Form small, subcylindrical, convex. Colour uniformly castaneous, antennae, palpi, and legs paler. Punctures distinct. Length 2.6 mm.

Head subconvex, small, broader than long, obliquely declivous towards apical margin; moderately, not closely, punctate. Frons with rows of longitudinal carinae both sides of midline forming apical median impression. Antennal club dilated only internally; eleventh article prominent, much larger than tenth. Eyes large relative to head, slightly projecting. Submentum sparsely setose, with outer angles each anteriorly produced as prominent angular process to base of mandible, not acute.

Pronotum convex, longer than wide, much longer than head; sparsely punctate; lateral margins at apex and base rounded. Front tarsus with elongate spur. Prosternum at middle relatively sparsely, coarsely punctate, at sides more closely punctate. Metasternum moderately coarsely, closely punctate.

Elytron with punctures distinct, moderately coarse, finer towards apex; in irregular rows, not serially arranged except traces at disc; striae obscure.

Abdomen with sterna moderately coarsely punctate, except last sternum finely, sparsely punctate.

Collecting notes. Two specimens, seen in addition to the holotype and paratypes, were reared from Rhytometopi hicoriae Sept., Oct., collected at Tryon, North Carolina. Another was reared from Vachellia farnesiana at Brunsville, Texas.

Distribution. In addition to the holotype and

paratypes three specimens were seen from the following localities:

UNITED STATES

NORTH CAROLINA: Polk Co., Tryon (USNM).

TEXAS: Cameron Co., Brunsville (USNM).

Airora Reitter

Airora Reitter, 1876:18; Sharp, 1891:391; Schaeffer, 1915: 68; 1918:191; 1920:193; Casey, 1916:108; Hatch, 1962:190. Type-species: Trogosita cylindrica Serville, 1828:719, new designation.

Alindria; LeConte, 1861a:88; 1863b:31; LeConte and Horn, 1883:153 (not Erichson, 1844:451).

Various authors have recognized Airora as distinct from the "African" genus Alindria Erichson based on differences in structure of the antenna; the club is unilaterally dilated in the former, approaching bilaterally dilated in the latter. In conformity with treatment of other groups in the family this genus should be placed in synonymy with Alindria but specimens of the latter were not examined critically to reveal other possible differences that might show the group to be distinct from Airora.

As in the case of Temnochila and Tenebroides the genus Airora, with about twenty-two recognized species, is predominantly Central and South American. Only three species also occur north of Mexico and these, as in most

species of Temnochila and Tenebroides, appear to be divided by the Great Plains; cylindrica in the east, aequalis and minuta in the west. Southern specimens of aequalis that were examined were all collected from the west coast of Mexico and from Baja California. A few specimens similar to North American individuals of cylindrica were seen from eastern Mexico but the punctation was somewhat different and intermediates were not found. No cylindrica-like individuals were seen from western Mexico.

The combination of elongate, subcylindrical form; distinct spines externally on all tibiae, very short antennae, and the more or less projecting apical angles of the pronotum separating the prosternal and pronotal margins characterize this genus.

Description. Body subcylindrical, elongate.

Head subconvex; front near apex anteriorly, broadly, shallowly, declivent; with or without median longitudinal impression; apical margin shallowly trisinuate. Mandibles deflexed. Eyes transverse, not prominent, somewhat emarginate. Antenna prominent, but very short, scarcely reaching apical margin of pronotum, with eleven articles; funiculus well developed, articles distinct, club prominent, short, compact, three-articled, dilated only internally. Labium not emarginate. Submentum distinctly separated from gula in front; male without fulvous pit.

Prothorax regularly convex, quadrate, narrowly

marginate; longer than broad, lateral margins distinctly raised, at apex prominent or not; anterior margin of prosternum separated from anterior margin of pronotum by more or less projecting, not prominent, apical angles. Sides subparallel, convergent only slightly basally; behind middle not angularly deflexed. Apical margin straight or arcuate at middle; basal margin arcuate, bead entire; basal angles obtuse, not prominent. Prosternum somewhat convex, between coxae not or slightly compressed. Front coxal cavities closed. Legs short, all tibiae externally with distinct spines.

Elytron regularly convex; without basal impression; punctures serially arranged; with ten striae, impressed or not; intervals convex, finely biseriately punctate, outer row regular, continuous; inner row irregular, discontinuous, with punctures almost adventitious, basal marginal punctures distinct, continuous. Scutellum very small, recessed.

Abdominal sterna of female moderately coarsely and closely punctate; of male moderately coarsely, densely punctate. Sternum 8 as in Figs. 133, 152; segment 9 as in Figs. 140, 147.

Key to North American species of Airora

1 Pronotum with apical angles pointed, produced; apical margin at middle arcuate. East of Great Plains . . . . . '. cylindrica (Serville), p. 173

- Pronotum with apical angles rounded, not

produced; apical margin straight. West of Great Plains 2

2(1) Elytra with basal angles prominent, produced. Pronotum near apex with lateral margins distinct, not angularly reflexed . . .aequalis Reitter, p. 179

- Elytra with basal angles not or slightly produced. Pronotum near apex with lateral margins indistinct, angularly reflexed . . . . . minuta Schaeffer, p. 186

Airora cylindrica (Serville)

Trogosita cylindrica Serville, 1828:719. TYPE LOCALITY: "Amerique boréale."

Alindria cylindrica; Erichson, 1844:452; Lacordaire, 1854:342; LeConte, 1863b:31; Crotch, 1873:47; Blatchley, 1910:663; Ulke, 1902:19.

Airora cylindrica; Reitter, 1876:19; 1877b:172; Léveillé, 1888b:432; 1899:657; 1900:3; Casey, 1916:109; Schaeffer, 1920:193.

Trogosita niger Melsheimer, 1846:63. TYPE: not found. TYPE LOCALITY: "Pennsylvania."

Airora nigra; Reitter, 1876:19 (misspelling).

Trogosita nigellus Melsheimer, 1846:63. TYPE: not found. TYPE LOCALITY: "Pennsylvania."

Alindria nigella; Lacordaire, 1854:342.

Airora nigella; Reitter, 1876:19.

Airora nigrella; Casey, 1916:109; Schaeffer, 1920:193 (misspelling).

Trogosita teres Melsheimer, 1846:64. TYPE: not found. TYPE LOCALITY: "Pennsylvania." NEW SYNONYMY.

Alindria teres; Lacordaire, 1854:342; LeConte, 1863b:31; Crotch, 1873:47; Horn, 1894:324; Ulke, 1902:19.

Airora teres; Reitter, 1876:21; Leveillé, 1888b:432; 1900:4; Casey, 1916:109; Schaeffer, 1920:193.

The pronotum with pointed, produced apical angles and geographical distribution characterize individuals of this species.

Description. Body subcylindrical, elongate. Colour castaneous, rufopiceous or piceous. Shining. Length 4.5 - 14.6 mm.; ratios W/L pronotum 0.96 ± 0.031, W/L elytron 0.23 ± 0.009.

Head convex, moderately coarsely, not closely punctate, punctures scarcely impressed. Front with broad, shallow, longitudinal impression in most specimens; at apex broadly, shallowly declivent; apical margin distinctly trisinuate. Antenna robust, funiculus relatively broad.

Prothorax subcylindrical, subquadrate, relatively broad, moderately coarsely, not closely punctate, punctures scarcely impressed. Pronotal disc near flat. Apical angles produced, pointed, acute, marginal bead produced slightly anteriorly, lateral marginal bead prominent, distinctly continuous on to apical margin. Apical margin at

middle arcuate. Sides parallel. Basal angles distinct, obtuse. Basal margin broadly arcuate. Prosternum at middle not strongly convex; densely, coarsely punctate, punctures impressed; between coxae scarcely narrowed, behind coxae moderately produced laterally, not deflexed. Metasternum with punctures large, relatively dense, shallowly impressed. Legs robust, femora and tibiae relatively elongate, tarsi regular, with heavy spines.

Elytron convex, not rugose, with basal margin somewhat produced, narrowly rounded, acute. Striae distinct, impressed, regular, evident to apex; intervals with two rows of fine, distinct, regular punctures, evident to apex.

Abdomen with sterna of female moderately densely, coarsely punctate; of male at anterior two-thirds of first visible sternum and anterior third of succeeding sterna much more densely punctate.

Remarks. Colour, size, punctation, and both the apical declivity of the head and the median longitudinal impression on the head vary greatly, but continuously, in this species. The longitudinal median impression varies in depth, breadth, and length; in some specimens reaching the vertex, in others very short and terminating immediately behind the apical declivity, or not present at all. Colour varies from light castaneous to piceous. Length from 4.5 - 14.6 mm.

On the basis of these characters Melsheimer (1846)

and Casey (1916), according to their determined specimens, defined the species nigella and teres; nigella piceous in colour and with the front declivent but without the median longitudinal impression, and teres with the longitudinal impression obsolete and with punctures denser than those of cylindrica. The ratios W/L pronotum and W/L elytron of eight specimens the most similar to Casey's determined teres were 0.92 ± 0.026 and 0.23 ± 0.009 respectively, not significantly different from those of cylindrica.

The variation in cylindrica occurs within populations and these varying characters do not appear concordant. Both teres and nigella are considered here as variants of cylindrica.

Specimens of teres in the LeConte collection and determined by that author are all smaller than the smallest cylindrica and all lighter in colour; those of teres are quite uniform in size whereas those of cylindrica vary considerably.

Collecting notes. Collected from Pinus sp. Oct. (Jefferson, Texas), July, Feb. (Florida), loblolly pine 0 - 6 ft., Feb. (Elizabeth, Louisiana), Carya (Ellijay, Georgia), under bark of dead Quercus laevis Feb., March (Columbia Co. and nr. Red Water Lake, Florida), and at light, 19 June (Mt. Sequoyah, Arkansas).

Distribution. East of Great Plains; Missouri to eastern Texas, east to coast, Massachusetts to Florida.

One specimen was seen from Victoria, Tamaulipas, Mexico (MCZ). Three hundred and thirty-two specimens were examined from the following localities:

CANADA

ONTARIO: Windsor.

UNITED STATES

ALABAMA: Mobile Co., Mobile (CAS, UASM).

ARKANSAS: Garland Co., Hot Springs (OSU); Hempstead Co., Hope (AMNH); Washington Co. (UARK, INHS); Mt. Sequoyah (INHS).

DISTRICT OF COLUMBIA: Washington (AU).

FLORIDA: Alachua Co. (CU, FDA), Gainesville (CU); Collier Co., Naples (AMNH); Columbia Co. (FDA); Dade Co., Miami (CAS); Dixie Co., Shamrock (CAS); Hernando Co., Brooksville (CAS); Lake Co., Leesburg (FDA); Marion Co., Ocala (CAS); Orange Co., Winter Park (MCZ); Osceola Co., Kissimmee (CU); Pinellas Co., Dunedin (CU); Putnam Co., nr. Red Water Lake (FDA); Sarasota Co., Sarasota (FDA); Seminole Co., Sanford (MCZ); Volusia Co., De Land (FDA); New Smyrna Beach (CAS).

GEORGIA: Chatham Co., Savannah (CAS); Gilmer Co., Ellijay (CU); Billy's Island, Okefenokee Swamp (CU).

ILLINOIS: Champaign Co. (MCZ); McLean Co., Hudson (INHS); Montgomery Co., Waggoner (FDA); Scott Co., Exeter (CNHM).

INDIANA: Crawford Co. (CAS); Dubois Co., Huntingburg (CNHM); Lawrence Co., Smith's Woods, NE. Springville (CNHM); Turkey Run (CNHM).

KANSAS: Douglas Co. (UKL), Lawrence (CAS, CNC); Shawnee Co., Topeka (CU).

KENTUCKY: Harlan Co., Cumberland Gap (MCZ); Henderson Co.,

Henderson (CNC).

LOUISIANA: Allen Co., Elizabeth; Madison Co., Tallulah (MCZ); Hart (CAS).

MARYLAND: Baltimore (CAS); Harford Co., Army Chemical Centre (DRW).

MASSACHUSETTS: (INHS).

MICHIGAN: Wayne Co. (INHS); 12 Mile R., Detroit (CNC).

MISSISSIPPI: George Co., Lucedale (CU); Greene Co., State Line (CU); Perry Co., New Augusta (CU), Richton (CU).

MISSOURI: Saint Louis (CAS).

NEW JERSEY: Bergen Co., Ft. Lee (CAS); Ocean Co., Wrangle Brook Rd., Lakehurst (CU).

NEW YORK: Erie Co., Buffalo (CU, INHS, USNM); New York Co., New York (CNHM), Pelham (AMNH); Niagara Co., Olcott (CU); Tompkins Co., Ithaca (AU, CU).

NORTH CAROLINA: Moore Co., Southern Pines (AMNH, USNM); Pasquotank Co., Elizabeth City (AMNH).

OHIO: Delaware Co. (FDA, OSU); Franklin Co. (OSU); Greene Co. (OSU); Hamilton Co., Cincinnati (CAS); Perry Co. (OSU).

PENNSYLVANIA: Allegheny Co. (CU), Pittsburg (AMNH); Dauphin Co., Harrisburg (AU, CAS, CU, MCZ), Hummelstown (CAS, OSU); Delaware Co., Lansdowne (AMNH, CAS); Fayette Co., Uniontown (CAS); Westmoreland Co., Jeannette (AMNH).

SOUTH CAROLINA: Greenville Co., Sassafras Mt. (CAS); Oconee Co., Clemson (CAS), Clemson College (CAS, CNC).

TENNESSEE: Decatur Co., Perryville (UKL).

TEXAS: Bastrop Co., Bastrop State Park (CNC); Brazos Co. (TAM); College Station (TAM); Colorado Co. (UKL); Comal Co.

(CAS), New Braunfels (CU); Dallas Co., Dallas (INHS,MCZ); Gillespie Co. (OSU); Harris Co., Houston (CU); Hidalgo Co. (OSU); Marion Co., Jefferson (TAM); Montgomery Co. (TAM). VIRGINIA: Fairfax Co., Fairfax (AMNH, CU), Falls Church (MCZ), Mt. Vernon (UASM).

Airora aequalis Reitter

Airora aequalis Reitter, 1877b:172. TYPE LOCALITY: "California." Casey, 1916:110; Schaeffer, 1920:193; Hatch, 1962:192.

Airora bicolor Casey, 1916:110. LECTOTYPE (here designated): labelled as follows: "Mok. H; CASEY bequest 1925; TYPE USNM 49177 (red label) ; bicolor Csy."; USNM. PARALECTOTYPES: first specimen labelled as follows: "Cal. CASEY bequest 1925; bicolor - .2 PARATYPE. USNM 49177 (red label)" ; second specimen labelled as follows: "Cal. Ct. Cal.; CASEY bequest 1925; bicolor - .3 PARATYPE. USNM 49177 (red label)"; USNM. TYPE LOCALITY: "California (Mokelumne Hill, Calaveras Co.)." Schaeffer, 1920:193.

Airora aequalis ab. bicolor; Hatch, 1962:192.

Airora punctiventris Casey, 1916:110. LECTOTYPE (here designated): labelled as follows: "Ari.; CASEY bequest 1925; TYPE USNM 49176 (red label); punctiventris Csy."; USNM. PARALECTOTYPE: labelled as follows: "Ariz.; CASEY Bequest 1925; punctiventris .2 PARATYPE USNM 49176 (red label)"; USNM.

TYPE LOCALITY: "Arizona (Tucson)." Schaeffer, 1920:193. NEW SYNONYMY.

Airora polita Casey, 1916:111. LECTOTYPE (here designated): labelled as follows: "Prob. Cal.; CASEY bequest 1925; TYPE USNM 49178 (red label); politus Csy."; USNM. PARALECTOTYPE: labelled as follows: "Cal.; CASEY bequest 1925; polita -2 PARATYPE - USNM 49178 (red label)"; USNM. TYPE LOCALITY: "California (probably the coast regions)." Schaeffer, 1920:193. NEW SYNONYMY.

The form of the apical pronotal angles and geographical distribution separate individuals from those of cylindrica; the humeral angles and distinct lateroapical margins of the pronotum distinguish them from those of minuta.

Description. Body subcylindrical, elongate. Colour light castaneous to piceous, elytra sometimes somewhat darker than head and pronotum; palpi, antennal club and precoxae, in part, testaceous. Shining. Length 3.7 - 7.6 mm; ratios W/L pronotum 0.81 ± 0.020, W/L elytron 0.23 ± 0.011.

Head convex, moderately coarsely, not closely punctate, punctures distinctly impressed. Front not longitudinally impressed, toward apex broadly, transversely, shallowly declivent; apical margin shallowly trisinuate. Antenna not robust, funiculus not slender.

Prothorax subcylindrical, subquadrate, moderately

coarsely and closely punctate, punctures impressed, pronotal disc near flat. Apical angles distinct, rounded, obtuse, not produced. Anterior margin straight. Sides parallel, lateral margins distinct but not prominent, continuous to apex. Basal angles distinct, rounded, obtuse. Posterior margin broadly arcuate. Prosternum at middle not strongly convex; scarcely, finely punctate; between coxae scarcely narrowed; behind coxae slightly produced laterally, not deflexed. Metasternum with punctures relatively large, not close, shallowly impressed. Legs regular, tibiae spinous, regular.

Elytra convex, somewhat rugose, with basal margins somewhat produced, narrowly rounded, acute; each elytron with ten striae, 1 to 7 and 10 impressed, evident to apex; intervals convex, each with one row of regular punctures, evident to apex.

Abdomen with sterna relatively densely, closely punctate; those of male, at anterior third, much more densely, closely punctate than female.

Remarks. Size, colour, punctation, and the apical declivity of the head vary considerably, but less than in cylindrica. Colour ranges from light castaneous (including the lectotype of polita), almost rufous, to piceous; size from 3.7 to 7.6 mm. The apical declivity of the head varies in length, breadth, and degree of impression; in some individuals it is evident only narrowly immediately behind the apical margin. The head and pronotum of many specimens (also

equivalent to Casey's bicolor) are much lighter in colour (almost rufous) than the elytra. Van Dyke determined several specimens of bicolor as equal to immature aequalis, but this is more likely to be simply a colour variant. Individuals range from uniformly light castaneous to piceous to continuous degrees of contrasting colour between the head--pronotum and the elytra. Specimens of Casey's punctiventris are piceous (lectotype not black as indicated by Casey) and broadly declivent. There are many intermediates between this condition and the general form of aequalis. A. polita Casey is small in size (lectotype, length 5.02 mm.), but well within the range of aequalis, the punctures are less dense, and the apical angles of the pronotum are slightly more narrowly rounded. This condition also is considered here as a variant and is within the range of variation of aequalis. The variation is continuous, not geographic; none of these characters seem concordant, and individuals cannot be separated from the many continuous lines of intermediates.

Collecting notes. Specimens were collected from Pinus coulteri Nov. (Mt. Diablo, California); P. ponderosa Jan., March, April, June - Nov. (California), Aug., Oct. (New Mexico), June (Oregon), May (Washington); P. sabiniana March, June (North Fork, Sonora, California), P. edulis 7 Aug. (Los Alamos, New Mexico), P. contorta 7 May (Vernon, British Columbia), P. jeffreyi 28 Sept. (Harvey Valley, California), reared from P. ponderosa in March (Amador Co.,

California), collected 9 Jan. and emerged in summer from Fomes applanatus (Baja California), collected at light July, Aug. (Arizona).

Distribution. West of Great Plains; British Columbia to California, east to Colorado and western Texas; specimens were seen from the west coast of Mexico, Baja California, Gulf of California, and Tres Marias Islands. Three hundred and eighty specimens were examined from the following localities:

CANADA

BRITISH COLUMBIA: Oliver (CAS); Summerland (UW); Vernon (CAS).

UNITED STATES

ARIZONA: Cochise Co., Rustler Park, Chiricahua Mts. (AMNH), Chiricahua Mts. (OSU, USNM); Gila Co., Wheatfields near Globe (CAS); Graham Co., Shannon Camp, Graham Mt., 9600 ft. (CNHM), Graham Mt. (CAS); Maricopa Co., Marinette (CAS), Phoenix (CU); Pima Co., Alamo Canyon, Ajo Mts. (CAS), Mt. Lemmon, Catalina Mts. (CAS), Organ Pipe Cactus Nat. Mon. (UASM), Santa Catalina Mts. (AMNH, CAS), Tucson (CAS, OSU, USNM); Pinal Co., Superior (CAS); Yavapai Co., Camp Verde (CAS); Yuma Co. (AMNH); Hot Springs (USNM); 4 mi. S. Mountain View (CAS); Superstition Mts. (CAS).

CALIFORNIA: Amador Co., River Pines (WHT), River Springs (WHT); Butte Co., Feather River (CAS), Oroville (CAS); Calaveras Co., Mokelumne (CAS), Mokelumne Hill (USNM); Contra

Costa Co., Mitchell Canon, Mt. Diablo (CU), Mt. Diablo (CAS); Fresno Co., Camp 6 (CAS), Cedar Grove, 4600 ft. (CAS), Dalton Creek, 4800 ft. (CU), General Grant National Park (CAS), Huckleberry Meadow (CAS), Stevenson Creek (CAS); Lassen Co., Facht (CAS), Lassen National Forest (CAS); Madera Co., Ahwahnee (CAS), Arnold Meadow (CAS), Bass Lake (CAS), Chiquito Basin (CAS), Chiquito Creek, 4100 ft. (CU), North Fork (CU), Placer Station (CAS), Stevenson Creek (CAS); Mariposa Co., Crockers (CAS), Yosemite National Park (CAS); Modoc Co., Hackamore (CAS), Modoc National Forest (MCZ); Napa Co., Child's Val. (CAS), Mt. St. Helena (USNM); Placer Co., Penryn (CAS); Plumas Co., 6 mi. N. Chester (TLE), Mohawk (CAS), Portola (CAS), Walker Mine (CAS); Riverside Co., Keen Camp (OSU), Hurkey Creek, San Jacinto Mts. (CAS, CNC, MCZ), Idyllwild, San Jacinto Mts. (CAS), San Jacinto Mts. (CAS); Sacramento Co. (CU); San Bernardino Co., Deep Creek (CAS), Oro Grande (OSU), San Bernardino Mts. (CU); San Diego Co., Laguna (CAS), San Diego (CAS); Santa Clara Co., Mt. Hamilton (CAS); Shasta Co., Castle Crags (CAS), Hat Creek (CAS), Shasta Spgs. (CAS); Siskiyou Co. (CAS), Antelope Creek (CAS), McCloud (CAS), Nortons Mill (CAS); Sonoma Co., Santa Rosa (OSU); Trinity Co., Carrville (CAS, CNHM), Carrville, 2400 - 2500 ft. (CAS), Coffee Cr. (CAS, CNHM), Hayfork (CAS, UASM), Mad River, 6 mi. S. Ruth (CAS); Tulare Co., Kaweah (CAS, CNC), Kings Canon (CAS), Pine Flat, Hot Spgs. (CAS), Pine Flat (CAS); Tuolumne Co. (AMNH, CAS, CNHM), Sonora (WHT); Putah Cyn. (CAS); Greenhorn

Mt. (CAS); Harvey Valley (MCZ); Mts. W. La Panza (CAS).
COLORADO: Douglas Co. (MCZ); El Paso Co. (CAS).
NEVADA: Elko Co., Kyle Cn., Charleston Mts. (CAS); Washoe Co., Reno (CAS).
NEW MEXICO: Hidalgo Co., Rodeo, 4000 ft. (CU); Otero Co., High Rolls (ANSP); Sandoval Co., Los Alamos (USNM); San Miguel Co., Las Vegas (CU); Valencia Co., San Mateo Mts. (CAS).
OREGON: Deschutes Co., Sisters (CNHM); Grant Co., Silvies Valley (CNHM); Jackson Co., Central Point (CAS), Medford (CNHM,UW), Ochoco Ranger Sta. (UW); Klamath Co., Upper Klamath Lake (USNM).
TEXAS: Brewster Co., Pine Canyon, Big Bend National Park, 5000 ft. (CNC); Davis Mts. (CU).
WASHINGTON: Kooskooskie (UW).

Material was also examined from the following:

MEXICO - BAJA CALIFORNIA: 8 mi. NE. Cape San Lucas (1 CAS), Chapala Dry Lake (1 CAS), 15 mi. N. El Refugio (1 CAS), Hamilton Rch. (1 CAS), 10 mi. S. La Paz (2 CAS), 15 mi. W. La Paz (1 CAS), 4.5 mi. NE. Los Planos (2 CAS), 5 mi. S. Mirafloras (1 CAS), 1 mi. S. Mulege (1 CAS), 22 mi. NW. Penjamo (1 CAS), 15 mi. SE. San Antonio (18 CAS), 5 mi. W. San Bartol (5 CAS), San Fernando (1 CAS), San Jose del Cabo (1 ANSP, 10 CAS), Santa Rosa (2 CAS, 1 MCZ), Santiago (5 CAS), Todas Santos (11 CAS), Triunfo (3 CAS), Vernacio (1 CAS); COLIMA: Manzanillo (1 AMNH), SE. Slope Mt. Colima

(1 CAS); GULF OF CALIFORNIA: Angeles Bay (1 CAS), Porto Ballandra, Carmen I. (1 CAS), San Jose I. (1 CAS), Tiburon Is. (1 AMNH); SINALOA: Eldorado (1 CAS); SONORA: Desemboque (1 CAS); TRES MARIAS ISLANDS: Maria Madre I. (7 CAS), Maria Magdalena I. (5 CAS).

Airora minuta Schaeffer

Airora minuta Schaeffer, 1918:194. HOLOTYPE: USNM Type No. 70381, labelled as follows: "Ft. Yuma, Ar.; Coll Hubbard and Schwarz; preying on Hylocorus; Airora minuta Schaef. type."; USNM. TYPE LOCALITY: "Fort Yuma, Arizona." Schaeffer, 1920:193.

The prothorax with indistinct apical angles, not produced, and with indistinct lateroapical margins, angularly reflexed, separate individuals of this species from those of both cylindrica and aequalis.

Description. Body subcylindrical, elongate. Colour light castaneous. Shining. Length 3.2 - 3.6 mm; ratios W/L pronotum 0.78 ± 0.015, W/L elytron 0.22 ± 0.018.

Head convex, moderately sparsely, finely punctate; punctures not impressed. Front not longitudinally impressed; towards apex broadly, transversely, shallowly declivent; apical margin indistinctly, shallowly trisinuate. Antennal club with lobes relatively narrow, funiculus very slender, with articles very small relative to club.

Prothorax relatively elongate, subcylindrical,

subquadrate, moderately finely punctate, except laterally moderately coarsely punctate. Pronotal disc convex. Apical angles indistinct, not produced, truncate. Anterior margin straight. Sides parallel, lateral margins not prominent, near apex indistinct where angularly reflexed. Basal angles distinct, obtuse. Posterior margin broadly arcuate. Prosternum at middle relatively strongly convex; moderately finely, sparsely punctate, punctures scarcely impressed; between coxae somewhat narrowed, behind coxae scarcely produced laterally, not deflexed. Metasternum with punctures large, not close, scarcely impressed. Femora and tibiae relatively short, broad; tibiae scarcely spinous; tarsi relatively elongate, narrow.

Elytron convex; somewhat rugose; with basal margin subtruncate, apex broadly rounded. Striae scarcely or not impressed, somewhat irregular, at apex not evident; intervals with punctures sparse, apex impunctate.

Abdomen with sternal punctures large, not close, scarcely impressed.

Collecting notes. Specimens were collected from Cercidium correyanum 29 March (Sabina Canyon, Arizona). The type was collected at Ft. Yuma, Arizona, preying on Hylocorus.

Distribution. Southern California, south-western Arizona. One specimen was seen from Venedillo, Sinaloa, Mexico (CAS). Four specimens were examined from the following localities:

UNITED STATES

ARIZONA: Pima Co., Sabina Canyon (USNM), Tucson (OSU); Yuma Co., Fort Yuma (USNM).

CALIFORNIA: Riverside Co., Mecca (CAS).

Temnochila Westwood

Temnoscheila Westwood, 1830:231; Hope, 1840:131.

Type-species: Temnochila coerulea (Olivier) (= Trogossita), by proposing Temnochila as an emendation of Temnoscheila and by monotypy (Erichson, 1844: 449). Later citations: Temnoscheila splendens Gray by Hope, 1840:131 (not originally included); Temnochila coerulea (Olivier) by Crowson, 1964:296.

Temnochila Erichson, 1844:449 (emendation of Temnoscheila Westwood); 1845:241; Redtenbacher, 1845:126; 1849:20, 175; 1858:LXXIX, 340; 1872:372; 1874:LXXXVI; Bach, 1851:403; Lacordaire, 1854:340; Jacquelin du Val, 1858:162; LeConte, 1861a:88; 1863b:31; Seidlitz, 1875: 33, 153; 1891a:51; 1891b:239; Marseul, 1885:145, 148; Sharp, 1891:393; Ganglbauer, 1899:420, 423; Léveillé, 1908:323; Reitter, 1911:5, 7; Schaeffer, 1915:68; 1918:191; 1920:193; Hatch, 1962:190.

Trogossita (pars); Castelnau, 1840:383.

Trogosita (pars); Mannerheim, 1843:301.

Trogosita; Reitter, 1875a:3; 1876:26; 1882:143, 144; LeConte and Horn, 1883:153; Fowler, 1889:269.

Trogossita; Crowson, 1964:296.

Erichson (1844) noted that Westwood (1830) inadvertently mistransliterated the Greek letters into the Latin alphabet in forming his name Temnoscheila. Erichson intentionally changed the original spelling of the name to Temnochila, and added that "The Westwood name needs only a grammatical correction" (translated). The two names are objective synonyms, whether or not the emendation is justified, and therefore have the same type-species. The type fixation by monotypy of the replacement name Temnochila by Erichson thus applies to the replaced name Temnoscheila Westwood.

Hope's (1840) "typical species" are recognized by the International Commission, although in this case his designation is invalid because the species T. splendens Gray was not originally included by Westwood in his genus Temnoscheila nor was it synonymized by Hope with one of the originally included species.

The combination of middle and hind tibiae externally without spines and antennae relatively elongate separates members of Temnochila from Airora; the combination of prothorax with lateral margins behind middle angularly deflexed and labium at apex deeply emarginate separates members from Tenebroides and Airora. The form of Temnochila individuals is less cylindrical than that of Airora and more cylindrical than that of Tenebroides. All males of Temnochila are easily distinguished by the submentum with a distinct median pit.

Description. Body subconvex, elongate.

Head subconvex, at apex nearly as wide as pronotum; with median longitudinal impression or line in most species; not declivous anteriorly; apical margin trisinuate. Mandibles deflexed. Eyes transverse, not prominent. Antenna prominent, somewhat elongate, eleven-articled, with enlarged, loose, three-articled club, dilated only internally; funiculus with articles distinct. Submentum distinctly separated from gula in front; male with distinct median fulvous pit. Labium at apex very deeply, triangularly, emarginate.

Prothorax subconvex, lateral margins distinctly raised, prominent to apex; apical angles produced anteriorly, interrupting anterior margins of pronotum and prosternum; lateral margins behind middle angularly deflexed. Prosternum more or less flat, not or scarcely compressed between coxae. Coxae with setiferous pit at posterobasal margin. Front coxal cavities closed. Front tibia at apex digitate externally, externally with or without spines; middle and hind tibiae externally without spines.

Elytron subconvex; without basal impression; basal marginal bead entire; punctures serially arranged; intervals with punctation variable.

Abdominal sterna of male laterally finely, closely punctate; of female less finely, less closely punctate. Sternum 8 of male as in Fig. 134, of female with short apodeme, bifurcate basally; segment 9 as in Figs. 141, 149.

This genus includes about 107 species, most occurring in Central and South America. Ten species are found in America north of Mexico and three or four occur in the Old World, including the predominant and widely distributed coerulea Olivier.

Relationships. T. virescens, acuta, chlorodia, aerea, and omolopha share more characters in common than any other group of species of the genus (Table XIV). T. rhyssa and edentata are somewhat divergent from the virescens group, yet are probably closely related. T. hubbardi, barbata, and yuccae share few characters with each other or with the virescens group. T. virescens, chlorodia, and to a lesser extent aerea and acuta, appear to be successful, rapidly evolving groups in North America, as seen by their distribution and their high degree of variation. More southern forms of the group seem to be far less variable. T. barbata, hubbardi, and yuccae appear to be at the northern limits of their ranges and possess what are probably more primitive, specialized characters such as tibial spines, securiform labial palpi, and so on; and a different pattern than the virescens-like form common throughout Central and South America.

TABLE XIV

COMPARISON OF CHARACTERS OF SPECIES OF *Temnochila*

Character	Species									
	barbata	*yuccae*	*hubbardi*	*edentata*	*rhyssa*	*omolopha*	*aerea*	*virescens*	*chlorodia*	*acuta*
metallic blue, green, purple	-	-	-	-	+	+	+	+	+	+
form subcylindrical	+	±	+	-	-	-	-	-	-	-
labial palpus securiform	-	-	+	-	-	-	-	-	-	-
front with longitudinal groove	-	±	-	+	+	+	±	+	+	+
metasternal punctures coarse (Figs. 42, 44)	+	-	+	-	-	-	-	-	-	-
front tibia on outer margin toothed	+	+	-	-	-	-	-	-	-	-

TABLE XIV (continued)

Character	Species									
	barbata	yuccae	hubbardi	edentata	rhyssa	omolopha	aerea	virescens	chlorodia	acuta
elytra reticulate (Figs. 56, 58, 60-64)	-	+	-	+	-	+	+	+	+	+
elytral reticulation regular (Figs. 60-64)	-	-	-	-	-	+	+	+	+	+
elytral striae impressed	+	+	+	+	+	-	-	-	-	-
abdominal sterna male more densely punctate than female	-	+	-	+	-	+	+	+	+	+

Key to North American species of Temnochila

1 Front tibia margined each side of upper edge and with teeth towards middle on outer margin. Colour rufopiceous or piceous, not metallic 2

- Front tibia not margined each side of upper edge and without teeth towards middle on outer margin. Colour rufopiceous, piceous, metallic green, blue, purple, black 3

2(1) Elytral intervals with punctures small, scarcely evident (Fig. 55). Prosternum and metasternum with punctures large, deeply impressed (Fig. 42). California, Arizona . . . . . barbata LeConte, p. 196

- Elytral intervals with punctures large, prominent (Fig. 56). Prosternum and metasternum with punctures small, shallowly impressed (Fig. 43). California . . . . . yuccae (Crotch), p. 199

3(1) Colour rufopiceous, piceous, not metallic. 4

- Colour metallic green, blue, purple, black 5

4(3) Terminal article of labial palpus securiform. Metasternum coarsely, closely punctate (Fig. 44). Elytra rugose; interval punctures small. Florida . . . . . hubbardi Léveillé, p. 201

- Terminal article of labial palpus not securiform. Metasternum finely, not closely

punctate (Fig. 45). Elytra not rugose; interval punctures large. California, Arizona . . . . . edentata Schaeffer, p. 203

5(3) Lateral margin of pronotum behind middle with distinct deflexion (Fig. 71). Elytra strongly rugose. Anterior and posterior angles of pronotum broadly rounded, not produced (Fig. 71). California, Idaho . . . . . rhyssa, n. sp., p. 206

- Combination of characters not as above. Pronotum (Figs. 72-77) 6

6(5) Pronotum subcordiform; apical angles strongly produced, broad, acute; posterior margin strongly produced (Fig. 72). Elytron with basal marginal bead prominent. Colour dull metallic. Arizona, New Mexico . . . . . omolopha, n. sp., p. 208

- Combination of characters not as above. Pronotum (Figs 73-77) 7

7(6) Head, dorsally, with median longitudinal line obsolete (length 1 mm. or less from apex), impressed or not, or absent. California, Arizona . . . . . aerea LeConte, p. 210

- Head, dorsally, with median longitudinal line distinct, impressed or not. 8

8(7) Apical angles of pronotum less acute, less produced (Fig. 74). Head with vertex finely

punctate (Fig. 52). Humeral angles rounded, not prominent (Fig. 122). East of Great Plains . . . . . virescens (Fabricius), p. 214

\- Apical angles of pronotum more acute, more produced (Figs. 75-77). Head with vertex coarsely punctate (Figs. 53-54). Humeral angles pointed, or narrowly rounded, prominent (Figs. 123, 124). East or west of Great Plains 9

9(8) Pronotum less convex; lateral margins at apical two-thirds subparallel (Fig. 75). Prosternum more coarsely, more closely punctate. Head with vertex closely punctate (Fig. 53). West of Great Plains . . . . . chlorodia (Mannerheim), p. 219

\- Pronotum more convex; lateral margins convergent from apex (Figs. 76, 77). Prosternum less coarsely, less closely punctate. Head with vertex not closely punctate (Fig. 54). East of Great Plains . . . . . acuta LeConte, p. 229

Temnochila barbata LeConte

Temnochila barbata LeConte, 1863a:65. HOLOTYPE: male, labelled as follows: "(grey disc with edge cut off); Type 7037 (red label); T. barbata Lec."; MCZ. TYPE LOCALITY: "Cape San Lucas." LeConte, 1863b:31; Léveillé, 1888b:434; 1889a:XLV; 1900:6;

Schaeffer, 1920: 193.

Trogosita barbata; Crotch, 1873:47; Horn, 1894:323.

Individuals of this species are easily distinguished by the key characters.

Description. Body subcylindrical. Colour rufopiceous, not metallic. Length 8.7 - 16.5 mm.

Head coarsely, densely punctate; punctures well impressed; front with median longitudinal line scarcely evident, except impunctate, not impressed. Apical margin shallowly tridentate. Antenna regular; club not prominent; funiculus with articles not distinctly separated. Labial palpus with terminal article regular, subcylindrical. Fulvous hairs of submental pit few, not bushy.

Pronotum coarsely, closely punctate; punctures deeply impressed. Apical angles moderately produced, small, narrowly rounded; apical margin almost straight, lateral margins at apical half almost straight, convergent slightly posteriorly, behind middle slightly emarginate, behind emargination convergent strongly posteriorly, somewhat sinuate before basal angles; basal angles small, obtuse; basal margin broadly arcuate (Fig. 67). Front tibia each side of upper edge distinctly marginate; one third from apex with distinct but small toothlike projection; at apex with distinct, small, brush of setae. Legs somewhat sparsely setose. Metasternum with punctures large, not close, deeply impressed (Fig. 42).

Elytra moderately closely, very coarsely punctate; strial punctures large, deeply impressed; interval punctures fine. Striae impressed; intervals convex; not reticulate (Fig. 55).

Abdomen with sterna of female and male coarsely, not closely punctate; punctures deeply impressed, somewhat irregular.

Distribution. California, Arizona. Specimens have been recorded from Baja California and other areas in Mexico; material was seen from Baja California and Sonora, Mexico. Five specimens were examined from the following localities:

UNITED STATES

ARIZONA: Pima Co., Sabina Canyon, Santa Catalina Mts., 2600 - 3500 ft. (AMNH).
CALIFORNIA: Riverside Co., 4 mi. S. Palm Desert (CAS); Sierra Co., Sierra (ANSP); S. Nicolas Bay (CAS).

Specimens were also examined from the following:

MEXICO - BAJA CALIFORNIA: Bahia Refugio, Isla Angel de la Quarda (1 CAS), 5 mi. SW. Bartob (2 CAS), Cape San Lucas (MCZ), 20 mi. N. Comondu (1 CAS), Coyote Cove, Conception Bay (2 CAS), 14 mi. S. El Arco Mine (1 CAS), 25 mi. W. La Paz (2 CAS), 20 mi. NW. La Paz (5 CAS), 15 mi. W. La Paz (5 CAS), La Paz (1 CAS), 5 mi. S. Miraflores (2 CAS), Miraflores (1 CAS), 1 mi. S. Mulege (1 CAS), 22 mi. NW.

Penjamo (3 CAS), 15 mi. SE. San Antonio (1 CAS), 45 mi. N. San Ignacio (3 CAS), 10 mi. SW. San Jose del Cabo (1 CAS), San Jose del Cabo (8 CAS), 3 mi. N. San Pedro (4 CAS), Santa Rosa (10 CAS, 5 CU, 2 OSU), Santiago (2 CAS), Todos Santos (4 CAS), 6 mi. N. Triunfo (4 CAS), Triunfo (3 CAS); SONORA: 10 mi. W. Alamos (1 AMNH), Desemboque (4 CAS), Kino Bay (2 CAS), Puerto Libertad (1 CAS).

Temnochila yuccae (Crotch)

Trogosita yuccae Crotch, 1874:75. LECTOTYPE (here designated): female, labelled as follows: "Cala. m; TYPE 8314; T. yuccae Crotch"; LeConte collection, MCZ. TYPE LOCALITY: "Mojave desert."

Temnochila yuccae; Léveillé, 1888b:436; 1900:9; Schaeffer, 1918:194; 1920:193.

The key characters readily separate individuals of this species from other members of the genus.

Description. Body subcylindrical. Colour rufopiceous; shining, not metallic. Length 14.1 - 20.6 mm.

Head moderately finely, closely punctate; punctures shallowly impressed; front with median longitudinal line distinct from apex to vertex, scarcely impressed. Antenna regular, club not prominent, funiculus with articles distinctly separated. Labial palpus with terminal article regular, subcylindrical.

Pronotum moderately finely, closely punctate;

punctures shallowly impressed. Apical angles moderately rounded and produced; apical margin about straight; lateral margins scarcely rounded, from apical quarter moderately convergent posteriorly, behind middle distinctly emarginate, sinuate before basal angles; basal angles prominent, obtuse; basal margin broadly, strongly arcuate (Fig. 68). Front and middle tibia on outer margin one-quarter and one-third from apex with prominent toothlike projection. Front tibia each side of upper edge distinctly margined. Metasternum with punctures medium in size, moderately well impressed, not close (Fig. 43).

Elytra with strial and interval punctures prominent, deeply impressed. Strial punctures large; interval punctures large, smaller than strial. Reticulation evident, very fine, irregular, indistinct, without strial arrangement (Fig. 56). Striae impressed; intervals convex.

Abdominal sterna of female somewhat coarsely, not closely punctate; of male much more finely, closely punctate.

Variation. Size varies considerably. The first specimen (lectotype) of three in Crotch's series is much larger than the second and third but within the range of other individuals examined.

Collecting notes. Reared from Yucca brevifolia with host Astromula nitidum Chemsak and Linsley (Cerambycidae) (Palmdale, Los Angeles Co., California), attracted

to ultraviolet light (Pearblossom, Los Angeles Co., California).

Distribution. California; specimens were seen from Baja California. Twenty-four specimens were examined from the following localities:

UNITED STATES

CALIFORNIA: Los Angeles Co., 2 mi. W. Fairmont (CAS), Palmdale (WHT), Pearblossom (WHT); Riverside Co., Pinon Flat (CAS); San Bernardino Co., Apple Valley (CNC), Mojave Desert (MCZ).
NEVADA: Clark Co., Charleston Mts. near Las Vegas (CAS).

Material was also examined from the following:

MEXICO - BAJA CALIFORNIA: 20 mi. NW. La Paz (1 CAS), 13 mi. N. San Ignacio (2 CAS), 45 mi. N. San Ignacio (1 CAS), San Pedro, Martia Mts. (1 CAS).

Temnochila hubbardi Léveillé

Temnochila hubbardi Léveillé, 1888a:417. TYPE LOCALITY: "Florida." Léveillé, 1888b:435; 1900:9; Schaeffer, 1920:193.

The key characters readily distinguish individuals of this species from other members of the genus.

Description. Body subcylindrical. Colour rufopiceous, not metallic. Size small, length 5.6 - 7.0 mm.

Head coarsely, densely punctate; punctures moderately strongly impressed; front without median longitudinal line or groove. Antenna short, compact; club prominent, subequal to articles 4 - 11; articles 4 - 11 much wider than long, cylindrical, disc-like; eleventh article slightly produced, almost cylindrical; funiculus with articles distinctly separated. Labial palpus with terminal article prominent, securiform.

Pronotum coarsely, closely punctate; punctures distinctly impressed. Apical angles scarcely produced, narrowly rounded, acute; apical margin at middle narrowly arcuate; sides at apical half about parallel, distinctly emarginate behind middle, behind emargination strongly convergent posteriorly; basal angles not produced, slightly obtuse; basal margin broadly arcuate (Fig. 69). Tibiae without teeth; front femora very broad relative to length; legs sparsely setose. Front tibia regularly convex, at apical margin without distinct brush. Metasternum with punctures deeply impressed, relatively small, dense (Fig. 44).

Elytra with strial punctures large, deeply impressed; intervals with punctures fine, scarcely impressed (Fig. 57). Striae impressed; intervals strongly convex; not reticulate.

Abdomen with sterna of male and female coarsely, closely, not densely punctate; punctures irregular.

Collecting notes. Adult and larva collected from under bark of red mangrove (Upper Keys near Palusa Keys, Florida).

Distribution. Southern Florida. Also, twenty-two specimens were seen from S. Bimini Island, Bahamas (AMNH). Sixteen specimens were examined from the following localities:

UNITED STATES

FLORIDA: Monroe Co., Big Pine Key (FDA), Elliotts Key (CAS), Key Largo (OSU); Volusia Co., Enterprise (CU); Biscayne (ANSP, CU); near Palusa Keys, Upper Keys (EOW).

Temnochila edentata Schaeffer

Temnochila edentata Schaeffer, 1918:194. LECTOTYPE (here designated): first specimen, male, labelled as follows: "Type ♂; Ariz.; BROOKLYN MUSEUM COLL. 1929; Cotype No. 42607 USNM (red label); Temnochila edentata Schaef." PARALECTOTYPE: second specimen, female, labelled as first except: "Type ♀"; USNM. TYPE LOCALITY: "Prescott, Arizona." Schaeffer, 1920:193.

Temnochila sonorana Barrett, 1932:171, 172. HOLOTYPE: CAS Type No. 3612, female, labelled as follows: "Coachella, Cal., V-24-28; Van Dyke Collection; Holotype, Temnochila sonorah Barrett (red and white label)"; CAS; PARATYPES: two females, one male, Coachella, Cal., V-24-28, V-25-28; Van Dyke collection, CAS. TYPE LOCALITY: "Coachella, Riverside County, California." Leng and Mutchler, 1933:86. NEW SYNONYMY.

The characters given in the Key readily separate

individuals of this species from other members of the genus.

Description. Body subconvex. Colour rufopiceous, not metallic. Length 10.5 - 18.6 mm.

Head coarsely, densely punctate; punctures well impressed; front with median longitudinal line not prominent, distinctly but shallowly impressed. Anterior margin moderately deeply tridentate. Antenna regular; funiculus with articles not distinctly separated. Labial palpus with terminal article regular, subcylindrical.

Pronotum coarsely, closely punctate; punctures well impressed. Apical angles moderately produced, acute, narrowly rounded; apical margin about straight; lateral margins at apical two-thirds moderately rounded, behind middle slightly emarginate, from basal third moderately convergent posteriorly; basal angles slightly obtuse, small; basal margin broadly arcuate (Fig. 70). Front tibia regularly convex, both sides of upper edge not marginate; without toothlike projection; at apex without distinct brush of setae. Legs sparsely setose. Prosternum between coxae at middle slightly impressed. Metasternum with punctures small, not close, shallowly impressed (Fig.45).

Elytra with punctures well impressed; strial and interval punctures large; interval punctures slightly smaller than strial; striae impressed, intervals convex; reticulation obscure, not serially arranged (Fig. 58).

Abdomen with sterna of female moderately closely, coarsely punctate; of male densely, finely punctate.

Remarks. A specimen of edentata at CU is labelled as follows: "Phoenix, Ariz., V-1913; HOLOTYPE (printed red label); T. edentata Schaef.; Cornell U. Lot 908, Sub 59, Schaeffer Coll.; HOLOTYPE Cornell U., No. 1568.1 (red label)." A second specimen is labelled "Ariz.; PARATYPE Cornell U. No. 1568.2 (red label)," otherwise as first specimen. Schaeffer (1918) cited the locality at which, presumably, the specimens on which he based his description were collected, as Prescott, Arizona. This does not correspond with the CU label. The USNM specimens are here considered to represent the type material because each bears the label "type" in what is most probably Schaeffer's handwriting. Specimens designated as type by Schaeffer that were examined bear this same kind of label. Schaeffer (1918) generally indicated the place of deposition of his type material but in this case states only that "most of the specimens seen were collected by Dr. Kunze and distributed by Mr. Chas. Palm." The holotype label is of course not authentic since Schaeffer did not designate one of the several specimens on which he based his description as the type.

Both specimens of the type series of edentata have the head dorsomedially somewhat foveate, the male with a fine median line anteriorly and the female with the median line more strongly impressed. The humeral angles of the female are more strongly produced than those of the male.

The holotype and paratypes of Barrett's sonorana do not differ appreciably from Schaeffer's type material.

Collecting notes. Collected at light 27 June (Yuma, Yuma Co., Arizona). Two paratypes of T. soncrana were collected under the bark of mesquite, Prosopis juliflora glandulosa (Torr.) at Coachella, Riverside Co., California (Barrett, 1932).

Distribution. California, Arizona; also Baja California. Eighteen specimens were examined from the following localities:

UNITED STATES

ARIZONA: Maricopa Co., Phoenix (CAS, CU); Yavapai Co., Prescott (USNM); Yuma Co., Yuma (JGE).
CALIFORNIA: Imperial Co., Coyote Wells (MCZ), Holtville (CAS); Inyo Co., Independence (CU); Los Angeles Co. (CU); Riverside Co., Coachella (CAS); San Bernardino Co., Baker (CAS), Crenise Lake, Yermo (AMNH), Yermo (CAS); San Diego Co., Borrego (WHT).

Temnochila rhyssa, new species

The strongly rugose elytra with large strial and interval punctures, the prominent emargination on the side of the pronotum as well as the pronotal shape are diagnostic characteristics of this species.

Description. Body subconvex. Colour metallic blue, purple; shining. Length 14.6 - 19.4 mm.

Head moderately closely, coarsely punctate. Front with median longitudinal line distinctly impressed,

relatively broad, extending from apical margin to vertex. Apical margin deeply tridentate. Antenna regular; funiculus with articles not distinctly separated. Labial palpus with terminal article regular, subcylindrical.

Pronotum moderately closely, finely, punctate. Apical angles broadly rounded, obtuse, slightly produced; apical margin at middle narrowly arcuate; lateral margins regularly, scarcely, narrowed posteriorly, behind middle strongly, deeply, emarginate; basal angles obtuse, scarcely evident; basal margin broadly arcuate (Fig. 71). Front tibia regularly convex, upper edges both not marginate; without toothlike projections; at apex with distinct, small brush of setae. Legs not strongly setose. Metasternum very sparsely, but coarsely punctate; punctures small, well impressed (Fig. 46).

Elytra strongly sculptured; striae obscurely evident; punctures somewhat obscure because of rugosity; reticulation not evident. Strial and interval punctures large, deeply impressed; interval punctures slightly smaller than strial (Fig. 59).

Abdomen with sterna of male and female coarsely, closely punctate; punctures distinctly impressed.

Etymology. rhyssos, Gr. wrinkled, referring to the strongly rugose elytra.

Collecting notes. One specimen (paratype) was collected 3 July from Polyporus volvatus on Abies concolor at

Plaskett Meadows, 6200 ft., Glenn Co., California.

Distribution. California, Idaho.

Type material. HOLOTYPE, male, labelled as follows: "Chester, Cal., VI-23-48; D. J. and J. N. Knull Collrs."; (OSU Collection of Insects and Spiders); ALLOTYPE, female, labelled same as holotype; (OSU Collection of Insects and Spiders); Paratypes, 25 specimens, deposited in museums from which borrowed, as follows:

UNITED STATES

CALIFORNIA: Glenn Co., Plaskett Meadows, 6200 ft. (1 MCZ); Plumas Co., Chester (22 OSU, minus one in personal coll.); Tehama Co., Mineral (1 MCZ).

IDAHO: Meadow Creek, 1½ mi. S. Selway Falls (1 CAS).

Temnochila omolopha, new species

The pronotal shape and prominent marginal elytral bead separate this species from the other metallic forms of the genus.

Description. Body subconvex. Colour dull, dark metallic blue, purple. Length 12.9 - 21.4 mm.

Head moderately densely, coarsely punctate; punctures moderately impressed. Front with median longitudinal line slightly impressed, narrow, extending from apex to vertex. Apex moderately deeply tridentate. Antenna regular; funiculus with articles not distinctly separated. Labial palpus

with terminal article regular, subcylindrical.

Pronotum moderately densely, coarsely, punctate, punctures moderately impressed. Apical angles narrowly rounded, produced, acute; apical margin about straight; lateral margins at apical third broadly rounded, behind middle distinctly, moderately strongly emarginate, at basal two-thirds strongly convergent posteriorly, sinuate before basal angles; basal angles obtuse; basal margin broadly arcuate (Fig. 72). Front tibia regularly convex, both sides of upper edge not marginate; without toothlike projection; at apex without distinct brush of setae. Legs moderately densely setose. Metasternum sparsely, finely punctate; punctures shallowly impressed (Fig. 47).

Elytron with basal marginal bead prominent, broad; punctures small; strial and interval punctures same size, scarcely impressed. Reticulation distinct, regular, in longitudinal rows; two rows of punctures between rows of reticulation (Fig. 60); striae and intervals flat.

Abdominal sterna of female finely, sparsely punctate; of male at lateral third much more densely punctate.

Etymology. omos Gr., shoulder; lophos, Gr., crest; referring to the prominent marginal elytral bead.

Distribution. Arizona, New Mexico.

Type material. HOLOTYPE, male, labelled as follows: "Rustlers Camp, Chiricahua Mts., Cochise Co., Ariz., VI-1-1952; M. Cazier, W. Gertsch, R. Schrammel Collectors";

(AMNH No. 1050); ALLOTYPE, female, labelled as follows: "Rustler Camp, Chiricahua Mts., Cochise Co., Ariz., VII-16-1952, 8000 ft., G. M. Bradt"; (AMNH No. 1050); Paratypes, 27 specimens, deposited in museums from which borrowed, as follows:

UNITED STATES

ARIZONA: Apache Co., White Mts. (1 UKL); Cochise Co., Rustler Camp, Chiricahua Mts. (1 AMNH - in personal coll.); Rustler Camp, Chiricahua Mts., 8000 ft. (1 AMNH), Rustler Park, Chiricahua Mts., 8300 ft. (1 CNHM), Rustler Park, 8 mi. W. Portal (1 MCZ), Rustler Park, Chiricahua Mts., 8000 - 9000 ft. (1 CAS), Chiricahua Mts. (5 OSU); Coconino Co., Flagstaff (2 AMNH, 1 UKL), Mormon Lake (1 AMNH), Tusayan, 7200 ft. (1 CU); Graham Co., Graham Mts. (1 CAS), Shannon Camp, Graham Mt., 9000 ft. (1 CNHM); Pima Co., Mt. Lemmon, Catalina Mts. (2 CAS), Mt. Lemmon Station, Catalina Mts. (1 AMNH), Santa Catalina Mts. (2 CAS), Summerhaven, Santa Catalina Mts., 7600 - 8500 ft. (1 AMNH).
NEW MEXICO: Catron Co. (1 AMNH); no further data (1 CAS, 1 CU).

Temnochila aerea LeConte

Temnochila aerea LeConte, 1858:63. HOLOTYPE: male, labelled as follows: "(gold disc); TYPE 7038; T. aerea, S. Fr. Lec."; MCZ. TYPE LOCALITY: San Francisco, California." LeConte, 1863b:31; Léveillé, 1888b:434; 1900:6; Schaeffer, 1918:196; 1920:193.

Trogosita virescens var. nyentia Dow, 1912:70. LECTOTYPE (here designated): labelled as follows: "ARIZ.; Coll. R. P.; TYPE (pink label); nyenta Dow"; Casey collection, USNM. TYPE LOCALITY: "middle and southern Arizona."

The characters given in the Key separate specimens of this species from others in the genus. In addition, individuals may be distinguished from acuta by distribution, the more rounded apical angles of the pronotum and less closely punctate head and by the obsolete frontal impression.

Description. Body subconvex. Colour metallic blue, green, purple. Length 8.9 - 19.8 mm.

Head moderately closely, finely punctate, vertex more coarsely, less closely punctate. Front with median longitudinal line obsolete, where present, scarcely or not impressed, extending little beyond apical margin; apical margin moderately deeply tridentate. Antenna regular; funiculus with articles distinctly separated. Labial palpus with terminal article regular, subcylindrical.

Pronotum moderately finely, not closely punctate. Apical angles prominent, produced, narrowly rounded; apical margin at middle narrowly arcuate; lateral margins at apical two-thirds scarcely rounded, moderately convergent posteriorly, behind middle slightly emarginate, at basal third more strongly convergent posteriorly, sinuate before

basal angles; basal angles small, slightly obtuse; basal margin broadly arcuate (Fig. 73). Front tibia regularly convex, upper edge on both sides not marginate; without toothlike projections; apex with distinct brush of setae; legs moderately strongly setose. Metasternum with punctures small but not fine, not close, moderately impressed (Fig. 48).

Elytra sparsely, very finely punctate. Striae obsolete. Strial and interval punctures same size, shallowly impressed; reticulation distinct, regular, in longitudinal series and less distinct horizontal series, longitudinal series with double row of punctures between rows (Fig. 61). Striae and intervals flat.

Abdomen with sterna of female finely, moderately closely punctate; of male laterally finely, densely punctate.

Remarks. The type specimen of Dow's virescens var. nyentia is a metallic green specimen of aerea with a short, scarcely impressed median line evident at apex of the head. The type of aerea LeConte is similar; darker metallic green in colour, somewhat bronzy, with an evident, but shallow, short, median impression behind the apex of the head.

Collecting notes. Collected at light (Baboquivari Mts., Pima Co., Arizona).

Distribution. California, Arizona, New Mexico. Also occurs in Baja California and Honduras. Three hundred and five specimens were examined from the following localities:

UNITED STATES

ARIZONA: Cochise Co., Benson (UKL), Douglas (CAS, CNC, CU), San Bernardino Ranch, 8750 ft., Douglas (MCZ), Tombstone (CNHM); Coconino Co., Flagstaff (CU); Gila Co., Globe (CU, MCZ), Roosevelt (CU); Maricopa Co., Gila Bend (AMNH), 28 mi. SE. Gila Bend (CAS), 19 mi. NE. Mesa (UKL), Phoenix (CAS, CU, MCZ, OSU, UASM), Wickenburg (AMNH, UKL); Pima Co. (UKL), Alamo Canyon, Ajo Mts. (CAS), Baboquivari Mts. (CU, OSU, UKL), Brown's Canyon, E. side Baboquivari Mts. (CAS, CU), El Mirador Ranch, 4 mi. NW. Sasabe, Baboquivari Mts. (AMNH), Kits Peak, Rincon, Baboquivari Mts. (AMNH), near Kits Peak, Baboquivari Mts. (AMNH), Bear Canyon (MCZ), Fresnel Canyon (CNC), Madera Canyon, Santa Rita Mts., 3800 ft. (CU), Organ Pipe Cactus National Monument (AMNH, MCZ, UASM, WHT), Sabina Canyon (CU, MCZ, OSU, UKL), San Xavier, near Tucson (CAS), Santa Catalina Mts. (CAS), 2 mi. S. Sells (CAS), Tucson (AMNH, ANSP, CAS, CNHM, CU, MCZ, OSU); Pinal Co. (CNHM), Florence (ANSP); Santa Cruz Co., Nogales (CAS, CNHM, OSU), Oro Blanco Mts., near Nogales (AMNH), Sta. Cruz Village, Cobabi (AMNH); Yuma Co., Quartzsite (CU), Welton (AMNH), Yuma (AMNH, ANSP, CAS, MCZ); Black Dike Prspct. Sierritas (AMNH); Brush Corral (CAS); Coyote Mts. (AMNH); Ehrenberg (CAS); Metcalf (CAS); Pleasant Lake (UKL).

CALIFORNIA: Los Angeles Co. (CU); Riverside Co., Blythe (CAS), 5 mi. W. Blythe (CU), 6 mi. N. Blythe (WHT), Cathedral City (CAS), Coachella Valley (CAS), Painted Canyon (CAS), Palm Springs (CAS); San Diego Co., Anza Desert State Park, Split Mts. (CNC); San Francisco Co., San Francisco (MCZ);

San Joaquin Co., Tracy (WHT); Colorado River (MCZ); Marquer Bay (CAS); Walters Station (AMNH).
NEW MEXICO: Lincoln Co., Capitan Mt. (CAS).

Temnochila virescens (Fabricius)

Lucanus virescens Fabricius, 1775:817. TYPE LOCALITY: "America." (Senior homonym of Lucanus virescens Rossi, 1792, = T. coerulea Olivier).

Trogossita virescens; Olivier, 1790, No. 19:8; Castelnau, 1840:383; Blatchley, 1910:663.

Trogosita virescens; Fabricius, 1792:115; Herbst, 1797: 277; Fabricius, 1801:152; Schönherr, 1806:156; Crotch, 1873:47; Reitter, 1875a:30; Horn, 1885:90; Ulke, 1902:19.

Temnoscheila virescens; Westwood, 1830:231.

Temnochila virescens; Lacordaire, 1854:341; LeConte, 1863b:31; Léveillé, 1888b:436; 1900:9; Sharp, 1891:402; Hopkins, 1902:15 (biology); Schaeffer, 1918:195; 1920:193; Struble, 1942:97-107 (biology).

Trogosita cyanea Reitter, 1875a:28. TYPE LOCALITY: "Amer. bor." (Synonymy with virescens by Léveillé, 1888b:436; 1900:9; Schaeffer, 1920:193; but may instead be a synonym of chlorodia).

This species can be separated from the closely related chlorodia and acuta by the characters given in Table XV, and from other members of the genus by the

characters given in the Key and Table XIV. (Also, see Relationships, p. 231; Variation, p. 234).

Description. Body subconvex. Colour metallic blue, green, purple. Length 8.6 - 17.8 mm.

Head densely, finely punctate (Fig. 52). Front with median longitudinal line distinctly impressed, expanded into linear groove extending from apical margin to about vertex. Apical margin moderately tridentate. Antenna regular, funiculus with articles not all distinctly separated. Labial palpus with terminal article regular, subcylindrical.

Pronotum moderately closely, finely punctate. Apical angles moderately produced, narrowly rounded; apical margin at middle narrowly arcuate; lateral margins at apical two-thirds more or less straight, moderately convergent posteriorly, at basal third convergent more strongly posteriorly, sinuate before basal angles, behind middle slightly emarginate; basal angles distinct, slightly obtuse, pointed; basal margin broadly arcuate (Fig. 74). Front tibia regularly convex, upper edge not marginate; without tooth-like projection; apex with small brush of setae; legs moderately strongly setose. Metasternum with punctures small, not close, moderately shallowly impressed (Fig. 49).

Elytra finely punctate; interval punctures slightly smaller than strial, arranged in double rows between longitudinal reticulations. Reticulation distinctly regular, in longitudinal rows, and less distinct horizontal

rows (Fig. 62). Striae and intervals flat.

Abdomen with sterna finely, moderately closely punctate, except male at apical two-thirds much more densely punctate.

Collecting notes. Reared 27 Sept. (Washington, D.C.), collected from pine 3 March (Paradise Key, Florida). One specimen was extracted from boring dust of Dendroctonus frontalis Zimm. in Pinus oocarpa 16 March (Tegucigalpa, Honduras).

Distribution. East coast to eastern Texas, Oklahoma, Missouri, inclusive. This species, no doubt, also occurs in Mexico, and most probably also further south, and, in fact, its center of distribution is probably southern, but no southern specimens, other than one from Honduras, that correspond to the virescens pattern were seen. Three hundred and eighty-eight specimens were examined from the following localities:

UNITED STATES

ALABAMA: Franklin Co., Russellville (CNHM); Lee Co., Auburn (AU); Mobile Co., Mobile (CAS); Tallapoosa Co., Alexander City (AU).

ARKANSAS: Ashley Co. (UARK); Benton Co., 9 mi. E. Rogers (INHS); Bradley Co. (UARK); Clark Co. (UARK); Hempstead Co. (UARK), Hope (CU, INHS); Lafayette Co. (UARK); Pike Co. (UARK); Washington Co. (INHS), Fayetteville (INHS).

DISTRICT OF COLUMBIA: Washington (CAS, MCZ).

FLORIDA: Alachua Co., Gainesville (FDA); Bay Co. (FDA); Charlotte Co., Cleveland (CU), Punta Gorda (AMNH, CAS); Collier Co., Pine Crest (MCZ); Dade Co. (OSU), Homestead (CU, MCZ), Lemon City (AMNH), Miami (AMNH); Duval Co. (FDA), Jacksonville (AMNH); Hernando Co., Brooksville (CAS); Highlands Co., Archbold B. Station, Lake Placid (CU), Sebring (MCZ); Hillsborough Co., Hillsborough R. State Park (FDA), MacDill Fd., Tampa (MCZ), Tampa (MCZ); Jackson Co. (FDA); Lake Co., Leesburg (AMNH); Levy Co., Sea Horse Key (FDA), Yankeetown (UKL); Manatee Co., Oneco (CU); Marion Co. (PSU); Monroe Co., Long Pine Key (MCZ); Okaloosa Co., Valparaiso (AMNH); Orange Co., Orlando (FDA, CU), Winter Park (MCZ); Osceola Co., Kissimmee (CU), Osceola National Forest (CU); Palm Beach Co., Lake Worth (AMNH), West Palm Beach (CNHM); Pinellas Co., Dunedin (CU); Polk Co., Lakeland (FDA); Putnam Co. (FDA), Crescent City (MCZ); Saint Johns Co., St. Augustine (CAS, CU); Seminole Co., Sanford (AMNH, FDA, MCZ); Volusia Co., Enterprise (CU, INHS); Paradise Key (USNM); Punta Russa (FDA).

GEORGIA: Chatham Co., Georgia State College (CU), Savannah (CAS); Clarke Co., Athens (AMNH); De Kalb Co., Stone Mountain (OSU); Rabun Co. (CU); Clayton (CAS, CU); Billy's Island, Okefenokee (CU).

KENTUCKY: (CU).

LOUISIANA: Hart (CAS).

MARYLAND: Worcester Co., Pocomoke City (CU).

MISSISSIPPI: Attala Co., Kosciusko (CU); Forrest Co.,

Hattiesburg (AMNH); George Co., Lucedale (CU); Greene Co., Leaf (CU), State Line (CU); Hancock Co., Bay Saint Louis (CU); Harrison Co., Pass Christian (AMNH); Lafayette Co. (FDA); Lamar Co., Baxterville (CU); Agriculture College (MCZ).

MISSOURI: Taney Co., Branson (CU).

NEW JERSEY: Atlantic Co., Egg Harbor (CAS); Burlington Co. (CAS), Browns Mills (CU); Gloucester Co., Malaga (CAS, OSU), Westville (MCZ); Ocean Co., Lakehurst (AMNH, CU, MCZ), Lakewood (AMNH); Atsion (CAS); Da Costa (CAS); Homerstown (CU); Manchester (CU).

NEW YORK: New York Co., New York City (AMNH), vicinity of New York City (AMNH).

NORTH CAROLINA: Buncombe Co., Black Mountain (AMNH); Camden Co., South Mills (OSU); Columbus Co., Boardman (CU); Moore Co., Southern Pines (AMNH, CU, UW); Orange Co., Chapel Hill (AMNH, CU); Pasquotank Co., Elizabeth City (AMNH); Wake Co., Raleigh (CU).

OHIO: (AMNH).

OKLAHOMA: Latimer Co. (CAS); McCurtain Co. (CAS).

PENNSYLVANIA: Centre Co., State College (PSU); Philadelphia Co., Germantown (CAS); Voneida (PSU).

SOUTH CAROLINA: Charleston Co., Charleston (CAS); Horry Co., Arrowhead L.S.C., Myrtle Beach (CNC); Kershaw Co., Camden (MCZ); Lee Co., Rosehill (AMNH); Pickens Co., Rocky Bottom (CAS); Oconee Co., Clemson College (CAS); Camp Croft (CNHM).

TENNESEE: Blount Co., Townsend (CNHM); Roane Co., Kingston (MCZ).

TEXAS: Cameron Co., Brownsville (CU); Harris Co., Houston (CU); Harrison Co., Karnack (CU); Newton Co., Call (CU). VIRGINIA: Amelia Co., Amelia (CU); Fairfax Co., East Falls Church (MCZ), Falls Church (MCZ); Prince Edward Co., Farmville (CU); Princess Anne Co., Virginia Beach (CU); Spotsylvania Co., Spotsylvania (CAS); Great Falls (USNM). WEST VIRGINIA: Greenbrier Co., White Sulphur Springs (AMNH, CAS, MCZ).

Temnochila chlorodia (Mannerheim)

Trogosita chlorodia Mannerheim, 1843:301. TYPE LOCALITY: "California ad Americam meridionalem." Reitter, 1875a:31.

Temnochila chlorodia; Lacordaire, 1854:341; LeConte, 1858:63; 1859:70; 1863b:31; Sharp, 1891:399.

Temnochila chloroida; Léveillé, 1888b:436; 1900:9 (misspelling).

Trogosita virescens var. chlorodia; Horn, 1894:323.

Temnochila virescens chlorodia; Schaeffer, 1920:193; Hatch, 1962:190.

Temnochila virescens var. chlorodia; Schaeffer, 1918:196; Struble and Carpelan, 1941:153-156 (biology).

Trogosita viridicyanea Mannerheim, 1843:302. TYPE LOCALITY: "California." Reitter, 1875a:29.

Temnochila viridicyanea; Lacordaire, 1854:341; LeConte, 1863b:31.

Temnochila virescens chlorodia ab. viridicyanea; Hatch, 1962:190.

Temnochila prosternalis Schaeffer, 1918:197. HOLOTYPE: USNM Type No. 70385, female, labelled as follows: "Williams, Ar., 10.6; Barber and Schwarz Coll.; Temnochila prosternalis type Schffr."; USNM. PARATYPES: ten specimens, Cornell U. Nos. 1570.1 - 1570.10, collected at Davis Mts., Texas; Williams, Arizona; Chiricahua Mts., Arizona; Capitan, New Mexico; Larkspur, Colorado; Huachuca Mts., Arizona, 9000 ft.; most labelled "Barber and Schwarz Coll."; CU. TYPE LOCALITY: "Williams, Arizona." Schaeffer, 1920:193. NEW SYNONYMY.

Temnochila virescens chlorodia ab. melanica Hatch, 1962:190. HOLOTYPE: (not seen); PARATYPE: labelled as follows: "Priest Lake, I., 8-26-13; PARATYPE, Temnochila virescens F. chlorodia Mann. ab. melanica 1957-M. Hatch (red label)"; UW. TYPE LOCALITY: "Priest Lake, I."

The characters included in Table XV separate individuals of this species from those of virescens and acuta.

Colour metallic green, blue, or purple. Similar to virescens and acuta except by characters given in Table XV. (Also, see Relationships, p. 231; Variation, p. 234).

Remarks. The type specimens of Schaeffer's prosternalis are all small, dark blue, dull metallic forms. The median longitudinal line of the front is distinct and impressed forming a linear groove. The head, pronotum, and

elytra are closely, densely punctate. The prosternum behind the coxae is distinctly impressed. As noted under Variation, p. 234, these are variant forms within the general chlorodia pattern.

Hatch's paratype of T. virescens chlorodia ab. melanica is a typical Arizona and prosternalis form. All specimens determined viridicyanea Mannerheim in the LeConte collection have the prosternalis pattern.

LeConte's type specimen of acuta is metallic blue in colour.

Collecting notes. Collected from Pinus ponderosa (Arizona, California, Colorado, New Mexico--including paratypes), Polyporos volvatus on P. ponderosa (Kaweah, Tulare Co., California), P. jeffreyi (Frazier Mt., Ventura Co., California), Abies magnifica (Lassen National Forest, California), Abies concolor (Warner Mts., Modoc Co., California), Abies concolor on spruce 5 Dec. (Williams, Arizona), Yucca brevifolia April (Los Angeles Co., California), under bark and c.m. bands (Talent, Jackson Co., Oregon), from sea drift after storm (Pacific City, Tillamook Co., Oregon), Berlese funnel (Santa Catalina Mts., Arizona); reared from Libocedrus Aug. (nr. Sonora, Tuolumne Co., California), reared from Pinus ponderosa 9 June (El Paso Co., Colorado).

Distribution. West of Great Plains; west coast to New Mexico, Kansas, Nebraska, inclusive. Specimens have been recorded from Mexico and material was seen from Baja

California, Chihuahua, Durango, and Jalisco, Mexico. One thousand six hundred and eighty specimens were examined from the following localities:

CANADA

BRITISH COLUMBIA: Agassiz (CNC); Anarchist Mountain, Osoyoos (CNC); Annis Bay, Nelson Island (CAS); Bear Lake, Pender Harbour (CAS); Beaverfoot Range, Rocky Mountains (AMNH); Canoe (CNHM); Cranbrook (CNC); Crawford Mills (CNC); Creston (CNC, CU, UW); Cultus Lake (CNC); Duncan (CAS, CNC); Gabriola Island (UW); Goldfield, Vancouver Island (AMNH); Harrison Mills (UW); Hotel Lake, Pender Harbor (CAS); Jarvis Inlet (CNC); Kaslo (OSU); Kimberly (CAS); Keremeos (CNC); Kootenay Flats (CNC); Kuskanook (CNC); Lake Errock, near Deroche (UW); Lansdowne (MCZ); Limby (CAS); Lillooet (CNC); McIntyre Creek (CNC); Merritt (CAS); Midday Valley, Merritt (CAS, CNC); Mission (CNC); Nanaimo (CAS); Yellow Point, Nanaimo (CAS); Nelson Is. (CNC); Oliver (CNC, INHS); Peachland (CNC); Pender Harbor, Penticton (CAS, CNC); Penticton (INHS); Robson (CNC, UW); Rossland (CNC); Saanich (UW); Saanich District (UW); Salmon Arm (AMNH, CAS); Sicamous (MCZ); Sidney (CAS); Skoocumchuck (CNC); Steelhead (CAS); Stillwater (CNC); Summerland (UW); Trinity Valley (CAS, CNHM, CU); Vancouver (CAS, INHS, MCZ); Vancouver Is. (MCZ); Victoria (CNC, INHS, MCZ, UASM, UW); Vernon (CAS, CNC, INHS); Wasa (CNC); Wellington (UW); Westbank (INHS); Wolfshon Bay (CNC).

NORTHWEST TERRITORIES: Mackenzie River (CAS).

UNITED STATES

ARIZONA: Apache Co., White Mts. (AMNH, CAS); Cochise Co. (CU), Barfoot Park, Chiricahua Mts. (CAS, USNM), Chiricahua Mts. (OSU), S.W.R.S., 5 mi. W. Portal, 5400 ft., 8000 ft. (AMNH), Rustler Camp, Chiricahua Mts. (AMNH), Huachuca Mts., 9000 ft. (CU, OSU); Coconino Co., 5 mi. NW. Flagstaff, 7000 ft. (AMNH), Flagstaff (CAS, CU, OSU, USNM), San Francisco Mts., 7 mi. N. Flagstaff (AMNH), Snow Bowl, 15 mi. NW. Flagstaff (AMNH), Grand Canyon (CU), Mormon Lake (CAS), Tusayan (CAS, CU), Williams (CU, OSU, USNM); Graham Co., Graham Mt. (CAS); Gila Co., San Carlos (CAS); Navajo Co., Apache N.F. (CAS), Pinetop (CNC); Pima Co., Bear Wallow, Mount Lemmon (CU), Bear Wallow, 7600 ft.; Santa Catalina Mts. (AMNH), Bear Canyon Picnic Area, Santa Catalina Mts. (AMNH), Catalina Mts., Mount Lemmon (OSU), Mount Lemmon, 7500 ft. (AMNH), Santa Catalina Mts. (CAS, MCZ, UKL), Summerhaven, Santa Catalina Mts., 7600 - 8500 ft. (AMNH); Yavapai Co., Prescott (CAS, MCZ); Fort Valley (CAS); Lake Mary (CAS); Webber's Cabin (AMNH); 0.9 mi. from Marijilda Canyon, 3860 ft. (CAS).

CALIFORNIA: Alameda Co. (AMNH, CAS, CNHM), Berkeley (AU, CAS, CU), Livermore (CAS), Niles Canyon (CAS), Oakland (CAS), Oakland Hills (CU); Butte Co. (CAS), Oroville (CAS), nr. Paradise (CAS), Paradise Valley (CU); Calaveras Co., Mokelumne Hill (CAS), Murphys (CAS); Contra Costa Co., Lafayette (MCZ), Moraga (CAS), Mount Diablo (AMNH, CAS), Orinda (CAS), Vine Hill (CAS); Del Norte Co. (CNHM),

Crescent City (CU); El Dorado Co. (CNHM, MCZ, USNM), Glen Alpine (CAS), Lake Tahoe (CAS), Pollock Pines (CAS), Snowline Camp (CAS), Tallac (CAS); Fresno Co. (AMNH, CU, MCZ), Camp Greeley (ANSP, UASM), Cherry Gap, near Hume (AMNH), Dalton Creek (CU), General G. Park (CAS), Huckleberry Meadow (CAS), Huntington Lake (CAS), Kings Canyon (CAS), Kings River Canyon, south fork (CAS), Millwood (AMNH), Oak Flat Camp (CAS), Shaver Lake (AMNH); Glenn Co., Oriental (CAS), Plaskett Meadows, 6200 ft. (MCZ); Humboldt Co. (CNHM), Blocksburg (AMNH), Fort Seward (CAS), Green Point Ranch (CAS); Inyo Co., Bishop (CAS); Kern Co., Cannel Meadow (CAS), Tejon Canyon (CAS); Lake Co. (CAS), Lakeport (CAS), Lower Lake (CAS); Lassen Co., Chester (OSU), Facht (CAS), Grassy Lake, Lassen National Forest (CAS), Lassen National Forest (CAS, CU), 5 mi. E. Mineral (OSU), Mount Lassen National Park (OSU), Norval Flats (CAS); Los Angeles Co. (CAS, CU), Claremont (MCZ), East Rock (CAS), Glendale (AMNH), Pasadena (CAS, CNHM, MCZ), San Gabriel Mts. (CAS), Sierra Madre (CAS), Tanbark Flat (CAS); Madera Co., Bass Lake (AMNH), Bileda Meadow (CAS), Boggy Meadows (CAS), Chiquito Creek (CU), North Fork (CAS, CU); Marin Co. (CAS), 1 mi. SE. Inverness (CAS), Lagunitas (CAS), Mill Valley (CAS), Taylorville (CAS); Mariposa Co., Bear Lake (CAS), Mariposa Grove (CAS), Miami Ranger Station (CAS), Mormon Bar (AMNH), Yosemite (AMNH, CAS), Yosemite Valley (AU, CAS), Wawona (CAS); Mendocino Co., Casper (CNHM), Laytonville (MCZ), 2 mi. N. Piercy (MCZ), Sherwood (CNHM); Modoc Co.,

Bear Flat, Warner Mts. (CAS), Davis Creek (CAS), Fort Bidwell (MCZ), Long Valley, Clear Lake (TLE), Warner Mts. (CAS); Mono Co., Big Springs, near Mono Lake (CAS), Mammoth (CAS), Mono Lake (CAS); Monterey Co. (CAS), Arbolado (CAS), Big Sur (CAS), Carmel (CAS), Fort Ord (CAS), Junipero Serra Park, Santa Lucia Mts. (CAS), Pacific Grove (CAS), Paraiso Springs (CAS); Napa Co., Calistoga (CAS), Mount Saint Helena (CAS), Napa (CAS); Nevada Co., Sagehen Creek, near Hobart Mills (CAS), Truckee (CAS); Orange Co., Glen Ivy Hot Springs (CAS), Midway (CAS), Trabuco Canyon (CAS); Placer Co. (AMNH, CAS), Alta (CAS), Emigrant Gap (AMNH), Lincoln (MCZ); Plumas Co. (AMNH, CNHM, TLE), Butt Vy. Res. (CAS), trail to Homer Lake (CAS), Lake Almanor (CAS), Meadow Valley (UKL), Quincy (CAS), Walker Mine (CAS); Riverside Co. (AMNH), Idyllwild, San Jacinto Mts. (AMNH, CAS, UKL), Palmdale (CAS), Pinon Flat, San Jacinto Mts. (CAS), Santa Rosa Mts. (CAS), Whitewater Canyon (CAS); Sacramento Co. (CAS); San Benito Co., Pancche Pass (CAS), Pinnacles Nat. Mon. (CAS); San Bernardino Co. (CAS, INHS), Barton Flats (CAS), Deep Creek (CAS), Falls Pub. Cp., San Bernardino Mts. (CAS), Fawnskin (CAS), Lake Arrowhead (CAS), Mill Creek Canyon (CAS), San Bernardino Mts., 5000 ft, 7500 ft. (CAS), 11 mi. W. Victorville, Cajon Pass (CAS); San Diego Co., Johnstown (CAS), Laguna (MCZ), Laguna Mts. (CAS, MCZ), Mount Laguna (CAS), Poway (CAS), San Diego (CAS, CNHM, MCZ), Warner Springs (UKL); San Francisco Co. (MCZ), Nicaragua (CAS), San Bruno Hills (CAS), San Francisco Bay Area (CAS),

S. San Francisco (CAS); San Joaquin Co., Stockton (CAS), 6 mi. N. Tracy (WHT); San Luis Obispo Co., Atascadero (CAS), Paso Robles (CU), Cambria Pines, San Luis Obispo (CAS), San Luis Obispo (CAS); San Mateo Co. (CAS), La Honda (AMNH, CAS), Menlo Park (CAS), Palhemos Rd. (CAS), Palo Alto (CNHM), San Bruno (CAS); Santa Barbara Co., Figueroa P.C. (CAS), Pine Crest (CAS); Santa Clara Co. (CAS), Alum Rock Park (TLE), Arroyo Mocho, Mount Hamilton (WHT), Calero Dam, Santa Clara Valley (CAS), Gilroy Hot Springs (CAS, TLE), Jasper Ridge, Stanford U. (CAS), Los Trancos Creek, Stanford U. (CAS), Los Trancos Creek, Mud Lakes PSB Stanford U. (CAS), S.F. Bay Marsh, East Palo Alto. (CAS), Searsville Lake, Stanford U. (CAS); Santa Cruz Co., Ben Lomond (CAS), Glenwood Rd. (TLE), Mount Loma Prieta (TLE), Santa Cruz Mts. (CAS); Shasta Co. (CAS, CNHM), Burney (UKL, WHT), Castella (CAS), Fort McCloud Res. (MCZ), Hat Creek (CAS), Manzanita Camp, Lassen Nat'l. Park (AMNH), Manzanita Lake, Lassen Nat'l. Park (UKL), Shasta Springs (CAS), Shingletown (UKL); Sierra Co., Sierraville (AMNH), Truckee (CAS, MCZ), Yuba Pass (AMNH, CAS); Siskiyou Co. (CAS), Castle Lake (CAS), McCloud (CAS), Mount Shasta (CAS), Shasta Retreat (CAS); Sonomo Co. (AMNH), Cazadero (CAS), Guerneville (CAS), Santa Rosa Mts., 7500 ft. (CAS); Tehama Co., Deer Creek (AMNH), 1.5 mi. E. Gov't Flat (MCZ); Trinity Co. Carrville (CAS, CNHM), Coffee Creek (CAS, CNHM), Hayfork (CAS), Trinity N.F. (CAS); Tulare Co. (CNHM), Camp Nelson (AMNH, MCZ), Colony Mill Road (CAS), Giant Forest, Sequoia National Park (CAS, CU),

Kaweah (CAS), Kaweah River (CAS), foot of Mount Brewer (CAS), Kings Canyon National Park (AMNH), Portugese Pass, 7 mi. SE. Pine Flat (MCZ), Sequoia National Park (CAS), Visalia (CAS), Wood Lake (UASM); Tuolumne Co. (AMNH), Jamestown (CAS), Mather (CAS), Pine Crest (CAS), 8 mi. N. Sonora (WHT), Strawberry (AMNH), Twain Harte (CAS); Ventura Co., Frazier Mt. (CAS), Santalnez (CAS), Tejon (CAS); Yolo Co., Davis (CAS), Rumsey (CAS); Santa Cruz Island (CAS).

COLORADO: Arapahoe Co., Greenwood (CU); Douglas Co., Larkspur (CU); El Paso Co. (CAS); La Plata Co., Durango (CAS, CU), Vallecito R.S. (CAS); Ouray National Forest (CU).

IDAHO: Bonner Co., Priest Lake (CNHM, UW), Priest River (MCZ); Boundary Co., Bonners Ferry (AMNH); Canyon Co., Caldwell (UW); Clearwater Co., Kelly Creek Ranger District, Clearwater National Forest (PSU); Elmore Co., Atlanta (MCZ), Kootenai Co., Coeur d' Alene (USNM); Latah Co., Moscow, Cedar Mt. (UW), Moscow Mts. (AMNH); Shoshone Co., Wallace (CNHM); Valley Co., Cascade (UW).

KANSAS: (MCZ).

MONTANA: Sanders Co., Thompson Falls (CNHM); Goat Creek, Cabinet Mts. (CNHM).

NEBRASKA: (MCZ).

NEVADA: Clark Co., Kyle Canyon, Charleston Mts. (CAS), Lees Canyon, Charleston Mts. (AMNH, CAS); Esmeralda Co., Goldfield (CNHM); Washoe Co., Reno (CAS, INHS, MCZ), Verdi (CAS), Mount Rosa (CAS).

NEW MEXICO: Lincoln Co., Capitan (CU); McKinley Co., Fort

Wingate (MCZ); San Miguel Co., Las Vegas (INHS); Sandoval Co.,Jemez Mts. (CAS), Jemez Springs (CU); Santa Fe Co., Santa Fe (CAS); Iron Creek For. Camp, Black Range (CNHM).
OREGON: Baker Co., Baker (CAS, UW), Baker Creek (UW), Cornucopia (UW), Melhorn's Mill near Halfway (AMNH), Pine Creek, Blue Mts. near Baker (CNHM), Sparta (MCZ); Benton Co., Corvallis (AMNH, MCZ, UW); Coos Co., Camas Mts. (CAS); Curry Co., Pistol River (CNHM); Douglas Co., Roseburg (CNHM); Hood River Co., Mount Hood (CAS, MCZ); Jackson Co., Ashland Loop, Siskiyou Mts., 6500 ft. (CNHM), Crater Creek, Rogue River (CNHM), Gold Hill (CAS), Little Applegate River (CNHM), Medford (UW), Table Rock (CNHM), Talent (CAS); Josephine Co., O'Brien (CNHM, UW); Klamath Co. (AMNH), Klamath Falls (CAS); Lake Co., Goose Lake (MCZ); Lane Co., Eugene (CAS, CNHM, MCZ), Middle Fork of Willamette River (CNHM); Linn Co., Cascadia (AMNH, UW); Marion Co., Stayton (AMNH); Multnomah Co., Portland (MCZ); Tillamook Co., Manzanita (CAS), Pacific City (UW), Tillamook (UW); Umatilla Co., Meacham (UW); Wallowa Co., Minam (MCZ); Washington Co., Dilley (CU), Forest Grove (AMNH); Yamhill Co., McMinnville (UW), Peavine Ridge near McMinnville (UW); Boyer (UW); Coquillett Falls (USNM); Mary's River (AMNH); Maryspeak (AMNH); Whitman N.F. (AMNH).
SOUTH DAKOTA: Elmore (CU).
TEXAS: Davis Mts. (CU).
UTAH: Cache Co., Logan (USNM); Garfield Co., Panquitch Lake, Dixie N.F. (UKL); Salt Lake Co., Salt Lake (CU); Uintah Co.,

Vernal (UKL); Utah Co., American Fork Canon, 9500 ft. (MCZ), Provo (CAS); Beav. Cany. (CU).
WASHINGTON: Chelan Co., Leavenworth (UW), Wenatchee (UW); Grant Co., Grand Coulee, Dry Falls (UW); Island Co., Coupeville (UW), Whidby Island, Oak Harbor (UW); King Co., Enumclaw (UW), Seattle (CAS, MCZ, UW); Kittitas Co., Cle Elum (UW); Klickitat Co., Goldendale (AMNH), Mount Adams, West Klickitat (AMNH); Mason Co., Glenwood (UW); Pierce Co., Longmire, Mount Rainier (MCZ), Paradise Park, Mount Rainier (UW), Tacoma (MCZ); San Juan Co., Friday Harbor (UW); Snohomish Co., Arlington (AMNH), Darrington (CAS), Monroe (CAS), Tulalip (UW); Spokane Co., Cheney (UW), Spokane (CU); Stevens Co., Colville (AMNH, UW); Thurston Co., Olympia (CU, MCZ, UW); Walla Walla Co., Walla Walla (FDA, UW); Whitman Co., Pullman (UW); Yakima Co., Naches Pass (UW), Yakima (AMNH, UW); Argyle, S.J. Island (UW); Flat-Top Island (UW); Oreus Island (MCZ); San Juan Island (UW); Wenass V. (MCZ).

Material was also examined from the following:

MEXICO - Baja California: Santa Tomas (1 AMNH); CHIHUAHUA: Gaborachic (1 AMNH), 2 mi. W. Matachic (2 AMNH), 8 mi. W. Matachic (2 AMNH); DURANGO: 6 mi. NE. El Salto (1 AMNH); JALISCO: Mazamitla (1 AMNH).

Temnochila acuta LeConte

Temnochila acuta LeConte, 1858:63. LECTOTYPE (here designated):

female, labelled as follows: "(red disc); TYPE 7036 (red label); Temnochila acuta Lec."; MCZ.

TYPE LOCALITY: "Texas." LeConte, 1863b:31; Léveillé, 1888b:434; 1900:5; Schaeffer, 1918:195; 1920:193.

The characters included in Table XV separate individuals of acuta from both virescens and chlorodia.

Colour metallic green, blue, or purple. Similar to virescens and chlorodia except by characters included in Table XV. (Also, see Relationships, p. 231; Variation, p. 234).

Distribution. Eastern Texas, Alabama, Florida, Illinois, Pennsylvania. Specimens have been recorded from Mexico and material was examined from Tamaulipas and Veracruz, Mexico. One hundred and fourteen specimens were examined from the following localities:

UNITED STATES

ALABAMA: Tallapoosa Co., Dadeville (AU).

FLORIDA: Alachua Co., Gainesville (FDA); Hernando Co., Brooksville (CNHM); Seminole Co., Sanford (MCZ); Volusia Co., Enterprise (MCZ), New Smyrna (CAS); Rutledge (AMNH).

ILLINOIS: Alexander Co., Olive Branch (CAS, CNHM).

LOUISIANA: Orleans Co., New Orleans (CAS).

PENNSYLVANIA: (MCZ).

TEXAS: Austin Co., St. Austin State Park, San Felipe (MCZ), St. Austin State Park, near Sealy (CU); Bell Co.,

Temple (CNHM); Bexar Co., San Antonio (TAM); Brazos Co., College Station (TAM); Cameron Co., Brownsville (AMNH, CAS, CNHM, CU, MCZ, OSU, UKL, WHT), Harlingen (AMNH); Comal Co., New Braunfels (CU); Dallas Co., Dallas (MCZ); Gillespie Co. (OSU); Hidalgo Co. (OSU), Mission (AMNH); Kleberg Co., Kingsville (CU); Medina Co. (OSU); Uvalde Co., Uvalde (OSU); Val Verde Co., Del Rio (CAS); Webb Co., Laredo (CNHM).

Specimens were also examined from the following:

MEXICO - TAMAULIPAS: 10 mi. NE. Zamorina (2 UASM); VERACRUZ: 11.9 mi. E. Jalapa, 2600 ft., 9 Apr. (in bromeliads) (1 UASM), 2.5 mi. W. Sontecomapan, 1, 5, 20 June (on logs) (5 UASM).

Relationships: Temnochila chlorodia, virescens, acuta. Characters defining the species chlorodia, virescens, and acuta are included in Table XV. Because the characters of these closely related species are comparative, separate descriptions of acuta and chlorodia are not given. The characters found to be most reliable for separation of the three species are distribution, shape of apical angles and lateral margins of the pronotum, the amount of convexity in body form and the punctation. No convergence was found between virescens and chlorodia and between virescens and acuta. All individuals appear distinct throughout the range of each species, and all are separable on the basis of the characters given in Table XV. T. chlorodia is a

highly variable species and individuals approach the eastern species, acuta, in punctation and shape of the pronotum, although no specimens have the pronotal sides as strongly convergent as in all specimens of acuta. Study of the limits of this variation was not possible because the majority of the specimens seen were from eastern Texas only; the remaining few scattered throughout the range of virescens. Some large specimens of chlorodia somewhat resemble acuta but these were few in number and scattered in distribution and could not be separated from other chlorodia specimens because of a complete range of intermediates. Size and degree of convexity and pronotal shape may be correlated in the western species: larger individuals more convex and the lateral margins of the pronotum more strongly convergent. Specimens of chlorodia and acuta from Mexico showed little variation compared to the more northern forms and both groups are quite distinct on the basis of all characters given in Table XV. Specimens of chlorodia from Baja California are also quite uniform. The range of acuta does not seem to extend west of the Great Plains. A detailed study of variation in many populations of chlorodia should reveal the limits of variation of this group and its relationship to virescens and, in particular, to acuta.

All females of acuta, virescens, and chlorodia have the abdominal sterna not closely, almost sparsely, punctate. Males vary within the three species. The

abdominal sterna of acuta males at the apical two-thirds are very densely punctate and somewhat sculptured; otherwise as in the females. Males of chlorodia have the first abdominal sternum near the lateroapical corner with a small patch of dense punctures, the remaining sterna at the apical two-thirds are densely punctate, otherwise as in the females. Males of virescens are as acuta but less densely punctate and not sculptured, otherwise as in the females.

Specimens of virescens tend to be longer and narrower than those of chlorodia and this difference does not seem to be geographic (Table XVI). In values of the ratio L/W pronotum, the range of variation of specimens of acuta overlaps the ranges of specimens of virescens and chlorodia (Table XVI).

Notes on synonymy. Schaeffer (1918) described individuals from Arizona which "looked like small specimens of virescens var. chlorodia" under the name prosternalis; differing from chlorodia by the more densely punctate head and impressed apex of prosternum behind coxae. The prosternal character is variable throughout the chlorodia group and the variation pattern is not geographic; the punctation character is quite constant for Arizona specimens, as is the uniform, somewhat dull blue metallic colour. Punctation seems to follow a more or less definite geographic pattern. Body size and ratio L/W pronotum of populations of Arizona individuals and of individuals from other

localities are not significantly different.

Variation: Temnochila chlorodia, virescens, acuta. Variation is most considerable in colour, degree of convexity in form, shape of pronotum, length and depth of the median longitudinal impression of the head, punctation and size, and to a lesser extent in the other characters given in Table XV.

T. virescens is much less variable than either chlorodia or acuta. Most specimens of virescens are metallic green in colour, whereas most specimens of chlorodia are metallic blue or purple. The longitudinal impression of the head of chlorodia is evident at the apical margin in individuals from California, less distinct in individuals from Arizona. Arizona individuals of chlorodia appear to be the most uniform of the group and are almost all dark dull metallic blue-purple in colour (T. prosternalis Schaeffer). The pronotum converges more strongly posteriorly than in individuals from California and the marginal bead of the elytra is broader and more prominent; California specimens are slightly less densely punctate than more eastern individuals. Variation in degree of convexity does not appear to be correlated with geographical distribution.

T. acuta varies most strongly in punctation, degree of convexity, shape of pronotum and size. Most specimens are metallic green in colour. Most of this variation is evident in the Texas forms (representing the majority of specimens studied) and, therefore, does not seem to form a pattern correlated with geography.

TABLE XV

COMPARISON OF CHARACTERS OF *Temnochila chlorodia*, *virescens*, *acuta*

Character	Species		
	chlorodia	*virescens*	*acuta*
distribution	west of Great Plains	---east of Great Plains---	
form	more convex	less convex	strongly convex
length (mm.)	8.4 - 19.8	8.6 - 17.8	10.2 - 22.2
vertex punctures (Figs. 52-54)	small, close	fine, close	large, not close
eyes in dorsal view	not prominent	---prominent---	
sensory area 9th and 10th antennal articles (Figs. 14-16)	---small---		large
pronotum - apical angles (Figs. 74-77)	more prominent	less prominent	more prominent
- apical angles (Figs. 74-77)	pointed	---narrowly rounded---	

TABLE XV (continued)

Character	Species		
	chlorodia	virescens	acuta
pronotum			
- sides in dorsal view (Figs. 74-77)	---subparallel---		convergent
- sides in lateral view (Figs. 98-100)	---straighter---		strongly oblique
prosternum behind coxae	---less convex---		more convex
humeral angles (Figs. 122-124)	prominent	not prominent	prominent
humeral angles (Figs. 122-124)	pointed	broadly rounded	narrowly rounded
metasternal punctures (Figs. 49-51)	---fine---		coarse
elytral reticular arrangement	---regular---		somewhat irregular
1st abdominal sternum of male densely punctate	lateroapical corner	---apical two-thirds---	

TABLE XVI

VARIATION IN RATIOS L/W PRONOTUM AND W/L ELYTRON AMONG POPULATION SAMPLES OF *Temnochila chlorodia*, *virescens*, *acuta*

Species	Locality	N	Range	Mean	± SD
			L/W Pronotum		
chlorodia	Calif.	21	0.90 - 0.99	0.94	0.025
chlorodia	Ariz.	30	0.90 - 0.97	0.94	0.020
chlorodia	N. Mex.	17	0.90 - 0.97	0.93	0.018
virescens	Tex.	8	0.96 - 1.04	0.98	0.025
virescens	Miss.	23	0.94 - 1.03	0.98	0.023
virescens	Fla.	29	0.96 - 1.05	1.01	0.025
acuta	Tex.	31	0.85 - 1.00	0.94	0.031
			W/L Elytron		
chlorodia	Calif.	21	0.24 - 0.29	0.27	0.011
chlorodia	Ariz.	30	0.23 - 0.29	0.26	0.014
chlorodia	N. Mex.	17	0.24 - 0.28	0.26	0.001
virescens	Tex.	8	0.23 - 0.27	0.25	0.012
virescens	Miss.	23	0.23 - 0.27	0.25	0.001
virescens	Fla.	29	0.24 - 0.28	0.26	0.010
acuta	Tex.	31	0.23 - 0.28	0.25	0.013

Tenebroides Piller and Mitterpacher

Tenebrioides Scopoli, 1772:75 (not generic); Goeze, 1777: 124 (not binomial); Reitter, 1875b:65; 1876:28; 1882:144, 145; 1911:5, 7; LeConte and Horn, 1883:153; Fowler, 1889:268; Ganglbauer, 1899:420, 426.

Tenebroides Piller and Mitterpacher, 1783:87; Sharp, 1891: 416; Schaeffer, 1915:68; 1918:191; 1920:194; Hatch, 1962:190; Crowson, 1964:297.

Type-species: Tenebroides complanatus Piller and Mitterpacher (= Tenebrio mauritanicus Linnaeus), by monotypy. Later citation: Tenebroides mauritanica (L.) by Crowson, 1964:296.

Trogossita (pars) Olivier, 1790:5, No. 19; Latreille, 1804: 244; Palisot de Beauvois, 1811:125; Castelnau, 1840: 383.

Type-species: Tenebrio mauritanicus Linnaeus, by subsequent designation for the emendation Trogosita (Westwood, 1838:12, append.). Later citations: Trogosita caraboides Fab. by Latreille, 1810:431 (not originally included); Tenebrio mauritanica L. by Curtis, 1839:pl. 734; Trogosita varia Fab. by Hope, 1840:131; Trogosita mauritanica (L.) by Erichson, 1842:103; 1844:449; by Thomson, 1859:84; Trogosita coerulea (L.) by Crotch, 1870a:46; Trogossita coerulea (L.) by Crowson, 1964:297.

Trogosita (pars); Fabricius, 1792:114 (emendation of Trogossita Olivier); 1801:150; Herbst, 1797:267;

Schönherr, 1806:155; Sturm, 1807:236; 1826:205; Duftschmid, 1825:2; Mannerheim, 1843:302.

Tragosita; Cederhielm, 1798:13 (misspelling).

Trogosita; Illiger, 1798:116; Latreille, 1807c:22; Gyllenhal, 1808:72; Westwood, 1830:230; Hope, 1840:131; Erichson, 1842:103; 1844:452; 1845:242; Redtenbacher, 1845:126; 1849:20, 175; 1858:LXXIX, 340; 1872:372; 1874:LXXXVI; Bach, 1849:225; Lacordaire, 1854:343; Jacquelin du Val, 1858:163; Thomson, 1859:84; 1863:104; LeConte, 1861a:88; 1863b:31; Horn, 1862:82; Seidlitz, 1875:33, 153; 1891a:51; 1891b:240; Marseul, 1885:145, 149.

Trogossita;Latreille, 1802:160; 1807a:158; Blanchard, 1851:439.

Fabricius (1792) changed the spelling of the original name Trogossita Olivier to Trogosita; the former transliterated incorrectly from Greek to Latin by Olivier. The change in spelling by Fabricius was, with little doubt, intentional and is hence justified.

Olivier (1790) placed several nominal species in his genus Trogossita, including coerulea and mauritanicus. Subsequently and subjectively coerulea was regarded as a Temnochila and mauritanicus as a Tenebroides; later coerulea was established as type-species of Temnochila, and mauritanicus as type-species of Tenebroides. Several authors, particularly Erichson (1844), Reitter (1875a), Ganglbauer

(1899), and Crowson (1964), have discussed the resulting application of the name Trogosita. The first type designation was that of Westwood (1838) in the appendix of his, "An introduction to the modern classification of insects," Vol. I, 1838. The "typical species" listed in this appendix are recognized as type designations by the International Commission on Zoological Nomenclature (Opinion 71). Several authors subsequently designated mauritanicus as type of Trogosita, and these have priority over designation of coerulea as type. Thus, Trogosita is a junior objective synonym of Tenebroides and cannot be used in place of the more recent name Temnochila.

Several authors considered the name Tenebroides as a misspelling of Tenebrioides but the former has priority because both earlier uses of the latter prevent availability.

About 123 recognized, but still poorly defined, species of Tenebroides occur in Central and South America; four are found in the Old World, one from Tasmania and one from New Zealand. Of 29 nominal species found in North America north of Mexico 18 are recognized here.

The combination of middle and hind tibiae externally without spines and antennae relatively elongate separates members of this genus from those of Airora; the combination of prothorax with lateral margins behind middle not angularly deflexed and labium at apex shallowly emarginate separates members of Tenebroides from those of Airora

and Temnochila.

Description. Body subconvex or depressed, elongate, broad.

Head broad, not elongate, subconvex to depressed, nearly as wide as pronotum at apex; front with shallow transverse impression in most species; without longitudinal median impression or line; not strongly declivous anteriorly; apical margin trisinuate. Mandibles deflexed. Eyes transverse, not prominent, somewhat emarginate. Antenna prominent, somewhat elongate, 11-articled with enlarged, loose, 3-articled club, dilated only internally; funiculus well developed, articles distinct. Labium at apex feebly emarginate. Submentum distinctly separated from gula in front; male without median fulvous pit.

Prothorax subconvex to depressed, broader than long; lateral margins distinctly raised, prominent to apex; anterior margin of pronotum separated from anterior margin of prosternum by projecting apical angles; lateral margins behind middle not angularly deflexed. Prosternum more or less flat, not compressed between coxae. Front coxal cavities closed behind. Middle and hind tibiae externally not spinous.

Elytron subconvex or depressed, without basal impression; punctures serially arranged; striae prominent except last few in some species; intervals finely, biseriately punctate; basal marginal bead distinct towards humerus, absent towards scutellum.

Abdomen of most species with at least first visible sternum much more densely punctate in male than in female. Sternum 8 as in Figs. 135, 157; segment 9 as in Figs. 142,148.

Key to North American species of Tenebroides

1 Antenna with eighth article subequal to ninth, asymmetrical, globose, as articles 9-11 (Figs. 17, 22, 28) 2

\- Antenna with eighth article much smaller than ninth, cylindrical, as articles 1-7 (Figs. 18-21, 23-27, 29) 4

2(1) Pronotum with sides subparallel (Fig. 78). West of Great Plains . . . . sinuatus (LeConte), p. 247

\- Pronotum with sides convergent basally (Figs. 79, 80) 3

3(2) Eyes at base angulate. Pronotum with sides broadly rounded, lateral marginal bead produced strongly apically (Fig. 79). Cosmopolitan. . . . . mauritanicus (Linnaeus), p. 252

\- Eyes at base round. Pronotum with sides narrowly rounded, lateral marginal bead not or scarcely produced apically (Fig. 80). West of Great Plains . . . . . crassicornis (Horn), p. 258

4(1) East of Great Plains 5

\- West of Great Plains 18

5(4) Elytron with last three striae finely punctate, or absent; not or scarcely impressed 6

- Elytron with last three striae coarsely punctate, distinctly impressed 10

6(5) Pronotum with basal marginal bead at middle distinctly, broadly interrupted (Figs. 81, 83) 7

- Pronotum with basal marginal bead at middle not or scarcely, narrowly interrupted (Figs. 84, 94-96) 9

7(6) Elytron with last three striae absent. Pronotum (Fig. 81) and elytra widely marginate. Head and thorax orange-red, elytra black. Body depressed . collaris (Sturm), p. 264

- Elytron with last three striae present. Pronotum (Figs. 82, 83) and elytra narrowly marginate. Body subconvex 8

8(7) Elytra uniformly coloured. Pronotum with apical (Fig. 82) and elytra with basal angles denticulate . . nanus (Melsheimer), p. 267

- Elytra bicoloured. Pronotum with apical (Fig. 83) and elytra with basal angles not denticulate . . . . . marginatus (Palisot de Beauvois), p. 271

9(6) Pronotum quadrate, almost as long as broad (Fig. 84). Vertex with distinct median pit . . . . . soror (Jacquelin du Val), p. 275

- Pronotum with sides convergent basally; much broader than long (Figs. 94-96). Vertex

without median pit . . . . . .
. . . . . corticalis (Melsheimer), p. 314

10(5) Pronotum with lateral margins explanate. Antennal club prominent, articles spatulate, flat; sensitive area occupying more than one-third of each article (Figs. 18, 19, 25) 11

- Pronotum regular. Antennal club less prominent, articles globose; sensitive area occupying less than one-third of each article (Figs. 20, 21, 24, 26, 27) 13

11(10) Elytron unimaculate. Antennal club relatively large (Fig. 19). Submentum of male without pits . . . . . .
. . . . . bimaculatus (Melsheimer), p. 277

- Elytron uniformly coloured. Antennal club relatively small (Figs. 18, 25). Submentum of male at apical corners with distinct pit 12

12(11) Pronotum at base relatively narrow, sides abruptly convergent (Fig. 86) . . .
. . . . . americanus (Kirby), p. 281

- Pronotum at base relatively broad, sides gradually convergent (Fig. 87) . .
. . . . . laticollis (Horn), p. 288

13(10) Pronotum with basal marginal bead at middle distinctly, broadly interrupted,

basal angles obtuse, almost obliterated (Fig. 88). Body extremely depressed . . . . . obtusus (Horn), p. 294

\- Pronotum with basal marginal bead at middle not or scarcely, narrowly interrupted, basal angles distinct (Figs. 85, 89-91, 94-96). Body subconvex 14

14(13) Elytra strongly rugose. Pronotum as in Fig. 89, bicoloured . rugosipennis (Horn), p. 296

\- Elytra not or slightly rugose. Pronotum uniformly coloured 15

15(14) Elytron unimaculate. Pronotum as in Fig. 85 . . . . bimaculatus (Melsheimer), p. 277

\- Elytron uniformly coloured 16

16(15) Body relatively strongly convex, elongate. Pronotum with apical angles strongly produced (Fig. 90), lateral margins crenulate . . . . semicylindricus (Horn), p. 299

\- Body subconvex, relatively broad. Pronotum with apical angles moderately produced (Figs. 91,94-96), lateral margins smooth 17

17(16) Head subdepressed. Pronotum broad, lateral marginal bead not produced apically (Fig. 91) . floridanus Schaeffer, p. 304

\- Head subconvex. Pronotum narrow, lateral marginal bead produced apically

(Figs. 94-96) . corticalis (Melsheimer), p. 314

18(4) Pronotum with basal marginal bead at middle distinctly, broadly, interrupted, base relatively narrow (Fig. 92) . . . . . sonorensis Sharp, p. 307

- Pronotum with basal marginal bead at middle not or scarcely, narrowly, interrupted, base relatively broad (Figs. 89, 93-97) 19

19(18) Elytron with striae at middle finely punctate, scarcely impressed. Pronotum with sides widely marginate (Fig. 93) . . . . . tenuistriatus Fall, p. 312

- Elytron with striae at middle coarsely punctate, distinctly impressed. Pronotum with sides more narrowly marginate (Figs. 89, 94-97) 20

20(19) Elytra strongly rugose. Pronotum bicoloured, widest at middle (Fig. 89) . . . . . rugosipennis (Horn), p. 296

- Elytra not or slightly rugose. Pronotum uniformly coloured, widest at apical third (Figs. 94-97) 21

21(20) Pronotum more convex, sides rounded, abruptly convergent basally (Figs. 94-96). Pronotum and elytra with sides narrowly marginate. Elytron with lateral marginal

bead not produced anteriorly, basal angles obtuse . . . . . corticalis (Melsheimer), p. 314

- Pronotum less convex, sides straighter, gradually convergent basally (Fig. 97). Pronotum and elytra with sides broadly marginate. Elytron with lateral marginal bead produced anteriorly, basal angles acute . . . . . occidentalis Fall, p. 322

Tenebroides sinuatus (LeConte)

Trogosita sinuata LeConte, 1861b:344. HOLOTYPE: female, labelled as follows: "(blue disc); Type 108 (white and red label); T. sinuata Lec."; MCZ. TYPE LOCALITY: "East of Fort Colville." Horn, 1862:86; LeConte, 1863b:31.

Tenebrioides sinuata; Crotch, 1873:47; Fall, 1910:129.

Tenebroides sinuatus; Léveillé, 1888b:440; 1900:14; Schaeffer, 1920:194.

The distinctly produced eighth antennal article separates individuals of this species from others of the genus except mauritanicus and crassicornis. Specimens may be distinguished from both mauritanicus and crassicornis by the quadrate pronotum, the widely marginate pronotum and elytra, and by the eighth antennal article much smaller than the ninth instead of subequal to the

ninth. Specimens of this species are distinguished from those of the somewhat similar occidentalis by the antennal character and the quadrate pronotum.

Description. Body moderately depressed, broad. Colour piceous. Size intermediate, length 5.2 - 10.2 mm.

Head convex, moderately coarsely, densely punctate; front at middle broadly, shallowly, longitudinally depressed, somewhat declivous anteriorly; vertex with broad, shallow, indistinct median impression. Antenna robust, with eighth article wider than seventh, produced (Fig. 17).

Pronotum (Fig. 78) subquadrate, moderately depressed, broader than long, moderately coarsely, not closely punctate; sides moderately rounded, gradually convergent posteriorly, slightly sinuate before basal angles, distinctly, broadly marginate. Apical angles acute, moderately produced, denticulate, marginal bead at apex produced; basal angles right, denticulate, marginal bead produced; base broad, margin straight, bead at middle indistinctly interrupted. Prosternum finely, sparsely punctate; metasternum more coarsely, closely punctate.

Elytra moderately depressed; sides slightly rounded, broadly, distinctly marginate; basal angles acute, produced, denticulate; striae impressed, moderately coarsely punctate, near lateral margins striae not evident except last stria basally; intervals flat, finely, biseriately punctate.

Abdominal sterna of female sparsely punctate,

laterally finely, medially more coarsely punctate; of male at apical half laterally finely, very densely punctate, basally and medially more coarsely, not closely punctate.

Variation. In some specimens, including the type, the front of the head and the lateral margins of the pronotum and elytra are castaneous. The shape of the pronotum is quite constant; there is some variation in punctation.

Notes on synonymy. The name californicus is not synonymous with the name sinuatus as proposed by Crotch and Léveillé and as indicated by the determination labels of others.

Collecting notes. Collected from Pinus ponderosa April to Oct. (British Columbia, California, Idaho), Polyporus anceps on P. ponderosa (nr. Twain Harte, Tuolumne Co., California), P. jeffreyi May to Sept. (California), P. lambertiana 13 June (Chiquito Creek, Madera Co., California), P. coulteri (Santa Barbara N.F., California), Pinus sp. (Washington), Pinus contorta var. morrayana (Avalanche Meadow, California), Abies concolor (Huckleberry Meadow and Kern Co., California), Polyporus volvatus on Abies concolor (nr. Strawberry, Tuolumne Co., California), Abies magnifica (Lake Tahoe and Lassen N.F., California), fungus on Pseudotsuga taxifolia 6 May (Salmon Arm, British Columbia).

Distribution. Western; British Columbia to California, east to Montana, Nevada. Three hundred and eighty-eight specimens were examined from the following localities:

CANADA

BRITISH COLUMBIA: Aspen Grove (CAS); Beaverfoot Range, Rocky Mts. (AMNH); Creston (UW); Kamloops (CAS); Midday Creek, Indian Meadows (CAS); Midday Valley, Merritt (CAS, CNC, CU, INHS, UASM, UW); Princeton (INHS); 11 mi. W. Revelstoke (UW); Salmon Arm (CAS); Spious Creek (CAS).

UNITED STATES

CALIFORNIA: Alpine Co. (CAS); Butte Co., Butte Creek (CAS), near Paradise (CAS); Calaveras Co., Mokelumne Hill (CAS); El Dorado Co. (CNHM), Fallen Leaf, 6500 ft. (CAS), Fallen Leaf, Lake Tahoe (CAS); Glenn Co. (UASM), Oriental (CAS), Plaskett Mdw. (CAS); Fresno Co. (CAS), Camp 6, Millwood (CAS), Dalton Creek (CAS), General Grant National Park (CAS), Huckleberry Meadow, 6500 ft. (CAS), Huntington Lake, 7000 ft. (CAS); Inyo Co., Wyman Canyon, White Mts., 8500 ft. (CAS); Kern Co., Breckenridge Mt. (CAS), Cannel Meadows (CAS); Lake Co., Warners Lake (CAS); Lassen Co., Black's Mountain (CAS), Duck Lake (CAS), Facht (CAS), Goumaz (CAS), Grassy Lake, Lassen National Forest (CAS), Norval Flats (CAS), Pine Creek, 5200 ft. (CAS); Madera Co. (AMNH), Bass Lake (CAS), Chiquito Basin (CAS), Chiquito Creek (CAS, CU), North Fork (CAS); Mariposa Co., 5 mi. ENE. Fish Camp, 7000 ft. (CAS), Glacier Point, Yosemite, 7000 ft. (CAS), Yosemite,

12,000 ft. (CAS), Yosemite National Park (CAS); Modoc Co., Hackamore (AMNH, CAS); Mono Co., Mammoth (CAS, CU); Nevada Co., Truckee (CU); Placer Co. (CAS, CU), Alta (CAS), Lake Tahoe (CAS), Foresthill (CAS), 4.7 mi. Foresthill, 2280 ft. (CAS); Plumas Co. (CNHM), Chester (OSU), Mohawk (CAS), Meadow Valley, 3500 - 5000 ft. (CAS), Pinebark (TLE); Riverside Co., Dark Valley, San Jacinto Mts. (CAS), Idyllwild (CAS), Keen Camp (OSU), Santa Rosa Mts. (CAS); Sacramento Co., Michigan Bar (CAS); San Bernardino Co. (CAS), Bear Valley, Santa Cruz Mts. (CAS), Deep Creek (CAS), San Bernardino Mts.,5000 - 7500 ft. (CAS); Santa Barbara Co., Figueroa Park, Santa Barbara National Forest (CAS); Shasta Co., Manzanita Camp, Lassen National Park (AMNH), Shasta Springs (CAS); Sierra Co., 2.3 mi. NW. Calpine, 5200 ft. (CAS); Siskiyou Co. (CAS), Antelope Creek (CAS), McCloud (CAS, MCZ), McCloud River (CAS); Trinity Co., Carrville (CAS), Hayfork (CAS); Tulare Co., Badger Flat (CAS), Camp Nelson (MCZ), Gray Meadows (CAS, CU), Kaweah (CU), Lloyd Meadows (CAS), Scaffold Meadow (CAS, CU), Sequoia National Park (UKL); Tuolumne Co. (AMNH), Mather (CAS), Pinecrest (CAS), Sonora (WHT), Strawberry (AMNH), 21 mi. NE. Strawberry (MCZ), Rose Creek, 8 mi. NW. Twain Harte (MCZ); Avalanche Meadow (CAS).

IDAHO: Boise Co., Centerville (CU); Kootenai Co., Coeur d' Alene (MCZ); Latah Co., Moscow, Cedar Mt. (UW); Valley Co., Brundage Mt., McCall (CU), McCall (UW), Smiths Ferry (CU).

KANSAS: (CAS).

MONTANA: Lake MacDonald (MCZ).

NEVADA: Washoe Co., Reno (CAS); Lake Tahoe (CAS).

OREGON: Baker Co., Baker (UW); Grant Co., Blue Mts. (CAS); Hood River Co., Hood River (CU, UW); Jackson Co., Gold Hill (UW); Klamath Co., Fremont National Forest (CAS), Klamath Falls (UW), Ochoco River Station (UW), Denny Creek (UW); Tillamook Co., Pacific City (UW).

TEXAS: (MCZ).

WASHINGTON: King Co., Seattle (UW); Klickitat Co., Mount Adams, West Klickitat, 3500 ft. (AMNH); Snohomish Co., Darrington (CAS); Spokane Co., Spokane (MCZ); Stevens Co., Colville (MCZ); Whitman Co., Kamiack Butte, Pullman (UW); Buckeye (CAS, CU).

Tenebroides mauritanicus (Linnaeus)

Tenebrio mauritanicus Linnaeus, 1758:417. TYPE LOCALITY: "Algiriae."

Trogossita mauritanica; Olivier, 1790:6, No. 19; Latreille, 1804:245.

Trogosita mauritanica; Gyllenhal, 1808:72; Westwood, 1830: 231; 1838:12; Shuckard, 1840:28; Erichson, 1842:103; 1844:453; 1845:243, 244 (larva); Mannerheim, 1843: 302; Bach, 1849:225; Cuvier, 1849:460; Redtenbacher, 1849:175, 840; 1858:341; 1867:37; 1872:373; Lacordaire, 1854:336 (larva), 344; Jacquelin du Val, 1857a:254; 1857b:XXXV; 1858:163; 1859:108; Kraatz,

1858:136; Motschulsky, 1858:135; Thomson, 1859:84; 1863:106; Horn, 1862:83; LeConte, 1863b:31; Seidlitz, 1875:153; 1891a:225; 1891b:240; Marseul, 1885:149; Philippi, 1887:57; Xambeu, 1892:153 (larva).

Tenebrioides mauritanica; Crotch, 1870a:46; 1873:47; Reitter, 1875b:79; 1882:145; 1911:7; Rupertsberger, 1880:130, 272; 1894:139,284 (biology); Fowler, 1889:268; Horn 1894:324; Ganglbauer, 1899:427 (larva); Ulke, 1902:19.

Tenebroides mauritanicus; Léveillé, 1888b:438; 1900:12; 1908:323; Fleutiaux and Salle, 1889:387; Fauvel, 1891:158; Sharp, 1891:417; Ragusa, 1892:194; Alluaud, 1900:122; Schaeffer, 1918:197; 1920:194; Candura, 1932:1-56 (morphology and biology); Méquignon, 1947: 59; Basilewsky, 1956:393; Crowson, 1964:300.

Tenebrio caraboides Linnaeus, 1758:418. TYPE LOCALITY: "Europa." Fabricius, 1775:256.

Platycerus caraboides; Fourcroy, 1785:3.

Trogosita caraboides; Fabricius, 1792:115; 1801:151; Herbst, 1797:270; Illiger, 1798:117; Schönherr,1806:155; Latreille, 1807c:22; Sturm, 1807:242; 1826:205; Duftschmid, 1825:3; Westwood, 1830:230; 1838:147 (larva); Dejean, 1836:339; Kirby, 1837:166.

Tragosita caraboides; Cederhielm, 1798:13 (misspelling of Trogosita).

Trogossita caraboides; Latreille, 1802:161; Castelnau, 1840:383; Blanchard, 1851:440.

Platycerus fuscus Geoffroy, 1762:64 (not binomial). "TYPE LOCALITY": "environs de Paris."

Lucanus fuscus Goeze, 1777:125 (not binomial). "TYPE LOCALITY": "environs de Paris."

Lucanus fuscus Preyssler, 1790:6.

Tenebroides mauritanicus fuscus; Méquignon, 1947:60.

Tenebroides complanatus Piller and Mitterpacher, 1783:87. TYPE LOCALITY: "Hungaria."

Tenebrioides complanata; Crotch, 1870a:46.

Tenebrio piceus Schaller, 1783:319 (not binomial).

Tenebroides piceus Dalla Torre, 1879:32.

Carabus bucephalus Herbst, 1783:141.

Platycerus striatus Fourcroy, 1785:3. TYPE LOCALITY: "Gallia."

Lucanus dubius Scriba, 1790:42. TYPE LOCALITY: "Berlin."

Tenebrio planus Quensel, 1790:19 (not binomial). "TYPE LOCALITY": not given.

Trogosita nitida Horn, 1862:83. LECTOTYPE (here designated): female, labelled as follows: "(purple square); Type 117 (white and red label); T. nitida Horn."; LeConte collection, MCZ. TYPE LOCALITY: "a vessel from Sierra Leone--the neighborhood of Philadelphia." LeConte, 1863b:31.

Tenebrioides mauritanica var. nitida; Crotch, 1873:47.

Tenebroides mauritanicus var. nitidus; Rey, 1889:28; Méquignon, 1947:59.

Tenebroides mauritanicus nitidus; Schaeffer, 1920:194.

Individuals of this species resemble specimens of the western sinuatus and crassicornis in the structure of the antenna, with the eighth article laterally produced, instead of subcylindrical. The eighth article of sinuatus individuals, also produced, is much smaller than the ninth whereas in those of crassicornis and mauritanicus it is subequal to the ninth. The structure of the eye distinguishes mauritanicus from crassicornis; in mauritanicus, narrow, subtriangular, recessed, strongly emarginate, and laterobasally angulate; in crassicornis, broadly oval and not recessed. The apical angles of the pronotum are more strongly produced in mauritanicus and the sides are more or less subparallel at the apical half, instead of convergent moderately posteriorly from the apical third as in crassicornis. The laterodorsal profile of the head and pronotum is unique in mauritanicus and allows separation from other species once the character is understood.

Description. Body subconvex, broad. Colour black to piceous. Somewhat shiny. Size large, length 6.5 - 10.0 mm.

Head subdepressed, with medium, not close punctures; front broadly flat, vaguely triangularly depressed; vertex without median impression. Antenna elongate, robust, articles gradually increasing in width, eighth subequal to ninth, produced; the seventh subequal to sixth, produced; 2 - 6 subcylindrical (Fig. 28). Eyes narrow, subtriangular, recessed, strongly emarginate, laterobasally angulate.

Pronotum (Fig. 79) subtransverse, subdepressed, much

broader than long, punctures medium, not close; disc broadly flat; sides distinctly, but narrowly, marginate, at apical half subparallel, convergent posteriorly slightly, at basal half convergent strongly, sinuate immediately before basal angles. Apical angles acute, pointed, slightly produced, except marginal bead at apex strongly produced; basal angles right, somewhat denticulate; base narrow, moderately arcuate, marginal bead at middle usually broadly interrupted. Prosternum with punctures medium, distant; metasternum with punctures moderately coarse, not close, somewhat closer laterally.

Elytra subdepressed; sides moderately broadly rounded, narrowly marginate, towards base slightly reflexed; basal angles narrowly rounded, obtuse. Striae evident, impressed, except at lateral margins not or scarcely evident, last stria evident in some specimens. Intervals distinctly, moderately finely, biseriately punctate.

Abdominal sterna of female moderately coarsely, not closely punctate; of male less coarsely, densely punctate except at middle as in female.

Remarks. A specimen, determined nitidus Horn, at ANSP, is labelled as follows: "LECTOTYPE 3254 (red label); Horn Coll H 3836a; V. nitida Horn." Horn (1862) gave no indication of the number of specimens of nitidus before him when he wrote his description except that there were several. It can be assumed that Horn's type specimens, representing species described in his 1862 article, were deposited in the

LeConte collection (see "Remarks" under semicylindricus, p. 301). The authenticity of the nitidus material in the LeConte collection is far more likely than that of the ANSP specimen labelled lectotype, and the designation of the latter has no validity without publication, although it is certainly possible, but not likely, that the specimen is part of the type series. Two other specimens at ANSP and determined nitida are labelled "Para-Type 3254.2" and "Para-Type 3254.3," respectively.

Variation. Punctation varies to some degree (for example, Horn's type series and determined specimens of nitidus). Size also varies whereas the shape of the pronotum is quite constant.

Biology. The economically important mauritanicus lives largely in stored grain and grain products, however there is evidence that it remains primarily carnivorous, feeding on other insects frequenting these materials. There is also some evidence that this species occurs in the "wild." Crowson (1964) observed the gut contents of two specimens "wild caught" in France, a male with numerous insect fragments, and a larva with insect fragments and detrital material; also a larva from a Glasgow warehouse with fine granular matter (probably flour). Specimens were recorded from the following habitats: Collected from under codling moth band (Benton Co., Arkansas), on citrus (Sumatra, Florida), in cave (NW. Blanco Co., Texas), reared from elm (Chrisman, Illinois). The common name of this

insect, cadelle, was approved by the Entomological Society of America, 1965:316. (Common names of insects approved by the Entomological Society of America, 1965:287-320).

Distribution. Cosmopolitan, no doubt on the basis of its affinity to grain, but there is also some evidence of its occurrence in the "wild" in both the New and Old World. Seven hundred and one specimens with locality data in addition to many others reared in the laboratory were examined.

Tenebroides crassicornis (Horn)

Trogosita crassicornis Horn, 1862:83. HOLOTYPE: male, labelled as follows: "542; Type 109 (white and red label); T. crassicornis Horn."; LeConte collection, MCZ. TYPE LOCALITY: "California." LeConte, 1863b:31.

Tenebrioides mauritanica var. crassicornis; Crotch, 1873:47.

Tenebroides crassicornis; Léveillé, 1888b:437; 1900:11; Schaeffer, 1918:197; 1920:194.

Trogosita californica Horn, 1862:83. HOLOTYPE: male, labelled as follows: "(gold disc); Type 106 (white and red label); T. californica Horn."; LeConte collection, MCZ. TYPE LOCALITY: "California." LeConte, 1863b:31.

Tenebrioides sinuata var. californica; Crotch, 1873:47.

Tenebroides californicus; Léveillé, 1888b:437; Schaeffer, 1920:194.

Tenebrioides californica; Fall, 1910:129.

Trogosita pleuralis Horn, 1862:84. LECTOTYPE (here designated): first specimen, female, labelled as follows: "(gold disc); Type 120 (white and red label); T. pleuralis Horn."; LeConte collection, MCZ. PARALECTOTYPE: second specimen, female, labelled as follows: "(gold disc); Type 120 (white and red label); pleuralis"; LeConte collection, MCZ. TYPE LOCALITY: "California." LeConte, 1863b:31.

Tenebrioides pleuralis; Crotch, 1873:47.

Tenebroides pleuralis; Léveillé, 1888b:439; 1900:13.

The general appearance and the form of the antenna are similar to that of mauritanicus; the two species may be distinguished by the diagnostic characters given under mauritanicus (p. 255). Specimens of sinuatus, also with the eighth antennal article produced, are easily separated from those of crassicornis by the subquadrate rather than transverse pronotum and also by the widely marginate sides of pronotum and elytra. The laterally produced eighth antennal article of crassicornis is subequal to the ninth as in mauritanicus, rather than much smaller as in sinuatus.

Description. Body subconvex to somewhat depressed, broad. Colour castaneous to piceous. Somewhat shiny. Size intermediate, length 4.4 - 10.5 mm.

Head usually convex, coarsely, not closely punctate; front usually with shallow longitudinal depression, narrowly flat in a few individuals. Antenna robust, articles

gradually increasing in width to apex, eighth smaller than ninth, much larger than seventh, eighth produced, seventh asymmetrical, slightly produced, 2-6 subcylindrical (Fig. 22). Eyes broadly oval, not recessed.

Pronotum (Fig. 80) subtransverse, usually depressed, broader than long, moderately coarsely, not closely punctate; disc narrowly flat; sides narrowly marginate, moderately convergent posteriorly, sinuate well before basal angles. Apical angles acute, usually pointed, moderately produced, marginal bead at apex not or slightly produced; basal angles right or slightly obtuse, not or minutely denticulate; base relatively broad, marginal bead usually not or narrowly interrupted. Prosternum coarsely, sparsely punctate; metasternum with medium, shallow, not close punctures.

Elytra usually subconvex; sides moderately, narrowly rounded, narrowly marginate, near base slightly reflexed in some individuals; basal angles obtuse, angulate to narrowly rounded. Striae evident, impressed, except at lateral margins scarcely evident in some individuals; intervals distinctly, finely, biseriately punctate.

Abdominal sterna of female moderately coarsely, shallowly, sparsely punctate; of male at apical half laterally usually densely, less coarsely punctate than female, punctures well impressed.

Remarks. One specimen, a male, at ANSP, is labelled as follows: "Cal.; Horn Coll H 3837; PARA - Type (blue

label); T. pleuralis Horn." Immediately following his description of pleuralis, Horn (1862) states the following: "Two specimens, California; Dr. LeConte." The authenticity of this specimen as part of the type series is doubtful for the following reasons: it is not a specimen of pleuralis Horn but mauritanicus and it is unlikely that Horn would have made this mistake, Horn's type material is in the LeConte collection, including the two specimens of pleuralis (see Remarks under semicylindricus and mauritanicus), and Horn did not designate either specimen as type.

Variation. Within this species variation is considerable, particularly in the amount of convexity in body form--some individuals distinctly depressed, others convex (for example, the types of californicus Horn and crassicornis Horn). Shape of the pronotum, punctation, and antennal length also vary--in some individuals (for example, the type of californicus Horn) the eighth article is somewhat smaller than the ninth, whereas in others it is subequal. This variation does not appear to be geographic, but may, in part, be due to difference in over-all size. Smaller individuals are more depressed. Otherwise, these varying characters are probably discordant. The front and pronotal margins of some individuals are rufous in colour (for example, the types of californicus Horn and crassicornis Horn), again not seeming to be correlated with geography. It is concluded that this species is taxonomically

homogeneous, but highly variable; alternatively it may be composed of two or more sibling species.

Collecting notes. Collected from Larix occidentalis 27 Oct. (Creston, British Columbia), Quercus lobata 24 Nov. (Berkeley, Alameda Co., California), Expleurotus ostreatus (Turlock, Stanislaus Co., California), Populus sp. 11 April (Upper Klamath Lake, Oregon) and 30 March (Provo, Utah), Pseudotsuga taxifolia in March (Corvallis, Oregon), Pinus ponderosa 23 Oct., 1 April (Glenn Co., California), P. sabiniana 21 Feb. (Mount Hamilton, Santa Clara Co., California) and P. lambertiana 23 Oct. (Oriental, Glenn Co., California), and at light 29 July (Navato, Marin Co., California).

Distribution. Western; British Columbia to California, east to Idaho, Utah, Arizona. Three specimens were seen from Baja California. Two hundred and seventy-three specimens were examined from the following localities:

CANADA

BRITISH COLUMBIA: Cawston (CNC); Creston (MCZ); Kamloops (CAS); 7 mi. N. Oliver (CNC); Vernon (CAS).

UNITED STATES

ARIZONA: (INHS).

CALIFORNIA: Alameda Co., Berkeley (CU), Livermore (CAS), Niles Canyon (CAS), Teslar Road (CAS); Amador Co., Waterman Canyon (CAS); Butte Co. (CNHM); Calaveras Co., Mokelumne Hill (CAS); Contra Costa Co., Mount Diablo (CAS); Fresno

Co., Camp Greely, 2800 ft. (CU); Glenn Co. (CAS), Oriental (CAS); Inyo Co., Lone Pine (CAS); Kern Co., Tejon Canyon (CAS); Lake Co. (CAS, MCZ, USNM), Lucerne (CAS); Los Angeles Co. (CAS, CU), Burbank (AMNH), Chatsworth (MCZ), Los Angeles (AMNH, CAS), Mount Wilson (CAS), Pasadena (CAS, CU, MCZ); Madera Co., Bass Lake (CAS), North Fork (CAS, CU); Marin Co., Novato (CAS); Mariposa Co., Kinsley Station (CAS), Yosemite Valley, 4000 ft. (INHS), Yosemite Valley (AU, CAS); Mendocino Co., Comptche (CAS); Modoc Co., Fort Bidwell (MCZ), Warner Mts. (UKL); Mono Co., Crestview (CAS); Monterey Co., Tassajara (CAS); Napa Co., Child's Valley (CAS); Orange Co., Glen Ivy Hot Springs (CAS), Laguna Beach (CU), Trabuco Canyon (CAS); Placer Co. (CAS, CU), Lake Tahoe (CAS); San Bernardino Co. (CAS), Colton (INHS, MCZ), Oak Glen Lodge, 5000 ft. (CAS), San Bernardino Valley (MCZ); San Diego Co., Descanso (CAS), Julian (CAS), Poway (CAS), San Diego (CAS); San Joaquin Co., 6 mi. N. Tracy (WHT), Tracy (WHT); San Luis Obispo Co., Atascadero (CAS); Santa Barbara Co., Santa Barbara (AMNH, MCZ); Santa Clara Co., Los Gatos (CU), Mount Hamilton (WHT); Santa Cruz Co. (CNHM); Siskiyou Co., Dunsmuir (CAS);Solano Co., Green Valley Falls (CAS); Sonoma Co. (CU), Eldridge (CAS, CU), Glen Ellen (CAS), Sobre Vista (CAS); Stanislaus Co., Turlock (MCZ); Trinity Co., Garrville, 2400 - 2500 ft. (AMNH, CAS); Tulare Co. (CNHM, CU), California Hot Springs (CAS), Kaweah (CAS), Pine Flat (CAS), Sequoia National Park, Potwisha, 2000 - 5000 ft. (CAS); Ventura Co., Santa Inez (CAS), Santa Paula (CU), San Antonio Canyon (CAS); Santa Cruz Island (CAS); Sierra

Nevada (AMNH).

IDAHO: Kootenai Co., Coeur d' Alene (CU); Nez Perce Co., Lewiston (OSU), Webb (UW).

NEVADA: Ormsby Co., Carson City (OSU); Washoe Co., Reno (CAS, CU, MCZ); Sutro (MCZ).

NEW MEXICO: Sierra Co., Hot Springs, 7000 ft. (MCZ).

OREGON: Benton Co., Corvallis (CAS); Grant Co., Prairie City (UW); Klamath Co., Upper Klamath Lake (UW).

UTAH: Utah Co., Provo (UKL).

WASHINGTON: Kittitas Co., Cle Elum (UW); Walla Walla Co., Prescott (AMNH), Walla Walla (AMNH, UW); Whitman Co., Wawawai (CU).

Material was also examined from the following:

BAJA CALIFORNIA: 12 mi. SE. Maneandero (3 CAS).

Tenebroides collaris (Sturm)

Trogosita collaris Sturm, 1807:246. TYPE LOCALITY: not given. Duftschmid, 1825:4; Erichson, 1844:453; Horn, 1862:85; LeConte, 1863b:31.

Tenebrioides collaris; Crotch, 1873:47; Reitter, 1875b:68; Fall, 1910:129

Tenebroides collaris; Léveillé, 1888b:437; 1900:11; Schaeffer, 1920:194.

Trogosita nigripennis Sturm 1826:205 (nomen nudum). "TYPE LOCALITY": "Amer. bor."

Trogosita nigripennis Dejean, 1836:339 (nomen nudum). "TYPE LOCALITY": "Amer. bor."

The red-orange pronotum and black, smooth elytra and the combination of strongly depressed body and widely marginate pronotum and elytra are unique and distinctly characterize this group. Specimens of T. obtusus are more depressed, with strongly obtuse basal angles of the pronotum.

Description. Body strongly depressed. Head, pronotum, and ventral surface orange-red, elytra black. Size intermediate, length 4.5 - 8.1 mm.

Head moderately depressed, moderately sparsely, finely punctate; vertex at middle with small, shallow, indistinct impression. Antenna prominent, long, robust; eighth article as seventh, much smaller than ninth (Fig. 23). Eyes prominent.

Pronotum (Fig. 81) subquadrate, strongly depressed, broader than long, finely, relatively sparsely punctate; sides moderately rounded, slightly sinuate before basal angles. Lateral and basal margins prominent, reflexed, widely marginate. Apical angles prominent, acute, produced, pointed, marginal bead at apex moderately produced; basal angles prominent, right, pointed. Basal margin at sides somewhat oblique, curved; bead at middle distinctly, broadly interrupted. Sternum finely, sparsely punctate.

Elytra strongly depressed, widely marginate, margin strongly reflexed. Humeral angles distinct, pointed, slightly produced. Striae not or faintly impressed, last few rows absent; intervals smooth, flat, with punctures

sparse, scarcely evident.

Abdominal sterna of female finely, sparsely punctate; of male more coarsely, but still finely, more closely, but not densely punctate, except first visible sternum at anterolateral corners densely punctate.

Collecting notes. Collected from Pinus echinata 5 Sept. (Spartanburg, South Carolina), sticky traps and loblolly pine (Elizabeth, Louisiana), loblolly pine reared with Dendroctonus frontalis Zimm. and Ips avulsus (Hardin and Tyler Co., Texas), loblolly pine with D. frontalis eggs and larvae (Meadville, Franklin Co., Mississippi), last instar larvae collected from outer bark of loblolly pine and reared to adults (Hardin Co., Texas), predatory on Dendroctonus frontalis Zimm, according to Pickard (1968, in Litt.); at ultraviolet light 2 July (Grayburg, Texas).

Distribution. Coastal states of the United States from eastern Texas to New Hampshire and northern United States from New Hampshire to Michigan. Ninety-five specimens were examined from the following localities:

CANADA

ONTARIO: Constance Bay (CNC); Sudbury (CAS).

UNITED STATES

ALABAMA: Storrsland (AU).

ARKANSAS: Ashley Co. (UARK).

FLORIDA: Charlotte Co., Charlotte Harbor (AMNH), Punta

Gorda (AMNH, CAS); Highlands Co., Lake Placid (AMNH); Manatee Co., Bradenton (CAS); Osceola Co., Kissimmee (AMNH); Polk Co., Bartow.

GEORGIA: (ANSP).

LOUISIANA: Allen Co., Elizabeth (LFS); Natchitoches Co., Vowells Mill (CU).

MICHIGAN: Alpena Co., Alpena (CU).

MISSISSIPPI: Franklin Co., Meadville (LFS); George Co., Lucedale (CU).

NEW HAMPSHIRE: Hillsboro Co., Merrimack (MCZ).

NEW JERSEY: Monmouth Co., Manasquan (CNHM); Ocean Co., Lakehurst (AMNH, CU); Anglesea (OSU); Bomler (OSU); DaCosta (CAS); Five Mile Beach (OSU).

NEW YORK: Suffolk Co., Wyandanch, Long Island (CU).

NORTH CAROLINA: Moore Co., Southern Pines (AMNH, MCZ).

PENNSYLVANIA: Monroe Co., Pocono Lake (OSU).

SOUTH CAROLINA: Spartanburg Co., Spartanburg (CU).

TEXAS: Hardin Co. (LFS), Grayburg (FDA); Tyler Co. (LFS).

Tenebroides nanus (Melsheimer)

Trogosita nana Melsheimer, 1844:110. HOLOTYPE: female, labelled as follows: "(pink disc); Type 115 (white and red label); T. nana Mels. ? mutica Beauv."; LeConte collection, MCZ. TYPE LOCALITY: "Pennsylvania." Horn, 1862:85; LeConte, 1863b:31.

Tenebrioides nana; Crotch, 1873:47; Ulke, 1902:19.

Tenebroides nanus; Léveillé, 1888b:439; 1900:13; Schaeffer, 1920:194.

The following combination of characters separates this species from others of the genus: pronotum subquadrate, with basal marginal bead broadly and distinctly interrupted at middle, with sides narrowly marginate; elytron with last three striae scarcely evident, finely punctate. Apart from this combination of characters the group is somewhat similar in appearance to corticalis, the eastern marginatus, and the western sonorensis.

Individuals are distinguishable from those of sonorensis by geographical distribution and by the strongly rounded, posteriorly convergent sides of the pronotum of the latter. In form individuals are much more quadrate and depressed than corticalis and the basal marginal bead of the pronotum is broadly interrupted. Individuals of marginatus are unique by rufous margins on the pronotum and elytra, and they are much more coarsely, densely punctate, with pronotum transverse rather than subquadrate.

Description. Body moderately depressed. Colour uniformly castaneous, antennae and mouth parts paler. Shiny. Size intermediate, length 5.3 - 9.7 mm.

Head moderately depressed, moderately coarsely, not closely punctate; front broadly, shallowly, triangularly depressed; vertex without median impression. Antenna with eighth article as seventh,much smaller than ninth, subcylindrical; club not prominent, articles with lobes subcylindrical; funiculus slender.

Pronotum (Fig. 82) subquadrate, broader than long,

moderately depressed, finely, not closely punctate; disc distinctly, broadly flat; sides moderately rounded, widest at apical third, moderately convergent posteriorly, slightly sinuate before basal angles, distinctly but narrowly marginate. Apical angles acute, produced, pointed, marginal bead at apex produced; basal angles small, denticulate, right, except some specimens slightly obtuse; base broad, margin almost straight, bead at middle distinctly, broadly interrupted. Prosternum and metasternum finely, sparsely punctate.

Elytra moderately depressed; sides moderately rounded, narrowly marginate; humeral angles right; striae impressed, evident to lateral margins; intervals scarcely convex, distinctly, biseriately, finely punctate, somewhat rugulose.

Abdominal sterna of female moderately coarsely, not closely punctate; of male moderately finely, densely punctate.

Variation. Some variation is evident in size, colour, for example, light to dark castaneous, and shape of the pronotum, particularly the hind angles.

Collecting notes. Collected from sticky traps on loblolly pine in April, under bark of loblolly pine at 16 ft., with Dendroctonus frontalis Zimm. 12 Dec. (Elizabeth, Louisiana), Ganoderna lucidum 19 June (Fontainebleau State Park, Louisiana), under bark of mesquite 9 Dec. (Brownsville, Texas) and by beating oak 4 April

(Hazen, Alabama).

Distribution. Eastern United States; Ohio, Kentucky, Arkansas, eastern Texas to coast. Specimens were also seen from southern Mexico and Las Tres Marias Islands. One hundred and eighty-three specimens were examined from the following localities:

UNITED STATES

ALABAMA: Dallas Co., Hazen (AMNH); Mobile Co., Chunchula (CU), Mobile (CAS, CU), Spring Hill (CU).

ARKANSAS: Arkansas Co. (UARK).

GEORGIA: Thomas Co., Thomasville (CU).

KENTUCKY: (MCZ).

LOUISIANA: Allen Co., Elizabeth (LFS); Natchitoches Co., Vowells Mill (CU); Orleans Co., New Orleans (CAS), Many (UKL); Saint Landry Co., Opelousas (OSU); Sabine Co. (CAS); Fontainebleau State Park (MCZ); Hart (CAS).

MISSISSIPPI: George Co., Lucedale (CU); Greene Co., Leaf (CU); Perry Co., New Augusta (CU).

NEW JERSEY: Sussex Co., Colesville (CNHM).

NEW YORK: Saint Lawrence Co., Waddington (AMNH).

NORTH CAROLINA: Camden Co., South Mills (OSU); Polk Co., Tryon (CU).

OHIO: Brown Co., Georgetown (OSU); Delaware Co. (OSU).

PENNSYLVANIA: Westmoreland Co., Jeannette (AMNH, CAS, CU).

TEXAS: Anderson Co., 10 mi. SW. Elkhart (CU); Austin Co., St. Austin State Park near Sealy (CU), San Felipe (CU);

Bexar Co., San Antonio (MCZ, TAM); Blanco Co., Round Mt. (OSU); Brazos Co., College Station (TAM); Brooks Co., Falfurrias (CAS); Cameron Co., Brownsville (CNHM, CU, INHS, MCZ, OSU, UKL), Esperanza Ranch (CU); Colorado Co., Columbus (CAS); Comal Co., New Braunfels (CAS); Dallas Co., Dallas (INHS, MCZ); Hidalgo Co. (OSU); Lawrence Co. (MCZ); Medina Co. (OSU); Robertson Co., Benchley (OSU); Williamson Co., Liberty Hill (OSU).

WEST VIRGINIA: Marion Co., Fairmont (CAS).

Material was also examined from the following:

MEXICO - CHIAPAS: 32.5 mi. E. Comitan, Rte. 190, 2200 ft. (1 UASM), 9.2 - 12.5 mi. N. Ocozocuautla, 3200 ft. (1 UASM); JALISCO: nr. El Rin Con, 5700 ft. (1 UASM); LAS TRES MARIAS: Maria Madre (6 CAS), Maria Magdalena (2 CAS); MEXICO: Conteras (1 AMNH); NAYARIT: Tepic (1 AMNH); SAN LUIS POTOSI: 15 mi. N. Tamazunchale (1 CAS); TAMAULIPAS: El Limon, 200 ft. (2 CAS); VERACRUZ: Jalapa (2 AMNH), 2.5 mi. W. Sontecompan (3 UASM), 9 mi. N. Tempoal (1 CAS), 16 mi. NW. Tuxpam, 300 ft. (12 CAS).

Tenebroides marginatus (Palisot de Beauvois)

Trogossita marginata Palisot de Beauvois, 1811:125.

(Senior homonym of T. marginata Latreille, 1813:19).

TYPE LOCALITY: "Caroline du Sud."

Trogosita marginata, Melsheimer, 1844:110; LeConte, 1863b:31.

Tenebrioides marginata; Crotch, 1873:47; Ulke, 1902:19; Fall, 1910:129.

Tenebroides marginatus; Léveillé, 1888b:438; 1889b:LXII; 1900:12; Schaeffer, 1918:199; 1920:194.

Trogosita cucujiformis Horn, 1862:86. HOLOTYPE: labelled as follows: "(pink disc); Type 110 (white and red label); T. cucujiformis Horn"; LeConte collection, MCZ. TYPE LOCALITY: "Pennsylvania." LeConte, 1863b:31.

Tenebrioides marginata var. cucujiformis; Crotch, 1873:47; Ulke, 1902:19.

Tenebroides cucujiformis; Léveillé, 1888b:437; 1900:11.

The rufous margins of the pronotum and elytra readily separate this species. Individuals are somewhat similar in general appearance to the eastern nanus but can be distinguished by the diagnostic characters given under the latter (p. 268). The pronotum of the eastern corticalis is less quadrate and more convex than that of marginatus, also, the basal marginal bead is complete. Individuals of marginatus are not nearly as depressed as obtusus.

Description. Body somewhat depressed. Colour castaneous to piceous, except at sides; pronotum narrowly and elytra widely margined ferrugineous; antennae and palpi ferrugineous, head at apex margined ferrugineous. Size small, length 4.3 - 6.8 mm.

Head moderately depressed, moderately coarsely, not closely punctate. Antenna somewhat fine, with eighth article as articles 1-7, much smaller than ninth, subcylindrical.

Pronotum (Fig. 83) subtransverse, broader than long, narrowly marginate, moderately coarsely, not closely punctate; disc flat; sides moderately rounded, moderately convergent posteriorly, not sinuate before basal angles, widest at apical third. Apical angles acute, moderately produced, pointed, not denticulate, marginal bead at apex not produced; basal angles obtuse, small, somewhat denticulate; basal marginal bead at middle distinctly, broadly interrupted. Prosternum finely, sparsely punctate; metasternum moderately coarsely, not closely punctate.

Elytra moderately depressed, narrowly marginate; sides moderately rounded; basal angles obtuse, not produced, scarcely pointed; striae evident to margins, distinctly impressed, punctate; intervals convex, distinctly biseriately punctate, somewhat rugulose, punctures impressed.

Abdominal sterna of female sparsely, somewhat coarsely, shallowly punctate; of male very densely, finely punctate.

Variation. The ferrugineous margins of the pronotum vary in extent; in some individuals scarcely evident (for example, the type specimen of cucujiformis Horn, although, in this case, probably also teneral), in others relatively broad and distinct. Some individuals appear slightly less

convex than others.

Collecting notes. Collected from sticky traps on dead loblolly pine with Dendroctonus frontalis (Elizabeth, Louisiana), loblolly pine at 34 ft. with D. frontalis larvae and adults (Meadville, Mississippi), with D. frontalis adults July (Hardin Co., Texas), from under bark of dead pine and oak (Hazen, Alabama).

Distribution. Southern and middle eastern United States; Kansas to eastern Texas to coast, north to New York. Ninety-two specimens were examined from the following localities:

UNITED STATES

ALABAMA: Dallas Co., Hazen (AMNH); Mobile Co., Spring Hill (MCZ); Montgomery Co., Montgomery (ANSP).
FLORIDA: Broward Co., Fort Lauderdale (FDA); Charlotte Co., Charlotte Harbor (AMNH, CU); Highlands Co., Highlands Hammock (TLE); Orange Co., Winter Park (CU, MCZ); Seminole Co., Sanford (MCZ); Volusia Co., Edgewater (MCZ); Wakulla Co., Wakulla (UKL); Royal Palm (CAS).
GEORGIA: Decatur Co., Bainbridge (CU); Fulton Co., Atlanta (MCZ); Tift Co., Tifton (OSU).
ILLINOIS: Alexander Co., Olive Branch (MCZ).
KANSAS: Douglas Co., 900 ft. (MCZ).
KENTUCKY: Jefferson Co., Louisville (CAS, CU).
LOUISIANA: Allen Co., Elizabeth (LFS); Hart (CAS).
MISSISSIPPI: Franklin Co., Meadville (LFS); George Co.,

Lucedale (CU); Greene Co., Leaf (CU); Itawamba Co., Fulton (UKL); Perry Co., New Augusta (CU), Richton (CU).

MISSOURI: (ANSP).

NEW YORK: Niagara Co., Lockport (CU).

NORTH CAROLINA: Moore Co., Southern Pines (AMNH, CAS, MCZ, USNM).

OHIO: (MCZ).

PENNSYLVANIA: (ANSP, MCZ).

SOUTH CAROLINA: (type locality).

TEXAS: Hardin Co. (LFS); Montgomery Co., Sam Houston National Forest, Stubblefield Lake (TAM).

WEST VIRGINIA: Marion Co., Fairmont (CAS).

Tenebroides soror (Jacquelin du Val)

Trogosita soror Jacquelin du Val, 1857a:252. TYPE LOCALITY: "Cuba."

Tenebrioides soror; Reitter, 1875b:66.

Tenebroides soror; Léveillé, 1888b:440; 1900:14; Schaeffer, 1918:197; 1920:194.

The combination of large, subcylindrical, elongate form, dark near black colour, almost square pronotum, foveate head, the elytral striae, laterally, not or scarcely evident, and the intervals smooth and flat, with scarcely evident punctures serves to distinguish this group.

Description. Body subcylindrical, elongate. Colour dark castaneous to piceous, except antennae, mouth parts

and ventral surface castaneous. Somewhat shiny. Size large, length 8.1 - 11.3 mm.

Head convex; moderately finely, rather sparsely punctate; front at middle slightly, but distinctly, longitudinally impressed; vertex at middle with small, distinct, round fovea. Antenna with eighth article as seventh, much smaller than ninth, subcylindrical; club relatively small; funiculus moderately robust.

Pronotum (Fig. 84) quadrate, almost as long as wide, distinctly, but not broadly marginate, moderately finely, not closely punctate; disc narrowly flat, finely, sparsely punctate; sides almost parallel, straight, slightly convergent posteriorly. Apical angles narrowly rounded, produced, acute, marginal bead at apex not produced; basal angles almost rectangular, slightly obtuse, moderately denticulate; basal margin moderately arcuate, bead complete, not interrupted at middle. Prosternum finely, sparsely punctate; metasternum more coarsely, but shallowly, not closely punctate.

Elytra subconvex, narrowly marginate; sides parallel, straight; humeral angles slightly acute, produced, denticulate; strial punctures moderately fine, closely spaced, scarcely impressed, except lateral striae not or vaguely evident; intervals flat, smooth, with punctures fine, sparse, scarcely evident.

Abdominal sterna of female moderately coarsely, not closely punctate except first visible sternum somewhat

sparsely, moderately coarsely punctate; male same as female except first visible sternum at apical third laterally finely, very densely punctate.

Distribution. Florida Keys. Specimens have been recorded from Cuba (type locality) and examined from Bahamas and Cuba. Sixteen specimens were examined from the following localities:

UNITED STATES

FLORIDA: Monro Co., Key Largo (AMNH , CU, FDA), Key West (CU).

Material was also examined from the following:

BAHAMAS - S. Bimini Isl. (281 AMNH).

CUBA - Soledad, Cienfuegos (2 AMNH).

Tenebroides bimaculatus (Melsheimer)

Trogosita bimaculata Melsheimer, 1844:110. LECTOTYPE (here designated): female, labelled as follows: "Type 105 (white and red label); T. bimaculata Mels."; LeConte collection, MCZ. TYPE LOCALITY: "Pennsylvania." Horn, 1862:87; LeConte, 1863b:31.

Tenebrioides bimaculata; Crotch, 1873:47; Ulke, 1902:19.

Tenebroides bimaculatus; Léveillé, 1888b:437; 1891:CXCII; 1900:10; Schaeffer, 1920:194. Senior homonym of T. bimaculatus Sharp, 1891:434.

The distinct maculation on each elytron as well as

the small size and pronotum with arcuate sides, somewhat explanate, and with obtuse basal angles characterize specimens of this species.

Description. Body moderately depressed. Colour castaneous to piceous; elytron slightly anterior to middle with a prominent, irregular, flavous maculation; antennal club and tarsi yellowish. Size small, length 3.2 - 5.4 mm.

Head somewhat depressed, moderately closely, finely punctate; front anteriorly distinctly declivous; vertex at middle with a small, often indistinct, round impression. Eyes prominent. Antenna with eighth article as seventh, much smaller than ninth, subcylindrical; club large, prominent relative to funiculus, articles prominent, flat, somewhat spatulate, sensory area occupying more than one-third of article (Fig. 19).

Pronotum (Fig. 85) subconvex, moderately closely, finely punctate, broader than long, distinctly but narrowly marginate; disc scarcely flattened; lateral margins slightly but distinctly crenulate, somewhat explanate, distinctly, not strongly reflexed, at apical two-thirds moderately arcuate, sinuate before basal angles, widest at middle. Apical angles acute, moderately produced, angulate interiorly, denticulate, marginal bead at apex not produced; basal angles small, slightly obtuse, denticulate; basal margin at sides oblique, at middle narrowly arcuate, bead at middle not or indistinctly

complete. Prosternum and metasternum finely, sparsely punctate.

Elytra subconvex; sides slightly rounded, distinctly but not broadly marginate; basal angles obtuse, narrowly rounded but distinct; striae impressed, coarsely punctate except at apical third obsolete, punctures shallow; intervals convex, rugose, indistinctly, biseriately punctate, punctures fine.

Abdominal sterna of female finely, shallowly, sparsely punctate; of male coarsely, not closely punctate, punctures well impressed.

Variation. The lateral margins of the pronotum of some individuals are somewhat more rounded. Colour ranges from castaneous to piceous. The basal marginal bead of the pronotum is vaguely, narrowly interrupted in a few specimens. The median, small, round impression on the vertex is prominent to indistinct.

Collecting notes. Collected from sticky traps on loblolly pine in April (Elizabeth, Louisiana), under bark of dead Quercus laevis 2 March (Putnam Co., Florida), Quercus sp. 19 May (Carbondale, Illinois), black light trap 1 Feb. (Mayport, Florida), light trap 10 Sept. (College Station, Texas) and at light in May (North Carolina).

Distribution. Eastern United States from Michigan, Missouri, Arkansas, eastern Texas, east to coast. Ninety-eight specimens were examined from the following localities:

UNITED STATES

ALABAMA: Mobile Co., Mobile (CAS).

ARKANSAS: Franklin Co., Ozark (DJL); Washington Co., Mount Sequoyah (UARK).

CONNECTICUT: Fairfield Co., Stamford (CU).

DISTRICT OF COLUMBIA: (USNM).

FLORIDA: Duval Co., Mayport (FDA); Hernando Co., Brooksville (CAS); Lee Co., Fort Myers (AMNH); Marion Co. (ANSP); Putnam Co. (FDA), Crescent City (CU).

GEORGIA: De Kalb Co., Dunwoody (OSU); Rabun Co., Clayton (CU).

ILLINOIS: Cook Co. (CNHM), W. Pullman, Chicago (CNHM); Jackson Co., Carbondale (INHS).

KENTUCKY: (MCZ).

LOUISIANA: Allen Co., Elizabeth (USNM).

MASSACHUSETTS: Middlesex Co., Framingham (MCZ); Suffolk Co., Dorchester (MCZ), Wellesley (MCZ).

MISSISSIPPI: George Co., Lucedale (CU); Perry Co., New Augusta (CU).

MISSOURI: Jefferson Co., Arnold (OSU).

NEW JERSEY: Bergen Co., Palisades (CAS); Anglesea (OSU).

NEW YORK: Erie Co., Buffalo (INHS); New York Co., Bronx Park (AMNH, CU), New York (AMNH); Suffolk Co., Huntington Lake (CU); Westchester Co., New Rochelle (AMNH).

NORTH CAROLINA: Buncombe Co., Asheville (UASM), Black Mt. (AMNH); Polk Co., Tryon (CU); Swain Co., Cherokee (CAS).

PENNSYLVANIA: Allegheny Co. (CU); Centre Co., State College (PSU); Monroe Co.,Delaware Water Gap (AMNH); Northampton Co.,

Easton (CAS, FDA).

TENNESEE: Morgan Co., Burrville (CNHM, FDA).

TEXAS: Anderson Co., 10 mi. S. Elkhart (TAM); Brazos Co., College Station (TAM).

WISCONSIN: Walworth Co., Delavan (CNHM).

Tenebroides americanus (Kirby)

Trogosita brevicollis Dejean, 1836:339 (nomen nudum).
"TYPE LOCALITY": "Amer. bor."

Trogosita americana Kirby, 1837:166. TYPE LOCALITY: "the Journey between New York and Cumberland-house."

Tenebroides americanus; Léveillé, 1888b:437; 1900:10; Schaeffer, 1918:198; 1920:194.

Tenebrioides americana; Ulke, 1902:19.

Trogosita castanea Melsheimer, 1844:109. LECTOTYPE (here designated): female, labelled as follows: "Melsh.; Type 107 (white and red label); castanea. M. Pa."; LeConte collection, MCZ. TYPE LOCALITY:"Pennsylvania." Horn, 1862:86; LeConte, 1863b:31.

Tenebrioides castanea; Crotch, 1873:47.

Trogosita nigrita Horn, 1862:86. LECTOTYPE (here designated): first specimen, female, labelled as follows: "(yellow disc); Type 116 (white and red label); T. nigrita Horn."; LeConte collection, MCZ. PARALECTOTYPE: second specimen, female, labelled as follows: "(yellow disc); Type 116 (white and red label); nigrita."; LeConte collection, MCZ. TYPE LOCALITY:

"Kansas." LeConte, 1863b:31.

Tenebrioides castanea var. nigrita; Crotch, 1873:47.

Tenebroides americanus var. nigritus; Léveillé, 1888b:437; 1900:10.

Tenebroides americanus nigritus; Schaeffer, 1920:194.

Males of both americanus and laticollis can immediately be separated from all other species of the genus by the distinct pit with fulvous hairs on the anterolateral corners of the submentum. Females and males of both species can be separated from others by the prominent antennal club with greatly expanded sensory areas and the wide, somewhat explanate lateral margins of the pronotum. T. americanus is very similar to the closely related laticollis and can be separated by the diagnosis given for that species (p. 288).

Description. Body moderately depressed, broad. Colour rufopiceous. Moderately shiny. Size large, length 6.4 - 12.3 mm.

Head moderately depressed, finely, not densely punctate; front longitudinally, triangularly depressed, anteriorly declivous; submentum at anterolateral corners of male with a distinct pit with fulvid setae. Antenna with eighth article as articles 1-7, much smaller than ninth, subcylindrical; club large relative to funiculus, with articles prominent, elongate, asymmetrical, spatulate, flattened; sensory areas greatly expanded, occupying more than one-third area of article; funiculus slender (Fig. 18).

Pronotum (Fig. 86) moderately depressed, much broader than long, finely, moderately closely punctate, surface irregularly convex, moderately depressed; sides broadly rounded, sinuate before basal angles, distinctly, not widely, marginate, margins distinctly, relatively strongly reflexed. Apical angles produced, acute, pointed, angulate interiorly, marginal bead at apex produced; basal angles small, right, denticulate; base relatively narrow, marginal bead narrow, at middle usually broadly interrupted. Prosternum and metasternum finely, sparsely punctate.

Elytra subconvex, broad, relatively elongate; sides broadly rounded, widely marginate; humeral angles obtuse, not produced; striae shallowly impressed, finely, closely punctate, evident to lateral margins; intervals moderately convex, indistinctly, finely, sparsely, biseriately punctate, distinctly, somewhat strongly rugulose.

Abdominal sterna moderately coarsely, densely punctate; first visible sternum with lateroapical corners impunctate; all sterna of male somewhat more densely punctate than female.

Remarks. Variation is considerable in size and in the degree of irregularity in convexity of the dorsal surface of the pronotum; the sides of the pronotum are more strongly curved in some individuals. The lectotype (genitalia exposed) and paralectotype of Horn's nigrita differ from each other and from the lectotype of Melsheimer's castanea in the amount of irregularity in convexity of the

pronotum. The three specimens represent intermediates in the range of variation of the species. The lectotype of castanea Melsheimer is very light brown in colour and probably teneral.

Collecting notes. Collected from under bark of dead willow 28 Dec. (Ozark, Arkansas), under bark of beech 29 Sept. (Olive Branch, Illinois), under leaves and bark of maple 27 May, sycamore clump 14 June, under boards 11 April, at light 3 May, 14 July (Illinois), at light 20 March, 6 July (New York) and from light trap 2 May (Tennessee), 22 March (Brazos Co., Texas).

Distribution. Eastern; Minnesota, Nebraska, Kansas, eastern Texas to coast. Two specimens were seen from Santa Catarina, Brazil. Seven hundred and sixty-one specimens were examined from the following localities:

CANADA

ONTARIO: Prince Edward Co., Brinley (CU, MCZ); Preston (CNC); Toronto (CU).

QUEBEC: Knowlton (CAS).

UNITED STATES

ALABAMA: Baldwin Co., Fairhope (CU); Lee Co., Auburn (CAS, PSU); Mobile Co., Mobile (CU, MCZ), Mount Vernon (CU).

ARKANSAS: Carroll Co., Berryville (MCZ); Franklin Co., Ozark (UARK); Hempstead Co., Hope (AMNH); Washington Co., Mount Sequoyah (UARK); Yell Co. (UARK).

CONNECTICUT: Litchfield Co., Cornwall (CU).

DELAWARE: Kent Co., Dover (CNHM).

FLORIDA: Jackson Co., Caverns State Park (FDA).

GEORGIA: Bryan Co., Richmond Hill (MCZ); Chatham Co., Savannah (CAS); De Kalb Co., Dunwoody (OSU); Rabun Co., Clayton (CAS).

ILLINOIS: Adams Co., Quincey (CAS, MCZ); Alexander Co., Olive Branch (CNHM); Champaign Co., Urbana (CNHM, INHS); Clay Co., Louisville (INHS); Cook Co., Chicago (CAS), Des Plaines, Evanston (CAS), Palos Park (CNHM), Willow Springs (CNHM); Effingham Co., Watson (INHS); Franklin Co., Zeigler (INHS); Jackson Co., Carbondale (INHS), Running Lake near Carbondale (INHS); McLean Co., Funks Grove (INHS), Twin Grove (INHS), Murphysboro (INHS); Pulaski Co., Villa Ridge (INHS); Richland and Lawrence Co., Wabash Valley (MCZ); Sangamon Co., Springfield (INHS); Scott Co., Exeter (CNHM); Union Co., Ware (INHS); Putnam Co., Bosky Dell (CNHM); Brownville (CNHM); Edgebrook (MCZ).

INDIANA: La Porte Co., Smith Station (CNHM); Perry Co., Cannelton (CNHM); Wayne Co., Richmond (CNHM); Marion Co. (CU).

IOWA: Pottawattamie Co., Council Bluffs (CAS); Story Co., Ames (CAS, MCZ).

KANSAS: Douglas Co., Lawrence (UKL), Lecompton (CNHM); Harvey Co., Sedgwick (MCZ); Saline Co., Salina (CU); Wabaunsee Co., McFarland (MCZ); Wilson Co., Benedict (CU); Wyandotte Co., Argentine (CAS, MCZ).

KENTUCKY: (AMNH, CAS, CU).

LOUISIANA: Livingston Co., Denham Springs (UKL), Killian

(MCZ); Hart (CAS).

MARYLAND: Baltimore (CAS); Harford Co., Edgewood (CU).

MASSACHUSETTS: (MCZ).

MICHIGAN: Berrien Co., E. K. Warren Preserve (UASM); Cheboygan Co. (UKL); Eaton Co., Grand Ledge (CU); Midland Co. (CAS); Washtenaw Co. (UW), Pittsfield township (UW); Wayne Co., Detroit (MCZ).

MINNESOTA: (MCZ).

MISSISSIPPI: George Co., Lucedale (CU); Greene Co., Avera (CU), Leaf (CU), State Line (CU); Perry Co., New Augusta (CU), Richton (CU).

MISSOURI: Roaring River State Park (CAS).

NEBRASKA: Lancaster Co., Lincoln (CAS), Malcolm (MCZ).

NEW JERSEY: Essex Co., Irvington (AMNH); Franklin Co., Princeton (MCZ); Middlesex Co. (MCZ); Sussex Co., Colesville (CNHM); Union Co., Elizabeth (AMNH).

NEW YORK: Cattaraugus Co., Rock City (CU); Columbia Co., New Lebanon (CU); Erie Co., Buffalo (INHS), Lancaster (CAS); Herkimer Co., Newport (MCZ), Warren (CAS); Monroe Co., Brockport (CU); Niagara Co., Olcott (CU); New York Co., New York(AMNH), Pelham (AMNH); Rockland Co., Piermont (CAS); Tomkins Co., Ithaca (CU, INHS), McLean (CU), McLean Bogs Reserve (CU); Ulster Co., Bushnell's Basin (CU); Westchester Co., Bronxville (AMNH), New Rochelle (AMNH), Scarsdale (AMNH), Tarrytown (CU), Van C. Park (AMNH), Yonkers (CNHM); Wyoming Co., Silver Lake (CAS).

NORTH CAROLINA: Buncombe Co., Asheville (MCZ); Mecklenburg

Co., Elizabeth (AMNH); Moore Co., Southern Pines (AMNH, USNM); New River (CAS).

OKLAHOMA: Latimer Co. (CAS).

OHIO: Ashtabula Co. (OSU); Delaware Co. (OSU); Franklin Co. (OSU); Greene Co. (OSU); Hamilton Co. (OSU); Hocking Co. (OSU); Knox Co., Gambier (CNHM); Lowndes Co., Columbus (OSU); Morrow Co. (OSU); Perry Co. (OSU); Scioto Co. (OSU).

PENNSYLVANIA: Allegheny Co. (CNC), Millvale (CNC), Wall (CNC); Dauphin Co., Harrisburg (AU), Hummelstown (CAS, UASM); Pike Co., Milford (CNHM); Philadelphia Co., Chestnut Hill (MCZ), Mount Airy (CAS), Philadelphia (CNHM); Warren Co., Bear Lake (CU); Westmoreland Co.,Jeannette (AMNH).

SOUTH CAROLINA: Pickens Co., Sassafras Mt. (CAS).

TENNESSEE: Cumberland Co., Crossville (CNC); Knox Co., Knoxville (CNC); Morgan Co., Burrville (FDA).

TEXAS: Austin Co., San Felipe (CU); Bexar Co. (TAM), San Antonio (TAM, MCZ); Brazos Co. (INHS, TAM), College Station (TAM); Comal Co., New Braunfels (CU); Coryell Co., Mother Neff State Park (CU); Dallas Co. (INHS, MCZ), Dallas (INHS, MCZ); Guadalupe Co., Seguin (UKL); Harris Co. (MCZ); Hunt Co., Commerce (OSU); Travis Co., Austin (CAS); Williamson Co., Liberty Hill (OSU).

VIRGINIA: Fairfax Co., Falls Church (MCZ); Henrico Co., Richmond (CNHM).

WISCONSIN: (CU, INHS, MCZ).

Material was also examined from the following locality:

BRAZIL - Santa Catarina (2 CAS).

Tenebroides laticollis (Horn)

Trogosita laticollis Horn, 1862:86. LECTOTYPE (here designated): female, labelled as follows: "(green disc); Type 113 (white and red label); T. laticollis Horn."; LeConte collection, MCZ. TYPE LOCALITY: "Southern and Western states." LeConte, 1863b:31.

Tenebrioides castanea var. laticollis; Crotch, 1873:47.

Tenebroides laticollis; Léveillé, 1888b:438; 1900:12; Schaeffer, 1920:194.

Tenebrioides americana var. laticollis; Ulke, 1902:19.

Tenebroides americanus laticollis; Schaeffer, 1918:198.

Trogosita obscura Horn, 1862:87. LECTOTYPE (here designated): female, labelled as follows: "(yellow disc); Type 118 (white and red label); T. obscura Horn."; LeConte collection, MCZ. TYPE LOCALITY: "Illinois." LeConte, 1863b:31.

Tenebrioides castanea var. obscura; Crotch, 1873:47.

Tenebroides obscurus; Léveillé, 1888b:439; 1900:13.

The diagnostic characters given under the closely related americanus (p. 282) also distinguish this species. Individuals of bimaculatus also have arcuate, somewhat explanate, pronotal margins, but the distinct elytral maculation separates them from the members of this group. Specimens of laticollis may be separated from americanus by the pronotum with a broad base relative to apex; in americanus the base is narrow relative to the apex, the

sides convergent much more strongly posteriorly. Other characters that distinguish the two groups are as follows: laticollis smaller in size, pronotal surface regularly convex, with arcuate sides scarcely sinuate, elytra less rugose, pronotum and elytra with sides broadly rounded, more narrowly marginate.

Description. Body moderately depressed, broad. Colour rufopiceous. Moderately shiny. Size intermediate, length 4.5 - 9.7 mm.

Head moderately depressed, finely, not closely punctate; front longitudinally, triangularly, vaguely depressed, anteriorly strongly declivous. Submentum at anterolateral corners of male with distinct pit with fulvous setae. Antenna with eighth article as articles 1-7, much smaller than ninth, subcylindrical; club prominent, with articles elongate, flat, spatulate, sensory areas occupying more than one-third area of article; funiculus slender (Fig. 25).

Pronotum (Fig. 87) moderately depressed, much broader than long, finely, not closely punctate, surface regularly convex; sides moderately rounded, widest at apical third, at base not or vaguely sinuate, narrowly marginate, somewhat reflexed. Apical angles produced, prominent, acute, pointed, marginal bead at apex not produced; basal angles very small, not prominent, obtuse, pointed, indistinctly denticulate; base relatively broad, margin at sides straight, oblique, medially slightly rounded, bead at middle usually interrupted. Prosternum and metasternum finely, sparsely

punctate.

Elytra broad, relatively short, subconvex; sides moderately rounded, distinctly, not broadly marginate; humeral angles obtuse, not produced; striae shallowly impressed, finely, closely punctate, evident to lateral margins; intervals moderately convex, indistinctly, finely, biseriately punctate, scarcely rugulose.

Abdomen with first visible sternum at lateroapical corners impunctate; all sterna of female moderately coarsely, densely punctate; of male slightly more densely punctate.

Remarks. The lectotype of obscurus Horn is simply a small specimen of laticollis and within the size range of the latter. The lectotype of laticollis Horn is larger and this is essentially the only difference between the two specimens.

Schaeffer (1918) considered the closely related and sympatric americanus and laticollis as subspecies on the basis of the distinctive features shared by the two groups, namely, the expanded lateral margins of the pronotum, the characteristic antennae, and the submental pits of the male. All individuals of laticollis can be separated from those of americanus and the two groups are considered here as distinct species, as by Léveillé and Schaeffer. Individuals of americanus vary considerably in size, pronotal shape, and degree of irregularity in the dorsal convexity of the pronotum but the range of variation does not approach that of laticollis. Individuals of the latter are much more constant

and the pronotum is regularly convex.

Collecting notes. Collected from sticky traps on loblolly pine in March, April (Elizabeth, Louisiana); from bark of apple 2 April (Poinsett Co., Arkansas), 4 April (Illinois); under bark of dead Quercus sp. 2, 22 March, avocado 19 June, and from Polyporus sulfureus 25 June (Florida); red oak (Illinois); tamarack 3 July (Mineral Springs, Indiana) and at light, 21 June (Arkansas), 25 Aug. (Florida), 29 June (New York), 7 July (Missouri).

Distribution. Eastern; Minnesota, Kansas, eastern Texas to coast. Five hundred and thirty-seven specimens were examined from the following localities:

CANADA

ONTARIO: Cranston (OSU).

UNITED STATES

ALABAMA: Colbert Co., Barton (CAS); Lee Co., Auburn (AU); Mobile Co., Mobile (CU, MCZ); Cheaha State Park (CAS); Monte Sano State Park (FDA).

ARKANSAS: Arkansas Co. (UARK); Benton Co., Bentonville (CAS); Garland Co., Hot Springs (CU); Hempstead Co., Hope (CU); Lawrence Co., Imboden (MCZ); Poinsett Co. (UARK), Bradford (CNHM); Pulaski Co., Little Rock (UARK); Washington Co. (AMNH, UARK), Mt. Sequoyah (UARK); White Co., Bradford (CNHM).

DELAWARE: New Castle Co., Newark (OSU).

DISTRICT OF COLUMBIA: Washington (AU, CU, INHS, MCZ).

FLORIDA: Alachua Co., Gainesville (CNC, FDA, OSU); Columbia Co. (FDA); Dade Co., Subtropical Experimental Station (FDA); Hendry Co., La Belle (AMNH, UKL); Hernando Co., Brooksville (CAS, CNHM); Highlands Co., 4 mi. SE. Lake Placid (MCZ); Lake Co., Clermont (FDA); Lee Co., Fort Myers (MCZ); Levy Co., Waccasassa River (CU); Orange Co., Orlando (CAS), Winter Park (MCZ); Palm Beach Co., Canal Point (CU); Pinellas Co.,Dunedin (CU); Putnam Co. (FDA), Georgetown (MCZ), Red Water Lake (FDA); Volusia Co., Enterprise (MCZ); New Smyrna (CAS); Biscayne Bay (MCZ); Draugi (AMNH); Sawannae River (CAS).

GEORGIA: Chatman Co., Savannah (CAS); Clayton Co. (CU); De Kalb Co., Dunwoody (OSU); Clarke Co. (AMNH).

ILLINOIS: Alexander Co., Olive Branch (CAS); Cook Co. (CNHM); Hardin Co., Elizabethtown (INHS); Jackson Co., Carbondale (INHS); McHenry Co., Algonquin (INHS); Macon Co., Decatur (INHS); Sangamon Co., Springfield (CNHM); Vermilion Co., Muncie (INHS); Union Co., Ware (INHS).

INDIANA: Lake Co., Hessville (CNHM); Marion Co. (CU); Posey Co. (CU), Mount Vernon (CNHM); Tippecanoe Co., LaFayette (CAS); Mineral Springs (CNHM); Smith's Woods (CNHM).

KANSAS: Douglas Co. (UKL); Wilson Co., Benedict (CAS); Wyandotte Co., Argentine (CAS); Atchinson Co. (UKL).

KENTUCKY: Green Co., Crailhope (CAS); Henderson Co., Henderson (CNC); Sanborn (MCZ).

LOUISIANA: Allen Co., Elizabeth (LFS); Orleans Co.,

New Orleans (INHS); Hart (CAS).

MARYLAND: Baltimore (CAS); Dorchester Co., Williamsburg (CNC); Harford Co., Edgewood (CU); Prince Georges Co., College Park (MCZ); Takoma Park (CAS).

MICHIGAN: Wayne Co., Detroit (UW).

MISSISSIPPI: Forrest Co., Hattiesburg (AMNH); George Co., Lucedale (CU); Greene Co. (FDA), Leakesville (CU), State Line (CU); Lafayette Co. (FDA); Perry Co., New Augusta (CU).

MISSOURI: Jefferson Co., Arnold (OSU); Greene Co., Willard (MCZ, UASM); Big Spring State Park (CAS); Saint Louis (MCZ).

NEW JERSEY: Bergen Co., Ramsey (AMNH); Morris Co., Morristown (CNHM); Ocean Co., Wrangle Brook, Lakehurst (CU); Passaic Co., Paterson (AMNH); Atslon (CAS).

NEW YORK: New York Co., Pelham (AMNH); Queens Co., Flushing (AMNH), Long Island (CU); Richmond Co., Clove Valley, Staten Island (AMNH); Wayne Co., Newark (MCZ); Westchester Co., New Rochelle (AMNH).

NORTH CAROLINA: Wake Co., Raleigh (CU).

OHIO: Greene Co. (OSU); Hamilton Co., Cincinnati (CU); Hocking Co. (OSU); Holmes Co. (OSU); Jefferson Co., Steubenville (OSU); Knox Co., Gambier (OSU); Lucas Co. (OSU); Perry Co. (OSU).

OKLAHOMA: Latimer Co. (CAS); Tulsa Co., Tulsa (CAS); Wichita National Forest (CAS).

PENNSYLVANIA: Allegheny Co., Pittsburg (AMNH); Centre Co., State College (PSU); Delaware Co., Lansdowne (AMNH); Elk Co., Saint Marys (CNHM); Monroe Co., Delaware Water Gap

(AMNH); Northampton Co., Bethlehem (CNHM); Westmoreland Co., Jeannette (AMNH, CU).

SOUTH CAROLINA: Aiken Co., Aiken (CNHM); Kershaw Co., Camden (CU, MCZ).

TENNESSEE: Morgan Co., Deer Lodge (CAS); Rutherford Co., Murfreesboro (CAS); Berrville (CNHM).

TEXAS: Anderson Co. (TAM); Austin Co. (OSU), S. F. Austin State Park near Seely (CU); Bastrop Co., Bastrop State Park (CNC); Bexar Co., San Antonio (MCZ); Blanco Co., Cypress Mill (CU); Brazos Co., College Station (TAM); Dallas Co., Dallas (MCZ); Kerr Co., Kerrville (CNC); Lee Co. (MCZ); Limestone Co., Mexia (TAM); Llano Co. (TAM); Montague Co., 2.5 mi. SW. Forestburg (CNHM); Smith Co., Tyler (TAM); Tyler Co., Campers Cove Park (TAM).

VIRGINIA: Accomack Co., Justisville (CU).

WISCONSIN: Walworth Co., Delavan (CNHM).

Tenebroides obtusus (Horn)

Trogosita obtusa Horn, 1862:87. LECTOTYPE (here designated): female, labelled as follows: "D.C.; Type 119 (white and red label); T. obtusa Horn."; LeConte collection, MCZ. TYPE LOCALITY: "Pennsylvania--Dist. Columbia." LeConte, 1863b:31.

Tenebrioides obtusa; Crotch, 1873:47; Ulke, 1902:19.

Tenebroides obtusus; Léveillé, 1888b:439; 1900:13; Schaeffer, 1920:194.

The strongly depressed form and subcordate pronotum with basal angles obtuse and almost obliterated distinguish individuals of this species. This is the most depressed species of the genus, individuals in lateral view being almost linear relative to specimens of other species of the genus.

Description. Body strongly depressed, elongate. Colour light castaneous to ferrugineous. Somewhat shiny. Size small, length 5.3 - 6.5 mm.

Head flat, closely, finely punctate; front not impressed or scarcely, broadly. Antenna with eighth article as articles 1-7, much smaller than ninth, subcylindrical; club small; funiculus fine (Fig. 24).

Pronotum (Fig. 88) subcordate, broader than long, narrowly marginate, finely, closely punctate; disc flat; sides strongly rounded and strongly convergent posteriorly, sinuate. Apical angles broadly rounded, acute, indistinctly pointed, angulate interiorly, moderately produced, marginal bead at apex not produced; basal angles strongly obtuse, not or scarcely evident, not denticulate; base narrow, marginal bead at middle distinctly, broadly interrupted. Prosternum finely, sparsely punctate; metasternum moderately coarsely, not closely punctate.

Elytra depressed, rugulose; sides broadly rounded, narrowly marginate; basal angles rounded, obtuse, scarcely evident, at margin anteriorly not pointed; striae moderately

impressed, evident, but not as strongly impressed at sides; intervals convex, biseriately, finely punctate.

Abdominal sterna of both sexes moderately coarsely, not closely punctate.

Remarks. The head of the lectotype of obtusus Horn is dorsally very shallowly, broadly, triangularly impressed.

Distribution. Eastern coastal states of the United States from Alabama to Pennsylvania. Thirty-six specimens were examined from the following localities:

UNITED STATES

ALABAMA: Mobile Co., Mobile (CAS, CU, MCZ, OSU), Mount Vernon (CU), Oak Grove (CU), Spring Hill (CU, MCZ).
DISTRICT OF COLUMBIA: (MCZ).
FLORIDA: Alachua Co., Gainesville (AMNH); Saint Johns Co., Saint Augustine (CAS).
GEORGIA: Decatur Co., Spring Creek (CU).
PENNSYLVANIA: (OSU).
SOUTH CAROLINA: Oconee Co., Clemson (CAS).

Tenebroides rugosipennis (Horn)

Trogosita rugosipennis Horn, 1862:87. HOLOTYPE: female, labelled as follows: "(pink disc); Type 121 (white and red label); T. rugosipennis Horn."; LeConte collection, MCZ. TYPE LOCALITY: "Pennsylvania." LeConte, 1863b:31.

Tenebrioides rugosipennis; Crotch, 1873:47; Ulke, 1902:19.

Tenebroides rugosipennis; Léveillé, 1888b:440; 1900:14; Schaeffer, 1918:198; 1920:194.

Tenebroides arizonensis Schaeffer, 1918:198. HOLOTYPE: female, labelled as follows: "Ariz.; HOLOTYPE (red label); T. arizonica Schaef.; Cornell U., Lot 908, Sub. 78, Schaeffer Coll.; HOLOTYPE, Cornell U., No. 1572 (red label)"; CU. TYPE LOCALITY: "Arizona." Schaeffer, 1920:194. NEW SYNONYMY.

The small size, rugose elytra, and rufous pronotal side margins separate specimens of this species from others of the genus. Secondary distinguishing features are the pronotum with arcuate sides and strongly obtuse, not prominent, hind angles.

Description. Body moderately convex. Colour castaneous, except antennae, mouth parts, and lateral margins of pronotum, rufous. Size small, length 3.5 - 5.2 mm.

Head subconvex, dorsally flat, without longitudinal impression, not declivous, moderately closely, not densely punctate; vertex at middle with very shallow, indistinct impression. Antenna with eighth article as seventh, much smaller than ninth, subcylindrical; club large, prominent relative to funiculus (Fig. 26).

Pronotum (Fig. 89) much broader than long, moderately coarsely and closely punctate, distinctly, but not broadly marginate; disc at middle almcst flat; sides arcuate,

scarcely reflexed, widest at middle, at apical two-thirds broadly, evenly rounded, at basal third convergent slightly more strongly posteriorly. Apical angles acute, not prominent, not strongly produced, sides broadly rounded, marginal bead at apex not produced. Basal angles strongly obtuse, small, not prominent, not denticulate; base broad, marginal bead complete, straight, except at sides slightly oblique. Prosternum moderately coarsely, not closely punctate; metasternum coarsely, shallowly, scarcely punctate.

Elytra subconvex, strongly rugose; sides slightly rounded, narrowly marginate; basal angles obtuse, narrowly rounded; striae impressed, prominent to lateral margins, coarsely punctate; intervals indistinctly, scarcely punctate.

Abdominal sterna of female moderately finely, not closely, punctate, except first visible sternum at latero-apical corners impunctate; of male somewhat more coarsely and densely, but not closely punctate.

Variation. The rufous margins of the pronotum vary somewhat in extent; general colouration varies from light to dark.

Notes on synonymy. Schaeffer's type specimen of arizonensis is simply a specimen of rugosipennis.

Collecting notes. Collected by beating Quercus sp. and under bark of Quercus sp. (Kerrville, Texas).

Distribution. Eastern United States, west to Arizona. Thirty-eight specimens were examined from the following localities:

UNITED STATES

ARIZONA: Cochise Co., Chiricahua Mts. (OSU).

GEORGIA: De Kalb Co., Dunwoody (OSU).

KENTUCKY: (CU).

NEW JERSEY: Anglesea (CU, OSU).

PENNSYLVANIA: Washington Co. (CAS, CU).

TEXAS: Kerr Co., Kerrville (CNC).

Tenebroides semicylindricus (Horn)

Trogosita semicylindrica Horn, 1862:85. LECTOTYPE (here designated): first specimen, female, labelled as follows: "(orange disc); Type 122 (white and red label); T. semicylindrica Horn."; LeConte collection, MCZ. PARALECTOTYPE: second specimen, female, labelled as follows: "(orange disc); Type 122 (white and red label); semicylindrica."; LeConte collection, MCZ. TYPE LOCALITY: "Georgia." LeConte, 1863b:31.

Tenebrioides semicylindrica; Crotch, 1873:47.

Tenebroides semicylindricus; Léveillé, 1888b:440; 1900:14; Schaeffer, 1918:199; 1920:194.

Tenebrioides subaenea Reitter, 1875b:77. TYPE LOCALITY: "Amer. sept."

Tenebroides subaeneus; Léveillé, 1888b:440; 1900:15.

Tenebroides foveatus Blatchley, 1917:142. HOLOTYPE: female, labelled as follows: "TYPE (red label), Dunedin, Fla., W.S.B. Coll. 7-6-15, Tenebroides foveatus sp. nov."; PU[*]. TYPE LOCALITY: "Dunedin, Fla." NEW SYNONYMY.

Species of uncertain synonymy with semicylindricus:

Tenebroides helophorus Sharp, 1891:432. TYPE LOCALITY: "Mexico, Jalapa, Chilpancingo---, Playa Vicente" (Synonymy with semicylindricus by Schaeffer, 1918:199).

This species is represented by the most cylindrical individuals of the genus; the crenulate lateral margins of the pronotum are unique. In addition, the apical angles of the pronotum are strongly produced, and the sides are almost parallel. In combination, these characters distinguish this species.

Description. Body elongate, subcylindrical. Colour ferrugineous to piceous, except antennae, mouth parts, tarsi rufous. Size large, length 4.5 - 11.0 mm.

Head convex, moderately coarsely, closely punctate; front not longitudinally impressed; vertex without distinct median impression. Eyes prominent, produced. Antenna with eighth article as seventh, much smaller than ninth, subcylindrical; club relatively small, articles globose; funiculus slender.

[*] Purdue University

Pronotum (Fig. 90) quadrate, slightly narrowed posteriorly, not much broader than long, distinctly but not broadly marginate; moderately coarsely, not closely punctate; disc subconvex, more sparsely punctate; side margins distinctly crenulate, slightly reflexed, almost parallel, convergent somewhat posteriorly. Apical angles strongly produced, strongly angulate interiorly, narrowly rounded apically, not denticulate, marginal bead at apex not produced; basal angles prominent, pointed, obtuse, not or scarcely denticulate, not or scarcely sinuate; basal margin moderately to strongly arcuate, bead entire. Prosternum and metasternum finely, sparsely punctate.

Elytra subconvex, elongate, somewhat broadly marginate; sides slightly rounded; humeral angles narrowly rounded, produced, not denticulate; strial punctures distinctly impressed, coarsely punctate, evident to lateral margins; intervals convex, rugose, with punctures relatively coarse, sparse, scarcely evident.

Abdominal sterna of both sexes moderately finely, not closely punctate.

Remarks. The type specimen of foveatus Blatchley was examined by T. L. Erwin. Schaeffer (1918) placed the name foveatus in synonymy with soror. The type, a female, 11 mm. long, does not at all resemble soror, but instead, semicylindricus, and shares the distinctive features of the latter including the crenulate lateral margins of the pronotum, the prominent apical angles, and the elytral

punctation. The size is outside the range observed in other specimens but this is an extremely variable character in this group. The basal margin of the pronotum is strongly arcuate but within the limits observed in other specimens. T. foveatus is thus considered here as synonymous with semicylindricus.

A female specimen of semicylindricus at ANSP is labelled as follows: "Ga; LECTOTYPE 3256 (red label); Horn Coll. H 3877; T. semicylindrica H." Horn (1862) following his description of semicylindrica states "Two specimens, Georgia; Dr. LeConte." Horn's description of each new species was followed with a statement of number of specimens, locality, and usually with "Dr. LeConte." All of this material is in the LeConte collection (MCZ). Horn's notation "Dr. LeConte," was, no doubt, in reference to that author's collection and in his introduction he stated that "the species here described have been derived in great part from the collection of Dr. LeConte, with whom all the typical specimens will be found, . . ." It can therefore be concluded that the ANSP specimen is not part of the type series.

The first specimen of the type series of semicylindricus in the LeConte collection is a female with exposed genitalia; both specimens have the pronotal side margins distinctly crenulate.

Variation. There is some variation in the amount of crenulation on the lateral margins of the pronotum

although always evident, the hind margins of the pronotum from moderately to strongly arcuate, length 4.5 - 11.0 mm., colour from ferrugineous to piceous. This variation appears within populations.

Collecting notes. Collected from steiner trap 3 Oct. (Manatee Co., Florida), house 8 July (South Carolina) and ultraviolet trap 2 July (Grayburg, Texas).

Distribution. Coastal states of the United States from eastern Texas to Virginia. Specimens were also seen from Colima, Sinaloa, and Tamaulipas, Mexico. The type of helophorus Sharp is recorded from Jalapa, Mexico. One hundred and ten specimens were examined from the following localities:

UNITED STATES

ALABAMA: Dallas Co., Burnsville (UKL); Mobile Co., Mount Vernon (CU).

FLORIDA: Alachua Co., Gainesville (CU, FDA); Dade Co. (OSU), Biscayne (ANSP, USNM); Duval Co., Jacksonville (MCZ); Highlands Co. (CU), Archbold B. Station, Lake Placid (CU), Lake Placid (UKL); Hillsborough Co., Plant City (UKL); Levy Co., Sea Horse Key (FDA); Manatee Co. (FDA); Marion Co., Ocala N.F. (OSU); Monroe Co., Key Largo (CAS, OSU); Palm Beach Co., Belle Glade (CU), South Bay, Lake Okeechobee (AMNH); Pinellas Co., Dunedin (PU); Putnam Co., Crescent City (AMNH, CU); Volusia Co., Enterprise (MCZ).

GEORGIA: Chatham Co., Tybee Island (AMNH, CAS, CU);

Glynn Co., Saint Simon Island (MCZ); Okefenokee Swamp (UKL).

LOUISIANA: Saint Tammany Co., Covington (CU).

NORTH CAROLINA: Currituck Co., Knotts Island (MCZ).

SOUTH CAROLINA: Charleston Co., McClellanville (AMNH).

TEXAS: Cameron Co., Brownsville (CU, MCZ, OSU), Esperanza Ranch, Brownsville (CAS, MCZ); Hardin Co., Grayburg (FDA).

VIRGINIA: Deep Creek (MCZ).

Material was also examined from the following:

MEXICO - COLIMA: Armeria (1 AMNH); SINALOA: Mazatlan (1 AMNH); TAMAULIPAS: Antiguo Morelos (1 UASM); 14 mi. W. Antiguo Morelos (DJL).

Tenebroides floridanus Schaeffer

Tenebroides floridanus Schaeffer, 1918:199. HOLOTYPE: USNM type No. 70384, male, labelled as follows: "Key West, Fla., 22. III. 12; E A Schwarz Collector; Tenebroides floridanus Schffr. type"; USNM. PARATYPES: six specimens labelled "syntype," collected at Key West and Enterprise, Florida; CU. TYPE LOCALITY: "Key West, Florida." Schaeffer, 1920:194.

Individuals of this species can readily be separated from others of the genus. They are not similar to any of the western forms and could only be confused with the

eastern laticollis and bimaculatus. They can be distinguished from bimaculatus by the maculation on the elytron of the latter; from laticollis by the absence in males of pits on the submentum and in both sexes by the broad, arcuate, not explanate or reflexed sides of the pronotum, widest at apical half instead of apical third; the sensory areas of the antennal club are not expanded and do not occupy more than one-third the area of each article.

Description. Body moderately depressed, broad. Colour castaneous or piceous. Moderately shiny, except pronotum somewhat dull. Size intermediate, length 3.8 - 6.8 mm.

Head flat, punctures intermediate, not close; front very shallowly, vaguely, triangularly depressed and declivous anteriorly. Antenna with eighth article as seventh, much smaller than ninth, subcylindrical; club not prominent, articles globose; funiculus relatively slender (Fig. 20). Eyes prominent, large.

Pronotum (Fig. 91) subconvex, much broader than long, moderately coarsely, closely punctate; sides arcuate, moderately rounded, slightly sinuate before basal angles, narrowly marginate, moderately convergent basally. Apical angles acute, broad, moderately produced, marginal bead at apex not produced; basal angles small, acute, denticulate; base broad, margin slightly arcuate, bead entire. Prosternum finely, not closely, punctate; metasternum

more coarsely but sparsely, shallowly punctate.

Elytra subconvex, broad; sides moderately rounded, narrowly marginate; humeral angles obtuse, not produced; strial punctures moderately coarse, except towards apex fine, evident to lateral margins; intervals flat, sparsely rugulose, biseriately, finely punctate.

Abdominal sterna of female moderately coarsely, not closely, punctate, except first visible sternum sparsely punctate; sterna of male as female, except first visible sternum finely, densely punctate, anterolaterally impunctate and laterobasally sparsely punctate.

Variation. Significant variation was noted in colour and size.

Collecting notes. Collected from sticky traps on loblolly pine in April (Elizabeth, Louisiana), under bark of dead avocado stump (Dade Co., Florida) and black light trap (Stock Island, Florida).

Distribution. Florida, Louisiana. This species has been recorded from Mexico and Cuba; specimens were seen from Bahamas, Brazil, Cuba, Guadeloupe, Haiti, Jamaica, Mexico, Puerto Rico, and Surinam. Thirty-six specimens were examined from the following localities:

UNITED STATES

FLORIDA: Charlotte Co., Punta Gorda (INHS); Dade Co., Subtropical Experimental Station (FDA); Highlands Co.,

Highlands Hammock State Park (CU); Lee Co., Captiva Is. (USNM); Monroe Co., Key Largo (FDA), Key West (CU, USNM), Stock Island (FDA); Palm Beach Co., Lake Worth (AMNH); Volusia Co., Enterprise (CU); Biscayne (USNM); Biscayne Bay (AMNH); Capron (MCZ, USNM); Paradise Key (CAS).
LOUISIANA: Allen Co., Elizabeth (LFS).

Material was also examined from the following:

BAHAMAS: - S. Bimini Isl. (102 AMNH).
BRAZIL - Vicosa Minas Gerais(1 CAS).
CUBA - Guanahacabibes Pen. P.R. (3 AMNH), Soledad, Cienfuegos (2 AMNH).
GUADELOUPE - Antilles, Les Saintes Terre de Haut (1 AMNH), Gourbeyse (1 AMNH).
HAITI - Manville (3 AMNH).
JAMAICA - Cinchona (2 AMNH).
MEXICO - CHIAPAS: 11.6 mi. N. Ocozocuautla, 3200 ft., 10 - 13 June (black light) (6 UASM).
PUERTO RICO - Aibonito (1 AMNH), Calderon Mt. (1 AMNH), Cayey (1 AMNH), Ft. Cangreios (1 AMNH), Puerca Bay (2 AMNH).
SURINAM - Moengo, Boen Cottica R. (1 CU).

Tenebroides sonorensis Sharp

Tenebroides sonorensis Sharp, 1891:418. LECTOTYPE (here designated): first specimen, labelled as follows: "Tenebroides sonorensis ♂ Type D.S. N. Sonora. Morrison; type (BM circular type label); N. Sonora,

Mexico. Morrison; 7; Sharp Coll. 1905-313; B.C.A. Col. II. 1. Tenebroides sonorensis, Sharp; nov. sp. voisin de subplana & de patruelis"; BM. PARALECTOTYPES: second specimen, labelled as follows: "Tenebroides sonorensis ♀ Type D.S. N. Sonora. Morrison; type; sp. figured; N. Sonora, Mexico. Morrison; B.C.A. Col. II. 1. Tenebroides sonorensis, Sharp"; third specimen, labelled as follows: "N. Sonora, Mexico. Morrison; B.C.A., Col. II (1). Tenebroided sonorensis, D.S."; BM. TYPE LOCALITY: "Mexico, Northern Sonora." Léveillé, 1900:14; Schaeffer, 1918:198; 1920:194.

Tenebrioides debilis Fall, 1910:128. HOLOTYPE: male, labelled as follows: "El Paso 11-23-89; debilis TYPE; M.C.Z. Type 24478 (red label)"; MCZ. PARATYPE: labelled as follows: "paratype; Tex.; debilis; BROOKLYN MUSEUM coll. 1929; Paratype 42608 U.S.N.M.; Tenebroides sonorensis Sharp"; USNM. TYPE LOCALITY: "El Paso, Texas."

Specimens of this species can be readily distinguished from specimens of the western tenuistriatus and rugosipennis, and less readily from those of occidentalis and the western corticalis. T. sonorensis is the only species occurring west of the Great Plains that has a distinctly, broadly interrupted basal marginal pronotal bead. Specimens could be confused with occidentalis on the basis of this character where, in the latter, the

bead is narrowly interrupted in some specimens, but never as distinctly and broadly interrupted as in sonorensis. Individuals of sonorensis may also be distinguished from occidentalis by the pronotum with narrowly marginate sides much more strongly rounded and convergent posteriorly. The less convex pronotum with broadly interrupted basal marginal bead separate individuals from corticalis. All specimens of corticalis have a complete marginal bead. Individuals may be readily separated from rugosipennis by the lack of strongly rugose elytra; also, usually, by the large size. Specimens of tenuistriatus are black, the pronotum is quadrate, with arcuate, strongly, widely marginate sides. T. sonorensis is much lighter in colour and the narrowly marginate sides of the pronotum converge strongly to a narrow base.

Description. Body somewhat depressed. Colour castaneous to light piceous. Size intermediate, length 4.2 - 9.2 mm.

Head somewhat depressed, anteriorly indistinctly declivous; coarsely, closely punctate. Antenna slender, with eighth article as seventh, much smaller than ninth, subcylindrical; club not prominent, with lobes small, subcylindrical, not at all incrassate.

Pronotum (Fig. 92) subtransverse, broader than long, distinctly, somewhat strongly, but narrowly marginate; sides broadly rounded, widest at apical third, somewhat strongly convergent posteriorly, slightly sinuate before

basal angles; base narrow. Apical angles acute, broadly rounded, exteriorly pointed, marginal bead at apex produced; basal angles obtuse, almost right, denticulate; basal margin at sides slightly oblique or straight, bead at middle distinctly, broadly interrupted. Prosternum and metasternum moderately finely, sparsely punctate.

Elytra moderately depressed; sides moderately rounded, somewhat broadly marginate. Humeral angles obtuse, not produced, scarcely pointed; striae impressed, at lateral margins incomplete, not or scarcely impressed; intervals convex, somewhat rugulose, distinctly, biseriately punctate.

Abdominal sterna of female with medium punctures, not closely arranged, except first visible sternum at lateroapical corners impuncate; sterna of male at apical half finely, densely punctate, at basal half medium punctures, not closely arranged, as female; at middle medium and small punctures intermixed.

Remarks. The three syntypes of Sharp's sonorensis were examined by R. B. Madge (BM) and agree in all essential respects with the specimens compared. The specimens in Fall's type series of sonorensis are similar to the latter.

Variation. Variation is not significant except in colour and size.

Collecting notes. Collected with ultraviolet light

5, 16 July (Chiricahua Mts., Arizona), Aug. (Oak Creek Canyon and Pena Blanca, Arizona).

Distribution. Southwestern United States; California, Utah, Arizona, western Texas. One specimen was seen from Chihuahua, Mexico; sonorensis syntypes from Northern Sonora, Mexico. One hundred and forty-nine specimens were examined from the following localities:

UNITED STATES

ARIZONA: Apache Co., White Mts. (CU); Cochise Co., Cave Creek Canyon, Chiricahua Mts. (WHT), Chiricahua (OSU), Chiricahua Mts. (CAS), Huachuca Mts., 9000 ft. (OSU), Huachuca Mts. (OSU), South West Research Station, 5 mi. W. Portal, 5400 ft. (AMNH, CAS), Rucker Canyon, Chiricahua Mts. (MCZ); Coconino Co., Oak Creek Canyon (UKL), Oak Creek Canyon, 5000 - 6000 ft. (UASM); Gila Co., Globe (CAS, CU); Graham Co., Fort Grant (CAS), Galiuro Mts. (CU), Graham Mts. (CAS); Maricopa Co., Phoenix (CAS, CU, MCZ, OSU); Pima Co., Arivaca (UKL), Molino Basin (CAS); Santa Cruz Co., Madera Canyon, Santa Rita Mts. (CU), Madera Canyon, Santa Rita Mts., 4880 ft., 5000 - 5800 ft. (UASM), Miller Canyon (UKL), Nogales (CAS, CNHM), Patagonia (CAS), Pena Blanca, 4000 ft. (UASM), Ruby (OSU), Yank's Spring, Sycamore Canyon (CAS); Yavapai Co., Bumble Bee (CAS); Yuma Co., Fort Yuma (CU), Yuma (OSU).

CALIFORNIA: Riverside Co., Thousand Palms (CNC).

TEXAS: El Paso Co., El Paso (MCZ, USNM).

UTAH: Washington Co., St. George (AMNH, CU).

Material was also examined from the following:

MEXICO- CHIHUAHUA: Catarinas, 5800 ft. (1 AMNH).

Tenebroides tenuistriatus Fall

Tenebrioides tenuistriatus Fall, 1910:128. LECTOTYPE (here designated): female, labelled as follows: "Las Vegas Hot Spgs. 11-9-89; castanea H(T); TYPE tenuistriata; M.C.Z. TYPE 24480 (red label)"; MCZ. PARALECTOTYPE: male, labelled as follows:"Co - Type ♂; Las Vegas Hot Spgs. 11-4-89; H. C. Fall collector; tenuistriatus; Brooklyn Museum Coll. 1929; Cotype No. 42609 USNM (red label); Tenebroides tenuistriatus Fall"; USNM. TYPE LOCALITY: "Las Vegas Hot Springs, New Mexico."

Tenebroides tenuistriatus; Schaeffer, 1920:194.

The combination of black colour, pronotum with arcuate, widely marginate sides, truncate hind margins, elytra without lateral striae, median striae scarcely impressed and intervals smooth and flat readily separates specimens of this species from others in the genus.

Description. Body moderately depressed. Colour piceous, ventral surface black or piceous to castaneous. Moderately shiny. Size intermediate, length 5.6 - 8.9 mm.

Head convex, moderately coarsely, not closely punctate; front flat, somewhat declivous anteriorly;

vertex at middle with small, indistinct, round impression. Antenna moderately fine, with eighth article as articles 1-7, much smaller than ninth, subcylindrical.

Pronotum (Fig. 93) subquadrate, broader than long, distinctly, widely marginate, moderately finely, closely punctate; sides arcuate, widest at middle, anterior two-thirds evenly rounded, distinctly but not strongly sinuate, basally strongly widely marginate. Apical angles acute, produced, pointed, marginal bead at apex produced; basal angles right, produced laterally, denticulate; basal margin straight, bead at middle not interrupted. Sternum moderately finely, not closely punctate.

Elytra moderately depressed, strongly, widely marginate; sides moderately rounded; humeral angles prominent, almost right, produced, denticulate; strial punctures very fine, scarcely impressed; striae at lateral margins absent; intervals flat, smooth, biseriately, distinctly, finely punctate.

Abdominal sterna of male laterally, at apical third, densely, finely punctate, basal two-thirds more sparsely punctate; all sterna of female moderately finely, not closely punctate, except first visible sternum anterolaterally impunctate.

Collecting notes. Collected from Pinus ponderosa 26 Oct. (Santa Rita Mts., Arizona, at 7000 ft.), (San Isabel National Forest, Colorado).

Distribution. Colorado, New Mexico, Arizona.

Specimens were also seen from Chihuahua and Durango, Mexico. Forty-five specimens were examined from the following localities:

UNITED STATES

ARIZONA: Cochise Co., Rustler Camp, Chiricahua Mts., 8000 ft. (AMNH), Rustler Park, Chiricahua Mts., 8300 ft. (CNHM), Chiricahua Mts. (OSU), Huachuca Mts., 9000 ft. (CU, OSU); Coconino Co., Flagstaff (CU), Tusayan, 7200 ft. (CU), Williams (OSU); Graham Co., Graham Mts. (CAS); Maricopa Co., Phoenix (USNM); Pima Co., Santa Catalina Mts. (CAS, CU), Tucson, 2400 ft. (AMNH); Santa Rita Mts., 7000 ft. (CAS).

COLORADO: San Isabel National Forest (CU).

NEW MEXICO: San Miguel Co., Las Vegas (CU), Las Vegas Hot Springs (MCZ, USNM).

Material was also examined from the following:

MEXICO - CHIHUAHUA: Gaborachic, 8000 ft. (3 AMNH); DURANGO: 6 mi. NE. El Salto, Durango Dist. (1 AMNH).

Tenebroides corticalis (Melsheimer)

Trogosita corticalis Dejean, 1836:339 (nomen nudum).

"TYPE LOCALITY": "Amer. bor."

Trogosita corticalis Melsheimer, 1844:109. TYPE: not found.

TYPE LOCALITY: "Pennsylvania." LeConte, 1861b:344; 1863b:31; Horn, 1862:84.

Tenebrioides corticalis; Crotch, 1863:47; Ulke, 1902:19;

Fall, 1910:128.

Tenebroides corticalis; Léveillé, 1888b:437; 1900:11; Schaeffer, 1920:194.

Trogosita conformis Dejean, 1836:339 (nomen nudum). "TYPE LOCALITY": "Amer. bor."

Trogosita limbalis Melsheimer, 1844:109. LECTOTYPE (here designated): first specimen, male, labelled as follows: "(pink disc); Type 114 (white and red label); T. limbalis Mels."; LeConte collection, MCZ. PARALECTOTYPE: second specimen, labelled as follows: "(pink disc); Type 114 (white and red label); limbalis"; LeConte collection, MCZ. TYPE LOCALITY: "Pennsylvania." Horn, 1862:84; LeConte, 1863b:31.

Tenebrioides corticalis var. limbalis; Crotch, 1873:47.

Tenebroides limbalis; Léveillé, 1888b:438; 1900:12; Schaeffer, 1920:194.

Trogosita dubia Melsheimer, 1844:110. LECTOTYPE (here designated): male, labelled as follows: "(pink disc); Type 111 (white and red label); T. dubia Mels"; LeConte collection, MCZ. TYPE LOCALITY: "Pennsylvania." Horn, 1862:85; LeConte, 1863b:31.

Tenebrioides corticalis var. dubia; Crotch, 1873:47.

Tenebroides dubius; Léveillé, 1888b:437; 1900:11.

Trogosita intermedia Horn, 1862:84. LECTOTYPE (here designated): first specimen, male, labelled as follows: "(yellow disc); Type 112 (white and red

label); T. intermedia Horn."; LeConte collection, MCZ. PARALECTOTYPE: second specimen, female, labelled as follows: "(yellow disc); Type 112 (white and red label); intermedia"; LeConte collection, MCZ. TYPE LOCALITY: "Kansas---San Jose." LeConte, 1863b:31.

Tenebrioides corticalis var. intermedia; Crotch, 1873:47.
Tenebroides intermedius; Léveillé, 1888b:438; 1900:12.
Tenebroides corticalis intermedius; Schaeffer, 1920:194.

The laterodorsal profile and convexity of the pronotum of corticalis is unique and individuals are easily separated from other species once the character is understood. Other sources of separation are, for the most part, dependent on the presence or absence of combinations of characters in relation to the other species of somewhat similar over-all appearance. The antennae of corticalis are always relatively delicate, slender, and usually relatively short (especially the eastern specimens).

This species is easily separated from rugosipennis and tenuistriatus in the west and all species except nanus, floridanus, and possibly marginatus in the east by the unique characters possessed by each of those species (see diagnostic characters). Specimens are not easily distinguished from occidentalis and sonorensis in the west. They are generally smaller than occidentalis, the lateral margins of the pronotum are much less straight and distinctly less marginate, and usually the form is more convex.

Individuals may be separated from sonorensis by the complete basal margin of the pronotum (distinctly, broadly interrupted in sonorensis); the pronotum is also more convex and the sides converge much less strongly to a broader base. The eastern species nanus can be separated from corticalis by the more quadrate pronotum, with apical third scarcely rounded instead of broadly rounded, lighter colour, more depressed form and the basal marginal bead of the pronotum at middle distinctly and broadly interrupted. T. marginatus can be distinguished by the rufous margins of the pronotum and elytra and the interrupted basal margin of the pronotum, as well as the more depressed form. T. floridanus is always lighter in colour, the pronotum is always very broad relative to the length and the sides are arcuate with rather wide edges.

Description. Body subconvex, broad. Colour black to piceous. Size intermediate, length 4.3 - 9.7 mm.

Head subconvex, coarsely, not closely to densely punctate; front not or scarcely impressed; vertex with or without vague, shallow, median impression. Antenna short, slender, club not prominent, eighth article much smaller than ninth, subcylindrical (Figs. 21, 27).

Pronotum (Figs 94-96) variable, subtransverse (usually) to subcordate, broader than long, moderately coarsely, not closely to densely punctate; disc convex (usually) to narrowly flat; sides narrowly marginate, slightly (usually) to strongly rounded, widest at apical third, convergent

moderately to very strongly basally, sinuate or not before basal angles. Apical angles acute, moderately (usually) to slightly produced, lateral margins narrowly (usually) to broadly rounded, marginal bead at apex not or slightly produced; basal angles obtuse, denticulate or not, angulate (usually) to broadly rounded and almost obliterated, marginal bead not produced; base broad (usually) to narrow, marginal bead at middle not or scarcely, narrowly interrupted. Prosternum moderately coarsely, not closely punctate; metasternum moderately coarsely, sparsely punctate.

Elytra subconvex; sides moderately rounded, narrowly marginate; humeral angles obtuse, narrowly rounded to angulate, not or scarcely produced; striae impressed, more or less distinctly evident to lateral margins; intervals distinctly, finely, biseriately punctate.

Abdominal sterna of female with medium punctures, well impressed, closely arranged, except first visible sternum at lateroapical corners impunctate; sterna of male at middle with medium punctures, well impressed, closely arranged, as in female, anterolaterally with fine, very dense punctures, towards middle with small and medium punctures intermixed.

Remarks. One specimen at ANSP is labelled as follows: "LECTOTYPE 3255 (red label); Horn Coll. 3838a; v intermedia H." The authenticity of this specimen as part of the type series (two from Kansas, one from San Jose) is questionable and for the same reasons as are the "types"

of semicylindricus and nitidus, also at ANSP (see Remarks under semicylindricus and mauritanicus). The specimens on which Horn (1862) based his new species of "Trogosita" are in the LeConte collection, MCZ. In addition, Horn did not describe the species as a variety, but according to his determinations (of which several were seen) did later consider them as such. The very broad range of habitats of this species has, no doubt, contributed to its predominance in North America. Individuals occur across the north from coast to coast, probably because they are not restricted to pine but are also found readily under the bark of poplar, spruce, and so on. East-west populations are probably not reproductively isolated whereas populations of other species of the genus in North America are restricted, probably by lack of adaptability to diversity in habitat, and are thus more or less confined to the ranges of their limited numbers of host plant species and, but more likely secondarily, to the host fauna which these contain.

Variation. Individuals vary in punctation, pronotal shape and degree of convexity, antennal length, and degree of impression of elytral striae. Individuals west of the Great Plains are less coarsely, more densely, punctate than eastern forms, the antennae are sometimes somewhat longer, the pronotum is more quadrate and the sides less sinuate; the basal margin of the elytron is straighter, and the elytral striae are less impressed, but these differences are within the over-all variation of the group and there

are continuous lines of intermediates. The sides of the pronotum are more strongly rounded, particularly apically, in a few eastern individuals and the apical angles are internally angulate (Fig. 95). These specimens are less convex, particularly regarding the pronotum, with the disc broadly flattened; the basal angles are more strongly obtuse. Continuous lines of intermediates lead to the other extreme with the pronotal margins much straighter, for example, the type of dubia Melsheimer and of limbalis Melsheimer (the latter is also teneral). Horn considered individuals with the pronotum somewhat broader and less convex as a distinct species, namely intermedia, but later determined these forms as a variety.

Collecting notes. Collected from locust in June (Black Mountain, North Carolina); under Quercus sp. April, July, Sept. (Illinois), 5 June (New York), 23 April (Oklahoma), (Kerrville, Texas); apple 10 May (New York), 5 Sept. (New Jersey); larvae and adult under bark of spruce 22 May, adults from balsam poplar 10 Sept., poplar 17 May (Alberta), elm Aug., Sept. (Illinois); found in "hibernation" under fallen log and leaves of elm 1 Dec. (Urbana, Illinois); collected from dead maple 8 July (Willow Springs, Illinois); under bark of Salix niger 16 April (Houston, Texas); under bark of sycamore 7 Oct. (Olive Branch, Illinois); Pinus ponderosa (Larkspur, Colorado); loblolly pine with Dendroctonus frontalis (Hardin Co., Texas); sticky traps on loblolly pine 19 March (Elizabeth, Louisiana); outer bark

of loblolly pine at 1 ft. with Dendroctonus frontalis Zimm. and Dendroctonus terebrans (O.) Sept. (Elizabeth, Louisiana); about stumps in overflow land (Illinois); shelf fungus Oct. (College Station, Texas); fungus 22 May (British Columbia) 15 April (Alberta); flowering plants 21 Sept., stored grain 5 Feb., at sugar April, from Rabina inermis 4 Oct., collected by sweeping 4 July (Illinois); bred in Carya 25 July, collected from moss roots 26 March, ocean wash 22 May (Massachusetts).

Distribution. Generally distributed throughout the United States; north to Alaska, Yukon, Northwest Territories; the only species of the genus that is distributed across the north coast to coast. Specimens were also seen from Guatemala, southern Mexico, and Sonora in northwestern Mexico. One thousand five hundred and forty-six specimens were examined from America north of Mexico and the following from Guatemala and Mexico:

GUATEMALA - Antigua (8 AMNH).
MEXICO - CHIAPAS: 33.7 mi. N. Anixth, 6000 ft. (1 UASM); COLIMA: SE. slope Mt. Colima (10 CAS); JALISCO: 7 mi. S. Mazamitla (pine forest) (1 CAS), N. Tecalitlan (1 AMNH), 21.4 mi. S. Tecalitlan, 6650 ft., 4 Aug. (oak forest) (1 UASM); MEXICO: Chapingo (1 CU), 15 mi. S. El Guarda (3 CAS); MICHOACÁN: 15 mi. S. Carapan (1 CAS); MORELOS: 5.4 mi. E. Cuernavaca, 4600 ft., 29 June (pedregal, black light) (1 UASM), 7 mi. N. Cuernavaca, 1800 ft. (1 UKL);

NUEVO LÉON, 20 mi. W. Linares (4 CAS); QUERETARO: 17.8 mi. E. Landa de Matamoros, 5300 ft. (1 UASM); SAN LUIS POTOSÍ: Palitla, 5 mi. N. Tamazunchnle (1 CAS); SONORA: Minas Nuevas (1 AMNH); VERACRUZ: Cordoba (2 CAS), Jalapa (1 AMNH), Orizaba (2 CAS); ZACATECAS, Fresnille, 7000 ft. (1 AMNH).

Tenebroides occidentalis Fall

Tenebrioides occidentalis Fall, 1910:128. HOLOTYPE: female, labelled as follows: "Cloudcroft, VI.19.02, NM; occidentalis TYPE; M.C.Z. TYPE 24479 (red label)"; MCZ. TYPE LOCALITY: "Cloudcroft--New Mexico."

Tenebroides occidentalis; Schaeffer, 1920:194.

Individuals of this species can be distinguished from others west of the Great Plains by the following combination of characters: pronotum transverse, with sides widely marginate, with basal marginal bead usually complete, or narrowly interrupted; elytra with sides widely marginate, striae impressed, intervals convex.

T. tenuistriatus is the only other western species with the pronotum and elytra widely marginate, but the sides of the pronotum are arcuate, widest at the middle, the elytral intervals are flat and smooth, and the colour is black. T. sonorensis can easily be separated from occidentalis by the pronotum with basal marginal bead broadly interrupted, the sides narrowly marginate, broadly

rounded, and converging strongly basally. The rugose elytra and small size are diagnostic for rugosipennis.

T. corticalis is not as easily separated from occidentalis. The antennae of corticalis are generally shorter, always less robust, the pronotum is more convex, with the sides more rounded; the sides of the pronotum and elytra are distinctly less marginate.

Description. Body subconvex, broad. Colour castaneous to piceous. Shiny. Size large, length 6.4 - 12.3 mm.

Head convex, coarsely, not closely punctate; front at middle shallowly, broadly, longitudinally depressed; vertex without median impression. Antenna elongate, robust, club not prominent, eighth article much smaller than ninth, subcylindrical (Fig. 29).

Pronotum (Fig. 97) subtransverse, subconvex, broader than long, moderately coarsely, not densely punctate; disc narrowly flat; sides moderately broadly marginate, slightly rounded, widest at apical third, converging gradually basally, vaguely sinuate before basal angles. Apical angles acute, produced, pointed, marginal bead at apex produced; basal angles obtuse, minutely denticulate, marginal bead not produced; base broad, marginal bead entire or vaguely, narrowly, interrupted at middle, basal margin at sides slightly oblique, slightly rounded medially. Prosternum moderately coarsely, but sparsely punctate; metasternum coarsely, very sparsely punctate.

Elytra subconvex; sides slightly rounded, broadly distinctly marginate, somewhat reflexed; basal angles at margin acute, produced; striae impressed, moderately coarsely punctate, not or scarcely evident near lateral margins except last stria near apex; intervals convex, distinctly, moderately finely,biseriately punctate, slightly rugulose.

Abdominal sterna of female moderately coarsely, not closely punctate; of male moderately finely, very densely punctate.

Variation. There is very little variation in shape of the pronotum; the sides of some individuals are slightly more rounded, more convex. Evidence of elytral striae at the side margins varies. Punctation varies but individuals are always relatively coarsely punctate, the punctures closer in some individuals. Variation in size is considerable.

Collecting notes. Collected under bark of Pinus ponderosa in April, May, July, Nov. (British Columbia, Arizona, California, Colorado, Utah) from P. contorta 7 May (Vernon, British Columbia), P. jeffreyi 7 July (California), Pinus sp. March, April, June (New Mexico, Oregon, South Dakota), Quercus sp. 28 April (Jolon, Monterey Co., California), from Picea parryarra 24 June (Florissant, Colorado), Polyporous vesicolor 4 Aug. (nr. Portal, Cochise Co., Arizona).

Distribution. Western; British Columbia to California, east to South Dakota, Nebraska, Colorado, New Mexico. Specimens were also seen from Chihuahua and Durango, Mexico. Six hundred and six specimens were examined from the following localities:

CANADA

BRITISH COLUMBIA: Creston (CAS, CNC, UW); Monte Creek (CNC); 5 mi. N. Oliver (CNC); 7 mi. N. Oliver (CNC); Oliver (CAS); Peachland (CNC, MCZ); Richter Pass, Osoyoos (CNC); Vernon (CAS, UW).

UNITED STATES

ARIZONA: Apache Co., White Mts. (CAS); Cochise Co., Cave Creek, Chiricahua Mts. (CAS), Chiricahua Mts. (CAS, MCZ, OSU), Huachuca Mts. (OSU), Painted Canyon Ranch (AMNH), 5 mi. SSW. Portal (MCZ), S.W.R.S. (FDA), 5 mi. W. Portal, 5400 ft. (AMNH); Coconino Co. (CNHM), Flagstaff (AMNH, CAS, CU, OSU), North Rim Grand Canyon, 20 mi. SW. Heber, 7800 ft. (AMNH), Grand Canyon (CAS), Jacob Lake (AMNH), Lake Mary (AMNH), Mormon Lake (CAS), Manzanita Camp, Oak Creek Canyon (AMNH),Oak Creek Canyon (CAS, UKL), Tusayan, 7800 ft. (AMNH), Williams (CU, MCZ), Williams, 6750 ft. (CAS, OSU); Gila Co., Globe (CAS, CU), Pine (DJL); Graham Co., Graham Mts. (CAS), Mount Graham (CAS), Shannon Camp, Graham Mts., 9600 ft. (CNHM); Jeff Davis Co. (OSU); Navajo Co., Navajo Mt. (CAS); Pima Co., Arivaca (CAS), Browns Canyon, Baboquivari Mts. (AMNH), Santa Catalina, Santa Catalina Mts. (CAS); Santa Cruz Co.,

Nogales (CAS), Patagonia (AMNH); Carrizo Mts. (OSU); Hualapai (OSU).

CALIFORNIA: Amador Co., River Springs (WHT); Butte Co., Oroville (CAS); Calaveras Co., Mokelumne Hill (CAS), Vallecito (CAS); Fresno Co., Dalton Creek (CU); Imperial Co. (MCZ); Keen Co., Greenhorn Mt. (CAS); Kern Co. (AMNH, CAS), Cuddy Valley (CAS); Lassen Co., Duck Lake (CAS), Facht (CAS), Pine Creek (CAS); Los Angeles Co., Pasadena (MCZ), Tanbark Flat (CAS); Madera Co., Bass Lake (CAS), Chiquito Creek, 4100 ft. (CU), North Fork (CU); Mariposa Co., Bear Valley (CAS), Yosemite (CAS); Modoc Co., Hackamore (AMNH); Mono Co., Rock Creek (CAS); Monterey Co., Jolon, 3 mi. up valley (CAS), Tassajara (CAS), Tassajara Hot Springs (CAS); Napa Co., Child's Valley (CAS); Plumas Co., Mohawk (CAS); Riverside Co., Bluff Lake (CAS), Dark Valley, San Jacinto Mts. (CAS), Fern Basin, San Jacinto Mts. (CAS), Herkey Creek, San Jacinto Mts. (CAS), Idyllwild (CAS), Keen Camp (OSU), Santa Rosa Mt. (CAS, OSU),Wenass Valley (MCZ); San Benito Co., Panoche Pass (CAS); San Bernardino Co., Deep Creek (CAS); San Diego Co., Julian (CAS, MCZ), Laguna (CAS, MCZ), Laguna Mts. (CU, MCZ), Mount Laguna (MCZ), 1.5 mi. W. Mount Laguna, Pine Valley (CAS), San Diego (CAS); Santa Barbara Co., Santa Barbara (MCZ); Santa Clara Co., Arroyo Mocho, Mount Hamilton (WHT), Gilroy Hot Springs (CAS); Shasta Co. (CAS, CNHM), Burney Falls (CAS); Siskiyou Co. (CAS), Soda Springs (CAS); Sonoma Co. (MCZ); Trinity Co.,

Carrville (CAS), Hayfork (CU); Tulare Co. (MCZ); Ventura Co., Wheeler Springs (AMNH), Bear Lake (CAS); Sierra Nevada (AMNH).

COLORADO: Boulder Co., Boulder (MCZ); Douglas Co. (CAS, MCZ); El Paso Co. (MCZ), Manitou (CAS); Garfield Co. (CNHM); Lake Co., Leadville, 10,000 - 11,000 ft. (ANSP); La Plata Co., Durango (MCZ), Jones Ranch, Durango (CAS), Vallecito (CAS); Larimer Co., Estes Park (CAS); Routt Co., Steamboat Springs, 6800 ft. (CAS); Saguache Co., Cochetopa Pass (MCZ); Teller Co., Florissant (CU).

IDAHO: Kootenai Co., Hayden Lake, 2100 ft. (CAS); Latah Co., Moscow (UW), Moscow Mt., 2600 ft. (UW).

MONTANA: Lewis and Clark Co., Helena (CU).

NEBRASKA: Sioux Co., Glen (AMNH).

NEVADA: Clark Co., Charleston Mts. (AMNH); Elko Co., Charleston Park (CAS), Kyle Canyon, Charleston Mts. (CAS), Lees Canyon, Charleston Mts. (AMNH); Washoe Co., Reno (CAS).

NEW MEXICO: Hidalgo Co., Las Vegas (INHS), 8 mi. SE. Rodeo (AMNH); Lincoln Co., Capitan (CU); Otero Co., Cloudcroft (CAS, MCZ), Cloudcroft, 9000 ft. (CU), James Canyon (CU); Sandoval Co., Jemez (CU), Jemez Mts. (CAS), Jemez Springs, 8500 ft. (MCZ); San Miguel Co., Las Vegas Hot Springs (MCZ), near Las Vegas Hot Springs, 7000 ft. (CU), Las Vegas (CU), Pecos (MCZ); Valencia Co., Laguna (MCZ).

OREGON: Deschutes Co., Sisters (CNHM); Grant Co., Silvies Valley (CU); Jackson Co., Gold Hill (UW);

Josephine Co., Kerby (CNC); Klamath Co., 11 mi. NE. Bly (UW), Bly Mt. (UW), Upper Klamath Marsh (UW), Olene (UW); Umatilla Co., Meacham (UW); Wasco Co., Tygh Valley (UW); Ochoco Nat. For. (UW).

SOUTH DAKOTA: Custer Co., Custer (CAS), Flynn Creek, 8 mi. N. Pringle, 5800 ft. (CNC); Pennington Co., Hill City (CAS), Rapid Creek, 1 mi. W. Hisega (CNHM); Black Hills (AMNH, CU); Mount Rushmore (CAS).

UTAH: Duchesne Co., Duchesne (AMNH, OSU); Garfield Co., Bryce Canyon, Panguitch (CU); Grand Co., Moab (CU); Uintah Co., Vernal (UKL); Utah Co. (OSU), Provo (UKL), Provo, 4000 ft. (CAS); Washington Co., Saint George (AMNH), Bryce Canyon (AMNH), Bryce Canyon National Park (CAS); Long Hollow, Dixie National Forest (UKL); Navajo Mts., 8500 ft. (CAS).

WASHINGTON: King Co., Seattle (UW); Kittitas Co., Ellensberg (UW); Klickitat Co., Blockhouse (UW); Spokane Co., Cheney (UW); Walla Walla Co., Walla Walla (UW), Kamiac Butte (CAS, UW).

Material was also examined from the following:

MEXICO - CHIHUAHUA: 2 mi. W. Matachic, 6400 ft. (1 AMNH); DURANGO: Juan Manuel, El Salto, 9300 ft. (2 CAS).

Species incertae sedis

Trogossita depressior Palisot de Beauvois, 1811:126. TYPE LOCALITY: "États-Unis d'Amérique, Pensylvanie."

"Sp. dub." sec. Léveillé, 1888b:437; 1900:11; incertae sedis sec. Horn, 1885:90; Schaeffer, 1920:194.

Trogosita depressior; Sturm, 1826:205.

Trogossita mutica Palisot de Beauvois, 1811:126. TYPE LOCALITY: "États-Unis d'Amérique, Pensylvanie, Virginie, etc." Synonymy with nanus by Horn 1862: 85; LeConte, 1863b:31; species incertae sedis sec. Horn, 1885:90; Schaeffer, 1920:194.

Tenebroides muticus; Léveillé, 1888b:439; 1900:13

Trogossita subnigra Palisot de Beauvois, 1811:127. TYPE LOCALITY: "États-Unis d'Amérique, Pensylvanie." "Sp. dub." sec. Léveillé, 1888b:440; 1900:15; subniger (misspelling) by Léveillé, ibid.; incertae sedis sec. Schaeffer, 1920:194.

Trogosita punctata Dejean 1836:339 (nomen nudum). "TYPE LOCALITY": "Amer. bor." Synonymy with muticus by Léveillé, 1888b:439; 1900:13.

Trogosita patruelis Dejean, 1836:339 (nomen nudum).

Tenebrioides patruelis Reitter, 1875b:70. TYPE LOCALITY: "Brasilia, Carolin. meridi." Locality probably not North America sec. Schaeffer, 1918:200; species incertae sedis sec. Schaeffer, 1920:194.

Trogosita pusillima Mannerheim, 1843:303. TYPE LOCALITY: "Sitkha." Not Trogosita sec. Horn, 1862:88;

Lathropus ? sec. LeConte, 1866:379; incertae sedis sec. Schaeffer, 1920:194.

Tenebrioides opaca Reitter, 1875b:69. TYPE LOCALITY: "Columbia et Amer. bor." Locality probably not North America sec. Schaeffer, 1918:200; species incertae sedis sec. Schaeffer, 1920:194.

Fossil material

Trogosita insignis Heer, 1868:129 (= Temnochila insignis). TYPE: not seen. TYPE LOCALITY: Atanekerdluk, North Greenland. Heer, 1883:144; Scudder, 1900:89; Wickham, 1920:356. Greenland Eocene.

Tenebroides corrugata Wickham, 1913:291. HOLOTYPE: not seen; "Type.-Cat. No., 59641, U.S.N.M." TYPE LOCALITY: "Florissant." Wickham, 1920:356. Florissant Miocene.

Peltis laminata Wickham, 1910:48 (= Ostoma laminata). HOLOTYPE: not seen; "Station number R4. Collection number 145, Florissant Expedition 1906. Received from Prof. Cockerell. Holotype in the Peabody Museum of Yale University, Cat. No. 12." TYPE LOCALITY: Florissant. Wickham, 1920:356. Florissant Miocene.

Species not Trogositidae

Peltis americana Motschulsky, 1863:508 (= Lycoptis villosa Casey). TYPE: labelled as follows: "Peltis americana Mots. Am. bor. (green square); (green disc); Motsch.; type"; USSR. TYPE LOCALITY: "Géorgie."

Lophocateres americanus, Léveillé, 1888b:445; 1889a:XLIV; 1900:22; Schaeffer, 1915:69; 1918:201; 1920:194.

Lycoptis villosa Casey, 1890:312. HOLOTYPE: labelled as follows: "S. Carol. Morrison; CASEY bequest 1925; TYPE USNM 49183 (red label); Lycoptis villosa Csy."; USNM. TYPE LOCALITY: "South Carolina." Léveillé, 1900:26; Ulke, 1902:19, 46; Schaeffer, 1920:194. NEW SYNONYMY.

Remarks. The type specimen of Peltis americana Motschulsky and of Lycoptis villosa Casey are similar and undoubtedly the two names apply to the same species. Two specimens at BM and one at CU (topotype) are determined Lophocateres americanus Motschulsky and correspond to the type specimens of L. americanus and Lycoptis villosa. The type specimen of Peltis americana Motschulsky was examined by G. E. Ball.

R E F E R E N C E S

REFERENCES

Allibert, A. 1847. Note sur divers insectes coléoptères trouvés dans des graines de légumineuses rapportées de Canton. Revue Zoologique 10:11-19.

Alluaud, C. 1900. Liste des insectes coléoptères de la région Malgache. In A. Grandidier, Histoire physique, naturelle et politique de Madagascar. Paris. Vol. 21.

Arnett, R. H. 1962. The beetles of the United States (A manual for identification). The Catholic University of America Press, Washington, D.C. Pt. IV, pp. 525-644.

Arrow, G. J. 1909. Systematic notes on Coleoptera of the clavicorn families. Ann. Mag. nat. Hist. Ser. 8, 4:190-196.

Audouin, J. V. and A. Brullé. 1835. Histoire naturelle des insectes, Coléoptères II. Paris. Vol. 5, 436 pp.

Bach, M. 1849. Käferfauna für Nord-und Mitteldeutschland, mit besonderer Rücksicht auf die preussischen Rheinlande. Coblenz. Vol. 1, Lief 1, pp. 1-336.

Bach, M. 1851. Käferfauna für Nord-und Mitteldeutschland, mit besonderer Rücksicht auf die preussischen Rheinlande. Coblenz. Vol. 1, Lief 2, pp. 337-414.

Balduf, W. V. 1935. The bionomics of entomophagous Coleoptera. John S. Swift Co., Inc., New York. 220 pp.

Barrett, R. E. 1932. New Coleoptera from California. Pan-Pacif. Ent. 8(4):171-172.

Basilewsky, P. 1956. Contributions à l'étude de la faune entomologique du Ruanda-Urundi. XCV. Coleoptera Ostomatidae. Ann. Mus. Congo Tervuren, in-8°, Zool. 51:388-393.

Beutenmueller, W. 1890. Description of the larva of Thymalus fulgidus Er. Entomologica am. 6(3):57.

Blackwelder, R. E. 1945. Checklist of the coleopterous insects of Mexico, Central America, the West Indies, and South America. United States National Museum Bulletin No. 185 (Part 3):343-550.

Blackwelder, R. E. and R. M. Blackwelder. 1948. Fifth supplement 1939-1947 (inclusive) to the Leng catalogue of Coleoptera of America, north of Mexico. Mount Vernon, N.Y. 87 pp.

Blanchard, C. E. 1851. Fauna Chilena. Insectos. Coleopteros, pp. 285-564. In Gay, Historia fisica y politica de Chile. Vol. 5.

Blatchley, W. S. 1910. An illustrated descriptive catalogue of the Coleoptera or Beetles known to occur in Indiana. The Nature Publishing Co., Indianapolis. 1386 pp.

Blatchley, W. S. 1917. On some new or noteworthy Coleoptera from the west coast of Florida. Can. Ent. 49(4):137-143.

Böving, A. G. and F. C. Craighead. 1931. An illustrated synopsis of the principal larval forms of the order Coleoptera. Entomologica am. 11:1-351.

Candura, G. S. 1932. Contributo alla conoscenza morfologica e biologica dello struggigrano (Tenebroides mauritanicus L.). Bollettino del Laboratorio di Zoologia Generale e Agraria del R. Instituto Superiore Agrario di Portici 27:1-56.

Casey, T. L. 1890. Coleopterological notices. II. Ann. N.Y. Acad. Sci. 5:307-504.

Casey, T. L. 1916. Some random studies among the Clavicornia. Memoirs on the Coleoptera 7:35-292.

Casey, T. L. 1924. Additions to the known Coleoptera of North America. Memoirs on the Coleoptera 11:1-347.

Castelnau, Compte de (Laporte, F. L. de). 1840. Histoire naturelle des animaux articulés. P. Duménil, Paris. Vol. 2.

Cederhielm, J. 1798. Faunae Ingricae prodromus . . . Hartnoch, Lipsiae. 348 pp.

*Chevrolat, L. A. A. 1842. In C. d'Orbigny, Dictionnaire universel d'histoire naturelle . . . Paris. Vol. 2.

Crotch, G. R. 1870a. The genera of Coleoptera studied chronologically (1735-1801). Trans. R. ent. Soc., Lond. 18:41-52.

Crotch, G. R. 1870b. The genera of Coleoptera studied chronologically (1802-21). Trans. R.ent. Soc., Lond. 18:213-241.

*Reference not seen by author.

Crotch, G. R. 1873. Check list of the Coleoptera of America, north of Mexico. Salem, Massachusetts. 136 pp.

Crotch, G. R. 1874. Descriptions of new species of Coleoptera from the Pacific Coast of the United States. Trans. Amer. ent. Soc. 5:73-80.

Crowson, R. A. 1955. The natural classification of the families of Coleoptera. Nathaniel Lloyd & Co., Ltd., London. 187 pp.

Crowson, R. A. 1964. A review of the classification of Cleroidea (Coleoptera) with descriptions of two new genera of Peltidae and of several new larval types. Trans. R. ent. Soc. Lond. 116:275-327.

Crowson, R. A. 1966. Further observations on Peltidae (Coleoptera: Cleroidea), with definitions of a new subfamily and of four new genera. Proc. R. ent. Soc., Lond. Ser. B, 35(9-10):119-127.

Curtis, J. 1824. British entomology . . . London. Vol. 1.

Curtis, J. 1830. British entomology . . . London. Vol. 7.

Curtis, J. 1839. British entomology . . . London. Vol.16.

Cuvier, G. 1849. Le regne animal distribué d'après son organization, pour servir de base a l'histoire naturelle des animaux . . . Disciples' edition. Paris. Vol. 1.

*Dalla Torre, K. W. von. 1879. Systematisches Verzeichniss der in Oberösterreich bis jetzt beobachteten Käfer. Bericht des Vereins für Naturkunde in Oesterrich ob der Ens zu Linz. Vol. 10.

---

*Reference not seen by author.

Degeer, C. 1774. Mémoires pour servir à l'histoire des insectes. Stockholm. Vol. 4.

Dejean, P. F. M. A. 1836. Catalogue des coléoptères de la collection de M. le comte Dejean. Troisième édition, revue, corrigée et augmentée. Paris. Livr. 1-4, pp. 1-468.

Dow, R. P. 1912. A new variety of Trogosita virescens. Jl N.Y. ent. Soc. 20:70-71.

Duftschmid, C. E. 1825. Fauna Austriae. Oder Beschreibung österreichischen Insecten, für angehende Freunde der entomologie. Linz. Vol. 3.

Emden, F. van. 1932. Die Larven der Callirrhipini, eine mutmassliche Cerophytum-Larve und Familien-Bestimmungstabelle der Larven der Malacodermata-Sternoxia-Reihe (Coleoptera) (Zur Kenntnis der Sandalidae 18). Bull. Annls. Soc. r. ent. Belg. 72:199-260.

Entomological Society of America. 1965. Common names of insects approved by the Entomological Society of America. Bull. ent. Soc. Am. 11(4):285-320.

Erichson, W. F. 1842. Verbindung mit mehreren Gelehrten herausgegeben . . . Arch. Naturgeschichte. Vol. 8, pt. 1.

Erichson, W. F. 1843. Versuch einer systematischen Eintheilung der Nitidularien. Z. Ent. 4:225-361.

Erichson, W. F. 1844. Einige Nachträge zur meinem Versuch einer systematischen Eintheilung der Nitidularien. Z. Ent. 5:438-458.

Erichson, W. F. 1845. Naturgeschichte der Insecten Deutschlands. Abt. 1, Coleoptera. Berlin. Vol. 3, Lief 2.

Fabricius, J. C. 1775. Systema entomologiae. Korte, Flensburgi et Lipsiae. 30 + 832 pp.

Fabricius, J. C. 1787. Mantissa insectorum. Hafniae. Vol. 1.

Fabricius, J. C. 1792. Entomologia systematica. Hafniae. Vol. 1.

Fabricius, J. C. 1801. Systema eleutheratorum. Kiliae. Vol. 1.

Fall, H. C. 1910. Miscellaneous notes and descriptions of North American Coleoptera. Trans. Amer. ent. Soc. 36:89-197.

Fauvel, C. A. A. 1891. Les coléoptères de la Nouvelle-Calédonie et dépendances, avec descriptions, notes et synonymies nouvelles. Revue Ent. 10:148-182.

Fleutiaux, E., and A. Salle. 1889. Liste des coléoptères de la Guadeloupe et descriptions d'espèces nouvelles. Ann. Soc. ent. Fr. Ser. 6, 9:351-484.

Forbes, W. T. M. 1922. The wing-venation of the Coleoptera. Ann. ent. Soc. Am. 15:328-352.

Forbes, W. T. M. 1926. The wing folding patterns of the Coleoptera. Jl N.Y. ent. Soc. 34:42-68, 91-139.

Fourcroy, A. F. de. 1785. Entomologia Parisensis, sive catalogus insectorum, quae in agro parisiensi reperiuntur . . . Paris. Vol. 1.

Fowler, W. W. 1889. The Coleoptera of the British Islands . . . Clavicornia (Leptinidae - Heteroceridae). London. Vol. 3.

Ganglbauer, L. 1889. Die Käfer von Mitteleuropa . . ., vol. 3, Familienreihe Staphylinoidea, 2. Theil: Familienreihe Clavicornia. Wien.

Gebler, F. A. von. 1830. Bemerkungen über die Insecten Sibiriens vorzüglich des Altai. In C. F. von Ledebour, Reise nach dem Altai. Berlin. Vol. II, 2, app. III.

Gemminger, M. and E. von Harold. 1868. Catalogus coleopterorum hucusque descriptorum synonymicus et systematicus. Monachii. Vol. 3.

Geoffroy, E. L. 1762. Histoire abrégée des insectes qui se trouvent aux environs de Paris, dans laquelle ces animaux sont rangés suivant un ordre méthodique. Paris. Vol. 1.

Goeze, J. A. E. 1777. Entomologische Beiträge zu des Ritter Linné 12. Ausgabe des Natursystems. Leipzig. Vol. 1.

Gozis, M. des. 1886. Recherche de l'espèce typique de quelques anciens genres. Rectifications synonymiques et notes diverses. Montluçon. 36 pp.

Gray, G. R. 1832. Notices of new genera and species. In Griffith and Pidgeon, The animal kingdom arranged in conformity with its organization by the Baron Cuvier. London. Vol. 15 (Insecta, vol. 2).

Grensted, L. W. 1954. The gender and stem of generic names ending in -ma. Entomologist's mon. Mag. 90:71.

Gyllenhal, L. 1808. Insecta Suecica descripta. Classis I. Coleoptera sive Eleutherata 8. Leverentz, Scaris. Vol. 1.

Halstead, D. G. H. 1968. Some observations on the biology of Lophocateres pusillus (Klug) (Coleoptera: Trogositidae). J. stored Prod. Res. 4:197-202.

Hatch, M. H. 1962. The beetles of the Pacific Northwest. Part III: Pselaphidae and Diversicornia I. University of Washington Publications in Biology. Vol. 16.

*Heer, O. 1868. Flora fossilis arctica, I. Zurich.

Heer, O. 1883. Flora fossilis Groenland, II. Zurich.

Hennig, W. 1950. Grundzüge einer Theorie von phylogenetischen Systematik. Deutscher Zentralverlag, Berlin. 370 pp.

Hennig, W. 1966. Phylogenetic systematics. Translated by D. D. Davis and Rainer Zangerl. University of Illinois Press, Urbana. 263 pp.

Herbst, J. F. W. 1783. Kritisches Verzeichniss meiner Insecten-Sammlung. Archiv der Insectengeschichte. Heft 5, pp. 68-151.

Herbst, J. F. W. 1793. Natursystem aller bekannten in- und ausländischen Insecten, . . . Berlin. Vol. 5.

---

*Reference not seen by author.

Herbst, J. F. W. 1797. Natursystem aller bekannten in- und ausländischen Insecten, . . . Berlin. Vol. 7.

Hope, F. W. 1840. The coleopterist's manual, part the third, containing various families, genera, and species, of beetles, recorded by Linnaeus and Fabricius . . . London. 191 pp.

Hopkins, A. D. 1902. Insect enemies of the pine in the Black Hills forest reserve. Bulletin U.S. Dep. Agric. Ent. No. 32, new ser., 24 pp.

Hopping, R. 1899. Some notes on Coleoptera found on species of Ceanothus. Ent. News 10(5):162-165.

Horn, G. H. 1862. Monograph of the species of Trogosita, inhabiting the United States. Proc. Acad. nat. Sci. Philad. 14:82-88.

Horn, G. H. 1885. Synonymical notes no. 2. Entomologica am. 1(5):88-90.

Horn, G. H. 1894. The Coleoptera of Baja California. Proc. Calif. Acad. Sci. 2nd Ser., 4:302-449.

Hubbard, H. G. and E. A. Schwarz. 1878a. The Coleoptera of Michigan. 2. List of Coleoptera found in the Lake Superior region. Proc. Am. phil. Soc. 17:627-643.

Hubbard, H. G. and E. A. Schwarz. 1878b. The Coleoptera of Michigan. 3. Contribution to a list of the Coleoptera of the Lower Peninsula of Michigan. Proc. Am. phil. Soc. 17:643-666.

Iablokoff-Khnzorian, S. M. von. 1962. Die Gattungstypen von Latreille. Folia Entomologica Hungarica (N.S.) 15:419-426.

Illiger, J. C. W. 1798. In J. G. Kugelann, Verzeichniss der Käfer Preussens, ausgearbeitet von Illiger. Halle. 510 pp.

Illiger, J. C. W. 1807. Vorschlag zur Aufnahme in Fabricischen Systeme fehlender Käfergattungen. Magazin für Insektenkunde 6:318-349.

Jacobson, G. 1905. Käfer Russlands u. Westeuropas, Lief II. Devriena, St. Petersburg (Leningrad). 1024 pp.

Jacquelin du Val, P. N. C. 1857a. Insectes. Ordre des coléoptères, Lin. pp. 137-328. In R. de la Sagra, Histoire physique, politique et naturelle de l'Ile de Cuba. Vol. 7.

Jacquelin du Val, P. N. C. 1857b. Manuel entomologique. Genera des coléoptères d'Europe . . . Paris. Vol. 1, pp. i-cclxxvi, 1-140, 1-52.

Jacquelin du Val, P. N. C. 1858. Genera des coléoptères d'Europe . . . Paris. Vol. 2, 285 pp.

Jacquelin du Val, P. N. C. 1859. Catalogue de la famille des peltides, p. 108. In Genera des coléoptères d'Europe . . . Paris. Vol. 2, pp. 1-124.

Jeannel, R. 1955. L'édéage. Initiation aux recherches sur la systématique des coléoptères. Éditions Du Muséum. Paris. 155 pp.

King, E. W. 1962. Venation in the anal field of the beetle family Ostomatidae. Bull. Brooklyn ent. Soc. 57(2):51-55.

Kirby, W. 1837. Insects. Coleoptera. In J. Richardson, Fauna Boreali-Americana; or the zoology of the northern parts of British America . . . Norwich. 249 pp.

Klug, J. C. F. 1833. Bericht über eine auf Madagascar veranstaltete Sammlung von Insecten aus der Ordnung Coleoptera. Abh. preuss. Akad. Wiss. pp. 91-223.

Kraatz, G. 1858. Beitrag zur Käferfauna Griechenlands. Berl. ent. Z. 2:123-148.

Kugelann, J. G. 1793. Verzeichniss der in einigen Gegenden Preussens bis jetzt entdeckten Käferarten nebst kurzen Nachrichten von denselben. Neuestes Magazine für die Liebhaber der Entomologie 1(4):477-512.

Küster, H. C. 1844. Die Käfer Europas . . . Nürnberg. Vol. 1.

Lacordaire, J. T. 1854. Histoire naturelle des insectes. Genera des coléoptères . . . Paris. Vol. 2.

Laicharting, J. N. von. 1781. Verzeichniss und Beschreibung der Tyroler Insecten. Zürich. Vol. 1.

Latreille, P. A. 1802. Histoire naturelle, générale et particulière des crustaces et des insectes. Paris. Vol. 3.

Latreille, P. A. 1804. Histoire naturelle, générale et particulière des crustaces et des insectes. Paris. Vol. 10.

Latreille, P. A. 1807a. (Entomological articles). In Nouveau dictionnaire d'histoire naturelle Déterville, edition 1. Paris. Vol. 24.

Latreille, P. A. 1807b. Genera crustaceorum et insectorum secundum ordinem naturalem in familias disposita, iconibus exemplisque plurimus explicata. Paris. Vol. 2.

Latreille, P. A. 1807c. Genera crustaceorum et insectorum secundum ordinem naturalem in familias disposita, iconibus exemplisque plurimus explicata. Paris. Vol. 3.

Latreille, P. A. 1809. Genera crustaceorum et insectorum secundum ordinem naturalem in familias disposita, iconibus exemplisque plurimus explicata. Paris. Vol. 4.

Latreille, P. A. 1810. Considérations générales sur l'ordre naturel des animaux composant les classes des crustacés, des archnides, et des insectes; avec un tableau méthodique de leurs genres, disposés en familles. Paris. 444 pp.

Latreille, P. A. 1813. Insects de l'Amérique équinoxiale, recueillis pendant le voyage de MM. de Humboldt et Bonpland. Seconde partie. In Voyage de Humboldt et Bonpland, deuxième partie. Observations de zoologie et d'anatomie comparée. Vol. 2, pp. 1-64.

Latreille, P. A. 1825. Familles naturelles du règne animal . . . Baillière, Paris. 570 pp.

LeConte, J. L. 1858. Description of new species of Coleoptera, chiefly collected by the United States and Mexican Boundary Commission, under Major W. H. Emory, U.S.A. Proc. Acad. nat. Sci. Philad. 10:59-89.

LeConte, J. L. 1859. Catalogue of the Coleoptera of Fort Tejon, California. Proc. Acad. nat. Sci. Philad. 11:69-90.

LeConte, J. L. 1861a. Classification of the Coleoptera of North America. Prepared for the Smithsonian Institution. Smiths. Misc. Coll. No. 136, pp. 1-208.

LeConte, J. L. 1861b. New species of Coleoptera inhabiting the Pacific district of the United States. Proc. Acad. nat. Sci. Philad. 13:338-359.

LeConte, J. L. 1863a. New species of North American Coleoptera. Prepared for the Smithsonian Institution. Smiths. Misc. Coll. No. 167 (Pt. 1), pp. 1-86.

LeConte, J. L. 1863b. List of the Coleoptera of North America. Prepared for the Smithsonian Institution. Smiths. Misc. Coll. No. 140 (Pt. 1), pp. 1-49.

LeConte, J. L. 1866. Additions to the coleopterous fauna of the United States. No. 1. Proc. Acad. nat. Sci. Philad. 18:361-394.

LeConte, J. L. and G. H. Horn. 1883. Classification of the Coleoptera of North America. Prepared for the Smithsonian Institution. Smiths. Misc. Coll. No. 507, 26(4):i-xxxvii, 1-567.

Leng, C. W. 1920. Catalogue of the Coleoptera of America, north of Mexico. Mount Vernon, N. Y. 470 pp.

Leng, C. W. and A. J. Mutchler. 1927. Supplement 1919-1924 (inclusive) to catalogue of the Coleoptera of America, north of Mexico. Mount Vernon, N. Y. 78 pp.

Leng, C. W. and A. J. Mutchler. 1933. Second and third supplements 1925 to 1932 (inclusive) to catalogue of the Coleoptera of America, north of Mexico. Mount Vernon, N. Y. 112 pp.

*Lepechin, J. I. 1774. Tagebuch der Reise durch verschiedene Provinzen des Russischen Reiches in den Jahren 1768 u. 1769. Aus dem Russischen übersetzt von M. Christian Heinrich Hase. Richter, Altenburg. Vol. 1.

Lepesme, P. and R. Paulian. 1944. Les Nemosoma et genres voisins (Col. Ostomatidae). Revue fr. Ent. 10:136-141.

Léveillé, A. 1877. (Description d'une nouvelle espèce de trogositide). Bull. Soc. ent. Fr. pp. cxi-cxii.

Léveillé, A. 1888a. Descriptions de temnochilides nouveaux. Ann. Soc. ent. Fr. Ser. 6, 8:411-428.

Léveillé, A. 1888b. Catalogue de la famille des temnochilides. Ed. I. Ann. Soc. ent. Fr. Ser. 6, 8:429-448.

Léveillé, A. 1889a. (Rectifications synonymiques sur la famille des temnochilides). Bull. Soc. ent. Fr. pp. xliv-xlv.

Léveillé, A. 1889b. (Rectifications relatives aux temnochilides). Bull. Soc. ent. Fr. p. lxii.

Léveillé, A. 1889c. Voyage de M. E. Simon au Venezuela (Décembre 1887-Avril 1888). Coléoptères, 3e mémoire. Ann. Soc. ent. Fr. Ser. 6, 9:167-168.

Léveillé, A. 1891. (Rectification synonymique). Bull. Soc. ent. Fr. p. cxcii.

Léveillé, A. 1894. (Descriptions de dix espèces nouvelles de coléoptères de la famille des temnochilides). Bull. Soc. ent. Fr. pp. cxliii-cxlviii.

---

*Reference not seen by author.

Léveillé, A. 1895. Descriptions de temnochélides de l'Amérique méridionale. Act. Soc. scient. Chili 5:76-81.

Léveillé, A. 1899. Études sur la famille des temnochilides. Ann. Soc. ent. Fr. 68:644-657.

Léveillé, A. 1900. Catalogus temnochilidum (seu trogositidum) inter annos 1758 - 1900 editorum. Ann. Soc. ent. Fr. 69:1-26.

Léveillé, A. 1905. Études sur la famille des temnochilides. Ann. Soc. ent. Fr. 74:29-50.

Léveillé, A. 1908. Temnochilidae, pp. 321-325. In A. Grouvelle, Coléoptères de la région Indienne. Rhysodidae, Trogositidae, Nitidulidae, Colydiidae, Cucujidae. Ann. Soc. ent. Fr. 77:315-495.

Léveillé, A. 1910. Temnochilidae, pars. 11, pp. 1-40. In W. Junk (ed.), Coleopterorum catalogus. Berlin. Vol. 15.

Linnaeus, C. 1758. Systema naturae . . . Ed. 10. Holmiae. Vol. 1.

Mannerheim, G. C. G. von. 1843. Beitrag zur Kaefer-Fauna der Aleutischen Inseln, der Insel Sitkha und Neu-Californiens. Byull. mosk. Obshch. Ispȳt. Prir. 16(2):175-314.

Mannerheim, G. C. G. von. 1852. Zweiter Nachtrag zur Kaefer-Fauna der Nord-Amerikanischen Laender des Russischen Reiches. Byull. mosk. Obshch. Ispȳt. Prir. 25(2):283-387, 534-535.

Marseul, S. A. de. 1885. L'Abeille, Journal d'Entomologie Ser. 4, 23:145-156.

Masters, G. 1896. Catalogue of the described Coleoptera of Australia. Supplement, Part II . . . Proc. Linn. Soc. N.S.W. 21:94-95 (Trogositidae).

Mayr, E. 1963. Animal species and evolution. Belknap Press of Harvard University Press, Cambridge, Mass. 797 pp.

Mayr, E. 1965. Numerical phenetics and taxonomic theory. Systematic Zoology 14(2):73-97.

Mayr, E., E. G. Linsley and R. L. Usinger. 1953. Methods and principles of systematic zoology. McGraw-Hill Book Company, Inc., New York. 336 pp.

Melsheimer, F. E. 1844. Descriptions of new species of Coleoptera of the United States. Proc. Acad. nat. Sci. Philad. 2:98-118.

Melsheimer, F. E. 1846. Descriptions of new species of Coleoptera of the United States. Proc. Acad. nat. Sci. Philad. 3:53-66.

Méquignon, A. 1947. Notes diverses sur des Coléoptères de France (5ième note). Bull. Soc. ent. Fr. 52:58-61.

Motschulsky, V. von. 1858. Sur les collections coléoptèrologiques de Linné et de Fabricius. Études Entomologiques. Helsingfors. Pt. 7, pp. 123-152.

Motschulsky, V. von. 1863. Essai d'un catalogue des insectes de l'Île Ceylan. Byull. mosk. Obshch. Ispyt. Prir. 36(2):421-532.

Müller, O. F. 1776. Zoologiae Danicae prodromus, seu animalium Daniae et Norvegiae indigenarum characteres, nomina, et synonyma imprimis popularium. Hallager, Hafniae. 282 pp.

Mutchler, A. J. and H. B. Weiss. 1929. The Ostomidae of New Jersey. New Jersey Department of Agriculture Circular No. 154. 17 pp.

Newman, E. 1838. Entomological notes. Entomological Magazine 5:372-402.

Olivier, A. G. 1790. Entomologie, ou histoire naturelle des insectes, avec leurs caractères génériques et spécifiques, leur description, leur synonymie, et leur figure enluminée Coléoptères. Paris. Vol. 2.

Olliff, A. S. 1883a. Remarks on a small collection of clavicorn Coleoptera from Borneo, with descriptions of new species. Trans. R. ent. Soc. Lond. pp. 173-186.

Olliff, A. S. 1883b. Descriptions of two larvae and new genera and species of clavicorn Coleoptera, and a synopsis of the genus Helota, Macleay. Cistula Entomologica 3(27):49-61.

Palisot de Beauvois, A. M. F. J. 1811. Insectes recueillis en Afrique et en Amérique, 1805-1821. Duménil, Paris. 276 pp.

Panzer, G. W. F. 1801. Faunae Insectorum Germanica initia oder Deutschlands Insecten. Heft 75.

Pascoe, F. P. 1872. Notes on Coleoptera, with descriptions of new genera and species. - Part II. Ann. Mag. nat. Hist. Ser. 4, 10:317-326.

Paykull, G. von. 1798. Fauna Suecica: Insecta. Upsaliae. Vol. 1.

Philippi, F. 1887. Catálogo de los Coléopteros de Chile. Anales de la Universidad, Republica de Chile 71:1-190.

Piller, M. and L. Mitterpacher. 1783. Iter per Poseganam, Sclavoniae provinciam mensibus Junio et Julio 1782 susceptum. Budae. 147 pp.

Preyssler, J. D. E. 1790. Verzeichniss böhmischer Insecten. Erstes Hundert. Schoenfeld-Meissner, Prague. 108 pp.

Quensel, C. 1790. Dissertatio historico-naturalis, ignotas insectorum species continens. Lundae. 20 pp.

Ragusa, E. 1892. Catalogo Ragionato dei Coleotteri di Sicilia. Naturalista sicil. 11(9-10-11):193-195 (Trogositidea).

Randall, J. W. 1838. Description of new species of coleopterous insects inhabiting the State of Maine. Boston Journal of Natural History 2:1-33.

Redtenbacher, L. 1845. Die Gattungen der deutschen Kaefer-Fauna nach der analytischen Methode bearbeitet, nebst einem kurz gefassten Leitfaden, zum Studium dieses Zweiges der Entomologie. Wien. 177 pp.

Redtenbacher, L. 1849. Fauna Austriaca. Die Käfer. Nach der analytischen Methode bearbeitet. 1st ed. Wien. 883 pp.

Redtenbacher, L. 1858. Fauna Austriaca. Die Käfer. Nach der analytischen Methode bearbeitet. 2nd ed. Wien. 1017 pp. + app.

Redtenbacher, L. 1867. Reise der österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter den befehlen des Commodore B. von Wüllerstorf-Urbair. Zoologischer Theil. Zweiter Band: Coleopteren. Wein. 249 pp.

Redtenbacher, L. 1872. Fauna Austriaca. Die Käfer. Nach der analytischen Methode bearbeitet. 3rd ed. Wien. Vol. 1, 564 pp.

Redtenbacher, L. 1874. Fauna Austriaca. Die Käfer. Nach der analytischen Methode bearbeitet. 3rd ed. Wien. Vol. 2, pp. 1-571, I-CLIII.

Reitter, E. 1875a. Revision der Gattung Trogosita Oliv. (Temnochila Westw.) Verh. naturf. Ver. Brünn 13:3-44. Also published in Dt. ent. Z. Heft iv, 1875.

Reitter, E. 1875b. Die Süd - und Mittel - Amerikanischen Arten der Gattung Tenebrioides Pill. et Mitterp. (Trogosita Strm., Er., Redt., Thoms., Horn) diagnostisch dargestellt. Verh. naturf. Ver. Brünn 13:65-79.

Reitter, E. 1876. Systematische Eintheilung der Trogositidae (familia coleopterorum). Verh. naturf. Ver. Brünn 14:3-69. Also published in Dt. ent. Z. 20:27-95, 1876.

Reitter, E. 1877a. Beiträge zur Kenntniss aussereuropäischer Coleopteren. Mittheilungen des Münchener Entomologischen Vereins 1:126-140.

Reitter, E. 1877b. Coleopterorum species novae. Verh. zool. - bot. Ges. Wien 27:165-194.

*Reitter, E. 1877c. Geographical distribution of Nitidulidae, Trogositidae, Cryptophagidae, and Lathridiidae. Dt. ent. Z. 21:175-176.

Reitter, E. 1880. Beitrag zur Synonymie der Coleopteren. Verh. zool. - bot. Ges. Wien 29:507-512.

Reitter, E. 1882. Bestimmungs - Tabellen der europäischen Coleopteren. VI. Enthaltend die Familien Colydiidae, Rhysodidae, Trogositidae. Verh. naturf. Ver. Brünn 20:113-149.

Reitter, E. 1889. Neue Coleopteren aus Europa, den angrenzenden Ländern und Sibirien, mit Bemerkungen über bekannte Arten. Dt. ent. Z. Heft II, Siebenter Theil, pp. 273-288.

Reitter, E. 1911. Fauna Germanica. Die Käfer des Deutschen Reiches. Nach der analytischen Methode bearbeitet. Vol. 3.

Rey, C. 1888. (Description de la larve de l'Ostoma yvani Allibert). Bull. Soc. ent. Fr. pp. xxxviii-xxxix.

---

*Reference not seen by author.

Rupertsberger, M. 1880. Biologie der Käfer Europas. Eine Uebersicht der biologischen Literatur gegeben in einem alphabetischen Personen-und systematischen Sach-Register, nebst einem Larven-Cataloge. Linz. xii + 295 pp.

*Rupertsberger, M. 1894. Die biologische Literatur über die Käfer Europa's von 1889 an. Mit Nachträgen aus früherer Zeit und einem Larven-Cataloge. Linz. 294 pp.

*Samouelle, G. 1819. The entomologist's useful compendium . . . London. 496 pp.

Schaeffer, C. F. A. 1915. Change of generic names. Jl N.Y. ent. Soc. 23:68-69.

Schaeffer, C. F. A. 1918. On some genera and species of the family Ostomidae. Jl N.Y. ent. Soc. 26:190-201.

Schaeffer, C. F. A. 1920. Ostomidae, pp. 193, 194. In C.W. Leng, Catalogue of the Coleoptera of America, north of Mexico. Mount Vernon, N.Y. 470 pp.

Schaller, J. G. 1783. Neue Insekten beschrieben. Schriften der naturforschenden Gesellschaft zu Halle. Vol. 1, pp. 217-328.

Schilsky, J. 1889. Synonymische und andere Bemerkungen zu Dr. Carl W. v. Dalla Torre's "Synopsis der Insekten Oberösterreichs" und "Die Käferfauna von Oberösterreich." Dt. ent. Z. 2:345-356.

---

*Reference not seen by author.

Schönherr, C. J. 1806. Synonymia insectorum, oder: Versuch einer Synonymie aller bisher bekannten Insecten; nach Fabricii Systema Eleutheratorum geordnet. Stockholm. Vol. 1, pt. 1, pp. 1-293.

Schönherr, C. J. 1808. Synonymia insectorum . . . Stockholm. Vol. 1, pt. 2, pp. 1-424.

Scopoli, J. A. 1772. Historico naturalis. Lipsiae. Annus V, 128 pp.

Scriba, L. G. 1790. Journal für die Liebhaber der Entomologie. Pt. 1, pp. 1-96.

Scudder, S. H. 1900. Adephagous and clavicorn Coleoptera from the Tertiary deposits at Florissant, Colorado with descriptions of a few other forms and a systematic list of the non-rhynchophorous Tertiary Coleoptera of North America. Monographs of the United States Geological Survey, Washington. Vol. 40.

Seidlitz, G. von. 1875. Fauna Baltica. Die Käfer (Coleoptera) der Ostseeprovinzen Russlands. Arch. Naturk. Liv-Est-u. Kurlands. Ser. 2, 5:i-xlii, 1-142, 1-560.

Seidlitz, G. von. 1891a. Fauna Baltica. Die Kaefer (Coleoptera) der deutschen Ostseeprovinzen Russlands. Ed. 2. Königsberg. 192 + 818 pp.

Seidlitz, G. von. 1891b. Fauna Transsylvanica. Die Kaefer (Coleoptera) Siebenbürgens. Königsberg. 914 pp.

Semenow, A. 1898. Coleoptera nova Rossiae europaeae Caucasique. Trudy russk. ent. Obshch. 32:280-290.

Serville, J. G. A. 1828. In Encyclopédie méthodique . . ., Entomologie. Paris. Vol. 10, pt. 2, pp. 345-832.

Sharp, D. 1891. Biologia Centrali-Americana, Insecta, Coleoptera, Nitidulidae, Trogositidae, Synteliidae. Vol. 2, pt. 1.

Sharp, D. and F. Muir. 1912. The comparative anatomy of the male genital tube in Coleoptera. Trans. R. ent. Soc. Lond. 60:477-642.

Shuckard, W. E. 1840. The British Coleoptera delineated by W. J. Spry consisting of figures of all the genera of British beetles. Crosta, London. 83 pp.

Simpson, G. G. 1959. The nature and origin of supraspecific taxa. Cold Spring Harb. Symp. quant. Biol. 24:255-271.

Simpson, G. G. 1961. Principles of animal taxonomy. Columbia University Press, New York. 247 pp.

Stephens, J. F. 1830. Illustrations of British entomology . . . London. Vol. 3.

Struble, G. R. 1942. Biology of two native coleopterous predators of the mountain pine beetle in sugar pine. Pan-Pacific. Ent. 18:97-107.

Struble, G. R. and L. H. Carpelan. 1941. External sex characters of two important native predators of the mountain pine beetle in sugar pine. Pan-Pacif. Ent. 17:153-156.

Sturm, J. 1807. Deutschlands Fauna in Abbildungen nach der Natur mit Beschreibungen. Abt. v, Dei Insecten (Deutschlands Insecten, vol. 2, Käfer). Nürnberg.

Sturm, J. 1826. Catalog meiner Insecten-Sammlung, Erster Theil, Käfer. Nürnberg. 207 pp.

Sturm, J. 1839. Deutschlands Fauna in Abbildungen nach der Natur mit Beschreibungen. Abt. v, Die Insecten (Deutschlands Insecten, vol. 14, Käfer). Nürnberg.

Tanner, V. M. 1927. A preliminary study of the genitalia of female Coleoptera. Trans. Am. ent. Soc. 53:5-50.

Thomson, C. G. 1859. Skandinaviens Coleoptera. Lund. Vol. 1.

Thomson, C. G. 1862. Skandinaviens Coleoptera. Lund. Vol. 4.

Thomson, C. G. 1863. Skandinaviens Coleoptera. Lund. Vol. 5.

Thunberg, C. P. 1784. Novae insectorum species descriptae. Nova Acta R. Soc. Scient. Upsal. 4:1-28.

Thunberg, C. P. 1794. Dissertatio Entomologica sistens Insecta Suecica. Upsaliae. Pars 8, pp. 99-104.

Ulke, H. 1902. A list of the beetles of the District of Columbia. Proc. U.S. natn. Mus. No. 1275, 25:1-57.

Van Dyke, E. C. 1915. Some new beetles in the families Ostomidae (Trogositidae) and Cleridae from California. Bull. Brooklyn ent. Soc. 10:25-33.

Van Dyke, E. C. 1916. Supplementary notes and descriptions of North American Ostomidae, Cleridae, and Cossonus (Col.). Bull. Brooklyn ent. Soc. 11(4):71-79.

Van Dyke, E. C. 1920. New name for Nemosoma punctulata. Bull. Brooklyn ent. Soc. 15(2, 3):85.

Van Dyke, E. C. 1944. New species of North American Ostomidae (Coleoptera). Pan-Pacif. Ent. 20:147-153.

Vogt, H. 1967. Familie Ostomidae, pp. 14-18. In H. Freude, K. W. Harde and G. A. Lohse, Die Käfer Mitteleuropas. 7. Clavicornia. Goecke and Evers, Krefeld. 310 pp.

Weiss, H. B. 1920. Notes on Thymalus fulgidus Er., and its fungus hosts in New Jersey (Col.). Ent. News 31:1-3.

Westwood, J. O. 1830. On the affinities of the genus Clinidium of Kirby. The Zoological Journal 5:213-237.

Westwood, J. O. 1838. An introduction to the modern classification of insects; founded on the natural habits and corresponding organisation of the different families. (Also: Synopsis of the genera of British insects). London. Vol. 1.

Wickham, H. F. 1910. New fossil Coleoptera from Florissant, with notes on some already described. Am. J. Sci. 24: 47-51.

Wickham, H. F. 1913. Fossil Coleoptera from Florissant in the United States National Museum. Proc. U.S. natn. Mus. 45:283-303.

Wickham, H. F. 1916. A new brachyelytrous trogositid beetle from Colorado. Psyche 23(5):146-148.

Wickham, H. F. 1920. Catalogue of the North American Coleoptera described as fossils, pp. 349-365. In C. W. Leng, Catalogue of the Coleoptera of America, north of Mexico. Mount Vernon, N.Y. 470 pp.

Winkler, A. (ed.) 1924. Ostomidae, pp. 687-689. In Catalogus Coleopterorum regionis palaearcticae. Wien.

Xambeu, - . 1892. Moeurs et métamorphoses d'insectes. Annls. Soc. linn. Lyon 39:135-194.

A P P E N D I X

APPENDIX I

CHECKLIST OF NORTH AMERICAN TROGOSITIDAE

Peltinae

Calitys Thomson	
C. scabra (Thunberg)	Canada, U.S.A., Europe
C. minor Hatch	Canada, U.S.A.
Ostoma Laicharting	
O. pippingskoeldi (Mannerheim)	Canada, U.S.A.
O. ferruginea (Linnaeus)	Canada, U.S.A., Europe
O. columbiana Casey	Canada, U.S.A.
Grynocharis Thomson	
G. quadrilineata (Melsheimer)	Ont., Que., N.E. U.S.A.
G. oregonensis (Schaeffer)	B.C., Wash., Idaho, Nev., Calif.
Thymalus Latreille	
T. marginicollis Chevrolat	Canada, U.S.A.
Eronyxa Reitter	
E. expansus (Van Dyke)	Mts. Calif.
E. pallidus (Motschulsky)	B.C., Oreg., Wash., Mts. Calif.
E. angustus (Casey)	Nev., Oreg., Mts. Calif.
Lophocateres Olliff	
L. pusillus (Klug)	Cosmopolitan

Trogositinae

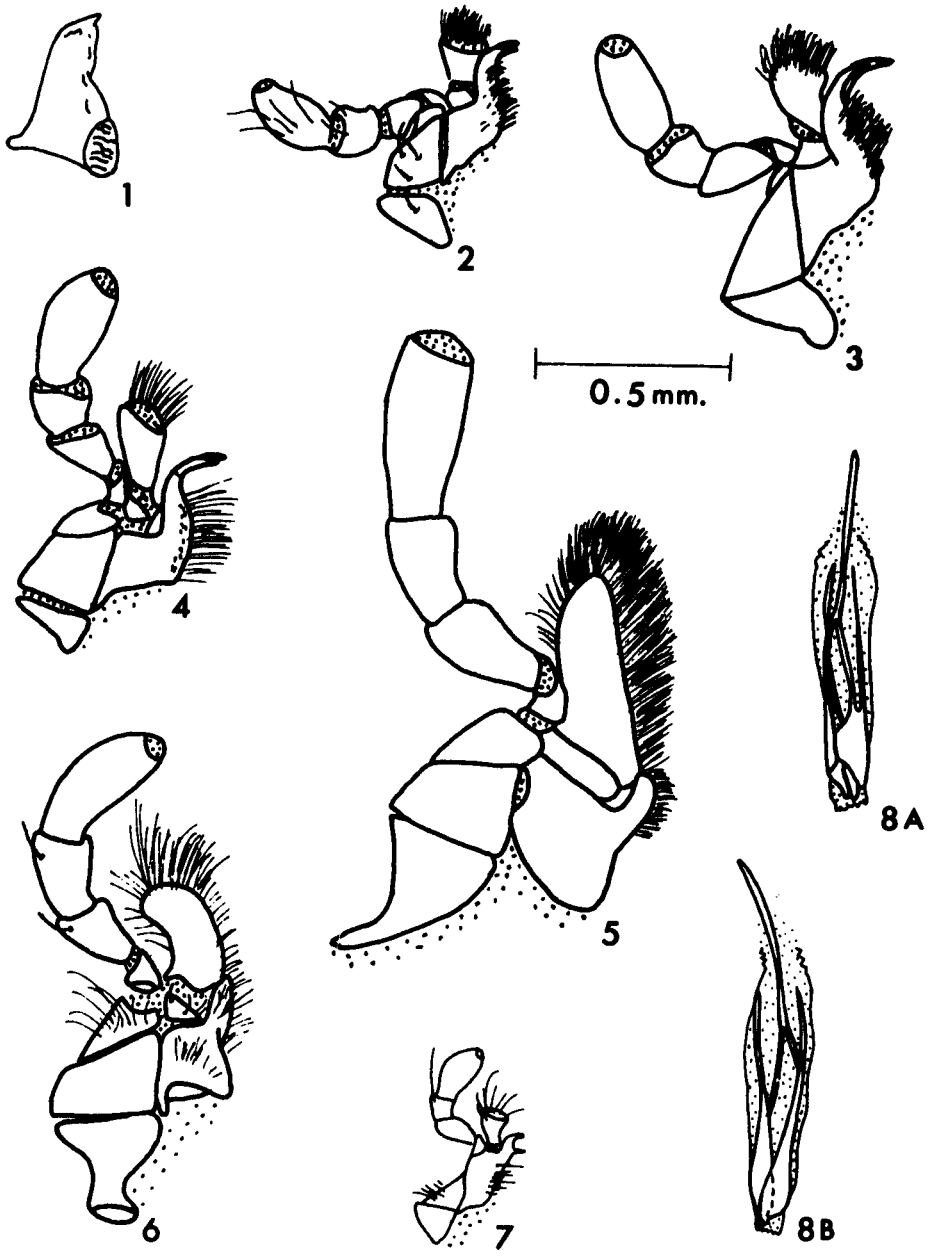
Nemosoma Latreille	
N. attenuatum Van Dyke	W. coast of U.S.A.

N. schwarzi Schaeffer	Ariz., Calif.
N. fissiceps (Fall)	Calif., Oreg.
N. punctulata Van Dyke	W. coast
N. cupressi Van Dyke	N. coast of Calif.
Cylidrella Sharp	
C. championi Wickham	Colo., N. Mex.[1]
Corticotomus Sharp	
C. depressus Schaeffer	E. U.S.A.
C. parallelus (Melsheimer)	E. U.S.A.
C. cylindricus (LeConte)	E. U.S.A.
C. caviceps (Fall)	W. U.S.A.
C. apicalis Van Dyke	Calif.
C. californicus Van Dyke	W. U.S.A.
Euschaefferia Leng	
E. mclayi (Van Dyke), new combination	Calif.
E. hicoriae (Schaeffer)	N.C., Tex.
Airora Reitter	
A. cylindrica (Serville)	E. of Great Plains, E. Mex.
A. aequalis Reitter	W. of Great Plains, W. Mex., Baja Calif.
A. minuta Schaeffer	Ariz., Calif.
Temnochila Westwood	
T. barbata LeConte	Calif., Ariz., W. Mex., Baja Calif.
T. yuccae (Crotch)	Calif., Baja Calif.
T. hubbardi Léveillé	S. Fla., Bahamas

[1] N. Mex. = New Mexico

T. edentata Schaeffer	Calif., Ariz., Baja Calif.
T. rhyssa, new species	Calif., Idaho
T. omolopha, new species	Ariz., N. Mex.
T. aerea LeConte	Calif., Ariz., N. Mex., Baja Calif.
T. virescens (Fabricius)	E. of Great Plains
T. chlorodia (Mannerheim)	W. of Great Plains, W. Mex., Baja Calif.
T. acuta LeConte	E. of Great Plains, E. Mex.
Tenebroides Piller and Mitterpacher	
T. sinuatus (LeConte)	W. of Great Plains
T. mauritanicus (Linnaeus)	Cosmopolitan
T. crassicornis (Horn)	W. of Great Plains, Baja Calif.
T. collaris (Sturm)	E. coastal states of U.S.A.
T. nanus (Melsheimer)	E. of Great Plains, E. Mex.
T. marginatus (Palisot de Beauvois)	E. of Great Plains
T. soror (Jacquelin du Val)	S. Fla., Bahamas, Cuba
T. bimaculatus (Melsheimer)	E. of Great Plains
T. americanus (Kirby)	E. of Great Plains, Brazil
T. laticollis (Horn)	E. of Great Plains
T. obtusus (Horn)	E. coastal states of U.S.A.
T. rugosipennis (Horn)	E. U.S.A., W. to Ariz.
T. semicylindricus (Horn)	E. coastal states of U.S.A., E.Mex.
T. floridanus Schaeffer	Fla.,La.,E.Mex., E.Central Amer., West Indies
T. sonorensis Sharp	S.W. U.S.A., Mex.
T. tenuistriatus Fall	Colo., N. Mex., Ariz., W. Mex.
T. corticalis (Melsheimer)	Canada, U.S.A., Mex., Guatemala
T. occidentalis Fall	W. of Great Plains, W. Mex.

FIGS. 1-8. 1, Mandible, right, ventral view, Eronyxa pallidus (Mots.). 2-7, Maxillae, right, ventral view: 2, Calitys scabra (Thunb.); 3-4, Ostoma spp.: 3, O. ferruginea (L.); 4, O. pippingskoeldi (Mann.); 5, Temnochila chlorodia (Mann.); 6, Tenebroides mauritanicus (L.); 7, Eronyxa pallidus (Mots.). 8, Tegmen of Corticotomus caviceps (Fall), a, dorsal view, b, ventral view.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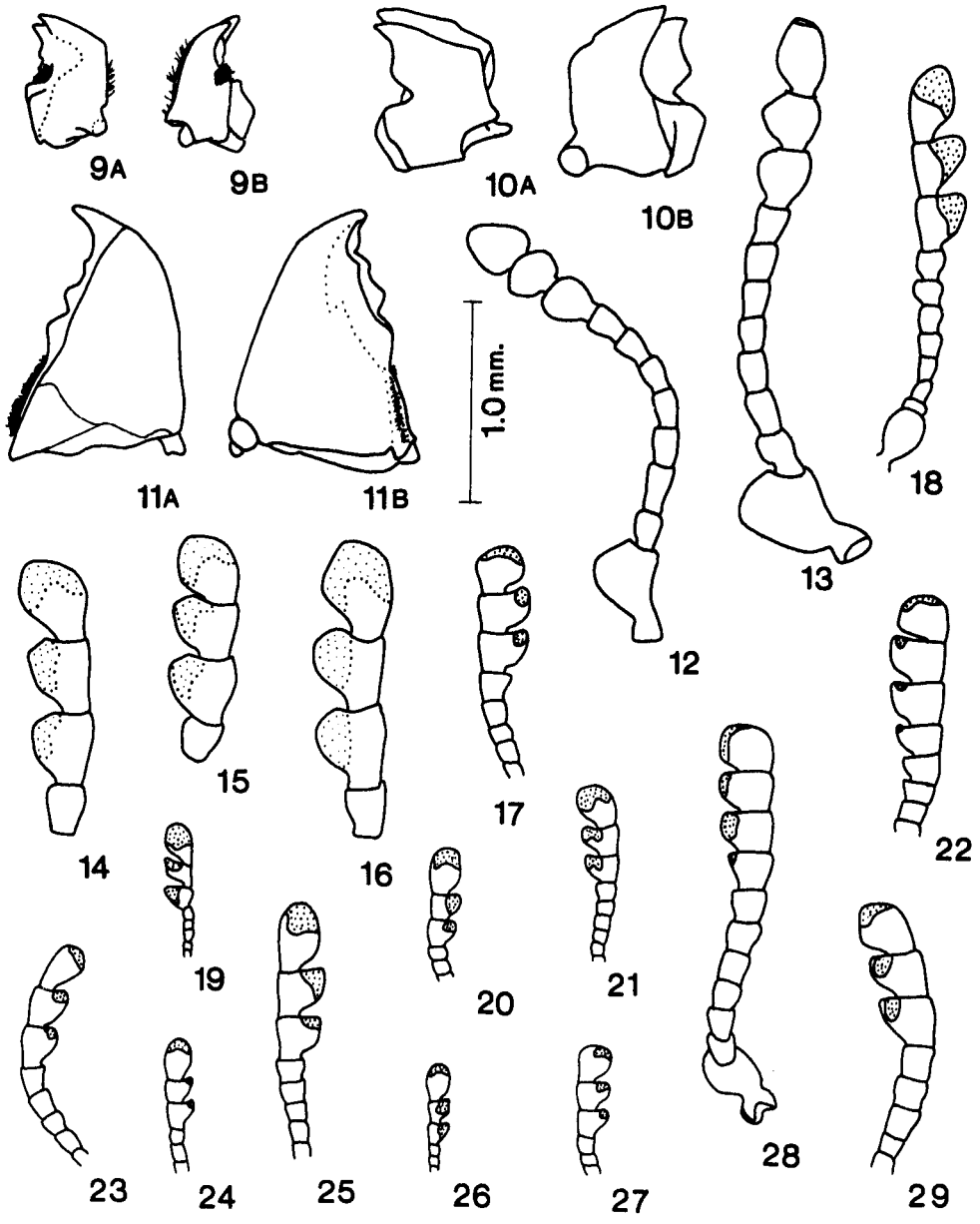
FIGS. 9-29. 9-11, Mandibles, right, a, dorsal view, b, ventral view: 9, Calitys scabra (Thunb.); 10, Ostoma ferruginea (L.); 11, Temnochila chlorodia (Mann.). 12-29, Antennae, right: 12-13, Ostoma spp.: 12, O. pippingskoeldi (Mann.); 13, O. ferruginea (L.); 14-29, terminal articles: 14-16, Temnochila spp.: 14, T. virescens (Fab.); 15, T. chlorodia (Mann.); 16, T. acuta Lec.; 17-29, Tenebroides spp.: 17, T. sinuatus (Lec.); 18, T. americanus (Kby.); 19, T. bimaculatus (Melsh.); 20, T. floridanus Schaef.; 21, 27, T. corticalus (Melsh.); 22, T. crassicornis (Horn); 23, T. collaris (Sturm); 24, T. obtusus (Horn); 25, T. laticollis (Horn); 26, T. rugosipennis (Horn); 28, T. mauritanicus (L.); 29, T. occidentalis Fall.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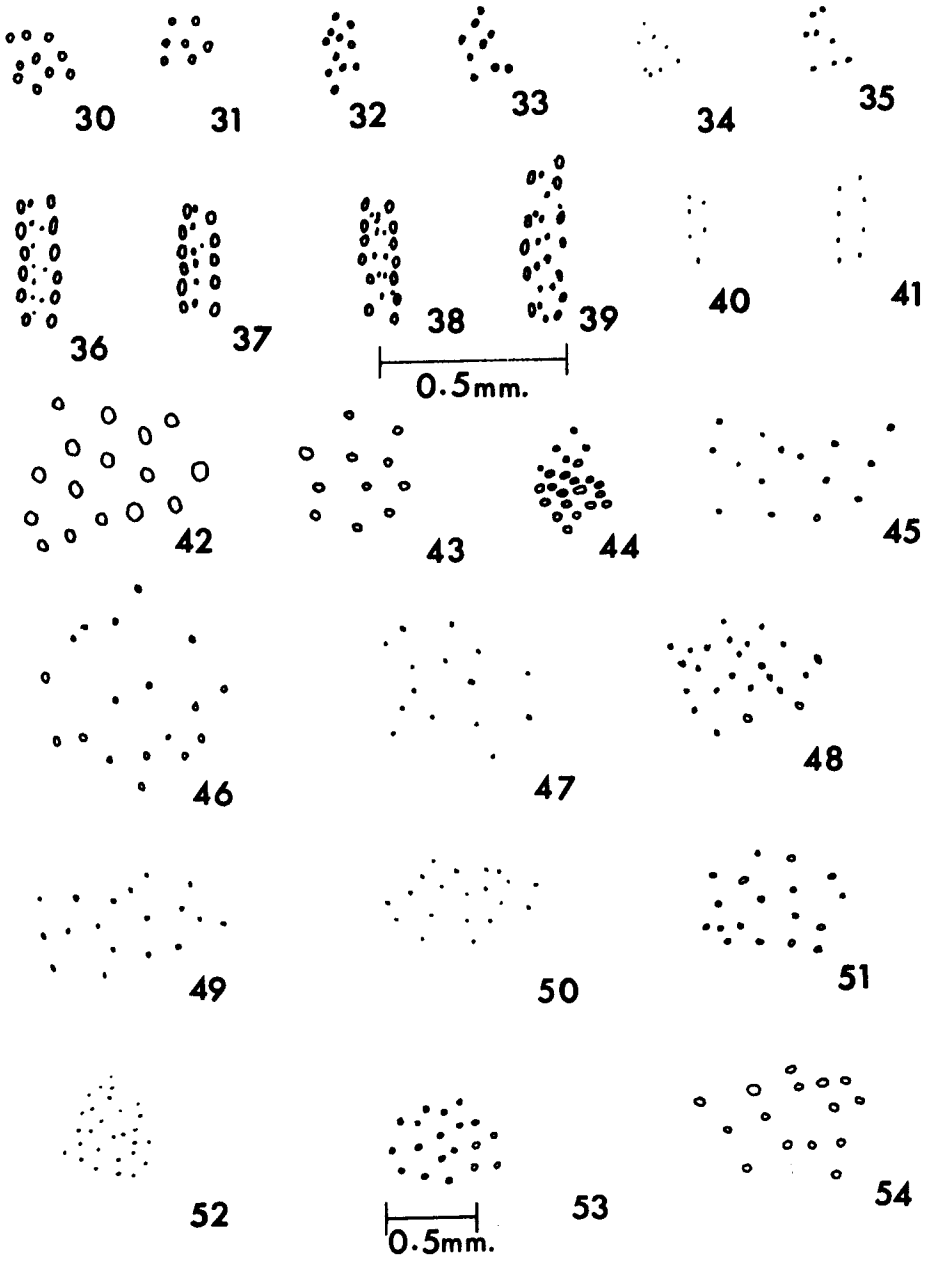
FIGS. 30-54. Punctures. 30-41, Corticotomus spp.: 30-35, of metasterna: 30, C. depressus Schaef.; 31, C. parallelus (Melsh.); 32, C. cylindricus (Lec); 33, C. caviceps (Fall); 34, C. apicalus Van D.; 35, C. californicus Van D.; 36-41, of left elytra: 36, C. depressus Schaef.; 37, C. parallelus (Melsh.); 38, C. cylindricus (Lec.); 39, C. caviceps (Fall); 40, C. apicalus Van D.; 41, C. californicus Van D. 42-54, Temnochila spp.: 42-51, of metasterna: 42, T. barbata Lec.; 43, T. yuccae (Cr.); 44, T. hubbardi Lev.; 45, T. edentata Schaef.; 46, T. rhyssa, n. sp.; 47, T. omolopha, n. sp.; 48, T. aerea Lec.; 49, T. virescens (Fab.); 50, T. chlorodia (Mann.); 51, T. acuta Lec.; 52-54, of vertices: 52, T. virescens (Fab.); 53, T. chlorodia (Mann.); 54, T. acuta Lec.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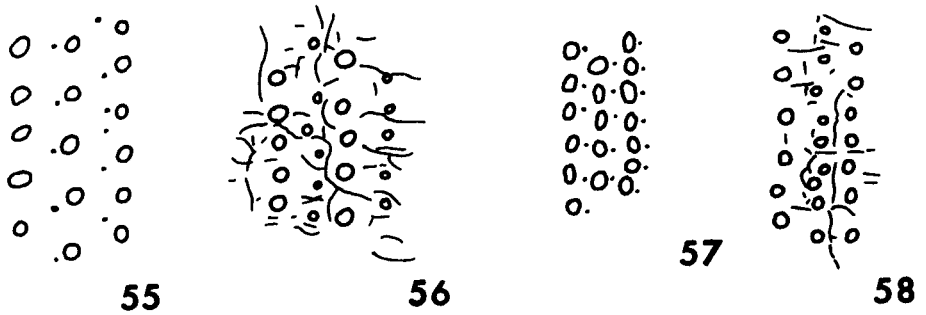
54

FIGS. 55-64. Punctures of left elytra of *Temnochila* spp. 55, *T. barbata* Lec. 56, *T. yuccae* (Cr.). 57, *T. hubbardi* Lev. 58, *T. edentata* Schaef. 59, *T. rhyssa*, n. sp. 60, *T. omolopha*, n. sp. 61, *T. aerea* Lec. 62, *T. virescens* (Fab.). 63, *T. chlorodia* (Mann.). 64, *T. acuta* Lec.



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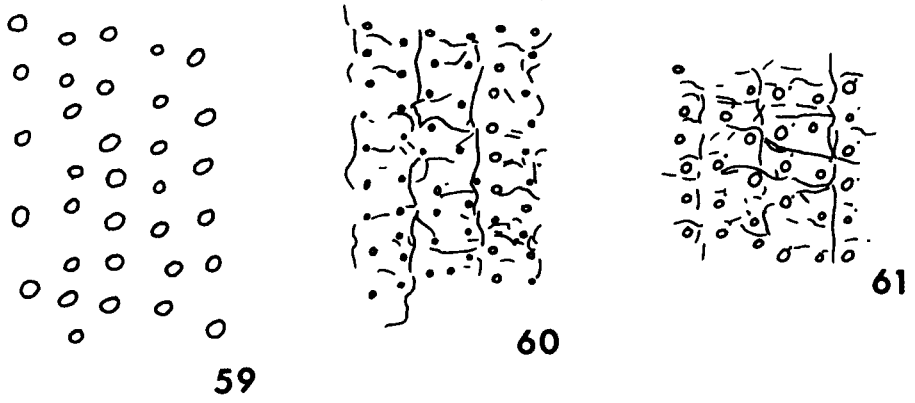
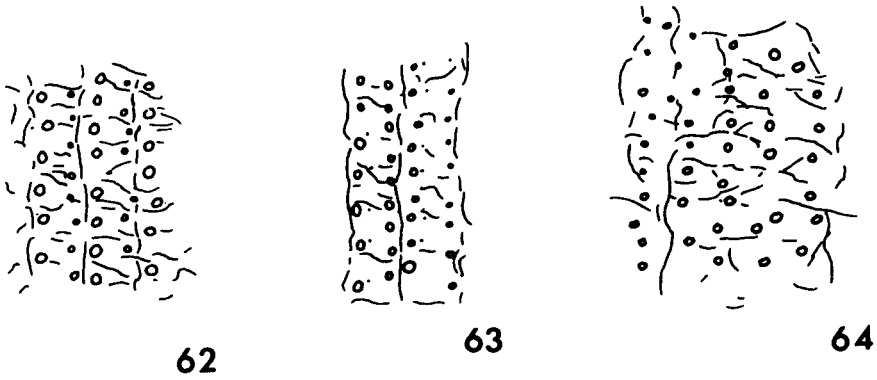
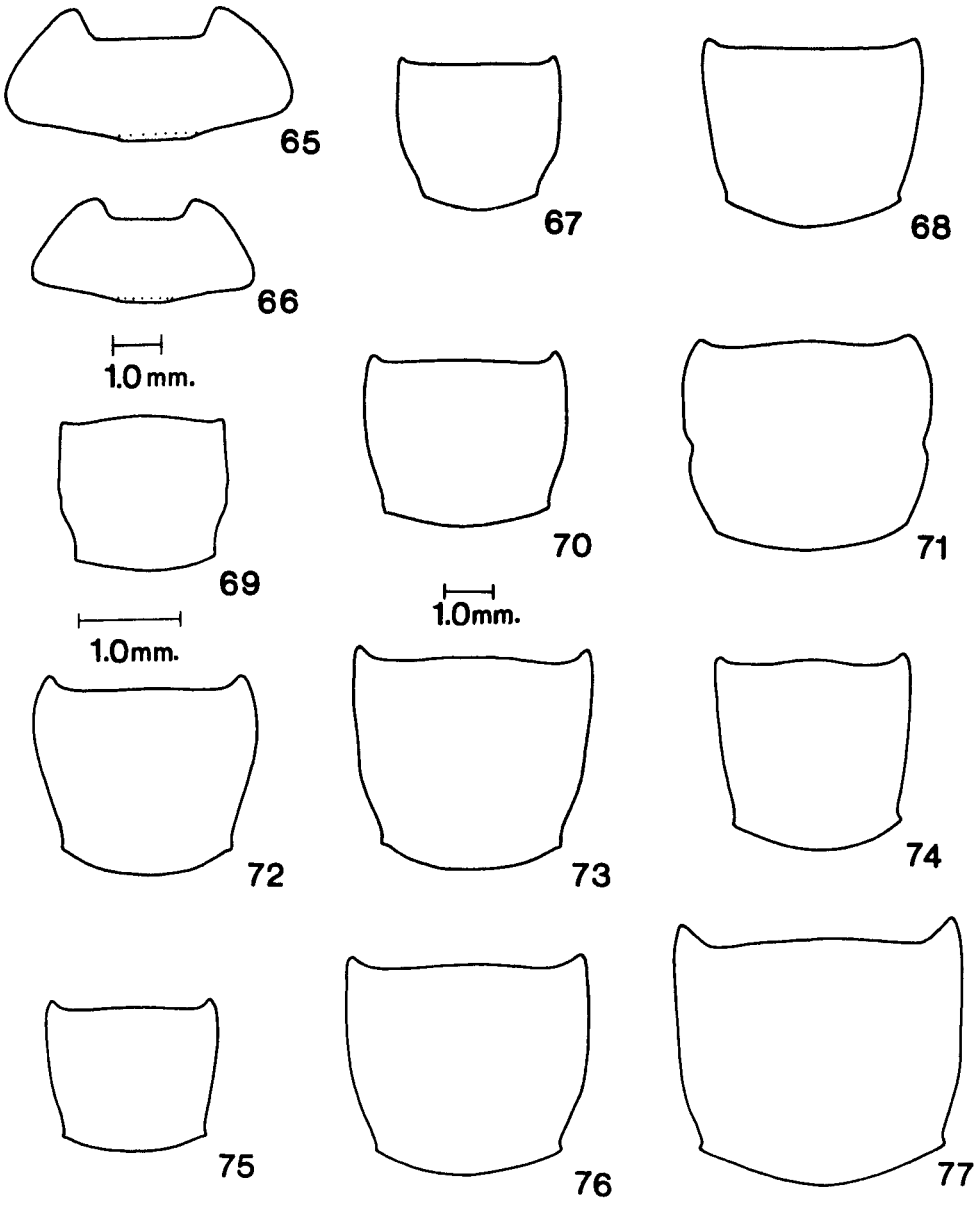




FIGS. 65-77. Pronota, dorsal view. 65-66, *Ostoma* spp.: 65, *O. ferruginea* (L.); 66, *O. columbiana* Csy. 67-77, *Temnochila* spp.: 67, *T. barbata* Lec.; 68, *T. yuccae* (Cr.); 69, *T. hubbardi* Lev.; 70, *T. edentata* Schaef.; 71, *T. rhyssa*, n. sp.; 72, *T. omolopha*, n. sp.; 73, *T. aerea* Lec.; 74, *T. virescens* (Fab.); 75, *T. chlorodia* (Mann.); 76-77, *T. acuta* Lec.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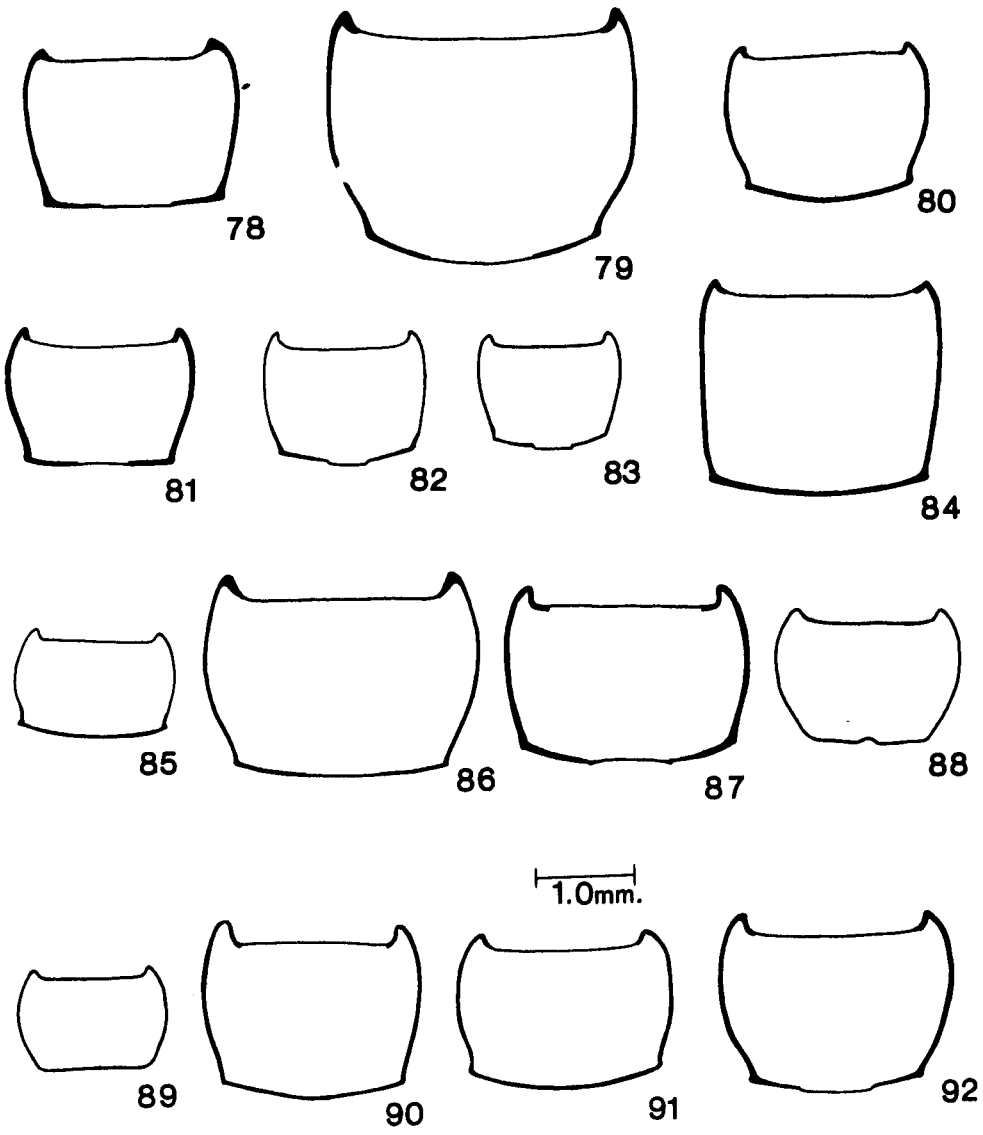
FIGS. 78-92. Pronota of *Tenebroides* spp., dorsal view. 78, *T. sinuatus* (Lec.). 79, *T. mauritanicus* (L.). 80, *T. crassicornis* (Horn). 81, *T. collaris* (Sturm). 82, *T. nanus* (Melsh.). 83, *T. marginatus* (Beauv.). 84, *T. soror* (Duv.). 85, *T. bimaculatus* (Melsh.). 86, *T. americanus* (Kby.). 87, *T. laticollis* (Horn). 88, *T. obtusus* (Horn). 89, *T. rugosipennis* (Horn). 90, *T. semicylindricus* (Horn). 91, *T. floridanus* Schaef. 92, *T. sonorensis* Sharp.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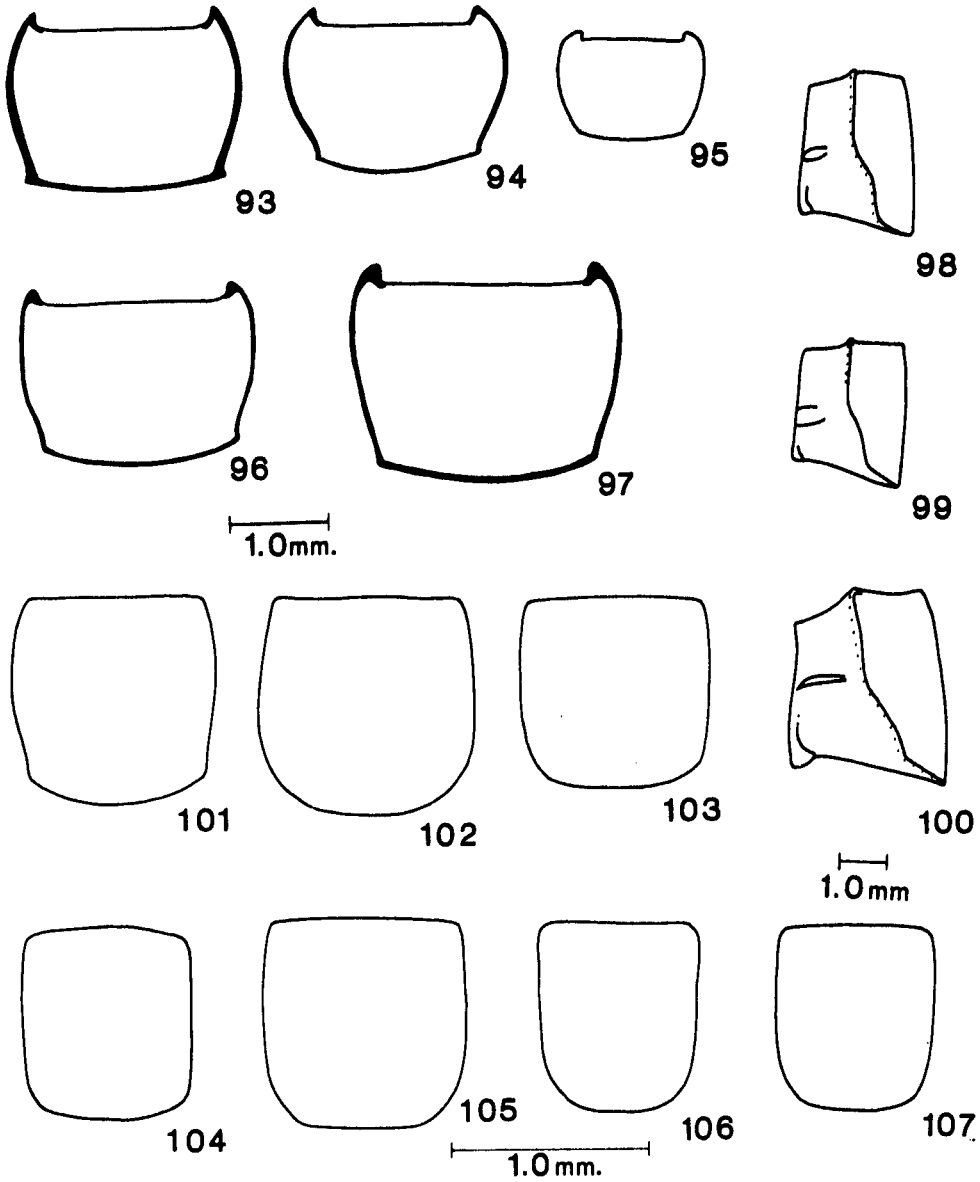
FIGS. 93-107. Pronota. 93-97, dorsal view, Tenebroides spp.: 93, T. tenuistriatus Fall; 94-96, T. corticalis (Melsh.); 97, T. occidentalis Fall. 98-100, lateral view, Temnochila spp.: 98, T. virescens (Fab.); 99, T. chlorodia (Mann.); 100, T. acuta Lec. 101-107, dorsal view, Corticotomus spp.: 101-102, C. depressus Schaef.; 103, C. parallelus (Melsh.); 104, C. cylindricus (Lec.); 105, C. caviceps (Fall); 106, C. apicalis Van D.; 107, C. californicus Van D.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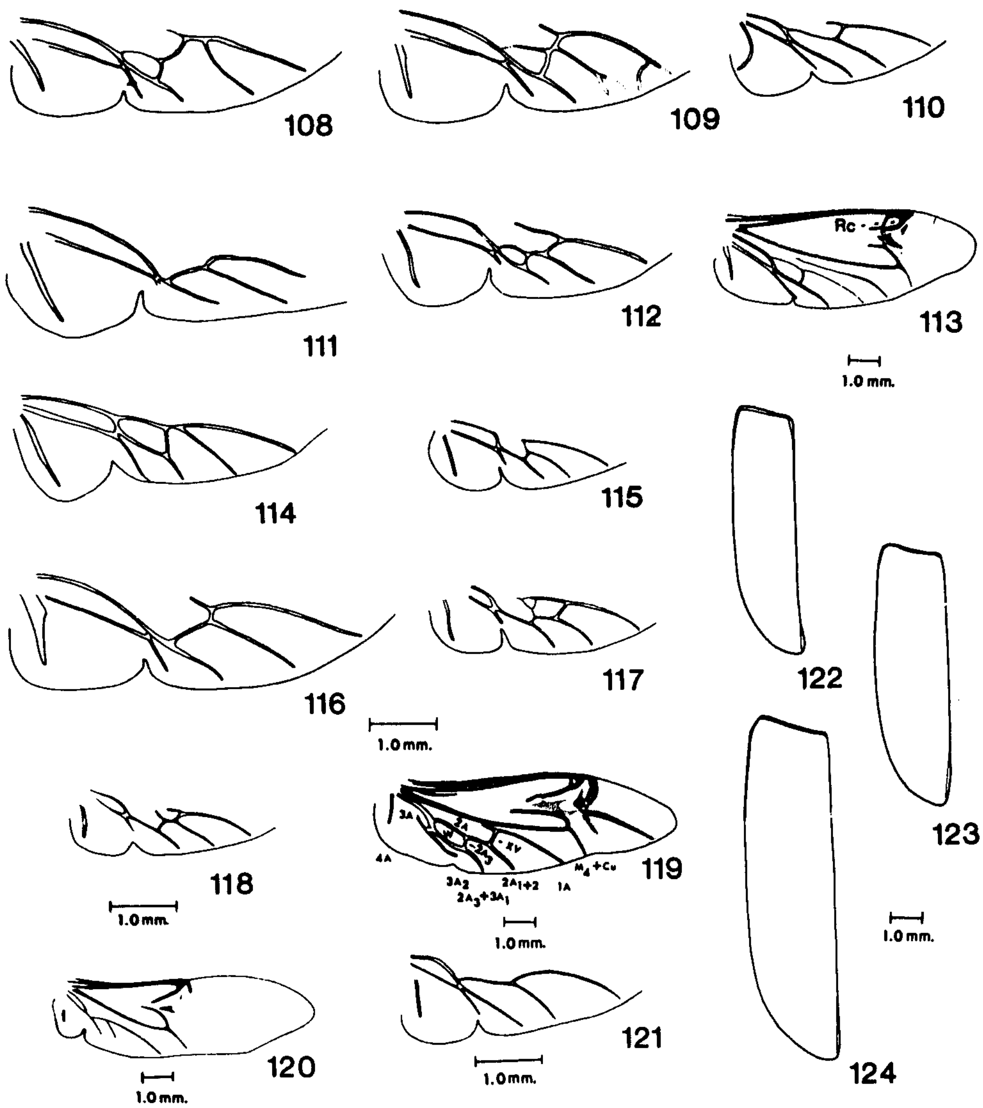
FIGS. 108-124. 108-121, Wings, right: 108-112, anal region: 108-109, Calitys scabra (Thunb.); 110, Airora cylindrica (Serv.); 111-112, Ostoma spp.: 111, O. pippingskoeldi (Mann.); 112, O. columbiana Csy.; 113, entire, Grynocharis oregonensis (Schaef.); 114-118, anal region: 114, Thymalus marginicollis Chev.; 115, Eronyxa pallidus (Mots.); 116, Calitys scabra (Thunb.); 117-118, Nemosoma fissiceps (Fall); 119-120, entire: 119, Temnochila chlorodia (Mann.); 120, Corticotomus parallelus (Melsh.); 121, anal region, Tenebroides mauritanicus (L.). 122-124, Left elytra of Temnochila spp.: 122, T. virescens (Fab.); 123, T. chlorodia (Mann.); 124, T. acuta Lec.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2A
4A
3A2
2A1+2
1A
M4+Cu
2A3+3A1
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121
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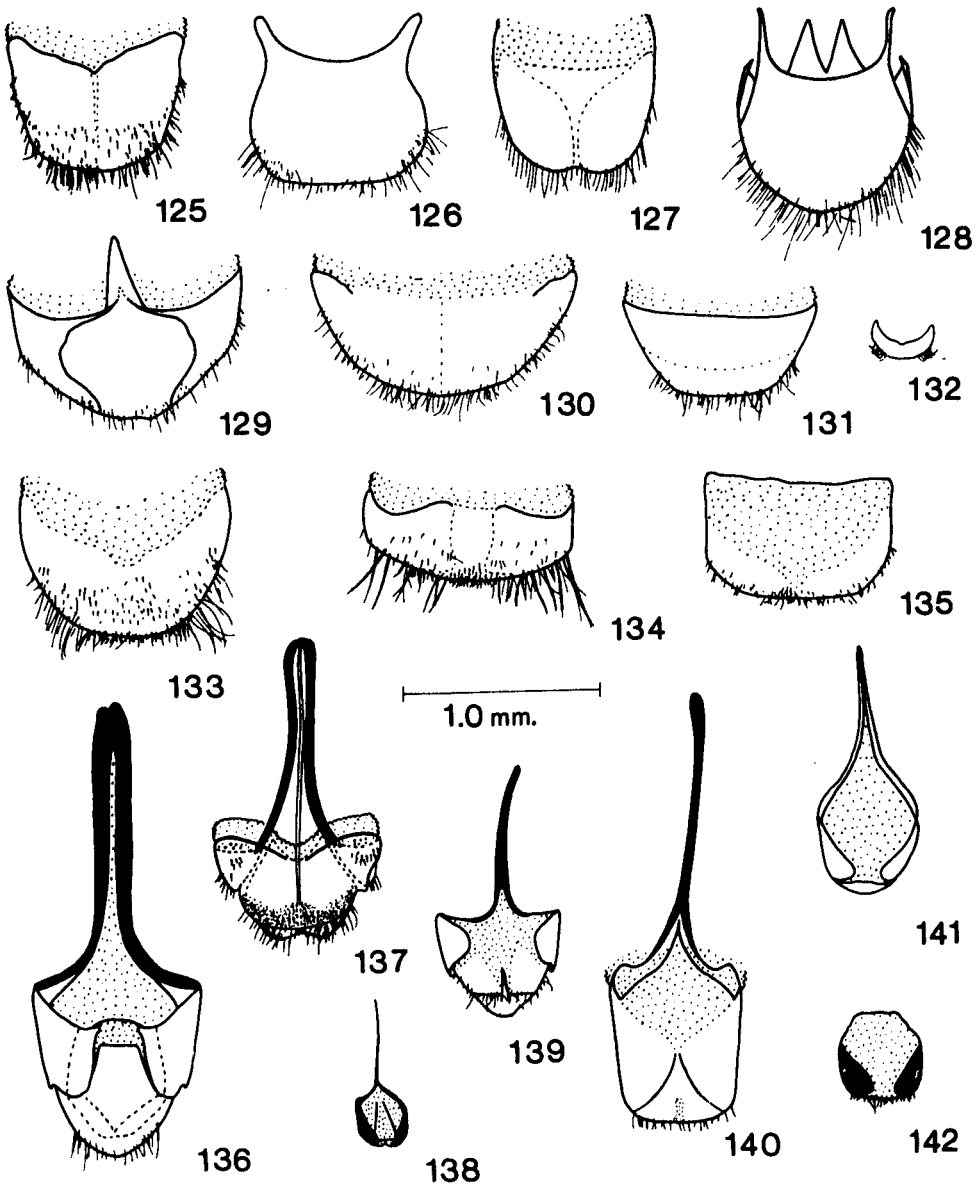
124

FIGS. 125-142. 125-128, Terga VIII: 125-126, of male: 125, Thymalus marginicollis Chev.; 126, Tenebroides mauritanicus (L.); 127-128, of female: 127, Thymalus marginicollis Chev.; 128, Temnochila chlorodia (Mann.). 129-135, Male sterna VIII: 129, Calitys scabra (Thunb.); 130, Ostoma pippingskoeldi (Mann.); 131, Thymalus marginicollis Chev.; 132, Corticotomus cylindricus (Lec.); 133, Airora cylindrica (Serv.); 134, Temnochila chlorodia (Mann.); 135, Tenebroides mauritanicus (L.). 136-142, Terga IX: 136, Calitys scabra (Thunb.); 137, Ostoma pippingskoeldi (Mann.); 138, Corticotomus caviceps (Fall); 139, Thymalus marginicollis Chev.; 140, Airora cylindrica (Serv.); 141, Temnochila chlorodia (Mann.); 142, Tenebroides laticollis (Horn).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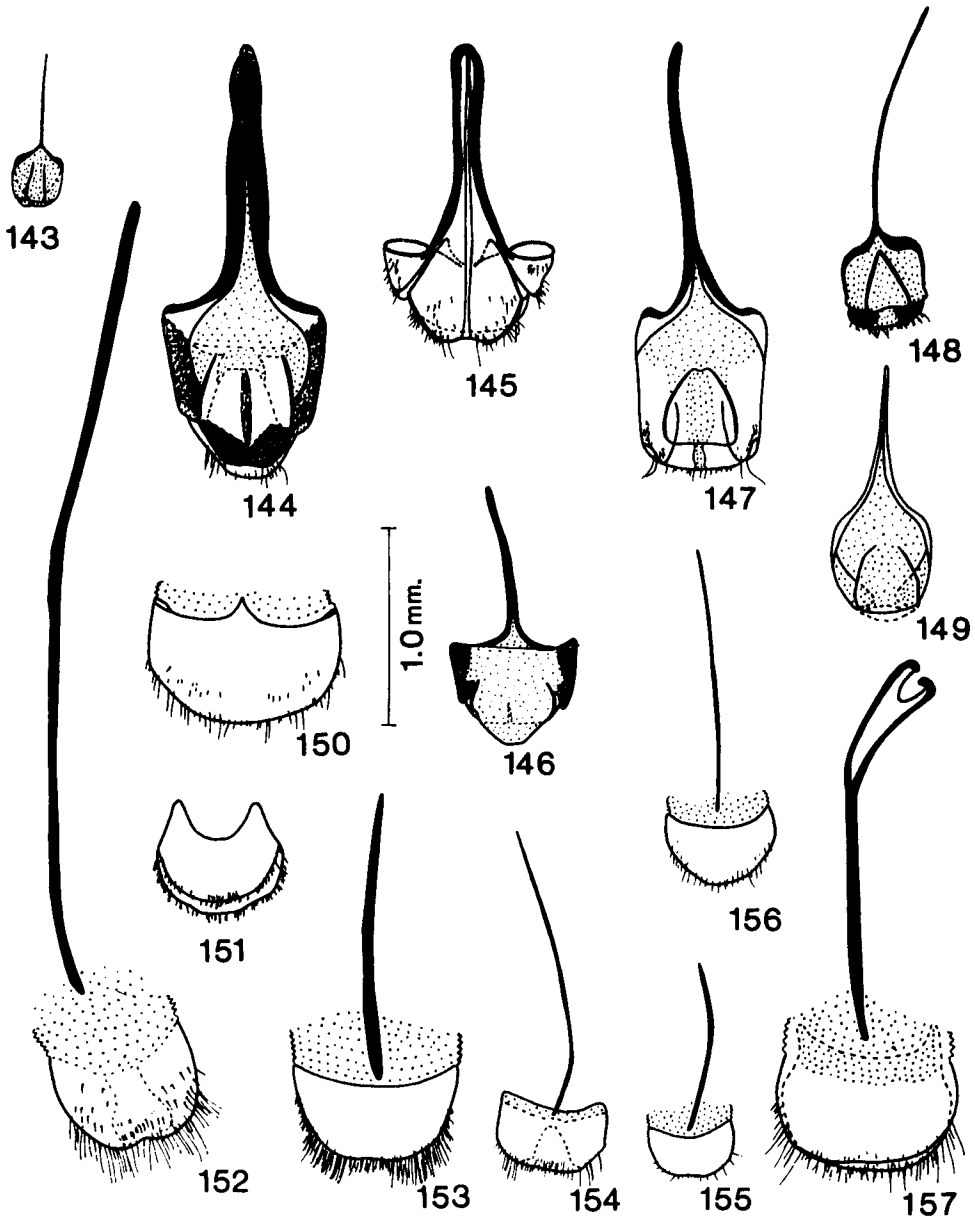
FIGS. 143-157. 143-149, Sterna IX: 143, Corticotomus caviceps (Fall); 144, Calitys scabra (Thunb.); 145, Ostoma pippingskoeldi (Mann.); 146, Thymalus marginicollis Chev.; 147, Airora cylindrica (Serv.); 148, Tenebroides laticollis (Horn); 149, Temnochila chlorodia (Mann.). 150-157, Female sterna VIII: 150, Calitys scabra (Thunb.); 151, Ostoma ferruginea (L.) (flagellum not shown); 152, Airora cylindrica (Serv.); 153, Thymalus marginicollis Chev.; 154, Eronyxa pallidus (Mots.); 155, Corticotomus caviceps (Fall); 156, Nemosoma punctulata Van D.; 157, Tenebroides mauritanicus (L.).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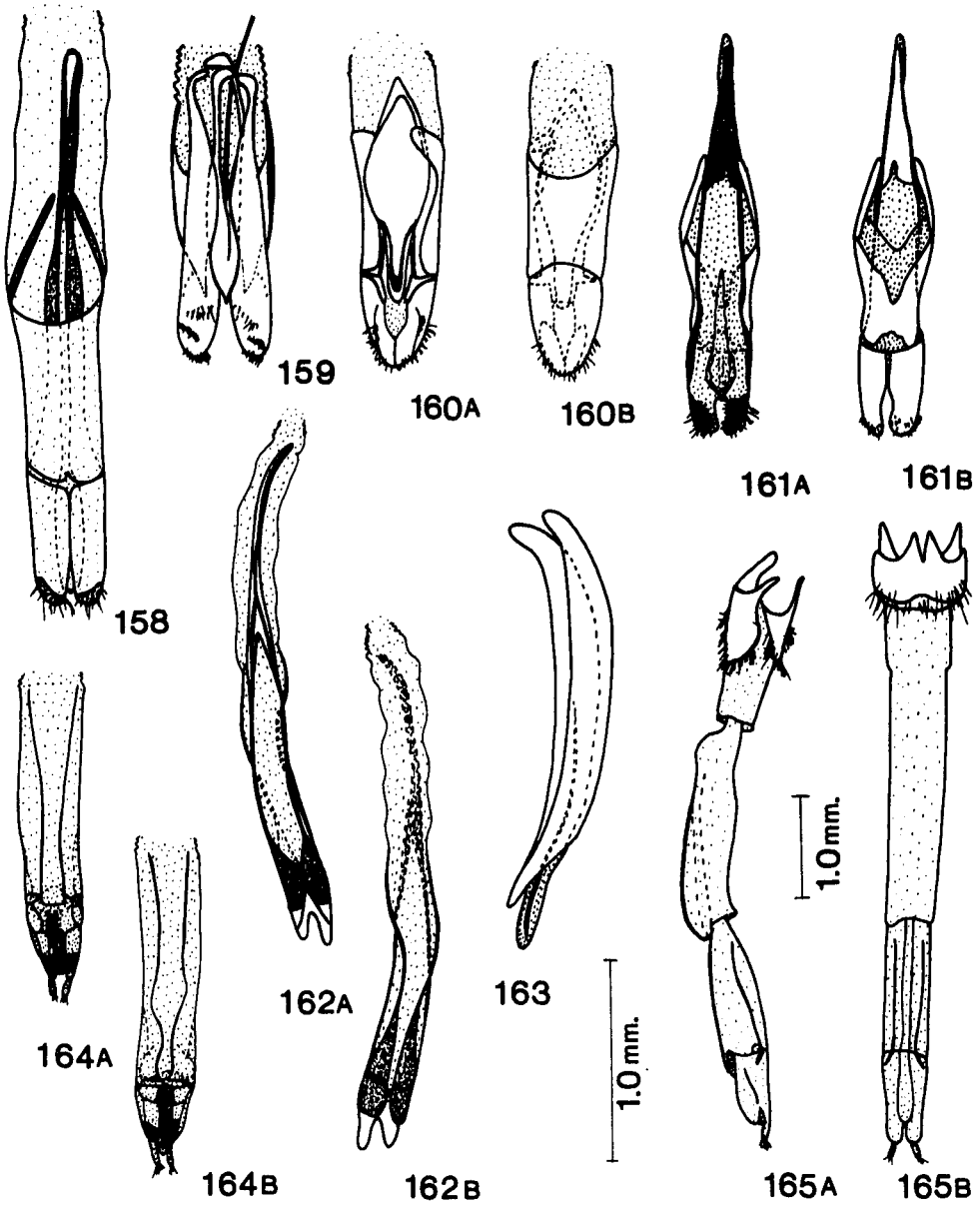
FIGS. 158-165. 158-162, Tegmina: 158, ventral view, Calitys scabra (Thunb.); 159, (plus aedeagus) dorsal view, Ostoma pippingskoeldi (Mann.); 160-162, a, dorsal view, b, ventral view: 160, Thymalus marginicollis Chev.; 161, Temnochila chlorodia (Mann.); 162, Tenebroides laticollis (Horn). 163, Aedeagus of Temnochila chlorodia (Mann.), dorsal view. 164-165, Female genitalia: 164, Eronyxa pallidus (Mots.), a, dorsal view, b, ventral view; 165, Temnochila chlorodia (Mann.), a, lateral view, b, ventral view.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