Proceedings of the United States National Museum

SMITHSONIAN INSTITUTION · WASHINGTON, D.C.

Volume 117 1965 Number 3515

REVISION OF DIAPERINI OF AMERICA NORTH OF MEXICO WITH NOTES ON EXTRALIMITAL SPECIES (COLEOPTERA: TENEBRIONIDAE)

By Charles A. Triplehorn [1]

Introduction

In the family Tenebrionidae, the darkling beetles, is a group of genera which centers around the enormous and cosmopolitan genus *Platydema*. This group has been recognized as a natural one for a long period (see history of the group below), and has been referred to variously as a family, a subfamily, and a tribe. For reasons which will become evident later, I propose to regard it as a tribe, Diaperini, in the subfamily Tenebrioninae.

Various elements have been shuttled in and out of the Diaperini by different authors and a number of classifications have been proposed. Numerous attempts have been made in the past to define the limits of the tribe, but most of these were based solely on the fauna of a particular region and, when expanded to embrace the world fauna, were found to be quite deficient. As usual, the earlier works were based for the most part on the European fauna. Fortunately the Nearctic fauna is comparable to that of the Palaearctic region, so that both fit the system reasonably well.

[1] Department of Zoology and Entomology, Ohio State University, Columbus, Ohio.

In beginning a study of the North American Tenebrionidae, one's initial impression of the Diaperini is that it forms a taxonomically sound group. This was my own feeling on the matter when I reviewed the Ohio species of the family (Triplehorn, 1952). Later, as I began to extend my studies to include the western and southern elements, I soon realized that the group actually was poorly understood. Several extraneous components were present, tribal limits were ill-defined, a number of names of uncertain validity were scattered through the literature, several new species needed to be described, and a certain amount of synonymy was involved among existing species. Moreover, it was evident that despite Champion's excellent work on the Central American fauna, the Nearctic and Neotropical components of the tribe had been compared by him only superficially.

Thus, the problem, which resulted in this report, was suggested. It was decided to review critically the limits of the group on a world-wide basis, to attempt to establish its taxonomic position, and to revise the North American Diaperini in light of our present knowledge of the world fauna.

A number of impediments are immediately apparent. Most of the types of the North American species are in European museums and are inaccessible if, indeed, they still exist. Representative collections from all faunal areas would be impossible to assemble, study, and compare in the time allocated. Certain areas of the world, notably South America, are so rich in new species that too much time would be expended simply in describing the new species encountered.

The scope of the problem has therefore been modified to a revision of the North American components of the tribe, supplemented by remarks on the Neotropical and Palaearctic species that were available. Virtually no material was seen from other extralimital areas, but the taxonomic treatments of such areas as Australia, West Africa, and the Indo-Malayan region were consulted for information regarding the higher categories.

History of the group.—Prior to 1800, a number of authors had described species now included in the Diaperini. One needs only to study the synonymy involved in a well-known species, such as the European *Diaperis boleti* (Linnaeus), to appreciate how confusing these insects were to the early taxonomists. This species was originally described in 1758 as *Chrysomela Boleti* Linnaeus. Earlier it had been mentioned as a *Dermestes* without a specific name (Uddmann, 1753). In succeeding years it was placed in *Tenebrio* (DeGeer, 1775) and *Coccinella* (*fasciata*) Scopoli (1763).[2]

[2] Synonymy based on Seidlitz (1894, p. 515).

It remained for Müller (1776, p. 74) to validate the generic name *Diaperis* of Geoffroy by including under it *boleti* Linnaeus. The history of the group might perhaps be regarded as beginning at this point.

Other species have had a similar history. Among the North American species, *Neomida bicornis* (Fabricius) was originally described (1776) in the genus *Hispa; Platydema ellipticum* (Fabricius) was placed originally in the genus *Tenebrio* and later transferred to *Mycetophagus* (Fabricius, 1801). *Platydema flavipes* (Fabricius, 1801) was also placed in *Mycetophagus*.

By 1831, the genus *Diaperis* had become quite sizable. It was in that year that Laporte and Brullé produced their monumental taxonomic treatise on the world Diaperini entitled "Monographie du Genre Diaperis." In this key work, the authors divided the genus *Diaperis* in its older sense into seven component genera, recognizing and describing as new, *Platydema* and *Oplocephala* (=*Hoplocephala*=*Neomida*), both of which are represented in North America, and *Ceropria* of the old world tropics, along with *Diaperis* in its present sense. Three other genera which they originally included have been moved to other widely separated tribes.

Redtenbacher (1845, p. 128) was the first to assign a name to this assemblage of genera recognized by Laporte and Brullé. His "Familie Diaperides" contained five genera: *Pentaphyllus*, *Phyletes* (=*Alphitophagus*), *Platydema*, *Diaperis*, and *Oplocephala* (=*Neomida*).

The next important contribution was that of Mulsant (1854). He divided the European Latigènes (=Tenebrionidae) into five "Groupes" which more or less correspond to currently recognized subfamilies. His third "Groupe" he called "Les Diaperides," and this was divided into seven "Familles," among which are a number of units which we now recognize as tribes (e.g., Phaleriens, Ulomiens). Mulsant's third "Famille" was called "Les Diaperiens" and is roughly comparable to the tribe Diaperini in its present sense. On the basis of the entire anterior margin of the eyes, he separated the "Pentaphyllaires," containing only the genus *Pentaphyllus* from the remainder of the "Famille," which he called "Les Diapéraires." In this "Deuxième Branche" he recognized the following genera: *Scaphidema*, *Philethus* (=*Alphitophagus*), *Diaperis*, *Platydema*, and *Oplocephala* (=*Neomida*). It is to the everlasting credit of Mulsant that his concept of the group, proposed at this early date, still stands relatively unchanged. His six genera (including *Pentaphyllus*) are identical, except for nomenclatorial changes, with the six listed by Portevin in 1934 for France.

Redtenbacher (1858) divided the Tenebrionidae, as currently understood, into four families of which number 47 is the "Diaperides." In this family he placed 14 genera, including all of the genera

which comprise the Diaperini in its present sense, plus such extraneous elements as *Cossyphus, Oochrotus, Ammobius, Bolitophagus, Erelus, Trachyscelis, Sphindus,* and, interestingly enough, *Phaleria.* The genera now included in the Ulomini were placed in another family ("Tenebrionides").

Lacordaire (1859), treating the group on a worldwide basis, divided the "Ténébrionides" into 46 tribes of which number 29 is called "Diapérides." He followed Mulsant closely, retaining the distinction between the "Pentaphyllides" (genus *Pentaphyllus*) and the "Diapérides vraies," which included all the genera Mulsant recognized plus several tropical genera which need not concern us here (*Cosmonota, Ceropria, Hemicera*). This work contains no great innovation over that of Mulsant.

Jacquelin du Val (1861) divided the "Famille des Ténébrionides" into 23 "Groupes." His "Groupe 18, Diapérites" embraced the "Bolitophagites, Ulomites, Gnathocérites and Hypophloeites" or, in other words, the Ulomini and Bolitophagini of modern workers, as well as "Diapérites propres."

In the diaperines at least, he seems to have been a lumper of higher categories but a splitter at the generic level. His lack of conservatism influenced later workers to include a number of extraneous elements which ultimately made the Diaperini a catch-all for a number of genera which were difficult to place.

By the time of Reitter (1911*a*), the group was again on a relatively firm taxonomic foundation. He divided the Tenebrionidae into 12 tribes, the Diaperini containing *Scaphidema, Diaperis, Platydema, Arrhenoplita* (=*Neomida*), *Alphitophagus,* and *Pentaphyllus.*

Around the middle of the 19th century, as the earlier North American coleopterists began to give serious attention to the Tenebrionidae, they needed only to fit their new finds into an already well-constructed classification. No sweeping changes have been introduced by any of the American workers who confined their activities in the group to descriptions of new genera and species. The tribe Diaperini as treated by LeConte and Horn (1883) consisted of eight genera divided into three groups. The first group (Diaperes) contained *Diaperis, Hoplocephala* (=*Neomida*), *Platydema, Phylethus* (=*Alphitophagus*), *Liodema,* and *Scaphidema;* the second group (Hypophloei) contained *Hypophloeus;* the third group (Pentaphylli) contained *Pentaphyllus.*

As is frequently the case, the greater number of North American species of Diaperini were described by European workers. Prominent among these were Laporte and Brullé (1831). Through correspondence with A. Villiers of the Musée National d'Histoire Naturelle, it was learned that the specimens upon which their monograph was

based have passed through several hands and those that have not been totally destroyed are in such a state of disarrangement that they are unrecognizable. The descriptions of Laporte and Brullé are accurate and very clear, so that recognition of their species is for the most part relatively easy.

Motschoulsky (1873) proposed a number of names for North American species of Diaperini which until now have either gone unrecognized or have been misapplied. It is doubtful that he ever consulted any existing works (e.g., Horn's revision, 1870) since he described everything he encountered as new. Fortunately, he was a keen observer and a very fine writer, so that all of his species are recognizable and all but one of his North American species may be irrefutably placed as synonyms under older names.

In direct contrast stand the taxonomic endeavors of Chevrolat (1877a, b, 1878). Happily for this study, he encountered very few of the North American species, but the multitude of names which he has proposed for South and Central American species, all accompanied by unnecessarily brief and inadequate descriptions, has made it virtually impossible for anyone to work intelligently with species from these regions. Some of his descriptions could apply to any number of species. Also, he chose to publish in the Petites Nouvelles Entomologiques, a relatively obscure and not generally available journal. Finally, he presented neither keys nor synopses of his species, merely registering a short description of species after species with practically nothing of a comparative nature mentioned.

Morphology and terminology.—Each genus and species is fully described in what is hoped to be clear and understandable terms. In many instances, great emphasis is placed upon characters which, in the final analysis, are relative in nature. Such characters are, in themselves, highly objectionable but unavoidable in many cases. Quite often these descriptions presuppose a familiarity with some closely related species. This was done intentionally in order that the reader will have some point of reference. Where practicable, illustrations have been prepared to eliminate some of the guesswork, particularly in regard to characters used in the keys.

The only new character which has been utilized to any appreciable extent is the structure of the male genitalia. The terminology is essentially that of Sharp and Muir (1912), Blaisdell (1909, 1939), and Lindroth and Palmén (1956), all of whom more or less agree. It is not the purpose of this paper to delve deeply into the controversies attending such studies but to use these structures as taxonomic implements. For this purpose, the male aedeagi were useful in the broader classification aspects, but were seldom necessary in distinguishing between species.

The male aedeagus consists of a basal sclerite, a pair of parameres (the lateral lobes of Blaisdell), which are often fused to form a single piece, and a penis (the median lobe of Blaisdell) bearing more or less prominent struts at the proximal end. In the event that the parameres are fused, the resultant structure is referred to in this paper as the apical sclerite.

The female genitalia, on the other hand, are so similar to one another as to be practically useless as taxonomic characters. The ovipositor is almost entirely membranous and is always provided with an apico-lateral pair of 1-segmented styli, each bearing terminal sensory setae. Only in the genus *Diaperis* (pl. 1, fig. 6) is there a radical departure from the conventional form illustrated by *Apsida* (pl. 6, fig. 49).

Techniques.—Genitalia were extracted and prepared for study in the usual manner. Dried specimens were first relaxed in hot water, the elytra spread from above and the contents of the abdomen scooped out along with the dorsal membrane with jeweler's forceps. It was found that this method of extraction left the specimens so unaltered that it would be difficult to detect they had been disturbed in any way. In some instances it was found expedient to remove the entire abdomen; in such cases it was usually possible to reattach the abdomen, leaving the specimen relatively intact.

After removal, the mass of tissue containing the genitalia was placed in a plant industry watch glass containing a 10 percent solution of potassium hydroxide warmed over a desk lamp until the muscular tissue was largely decomposed.

Several stains (mercurochrome and eosin red) were tried as a means of obtaining contrast in the unsclerotized portions of genitalia, but since these tended to obscure more characters than they intensified, the stains were abandoned altogether.

The cleared, unstained genitalia were placed in a drop of glycerine on a glass slide or watch glass, oriented and drawn by means of an ocular micrometer grid disc in a binocular microscope, using coordinant paper to insure accuracy. The outline was transferred to a 2-ply "Strathmore" drawing board and inked. Details were filled in by a compound microscope using reflected light.

In the drawings themselves, intensity of sclerotization is indicated by stippling, heavily sclerotized portions being entirely black and membranous areas left white.

The figures of the adult beetles were drawn on number 1½ and number 2 pebble-grained "Rossboard," using the ocular micrometer grid and coordinant paper essentially as described under genitalia drawings.

The photographs on plate 7 were taken with an Exacta camera

through extension tubes by Dr. John C. Moser, whose generous aid is hereby gratefully acknowledged.

Biology.—Information on life histories, immature stages, and habits of the North American species of Diaperini is extremely fragmentary. Apparently, they are almost all associated with fungi, either feeding on mycelia under bark or in sporophores and occasionally on fungi growing on other organic material. A number of species in the genera *Platydema*, *Neomida*, and *Diaperis* are recorded on fungi in the genera *Polyporus* and *Fomes*. Gebien (1925) has suggested that since both of these fungus genera are distributed throughout the world, there is no doubt but that this alone explains the wide distribution of the Diaperini and the Boletophagini. He supports this dogmatic statement with an impressive list of species of *Polyporus* and *Fomes* along with their world distribution, illustrating the surprisingly wide dispersion of many of them. *Fomes obliquus* Pers., for example, occurs in Europe, North and South America, the West Indies, Africa, Ceylon, and Australia; *Fomes pectinatus* Klotzsch., appears in Europe, North America, Australia, Java, the Philippines, India, and Africa; *Polyporus gilvus* Schwein., appears in North and South America, the West Indies, Africa, Australia, New Guinea, the Malay Archipelago, and East India. Unfortunately it is not known to what extent any of the diaperines are host specific. It remains to be shown by actual tests just how close these relationships are and as yet very few contributions have been made toward this end.

A perusal of the collection data accompanying specimens of North American Diaperini indicates that most of them are to be found in the adult stage the year around, hibernating under bark in the more northern latitudes. Some of them (e.g., *Neomida bicornis*, *Diaperis maculata*, *Platydema ruficorne*, and *P. excavatum*) occasionally congregate in large numbers ostensibly for this purpose.

Two species, *Alphitophagus bifasciatus* (Say) and *Platydema ruficorne* (Sturm), have entered the economic literature as the two-banded fungus beetle and the red-horned grain beetle respectively. Both have been reported on a number of occasions infesting cereal products, but in no instance have they been observed attacking sound grain or freshly milled products. It is only in situations where these products are allowed to accumulate and spoil that the beetles are attracted to them, in all probability to feed upon the attendant fungi rather than the grain products themselves. These beetles are generally regarded as of little or no economic importance.

Specimens studied.—A total of 15,467 specimens of North American Diaperini, supplemented by several thousand specimens from extralimital areas, was studied. New characters which might help place the tribe on a sounder basis were constantly sought. One that has

been almost completely overlooked until now and which was found to be quite valuable, especially in defining generic limits, is the structure of the male aedeagus. More than 300 specimens were dissected so that these structures might be studied.

Several institutions housing important collections were visited for the purpose of examining types: the Horn collection in the Academy of Natural Sciences of Philadelphia, the Casey and Linell collections in the U.S. National Museum, and the LeConte, Haldeman, Melsheimer, and Zimmerman collections in the Museum of Comparative Zoology, Harvard Univ.

The following institutions have lent material, in some instances their entire collections of the group, for this study. In parentheses are the abbreviations used for these institutions when they appear in the text, followed by the name of the person or persons to whom I am indebted for making the specimens available:

Agricultural and Mechanical College of Texas (TAM), H. J. Reinhard
American Museum of Natural History (AMNH), John C. Pallister
British Museum (Natural History) (BMNH), J. Balfour-Browne
California Academy of Sciences (CAS), Hugh B. Leech
Carnegie Museum (CMP), George Wallace
Cornell University (CU), Henry Dietrich
Department of Agriculture (Canada), Science Service (CSS), W. J. Brown
Emory University (EU), Edward F. Menhinick
Illinois Natural History Survey (INHS), Milton W. Sanderson
Iowa State University (IoSt), Jean L. Laffoon
Kansas State University (KSU), Fred A. Lawson
Michigan State University (MSU), Roland L. Fischer
Museum of Comparative Zoology, Harvard University (MCZ), W. L. Brown and Edward A. Chapin
Ohio State Museum (OSM), Edward S. Thomas
Ohio State University (OSU), Josef N. Knull
Ohio University (OU), William C. Stehr
Oklahoma State University (OAM), F. A. Fenton
Oregon State College (OrSt), Frank F. Hasbrouck
Pennsylvania State University (PenSt), S. W. Frost
Provincial Museum, British Columbia (PMBC), George A. Hardy
Purdue University (PU), Leland Chandler
Royal Ontario Museum of Zoology and Palaeontology (ROMZ), Glenn B. Wiggins
State Plant Board of Florida (FPB), Howard V. Weems, Jr., and R. E. Woodruff
South Dakota State College (SDSC), H. C. Severin
United States National Museum (USNM), T. J. Spilman
University of Arizona (UAriz), Floyd G. Werner
University of Arkansas (UArk), Lawrence H. Rolston
University of California (UCal), Paul D. Hurd, Jr.
University of Idaho (UIda), W. F. Barr
University of Kansas (UKan), George W. Byers
University of Minnesota (Minn), Edwin F. Cook
University of Missouri (UMo), Paul J. Spangler and Wilbur R. Enns
University of Nebraska (UNeb), W. T. Atyeo

Utah State University (Utah), George F. Knowlton

Abbreviations for collectors and collections used in the text are:

C. A. Triplehorn collection (CAT)
Dorothy J. and Josef N. Knull (DJ and JNK)
Musée National d'Histoire Naturelle, Paris (MNHN)
Norma Jean and Elbert L. Sleeper (NJ and ELS)
University of Moscow Museum of Zoology, U.S.S.R. (UMMZ)

A number of individuals have been invaluable in securing information on generally inaccessible literature, locality data, collecting notes, and other matters. Prominent among these must be mentioned: Dr. J. G. Franclemont, Dr. Howard E. Evans, and Dr. Henry Dietrich, all of Cornell University; Mr. T. J. Spilman, U.S. Dept. Agric. at the U.S. National Museum; Professor J. N. Knull, Ohio State Univ.; Dr. W. L. Brown, Jr., and Dr. E. A. Chapin, Museum of Comparative Zoology, Harvard University; Dr. H. J. Grant, Jr., Academy of Natural Sciences of Philadelphia; Dr. H. B. Leech, California Academy of Sciences; and Dr. E. L. Sleeper, Long Beach State College.

Dr. J. Balfour-Browne of the British Museum provided me with a set of the Champion cotypes which are under his supervision and compared specimens with types in the Bates collection at the same institution. His suggestions were most welcome and much credit for the accuracy of many statements contained herein is directly attributable to his keen observations.

The true status of a number of Motschoulsky's species could not have been ascertained without the enthusiastic cooperation of A. Ahelochovtsev and S. Kelejnikova of the Zoological Museum of the University of Moscow, U.S.S.R. The latter's meticulous comparisons of specimens that I submitted with the Motschoulsky types has clarified a number of names which have plagued colcopterists for three quarters of a century.

A. Villiers of the Musée National d'Histoire Naturelle has assisted by comparing specimens with the Chevrolat types.

The many curators of the various North American collections have been especially cooperative in either sending me material for study or in giving me unrestricted use of collections under their supervision. To all of them go my sincerest thanks.

Finally, to my wife, Wanda E. Triplehorn, goes my full measure of gratitude for her help in editing, typing, and checking this manuscript.

Tribe Diaperini Redtenbacher

Diaperides Redtenbacher, 1845, p. 128; 1849, p. 52; 1858, p. cv.—Lacordaire, 1859, p. 298.—Champion, 1886, p. 170.

Diaperiens Mulsant, 1854, p. 195.

Diaperidae Thomson, 1859, p. 115; 1864, p. 248; 1868, p. 122.

Diapérites Jacquelin du Val, 1861, pp. 295, 329.

DIAPERINI LeConte, 1862, p. 236.—Horn, 1870, p. 378.—Redtenbacher, 1874, p. 104.—Seidlitz, 1875, p. 95; 1891, pp. 121, 131; 1894, p. 506.—LeConte and Horn, 1883, p. 383.—Blatchley, 1910, p. 1260.—Reitter, 1911a, p. 338.—Portevin, 1934, p. 23.—Gebien, 1939, p. 765.—Blackwelder, 1945, p. 527.
DIAPERINAE Gebien, 1911, p. 364; 1925, p. 134.—Leng, 1920, p. 233.

Body usually oval and rounded, convex; wings well developed and functional. Head usually retracted into thorax as far as eyes which are emarginate anteriorly (except in *Pentaphyllus*); antennae with outer segments thicker than basal ones, perfoliate, frequently forming a distinct club; mentum small, gular peduncle distinct; genae expanded to cover bases of mandibles which are short and bifid apically; a distinct membranous band present between clypeus and labrum. Pronotum transverse with distinct lateral marginal bead; basal margin bisinuate with a fovea on each side of middle. Elytra evenly convex, never coarsely sculptured, usually punctato-striate, rarely pubescent; epipleura narrow. Prosternum short; prosternal process continuing posteriorly beyond front coxae; mesosternum more or less grooved for reception of prosternal process (except in *Liodema*); anterior coxae subtransverse; hindcoxae strongly and obliquely transverse; anterior prolongation of basal abdominal sternite acute between hindcoxae; tibiae usually slender, spurs fine and short; hindtibiae with finely crenulate ridges on outer margins; tarsi finely pubescent beneath.

TRIBAL LIMITS.—The Diaperini have been treated a number of times on a regional basis, but no recent attempts have been made to correlate the information derived from a study of the world fauna. The present paper can hardly lay claim to such a contribution, but at least a serious attempt has been made to compare the North American components of the tribe with those from Central and South America. Enough northern European species were available to make possible the inclusion of rather valuable, if scanty, information on certain Holarctic genera (i.e., *Scaphidema* and *Pentaphyllus*). Gebien has treated the West African (1920) and the Indo-Malayan (1925) Diaperini and his general considerations and conclusions are supported by and closely parallel those of the present study.

This tribe is difficult to define both in determining its limits and in its relation to other tribes within the subfamily Tenebrioninae. In the past, the character variously expressed as "eyes more conspicuous than sides of front" was used to separate the Diaperini from Phaleriini, Ulomini, and related tribes. This character is misleading and utterly worthless when one compares the small eyes of *Pentaphyllus* and *Scaphidema*, both members of Diaperini, with those of most of the species of *Phaleria* and with many genera of Ulomini.

A very useful character which has been generally overlooked by American workers is the shiny membranous band separating the clyp-

eus and labrum. In all genera which have been studied during the present survey, this structure has been distinctly present and may be used at least for all New World genera of Diaperini. Gebien (1925) reported that it is absent in *Labidocera* Gebien, from the Indo-Malayan region and in *Menimus* Sharp, from New Zealand. Since both of these genera have subsequently been removed from the Diaperini (Gebien, 1940), it is reasonable to assume that all members of the tribe as it is currently understood have the membranous band present.

It is the presence of this membranous band which strongly suggests that the Phaleriini should be united with the Diaperini. In general habitus and in the form of the male aedeagus, species of *Phaleria* are remarkably similar to typical species of *Platydema*. Indeed, many specimens of the former genus were sent along with Diaperini for identification and in one very famous collection, specimens of *Phaleria picipes* LeConte, determined by a distinguished coleopterist as *Platydema laevipes* Haldeman, have stood unchallenged for half a century.

The most constant difference between the two tribes, and the only conceivable reason for retaining them as distinct, is the greatly expanded front tibiae and spiny legs in species of *Phaleria* and related genera. The broad front tibiae are not entirely absent in the Diaperini; several of the dark, chestnut-colored species of *Neomida* from South America (e.g., *N. castanea* Bates and *N. hoffmannseggi* Laporte and Brullé) have these members fully as broadly expanded as in many of the Phaleriini.

A critical study of the relationships between the Diaperini and Phaleriini must be deferred until later, but it seems that there is little justification in retaining them as two distinct tribes.

In all species of North American Diaperini, there is a finely crenulate, sharp margin on the outer face of the hindtibiae. This character was discovered by Gebien (1925), who used it as the decisive one in doubtful cases. On this basis, he removed *Basanopsis* from the Diaperini and transferred it to the Ulomini.

The tribal limits therefore may be stated at this time as consisting of two well-defined characters: (1) the finely crenulate ridges of the hindtibiae and (2) the membranous band between labrum and clypeus.

Based on these criteria, a number of taxa, formerly included in this tribe, must be placed elsewhere. In the North American fauna, the following changes must be made: *Metaclisa* Jacquelin du Val should be placed in the tribe Cnodalonini, and *Corticeus* Piller and Mitterpacher (=*Hypophloeus* Fabricius) should be placed in Ulomini. These two transfers have already been made by Gebien (1940) and appear quite sound.

The species described by Horn (1874) as *Scaphidema pictum* has been transferred to the Phaleriini, where it now stands under the name *Phaleromela variegata* Triplehorn. The biological and nomenclatorial

problems involved in this transfer are discussed elsewhere (Triplehorn, 1961).

The most perplexing task in this revision has been determining the phylogenetic position of *Uloporus ovalis* Casey. No new material has been placed in collections since the original description was published in 1894, despite Casey's contention that the species is "widely diffused throughout the States bordering the Gulf of Mexico." A series of USNM specimens from Columbus, Tex., collected by Hubbard and Schwarz, from which the two specimens forming the basis for Casey's description came, was studied.

Uloporus ovalis possesses a number of features in common with certain species of Diaperini and it is, perhaps, understandable why Casey chose to assign it to this group. A number of these conspicuous features are considered unusual, or at least not typical of the Diaperini. A distinct dorsal vestiture is found in *Pentaphyllus*, *Alphitophagus*, and some of the species of *Neomida;* a 3-segmented antennal club is found in a West Indian genus as yet undescribed; the stout prosternal "bridge" is approached in several genera, especially so in another undescribed West Indian genus. Actually, the peculiar relationship between prosternum and mesosternum seen in *Liodema* is of a more "atypical" form than that of *Uloporus*, and this structure is certainly not of sufficient weight to rule it out of the Diaperini.

The hindlegs (pl. 6, fig. 64b) are quite different from those of any of the Diaperini encountered in this study. The tibiae lack sharp serrulate margins and the second tarsal segment is distinctly lobed beneath.

The male genitalia (pl. 6, fig. 64a) are equipped with prominent claspers which have no counterpart elsewhere in the Diaperini. Claspers of a similar type are found in certain Alleculidae, Melandryidae, and Monommidae, but not to my knowledge in any of the Tenebrionidae.

Except for the character of the legs and male genitalia, Casey's description is, as usual, painstakingly accurate and complete. No new morphological clues have been discovered which would enable, with any degree of confidence the placement of this species in its proper place.

A study of the Neotropical and West Indian Diaperini is under way and it is hoped that, as more is learned about the vast number of genera and species from these areas, the phylogenetic status of *Uloporus* can be determined.

Since this project may require years, it was deemed advisable to proceed with the publication of the remainder of the treatise, recognizing the fact that the retention of *Uloporus* in the Diaperini is

probably incorrect, but deferring its ultimate assignment to avoid possible further confusion.

Sexual dimorphism.—It is noteworthy that among species of Diaperini, it is either very easy or else virtually impossible to distinguish between the sexes without dissection, depending upon the species involved. In almost the entire genus *Neomida* and in quite a few species of *Platydema*, the males are provided with conspicuous frontal horns, whereas the females have either short tubercles instead of horns or no cephalic armature at all. The size of these horns is subject to a certain amount of variation, even among individuals of a single population, but the horns of the male are in all cases quite distinct from the tubercles of the female. This situation largely prevails in these two genera even when considered on a worldwide basis.

In the Indo-Malayan region, Gebien (1925) found species of *Platydema* in which neither the males nor the females are provided with cephalic armature. This is true of 15 of the 19 North American species of *Platydema*. Gebien also reported two distinct species groups of *Platydema* in which the horns of the male were asymmetrical, in one, the right, and in the other, the left, horn being larger. In several species (e.g., *P. monoceros* Gebien) there is but a single frontal horn; in others (e.g., *P. tricuspis* Motschoulsky) there is a rather large horn on the clypeus in addition to the two frontal horns.

An equal range of variation is to be found in *Neomida*, in which the males of almost every species have some sort of frontal or clypeal armature which is totally lacking or but feebly developed in the females.

It is not surprising that great use has been made of these structures. In Gebien's key to the species of *Platydema* of the Indo-Malayan region, they have been used as primary characters so that it would be impossible to determine females unless they could be associated in some way with males.

In *Pentaphyllus pallidus*, the males are provided with short tubercles near the inner margins of the eyes, whereas the females are unmodified in this respect. In *P. californicus* there is no sexual dimorphism.

The males of *Diaperis maculata* have the anterior margin of the pronotum bituberculate at the middle and have two blunt but prominent clypeal tubercles; these same structures are unmodified in females of that species. No sexual dimorphism is evident in any of the other species in the genus.

Probably the most peculiar example of sexual dimorphism is to be found in *Alphitophagus bifasciatus* (Say). The male of this species (pl. 6, fig. 57) has the clypeus greatly swollen and excavated laterally for reception of the prolonged genae. In addition, there are

two short carinate ridges on the frons near the epistomal margin. The head of the female is completely unmodified.

Except for the above-mentioned modifications, there is very little that can be used in separating the two sexes. In North America, this applies to most species of *Platydema*, three of the four species of *Diaperis*, one of the two species of *Pentaphyllus*, and the genera *Palembus*, *Scaphidema*, *Liodema*, and *Apsida*, each represented in our fauna by a single species. If a series is available, it is usually possible to separate most of the males from most of the females by size and shape; the females generally are larger and broader.

Geographic distribution.—Some genera of Diaperini are extraordinarily widely distributed. The ubiquitous genus *Platydema* includes species from every continent and many islands have species which are peculiar to them (e.g., *P. antennatum* Laporte and Brullé, on Cuba). *Neomida* is also cosmopolitan, but contains fewer species. If we exclude the Ulomini with its many species widely dispersed through commerce, the Diaperini are probably the most widespread of all the Tenebrionidae, although a few genera are somewhat restricted. *Cosmonota* is confined exclusively to Central and South America, *Ceropria* to the Old World tropics, and *Scaphidema* to the Holarctic region.

Most of the individual species occupy moderately restricted ranges. Only one, *Alphitophagus bifasciatus* (Say), can be considered cosmopolitan. As might be expected, the tropics of both hemispheres abound in species of Diaperini. The relative paucity of Nearctic species stands in distinct contrast to the bewildering array of Neotropical species, especially in the large genus *Platydema*. *Liodema* and *Apsida*, both moderate-sized genera, each have but one species represented north of the Rio Grande, the remaining species being found only in Central and South America.

The tribe knows no boundaries in North America. Individual species, of course, may be categorized as southern or northern, eastern or western, and very often exhibit interesting distributional patterns. Some (e.g., *Platydema excavatum*, *P. americanum*, *P. rufipes*, and *Neomida bicornis*) have exceedingly wide ranges, whereas others (e.g., *Platydema inquilinum*, *Diaperis rufipes*, and *D. californica*) are extremely localized.

Origin and phylogeny.—It would be impossible at this time to advance a theory as to the origin of the group in its entirety. If we regard as primitive the condition in which the parameres of the male aedeagus are unfused, then the *americanum* group of the genus *Platydema* must be considered the most primitive element. This group certainly has its metropolis in the Nearctic region; 9 of the 19

North American species of the genus are obviously very closely related as indicated by the structure of the male aedeagus (pl. 4) as well as by the unicolorous, shiny dorsal surface. Of the numerous Neotropical species dissected for genitalic studies, none possessed this type of aedeagus. *P. viriditinctum* Champion, from Mexico, is the only other new world species which appears to belong to the *P. americanum* group. This conjecture is based solely on the external morphology of the only specimen available for study, one of Champion's cotypes, which is a female.

It is noteworthy that only two species of this *P. americanum* group, *P. excavatum* and *P. mexicanum*, are found south of the Rio Grande.

Before any broad generalizations can be offered regarding the origin and phylogeny of the tribe, the world fauna must be reviewed in greater detail, particularly in regard to the genitalia. The relationships of the beetles with their host fungi mentioned under the section on biology, when more completely analyzed, will perhaps contribute greatly to our understanding of these interesting but perplexing problems. Any such attempts at this time would of necessity be based on only the most fragmentary evidence and would be highly speculative.

Checklist of North American Diaperini

Diaperis Müller
- *maculata* Olivier
- *californica* Blaisdell
- *rufipes* Horn
- *nigronotata* Pic

Neomida Latreille
- *bicornis* (Fabricius)
- *aeneipennis*, new species
- *ferruginea* (LeConte)
- *myllocnema*, new species

Palembus Casey
- *ocularis* Casey

Platydema Laporte and Brullé
- *excavatum* (Say)
- *teleops*, new species
- *cyanescens* Laporte and Brullé
- *americanum* Laporte and Brullé
- *mexicanum* Champion
- *neglectum*, new species
- *oregonense* LeConte
- *laevipes* Haldeman
- *subcostatum* Laporte and Brullé
- *picilabrum* Melsheimer
- *ruficorne* (Sturm)
- *ruficolle* Laporte and Brullé
- *ellipticum* (Fabricius)
- *flavipes* (Fabricius)
- *nigratum* (Motschoulsky)
- *erythrocerum* Laporte and Brullé
- *wandae*, new species
- *inquilinum* Linell
- *micans* Zimmerman

Scaphidema Redtenbacher
- *aeneolum* (LeConte)

Liodema Horn
- *laeve* (Haldeman)

Apsida Lacordaire
- *belti* Bates

Alphitophagus Stephens
- *bifasciatus* (Say)

Pentaphyllus Dejean
- *pallidus* LeConte
- *californicus* Horn

Incertis sedae: *Uloporus ovalis* Casey

Key to North American Genera of Diaperini

1. Genae entering anterior margins of eyes (only slightly in *Scaphidema*); eyes moderate to large in size and reniform in shape; elytra almost always punctate striate 2
   Genae extending to anterior margins of eyes but not entering them; eyes very small and rounded; elytra confusedly punctured.
   Pentaphyllus Dejean (p. 445)
2. Mesosternum anteriorly notched between middle coxae for reception of posternal process in repose 3
   Mesosternum prolonged cephalad as a rounded lobe which overlaps and conceals prosternal process in repose (pl. 3, fig. 14).
   Liodema Horn (p. 435)
3. Anterior projection of basal abdominal sternite broadly truncate between hindcoxae; all coxae widely separated.
   Scaphidema Redtenbacher (p. 432)
   Anterior projection of basal abdominal sternite acute between hindcoxae; all coxae narrowly separated 4
4. Basal segment of hindtarsus short, subequal in length to second segment. 5
   Basal segment of hindtarsus longer, subequal to or longer than second and third segments combined 6
5. Body broadly oval, strongly convex dorsally, almost hemispherical; elytra boldly patterned with red or orange and black (except *coccinea* Laporte, from South America), shining; never with frontal horns in either sex.
   Diaperis Müller (p. 365)
   Body elongate, cylindrical; elytra always unicolorous; males (at least in North American species) with conspicuous frontal horns between eyes; females with tubercles instead of horns or entirely lacking cephalic armature . . . . . **Neomida** Latreille (in part) (p. 374)
6. Epipleura abruptly abbreviated at or near last visible abdominal suture . 7
   Epipleura attaining or almost attaining elytral apices, always distinct well beyond last visible abdominal suture 8
7. Antenna with terminal 5 segments abruptly expanded to form a loose club; body broadly oval, strongly convex dorsally, nearly hemispherical; neither sex with frontal horns . . . . . **Apsida** Lacordaire (p. 438)
   Antenna with at least 7 segments expanded to form club; body elongate, cylindrical; males (at least in North American species) with conspicuous frontal horns, females with tubercles instead of horns or entirely lacking cephalic armature . . . . . **Neomida** Latreille (in part) (p. 374)
8. Entire dorsal surface with conspicuous vestiture of light colored, short, recumbent setae arising from punctures 9
   Dorsal surface without vestiture 10
9. Elytra bicolored; head of male with clypeus grotesquely swollen and with 2 longitudinal, parallel, carinate ridges on frons near epistomal margin (pl. 6, fig. 57); head of female simple . **Alphitophagus** Stephens (p. 441)
   Elytra unicolorous; head of male with conspicuous frontal horns; head of female horned, tuberculate or unarmed.
   Neomida Latreille (in part) (p. 374)
10. Anterior margin of pronotum truncate or slightly rounded; antenna short, not attaining base of pronotum, outer 7 segments strongly transverse forming a compact club . . . . . **Palembus** Casey (p. 387)

Anterior margin of pronotum always distinctly, usually deeply, emarginate; antenna long, always extending beyond base of pronotum, outer segments more gradually clavate . . . . **Platydema** Laporte and Brullé (p. 389)

Genus *Diaperis* Müller

Diaperis Geoffroy, 1762, p. 337 (not binomial, see International Commission . . ., Opinion 228, 1954).—Müller, 1764, p. xv; 1776, pp. xxii, 74.—Fabricius, 1787, p. 21; 1790, p. 216; 1792, p. 516; 1801, p. 585.—Latreille, 1796, p. 21; 1804, p. 306; 1807, p. 176; 1817, p. 301; 1829, p. 29.—Gyllenhal, 1810, p. 549.—Laporte and Brullé, 1831, p. 333.—Laporte, 1840, p. 222.—Redtenbacher, 1845, p. 128; 1849, pp. 52, 590; 1858, pp. cvi, 605; 1874, pp. ii, cxviii, 104.—Mulsant, 1854, pp. 200, 205.—Lacordaire, 1859, p. 301.—Thomson, 1859, p. 116; 1864, p. 250.—Jacquelin du Val, 1861, p. 295.—Seidlitz, 1875, p. 96; 1891, p. 131; 1894, pp. 508, 512.—Desbrochers, 1902, p. 4.—Everts, 1901, p. 256.—Reitter, 1911a, pp. 330, 339.—Gebien, 1925, pp. 142, 155.—Blaisdell, 1929, p. 61.—Portevin, 1934, p. 23.

TYPE SPECIES.—*Chrysomela boleti* Linnaeus (monobasic).

Moderate in size, broadly oval, robust, strongly convex, yellowish to reddish with black markings (except *D. coccinea* Laporte), glabrous, shining. Head greatly deflexed, scarcely visible from dorsal view; eyes large, convex, reniform, anterior margins deeply but narrowly emarginate; antennae with basal segment long, robust, second segment very short and cylindrical, third about twice as long as second and slightly expanded apically, segments 4 to 10 strongly transverse, at least twice as broad as long, forming an abrupt, short, loose club, terminal segment globose, feebly attenuate apically; terminal segment of maxillary palpus narrowly oval, flattened, rounded apically. Elytra punctate-striate, a well defined callosity near middle of basal half. Epipleura broad and flat, abruptly abbreviated at or near last ventral abdominal suture; terminal segment of hindtarsus 1.5 times as long as combined 3 basal segments which are subequal in length. Male genitalia (pl. 1, figs. 2, 3, 7, 8) with lateral lobes fused to form a solid apical sclerite; female genitalia (pl. 1, fig. 6) with a pair of large, heavily sclerotized, toothed lateral processes each bearing a 1-segmented stylus.

The short basal segment of the hindtarsus, the form of the antennae, and the presence of a pair of distinct elytral callosities render this genus quite distinct from other members of the tribe. In addition, it should be mentioned that while the male genitalia do not depart radically from the general pattern in the Diaperini, the large, clawlike lateral processes of the female genitalia are quite distinctive, at least among the North American components of the tribe.

Within limits, the elytral color pattern is quite useful in the separation of species, despite the fact that several of them possess almost identical color patterns (e.g., *D. boleti* and *D. rufipes; D. maculata* and *D. californica*). Fortunately none of these similar species are sym-

patric and, in cases of doubt, there are reliable supplementary characters which may be consulted. Nonrelative definitive characters are not numerous among the species and mainly involve the form of the prosternum, the development of the head, especially the manner in which the genae are raised above the antennal insertions, and of course, the male genitalia. Sexual dimorphism is known only in the North American *D. maculata*.

This genus contains only 12 known species but has an extraordinarily wide distribution. One or more species are found throughout Europe, temperate Asia, China, Japan, Ceylon, North America, the West Indies, Central America, and northern South America. As yet, none are known from either Africa or Australia. They are all remarkably alike in general habitus. All are of at least moderate size, and all except *D. coccinea* Laporte are yellowish to reddish in elytral ground color with distinct patterns of black bands and blotches. The entire dorsal surface of *D. coccinea* (from French Guiana and Brazil) is uniformly light brown in color.

Geoffroy (1762) presented a very clear and adequate diagnosis of the genus *Diaperis*, accompanied by an illustration unquestionably representing *D. boleti*. Since, however, he did not use binomials, the name *Diaperis* must be dated from the next earliest worker, Müller (1764), who validated the name and later (1776, p. 74) included under it *Chrysomela boleti* Linnaeus, which becomes the monobasic type of the genus.

Key to North American Species of *Diaperis*

1. Elytral pattern consisting of 2 continuous, transverse black bands (pl. 1, fig. 5); confined to the southwestern United States and Lower California . . . . . **rufipes** Horn
   Elytral pattern consisting of at most 1 continuous, transverse black band located on posterior half of elytra, or entirely lacking transverse bands . . . 2
2. Elytral pattern consisting of a continuous transverse black band on posterior half of elytra and a transverse series of 5 black spots across basal half, the middle one involving both elytra (pl. 1, fig. 4) . . . . . **nigronotata** Pic
   Elytral pattern with large black blotches on posterior half of each elytron which may or may not fuse to form a continuous transverse band; at most, 2 black spots on basal half of each elytron 3
3. Male with apical pronotal margin more or less bituberculate medially and with 2 small tubercles on clypeus; these structures unmodified in female. Ventral surface shining black; head usually bicolored, dark anteriorly, red behind eyes and ventrally. Abundant and widely distributed east of the Mississippi River . . . . . ***maculata*** Oliver
   Apical pronotal margin and clypeus unmodified in either sex; ventral surface reddish brown; head uniformly reddish. Known only from four counties in Central California . . . . . **californica** Blaisdell

Diaperis maculata Olivier

PLATE 1 (FIGS. 1, 2, 3)

Diaperis maculata Olivier, 1791, p. 273; 1795, p. 5, tab. 1, fig. 2, a, b.—Latreille, 1804, p. 307.—Champion, 1886, p. 174.—Blatchley, 1910, p. 1261, fig. 564.—Blaisdell, 1929, p. 61.

Diaperis hydactina Fabricius, 1798, p. 178.

Diaperis hydni Fabricius, 1801, p. 585.—Laporte and Brullé, 1831, p. 335.—Horn, 1870, p. 379.

Diaperis suturalis Chevrolat, 1877a, p. 170.

Diaperis maculata var. *floridana* Blatchley, 1912, p. 332.—Blaisdell, 1929, p. 61.

DESCRIPTION.—Broadly oval, strongly convex, reddish orange and black, shining. Head with frons flat or slightly concave between eyes; clypeus large, well defined and swollen, with 2 blunt but distinct tubercles in male, simple in female; genae sharply reflected above antennal insertions; antennae dark with basal 2 segments reddish; surface coarsely and densely punctured, color variable but usually dark brown or black anteriorly and red posteriorly from eyes and ventrally, sometimes uniformly reddish. Pronotum shining black, transverse, slightly more than twice as broad as long, apical margin bisinuate, more strongly so in males which in addition are bituberculate medially; basal margin strongly bisinuate, produced in region of scutellum; both basal and apical angles obtuse and broadly rounded; lateral margins moderately arcuate, narrowly expanded, finely beaded; surface finely and rather sparsely punctured. Scutellum black, finely punctulate. Elytra with lateral margins broadly rounded to subparallel; striae finely punctured, not impressed; intervals flat, moderately, coarsely, and densely to minutely, punctured; ground color reddish orange with black markings as follows: a sutural stripe not attaining scutellum, becoming irregularly broader toward apex; a large rounded spot on middle of basal third; usually a small elongate posthumeral spot near margin, a large irregular spot on apical half extending from lateral margin, separated from or fused with sutural stripe. Ventral surface of pronotum slightly concave, finely and rugosely punctured; prosternum very short in front, prosternal process strongly and evenly arcuate between coxae, its apex obtusely deflected and concealed; mesosternum small, deeply notched anteriorly; metasternum and abdominal sternites finely and densely punctured medially, punctures coarser laterally and on pleural sclerites; entire ventral surface and legs dark brown to black, shining. Male aedeagus (pl. 1, figs. 2, 3) with basal sclerite regularly convex behind apical sclerite, deeply and broadly channelled laterally for nearly half its length. Measurements: length 4.7–7.2 mm.; width 2.8–4.6 mm.

Remarks.—The color pattern of the elytra in this species, as in other members of the genus, is quite diagnostic, although not, as Horn (1870) states, "remarkably uniform in its system of elytral coloration." Plate 1 (fig. 1) illustrates what may be considered the typical pattern. The large black blotches on the posterior half of the elytra may be distinct, as shown, or may fuse with the sutural stripe forming a continuous band across the elytra. This character forms a fairly smooth north-south cline (fig. 1). The percentage of available specimens with the apical blotches fused is very low in the northern states and Canada and very high in the southern states. In the West Indies and Central America virtually the entire population has the blotches fused.

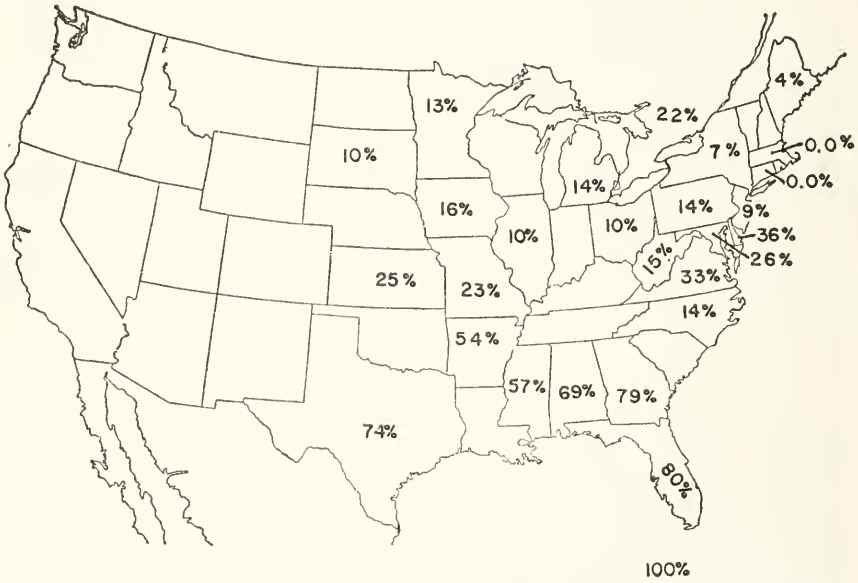


Figure 1.—*Diaperis maculata* Olivier: percentages represent the proportion of specimens from each state having the apical blotches of the elytra fused, based on at least 25 specimens from each state.

The elongate humeral spot, not shown in the figure because of the convexity of the elytra, is usually present and distinct in northern areas but obsolescent or completely absent in individuals from the Deep South, the West Indies, and Central America. Its presence or absence is quite independent of the fusion or separation of the apical blotches, and was omitted from consideration in studying the cline described above. It was to the phase in which the apical blotches are fused and the humeral spots absent that Blatchley assigned the name "*floridana*."

The two Fabrician species, *D. hydactina* and *D. hydni*, both refer to the same insect. In his 1801 paper, Fabricius uses the latter

name, referring it back to his 1798 paper where he had called it *hydactina*. Each name is accompanied by an identical description and designation of locality. Both of these names were preceded by the well-documented and figured Olivier name which thus has priority. Typical specimens of *D. maculata* from Iowa compared well with the type of *D. suturalis* Chevrolat (A. Villiers, in litt.).

This species is very abundant throughout its range, where it completes its entire life cycle in a number of species of fleshy fungi, notably those of the genus *Polyporus*. In the fall, in the northern states at least, large numbers congregate under bark to hibernate. It is also frequently attracted to lights.

Types.—*D. maculata* Olivier: not seen; whereabouts unknown; type locality not given. *D. hydactina* Fabricius and *D. hydni* Fabricius: not seen; type locality, "Habitat in Carolinae Hydna candido." *D. suturalis* Chevrolat: not seen, but specimens compared with type in MNHN by A. Villiers; type locality "Mexico." *Diaperis maculata* var. *floridana* Blatchley: cotypes in Blatchley collection, Purdue Univ.; cotype in H. C. Fall collection, MCZ; type locality, Sarasota, Fla., Feb. 28, 1911, W. S. Blatchley; reported as "frequent beneath bark of fungus-covered log" (Blatchley, 1912, p. 332).

Specimens examined.—From the following localities, 2458:

United States: Alabama (Auburn, Cheaha State Park, Gurley, Mobile, Peterman, Shimek, Tuscaloosa). Arkansas (Barnes, Cove, Hope, Prairie Co., Washington Co.). Connecticut (Cornwall, Litchfield, Stamford, Suffield, Woodmont). Delaware (Newark). District of Columbia. Florida (Big Pine, Brooksville, Dunedin, Eau Gallie, Enterprise, Gainesville, Highlands Hammock State Park, Lake Worth, Miami, Monticello, Newman's Lake, Ocala, Orlando, Paradise Key, Pine, Punta Gorda, Royal Palm State Park, Saint Augustine, Sanford, Sarasota, Torreya State Park, Winter Park). Georgia (Arlington, Athens, Atlanta, Brunswick, Clyo, Savannah, Stone Mountain). Illinois (Equality, Evanston, Glenview, Moline, Mossville, Oakwood, Quincy, Urbana, White Heath, Zeigler, Putnam Co.). Indiana (Lafayette, La Porte, Lebanon, Miller, Vincennes, Crawford Co., Harrison Co., Jennings Co., Kosciusko Co., Lagrange Co., Parke Co., Perry Co., Porter Co., Posey Co., Tippecanoe Co., Vigo Co., Wabash Co., Whitley Co.). Iowa (Ames, Alleman, Cedar Rapids, Fort Dodge, Iowa City, Ledges, Leon, Maxwell, Redfield). Kansas (Chanute, Elmo, Lawrence, Manhattan, Onaga, Topeka). Kentucky. Louisiana (Baton Rouge, New Roads). Maine (Bethel, Bridgton, Casco, Lincoln, Orono). Maryland (Baltimore, Branchville, Odenton, Plummers Island, Sparrows Point, Takoma Park, Frederick Co.). Massachusetts (Agawam, Beach Bluff, Belmont, Blue Hills, Boston, Cambridge, Concord, Dorchester, Framingham, Humarock, Lawrence, Martha's Vineyard, North Saugus, Springfield, Stoneham, Stoughton, Tyngsboro, Wakefield, Wellesley, Wilbraham, Wilmington, Norfolk Co.). Michigan (Ann Arbor, Big Stone Bay, Detroit, Douglas Lake, East Lansing, Grand Ledge, Grand Rapids, Hart, Honor, Owosso, Stony Creek, Cheboygan Co., Eaton Co., Emmet Co., Ingham Co., Kalamazoo Co., Keweenaw Co., Saginaw Co.). Minnesota (Afton, Eitzen, Excelsior, Floodwood, Hokah, Itasca Park, John Latsch State Park, Lakeland, Lake Minnetonka, Minneapolis, Mississippi Bluff, Pine Band, Saint Anthony

Park, Saint Paul, Anoka Co., Dakota Co., Fillmore Co., Goodhue Co., Hennepin Co., Mille Lacs Co., Olmsted Co., Pope Co., Ramsey Co., Scott Co., Sibley Co., Washington Co., Winona Co.). Mississippi (Bruce, Lucedale, Lumberton, Richton). Missouri (Cape Girardeau, Columbia, Marionville, New Hartford, Osage Hills, Saint Louis, Sedalia, Vera, Willard). Montana. Nebraska (Ashland, Lincoln, Nebraska City, Omaha). New Hampshire (Canobie Lake, Claremont, Farmington, Franconia, Milton). New Jersey (Alpine, Billingsport, Boonton, Burlington, Camden, Clementon, Collingswood, DaCosta, Englewood, Fort Lee, Garrett Rock, High Point, Lakehurst, Lake Hoptacong, New Brunswick, Moorestown, Paterson, Phillipsburg, Riverton, Springfield, Tenafly, Westville, Bergen Co.). New York (Allegany State Park, Batavia, Bronx Park, Bronxville, Buffalo, Canton, Chicago Bog, Eltingville, Flatbush, Forest Park, Ithaca, Lancaster, Long Island, McLean, Minetto, Mosholu, New Lebanon, Oakdale, Olcott, Oswego, Portage, Prince Bay, Schenectady, Sunken Meadow State Park, West Point, White Plains). North Carolina (Asheville, Black Mountain, Cherokee, Greensboro, Lake Junaluska, Murphy, Saluda, Swannanoa). North Dakota (Inkster). Ohio (Amherst, Athens, Bainbridge, Bedford, Bluffton, Buckeye Lake, Carbondale, Cedar Point, Clifton, Columbus, Crane Hollow, Dayton, Fort Ancient, Jefferson, Jersey, Lagrange, Lockbourne, Millport, Northfield, Rock Creek, Salem, Sparta, Sugar Grove, Wooster, Champaign Co., Delaware Co., Hocking Co., Holmes Co., Jackson Co., Madison Co., Marion Co., Meigs Co., Scioto Co., Summit Co.). Oklahoma (Big Cedar, Broken Bow, Stillwater, Wyandotte, McCurtain Co.). Pennsylvania (Angora, Chinchilla, Easton, East Berlin, Essington, Glenolden, Harrisburg, Hazleton, Jeannette, Lansdowne, Lime Rock, Ohiopyle, Overbrook, Philadelphia, Pittsburgh, Presque Isle, Shiloh, State College, Tinicum, Wall, Allegheny Co., Crawford Co., Delaware Co., York Co.). Rhode Island (East Providence). South Carolina (Beaufort, Camden, Clemson College, Jackson, Savannah River Plant). South Dakota (Custer State Park, Elmore, Sheridan). Tennessee (Deer Lodge, Perryville). Texas (Anahuac, College Station, Columbus, Dallas, Dickinson, Liberty, Maud, Mexia, Seabrook, Victoria, Willis, Eastland Co.). Virginia (Cape Henry, Cobham, Falls Church, Great Falls, New Market, Loudoun Co., Nelson Co.). West Virginia (Talcott, White Sulphur Springs). Wisconsin (Bayfield, Beaver Dam). Wyoming (Newcastle).

Canada: Ontario (Aylmer, Bells Corner, Lake Simcoe, Muskoka, Osgoode, Picton, Point Pelee, Port Colborne, Port Hope, Strathroy, Toronto, Trenton, Turkey Point, Vineland, Welland). Manitoba (Aweme, Winnipeg). Quebec (Aylmer, Fairy Lake, Fort Coulonge, Laniel, Montreal).

Bahama Islands: Nassau.

Costa Rica: Hamburg Farm, Reventazón.

Cuba: Baños de San Vicente, Cienfuegos, Upper Yara Valley, Isle of Pines.

Dominican Republic: Loma Rucilla, Constanzo.

Jamaica: Kingston, Mandeville, Port Antonio.

Panama: El Real de Santa María.

Puerto Rico: Añasco, Humacao, Mayagüez.

Virgin Islands: Saint Croix.

Diaperis californica Blaisdell

Diaperis californica Blaisdell, 1929, p. 60.

Description.—Elongate oval, strongly convex, reddish orange and black, shining. Head with frons perfectly flat between eyes; clyp-

eus large, well defined and swollen, simple in both sexes; genae feebly reflected above antennal insertions; antennae reddish brown; surface very coarsely and irregularly punctured, uniformly reddish in color. Pronotum dark reddish brown, shining, apical margin simply bisinuate in both sexes, otherwise as in *D. maculata*. Scutellum reddish orange, minutely punctulate. Elytra with lateral margins subparallel; striae rather coarsely punctured, not impressed; intervals flat, moderately, coarsely, and densely punctured; ground color reddish orange with black markings almost identical to and subject to the same variations as those of *D. maculata*. Entire ventral surface reddish brown except for lateral portions of abdominal sternites which may be darker; legs dark reddish brown; otherwise as in *D. maculata*. Male aedeagus indistinguishable from that of *D. maculata*. Measurements: length 5.0–5.8 mm.; width 2.9–3.3 mm.

Remarks.—If only the color pattern and male genitalia were considered, this species probably would be considered a slightly aberrant form of the rather variable *D. maculata*, to which it obviously is closely related. Its surprising occurrence far beyond the westernmost limits of the latter species' range invited the close scrutiny to which Blaisdell subjected it.

It may be distinguished from its eastern relative by a number of quite constant and diagnostic morphological characters. The more parallel form of the body, the unicolorous head, the reddish-brown ventral surface, legs, and pronotum, and the lack of sexual dimorphism (i.e., absence of tubercles on the clypeus and anterior pronotal margin in the male), should readily separate *D. californica* from *D. maculata*. The elongate, posthumeral black spot is always absent or obsolescent, but the size of the apical blotches is variable. In one specimen they fuse with the sutural black stripe; in another they are almost fused with it; in all others they are separated. Thus the species' color pattern falls well within the range of variation exhibited by *D. maculata*.

Types.—Holotype, male, CAS 2617, allotype, female, CAS 2618, and 6 paratypes all from Davis Meadow, near Railroad Flat, Calaveras Co., Calif., July 8, 1907, at 2800 feet, all taken from a large fungus on a dead white oak by Frank E. Blaisdell.

Specimens examined.—13 from the following localities:

United States: California (Stevenson Creek, Fresno Co., at 5000 feet, June 9, 1920, Henry Dietrich (CU, CAT); Placer Co., E. C. Van Dyke (CAS); Chiquito Creek, Madera Co., at 4100 feet, June 22, 1920, Henry Dietrich (CAS).

Diaperis rufipes Horn

PLATE 1 (FIGS. 5, 6, 7, 8)

Diaperis rufipes Horn, 1870, p. 379; 1894, p. 352.—Blaisdell, 1929, p. 61; 1943, p. 265.

DESCRIPTION.—Broadly oval, strongly convex, reddish orange and black, shining. Head with frons flat or slightly convex between eyes; clypeus large, well defined, feebly swollen, simple in both sexes; genae somewhat reflected above antennal insertions; antennae dark brown with basal 3 segments distinctly reddish; both dorsal and ventral surfaces of head usually uniformly bright red, coarsely and densely punctured. Pronotum shining black, transverse, slightly more than twice as broad as long; apical margin truncate, unmodified in either sex; basal margin strongly bisinuate, produced in region of scutellum; both basal and apical angles obtuse, broadly rounded; lateral margins strongly arcuate, narrowly expanded, finely beaded; surface finely and very sparsely punctured. Scutellum black, a few minute punctures confined to center. Elytra with lateral margins broadly rounded to subparallel; striae unimpressed, composed of fine punctures; intervals flat, finely and sparsely punctulate; ground color reddish orange with two irregular transverse bands continuous across elytra, connected by a narrow sutural black stripe, usually as in plate 1 (fig. 5), but occasionally with the black bands broader than areas of ground color. Ventral surface variable in color, usually black with reddish cast to edges of sclerites, sometimes entirely red; front femora always red, front tibiae and remaining legs variable, dark brown to reddish; basal tarsal segments and claws reddish, apical segment brown or black or each tarsus entirely red. Male aedeagus (pl. 1, figs. 7, 8) with basal sclerite deeply channelled behind apical sclerite; deeply channelled laterally from apex toward base for more than half the length of basal sclerite. Measurements: length 5.2–6.8 mm.; width 3.3–4.2 mm.

REMARKS.—This is the only North American species of *Diaperis* having two uninterrupted transverse black bands across the elytra. The coloration is highly variable. Normally the transverse bands are quite distinct and narrower than the reddish-orange ground color, but every variation exists from this to a specimen from Nogales, Ariz. (CAS), in which a narrow basal band and two small apical spots are all that remain of the ground color. The coloration of the legs and ventral surface is also variable, but the front femora are always reddish. Similarly, the normally red head is subject to a certain amount of darkening in some individuals.

Diaperis nigronotata Pic is quite similar, although its anterior elytral black band is broken up into a series of spots (pl. 1, fig. 4) and its overall pigmentation is much more constant.

The well known European species, *D. boleti* Linnaeus, itself quite variable in coloration, is almost identical to *D. rufipes* in its elytral pattern; however, the male genitalia suggest a closer relationship to *D. maculata*. The best morphological character that separates *D. boleti* from *D. rufipes*, and one which has hitherto been overlooked, is the remarkable form of the prosternal process of the former species. Anteriorly, this structure forms a sharp spine in front of the coxae and curves posteriorly between them where the apex is slightly produced, acute, and secondarily reflected. In *D. rufipes* and, in fact, in all North American species, this structure is simply and evenly convex between the coxae, with its apex deflexed and concealed.

The type was collected under cottonwood bark. Other ecological data accompanying specimens were: Tucson, Ariz. (UAriz) "bracket fungus on elderberry"; Blythe, Calif. (UCal) "at light"; Blythe, Calif. (UIda) "under bark of *Populus* sp."; El Centro, Calif. (CAS) "Ex *Polyporus*"; Albuquerque, N. Mex. (CAS) "on Sporophores."

Type.—ANSP 3989; type locality [Camp Grant], Ariz.

Specimens examined.—From the following localities, 94:

United States: Arizona (Arivaipa, Fort Yuma, Oak Creek Canyon, Oracle, Patagonia, Phoenix, Sierra Ancha Mts., Tucson, Washington Mts. near Nogales). California (Blythe, El Centro, Needles). New Mexico (Albuquerque).

Mexico: Baja California (Cape San Lucas, La Chuparosa, San José del Cabo).

Diaperis nigronotata Pic

Plate 1 (Fig. 4)

Diaperis rufipes var. *nigronotata* Pic, 1926, p. 22.
Diaperis rufipes var. *bicoloriceps* Pic, 1926, p. 22.

Description.—Broadly oval, strongly convex, reddish orange and black, shining. Similar to *D. rufipes*, differing from it mainly in the pattern of black markings on elytra, which are as follows: a sutural stripe, uniform in width, ending abruptly in a large blotch embracing both elytra on basal fourth; a small oval spot on each elytron and, in line with it, a large, irregular, marginal spot; a large irregular band on apical half of each elytron continuous across elytra (pl. 1, fig. 4). Front femora always entirely red, except for extreme distal portion which is dark brown; middle and hindfemora and all tibiae dark brown; basal tarsal segments and claws reddish, apical segment brown or black. Male aedeagus indistinguishable from that of *D. rufipes*. Measurements: length 5.1–6.4 mm.; width 3.2–3.9 mm.

Remarks.—The constant and distinctive elytral color pattern of this species is alone sufficiently diagnostic to separate it from any other known species of *Diaperis* in the world. The sculpture of the

male genitalia, the normally uniformly red head and the red front femora all indicate a close affinity with *D. rufipes*, and there seems but little doubt that they have had a common ancestry. They have, however, diverged sufficiently and are distinct enough to warrant specific rank.

The principal variation observed was in the intensity of coloration and in the contrast between ground color and pattern of the elytra. Many specimens were encountered in which the pattern was obscured by an overall darkening of the ground color. *D. bicoloriceps* Pic was described as having the head red behind and dark in front, an unusual but quite normal variation in *D. nigronotata*.

TYPES.—In the private collection of M. Pic of Paris, France. Identification of the initial specimens encountered in this study was verified by Mr. Pic himself. Type locality, "Floride."

SPECIMENS EXAMINED.—From the following localities, 190:

United States: Alabama (Spring Hill). Arkansas (Hope). Florida (Dunedin). Indiana. Iowa (Mount Vernon). Georgia (Athens, Atlanta, Dunwoody, Thomasville). Kansas. Louisiana. Maryland (Baltimore). Minnesota (Houston Co., Ramsey Co.). Mississippi (West Point). Missouri (Columbia). Ohio (Champaign Co., Hocking Co., Scioto Co.). Oklahoma (McCurtain Co.). Pennsylvania (Jeannette). South Carolina (Jackson). Texas (Brownwood, College Station, Dallas, Kingsville, Victoria, Colorado Co., Eastland Co.). West Virginia (White Sulphur Springs).

Genus *Neomida* Latreille

Neomida Latreille, 1829, p. 29.—Mulsant, 1854, p. 217.—Seidlitz, 1894, pp. 528, 532.

Hoplocephala Laporte and Brullé [scr. *Oplocephala*] 1831, p. 338.—Laporte, 1840, p. 222.—Redtenbacher, 1845, p. 128; 1849, pp. 52, 590; 1858, pp. cvi, 604; 1874, pp. ii, cxviii, 105.—Mulsant, 1854, p. 215.—Lacordaire, 1859, p. 302.—Thomson, 1859, p. 116; 1864, p. 248.—Jacquelin du Val, 1861, p. 295.—Horn, 1870, p. 379.—LeConte and Horn, 1883, p. 383.—Seidlitz, 1875, p. 96; 1891, p. 131; 1894, pp. 509, 526.—Gebien, 1925, pp. 143, 448.

Arrhenoplita Kirby, 1837, p. 235.—Champion, 1886, p. 175.—Reitter, 1911a, pp. 331, 340.

Evoplus LeConte, 1866, p. 128.—Bates, 1873b, p. 234.

TYPE SPECIES.—*Ips haemorrhoidalis* Fabricius (monobasic).

Body usually elongate, cylindrical, strongly convex. Head of males with horns or tubercles either on frons or clypeus or on both; head of female usually simple; eyes large, broadly but shallowly emarginate anteriorly; antenna usually with all but basal three or four segments strongly transverse, about twice as broad as long, forming a loose club; terminal segment of maxillary palpus elongate oval, cylindrical, obliquely truncate or rounded apically. Prosternal process convex between front coxae, strongly declivitous immediately behind them, apex usually concealed; mesosternum rather flattened,

V-shaped between coxae, broadly notched in front; epipleura usually abbreviated; terminal segment of hindtarsus at least 1.5 times longer than basal segment which is subequal in length to, or shorter than, the following two segments combined. Male aedeagus with apical sclerite composed of a single piece.

This genus is very difficult to delimit since there are so few characters that are not subject to exceptions. There are many detailed generic descriptions in the literature, but most of them are designed to cover only a limited faunal area and are usually based on the European *N. haemorrhoidalis* (Fabricius). While it is true that most of the species encountered do fit such a description, it was thought best to modify the above diagnosis so as to cover all variations encountered in the present study.

The criteria which most firmly unites members of this genus as a natural group are themselves subject to exceptions. The long, loose antennal club, a character shared with *Diaperis* and similar to those of *Palembus* and *Pentaphyllus*, the relatively short basal segment of the hindtarsus, the presence of horns or tubercles on the frons or clypeus or on both, at least, in the males of every species (except possibly *N. inermis* Champion), the convex prosternal process and the general form of the male aedeagus, all combine to give a very distinct habitus to members of this genus.

Some previous authors have arbitrarily placed all more or less cylindrical species into the genus, but this obscures the relationships and should be avoided. Several members of the genus *Platydema* (e.g., *P. picilabrum*, *P. subcostatum*) are more cylindrical than some of the species of *Neomida* (e.g., *N. myllocnema*, *N. suilla* Champion).

Most species have the epipleura abbreviated near the last ventral abdominal sternite, notable exceptions being *N. picea* (Laporte and Brullé) and *N. myllocnema*, in which the epipleura extend to the apices of the elytra.

Considerable variation exists in the punctation, striation, and dorsal vestiture of the elytra. Most species are typically punctate-striate and glabrous as in *N. bicornis* and *N. haemorrhoidalis*. Others are punctate-striate and clothed with fine setae as in *N. myllocnema* and *N. picea*, while still others are confusedly punctured as *N. inermis* (Champion) and *N. cioides* (Champion).

The cephalic horns, present to some degree in the males of all species of *Neomida*, differ widely in form. The frontal pair may be thin, cylindrical, and straight as in *N. bicornis*, thick, flattened, and blunt as in *N. myllocnema* and *N. suilla*, or long and curved as in *N. ferruginea* and *N. hoffmanseggi* (Laporte and Brullé).

The clypeus may be armed with two small tubercles as in *N. bicornis*, *N. aeneipennis*, and *N. lecontei* (Bates), one median tubercle as in *N.*

picea or none as in *N. hoffmannseggi* and *N. inermis*. In one species from British Honduras, apparently undescribed, both sexes lack frontal horns entirely, but the males have enormously developed clypeal horns.

Frontal horns are also found in some species of *Platydema*, but in that genus they are usually directed sharply forward while in *Neomida* they are porrect or even directed posteriorly over the pronotum. The greater length of the basal segment of the hindtarsus in horned members of *Platydema* will readily exclude them from *Neomida*.

In size, species of *Neomida* vary from less than 2 mm. (e.g., *N. suilla*) to almost 10 mm. (e.g., *N. lateralis* (Bates)).

Despite the great diversity of form in a number of morphological characters exhibited by members of this genus, they form a natural group which at present defies further division.

Most of these characters which look at first glance like good generic differences are found, when traced through the various species, to cut across "generic" limits or to grade imperceptibly from one "genus" into another.

It is perhaps a tribute to the general similarity of habitus expressed by the species of *Neomida* that we are not encumbered by a number of generic and subgeneric names and a longer list of synonyms, despite the number of coleopterists who have contributed new species.

It is regrettable that the well-known and firmly established name *Hoplocephala* must fall and be replaced by the misused and confusing appellation *Neomida*. This must be done, however, since *Neomida* was erected by Latreille (1829) for the validly described *Ips haemorrhoidalis* Fabricius, 2 years before Laporte and Brullé (1831) described *Hoplocephala*. *Arrhenoplita* (Kirby, 1837) is a primary objective synonym and contained only *bicornis* (Fabricius). LeConte (1866) separated his genus *Evoplus* from *Hoplocephala* by the deep postocular pits prominent in *ferruginea* (LeConte) but not distinctive enough to warrant a generic separation. This character is equally prominent in *N. lateralis* (Bates) and *N. lecontei* (Bates).

The name *Neomida* (not Latreille) has been applied to several quite different taxonomic units. Motschoulsky (1873) reserved it for the dull, lustreless species of *Platydema*, while Mulsant (1854) came close to using it in the present sense. He applied the name to a subgenus of *Hoplocephala* to contain one European species, *bituberculata* Olivier, ironically leaving the type species, *haemorrhoidalis*, in the subgenus *Hoplocephala*.

The genus *Neomida* is represented in the world fauna by at least 58 species. Twenty-four of these are from the Old World (Japan, China, Europe, India, Australia, Africa, Madagascar, and islands of the South Pacific). Thirty-four have been described from the New

World, mostly from the tropics. Many species which apparently are undescribed have been examined during the course of the present study so that the above figure has little meaning. The genus is unquestionably of tropical origin. Only 1 species, *N. bicornis,* invades the Nearctic Region to any appreciable extent, and in the Palaearctic Region, only 3 species are to be found. Two species are known from America, north of Mexico, while 2 others, both new to science, are of possible occurrence. They are separated in the following key.

Key to North American Species of *Neomida*

1. Epipleura entire; dorsal surface feebly shining and clothed with fine, short yellowish setae; head armed in both sexes . . . **myllocnema,** new species
   Epipleura abruptly abbreviated at or slightly beyond last ventral abdominal sternite; dorsal surface strongly shining, glabrous; head armed only in male 2
2. Entire dorsal surface reddish brown; head of male with deep, smooth postocular pits, frontal horns flattened and curved posteriorly. **ferruginea** (LeConte)
   Usually entire dorsal surface, but at least elytra, green, blue, or with bronze-green reflections; head of male without postocular pits, frontal horns cylindrical and porrect 3
3. Male with clypeal tubercles prominent and acute (pl. 6, fig. 63); apical sclerite of aedeagus broader than long (pl. 6, fig. 61); both sexes with median portions of abdominal sternites moderately coarsely, and densely punctured, each puncture bearing a very short seta; widespread and abundant in eastern North America. . . . . **bicornis** (Fabricius)
   Male with clypeal tubercles short and blunt (pl. 6, fig. 64); apical sclerite of aedeagus longer than broad (pl. 6, fig. 62); both sexes with median portions of abdominal sternites finely and sparsely punctured, each puncture bearing a long, fine, recumbent seta; Central America as far north as the State of Tamaulipas, Mexico . . . . . **aeneipennis,** new species

Neomida bicornis (Fabricius)

PLATES 2 (FIG. 9), 6 (FIGS. 61, 63)

Hispa bicornis Fabricius, 1776, p. 215; 1781, p. 82; 1787, p. 47.
Hispa cornigera Fabricius, 1781, p. 82; 1787, p. 47.
Diaperis bicornis (Fabricius), Oliver, 1791, p. 273; 1795, no. 55, p. 6, pl. 1, fig. 4a, b.
Diaperis cornigera (Fabricius), Oliver, 1795, no. 55, p. 7, pl. 1, fig. 5a, b.
Diaperis viridipennis Fabricius, 1801, p. 586.
Blaps metallica Palisot de Beauvois, 1805, p. 139, pl. 30b, fig. 2.
Oplocephala viridipennis (Fabricius), Laporte and Brullé, 1831, p. 340.
Oplocephala virescens Laporte and Brullé, 1831, p. 341.
Arrhenoplita bicornis (Fabricius), Kirby, 1837, p. 235.—Blatchley, 1910, p. 1261.
Hoplocephala viridipennis (Fabricius), Horn, 1870, p. 380.
Hoplocephala bicornis (Olivier), Horn, 1870, p. 380.—Seidlitz, 1894, p. 531.—Everts, 1901, p. 258.—Staig. 1940, p. 104, pl. 50.
Oplocephala gracilis Motschoulsky, 1873, p. 467.
Arrhenoplita viridipennis (Fabricius), Blatchley, 1910, p. 1261.

DESCRIPTION.—Elongate oval, very strongly convex, metallic greenish or bluish, sometimes with head, pronotum and scutellum dull to bright red, strongly shining. Head of male with two prominent, cylindrical erect horns directly between eyes, a broad, deep, smooth, sparsely punctulate depression behind and between them; epistomal margin with two prominent, acutely pointed tubercles, entire head surface minutely and sparsely punctulate; female lacking both frontal horns and epistomal tubercles, entire head coarsely and densely punctured; clypeus convex and distinct in both sexes; eyes large and prominent, deeply emarginate anteriorly; mouthparts reddish, maxillary palpi narrowly elongate oval; basal three or four antennal segments paler than remaining ones. Pronotum slightly less than twice as broad as long, sides broadly and angulately rounded, widest just behind middle, marginal bead fine, sharply reflected, basal and apical angles obtusely and broadly rounded, surface coarsely and rather sparsely punctured, punctures gradually larger from disc to lateral areas. Elytra with sides nearly parallel, narrowly margined with bead strongly reflected, striae feebly or not at all impressed, rather coarsely and deeply punctured, intervals flat or subconvex, finely and sparsely punctate. Ventral surface of pronotum convex, coarsely and densely, sometimes rugosely punctured; prosternal process strongly convex, its apex truncate between coxae, not prolonged toward mesosternum; entire ventral surface more or less coarsely and densely punctured; abdominal and metasternal setae, if present, short and inconspicuous; epipleura abruptly abbreviated anterior to apices of elytra. Male aedeagus with apical sclerite broader than long (pl. 6, fig. 61). Measurements: length 2.7–4.8 mm.; width 1.4–2.4 mm.

REMARKS.—This is the only shining metallic species of *Neomida* occurring in North America. Its nearest relative appears to be *N. aeneipennis*, which is unknown north of the Rio Grande. Differences between these two are summarized under the description of the latter species.

The most striking variation exhibited by *N. bicornis* is in the coloration of the pronotum, in some specimens being metallic green as on the elytra and in others a brilliant red. It was to the latter phase that Fabricius gave the name *viridipennis*, which has remained unchallenged until now.

The first suspicion that one species with two distinct color phases is involved occurred when a large series containing both phases in addition to several specimens of intermediate coloration (i.e., brownish to brownish-red pronotum) were reared from a single fungus taken near Newark, Del., in 1953. Since then, more than 3000 specimens have been studied and records kept of the pronotal color-

ation in each. The accompanying map (fig. 2) is the result of this study. Percentages refer to the proportion of the total number of specimens from each state in which the pronotum is red or reddish. Fortunately it was possible to classify the pronotal coloration of the vast majority of specimens as either red or green. The small number of intermediate specimens and those which were teneral were excluded from consideration.

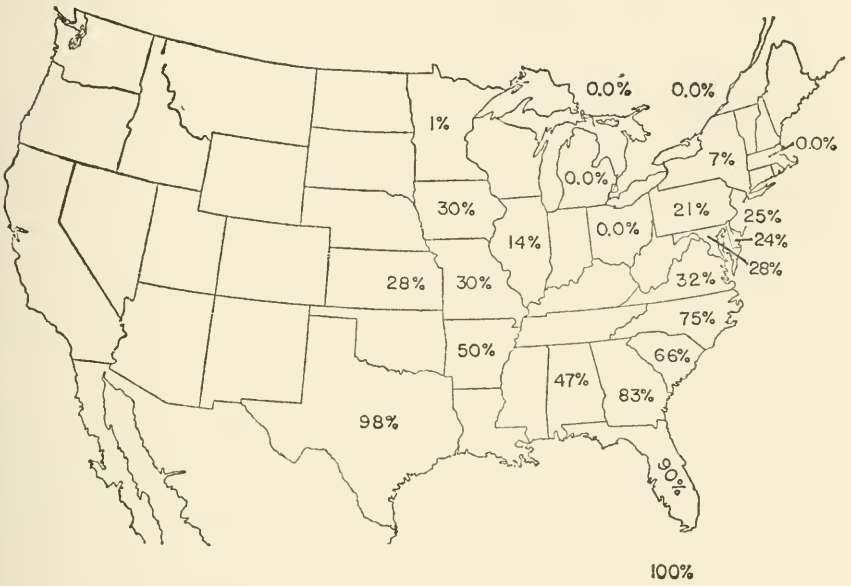


FIGURE 2.—*Neomida bicornis* (Fabricius): percentages represent the proportion of specimens from each state having red pronota, based on at least 25 specimens from each state.

The character of pronotal coloration forms a distinct north–south cline. In the northern states and Canada, the entire population has the dorsal surface greenish (rarely bluish), while in the West Indies and in the single specimen from Mexico, the pronotum is bright red. Specimens from states between these two extremes fit rather closely the expected curve of character gradient.

There is a source of confusion that perhaps is not readily apparent. It would have been more accurate to have collected data from specific localities rather than from entire states. This would have clarified the situation in such states as Texas and Florida, where the more southern localities should show a higher incidence of individuals with red pronota, but this was not feasible because there were too few large series from specific localities available for study.

Another source of confusion might be the tendency for collectors within a given area to select against the particular form that is

most abundant in the area. A collector in Pennsylvania, for example, having filled in a series of the green phase in his collection would tend to stop collecting and save only the red phase.

While this is perhaps neither the best method of studying this phenomenon nor the most convincing way of analyzing the data, it nevertheless indicates rather conclusively that pronotal coloration cannot be regarded as a reliable criterion for species separation in this genus, and the retention of the two Fabrician names in this case obscures rather than clarifies the situation.

Another interesting variation encountered was the overwhelming preponderance of bluish rather than greenish elytra on specimens from the West Indies. It too is perhaps clinal but is much less understandable than that of pronotal coloration. Specimens with blue elytra occur sporadically even at the northern limits of the range, and a few West Indian individuals have the typical green color. This blue phase was almost certainly the beetle described by Fabricius as *Hispa cornigera* from Cuba. The Fabrician type was figured and redescribed by Olivier (1795). Both the illustration and description compare perfectly with Cuban specimens studied. West Indian specimens average slightly larger than those from the United States.

This is one of our most abundant and widespread species. It has been introduced into various parts of the world, but apparently has never become established. Everts (1903) reported that it was imported into the Netherlands from Havana. Olivier (1795) listed it as "trouvé en Angleterre" under the name *Diaperis cornigera* (Fabricius). Reitter (1885, p. 156) identified specimens imported from Havana into Vienna as *Hoplocephala bituberculata* (Olivier), but Seidlitz (1898) refers these to the North American *Hoplocephala bicornis*. A male in the British Museum collection labelled "Wiens., Reitter," is indeed *N. bicornis*, as is a female from the Cape of Good Hope (Africa) in the same collection.

Types.—None seen. The type specimen of *Hispa bicornis* Fabricius, a male, has been redescribed in minute detail and figured by Staig (1940). It is located in the Hunterian collection at Glasgow Univ. Staig states that this is "presumably the insect described and figured by Olivier." Type locality, North America.

Two Ohio specimens of *N. bicornis* were said to correspond to the type of *Oplocephala gracilis* Motschoulsky, in the UMMZ (Kelejnikova, in litt.). Type locality, Ohio.

Oplocephala virescens Laporte and Brullé was listed by the authors themselves as possibly being a synonym of *Diaperis bicornis*, and the Olivier (1795) figure was cited. Type locality, North America.

The type locality of *Diaperis viridipennis* Fabricius is "North America" and of *Blaps metallica* Palisot de Beauvois, "Caroline du Sud."

SPECIMENS EXAMINED.—From the following localities, 3138:

United States: Alabama (Auburn, Mobile, Oxford). Arkansas (Hope). California. Colorado. Connecticut (Cornwall, Hamden, New Haven, Yantic). Delaware (Blades, Felton, Glasgow, Newark). District of Columbia. Florida (Biscayne Bay, Brooksville, Dunedin, Enterprise, Gainesville, Haulover, Jacksonville, Key Largo, Lake Harney, Lakeland, Lake Worth, Lutz, Miami, Ormond, Palatka, Saint Augustine, Sanford, Suwannee, Tallahassee, Tucker, Wakulla Springs). Georgia (Atlanta, Brunswick, Cartersville, Clayton, Dallas, Dunwoody, Griffin, Lakeland, Okefenoke Swamp, Thomasville, Clarke Co.). Illinois (Decatur, Forest Park, Fort Sheridan, Quincy, Saint Joseph, Urbana, Winnetka). Indiana (Lafayette, La Porte, Pine, Gibson Co., Jackson Co., Knox Co., Marion Co., Posey Co., Putnam Co., Spencer Co., Vigo Co.). Iowa (Ames, Cedar Rapids, Gilbert, Herrold, Iowa City, Keokuk, Maxwell, Mount Pleasant, Sioux City). Kansas (Atchison, Benedict, Lawrence, Lone Star, Manhattan, Onaga, Wellington, Geary Co., Gove Co., Neosho Co., Wallace Co.). Kentucky (Louisville, Mammoth Cave). Louisiana (Bogalusa, Doyle, Harahan, Lake Charles, Opelousas, Tallulah, Winnfield). Maine (Norway, Orono). Maryland (Baltimore, Edgewood, Plummers Island, Plum Point, Silver Spring, Sparrows Point). Massachusetts (Arlington, Beach Bluff, Blue Hills, Boston, Cambridge, Dover, Forest Hills, Lawrence, Leeds, Lowell, Nahant, Northampton, Quincy, Salem, Springfield, West Medford). Michigan (Aurelius, Detroit, East Lansing, Galesburg, Kalamazoo, Paw Paw, Cheboygan Co., Clare Co.). Minnesota (Hallock, Itasca Park, Lake Johanna, Lake Minnetonka, Mississippi Bluff, Newport, Pine City, Plummer, Saint Paul, Dakota Co., Fillmore Co., Goodhue Co., Hennepin Co., Houston Co., Mille Lacs Co., Olmsted Co., Otter Tail Co., Rice Co., Washington Co., Winona Co.). Mississippi (Columbia, Hattiesburg, Leaf, Lucedale, Lula, New Augusta, Richton, Hancock Co.). Missouri (Columbia, Des Peres, Kansas City, Rockview, Saint Louis, Springfield, Waynesville). Nebraska (Lincoln, Plattsmouth). New Hampshire (Claremont, Farmington, Franconia, Pike). New Jersey (Boonton, Camden, Chester, Clementon, Dunellen, Egg Harbor, Englewood, Fort Lee, Glassboro, Newark, Riverton, Sandy Hook, South Orange, Split Rock, Westville). New York (Batavia, Brooklyn, Buffalo, Catskill Mts., Dundee, Dunderburg, Elbridge, Flatbush, Fort Niagara, Geneva, Greenport, Greenwood Lake, Hamburg, Ithaca, Keuka Park, Lancaster, Long Island, McLean, New York City, Olcott, Parksville, Potsdam, Rosedale, Sag Harbor, Shokan, Staten Island, Unionport, West Point, Greene Co.). North Carolina (Asheville, Chapel Hill, Ellenboro, Murphy, Raleigh, Saluda, Tryon). Ohio (Athens, Buckeye Lake, Cleveland, Columbus, Crane Hollow, Dayton, Georgesville, Holgate, Jefferson, Lagrange, Millport, North Kingsville, Urbana, Westerville, Adams Co., Allen Co., Delaware Co., Hocking Co., Jackson Co., Morrow Co., Perry Co., Scioto Co.). Oklahoma (Ada, Fort Gibson, Page, Payne Co.). Pennsylvania (Bustleton, Castle Rock, Collingdale, Easton, Harrisburg, Ingram, Jeannette, Lawndale, Milford, Mount Airy, Philadelphia, Pittsburgh, State College, Tinicum Island, Uniontown, Wyoming, Allegheny Co., Delaware Co., Erie Co., York Co.). Rhode Island (Barrington, Kingston, Providence). South Carolina (Camden, Clemson, Georgetown). South Dakota (Vermillion). Tennessee. Texas (Austin, Beaumont, Dallas, Denison, Harrisburg, Houston, Liberty, Paris, Seabrook, San

Felipe, Seguin, Victoria). Utah (Emery Co.). Virginia (Arlington, Clapham Junction, Falls Church, Fredericksburg, Newport News, Norfolk, Rosslyn, Warrenton, Virginia Beach). West Virginia (Cheat Mts., Fairmont, Harpers Ferry, Justice, Morgantown).

Canada: Nova Scotia (Truro). Ontario (Cobourg, Grimsby, Leamington, Ottawa, Picton, Port Colbourne, Toronto, Trenton, Vineland, Hastings Co., Prince Edward Co.). Quebec (Aylmer, Coteau Junction, Fairy Lake, Gracefield, Hemmingford, Hudson, Hull, Knowlton, Montreal).

Cuba: Cienfuegos, Buenos Aires, Havana, Pico Turguino, Cienagade Zapata, Sierra de Los Organos, San Vicente, Isle of Pines.

Jamaica: Balaclava, Bath, Kingston, Mandeville, Old Harbor.

Bahama Islands: Andros.

Bermuda.

Neomida aeneipennis, new species

PLATE 6 (FIGS. 62, 64)

Arrhenoplita bicornis (Fabricius), Champion, 1886, p. 175 [misidentification].

DESCRIPTION.—Elongate oval, very strongly convex, light golden brown to dark metallic green, strongly shining. Head of male with two prominent, cylindrical, erect horns directly between eyes, a broad and deep, smooth, sparsely punctulate depression behind and between them; epistomal margin with two short, obtusely pointed tubercles, entire head surface minutely and sparsely punctulate; female lacking both frontal horns and epistomal tubercles, entire head surface coarsely and densely punctured; clypeus convex and distinct in both sexes; eyes large and prominent, deeply emarginate anteriorly; mouthparts reddish, maxillary palpi narrowly elongate oval; basal three or four antennal segments and sometimes apical one, all or in part reddish or at least paler than intervening segments. Pronotum slightly less than twice as broad as long, sides broadly and angulately rounded, widest just behind middle, marginal bead fine, sharply reflected, basal and apical angles obtusely and broadly rounded, surface coarsely and rather sparsely punctured, punctures gradually larger from disc to lateral areas. Scutellum always reddish. Elytra with sides nearly parallel, narrowly margined with bead strongly reflected, striae feebly or not at all impressed, rather coarsely and deeply punctured, intervals flat or subconvex, usually minutely and sparsely punctulate. Ventral surface of pronotum convex, coarsely, densely, sometimes rugosely, punctured; prosternal process strongly convex, its apex truncate between coxae, not prolonged toward mesosternum; medial portions of metasternum and abdominal sternites finely and sparsely punctate, sparsely clothed with conspicuous, pale, very fine, semierect setae which are easily rubbed off; lateral portions of metasternum and entire metepisternum coarsely punctured; epipleura abruptly abbreviated anterior to apices of elytra. Male aedeagus with apical sclerite longer than broad (pl. 6, fig. 62). Measurements: length 4.0–5.2 mm.; width 1.9–2.6 mm.

Remarks.—This species is so similar to *N. bicornis* in general facies that, following Champion (1886), the Central American specimens were regarded as conspecific with those from the United States. An apparent reversal of the cline described under *N. bicornis* inspired further investigation, ultimately leading to the conclusion that two distinct species were involved.

Champion could find no differences between the two, other than the larger size of Central American specimens (4–5 mm.) compared to that of those from the United States (3.5–4.0 mm.). He also mentioned that the horns of the former are stouter, a character which cannot be confirmed in the present study.

Differences in size and coloration, while relative in nature and subject to considerable overlapping, are quite striking when large series of each species are available. *N. aeneipennis* ranges from 4 to just over 5 mm. in length and is usually more or less bronzed in color while *N. bicornis* ranges from 2.7 to 4.8 mm. in length and is always a brilliant blue or green except in teneral individuals.

Males are easily distinguishable. The genitalia are diagnostic and should always be examined in cases of doubt. In *N. aeneipennis* (pl. 6, fig. 62), the apical sclerite is longer than broad; in *N. bicornis* (pl. 6, fig. 61), it is broader than long. In *N. aeneipennis* the epistomal tubercles are short and obtuse (pl. 6, fig. 64), while those in *N. bicornis* are long and acute (pl. 6, fig. 63.).

In both sexes in *N. aeneipennis*, the abdominal sternites are finely and sparsely punctured and clothed with rather conspicuous setae, while in *N. bicornis* these sternites are coarsely and densely punctured and the setae are much less prominent.

Insofar as locality records are available, *N. bicornis* and *N. aeneipennis* are completely allopatric. Specimens of the latter have been taken as far north as 20 miles north of El Limón, Tamaulipas, Mexico, but only one specimen (labelled "Mex." in MCZ) of *N. bicornis* has been seen south of the Rio Grande.

Types.—Holotype male and allotype female (BMNH): Rio Hondo, British Honduras, Blancaneau. Paratypes: British Honduras, 2 males, 3 females, Rio Hondo, Blancaneau (BMNH); 1 male, same data (MCZ); 1 female, Belize, Blancaneau (BMNH); 2 males, 5 females, M[ana]tee Dist[rict], August 1905 (Bowditch collection, MCZ); 1 male, 1 female, same data (CAT); 2 males, M[ana]tee Dist[rict] (Bowditch collection, MCZ).

Other specimens examined.—From the following localities, 50:

Mexico: 1 male, 1 female, 18 miles south of Tamazunchale, San Luis Potosi, Nov. 22, 1946, E. S. Ross (CAS). 1 female, 20 miles north of El Limón, Tamaulipas, Nov. 10, 1946, E. C. Van Dyke (CAS). 1 female, Tamazunchale, at 500 feet, June 18, 1937, M. A. Embury (Van Dyke collection, CAS). 1 female,

Tampico, July 12, E. A. Schwarz (USNM). 4 males, 1 female, Cordova, Sallé (BMNH). 2 females, Tuxtla, Sallé (BMNH). 1 female. Temax, northern Yucatan, Gaumer (BMNH). 1 male, 1 female, Jalapa, Höge (BMNH).

Guatemala: 5 males, 1 female, Zapote, G. C. Champion (BMNH). 1 male, 2 females, Zapote, G. C. Champion (MCZ). 1 female, Zapote. G. C. Champion (USNM). 1 male, Capetillo, G. C. Champion (BMNH). 1 male, Guatemala City, G. C. Champion (BMNH).

Nicaragua: 1 male, 1 female, Ometepe (Wickham collection, USNM). 1 female, Ometepe (Sharp collection, BMNH).

Neomida ferruginea (LeConte)

Plate 6 (Fig. 60)

Evoplus ferruginea LeConte, 1866, p. 128.—Bates, 1873b, p. 234.
Evoplus ferrugineus (LeConte).—Horn, 1870, p. 366.
Oplocephala castanea Motschoulsky, 1873, p. 467.
Arrhenoplita ferruginea (LeConte).—Champion, 1886, p. 176.

Description.—Elongate oval, very strongly convex, light reddish brown to dark chestnut, shining. Head of male with 2 elongate, stout, laterally compressed, caudally arcuate horns between and in contact with eyes; clypeus rectangular, convex, with 2 short, obtuse tubercles on outer edges; eyes feebly emarginate anteriorly, a very pronounced, broad, deep concavity immediately behind each, dorsal portions small, narrow, widely separated, ventral portions large and convex; genae broadly flattened, slightly raised and reflected above antennal insertions; mouthparts and antennae uniformly yellowish brown, maxillary palpi narrowly elongate oval; mandibles strongly angulate near base dorsally, projecting beyond lateral margins of apex of epistoma and base of labrum; entire head surface finely and sparsely punctured; head of female lacking both frontal horns and epistomal tubercles but with a feeble elevation at inner margins of eyes and, at most, a feeble suggestion of postocular pits; entire anterior margin of head evenly arcuate from eye to eye; head surface coarsely and densely punctured, punctures becoming confluent between eyes; otherwise as in male. In both sexes, pronotum about 1.5 times as broad as long, sides strongly and evenly rounded, widest just behind middle, finely margined, bead sharply reflected, anterior margin truncate or slightly arcuate medially, basal margin feebly bisinuate, all angles broadly and obtusely rounded, surface coarsely and densely punctured, especially on lateral areas. Elytra with sides straight and parallel, narrowly and sinuately margined, bead sharply reflected; striae distinctly impressed, coarsely, deeply, and closely punctured, intervals convex, finely and rather densely punctulate; ventral surface of pronotum thick, convex, rather coarsely and densely punctured except for large, smooth, convex area extending outward from coxae; otherwise ventral surface generally coarsely and moder-

ately densely punctured; prosternal process convex between coxae, its apex truncate, not prolonged toward mesosternum; anterior tibiae with conspicuous mat of dense golden hairs on anterior surface, outer apical angle noticeably expanded and strongly denticulate; epipleura abruptly abbreviated anterior to apices of elytra. Male aedeagus (pl. 6, fig. 60) extremely long and narrow, apical sclerite, comprising about ⅓ total length of aedeagus. Measurements: length 3.5–5.3 mm.; width 1.6–2.4 mm.

Remarks.—This species possesses so many distinctive characters that LeConte erected a new genus (*Evoplus*) to receive it. The deep postocular pits of the male are sufficient to separate it from most other New World species of *Neomida*, with the exception of *N. lecontei* and *N. lateralis* from Colombia, both described by Bates. I have studied a series of 36 specimens from Jamaica (MCZ) that were determined as *N. lecontei* and were verified by J. Balfour-Browne, who compared them to types in the British Museum. The two species are so closely related that they can be separated only by several relative but constant characters which apply equally to males and females. In general, it can be stated that the sculpture and punctation of the entire dorsal surface of *N. ferruginea* is coarse, while that of *N. lecontei* is quite delicate. Salient differences may be summarized as follows: punctures of pronotum coarse and dense in *N. ferruginea*, fine and sparse in *N. lecontei;* elytral striae impressed and coarsely punctured in *N. ferruginea*, unimpressed and finely punctured in *N. lecontei;* elytral intervals distinctly convex and conspicuously punctate in *N. ferruginea*, flat and obscurely punctate in *N. lecontei*. Each species is remarkably constant in regard to these characters and no intergradation in them was observed. The male genitalia appear to be identical.

In males of both species, the cephalic armature is often poorly developed, rendering the postocular pits proportionately more shallow.

Types.—*Evoplus ferruginea* LeConte, MCZ 4671. A male bearing an orange disk label signifying "Southern States"; the original description lists "Louisiana, Wapler and Guex." Also in the LeConte collection (MCZ) are 1 male and 2 females with the same data as the type, and 1 male and 2 females from Enterprise, Fla., May 26. *Oplocephala castanea* Motschoulsky; type locality, "Nouvelle-Orleans en Louisiane." S. Kelejnikova pronounced specimens of *Neomida ferruginea* (LeConte) from Brownsville, Tex., which agreed perfectly with the description, to be conspecific with the type, a female (UMMZ).

Specimens examined.—From the following localities, 186:

United States: Alabama (Mobile). Florida (Dunedin, Enterprise, Gainesville, Lakeland, Paradise Key, Marion Co.). Louisiana (Opelousas). Texas (Brownsville, Liberty, Tedor, Victoria, Hidalgo Co.).
Cuba: Soledad.
Haiti: Ennery.
Mexico: Mazatlán, Veracruz.
British Honduras: Manatee District.

Neomida myllocnema, new species

Plate 6 (Fig. 59)

Description.—Elongate parallel, moderately convex, very feebly shining. Head of male with two thick, blunt, arcuate frontal horns in contact with eyes; frons abruptly and deeply excavate between horns; clypeus well defined, transverse, with two prominent, narrowly separated tubercles on epistomal margin; eyes large, narrowly and deeply emarginate anteriorly, dorsal portion less than ⅓ the size of ventral portion; antennae very slender, segments 5 to 11 broader than long; terminal segment of maxillary palpus small, narrowly oval; surface of head finely and densely punctured except frontal excavation which is smooth and quite shiny; head of female with large but short and broad, blunt tubercles instead of horns, frons regularly concave between them but not abruptly excavate; epistomal tubercles short and obtuse; entire head surface coarsely and densely punctured; otherwise as in male.

Pronotum transverse, slightly more than 1.5 times as broad as long, widest at base, lateral margins almost straight, feebly convergent from base to apex, finely beaded; apical margin rounded, slightly angulate medially; base almost straight; apical angles broadly rounded, basal angles right-angled; entire surface uniformly coarsely and densely punctured. Elytra subparallel, narrowed at base, lateral margins with thin but prominent, strongly reflected bead, humeral angles sharply rectangular, striae feebly impressed on disk, becoming rather deep apically; strial punctures fine and widely spaced; intervals convex, quite strongly so apically, finely and densely punctulate. Entire dorsal surface clothed with fine but prominent yellowish setae arising from punctures.

Ventral surface of pronotum convex, edges thickened, coarsely and rugosely punctured; prosternal process convex between coxae, its apex deflected and acute, slightly prolonged behind; metasternum and abdominal sternites finely and sparsely punctured medially, punctures coarser and more closely spaced on pleural sclerites and lateral portions of abdominal sternites; entire ventral surface and all appendages, slightly lighter than dorsum; epipleura entire, rather prominent all the way to elytral apex; anterior femora conspicuously

thickened, especially in males where they are also slightly curved; all tibiae slender in both sexes except anterior pair in male, where they are slender and cylindrical on basal half, strongly curved and distinctly flattened and expanded apically, inner margin finely denticulate, inner apical angle drawn out to a prominent point. Male aedeagus (pl. 6, fig. 59) relatively small, fusiform. Measurements: length 4.3–4.6 mm.; width 1.9–2.3 mm. (Holotype 4.4, 2.2 mm.; allotype 4.5, 2.2 mm.)

Remarks.—This is by far the most distinctive member of the genus *Neomida* in the Nearctic Region. Most of the characters which are exhibited by it have their counterpart in other species as, for example, the entire epipleura, frons armed in both sexes, pubescent dorsal surface and modifications of the front legs in one or both sexes, but in no other species encountered in this study are so many divergencies from the conventional generic pattern to be found.

Types.—Holotype male and allotype female, USNM 66047: Santa Rosa, Low[er] Cal[ifornia]. Paratypes: 1 male and 1 female, L[ower] Calif[ornia], August 1901 (CAT); 1 male and 1 female, same data (CU); 1 male, Santa Rosa, Low[er] Cal[ifornia], September (CAS); 1 female, Santa Rosa, Low[er] Cal[ifornia] (CAS); 1 female, Mazatlán, Mexico, Mar. 28, 1918 (CAS); 1 male, 1 female, Santa Rosa, L[ower] Calif[ornia] (MCZ, H. C. Fall collection).

Specimens examined.—Eleven.

Genus *Palembus* Casey

Palembus Casey, 1891, p. 65.

Type species.—*Palembus ocularis* Casey (monobasic).

Elongate parallel, moderately convex, feebly shining. Head rather short and broad, unarmed in either sex; eyes very large and coarsely faceted, separated both dorsally and ventrally by less than the longer axis of one eye, anterior margin broadly and deeply emarginate; terminal segment of maxillary palpus elongate oval, slender, its apex obliquely truncate; antennae with segments 5 to 11 strongly transverse, forming a loose, parallel club. Pronotum transverse, about 1.7 times as broad as long, basal and apical margins equal, sides feebly arcuate. Elytra very long, nearly 3.5 times as long as the pronotum, lateral margins parallel. Prosternal process narrow between coxae, its apex deflected, blunt, not produced; mesosternum flattened, narrowly V-shaped; epipleura entire; femora flattened, distinctly claviform; hindtarsi long, basal segment equal to following two combined, only slightly shorter than terminal segment.

This genus is very closely allied to *Neomida*, differing from it primarily in the unarmed condition of the head in either sex, the more

elongate and depressed form, and the relatively enormous, coarsely faceted eyes.

The one species known to science occurs in Florida and the West Indies.

Palembus ocularis Casey

PLATES 2 (FIG. 10), 3 (FIG. 21)

Palembus ocularis Casey, 1891, p. 65.—Wolcott, 1948, p. 328.

DESCRIPTION.—Elongate parallel, moderately convex, light reddish brown, glabrous, shining. Head feebly and evenly convex; clypeus large, well defined, convex, anterior margin feebly rounded, posterior angles almost in contact with eyes; genae flat, horizontal; antennae and mouthparts reddish brown; punctures fine and dense on clypeus and genae, coarser and more widely spaced on frons. Pronotum transverse, apical margin broadly and evenly but feebly arcuate, base feebly bisinuate; lateral margins slightly arcuate, not at all expanded, widest near middle; both basal and apical angles obtuse, broadly rounded; a very fine bead continuous around entire pronotum; surface finely and densely punctured with conspicuous microreticulations between punctures. Elytra elongate, lateral margins parallel, bead fine and strongly reflected; striae feebly impressed, rather coarsely punctured; intervals slightly convex, finely and sparsely punctate with minute reticulations between punctures. Ventral surface of pronotum convex, finely and rugosely punctured; entire ventral surface light reddish brown, coarsely and densely punctured, including the entire epipleura, microreticulations between punctures; tibiae straight except anterior pair which are slightly bowed at base. Male aedeagus (pl. 3, fig. 21) long and narrow, apical sclerite comprising more than one third the total length, truncate at base, acute apically, penis membranous, the struts very fine. Measurements: length 3.5–4.3 mm.; width 1.3–1.6 mm.

REMARKS.—This very distinct species apparently is not as rare as cabinet material indicates. Wolcott (1948), in Puerto Rico, found both adults and larvae feeding on seeds of tamarind (*Tamarindus indica* Linnaeus) at Loíza and at Faro de Cabo Rojo. He also reported it from "on ground" at Point Cangrojos and on sedges at Ponce and at Cabo Rojo.

The number of specimens accompanied by data listing tamarind as the host suggests that there is probably more than a superficial or accidental association between the beetle and the plant. Tamarind, a member of the Leguminosae, is a native of the Old World tropics and has been naturalized in southern Florida, including the Keys, the West Indies, Mexico, Central and South America. It is possible that

the beetle is of Old World origin, but there is no evidence to support such a conjecture.

TYPE.—USNM 46806 (Casey collection); type locality, Florida. The specimen has the entire area between prosternum and abdomen obscured by the mounting medium; otherwise, all characters are clearly evident.

SPECIMENS EXAMINED.—From the following localities, 17:

United States: Florida (Key West, Tampa (from Mariel, Cuba)).
Bahama Island: Nassau.
Leeward Island: Montserrat.
Jamaica: Kingston.
Puerto Rico: Ponce, San Juan.

Genus *Platydema* Laporte and Brullé

Platydema Laporte and Brullé, 1831, pp. 332, 350.—Redtenbacher, 1845, p. 128; 1849, pp. 52, 591; 1858, pp. cvi, 604; 1874, pp. cxviii, ii, 106.—Mulsant, 1854, pp. 200, 211.—Thomson, 1859, p. 116; 1864, p. 252.—Lacordaire, 1859, p. 304.—Jacquelin du Val, 1861, p. 297.—Horn, 1870, p. 380.—Seidlitz, 1875, p. 97; 1891, pp. 131, 516; 1894, pp. 508, 518,—Champion, 1886, p. 181.—Desbrochers, 1902, p. 7.—Blatchley, 1910, p. 1262.—Reitter, 1911a, pp. 330, 339.—Chatanay, 1914, pp. 475, 484.—Carter, 1917, p. 702.—Gebien, 1920, p. 25; 1925, pp. 143, 539.—Portevin, 1934, p. 25.
Typhobia Pascoe, 1869, p. 279.
Neomida Motschoulsky, 1873, p. 476 (not Latreille, 1829).—Melsheimer, 1846, p. 61.
Histeropsis Chevrolat, 1878b, p. 221.

TYPE SPECIES.—*Platydema dejeani* Laporte and Brullé (original designation).

Elongate oval to broadly oval, moderately convex, strongly shining to dull and lustreless. Eyes moderate to large, emarginate anteriorly; antennae relatively slender, slightly clavate, segments 5 to 10 subequal in size or becoming increasingly broader. Prosternal process prominent, prolonged caudally horizontal or deflected behind front coxae; mesosternum deeply excavate anteriorly for reception of prosternal process; anterior extension of basal abdominal sternite acute between hindcoxae; epipleura entire or abbreviated very close to elytral apices; hindtarsi long, basal segment longer than two following segments combined and usually longer than terminal one; tibiae all relatively slender.

This is by far the largest genus included in the Diaperini, containing 281 species (Gebien, 1940), distributed throughout the world. An all-encompassing diagnostic description of the generic characters involved would be impossible at this time. The above description is based largely on the Nearctic species supplemented by a number of Central and South American components. Only a few Old World

species were available for study, so it is not known to what extent they would conform to the present treatment.

The relatively slender antennae, entire epipleura, well-developed prosternal process and elongate basal segment of the hindtarsi should serve to separate species of *Platydema* from other genera of Diaperini in most instances. Even these characters are subject to a certain amount of variation, so that it is necessary to consider them in combination when dealing with many of the species in order to determine to which genus they belong. As was mentioned previously, *Platydema* and *Neomida* are for the most part distinct enough. Certain species of the latter overlap the former genus in regard to a number of characters so that it becomes difficult to establish clearly defined generic limits. *Platydema* is much more homogeneous and, at least in regard to the above mentioned characters, is relatively stable. Reasons for the retention of the two genera as distinct despite this apparent interdigitation at the fringes are summarized under *Neomida*.

Cosmonota Blanchard, a small neotropical genus containing nine species, is even more difficult to separate from *Platydema*. As Lacordaire (1859) points out, these insects are extremely closely related to *Platydema*, and are distinguished more by their general form and system of coloration than by any precise characters.

It is not surprising that various workers have attempted to divide this unwieldy genus. There are a number of variable characters which would seemingly afford good generic or at least subgeneric criteria. Again, much the same situation prevails here as was encountered in the generic characters discussed under *Neomida*. Division of the genus based on any single arbitrarily selected character would be vastly different from the system derived by the utilization of another character. For example, if we used the armed condition of the head (frontal horns in males, tubercles in females) as a generic or subgeneric character, we would place *P. excavatum*, *P. teleops*, *P. cyanescens*, and *P. erythrocerum* in one group. A study of the genitalia of the males of these species (pl. 4, figs. 22, 23, 24, pl. 5, figs. 43, 44) indicates almost conclusively that the armed condition of the head has originated at least twice in the evolution of the genus *Platydema*, and that, whereas the other three-horned species are quite closely related, *P. erythrocerum* is widely divergent from them and should properly be placed near *P. flavipes* and *P. nigratum*.

Surface lustre has been suggested as a useful criterion for dividing the genus, not without considerable merit. Motschoulsky (1873) proposed the name *Neomida* (a most unfortunate choice) for all of the dull lustreless species and reserved *Platydema* for the shiny ones.

Chevrolat (1878) suggested a similar system in which the dull

species would be included in *Platydema* and the shiny ones in his own genus, *Histeropsis*. Unfortunately, he did not follow his own system himself and, as a result, it is exceedingly difficult to interpret the results of his studies.

Judging from the description, Pascoe's genus *Typhobia*, based on *T. fuliginea* from Queensland, Australia, is a good *Platydema*. It was distinguished from *Diaperis* by the fact that all the antennal segments except the terminal one were obconical.

For the North American species of *Platydema*, the surface lustre character works reasonably well, except for a few species which are either lustreless or only feebly shining but which actually belong to the shiny group and vice versa. The fact that it is a useful character cannot be denied. Virtually every worker has utilized it in some way in his key to the species, a situation which could not be avoided even in this study of the limited Nearctic components of the genus, but it does not seem that it can be applied successfully at the generic level.

The most satisfactory course is to regard *Platydema* as a large natural group, insufficiently understood at present to divide or to attempt, by studying male genitalia, surface lustre, and coloration, to define species groups. This was done rather sucessfully by Gebien (1925) for the Indo-Malayan species. He divided them into three groups which he regarded as natural:

1. Patterned, or at least pigmented species which are not metallic.
2. Metallic or shining black species.
3. Species with dull colored elytra.

Much the same classification was followed earlier by Champion (1886), who divided the Central American components of the genus into five groups:

1. Head of males horned or tuberculate.
2. Dorsal surface unicolorous, shining.
3. Dorsal surface unicolorous, lustreless.
4. Dorsal surface maculated, shining.
5. Dorsal surface maculated, lustreless.

A similar system can be applied arbitrarily to the 19 North American species. Two broad groups may be recognized:

1. More or less shining species having the apical sclerite of the male aedeagus composed of two lateral lobes (*P. "americanum"* group).

2. More or less dull, lustreless species having the apical sclerite composed of a single piece (*P. "ruficorne"* group).

The *P. "americanum"* group is quite homogeneous, all members being closely related and similar in general habitus. The other nine species comprising the *P. "ruficorne"* group are rather heterogene-

ous, with several distinct elements present, but all are derivable from a common ancestral type. When the Neotropical species are better known, it is probable that this second group may be further subdivided. The accompanying phylogenetic tree (fig. 3) for the genus is thought to be a reasonably accurate portrayal of the *P. "americanum"* group, whereas the placement of the other nine species comprising the *P. "ruficorne"* group is highly speculative, especially in regard to *P. inquilinum* and *P. micans*.

In the final analysis, the male genitalia seem to hold the key to the broad classification of this genus. In most cases (notably the *P. "americanum"* group) there are other more useful characters to distinguish between species. No new characters were discovered during the course of the present study, except the relative distance separating the eyes when viewed from below, a function of the size of the lower lobe of the eye. To arrive at an index, the specimen is turned upside down so that both eyes are entirely in view and then adjusted so that both eyes measure the same with an ocular micrometer. The longer axis of one eye is then compared to the distance separating the two eyes. In most species, this index is quite constant within narrow limits and is quite useful taxonomically (e.g., in *P. teleops* it is greater than three whereas in *P. americanum* it is less than one). In some species it varies so greatly that it is useless, and in others (e.g., *P. excavatum*) it varies clinally.

The relative convexity of the prosternal process is another very useful character if introduced at the proper place in a key. In a number of species (e.g., *P. americanum, P. neglectum, P. mexicanum, P. micans, P. oregonense*) this structure passes between the front coxae and is horizontal all the way to its apex; in others (e.g., *P. subcostatum, P. picilabrum*) it is just as constantly convex, with its apex deflected behind the coxae and concealed in repose. In *P. laevipes* and *P. nigratum* and several others, the form of the prosternal process is variable and hence useless as a diagnostic character.

The shape of the terminal segment of the maxillary palpi varies enough between species to be used as a supplementary character. Several of the earlier workers separated *Platydema* from other genera on the basis of the terminal segment of the maxillary palpi forming a nearly equilateral triangle. This might perhaps hold true for certain limited faunal areas, but by no means prevails throughout the genus on a worldwide basis.

The Holarctic Region is poorly represented in species of *Platydema*. In the Nearactic Region there are 19 species while Europe has only 5. The tropical regions of both hemispheres, on the other hand, abound in species. Gebien (1940) lists 40 from Africa, 77 from Asia, 54 from Central America, 55 from South America, and 28 from Papua and

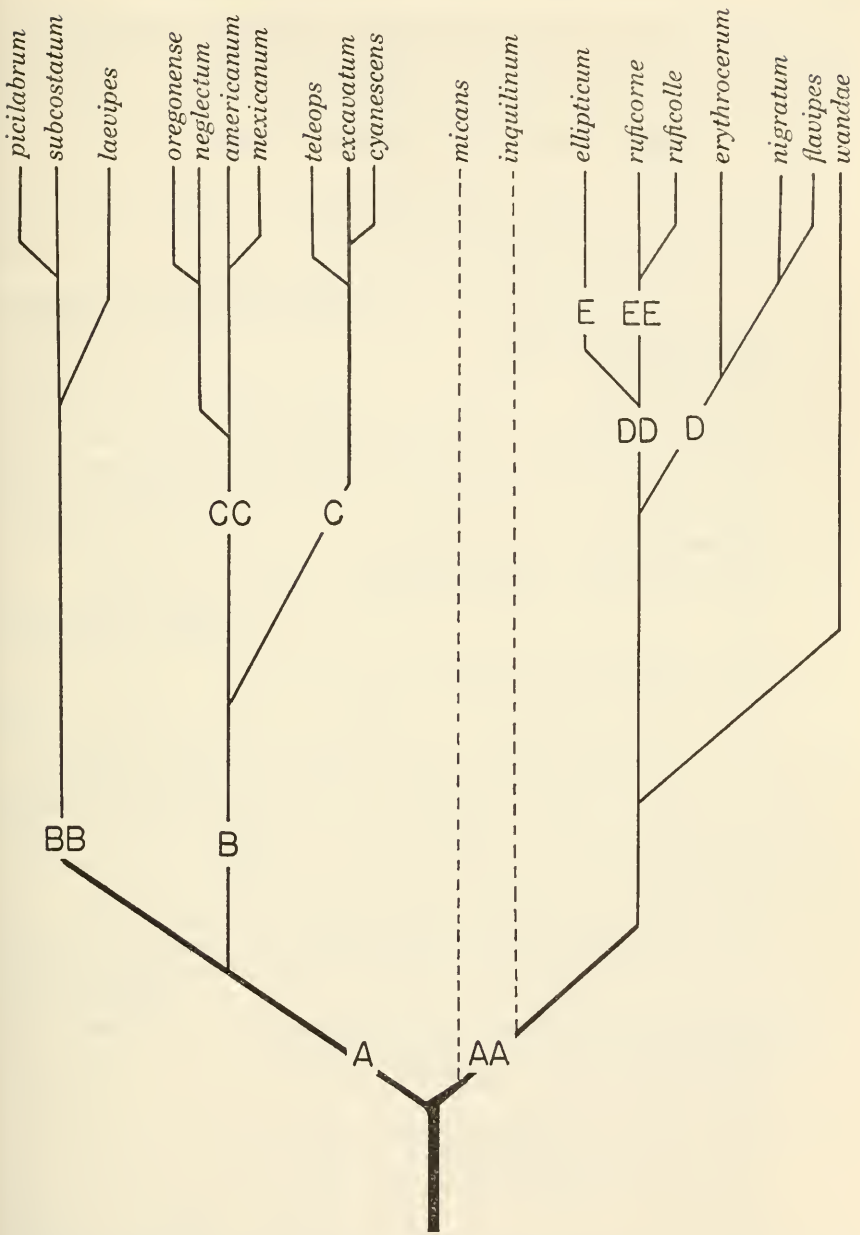


FIGURE 3.—Phylogenetic tree of the North American species of *Platydema:* A, apical sclerite composed of two parameres (see plate 4); AA, apical sclerite composed of a single piece (see plate 5); B, head with distinct longitudinal frontal impression or horned; BB, head lacking frontal impression; C, frons with horns in male, tubercles in female; CC, frons with longitudinal impression only; D, antennae bicolored; DD, antennae unicolorous; E, elytra bicolored; EE, elytra unicolorous.

Australia. Many of the Neotropical species are conspicuously patterned in bold reds and yellows. Only *P. ellipticum*, among the Nearctic forms, approaches them in this respect.

Key to North American Species of *Platydema*

1. Frons with two well-developed horns (males) or small tubercles (females) 2
   Frons with neither horns nor tubercles 5
2. Dorsal surface dull, lustreless; horns and tubercles thick and blunt. **erythrocerum** Laporte and Brullé
   Dorsal surface shining blue or black; horns slender and pointed, tubercles sharply pointed 3
3. Dorsal surface blue . . . . . **cyanescens** Laporte and Brullé
   Dorsal surface black 4
4. Eyes separated ventrally by at least three times the longer axis of one eye (pl. 7, fig. 66); body narrowly oval . . . . . **teleops**, new species
   Eyes separated ventrally by less than 2.5 times the longer axis of one eye; body broadly oval . . . . . **excavatum** (Say)
5. Dorsal surface entirely dull and lustreless 6
   Dorsal surface glossy to strongly shining 10
6. Dorsal surface bicolored; black with oblique red band on each elytron. **ellipticum** (Fabricius)
   Dorsal surface unicolorous, dark brown or black 7
7. Antennae unicolorous from base to apex 9
   Antennae with at least basal 3 segments distinctly lighter in color than remaining segments 8
8. Entire antennal club dark; average size smaller (3.6–5.4 mm. in length). **flavipes** (Fabricius)
   Apical antennal segment entirely lighter than remaining segments; average size larger (4.6–7.8 mm. in length) . . . . . **nigratum** (Motschoulsky)
9. Pronotum indistinctly punctured; average size larger (5.5–7.8 mm. in length); known only from Arizona and New Mexico. **wandae**, new species
   Pronotum distinctly punctured, especially laterally; average size smaller (3.5–5.8 mm. in length); widespread and common in eastern North America. **ruficorne** (Sturm)
10. Each elytron with 8 complete discal striae plus at least a trace of a short basal one which more or less parallels scutellum 11
    Each elytron with 8 complete discal striae; short basal one completely absent 18
11. Prosternal process horizontal, its apex acute and prominent; frons with more or less distinct longitudinal impression between eyes; eyes viewed from beneath separated by a distance not exceeding 1.5 times the longer axis of one eye 12
    Prosternal process convex between coxae, its apex deflected (sometimes feebly prominent in *laevipes*); frons evenly convex or flat between eyes; eyes viewed from beneath separated by a distance nearly twice the longer axis of one eye (except *inquilinum*) 15
12. Pronotum roughly trapezoidal in shape (pl. 6, fig. 52), sides nearly straight, rapidly converging toward apex; apical angles right angled and prominent 13

Pronotum transverse (pl. 6, fig. 53), sides strongly arcuate, especially from middle to apex; apical angles rounded and deflected 14

13. Outer elytral striae poorly defined for about ¼ to ⅓ the length of elytra at both base and apex; punctures shallowly impressed, rather widely and irregularly spaced; color usually black; average size smaller (4.0–6.1 mm. in length) . . . . . **oregonense** LeConte

Outer elytral striae well defined, strongly punctured, almost attaining base and complete at less than ¼ the length of elytra at apex; color usually brownish; average size larger (5.6–7.3 mm. in length).

neglectum, new species

14. Sides of pronotum rather broadly expanded, somewhat crenulate with punctures conspicuously larger than those of disc; elytra broadly convex from side to side . . . . . **americanum** Laporte and Brullé

Sides of pronotum narrowly if at all expanded, evenly arcuate, punctures shallowly impressed, poorly defined, subequal in size over entire pronotum; elytra feebly convex to almost flat. . . . . **mexicanum** Champion

15. Clypeus large, well defined, trapezoidal; eyes sunken below surface of head medially; color dark reddish brown; known only from mountains of southern Arizona . . . . . **inquilinum** Linell

Clypeus moderate in size, poorly defined, transversely subquadrate; inner margins of eyes raised above surface of head medially; color usually black or at least very dark. 16

16. Punctures of interstrial elytral intervals extremely minute and sparse; body brownish, feebly shining. . . . . **laevipes** Haldeman

Punctures of interstrial elytral intervals large and fairly dense; body black, shining 17

17. Ventral surface of pronotum smooth to feebly rugose; average size larger (5.0–6.0 mm.), robust, shining black. **subcostatum** Laporte and Brullé

Ventral surface of pronotum coarsely and longitudinally wrinkled; size smaller (4.5–5.5 mm.), elongate, narrow, black with brassy or greenish reflections, shining . . . . . **picilabrum** Melsheimer

18. Outer elytral striae poorly defined for about ¼ to ⅓ length of elytra at both base and apex . . . . . **oregonense** LeConte

Outer elytral striae well defined, strongly punctured, almost attaining base and complete at less than ¼ the length of elytra at apex 19

19. Outermost elytral striae approaching adjacent striae at base, leaving unusually large humeral intervals; head densely, almost confluently, punctured . . . . . **micans** Zimmerman

Outermost elytral striae normally placed; head finely and sparsely punctulate. **ruficolle** Laporte and Brullé

Platydema excavatum (Say)

Plates 4 (Figs. 22, 23), 7 (Fig. 67)

Diaperis excavata Say, 1824, p. 267.
Platydema tuberculata Laporte and Brullé, 1831, p. 352.
Platydema excavata (Say), Haldeman, 1848, p. 102.
Platydema excavatum (Say), Horn, 1870, p. 381.—Champion, 1886, p. 184, pl. 8, fig. 11.
Platydema nigritum Motschoulsky, 1873, p. 470 [new synonymy].
Platydema tuberculatum (Laporte and Brullé), Chevrolat, 1878b, p. 210.
Platydema fraternum Chevrolat, 1878b, p. 210.

Platydema parvulum Casey, 1884, pp. 50, 195.—Horn, 1885, p. 111.—Casey, 1890, p. 485.

DESCRIPTION.—Body broadly oval, moderately convex, black, shining. Head of male with two prominent, parallel, cylindrical, forward-projecting horns between eyes, a deep depression between them; head of female with sharply pointed tubercles instead of horns, depression between them shallower, antennae and mouthparts reddish brown, terminal segment of maxillary palpus short, broadly triangular; eyes large, flattened dorsally, very deeply emarginate, separated ventrally by a distance varying from 1 to slightly more than 2½ times the longer axis of one eye. Pronotum trapezoidal, strongly narrowed from base to apex, sides nearly straight to slightly arcuate, basal angles rectangular, apical angles narrowly rounded, strongly deflected, marginal bead rather fine, slightly reflected, set off from rest of pronotum by a very narrow flattened area which parallels it, surface uniformly moderately, coarsely, and densely, punctured. Elytral striae feebly impressed, finely and closely punctured, intervals distinctly convex, relatively coarsely and densely punctured. Prosternal process horizontal and prominent. Ventral surface of prothorax usually thickened and convex, coarsely and densely punctured to almost smooth; metasternum punctured at least on anterior two thirds, impunctate on posterior third or less. Basal three abdominal sternites coarsely and densely, sometimes confluently, punctured, especially laterally; apical two segments finely and sparsely punctulate. Male genitalia with ventral portions of lateral lobes elongate, curved laterally, meeting the basal sclerite (pl. 4, figs. 22, 23). Measurements: length 3.4–5.8 mm.; width 2.0–3.5 mm.

REMARKS.—This is a widespread and common species and, as one might expect, subject to considerable subtle variation, particularly in sculpture and punctation. The most noteworthy variation is in the distance separating the eyes ventrally, which caused considerable consternation until a systematic study of series of specimens from various localities was undertaken. From the accumulated data, it was found that the species varies clinally in regard to this character. In the northern part of its range, from New England west to Minnesota and south to Ohio, Indiana, and Illinois, the eyes are separated by a distance subequal, on the average, to about twice the longer axis of one eye. This ratio diminishes as one proceeds southward, reaching its climax in northern South America, where the distance separating the eyes is subequal to one eye. Roughly the same ratio prevails in the West Indies.

Champion (1886) considered all of his Central American specimens to be conspecific with those from the United States. Specimens

studied from scattered localities in Mexico, Honduras, and Costa Rica fit into the clinal concept quite well.

Platydema excavatum is most likely to be confused with *P. teleops* and *P. cyanescens*. The vivid blue color of the latter species, combined with the discontinuous variation in the ventral distance between the eyes of this species and of specimens of *P. excavatum* from southern localities, should be sufficient to distinguish it.

Except for color, *P. teleops* is even more distinct than *P. cyanescens*, the distance separating the eyes ventrally reaching its height (3.2–4.2 times the longer axis of one eye) in *P. teleops*. Other characters, which unfortunately presuppose a familiarity with *P. excavatum* and hence are relative in nature, include the more narrowly elongate body, the more shining lustre, the flatter pronotum and elytral intervals, and the finer punctation of the entire dorsum.

Types.—*Diaperis excavata* Say. Not seen, presumably lost; type locality, "Arkansa" [sic]. *Platydema tuberculata* Laporte and Brullé. Not seen, type locality, Cuba. *P. nigritum* Motschoulsky. Not seen; specimens from Mississippi were said to compare with the type (Kelejnikova, in litt.) present in UMMZ; type locality, "Nouvelle-Orléans et à Atlanta." At the latitude of these two southern cities, any shiny black *Platydema* with horns almost certainly is *excavatum*. *P. fraternum* Chevrolat. Not seen and could not be found in Paris Museum (M. Villiers, in litt.); type locality, "Santo Domingo." Champion (1886) examined a "typical example from Santo Domingo" which he proclaimed to be "merely a small *P. excavatum*." *P. parvulum* Casey. Willets Point, Long Island, N.Y., USNM 46812. The single specimen representing this species in the Casey collection is a female, although the original discription specifies a male in which "the frontal horns are rudimentary." The description is lengthy and quite accurate, but the salient characters which are weighed most heavily in the present paper are omitted, and as a result the description could apply to either *P. excavatum* or *P. teleops*. In a note at the end of his paper Casey (1884, p. 195) states that "*Pl. parvulum* is perhaps a very small and singularly deformed specimen of *excavatum*, and the name should therefore be entered as a synonym of that species until future collecting can decide upon its true relationship."

Horn (1885), without further comment, placed it in synonymy with *P. excavatum*. In 1890, Casey (p. 485), without mention of supplemental material, elaborated further on his original description of *P. parvulum* and lists in the form of a key the differences between it and *P. excavatum*. The differences to which he alludes simply do not exist and "*parvulum*" may at best be regarded as a very small, deformed, teneral specimen of *excavatum*, a course which Casey himself was almost willing to follow in 1884. Following are notes taken

with the unique type of *P. parvulum* before me: "If anything, it is more robust than is typical of *excavatum;* the length of the antennae (weighed heavily by Casey) is not relatively any shorter than normal; the fifth and sixth interval on the left elytron are fused and obsolete on the basal fourth of their length."

SPECIMENS EXAMINED.—From the following localities, 1554:

United States: Alabama (Auburn, Mobile, Oak Grove, Oxford, Tuscaloosa). Arizona (Patagonia). Arkansas (Hope). California. Colorado. Connecticut (Litchfield, New Haven). Delaware (Dover, Glasgow). District of Columbia. Florida (Biscayne, Brooksville, Dunedin, Enterprise, Key Largo, Key West, Lake Worth, Royal Palm Park, Sanford, Sarasota, Alachua Co.). Georgia (Athens, Atlanta, Dunwoody, Savannah). Illinois (Bloomington, Riverside, Willow Springs, Saint Clair Co.). Indiana (Hovey Lake, Lafayette, South Bend, Crawford Co., Lake Co., Marion Co., Parke Co., Perry Co., Posey Co., Putnam Co., Tippecanoe Co., Vigo Co.). Iowa (Ames, Guttenberg, Iowa City, Keokuk, Milton, Mount Pleasant). Kansas (Benedict, Lawrence, Leavenworth, Lone Star, Manhattan, Medora, Onaga, Topeka, Neosho Co.). Kentucky (Frankfort, Louisville). Louisiana (Bayou Sara, Tallulah, Winnfield). Maryland (Baltimore, Berwyn, Henson Creek, Hyattsville, Plummers Island, Plum Point, Point Piney). Massachusetts (Leeds, Lowell, Sudbury). Michigan (Bath, Detroit, East Lansing, Kalamazoo Co.). Minnesota (Frontenac, Mississippi Bluff, Houston Co.) Mississippi (Leakesville, Lucedale, New Augusta, Richton). Missouri (Columbia, Creve Coeur Lake, Kansas City, Rosati, Saint Charles, Saint Louis, Warsaw). Nebraska (Fremont, King Hill, Lincoln, South Bend). New Hampshire (Farmington). New Jersey (Boonton, Clementon, Collingswood, Englewood, Fort Lee, Hopatcong, Malaga, Mount Arlington, Westville). New Mexico (La Cueva). New York (Buffalo, Dunderburg, Elbridge, Ithaca, Lockport, McLean, New York City, Olcott, Portage, Rockaway, Southold, West Point, Yaphank, Greene Co.). North Carolina (Asheville, Southern Pines, Tryon). Ohio (Athens, Bedford, Cincinnati, Columbus, Crane Hollow, Lagrange, Lancaster, Marion, Urbana, Westerville, Wooster, Allen Co. Delaware Co., Hancock Co., Holmes Co., Morrow Co., Perry Co., Scioto Co.) Oklahoma (Summerfield, Vinita, Payne Co.). Pennsylvania (Belle Vernon, Blossburg, East Berlin, Easton, Frankford, Harrisburg, Jeannette, Milford, Overbrook, Pittsburgh, Upper Darby, Wyoming, Allegheny Co.). Rhode Island (Kingston). South Carolina (Camden, Clemson, Jackson). Tennessee (East Ridge). Texas (Bastrop, Beeville, Brownsville, Bryan, Cedar Lake, College Station, Columbus, Daingerfield, Dallas, Houston, Jefferson, Kingsville, Lexington, Liberty Hill, Luling, Macdona, Mexia, New Braunfels, Round Mountain, San Felipe, Victoria, Eastland Co., Harris Co.). Virginia (Fort Monroe, Mount Vernon, Rosslyn, Nelson Co.). West Virginia (Cave Mountain, Fairmont, Huntington, Morgantown, White Sulphur Springs). Wisconsin (Baraboo, West Bend, Dane Co., Sauk Co.).

Canada: Ontario (Grimsby).

Cuba: Cienfuegos, mountains north of Imias.

Jamaica: Mandeville.

Haiti: Manneville.

Dominican Republic: Loma de la Péna.

Mexico: 32 miles south of Acaponeta, Cordoba, Jalapa, Jicaltepec, 20 miles west of Linares, Mount Colima, Puebla, Tampico, Tepic.

British Honduras: Manatee district.

Guatemala: San José.
Honduras.
Costa Rica: Hamburg Farm, San José.
British Guiana: Bartica.

***Platydema teleops*, new species**

PLATE 7 (FIGS. 66, 68)

DESCRIPTION.—Body narrowly oval, subconvex, black, shining. Head of male with two prominent, parallel, cylindrical, forward-projecting horns between eyes, a deep depression between them; head of female with sharply pointed tubercles instead of horns, depression between them shallower, antennae and mouthparts pale reddish brown, terminal segment of maxillary palpus short, broadly triangular; eyes small, flattened dorsally, shallowly emarginate, separated ventrally by a distance greater than three times the longer axis of one eye (pl. 7, fig. 66). Pronotum trapezoidal, flattened, slightly narrowed from base to apex, sides nearly straight, basal angles rectangular, apical angles acute, marginal bead fine but prominent, not set off abruptly from rest of pronotum by a flattened area, surface coarsely and rather densely punctured, especially laterally. Elytral striae deeply and abruptly impressed, finely punctured, intervals flattened, minutely and densely punctate. Ventral surface of pronotum convex or flat, smooth to finely rugulose; prosternal process narrow, horizontal, its apex prominent; metasternum coarsely punctured; basal three abdominal sternites rather coarsely punctured, especially laterally where they usually become confluent, forming longitudinal ridges; apical two sternites with punctures fine and sparse. Male genitalia with ventral portions of lateral lobes elongate, curved laterally, meeting the basal sclerite as in *P. excavatum* (pl. 4, figs. 22, 23). Measurements: length 3.3–4.6 mm.; width 1.8–2.6 mm.

REMARKS.—This species may be readily separated from *P. excavatum*, the only one with which it might be confused, by the widely separated eyes when viewed ventrally. By actual measurement, this distance varied between 3.2 and 4.4 times the longer axis of one eye. This character shows no clinal variations as exhibited by *P. excavatum*. Other useful characters are to be found in the elongate, narrowly oval body, the flatness of the elytral intervals and the shape, sculpture, and punctation of the pronotum. As a general rule, *P. teleops* has a much more polished lustre than any of its congeners. No intergrades between this species and *P. excavatum* were observed.

Almost every sizeable collection examined yielded specimens of *P. teleops* placed under the name *P. excavatum*. It is quite understandable that this species has gone unrecognized for such a long period of time. It was only after hundreds of measurements, much sorting and

resorting, and a critical evaluation of accumulated data that the true relationships were established.

Types.—Holotype male and allotype female, USNM 66048: Blendon Woods Metropolitan Park, Franklin Co., Ohio, May 6, 1951, NJ and ELS. Paratypes: 1 male, same as holotype (CAT); 1 female Union Township, Scioto Co., Ohio, May 26, 1951, NJ and ELS; 2 males, Scioto Co., Ohio, July 15, 1953, ELS; 1 male, Westerville, Ohio, Nov. 14, 1948, ELS; 1 female Hocking Co., Ohio, May 21, 1953, ELS; 1 male, 2 females, Hocking Co., Ohio, June 3, 1953, ELS (CAT); 3 females, Delaware Co., Ohio, May 21, DJ and JNK; 1 male, Delaware Co., Ohio, June 21, DJ and JNK; 1 female, Delaware Co., Ohio, June 25, DJ and JNK; 1 male, Delaware Co., Ohio, July 20, DJ and JNK; 1 female, Delaware Co., Ohio, June 20, 1943, DJ and JNK; 1 female, Delaware Co., Ohio, August 29, DJ and JNK; 1 male, 1 female, Scioto Co., Ohio, June 10, 1944, DJ and JNK; 1 female, Scioto Co., Ohio, June 9, 1945, DJ and JNK; 1 male, 1 female, Hocking Co., Ohio, May 20, DJ and JNK; 1 female, Hocking Co., Ohio, May 23, 1944, DJ and JNK; 1 male, Hocking Co., Ohio, May 26, 1938, DJ and JNK; 1 male, 1 female, Greene Co., Ohio, June 2, 1953, DJ and JNK (OSU); 2 males, 2 females, Ames, Iowa, Apr. 17, 1933, Ruth Madden (IoSt); 2 males, 1 female, Washington Co., Minn., May 11, 1940, W. A. Connell (Minn.); 1 male, Allegheny Co., Penn., June 17, 1894, E. A. Klages; 1 female, Allegheny Co., Penn., June 24, 1888 (CU); 1 male, 1 female, Bayfield, Wis., Wickham (MCZ); 3 males, 3 females, Stoneham, Mass., Nov. 7, F. A. Sherriff (CAS).

Specimens examined.—From the following localities, 214:

United States: Colorado, Connecticut (Cornwall). District of Columbia. Illinois (Forest Park). Indiana (La Porte). Iowa (Ames, Guthrie, Iowa City). Kansas (Riley Co.). Maine (Paris). Maryland (Bladensburg, Edgewood, Little Falls, Odenton, Sparrows Point). Massachusetts (Arlington, Cambridge, Chatham, Dover, Framingham, Marion, Melrose Highlands, Stoneham, Wayland). Michigan (Detroit). Minnesota (Mouth of Snake River, Hennepin Co., Olmsted Co., Washington Co.). Missouri (Columbia, Kansas City, Willard). Nebraska (Lincoln, Nebraska City). New Hampshire (Amherst, Durham, Franconia, Hampton). New Jersey (Anglesea, Boonton, Cape May, Clementon, Estling Lake, Rahway, Rutherford). New York (Hempstead Plains, Mosholu, New York City, Patterson, Westchester, West Point, Yaphank). North Carolina (Asheville, Saluda). Ohio (Georgesville, Westerville, Delaware Co., Greene Co., Hocking Co., Scioto Co.). Pennsylvania (Frankford, Hazleton, Jeannette, Pittsburgh, State College, Allegheny Co.). South Carolina. Texas (College Station, Columbus, Kerrville, Harrison Co.). Virginia (Fort Monroe, Warrenton, Nelson Co.). West Virginia (White Sulphur Springs). Wisconsin (Bayfield, Dane Co., Polk Co., Sauk Co.).

Canada: Ontario (Ottawa, Toronto). Quebec (Aylmer).

Platydema cyanescens Laporte and Brullé

Platydema cyanescens Laporte and Brullé, 1831, p. 356.—Horn, 1870, p. 381.

Description.—Body narrowly oval, moderately convex, deep metallic blue, shining. Head of male with two prominent, parallel, cylindrical, forward-projecting horns between eyes, a deep depression between them; head of female with sharply pointed tubercles instead of horns, depression between them shallower, antennae and mouthparts reddish brown, terminal segment of maxillary palpus short, broadly triangular; eyes moderate in size, flattened dorsally, deeply emarginate anteriorly, separated ventrally by a distance of from 2.2 to 2.9 (average 2.5) times the longer axis of one eye. Pronotum trapezoidal, strongly narrowed from base to apex, sides nearly straight to slightly arcuate, basal angles rectangular, apical angles narrowly rounded, strongly deflected, marginal bead rather fine, slightly reflected, set off from rest of pronotum by a very narrow flattened area which parallels it, surface uniformly coarsely and densely punctured. Elytral striae feebly impressed, finely punctured; intervals subconvex to flat, minutely and sparsely punctulate. Prosternal process horizontal, prominent; ventral surface of pronotum thickened, flat or convex, coarsely and rugosely punctured; metasternum coarsely but sparsely punctured; basal three abdominal sternites coarsely and densely punctured, especially laterally where they are confluent, forming longitudinal ridges; terminal two sternites minutely punctulate, entire ventral surface dark brown to black with legs always a shade or two lighter. Male genitalia with ventral portions of lateral lobes elongate, curved laterally, meeting the basal sclerite as in *P. excavatum* (pl. 4, fig. 24). Measurements: length 3.4–4.6 mm.; width 1.8–2.6 mm.

Remarks.—This species shows a close affinity to both *P. excavatum* and *P. teleops*. It may be distinguished at once from either of these by the vivid blue color (sometimes tending toward greenish) of the dorsum. In the more narrowly elongate body and the flatness of the elytral intervals, it is strongly suggestive of *P. teleops*, while in the form and punctation of the pronotum and most other characters it more closely approximates *P. excavatum* in general facies.

Type.—Not seen; presumably lost; type locality, "Amerique septentrionale."

Specimens Examined.—From the following localities, 65:

United States: Alabama (Chickasaw, Mobile, Oak Grove). Florida (Biscayne, Crescent City, Dunedin, Enterprise, Fort Myers, Haulover, Lake Mary, Myakka River State Park, Ocala National Forest, Saint Petersburg, Silver Springs). Georgia (Brunswick, Spring Creek, Tybee Island). Indiana (Marion Co.). Louisiana (Covington). Mississippi (Brooklyn, Lucedale, Meridian, Richton). Tennessee (Memphis). Texas (Columbus).

Platydema americanum Laporte and Brullé

PLATES 5 (FIG. 42), 6 (FIG. 53)

Platydema americana Laporte and Brullé, 1831, p. 358.
Platydema americanum Laporte and Brullé, Horn.—1870, p. 383.

DESCRIPTION.—Obovate, convex, reddish brown to almost black, shining. Head moderately impressed between eyes, coarsely, densely and irregularly punctured, antennae and mouthparts reddish brown, terminal segment of maxillary palpus elongate, narrowly triangular; eyes large, flattened dorsally, usually separated by a distance subequal to longer axis of one eye. Pronotum transverse, sides strongly arcuate, converging rapidly from middle toward apex, lateral margin broadly flattened, slightly reflected, a broad depression slightly behind middle, marginal bead fine, basal angles obtuse, apical angles broadly rounded, punctures of disc fine and well separated, becoming larger laterally, those of flattened portion of margins 3 or 4 times larger than those of disc. Elytral striae feebly impressed, punctures fine and deep, intervals distinctly convex, finely, sparsely, but distinctly, punctate; elytral margins rather broad, flaring, bead fine. Prosternal process narrow, flattened, horizontal; metasternum rather coarsely and densely punctured anteriorly, becoming more widely spaced posteriorly and absent on caudal fourth; abdominal punctures fine medially, becoming quite coarse and dense laterally, forming longitudinal wrinkles; apical segment uniformly finely and sparsely punctate. Male genitalia with ventral portion of lateral lobes continued backward as a single spine (pl. 4, fig. 25). No apparent external sexual dimorphism. Measurements: length 4.6–7.2 mm.; width 2.6–3.8 mm.

REMARKS.—This species may be separated from all other members of the species group by the peculiar form of the pronotum. The flattened and reflected, often crenulate lateral margins with the large indentations just behind the middle, the accentuated impressions on either side of the middle of the base, plus several other surface irregularities combine to give the pronotum a very misshapen appearance.

TYPE.—Not seen. The description leaves but little doubt as to the identity of this species. As Laporte and Brullé point out: "La tête . . . . marquée d'un enfoncement transversal entre les yeux . . . . Le corselet . . . est bordé et un peu arrondi sur les côtes . . . . et presente deux impressions en arrière et une autre, beaucoup moins marquée, située de chaque côte, vers le milieu du bord lateral . . . . La patrie . . . . est l'Amérique septentrionale." These excerpts from the original description are sufficient to characterize the present species to the exclusion of all others. In collections I find it frequently con-

fused with *P. subcostatum*, to which it bears only the most superficial resemblance.

Specimens examined.—From the following localities, 576:

United States: Arizona (Bright Angel Camp, Catalina Mts., Chiricahua Mts., Flagstaff, Greer, Huachuca Mts., Morrison, Mount Graham, Oak Creek Canyon Palmerlee, Polino, San Francisco Mts., Santa Catalina Mts., Santa Rita Mts., White Mts., Williams). California (San Bernardino Mts., San Diego). Colorado (Cowdrey, Durango, Manitou Springs, Ouray, Waldo Canyon, Boulder Co.). Connecticut (Cornwall). Idaho (Coeur d'Alene, Moscow Mt., Priest River). Illinois. Iowa (Ames, Guttenberg, Mount Vernon). Kansas (Douglas Co.). Maine (Bethel, Monmouth, Weld). Michigan (Copper Harbor, Detroit, East Lansing, Marquette, Newberry, Saginaw, Cheboygan Co., Chippewa Co., Ottawa Co.). Minnesota (Cedar Creek Bog, Lake Itasca, Mississippi Bluff, Plummer, Olmsted Co.). Missouri (Saint Louis). Montana (Bear Paw Mt., Cimbia Falls, Potomac). Nebraska (Pine Ridge, Custer Co.). Nevada (Dixie National Forest). New Hampshire (Claremont). New Jersey (Englewood, Bergen Co.). New Mexico (Albuquerque, Cloudcroft, Jemez Mts., Las Vegas, Manzano, Santa Fe, Tajique). New York (Allegany State Park, Buffalo, Danby, Elbridge, Hamburg, Ithaca, Lancaster, New York City, Olcott, Peru, West Point, Greene Co.). North Carolina (Black Mts.). Ohio (North Olmsted, Wooster, Franklin Co.). Pennsylvania (Hummelstown, Jeannette, Pittsburgh, State College, Allegheny Co., Tioga Co.). South Dakota (Hill City, Spearfish). Texas (Davis Mts., El Paso). Utah (Bryce Canyon, Farmington, Parowan Canyon, Provo, Utah Co.). Washington (Palouse). Wisconsin (Bayfield, West Bend). Wyoming.

Canada: Alberta (Edmonton). British Columbia (Foulder, Merritt, Trinity Valley). Manitoba (Aweme). Ontario (Bells Corners, Bruce, Grimsby, Guelph, Manitoulin Island, Muskoka, Strathroy, Toronto, Turkey Point, Hastings Co., Prince Edward Co.). Quebec (Aylmer, Fort Coulonge, Duparquet, Laniel, Montreal).

Platydema mexicanum Champion

Plates 4 (Fig. 26), 7 (Fig. 69)

Platydema mexicanum Champion, 1886, p. 187, tab. 8, fig. 12.

Description.—Body obovate, slightly depressed medially, light reddish brown to almost black, feebly shining. Head shallowly impressed between eyes, moderately coarsely and densely punctured, antennae and mouthparts reddish brown, terminal segment of maxillary palpus elongate, narrowly triangular; eyes large, flattened dorsally, separated ventrally by a distance subequal to longer axis of one eye. Pronotum transverse, sides evenly arcuate, basal angles obtuse apical angles broadly rounded, lateral marginal bead thickened and reflected, punctures fine, shallowly impressed, rather sparsely and irregularly distributed, becoming somewhat larger baso-laterally in some specimens. Elytral striae feebly impressed, punctures fine, shallow; intervals almost flat, very minutely and sparsely punctured, lateral margins of elytra rather broad, flaring, marginal bead fine. Prosternal process narrow, horizontal; metasternum finely and sparsely punctate, punctures absent on caudal portion; abdomen rather coarsely

but sparsely punctured forming longitudinal wrinkles laterally, except two apical segments on which punctures are very fine and more closely spaced. Male genitalia with ventral portion of lateral lobes continued backward as a single spine (pl. 4, fig. 26). No apparent external sexual dimorphism. Measurements: length 5.7–7.4 mm.; width 3.0–3.8 mm.

Remarks.—This species is very closely allied to *P. americanum* and at first appeared to represent just a slightly aberrant form of the latter species. Champion was apparently unfamiliar with *P. americanum* except from its description, but he correctly inferred the close affinity between it and the present species, a tribute to the accurate descriptions of Laporte and Brullé.

P. mexicanum may be distinguished from *P. americanum* by the relative flatness and feebly shining lustre of the dorsum, the much less conspicuous punctures on the head, pronotum, and elytra, and the form and punctation of the lateral margins of the pronotum. All of the foregoing characters, relative in nature, give, when taken together, a facies totally unlike that of any other member of this species group.

Type: BMNH: Jalapa, Mexico (Höge). Lectotype selected from Champion's cotypic series; sex undetermined. This is the specimen figured by Champion. It is in excellent condition, but because of its historical value and the manner in which it is mounted, it was deemed inadvisable to attempt a dissection.

Specimens examined.—From the following localities, 84:

United States: Arizona (Chiricahua Mts., Flagstaff, Palmerlee, Santa Catalina Mts., White Mts.). New Mexico (Las Vegas, Porvenir).

Mexico: Ciudad in Durango, Durango, Jalapa, Juan Manuel El Salto, Mount Colima.

***Platydema neglectum*, new species**

Description.—Body obovate, strongly convex, light reddish brown to almost black, strongly shining. Head prominently impressed between eyes, coarsely and densely punctured, antennae and mouthparts reddish brown, apical antennal segment sometimes sharply pointed (pl. 6, fig. 54); terminal segment of maxillary palpus elongate, narrowly triangular; eyes large, flattened dorsally, separated ventrally by a distance usually subequal to longer axis of one eye. Pronotum trapezoidal, sides usually almost straight, narrowly margined, strongly reflected, bead very fine, basal angles nearly square, apical angles obtuse, narrowly rounded, surface coarsely but not densely punctured, lateral punctures slightly larger than those of disc. Elytral striae moderately strongly impressed, punctures rather coarse and deep, intervals convex, rather coarsely and densely punctate. Pro-

sternum prominent, convex, horizontal, its apex bluntly rounded, anterior portion (in front of forecoxae) strongly carinate; metasternum finely and densely punctate, except caudo-lateral portion; abdomen coarsely and densely punctured, forming longitudinal wrinkles laterally except two apical segments where punctures are fine and sparse, not forming wrinkles laterally. Male genitalia with ventral portion of lateral lobes continued backward as a single spine incomplete at apex (pl. 4, fig. 28). No apparent external sexual dimorphism. Measurements: length 5.6–7.3 mm.; width 3.1–4.2 mm.

Remarks.—I encountered in a number of collections occasional individuals and short series of specimens which at first I thought represented extreme variations of *P. americanum*. Many had been identified by various workers as *P. americanum* and *P. oregonense*. When these were segregated, critically examined, and plotted distributionally, it became evident that I was dealing with a strikingly different form, which I regard as a distinct species. Its resemblance to both of the above mentioned species cannot be denied; however, it resembles neither of them entirely, being more or less intermediate in regard to several characters.

It may be distinguished from *P. oregonense* by its more parallel elytral margins and the relatively complete outermost elytral striae, the more conspicuously punctured elytral intervals, the more shallowly impressed frontal depression, and the somewhat larger average size.

From *P. americanum* it may be separated by the trapezoidal pronotum with its straight or very feebly arcuate, narrowly expanded, and less strongly reflected, lateral margins, which almost always lack even traces of the broad impression on each side behind the middle so characteristic of *P. americanum*.

The genitalia suggest a closer affinity with *P. americanum* than with *P. oregonense*, but external characters point first toward one and then the other. The head and thorax strikingly resemble those of *P. oregonense*, while the form and sculpture of the elytra are equally as strongly suggestive of *P. americanum*.

The distance separating the eyes ranges from almost twice to less than the longer axis of one eye and is unreliable as a taxonomic character.

The peculiar prolongation of the apical antennal segment mentioned above is most perplexing. In a series of 105 specimens from Modoc County, Calif., 22 show an extreme awl-shaped segment (pl. 6, fig. 54), 33 show a tendency toward this modification but developed to a lesser degree, 25 show merely a pointed apical segment, while 29 show a rounded type which I consider more or less typical of a member of this genus.

In the other 142 specimens from numerous localities which I examined, only one specimen (North Bend, British Columbia) bears the awl-shaped segment. One can, therefore, place no reliance on the form of this segment. Evidently the Modoc County series represents an isolated population; I have seen nothing approaching this antennal modification in any other members of *Platydema*.

TYPES.—Holotype male and allotype female, USNM 66049; Modco County, Calif., 15 miles north of Alturas, June 16, 1954, R. O. Shuster. Paratypes: same data as holotype placed in following collections—2 each in BMNH, MCZ, CU, OSU, CAT; 90 in UCal.

SPECIMENS EXAMINED.—From the following localities, 264:

United States: California (15 miles north of Alturas, Angora Lake, Auburn, Boonville, Carmel, Carter Mountain, Chester, Davis, Facht, Fallen Leaf, Fish Camp, Hat Creek, Idyllwild, Lassen National Park, Lone Pine, Los Angeles, Mammoth, McCloud, Meadow Valley, Mokelumne Hill, Monterey, Nichols Mills, Old Station, Placerville, Pohono Trail, Round Meadow Giant Forest, San Jacinto Mts., Sierra National Forest, Soda Springs, Viola, Weed, Yosemite, Humboldt Co., Madera Co., Mariposa Co., Tulare Co.). Idaho (Coeur d'Alene, Centerville, Moscow, Riggins, Robinson Lake). Montana (Kalispell, Sula). Nevada (Reno, Washoe Co.). Oregon (Blue Mts., Cliff Ridge, Dilley, Hilgard, Hood River, The Dalles). Utah (Logan Canyon). Washington (Fort Lewis, Pullman. Tenino).

Canada: British Columbia (North Bend).

Platydema oregonense LeConte

PLATE 4 (FIG. 27)

Platydema oregonense LeConte, 1857, p. 51.—Horn, 1870, p. 383.

DESCRIPTION.—Body broadly ovate, strongly convex, dark reddish brown to almost black, moderately shining. Head deeply impressed between eyes, coarsely but not densely punctured, antennae and mouthparts reddish brown, terminal segment of maxillary palpus elongate, narrowly triangular; eyes rather small, flattened dorsally, separated ventrally by a distance subequal to 1.5–2.0 times the longer axis of one eye. Pronotum trapezoidal, evenly convex from side to side, sides almost straight, basal angles rectangular, apical angles obtusely rounded, lateral marginal bead fine, narrowed basally and apically, slightly wider behind middle, surface finely and sparsely punctured on disc, punctures becoming larger and more closely spaced laterally. Elytral striae feebly impressed, finely punctured, outermost stria on each side conspicuously abbreviated at both ends, punctures closely spaced medially, becoming increasingly farther apart and disappearing altogether at a considerable but variable distance from both base and apex; intervals subconvex, minutely and sparsely punctate; lateral margins of elytra undulated, marginal bead fine, feebly reflected. Prosternal process narrow anterior to

front coxae, becoming gradually broader to just behind coxae, then rapidly tapering to a point apically, horizontal, and prominent. Metasternum coarsely and sparsely punctured anteriorly, a large crescent-shaped area along caudal margin devoid of punctures. First four abdominal segments uniformly coarsely and densely punctured, forming longitudinal wrinkles laterally, apical two segments finely and sparsely punctate. Male genitalia with ventral portion of lateral lobes continued backward as a single short spine (pl. 4, fig. 27). No apparent external sexual dimorphism. Measurements: length 4.0–6.1 mm.; width 2.3–3.4 mm.

Remarks.—This species is remarkably constant in appearance and may readily be distinguished from its congeners by the broadly ovate form, the deeply impressed head, the very narrow and slightly undulated lateral elytral margins and the abbreviated outermost elytral striae.

Type.—MCZ 4692; type locality, Oregon. The specimen is in very poor condition but quite recognizable.

Specimens examined.—From the following localities, 682:

United States: California (Ahwahnee, Auburn, Bartlett Springs, Bass Lake, Beaumont, Biledo Meadow, Blocksburg, Bucks Lake, Carmel, Cazadero, Chester, Chiquito Creek, Cole, Colorado Desert, Colton, Dunsmuir, Eagle Park Meadows, Facht, Gold Lake, Huckleberry Meadow, Huntington Lake, Idyllwild, Indio, Kaweah, Kyburz, Laguna Beach, Lagunitas, Lake Arrowhead, Lake Tahoe, Little Yosemite, Los Gatos, Lyons Dam, Manzanita Lake, Mather, McCloud, Meadow Valley, Millwood, Mokelumne River, Mountain Springs, North Fork, Oakland, Ojai, Old Station, Pacific Slope, Palo Alto, Palomar, Pasadena, Phillips Station, Riverside, Round Meadow Giant Forest, San Berardino, San Diego, San Jacinto Mts., San Mateo, Santa Cruz Mts., Sequoia National Park, Sierra National Forest, Soda Springs, Stockton, Strawberry Valley, Sugar Pine, Summit Lake, Tallac, Tanbark Flat, Tenaya Canyon, Truckee, Viola, Walnut Creek, White Water, Wolverton, Wrights Lake, Yosemite National Park, Alpine Co., El Dorado Co., Los Angeles Co., Mariposa Co., Placer Co., Santa Clara Co., Siskiyou Co., Sonoma Co., Trinity Co., Tulare Co.). Idaho (Pierce, Priest River, Wallace). Oregon (Ashland, Astoria, Corvallis, Forest Grove, Hood River, Medford, Portland, Suttle Lake, Upper Klamath Lake). Washington (Baring, Easton, North Bend, Tenino, Wenatchee).

Canada: British Columbia (Creston, Lillooet District, Mission City, Pender Harbor, Steelhead, Trinity Valley, Vancouver).

Platydema laevipes Haldeman

Plate 4 (Fig. 29)

Platydema laevipes Haldeman, 1848, p. 101.—Horn, 1870, p. 383.—Blatchley, 1910, p. 1264.

Platydema crenatum LeConte, 1878, p. 422 [new synonymy].

Description.—Body elongate oval, strongly convex, dark brown to blackish, feebly shining. Head convex between eyes, coarsely and densely punctured, usually a few large, widely separated punctures

just above clypeus, antennae and mouthparts reddish brown, terminal segment of maxillary palpus short, broadly triangular; eyes small, convex dorsally, inner margins raised well above plane of head, separated ventrally by a distance subequal to twice the longer axis of one eye. Pronotum transverse, sides rather strongly arcuate, parallel at least behind middle, basal angles obtusely rectangular, apical angles broadly rounded, lateral marginal bead fine, margins slightly and uniformly flattened from base to apex, often feebly reflected, surface finely and sparsely punctured on disc with larger punctures in lateral depression. Elytral striae shallowly but distinctly impressed, punctures coarse and well separated, intervals more or less strongly convex, minutely and sparsely punctate. Prosternal process broad and flat between coxae, its apex usually prominent but occasionally deflected and obtuse. Ventral surface of pronotum usually impunctate but frequently with feeble longitudinal ridges. Metasternum coarsely but sparsely punctured; abdominal sternites coarsely and densely punctured except apical two which have minute, widely separated punctures. Male genitalia with ventral portions of lateral lobes continued backward as two short spines (pl. 4, fig. 29). No apparent sexual dimorphism. Measurements: length 4.4—6.3mm.; width 2.4—3.5 mm.

Remarks.—This species closely approaches *P. subcostatum* in general appearance and understandably is often mistaken for it in collections. The majority of specimens may be separated from *P. subcostatum* at once by the erect prosternal process; however, a number have been observed in which the apex of this structure is concealed in such a way that it would be impossible to identify them by this character alone, without relaxing them and pushing back the pronotum in order to raise the prosternum from its cleft in the mesosternum. A number of other constant but unfortunately relative characters render it quite distinct from *P. subcostatum.* The duller lustre of the dorsum, the shape of the pronotum and the deeper, more coarsely punctured elytral striae are useful taxonomic characters, although difficult to describe. The elytral intervals of *P. laevipes* are always distinctly convex and obscurely punctured. The male genitalia are of little or no value in diagnosing this species.

Platydema crenatum LeConte is but an extreme variant of the present species, in which the punctures of the elytral striae are slightly coarser and the intervals more convex.

Type.—MCZ 8371. The specimen bearing the type label is spotted with mud or other detritus, but is otherwise in good condition and quite recognizable. It bears a pink "Middle States" label. Other material under this name in the LeConte collection (MCZ) where the type now reposes includes two additional specimens with the pink

"Middle States" label, presumably from the original Haldeman series, two labeled "Texas," and one labeled "Va."

The type of *P. crenatum* LeConte (MCZ 4693) is a unique in the cabinet of LeConte. It was taken at Haulover, Fla., on March 1.

Specimens examined.—From the following localities, 154:

United States: Alabama (Mobile, Monroeville). Arkansas (Hope, Ouachita Mts., Lawrence Co.). District of Columbia. Florida (Crescent City, Fernandina Beach, Gainesville, Haulover, Orlando, Citrus Co.). Georgia (Adairsville, Atlanta, Clayton, Dunwoody). Indiana (Crawford Co., Posey Co., Vigo Co.). Iowa (Washington Co.). Kansas (Princeton). Louisiana (Opelousas, Winnfield). Maryland (Baltimore, Bladensburg, Odenton, Sparrows Point). Massachusetts (Sherborn). Mississippi (Avera, Leakesville, Lucedale, New Augusta, State Line). Missouri (Columbia, Creve Coeur, Hayden, New Hartford, Pike Co.). New Jersey (Chadwicks, Ocean City, Vineland). New York (Rockaway). North Carolina (Asheville, Tryon). Ohio. Pennsylvania. South Carolina (Camden, Florence). Texas (College Station, Columbus, Daingerfield, Dallas, Davis Mts., Deweyville, Green Valley, Handley, Houston, Victoria, Burleson Co., Burnet Co., Jackson Co.). Wisconsin (Dane Co.).

Platydema subcostatum Laporte and Brullé

Plates 2 (Fig. 11), 4 (Fig. 31)

Platydema subcostata Laporte and Brullé, 1831, p. 362.
Platydema subcostatum Laporte and Brullé.—Horn, 1870, p. 384.—Blatchley, 1910, p. 1264.
Platydema clypeatum Haldeman, 1848, p. 102.
Platydema oblongulum Motschoulsky, 1873, p. 470 [new synonymy].

Description.—Body elongate oval, strongly convex, dark brown to almost black, shining. Head uniformly convex between eyes, coarsely and densely punctured, usually a few large, widely separated punctures just above clypeus, antennae and mouthparts reddish brown, terminal segment of maxillary palpus short, broadly triangular; eyes moderate in size, convex dorsally, inner margin raised well above plane of head, separated ventrally by a distance equal to from 2 to 3 times the longer axis of one eye. Pronotum transverse, sides feebly arcuate, almost parallel, an elongate impression slightly behind middle tapering toward base and apex, basal angles rectangular, apical angles very broadly rounded, lateral marginal bead fine, surface finely and sparsely, rather uniformly punctured with a few well-separated larger punctures in flattened lateral areas. Elytral striae feebly impressed, finely punctured, intervals flat to subconvex, usually finely and rather densely punctured; elytral margins feebly arcuate, nearly parallel, bead fine, slightly reflected. Prosternal process broad and flat between coxae, its apex deflected, obtuse, not prominent. Ventral surface of pronotum variously sculptured, smooth to rugose, never with strong longitudinal ridges, metasternum and basal three abdominal sternites coarsely and densely punctured;

apical two abdominal sternites minutely and sparsely punctate. Male genitalia with ventral portions of lateral lobes continued backward as two short spines; dorsal portions fused, forming a broad arc posteriorly, but with visible remnants of a much narrower fusion (pl. 4, fig. 31). No apparent external sexual dimorphism. Measurements: length 5.0–7.9 mm.; width 2.7–4.2 mm.

Remarks.—This species, the largest in northeastern North America, is closely related to both *P. picilabrum* and *P. laevipes*. This conclusion is supported by a study of the male genitalia in which the ventral portions of the lateral lobes are continued backward as two spines and the dorsal portions are fused much farther posteriorly, forming an arcuate bridge which more or less obscures their paired nature (pl. 4, fig. 31).

The larger size of *P. subcostatum*, its broader form, uniform dark coloration without bluish or greenish reflections, the raised inner margins of the eyes, and the lack of coarse longitudinal ridges on the underside of the pronotum, should readily distinguish the majority of specimens from *P. picilabrum*. An excellent character is to be found in the dorsal portions of the lateral lobes of the male genitalia. In *P. picilabrum* these lobes are completely fused, forming a strong, nearly straight bridge, while in *P. subcostatum*, the traces of former lines of fusion are quite apparent.

P. subcostatum may be distinguished from *P. laevipes* by the shining lustre of the dorsum, the consistently deflexed apex of the prosternal process, the flatter, more strongly punctured elytral intervals, the more feebly impressed and more finely punctured elytral striae, and the very narrowly margined pronotum. There are no clearcut differences in the male genitalia. In *P. subcostatum*, the acute dorsal groove of the basal sclerite and the struts in repose protruding substantially beyond the base of the sclerite appear to be constant and diagnostic characters. In addition, the relatively larger size of the entire aedeagus is a useful criterion.

Type.—Not seen; type locality listed as Philadelphia. The type of *P. clypeatum* Haldeman (MCZ 8368) is a typical specimen of *P. subcostatum* and was placed under that name by LeConte in his collection. It bears a "Middle States" label. Ohio specimens correspond to the types of *P. oblongulum* in UMMZ (Kelejnikova, in litt.). Type locality, "Florida."

Specimens examined.—From the following localities, 763:

United States: Alabama (Barton, Selma, Tuscaloosa). Arkansas (Hot Springs). Connecticut (Cornwall, Hamden, New Haven). Delaware (Bombay Hook, Glasgow, Newark, Seaford). District of Columbia. Florida (Brooksville, Cresent City, Enterprise, Suwannee River). Georgia (Athens, Atlanta, Clayton, Cornelia, Dunwoody, Savannah, Tybee Island). Illinois (Forest

Park, McHenry, Quincy, Willow Springs, Saint Clair Co.). Indiana (Lafayette, Clark Co., Fountain Co., Jackson Co., Jennings Co., Lake Co., Lawrence Co., Marion Co., Marshall Co., Perry Co., Putnam Co., Starke Co., Vigo Co., Warren Co.). Iowa (Ames, Gladbrook, Iowa City, Lehigh, Shenandoah, Washington Co.). Kansas (Argentine, Douglas Co.). Kentucky (Frankfort, Louisville, Edmonson Co.). Louisiana (Covington). Maryland (Baltimore, Bladensburg, Glen Echo, Odenton, Plummers Island, Riverdale, Somerset, Tacoma Park). Massachusetts (Arlington, Beach Bluff, Boston, Cambridge, Dorchester, Lowell, Marion, Nahant, Natick, Northfield, Sherborn, Springfield, Swampscott, Tyngsboro, Woburn). Michigan (Detroit, East Lansing, Galesburg, George Reservation, Inkster, Pittsford, Port Huron). Minnesota (Eitzen, John Latsch State Park, Lake Pepin, Mississippi Bluff). Mississippi (Columbia, Lucedale, New Augusta, State Line). Missouri (Hayden, New Hartford, Saint Louis). New Hampshire (Farmington). New Jersey (Anglesea, Atsion, Boonton, Camden, Chadwicks, Clementon, Englewood Cliffs, Fort Lee, Hemlock Falls, Highlands, Hopatcong, Lakewood, Malaga, Merchantville, Orange, Phillipsburg, Riverton, Taunton Lake, Tenafly, Vineland, Wenonah, Woodbury). New York (Aqueduct, Brooklyn, Brownville, Cedarhurst, Cold Spring Harbor, Flatbush, Flushing, Forest Park, Ithaca, Kew Gardens, McLean, Montauk, New York City, Olcott, Peekskill, Riverhead, Rockaway Beach, Sunken Meadow State Park, Wading River, West Farms, West Point, Wyandanch, Yaphank). North Carolina (Asheville, Lake Toxaway, Mount Sterling, New River, Southern Pines, Tryon, Wilkesboro). Ohio (Akron, Athens, Cincinnati, Columbus, Georgesville, Allen Co., Delware Co., Fairfield Co., Hocking Co., Licking Co., Scioto Co.). Pennsylvania (Allegheny, Belle Vernon, Bethlehem, Bustleton, Castle Rock, Cresent Hill, Doyle, Easton, Frankford, Harrisburg, Jeannette, Overbrook, Philadelphia, Pittsburgh, State College, Tinicum Island, Villanova, West View, Delaware Co., Washington Co., York Co.). Rhode Island (Watch Hill). South Carolina (Clemson College). Tennessee (Deer Lodge, Elmwood). Texas (Deweyville, Liberty). Virgina (Fairfax, Falls Church, Fredericksburg, Great Falls, Pennington Gap, Vienna, Lee Co., Nelson Co.). West Virginia (Berkeley Springs, Cheat Mts., Fairmont, Harpers Ferry, Morgantown). Wisconsin (Dane Co.).

Canada: Ontario (Grimsby).

Platydema picilabrum Melsheimer

Plate 4 (Fig. 30)

Platydema picilabrum Melsheimer, 1846, p. 62.—Horn, 1870, p. 384.—Blatchley, 1910, p. 1264.

Description.—Body elongate oval, strongly convex, dark brown to blackish with bluish, greenish, or coppery reflections, shining. Head convex between eyes, rather uniformly coarsely and densely punctured, antennae and mouthparts reddish brown, terminal segment of maxillary palpus short, broadly triangular; eyes small, convex dorsally but with inner margin not conspicuously raised above plane of head, separated ventrally by a distance equal to from 1½ to 3 times the longer axis of one eye. Pronotum transverse, sides feebly arcuate, almost parallel, basal angles obtusely rectilinear, apical angles very broadly rounded, lateral marginal bead fine, surface rather uniformly coarsely and densely punctured. Elytral striae strongly impressed,

finely punctured; intervals subconvex, finely and densely punctured; elytral margins feebly arcuate, nearly parallel, bead fine, slightly reflected. Prosternal process with parallel sides, its apex deflected and obtuse, not prominent. Ventral surface of pronotum with strong longitudinal ridges instead of punctures, entire ventral surface coarsely and densely punctured except apical two abdominal sternites where punctures are fine and sparse. Male genitalia with ventral portions of lateral lobes continued backward as two short spines; dorsal portions fused basally to form a broad shallow arc without a trace of former lines of fusion (pl. 4, fig. 30). No apparent external sexual dimorphism. Measurements: length 4.2–5.7 mm.; width 2.2–2.6 mm.

Remarks.—This species may be readily separated from *P. subcostatum*, its nearest ally, by its smaller, narrower form, the metallic coppery, bluish or greenish reflections of the dorsum, and the presence of coarse longitudinal ridges on the ventral side of the pronotum. The male genitalia are quite distinctive in that the lateral lobes are fused basally, thus obscuring their paired condition.

Type.—In the Melsheimer collection (MCZ) there are two specimens of the present species, both without data. One of these is hereby designated as lectotype but as yet has not been assigned an accession number. Type locality, Pennsylvania.

Specimens examined.—From the following localities, 156:

United States. Alabama (Barton, Mobile). Arkansas. District of Columbia. Florida (Crescent City, Enterprise). Georgia (Atlanta, Cornelia, Dunwoody). Illinois (Chicago, Downers Grove). Indiana (Posey Co., Putnam Co., Vigo Co.). Kansas. Kentucky (Frankfort). Louisiana (Covington). Maryland. Massachusetts (Amherst, Framingham, Lowell, Natick, Sherborn, Tyngsboro, Wayland). Michigan (Detroit). Mississippi (Lucedale, State Line). Missouri (New Hartford, Saint Charles). New Jersey (Anglesea, Fort Lee, Paterson, Wenonah). New York (Bergen Beach, West Point). North Carolina (Murphy, Saluda, Tryon). Ohio (Athens, Delaware Co., Scioto Co.). Pennsylvania (Easton, Harrisburg, Jeannette, Pittsburgh, State College, Allegheny Co., Washington Co., York Co.). South Carolina (Camden). Texas (Houston). Virginia (Mount Vernon). West Virginia (Morgantown, White Sulphur Springs).

Platydema ruficorne (Sturm)

Plate 5 (Figs. 40, 41)

Diaperis ruficornis Sturm, 1826, p. 69, tab. 3, fig. 21.
Platydema rufiventris Laporte and Brullé, 1831, p. 378.—Haldeman, 1848, p. 101.
Neomida ruficornis (Sturm).—Sturm, 1843, p. 155.
Neomida rufa Melsheimer, 1846, p. 62.
Platydema analis Haldeman, 1848, p. 101.
Platydema ruficorne (Sturm).—Horn, 1870, p. 382; 1885, p. 111.—Blatchley, 1910, p. 1263.—Cotton, 1941, p. 9, fig. 15.—Back and Cotton, 1953, p. 31, fig. 43.
Platydema opaculum Casey, 1884, p. 51; 1890, p. 485.

Description.—Short, broadly oval, moderately convex, brownish black to black, often with purplish cast, dull in lustre. Head evenly arcuate in front, anterior margin reddish, flattened or feebly convex between eyes, epistomal suture well defined, surface uniformly coarsely and densely punctured; eyes small, widely separated both above and below, convex, broadly and deeply emarginate anteriorly, dorsal anterior margin deeply set in head, sharply elevated behind; separated ventrally by a distance subequal to about two (1.8–2.6) times the longer axis of one eye; mouthparts light reddish brown, terminal segment of maxillary palpus broadly triangular with distal angle prolonged; antennae uniformly pale reddish brown from base to apex. Pronotum twice as broad as long, strongly narrowed from base to apex, sides strongly arcuate, narrowly margined, bead fine and slightly reflected, basal angles rectangular, apical angles broadly rounded, disc finely but distinctly punctured, lateral punctures larger, subequal to those of head. Elytra convex, sides strongly rounded, narrowly margined with distinct bead, striae feebly or not at all impressed, finely and closely punctured, intervals flat to rather strongly convex, impunctate, rarely with a few minute, widely scattered punctures. Prosternal process variable, usually horizontal with apex prominent, sometimes feebly convex or convex with apex secondarily reflected, margined between coxae. Ventral surface of pronotum concave, usually coarsely and densely punctured, sometimes smooth, edges very thin; metasternum with coarse, widely spaced punctures; abdominal sternites coarsely and densely punctured, each with at least a faint lateral depression, always especially pronounced on fourth sternite; entire ventral surface including epipleura reddish brown, except apical sternite which is often black. Male aedeagus with apical sclerite flat, blade like, about one-fifth longer than basal sclerite; a strong constriction between apical and basal sclerites (pl. 5, figs. 40, 41). Measurements: length 3.5–5.8 mm.; width 2.0–3.4 mm.

Remarks.—This is probably the most frequently encountered and abundant species of *Platydema* inhabiting eastern North America, excluding the New England states and the northern parts of Minnesota, Wisconsin, and Michigan. It is difficult to characterize because there is nothing particularly distinctive about it. Its salient features, consisting of a broadly oval form, dull and velvety dorsal surface, coarsely and densely punctured head and pronotum, and uniformly pale antennae, separate it from its congeners, with the possible exceptions of *P. ruficolle* and *P. wandae*. Characters which will separate it from these two are discussed separately under each of the latter. In collections it is frequently confused with both *P. nigratum* and *P. flavipes*, but these readily may be distinguished by means of

their bicolored antennae. The male genitalia indicate a close relationship with both *P. ruficolle* and *P. flavipes*.

Numerous deviations in form have been encountered, making it necessary to preface a number of statements in the composite description with the word "usually." All of these deviations were carefully considered and were found to belong to one rather variable species. Several of the synonyms were based on extreme variants of of the typical form; indeed, it is surprising that it was described only under five different names. Prominent among these variations is the elongate form which approaches that of *P. flavipes*. The relative convexity of the elytral intervals and the position of the apex of the prosternal process fluctuate considerably, even among individuals of a single population. The dorsal surface lustre is constant. Specimens appearing slightly glossy reveal their true lustre when touched lightly with a brush dipped in ether.

P. ruficorne has entered the economic literature under the common name "red-horned grain beetle" (Back and Cotton, 1953). It has been reported commonly from shelled corn in Missouri, Iowa, and Illinois. From all indications the beetle is particularly attracted to grain having a high moisture content which makes it damp and moldy; it is doubtful that it ever attacks sound grain. Normally it is found under the bark of dead trees and in fleshy fungi. On several occasions it has been reported coming to lights.

TYPES.—*Diaperis ruficornis* Sturm; not seen; type locality, "Amer. bor." *Platydema rufiventris* Laporte and Brullé; not seen; type locality, "Philadelphie." *Neomida rufa* Melsheimer; not seen; missing from Melsheimer collection (MCZ) (E. A. Chapin, in litt.); type locality, Pennsylvania. Horn (1870) states that it is "but an immature specimen of *ruficorne*." *Platydema analis* Haldeman: MCZ 8369; bears a pink "Middle States" label. This is a very typical specimen of *ruficorne* as defined herein. Both hindlegs and both antennae are gone and the pin is badly corroded. *Platydema opaculum* Casey: USNM 46813; bears a "Penn." label but said by Casey to be from near Philadelphia. A year after its description, Horn (1885) placed it into synonymy with *P. ruficorne*, calling it var. *anale* Haldeman. Casey himself (1890) somewhat reluctantly concurred, with the comment that it "appears to be a small and rather abnormal specimen of *ruficornis* Sturm . . . " and placed it under that name in his collection. It falls well within the range of variation, including size (3.9 mm. long), as described above. *Platydema pallens* Laporte and Brullé (1831, p. 377) is sometimes included (Gebien, 1911, 1940; Leng, 1920), as a synonym of the present species. The original description could fit any number of species including *P. ruficorne*. The measurements given (3 lines long, 2 lines

wide) are well beyond the range of size encountered in this study and the locality ("bords du Maroni, dans la Guiane francaise") is, of course, widely separated from the known limits of distribution for *P. ruficorne*. It almost certainly represents some other species.

SPECIMENS EXAMINED.—From the following localities, 1793:

United States: Alabama (Auburn, Bessemer, Cheaha State Park, Marion, Mobile, Montgomery, Oxford, Peterman, Riderwood, Tuscaloosa, Wadley). Arkansas (Carthage, Cove, Fouke, Hope, Lawrence Co., Prairie Co., Washington Co.). Colorado (Denver). Connecticut (Hamden). Delaware (Glasgow, Newark). District of Columbia. Florida (Big Pine, Brooksville, Citra, Dunedin, Dunseith, East Palatka, Elfers, Enterprise, Fruitland Park, Gainesville, Jacksonville, Lakeland, Lake Worth, Monticello, Orange, Ormond Beach, Paradise Key, Pine, Punta Gorda, Saint Augustine, Sanford, Sarasota, Tampa, Winter Park, Duval Co., Jackson Co., Leon Co., Marion Co.). Georgia (Albany, Arlington, Athens, Atlanta, Baconton, Cartersville, Clayton, Cornelia, Dunwoody, Griffin, Kings Island, Milner, Norwood, Savannah, Stone Mountain, Thomasville, Thomson, Warrenton). Illinois (Bloomington, Camp Drake, Fort Sheridan, Homer, Quincy, Scott Field, Urbana, Willow Springs, Piatt Co.). Indiana (Hessville, Hovey Lake, Lafayette, La Porte, Lebanon, Cass Co., Crawford Co., Harrison Co., Jackson Co., Knox Co., Lake Co., Marion Co., Marshall Co., Posey Co., Putnam Co., Switzerland Co., Vigo Co., Warren Co.). Iowa (Ames, Hedrick, Iowa City, Jefferson, Ledges State Park, Mount Pleasant, Sac City, Shenandoah, Sioux City, Storm Lake, Unionville, Winterset, Adair Co., Carroll Co., Cass Co., Keokuk Co., Monona Co., Marshall Co., Wapello Co.). Kansas (Alta Vista, Argentine, Benedict, Lawrence, Manhattan, Onaga, Topeka, Doniphan Co., Neosho Co.). Kentucky (Sanborn). Louisiana (Alexandria, Chastine, New Orleans, Ponchatoula, Tallulah, Winnfield). Maryland (Baltimore, Hyattsville, Plummers Island, Plum Point, Riverdale, Seat Pleasant, Sparrows Point, Takoma Park). Massachusetts (Medford, Williamstown). Michigan (Ann Arbor, Detroit, East Lansing, Galesburg, Lizzie, Owosso, Gratiot Co., Washtenaw Co.). Minnesota (Mississippi Bluff, Houston Co.). Mississippi (Bruce, Charleston, Leakesville, Lucedale, Lumberton, Natchez, New Augusta, State College). Missouri (Brunswick, Columbia, Helena, Kansas City, Keytesville, Maitland, Maryville, Metz, New Hartford, Palmyra, Rutledge, Saint Louis, Santa Fe, Warsaw). Nebraska (Hastings, Lincoln, Omaha, Platte, Plattsmouth). New Jersey (Boonton, Clementon, Englewood, Lakewood, Manumuskin, Mauricetown, Phillipsburg, Pine Barrens, Rahway, Vineland). New York (Buffalo, Clermont, Danby, Delmar, East Aurora, Elbridge, Flatbush, Flushing, Georgetown, Ithaca, Lancaster, Lockport, Orient, Pike, West Point, Greene Co.). North Carolina (Alexander, Asheville, Black Mountain, Cape Hatteras, Chapel Hill, Edenton, Elizabeth City, Murphy, Raleigh, Southern Pines). Ohio (Athens, Aurora, Bluffton, Columbus, Durbin, Georgesville, Hamilton, Lagrange, Marietta, Millport, North Olmsted, Urbana, Wooster, Ashtabula Co., Delaware Co., Fairfield Co., Greene Co., Hancock Co., Highland Co., Hocking Co., Licking Co., Meigs Co., Monroe Co. Morrow Co., Perry Co., Putnam Co., Scioto Co.). Oklahoma (Locust Grove, Okemah, Stillwater, McCurtain Co., Osage Co., Payne Co.). Pennsylvania (Bethlehem, Darby, Easton, Essington, Harrisburg, Jeannette, Lime Rock, Olney, Overbrook, Patton, Philadelphia, Pittsburgh, Scranton, Tinicum, Wyoming, Allegheny Co., Delaware Co., York Co.). South Carolina (Clemson, Columbia, Savannah River Plant). Tennessee (Deer Lodge, Elmwood, Madison, Memphis, Nashville). Texas

(Brownsville, College Station, Columbus, Cypress Mill, Dallas, Fedor, Gall, Harrisburg, Houston, Jacksonville, Kerrville, Liberty, Mexia, New Braunfels, Palestine, San Felipe, Seabrook, Seguin, Texarkana, Uvalde, Victoria, White Rock Lake, Burnet Co., Colorado Co., Eastland Co., Hays Co.). Virginia (Belle Haven, Cherrydale, Falls Church, Fort Monroe, Great Falls, Mount Vernon, Suffolk, Nelson Co.), West Virginia (Cave Mountain).

Canada: Ontario (Almonte, Grand Bend, Grimsby, Ottawa, Picton, Point Pelee, Tillsonburg, Toronto, Turkey Point, Hastings Co.). Quebec (Coteau Junction, Montreal).

Platydema ruficolle Laporte and Brullé

PLATE 5 (FIGS. 47, 48)

Platydema ruficollis Laporte and Brullé, 1831, p. 375.—Haldeman, 1848, p. 102.
Neomida sanguinicollis Melsheimer, 1846, p. 61.
Platydema ruficolle Laporte and Brullé.—Horn, 1870, p. 382.—Blatchley, 1910, p. 1263.

DESCRIPTION.—Small, short, broadly oval, strongly convex; head, pronotum, scutellum, and margins of elytra reddish, elytra black, feebly shining. Head broadly arcuate in front, epistomal margin almost truncate, epistomal suture usually well defined; surface uniformly coarsely and densely punctured; eyes small, widely separated both above and below, convex, deeply and broadly emarginate anteriorly, anterior dorsal margin deeply set in head, posterior margin sharply elevated, separated ventrally by a distance equal to from 2 to 3 times the longer axis of one eye; mouthparts light reddish brown, terminal segment of maxillary palpus broadly triangular; antennae uniformly reddish brown from base to apex. Pronotum 2.2 to 2.4 times as broad as long, strongly narrowed from base to apex, sides strongly arcuate, margined only by a very fine reflected bead; basal angles rectangular, apical angles narrowly rounded; disc finely and sparsely punctured, more coarsely so laterally. Elytra convex, sides strongly rounded, narrowly margined with distinct bead; striae moderately impressed, especially laterally and apically, coarsely punctured; scutellar striae absent; intervals distinctly convex, very minutely but moderately densely punctulate. Prosternal process horizontal, its apex broadly triangular and prominent, margined between coxae. Ventral surface of pronotum concave, smooth, very thin on lateral margins; entire ventral surface reddish brown, legs usually lighter. Metasternum and basal four abdominal sternites with widely spaced, abnormally larger punctures, apical two abdominal sternites finely and rather sparsely punctulate, fourth sternite conspicuously impressed laterally. Male aedeagus with basal sclerite comparatively longer than apical sclerite, no constriction between

them (pl. 5, figs. 47, 48). Measurements: length 3.3–4.4 mm.; width 2.0–2.5 mm.

Remarks.—The fairly consistant coloration of this species combined with the glossy lustre of the entire dorsum, the very large, well-separated punctures of the metasternum and first four abdominal sternites and the absence of scutellar striae are sufficient to distinguish this species from any other North American member of the genus.

Because of its glossy lustre, it bears a superficial resemblance to *P. micans*, from which it may be separated by the normally placed outermost elytral striae, the minutely and indistinctly punctured elytral intervals, and the much finer and sparser punctures of the head.

Despite the difference in dorsal surface lustre, its nearest sympatric relative appears to be *P. ruficorne*, as indicated by the male genitalia. Otherwise, the two are quite similar in overall appearance.

Even in the small series available for study, there is a rather wide range of color variation, and since this character is given considerable taxonomic weight, it seems in order to describe it in greater detail. The above description of reddish head, pronotum, scutellum, and elytral margins applies to the majority of specimens, however, the specimens at hand range from one which is almost completely black to several which are almost uniformly reddish brown. In all of them, the previously mentioned parts are invariably lighter than the disc of the elytra. Several specimens were examined in which the black of the elytra extended well onto the pronotum, obliterating the red except at the margins and apex, the scutellum remaining red as usual. At the other extreme were three specimens in which the elytral base was as red as the scutellum and a narrow band of the same color extended a slight distance down the elytral suture. It is quite probable that specimens will be encountered which exhibit even greater deviation from the normal coloration, in which case there are several other equally useful characters which will adequately distinguish this species from its congeners.

Types.—*Platydema ruficollis* Laporte and Brullé: not seen; type locality, "Philadelphie." *Neomida sanguinicollis* Melsheimer: represented in Melsheimer collection (MCZ) by one specimen without data or accession number; type locality, Pennsylvania. A very typical specimen of *P. ruficolle*.

Specimens examined.—From the following localities, 29:

United States: Arkansas (Bentonville, Hope). Florida (Pensacola). Georgia (Dunwoody). Illinois. Indiana (Lake Co., Posey Co., Putnam Co.). Iowa (Burlington). Mississippi (Lucedale, Ocean Springs). New Jersey (Lakehurst). Oklahoma (Ardmore). South Carolina (Florence). Texas (College Station, Dallas, 10 miles east of Shelbyville). Virginia (Cape Henry, Fredericksburg).

Platydema ellipticum (Fabricius)

PLATE 5 (FIG. 37)

Tenebrio ellipticus Fabricius,1798, p. 49.

Mycetophagus ellipticus Fabricius, 1801, p. 566.

Platydema elliptica (Fabricius).—Laporte and Brullé, 1831, p. 380.—Candèze, 1861, p. 46 (larva).

Platydema ellipticum (Fabricius).—Horn, 1870, p. 383.—Blatchley, 1910, p. 1263. Weiss, 1919, p. 276 [biology].

DESCRIPTION.—Elongate elliptical, moderately convex, dark brown to black, with irregular reddish spot on each elytron, dull in lustre. Head coarsely and densely punctured, epistomal suture clearly outlined; eyes moderately large, broadly and deeply emarginate anteriorly; mouthparts and antennae dark brown to black, terminal segment of maxillary palpus robust, elongate oval, obliquely truncate apically. Pronotum almost twice as broad as long, sides evenly arcuate and rather strongly convergent from base to apex, apex feebly emarginate, base slightly bisinuate, both basal and apical angles sharply rectangular, lateral margins scarcely expanded, bead very fine, surface coarsely and densely punctured, especially laterally. Elytra with sides nearly parallel, narrowly margined, bead fine and strongly reflected, striae slightly or not at all impressed, finely and distantly punctured, intervals subconvex to flat, minutely and sparsely punctulate, surface black with a prominent, irregularly margined red spot extending obliquely from humeral region of each elytron toward suture, sometimes actually attaining it. Ventral surface of pronotum coarsely and densely punctured, forming longitudinal ridges; prosternal process horizontal, its apex prominent and acute posteriorly; entire ventral surface dark brown or black, shining, coarsely and densely punctured, punctures smaller and more widely separated on apical two abdominal sternites. Male aedeagus with basal sclerite robust and subequal in length to apical sclerite, which is parallel sided and acutely pointed apically (pl. 5, fig. 37). Measurements: length 4.4–7.7 mm.; width 2.3–3.8 mm.

REMARKS.—This species is unique among the North American components of the genus *Platydema* in having the distinct, constant color pattern described above. From Central Mexico, south through most of South America, a number of very similar species enter the fauna. These consist of moderate to rather large forms, dull black dorsally, attractively patterned with spots and bands in various combinations and arrangements of this same reddish color noted in *P. ellipticum*. A number of these have been studied and on the basis

of limited series it appears that these patterns are quite constant and afford excellent diagnostic characters.

Most nearly approximating *P. ellipticum* are *P. högei* Champion, from Mexico, and *P. affine* Laporte and Brullé, from Brazil, Argentina, and Uruguay. Both of these have two transverse bands of red on each elytron; in the latter species, the posterior band encompasses the entire apex of each elytron while in *P. högei*, the extreme apex is black. Two other species with obviously close affinities include *P. diophthalmum* Laporte and Brullé, from most of Central America and Cuba, and *P. bimaculatum* Champion, from Central America, both of which have a single, rounded red spot on each elytron; in the former species the spots are located near the base of each elytron, in the latter, they are found near the middle.

Weiss (1919) reports that *P. ellipticum* is commonly associated with the shelf fungus, *Polyporus gilvus*, in New Jersey. Both larvae and adults were found in this fungus in mid-September.

Type.—Not seen; type locality, "Carolina."

Specimens examined.—From the following localities, 1015:

United States: Alabama (Cheaha State Park, Mobile, Monroeville, Oxford). Arkansas (Fayetteville, Hope, Washington Co.). Colorado (Denver). Connecticut. Delaware (Bombay Hook, Glasgow, Newark). District of Columbia. Florida (Biscayne Bay, Brooksville, Cresent City, Dunedin, Enterprise, Gainesville, Kissimmee, Lakeland, Miami, Palatka, Pine, Punta Gorda, Sanford, Tildenville, Winter Park, Citrus Co., Duval Co.). Georgia (Athens, Boston, Cornelia, Dunwoody, Hartwell, Milledgeville, Savannah, Thomasville, Tifton). Illinois (Centralia, Fort Sheridan, Galesburg). Indiana (Hovey Lake, La Porte, Terre Haute, Crawford Co., Jennings Co., Knox Co., Lagrange Co., Marion Co., Posey Co., Vigo Co.). Iowa (Ames, Clermont, Fort Madison). Kansas (Argentine, Lawrence, Lone Star Lake, Manhattan, Onaga, Topeka). Kentucky (Louisville). Louisiana (Baton Rouge, Bayou Sara, Greenwell Springs, Negreet, New Orleans, Opelousas, Ponchatoula). Maryland (Edgewood, University Park). Mississippi (Leaf, Lucedale, New Augusta, State Line, Jackson Co.). Missouri (Columbia, Corondelet, Kansas City, Rosati, Saint Charles, Saint Louis, Valley Park). New Jersey (Anglesea, Blackwood, Englewood, Merchantville, Rahway, Riverton, Springfield, Vineland). New York (Bergen Beach, Flushing, Jamaica, Molliswood, New York City, Queens, Rosedale, Staten Island). North Carolina (Southern Pines, Tryon). Ohio (Athens, Canaan, Cincinnati, Columbus, Holmesville, Allen Co., Delaware Co., Fayette Co., Greene Co., Hocking Co., Perry Co., Vinton Co.). Oklahoma (Osage, Stillwater). Pennsylvania (Angora, Castle Rock, Essington, Fern Rock, Germantown, Glenolden, Harrisburg, Jeannette, Linglestown, Overbrook, Pittsburgh, Uniontown, Unionville, Wilmerding, Wyoming, Allegheny Co.). South Carolina (Camden, Greenville, Jackson, Sassafrass Mt.). Tennessee (Madison, Memphis). Texas (Bay City, Columbia, Dallas, Harrisburg, Houston, Lake Charlotte, New Braunfels, Paris, Rock Island, Victoria, Cherokee Co., Colorado Co.). Utah. Virgina (Cobham, Falls Church, Lake Drummond, Vienna, Fluvanna Co., Nelson Co.).

Platydema flavipes (Fabricius)

PLATE 5 (FIGS. 45, 46)

Mycetophagus flavipes Fabricius, 1801, p. 567.
Platydema flavipes (Fabricius).—Laporte and Brullé, 1831, p. 388.—Horn, 1870, p. 382.—Blatchley, 1910, p. 1263.
Platydema basalis Haldeman, 1848, p. 101.

DESCRIPTION.—Elongate oval, subdepressed, black, dull in lustre. Head uniformly arcuate in front, slightly reddish along margin, convex between eyes, epistomal suture poorly defined; surface coarsely, densely, almost confluently, punctured; eyes moderately strongly convex, feebly emarginate anteriorly, separated ventrally by a distance subequal to twice the longer axis of one eye; mouthparts light reddish brown, terminal segment of maxillary palpus short, broadly triangular; basal 3 or 4 antennal segments light reddish brown, the remaining segments dark brown to black. Pronotum twice as broad as long, sides evenly and strongly arcuate, finely margined, basal angles rectangular, apical angles narrowly rounded and moderately prominent; surface finely, shallowly but rather densely, punctured on disc, punctures abruptly larger and more deeply impressed laterally. Elytra with sides nearly parallel, striae distinctly impressed, very coarsely and deeply punctured, intervals strongly convex, minutely and sparsely punctulate, punctures discernable only at high magnification. Prosternal process convex between coxae, its apex acute and secondarily slightly reflected. Ventral surface of prothorax usually thickened and convex; entire ventral surface reddish, coarsely and densely punctured except two apical abdominal sternites, which are finely and sparsely punctate. Male genitalia short, relatively small, constricted between basal sclerite and lateral lobes (pl. 5, figs. 45, 46). Measurements: length 3.6–5.4 mm.; width 1.7–2.6 mm.

REMARKS.—The pale basal segments of the antennae immediately distinguish this from any other nearctic species of *Platydema*. It differs from its nearest relative, *P. nigratum* (Motschoulsky), in its smaller average size, the uniformly dark antennal club, the much coarser overall punctation and in other more subtle characters. The male genitalia (pl. 5, figs. 45, 46) are quite distinctive.

TYPES.—*Mycetophagus flavipes* Fabricius: not seen; presumably lost; type locality, "Carolina." *Platydema basalis* Haldeman: MCZ 8370. The specimen bearing this type label is hereby designated a lectotype. It is one of six Haldeman specimens incorporated into the LeConte collection under the name *P. flavipes*, and is the only one labelled *P. basalis*, presumably by Haldeman himself. It bears an orange "So. St." label and no specific locality is given in the original description other than that it "inhabits from New York to

Georgia." It is a very typical specimen of *P. flavipes*, and this is a clear case of absolute synonymy.

SPECIMENS EXAMINED.—From the following localities, 548:

United States: Alabama (Auburn, Cheaha State Park, Marion, Mobile, Selma, Tuscaloosa). Arkansas (Hope). Delaware (Fenwick Island). District of Columbia. Florida (Archer, Avalon, Belleair, Biscayne Bay, Brooksville, Capron, Coconut Grove, Dunedin, Edgewater, Elfers, Enterprise, Fruitland Park, Gainesville, Haulover, Highlands Hammock State Park, Homestead, Kissimmee River, La Belle, Lake City, Lake Worth, Miami, Monticello, Naples, Ocala, Odessa, Orange Park, Ormond Beach, Palatka, Paradise Key, Pine, Punta Gorda, Royal Palm State Park, Saint Augustine, Sand Point, Sanford, Sarasota, Tampa, Winter Park, Dade Co., Duval Co., Citrus Co., Highlands Co., Levy Co., Marion Co., Pinellas Co., Polk Co., Putnam Co.). Georgia (Adairsville, Albany, Athens, Atlanta, Baconton, Billys Island, Brunswick, Buckhead, Camilla, Cartersville, Clarkesville, Clyo, Dunwoody, Milledgeville, Ochlochnee, Saint Simons Island, Savannah, Stone Mountain, Swainsboro, Thomasville, Thomson, Thunderbolt, Tybee Island, Warrenton). Indiana (Clark Co., Posey Co.). Kansas (Riley Co.). Kentucky. Louisiana (New Orleans, Ponchatoula, Winnfield). Maryland. Massachusetts (Brookline, Cambridge, Hopkinton, Lowell, Milton, Springfield, Wilbraham). Mississippi (Avera, Leaf, Leakesville, Lucedale, New Augusta). New Hampshire (Durham). New Jersey (Jamesburg, Lakehurst, Lakewood, Riverton, Vineland). New York (Flushing, Ithaca, New York City, Orient, Pinelawn, Riverhead, Yaphank). North Carolina (Asheville, Boardman, Chapel Hill, Saluda, Southern Pines, Tryon). North Dakota (Beach). Ohio (Athens). Pennsylvania (Jeannette, Pittsburgh). South Carolina (Charleston, Clemson College, Greenwood, Jackson). Tennessee (Deer Lodge, Elmwood). Texas (Anahuac, College Station, Columbus, Dallas, Deweyville, Flatonia, Gail, Handley, Karnack, San Felipe, Victoria, Waco). Virginia (Cape Charles, Charlottesville, Falls Church, Fort Monroe, Newport News, Norfolk, Sherrydale).

Platydema nigratum (Motschoulsky)

PLATE 5 (FIGS. 38, 39)

Platydema janus Horn, 1870, p. 382 (not Fabricius, 1801, p. 566) [misidentification].

Neomida nigrata Motschoulsky, 1873, p. 478.

Platydema pernigrum Casey, 1884, p. 49.—Horn, 1885, pp. 111, 113.

Platydema subquadratum (Motschoulsky).—Champion, 1886, p. 188; 1893, p. 538.—Blaisdell, 1923, p. 277 [misidentification].

DESCRIPTION.—Subquadrate to elongate oval, feebly convex, dark brown to black, dull in lustre. Head evenly arcuate in front, anterior margin reddish, flattened or feebly convex between eyes, epistomal suture well defined; surface finely and very densely, almost confluently, punctured; eyes large, convex, feebly emarginate anteriorly, separated ventrally by a distance subequal to about 1.7 times the longer axis of one eye; mouthparts light reddish brown, terminal segment of maxillary palpus elongate triangular; basal four and apical segment of antennae light reddish brown, segments 5–10 dark brown to black. Pronotum twice as broad as long, sides strongly converging

from base to apex, feebly arcuate to almost straight, finely margined, basal angles rectangular, apical angles broadly rounded, surface uniformly finely, shallowly, and densely punctured. Elytra with sides nearly parallel to feebly arcuate, striae feebly impressed, finely and shallowly punctured; intervals flat to subconvex, minutely, rather sparsely, but usually distinctly, punctulate, even at low magnifications. Prosternal process variable, never extremely convex between coxae and not horizontal but tending toward the two extremes even among individuals from the same population. Ventral surface of pronotum concave, not thickened, finely and sparsely punctate to smooth; metasternum finely and densely punctate medially, smooth or with a few scattered coarse punctures caudo-laterally; metepisternum with a few scattered coarse punctures; abdominal sternites all finely and densely punctured, punctures becoming coarser on lateral portions of each segment. Male aedeagus with basal sclerite unusually large, about 1.7 times the length of the parallel-sided apical sclerite which has the apex acutely pointed, base truncate (pl. 5, figs. 38, 39). Measurements: length 4.6–7.8 mm.; width 2.6–4.1 mm.

Remarks.—This species may be separated from all other members of the genus *Platydema* known to occur north of the Rio Grande by the antennal coloration described above. South of this boundary, positive identification is made troublesome by the addition of at least two other quite distinct and obviously closely related forms. The situation is further complicated by the existence in the literature of a number of names which cannot with any certainty be associated with any of these species, without consulting the types.

One of these occurs at least as far north as Tamazunchale in San Luis Potosi, Mexico, where on at least two separate occasions it has been collected in company with *P. nigratum*. These two species occupy the same range southward at least to Panama. Champion (1886) has referred to this second species as *P. sobrinum* Chevrolat, but specimens submitted to M. Villiers did not compare at all with the type in the Paris Museum. For the purposes of the present study it will remain nameless.

P. nigratum may be known from this second species by its more parallel form, its more coarsely and densely punctured head, and its much less convex pronotum, which is always distinctly and frequently coarsely and densely punctured, and the finely but almost always distinctly punctured elytral intervals. Each is clearly recognizable and no intergradation of diagnostic characters has been observed in the material at hand.

A third species, closely resembling the two described above, possibly represents a distinct species apparently undescribed. It most

closely approximates *P. nigratum*, with which it shares the characters of the conspicuously punctured pronotum and elytral intervals. The essential difference between the two lies in the distance separating the eyes, which seems constant in the two forms. In *P. nigratum*, this distance is always subequal to 1.7 times the longer axis of one eye, while in the other form, it is at least 3 times the eye length. The lateral punctures of the basal three abdominal sternites are extremely coarse and widely separated in the new form. I have seen only three specimens, all from Mexico.

All of the above three taxa look very much alike superficially, especially since they all have the identical system of antennal coloration. In addition, they are inseparable on the basis of the male genitalia. It is possible that they are all variations of the same species, but since they are readily distinguishable, they may be regarded as distinct until additional contrary information is available.

The system of antennal coloration mentioned above is by no means restricted to members of this *P. nigratum* complex. It has been a source of confusion which persists even into the present paper. There are a number of South and Central American forms which also exhibit the character, but all of these studied to date were found to be distinguished from one another, or at least broken down into workable units, by the structure of the male genitalia.

The principle variations exhibited by *P. nigratum* are the relative convexity of the prosternum, which is subject to a rather wide degree of variation and should not be relied upon as a taxonomically useful character, and the relative degree of punctation of the elytral intervals. Many specimens appear to be covered by a fine velvety pile, rendering it difficult or impossible to distinguish punctures; there is also a decided tendency for grease to clog the punctures, with the same effect. In instances of doubt, it is best to clean specimens thoroughly with ether and a small brush.

Types.—*Platydema janus* Horn (not Fabricius, 1801). This name is included in the synonymy since it is the first reference in the literature to the present species. Horn (1870) referred specimens of this species to *P. janus* (Fabricius), described from Peru. Since no specimens of *P. nigratum* have been seen south of Nicaragua, it seems best to assume, as suggested by Champion (1886), that *P. janus* represents another species. The Fabrician types were not seen, but the material upon which Horn's revision is based (ANSP) is typical of *P. nigratum* as defined above. *Neomida nigrata* Motschoulsky. Type in UMMZ. Two Texas specimens sent for comparison corresponded fully regarding all characters (Kelejnikova, in litt.). In addition, she pointed out that Motschoulsky failed to indicate that

the last antennal segment is lighter than the preceding ones. Type locality, "Californie." *Neomida subquadrata* Motschoulsky (auctor). According to Kelejnikova (in litt.), the type (UMMZ) is in very poor condition but quite distinct from specimens of any species submitted for comparison. An outline sketch of the type, kindly sent by S. Kelejnikova, indicates a very robust species. Undoubtedly the remarks concerning *P. janus* (Fabricius) would apply equally well here, this name referring to one of the host of Central and South American species, all having a frustratingly similar external appearance. Type locality, "Amerique Centrale." *Platydema pernigrum* Casey. Holotype USNM 46814 and paratype USNM 48814. These specimens fall well within the range of normal variation encountered in this species. The following notes were made with the types plus Casey's specimens of what he considered to be typical "*janus*" (=*nigratum*) before me: "The holotype and paratype are larger than any of Casey's specimens of *P. nigratum*. True, they are blacker than the latter specimens, but the differences in head sculpture to which he alludes seems quite nebulous to me. The paratype is the cleaner of the two and for this reason its interstrial areas appear slightly more convex. Also, in the paratype, these areas are quite evidently punctured; not so on the holotype. Casey's eye length character escapes me completely and all diagnostic characters which he mentions are well within the range of normal variation which I have observed for this species."

The Casey collection contains seven Texas specimens of *P. nigratum* placed under the name "*janus*" and one British Honduras and two Arizona specimens placed under "*subquadratum*." With such short series available to him, it is understandable why he chose to regard them as distinct. Where he had little more than a dozen specimens on which to base his conclusions, I have examined almost 300 specimens from scattered localities throughout the range of the species. Type locality, Arizona (Morrison).

Platydema ventrale Chevrolat, described from Mexico, was listed as a synonym of the present species by Champion (1886) who states that he "examined a typical example of *P. ventrale* and see no reason for separating it from" the present species. This synonymy was followed in later checklists (Leng, 1920; Gebien, 1911; Blackwelder, 1945). Specimens of *P. nigratum* from Mt. Colima, Mexico, were compared with the Chevrolat type by A. Villiers who states (in litt.) that they do not correspond. According to Villiers, *P. ventrale* is broader, more convex, and less parallel than the specimens submitted. Chevrolat's species must therefore be considered valid until a more comprehensive study of the Central American species of *Platydema* can be undertaken.

Specimens examined.—From the following localities, 297:

United States: Alabama (Auburn, Mobile). Arizona (Arivaca, Catalina Springs, Cibola, Fort Yuma, Galiuro Mts., Globe, Huachuca Mts., Nogales, Phoenix, Sabino Canyon, Santa Catalina Mts., Superstition Mts., Tucson, Willcox). California (Needles, San Diego, San Jose Island, Yuma). Florida (Capron, Bartow, Brooksville, Dunedin, Enterprise, Gainesville, Highlands Hammock State Park, Homestead, Key Largo, Key West, Lake Harney, Lake Worth, Naples, Punta Gorda, Royal Palm Park, Saint Lucie, Sanford, Sarasota). Georgia (Brunswick). Indiana (Marion Co.). Kansas (Benedict). Louisiana. Mississippi (Lucedale). New Mexico (Albuquerque). North Carolina. South Carolina. Texas (Brownsville, Devils River, Montell, New Braunfels, San Diego, Victoria, Hidalgo Co.).

Cuba: Cienfuegos, Baraguá.

Lower California: Cape San Lucas, Comondu, El Triunfo, Las Animas Sierra Laguna, San Bartolo.

Mexico: Acahuizlotla, Acaponeta, Agua Marina near Alamos, Ciudad del Maíz, Ciudad Obregon, Cuernavaca, Eldorado, Jicaltepec, Minatitlán, Mount Colima, Santa Rosa, Tamazunchale, Tampico, Tepic.

British Honduras: Manatee District, Rio Hondo.

Honduras: Roatán Island.

Nicaragua.

Costa Rica: La Caja near San José.

Platydema erythrocerum Laporte and Brullé

Plate 5 (Figs. 43, 44)

Platydema erythrocera Laporte and Brullé, 1831, p. 355.
Platydema erythrocerum Laporte and Brullé.—Horn, 1870, p. 382.
Neomida flavicornis Motschoulsky, 1873, p. 479 [new synonymy].

Description.—Elongate oval, rather strongly convex, light reddish brown to almost black, sometimes with purplish caste. Head narrowly rounded in front, epistomal suture well defined, clypeus convex and distinct; surface minutely and obscurely punctulate; males with two thick, very blunt, parallel, forward projecting horns on frons immediately between eyes, a deep abruptly defined impression between them; females with short, very blunt tubercles on frons, a shallow impression between them; eyes large, convex, separated ventrally by a distance subequal to the longer axis of one eye; mouthparts pale yellowish or reddish, terminal segment of maxillary palpus moderately short, rather narrowly triangular; basal four or five antennal segments pale yellowish, the remaining segments dark brown except apical one which is frequently all or in part paler in color. Pronotum slightly more than twice as broad as long, sides feebly and evenly arcuate from base to apex, marginal bead very fine, feebly reflected, basal angles obtusely rounded, apical angles broadly rounded; surface indistinctly punctate, punctures minute and widely spaced. Elytra with sides nearly parallel to feebly arcuate, striae shallowly or not at all impressed, punctures deep, moderately coarse

and usually rather widely spaced; intervals flat to subconvex, impunctate. Prosternal process extremely narrow, horizontal, its apex greatly prolonged behind and acutely pointed. Ventral suface of prothorax smooth and polished, impunctate; sterna and pleura of meso- and metathorax practically smooth, with only a few minute, widely scattered punctures; abdominal sternites finely, sparsely, and rather uniformly punctured, usually with faint longitudinal wrinkles, fourth sternite with prominent lateral impressions. Male genitalia (pl. 5, figs. 43, 44) with apical sclerite drastically reduced, only one-fifth as long as basal sclerite, entire aedeagus tapering gradually to the acute apex. Measurements: length 3.2–4.4 mm.; width 1.7–2.6 mm.

Remarks.—This is one of the most easily characterized members of the genus *Platydema* in the Nearctic region. The only other species possessing frontal horns are *P. excavatum*, *P. cyanescens*, and *P. teleops*, and all these are quite shiny in lustre with their horns thin and sharply pointed. The presence or absence of these horns cannot be considered reliable in establishing relationships within this genus. A comparison of the male genitalia of *P. erythrocerum* and the three other horned species indicates that they stand rather far apart phylogentically.

The affinities of this species clearly lie with the tropical *P. undatum* Chevrolat, which occurs at least as far north as Jalapa, Veracruz, Mexico, and extends southward well into Brazil (Santarém). The male genitalia illustrate a close relationship, but in *P. undatum*, the horns of the male are reduced to small tubercles as in the female of *P. erythrocerum* and the females lack even the tubercles. Both species are dull in lustre and have the same antennal coloration. Whereas *P. erythrocerum* is unicolorous, *P. undatum* is attractively marked with variable bands of orange outlined in dark brown on a yellow ground color. Two other species, *P. rodriguezi* Champion and *P. hondurense* Champion, according to their descriptions, should also prove to be members of this species group.

Type.—Not seen. The description is quite adequate to establish the identity of this species. According to Laporte and Brullé (1831), "Cet insecte habite L'Amérique méridionale." This I have interpreted to mean southern North America and not South America. The type of *Neomida flavicornis* (UMMZ) corresponds to specimens from Mississippi sent for comparison (Kelejnikova, in litt.). The description is very adequate for its determination. Type locality, "Nouvelle-Orléans et à Mobile."

Specimens examined.—From the following localities, 179:

United States: Alabama (Auburn, Peterman, Tuscaloosa). Arkansas. Delaware (Newark). District of Columbia. Florida (Bartow, Brooksville, Capron, Dunedin, Enterprise, Gainesville, Haulover, Highlands Hammock State Park,

Oneco, Orlando, Ormond, Paradise Key, Punta Gorda, Royal Palm Park, Sarasota, Tampa, Highlands Co., Leon Co., Levy Co., Marion Co.). Georgia (Atlanta, Barnesville, Dallas, Dunwoody, Thomasville, Tifton, Clarke Co.). Illinois (Olive Branch). Indiana (Terre Haute, Posey Co., Putnam Co., Vigo Co., Warren Co.). Kansas. Kentucky (Taylor Co.). Louisiana (Baton Rouge, Harahan, Logansport, New Orleans, Tallulah). Maryland (Hyattsville). Mississippi (Lucedale, Lula, Natchez, New Augusta, State College, State Line). Missouri (Kansas City). New York. North Carolina (Chimney Rock). Ohio (Tuppers Plains, Athens Co., Fairfield Co.). Oklahoma (Pearson, Tulsa). South Carolina (Swansea). Tennessee (Nashville). Texas (Dallas, Harrisburg, Houston, Jacksonville, Liberty, Longview). Virginia (Mount Vernon, Suffolk, Nelson Co.). West Virginia (Weston).

Platydema wandae, new species

Plate 5 (Fig. 32)

Description.—Large, broadly oval, moderately convex, dark brown to black, dull in lustre. Head evenly arcuate in front, anterior margin reddish, flattened between eyes, epistomal suture well defined; surface very finely and densely punctulate; eyes large, convex, deeply emarginate anteriorly, entirely flush with head surface medially, separated ventrally by a distance of 1.2–1.5 times the longer axis of one eye; mouthparts, antennae, legs, and entire ventral surface, including epipleura, reddish brown; terminal segment of maxillary palpus short, narrowly triangular. Pronotum slightly more than twice as broad as long, strongly narrowed from base to apex, sides uniformly arcuate, scarcely margined, bead extremely fine and reflected, basal angles rectangular, apical angles obtuse and narrowly rounded; surface uniformly minutely and sparsely, usually indistinctly, punctulate. Elytra evenly convex, sides broadly rounded, narrowly margined, bead fine and strongly reflected; striae feebly or not at all impressed, very finely punctured; intervals feebly convex to flat, minutely but densely punctulate. Ventral surface of pronotum concave, practically smooth; prosternal process broad and flat between coxae, horizontal, its apex prominent; metasternum and all pleural sclerites smooth with minute, widely spaced punctures; abdominal sternites finely and sparsely punctured, especially laterally, each with at least a faint lateral depression, particularly pronounced on fourth sternite. Male aedeagus (pl. 5, fig. 32) lightly scelerotized, apical sclerite acutely pointed, continuous at base with basal sclerite, penis struts indistinct. Measurements: length: 5.1–7.8 mm.; width 3.2–4.9 mm. (holotype 6.5 mm., 4.2 mm.).

Remarks.—This is the largest species of *Platydema* to be found north of the Rio Grande. Of the North American forms, it resembles *Platydema ruficorne* (Sturm) most closely, but, in addition to its larger size, there are other noteworthy differences between the

two as follows: the pronotum in *P. wandae* is always indistinctly punctulate due to a velvety pile which usually covers the entire dorsum (even when this pile is removed, the punctures are seen to be quite small and inconspicuous); the ventral punctures are relatively much finer and more sparse than in *ruficorne*; in cases of doubt, the male genitalia have proved to be sufficiently diagnostic. According to all available records, there is no overlap between the ranges of the two species. Within its range, *P. wandae* is most likely to be confused with *P. nigratum* (Motschoulsky), which is more elongate in form and has the basal three or four and the apical antennal segments paler than the remaining segments. Here, too, the genitalia have proved to be the most reliable character to utilize in cases of doubt.

In Central and South America there is a bewildering array of species which may, at best, be characterized as large, rotund and velvety-black. To further complicate the situation, there is an equally bewildering list of names, most of which were proposed by Chevrolat, and none of which are detailed enough to enable one to associate names with insects. Champion (1886) utilized with reservations a number of these Chevrolat names but obviously was not at all certain that he was applying them correctly. He was able to examine specimens of *P. rotundatum* Chevrolat, named by Chevrolat himself, and apparently had a clear concept of at least that species. Three of Champion's specimens of *P. rotundatum* have been studied critically and were found to be quite distinct from, although evidently quite closely related to *P. wandae*.

It is regrettable that yet another name must be added to the already unwieldy list of those species of *Platydema* belonging to this complex. Repeated attempts to associate the present species with any of the available names were unsuccessful. Until further Central American material is accumulated, the Chevrolat types are examined, and the validity of his names is determined, any conclusions would be highly inferential and speculative.

J. N. Knull (1960, in litt.) reports that the adults of this species are nocturnal. He observed them in numbers on shelf fungi which grew from bases of oak stumps and dead trees, 3 miles west of Portal, Arizona, in the Chiricahua Mountains. Professor Knull was able to obtain the large portion of the type series mentioned below by placing fungi at the bases of dead trees and periodically collecting the beetles from beneath them. He also states that they are attracted to light.

I take great pleasure in naming this interesting beetle in honor of my wife, Wanda Elaine Triplehorn.

Types.—Holotype male, USNM 66050: Nogales, Ariz., Aug. 28, 1906, F. W. Nunenmacher. Paratypes: 5, same data (CAS); 1, same data (Minn); 2 same data (KSU); 6, Nogales, Ariz., Sept. 25, 1906, F. W. Nunenmacher (CAS); 1, Nogales, Ariz., Aug. 24, 1906, F. W. Nunenmacher (CAS); 1, Nogales, Ariz., Aug. 12, 1906, F. W. Nunenmacher (CAS); 2, same data (USNM); 3, Patagonia, Ariz., June 6, 1936, M. Cazier (CSS); 41, Baboquivari Mts., Ariz., F. H. Snow (UKan); 5, same data (CAT); 2, same data (MCZ, H. C. Fall collection); 1, Chiricahua Mts., Ariz., July 22, 1953, DJ and JNK (OSU); 116, Chiricahua Mts., Ariz. July 9, 16, 23, 30, Aug. 7, 15, 1959, DJ and JNK (OSU, CAT, BMNH, UMMZ). Also examined: 1 specimen, Albuquerque, N. Mex. Aug. 1919, Long (CAS).

Platydema inquilinum Linell

Plate 5 (Figs. 35, 36)

Platydema inquilnum Linell, 1899, p. 183.

Description.—Elongate elliptical, moderately convex, dark reddish brown, feebly shining. Head with clypeus very large, trapezoidal, posterior angles but narrowly separated from eyes, epistomal margin truncate; eyes coarsely faceted, broadly but shallowly emarginate anteriorly, slightly convex dorsally, sunken below surface of head medially, separated ventrally by about 1.5 (1.3–1.6) times the longer axis of one eye; antennae, mouthparts, and legs concolorous with dorsal surface; antennae short, not extending posteriorly beyond pronotal base, terminal segment sometimes slightly lighter than those preceding; terminal segment of maxillary palpus narrowly oval, attenuate apically, obliquely truncate at tip; mentum conspicuously bearded with coarse hairs, especially in males; entire head surface finely and densely punctate. Pronotum transverse, about twice as broad as long, sides feebly arcuate, rather strongly convergent from base to apex, margins finely beaded, not at all expanded; apex truncate, base broadly bisinuate; apical angles obtuse and narrowly rounded, basal angles abruptly acute, slightly overlapping humeral angles of elytra; entire surface finely and densely punctured. Elytra with lateral margins evenly arcuate, bead fine and slightly reflected; striae scarcely impressed, finely punctured; intervals flat on disc, rather strongly convex laterally and apically, finely and rather densely punctured. Ventral surface of pronotum flat, edges thickened, finely and rugosely punctured; prosternal process prominent, swollen in front of anterior coxae, well developed between them, sulcate on each side of middle, acute and prolonged behind but deflected apically in a broad arc; metasternum with a few minute, widely scattered punctures; pleural sclerities and abdominal sternites more coarsely and densely punc-

tured, becoming even coarser laterally on basal four abdominal sternites; entire ventral surface concolorous with dorsum. Male aedeagus (pl. 5, figs. 35, 36) narrow and elongate; apical sclerite well sclerotized, acutely pointed; basal sclerite strongly curved basally, constricted just behind apical sclerite; penis membranous and indetectable, struts weakly developed. Measurements: length 4.0–4.6 mm.; width 1.9–2.4 mm.

Remarks.—This seemingly rare species is known only from the mountains of southern Arizona. The elongate, comparatively depressed form, the relatively large clypeus which extends backward almost to the eyes, the deep reddish-brown color, the gradually deflexed apex of the prosternal process and the conspicuously punctured, slightly convex elytral intervals should suffice to distinguish *P. inquilinum* from other Nearctic species of *Platydema*. The relatively large male genitalia (pl. 5, figs. 35, 36) indicate no close affinities with other forms studied and its relationships within the genus are not clear. Along with *P. micans*, it apparently represents a wide divergence from the main line of evolution in *Platydema*.

While it is poorly represented in collections it is worthy of note that D. J. and J. N. Knull have accumulated 23 specimens (OSU) from the Chiricahua Mountains. These represent more than half of the total specimens available for this study and suggest that the species is probably much more abundant than we realize. The series is the result of two years' (1952, 1953) collecting, but all were taken in the month of July.

The type series of four specimens was collected by H. G. Hubbard near Tucson, Ariz. (December 23) in nests of a wood rat (*Neotoma albigula*). The specimens collected by the Knulls were all taken under bark, and there probably is no direct association between the beetles and the rodents.

Type.—USNM 4173: Tucson, Ariz., December 23, Hubbard and Schwarz. Three specimens plus one empty pin constitute the type series. All bear type labels but the first example bears Linell's determination label and is to be regarded as the holotype.

Specimens examined.—From the following localities, 41:

United States: Arizona (Baboquivari Mts., Chiricahua Mts., Globe, Patagonia, Pinal Mts., Santa Catalina Mts., Tucson).

Platydema micans Zimmerman

Plate 5 (Figs. 33, 34)

Platydema micans Zimmerman.—Horn, 1870, p. 383.—Blatchley, 1910, p. 1264.

Description.—Short, broadly oval, strongly convex, dark reddish brown to black, shining. Head with epistomal margin evenly

arcuate from eye to eye, clypeus well defined, eyes moderately large, convex, anterior margin broadly and deeply emarginate; separated ventrally by from 1.6 to 2.3 times the longer axis of one eye; terminal segment of maxillary palpus robust, broadly triangular; antennae and mouthparts uniformly dark brown; dorsal surface of head very coarsely and densely, sometimes rugosely punctured. Pronotum transverse, sides strongly and evenly arcuate, convergent from base to apex, apical margin feebly emarginate, basal margin feebly bisinuate; scarcely margined but prominently beaded laterally; both basal and apical angles obtuse, broadly rounded; surface uniformly finely and densely punctured. Elytra narrowly margined and feebly undulate laterally, bead coarse and sharply reflected; discal striae not impressed, punctures coarse and rather widely spaced; outermost stria gradually approaching adjacent one toward base, leaving an unusually large, convex humeral interval between it and elytral margin; scutellar striae absent; remaining striae normal, intervals flat to feebly convex, moderately coarsely and densely punctured; entire dorsal surface with short, microscopic setae arising from punctures. Ventral surface of pronotum slightly concave, smooth; prosternum narrow between coxae, broadly expanded and horizontal caudally, apex acute, unusually deeply inserted into mesosternum; mesosternum prominent with narrowly V-shaped, elevated ridges; metasternum coarsely and densely punctured medially, punctures finer and more widely separated laterally; abdominal sternites densely punctured medially, more coarsely and sparsely so laterally and apically; fourth abdominal sternite always deeply impressed laterally; other sternites sometimes also with lateral impressions. Femora and tibiae concolorous with body, tarsi lighter, yellowish brown. Male aedeagus (pl. 5, figs. 33, 34,) extremely large, apical sclerite comprising only one-fifth the total length of aedeagus; penis prominent, acutely prolonged and moderately well sclerotized apically. Measurements: length 3.4–4.4 mm.; width 1.8–2.6 mm.

Remarks.—This species, frequently credited to Horn, should be assigned to Zimmerman. Horn published the description verbatim from Zimmerman's manuscript after the latter's death, clearly giving him full recognition as author of the species.

Considering the male genitalia alone, this species is probably the most widely divergent member of the genus *Platydema* to be found in the Nearctic region. This divergence is further reflected in the general appearance of the beetle. Superficially it most closely resembles *P. ruficolle,* sharing in common with it, in addition to other characters, the absence of scutellar striae. The abnormally large humeral interstrial elytral interval will immediately separate *P. micans* from

P. ruficolle, and indeed, from all other species of *Platydema* in our fauna.

The nearest modern relative to *P. micans* appears to be *P. inquilinum*, but even this relationship is not especially close and may be but another case of superficial resemblance.

A black light trap operated in 1955 by E. F. Menhinick at Dunwoody, Ga., yielded 474 specimens of this beetle which had previously been considered quite rare. Blatchley (1910) reports taking specimens from decaying fleshy fungi in Lawrence County, Ind. Collection data accompanying specimens examined include: "under rotton wood (Florida); red mangrove (Florida); royal palm (Florida); woods trash (South Carolina)."

TYPE.—MCZ 7211; type locality, S[outh] C[arolina] (probably from near Zimmerman's home, Columbia). The specimen is now in the LeConte collection.

SPECIMENS EXAMINED.—From the following localities, 656:

United States: Alabama (Tuscaloosa). Arkansas (Hope, Washington Co.). California (Los Angeles, in quarantine from Florida). District of Columbia. Florida (Biscayne, Cape Sable, Capron, Daytona Beach, Dunedin, Edgewater, Enterprise, Gainesville, Gulfport, Haulover, Jacksonville, Jupiter, Key Largo, Key West, Lake Worth, Miami Beach, New Smyrna, Oneco, Ormond Beach, Paradise Key, Royal Palm Park, Saint Petersburg, Sand Point, Torreya State Park, Walton, Winter Park, Collier Co., Highlands Co., Volusia Co.). Georgia (Atlanta, Dunwoody). Indiana (Lawrence Co.). Kansas (McPherson). Louisiana (Baton Rouge). Mississippi (Hattiesburg). South Carolina (Florence, Savannah River Plant). Tennessee (East Ridge). Texas (Beeville, Brownsville, College Station, Dallas, Denton, Fort Worth, Goliad, Kingsville, New Braunfels, Sabinal, San Antonio, Sonora, Brazos Co.). Virginia (Norfolk).

Cuba: Cienfuegos.

Jamaica: Liguanea Plain.

Haiti: Ennery.

Mexico: Ciudad del Maíz, Rio Guagalejo, Venodio.

British Guiana: Bartica.

Brazil: Bahia.

Genus *Scaphidema* Redtenbacher

Scaphidema Redtenbacher, 1849, p. 591; 1858, pp. cvi, 603; 1874, pp. cxix, ii, 105.—Mulsant, 1854, p. 200.—Lacordaire, 1859, p. 303.—Thomson, 1859, p. 116; 1864, p. 253.—Jacquelin du Val, 1861, p. 297.—Horn, 1870, p. 386.—Seidlitz, 1875, p. 97; 1891, p. 131; 1894, pp. 508, 509.—Fowler, 1891, p. 15.—Everts, 1901, p. 256.—Desbrochers, 1902, p. 5.—Reitter, 1911a, pp. 330, 339.—Gebien, 1925, p. 143.—Portevin, 1934, p. 25.

Nelites LeConte, 1850, p. 232.

TYPE SPECIES.—*Mycetophagus metallicus* Fabricius (monobasic).

Broadly oval, moderately convex, strongly shining. Head small, short, and broad; eyes small, widely separated both dorsally and ventrally, shallowly emarginate anteriorly; terminal segment of max-

illary palpus elongate oval, truncate apically; antennae clavate, extending but slightly beyond pronotal base, basal segment thick, segments 2 to 4 more slender, segments 5 to 10 slightly transverse, becoming increasingly larger, apical segment large and elliptical. Pronotum with lateral margins almost straight, broadly expanded and reflected, apical margin deeply emarginate, angles acute and prominent; base straight or slightly rounded, angles sharply obtuse. Elytra punctate striate, strongly inflated near lateral margins, particularly at base, lateral margins rather broadly expanded and reflected, humeral angles prominent, smoothly continuous with expanded portion of pronotal margin. Prosternal process broad and spatulate, not prolonged caudally, widely separating front coxae, mesosternum short, flat, broadly U-shaped, widely separating middle coxae, epipleura broad basally, gradually narrowing toward apex, abbreviated near terminal suture of abdominal sternites; first abdominal sternite broad and truncate between hindcoxae, which are widely separated; legs all moderately slender, basal and apical segments of hindtarsi long and subequal, segments two and three very short and subequal. Male aedeagus (pl. 3, figs. 19, 20) with apical sclerite truncate at base dorsally.

The small, shallowly impressed eyes, the stout clavate antennae, the broad spatulate prosternal process, the broad truncate base of the first abdominal sternite between the hindcoxae, the broadly expanded and reflected lateral elytral margins with prominent humeral angles, and the widely separated coxae of all three pairs of legs serve to separate *Scaphidema* from all other genera of Diaperini. Lacordaire (1859) considered this genus to be intermediate between *Neomida* and *Platydema*. Seidlitz (1894) pointed out that in general habitus, *Scaphidema* appears more similar to *Platydema*, but that because of the flattened mesosternum, it is in reality more closely related to *Neomida*. Actually, these other two genera seem to be more closely related, one to the other, than either of them are to *Scaphidema*. Of the two, its closer affinities seem to lie with *Platydema*, although even this relationship is not particularly close.

Seven species of *Scaphidema* are known in the world fauna. Four were described from Japan, one from China, one from Europe, and one from North America. The latter two are the only ones available during the present study.

The European *S. metallicum* (Fabricius), type of the genus, has been well studied. Gebien (1940) lists four synonyms and two varietal names under this species, and the immature stages have been described and figured a number of times (Westwood, 1839, p. 314, fig. 37; Schiødte, 1879, p. 552, tab. 9, figs. 10–16; Seidlitz, 1898, pp. 212, 215; Reitter, 1911a, p. 339, fig. 121).

The North American species is quite similar to the type species. Differences between the two are summarized below under *Scaphidema aeneolum* (LeConte).

As stated earlier, *Scaphidema pictum* Horn has been transferred to the Phaleriini (Triplehorn, 1961). Because of homonymy involved in this transfer, it is now called *Phaleromela variegata* Triplehorn.

Scaphidema aeneolum (LeConte)

PLATES 2 (FIG. 12), 3 (FIG. 20)

Nelites aeneolus LeConte, 1850, p. 232.
Scaphidema aeneolum (LeConte).—Horn, 1870, p. 386.—Blatchley, 1910, p. 1265.

DESCRIPTION.—Elongate oval, strongly convex, greenish bronze to black, strongly shining. Head very short in front of eyes, clypeus very short but broad, poorly defined, epistomal margin feebly rounded; genae slightly reflected above antennal insertions, entire head surface evenly convex, coarsely and densely punctured. Pronotum almost twice as broad as long, convex, lateral margins straight and parallel except near apex where they are sharply rounded; surface deeply, coarsely, but sparsely, punctured. Elytra with lateral margins feebly arcuate, gradually attenuate apically; striae finely and closely punctured, very feebly impressed; intervals subconvex, usually with a few widely spaced minute punctures forming irregular series on each interval. Ventral surface of pronotum with a few moderately coarse punctures near middle, faintly wrinkled posteriorly and near front coxal cavities; prosternum with coarse, dense punctures along anterior margin, prosternal process broad, slightly concave between coxae, its apex truncate and deflected; mesosternum flattened and practically smooth; metasternum smooth except for an elongate group of coarse punctures extending from middle coxal cavities to the anteriolateral edge of hindcoxal cavities; pleural sclerites rather coarsely and densely punctured; epipleura distinctly but irregularly punctured; abdominal sternites finely and sparsely punctulate medially, each with distinct lateral impressions within and beyond which the punctures are much coarser; hindtarsi long, basal and apical segments subequal in length. Male aedeagus (pl. 3, fig. 20) with apical sclerite 0.6 as long as basal sclerite, its base truncate. Measurements: length 3.3–4.7 mm.; width 1.6–2.5 mm.

REMARKS.—The European *S. metallicum* (Fabricius) is much more broadly oval than *S. aeneolum* and has the sides of the pronotum straighter and more rapidly convergent anteriorly. The male aedeagus (pl. 3, fig. 19) is much more elongate and less attenuate apically than in its North American relative. In addition, there are a number of relative but nevertheless taxonomically useful differences between them. *S. metallicum* usually has the elytral

striae more finely punctured and not at all impressed, the prosternum lacks the coarse punctures along the anterior margin and the elytra are more convex and inflated basolaterally.

S. aeneolum is strictly a boreal species. It has been taken from under bark of *Pinus ponderosa* and *Picea glauca*. A series of 24 specimens from Duparquet, Quebec, was taken from lake drift by G. Stace Smith from May 24 to June 27. Adults have been collected in the field solely from May 15 (Plummer, Minn.) to September 30 (Cornwall, Conn.).

TYPE.—MCZ 4694. The specimen bears a light blue "Lake Superior" label which was listed by LeConte as "Pic to Ft. William." The LeConte collection contains three additional specimens with identical labels and one specimen with a yellow "Western States" label.

SPECIMENS EXAMINED.—From the following localities, 118.

United States: Alaska (Eagle). Connecticut (Cornwall). Illinois (Chicago). Michigan (Detroit, Marquette). Minnesota (Plummer). New Hampshire (Mount Washington). New York (Catskill Mts., DeBruce, Mount MacIntyre, Oliverea, Redford, Saranac, Schenectady, West Point). Pennsylvania (Mount Pocono). Wyoming (Grand Tetons, Jenny Lake).

Canada: Alberta (Edmonton). British Columbia (Cariboo District, Golden, King Creek, McBride, Merritt). Labrador (Goose Bay). Manitoba (Aweme). New Brunswick (River Glade). Ontario (Isle Royale, Michipicoten River). Quebec (Cascapedia River, Duparquet, Kazubazua, Laniel).

Genus *Liodema* Horn

Liodema Horn, 1870 p. 385.—Bates, 1873b, p. 235.—Champion, 1886, p. 205.

TYPE SPECIES.—*Platydema laevis* Haldeman (monobasic).

Broadly oval, strongly and uniformly convex, moderately shining. Head deeply inserted into thorax, concealing posterior margin of eyes; clypeus large, well defined, rounded posteriorly, extending almost to eyes; eyes large, deeply emarginate anteriorly, entire dorsal periphery sunken below surface level of head; antennae with segments 4 to 10 more or less serrate along inner margin. Pronotum smooth, extremely minutely punctulate, narrowly embracing humeral angles of elytra at base. Elytra smooth, striae unimpressed, very minutely punctulate, intervals flat, punctures sparse and visible only at high magnification. Ventral surface moderately shining, finely and sparsely punctured, metasternum entirely smooth laterally; epipleura broad and concave at base, well defined and broadly continued to apex of elytra; prosternal process broad between coxae, expanded laterally to embrace coxae posteriorly, prolonged medially to the acute apex; mesosternum forming prominent, apically rounded lobe which extends forward, concealing prosternum in repose (pl. 3, fig. 14); tibiae straight, moderately expanded apically, terminating in a comb-

like crown of short spinules; tarsi relatively long, hindpair nearly as long as their tibiae; basal segment of hindtarsus longer than following two segments combined.

This genus was erected by Horn to receive the single species *Platydema laevis* Haldeman. His only criterion for its separation from *Platydema* is in the structure of the mesosternum and its relation to the prosternum, a diagnosis which in itself is quite adequate. Bates (1873b) added to the generic description the facts that the antennae are more or less serrate at their inner edges and that the epipleura are entire. In addition, he described six species from South America. Between 1877 and 1878, Chevrolat described seven South American species which have subsequently been referred to *Liodema*. Three of these were originally placed in the genus *Platydema*, three in *Scaphidema*, and only one in *Liodema*. Chevrolat himself transferred these species plus one species of *Platydema*, described by Laporte and Brullé, to *Liodema*, casting two of his own species into synonymy with two of Bates'. Champion (1886) placed four species described by Chevrolat, one by Laporte and Brullé, and one by Bates as synonyms of other recognized forms, at the same time adding two new species from Central America. Gebien (1906, p. 219), upon examination of the Fabrician types in Copenhagen, discovered that *Mycetophagus maculatum* Fabricius is actually a *Liodema*. In his 1940 checklist, Gebien recognizes 12 species of *Liodema* in the world fauna, summarizing our knowledge of the genus to date.

It is quite possible that a number of species described by older authors in the genus *Platydema* will eventually be found to belong here. In general habitus, there is a striking resemblance between the two genera except for the peculiar development of the mesosternum in *Liodema*, a character which is often obscured in the mounting process, particularly in older collections.

The distribution of *Liodema* is almost entirely Neotropical, with only one species occurring north of the Rio Grande. Several of these (e.g., *L. obydense* Bates) are widespread, occurring from Mexico, throughout Central America, and well into Brazil.

Liodema laeve (Haldeman)

PLATE 3 (FIGS. 13, 14)

Platydema laevis Haldeman, 1848, p. 101.
Liodema laeve (Haldeman).—Horn, 1870, p. 385.—Champion, 1886, p. 205.

DESCRIPTION.—Broadly oval, strongly convex, dark brown to black, smooth, moderately shining. Head reddish in front of eyes, black posteriorly, surface minutely and rather densely punctulate; eyes large, flattened dorsally; antennae, labrum, mouthparts and legs

light reddish brown, terminal segment of maxillary palpus narrowly triangular, outer margin strongly oblique. Pronotum dark brown or black with apex and basolateral edges gradually lighter; lateral margins arcuate, finely beaded, very strongly converging from base to apex; apex feebly emarginate, base strongly bisinuate; apical angles broadly rounded and deflected, basal angles obtuse; surface smooth, very minutely but rather densely punctulate. Elytra dark with considerable portion of apex and sometimes a faint sutural stripe lighter; lateral margins very narrowly margined and beaded; surface minutely striato-punctulate, intervals flat, punctures extremely minute. Ventral surface, including epipleura, reddish brown, shining, finely and sparsely punctate with lateral areas of metasternum, pleural sclerites and ventral surface of pronotum perfectly smooth. Mesosternum (pl. 3, fig. 14) broad, spatulate, finely and rugosely punctate. Male aedeagus with apical sclerite small, much narrower at base than basal sclerite; penis struts fused for a portion of their length and rather heavily sclerotized (pl. 3, fig. 15). Measurements: length 3.7–4.4 mm.; width 2.4–2.5 mm.

Remarks.—This is the only species of *Liodema* which has been found in the United States. It is easily the most prosaic member of the genus, distinct among its congeners in its somber coloration. All of the other described species are banded or spotted in various shades of red and yellow.

Champion (1886, p. 205) records this species from Mexico (Jalapa) and Guatamala (Capetillo), but did not see any examples from the United States. A series of five specimens labelled "Mexico, May, 1934"(CU) has been studied, and these were found to differ considerably from American specimens in the following respects: They are quite dull in lustre, the punctures of the elytral striae are much larger and more conspicuous, there is no light area at the apex of the elytra, and the apical sclerite of the male aedeagus is relatively shorter. Until further specimens with more detailed data become available, it is best to postpone description of a new species; meanwhile, the two Central American localities must be considered of doubtful validity.

Type.—MCZ 8372. Bears an orange "Southern States" label but according to the description is from "Carolina" (collected by Zimmerman). Most of the ventral surface of the specimen is obscured by glue, but the mesosternum and other salient features are quite evident.

Specimens examined.—From the following localities, 10:

United States: Florida (Brooksville, Jan. 27, 1940, Crescent City, March 27, 1896, H. G. Hubbard). Georgia (Dunwoody (light trap)). North Carolina. Texas.

Genus *Apsida* Lacordaire

Apsida Lacordaire, 1859, p. 309.—Bates, 1873c, p. 15.
Hapsida Champion, 1886, p. 211.

Moderate to large, robust, strongly convex, shining. Head short and broad; clypeus transversely very broad, not prolonged beyond genae, epistomal margin broadly and feebly emarginate or truncate on level with antennal insertions; eyes rather small, narrow, widely separated both dorsally and ventrally; broadly emarginate anteriorly; terminal segment of maxillary palpus broadly triangular with outer angle strongly produced; terminal five antennal segments abruptly expanded to form rather compact, flattened club. Prosternal process broad and robust between anterior coxae, its apex obtuse, slightly prolonged and broadly rounded behind, sometimes slightly declivitous; mesosternum short, prominently notched anteriorly for reception of prosternum; epipleura broad, abruptly abbreviated at or near last ventral abdominal suture; legs moderately long, femora compressed, slightly claviform, tibiae distinctly bowed; basal segment of hindtarsus half again as long as following two segments combined and subequal to fourth.

Type species.—*Apsida chrysomelina* Lacordaire, 1859, p. 309 (by original designation).

The abruptly 5-segmented club, broad but short clypeus which is not prolonged beyond genae, and the abbreviated epipleura will, in combination, separate *Apsida* from all other New World genera of Diaperini. Its Asiatic counterpart is *Hemicera* Laporte and Brullé, whose members closely resemble our Central American species of *Apsida*, differing primarily in having the antennal club composed of six rather than five segments.

This genus, briefly but adequately delimited by Lacordaire, was erected to receive the single species *Apsida chrysomelina* Lacordaire. His original description is merely a brief summary of characters which separate *Apsida*, an exclusively neotropical genus, from the Old World genus *Hemicera*. Bates (1873c) presented a detailed redescription of the genus and added four more species. Chevrolat (1877a) described two more species, but these were later placed in synonymy by Champion (1886) who, at the same time, added four more species of his own. At least nine species are represented in the World fauna.

A wide variation in color, form, and structure exists among species of this genus and affords useful characters for their separation. Coloration varies from the yellowish *A. boucardi* Bates to the uniformly dark *A. gibbosa* Champion. Many species have a series of

iridescent reddish, greenish, and golden stripes and blotches on the elytra which appear to be evanescent and should not be relied upon too heavily as an important taxonomic character, as was done by Bates.

The shape of the pronotum varies from the elongate form with straight sides, prominent apical angles, and deeply emarginate anterior margin as in *A. chrysomelina* Lacordaire and *A. gibbosa* Champion, to the short, more transverse form with rounded sides and apical angles as in *A. belti* Bates and *A. purpureomicans* Bates.

The punctures forming the elytral striae and the relative size and abundance of the punctures of the elytral intervals are constant enough within a species to be taxonomically useful, as are the microreticulations and consequent intensity of the surface lustre of the elytra.

The form and sculpture of both the prosternal process and the mesosternum likewise may prove constant enough to be of value.

Unlike most Diaperini, members of this genus apparently are not associated with fungi. Champion states that the Central American forms are found "upon herbage or by beating the withered, still-attached leaves of fallen trees in new clearings."

In attempting to establish the identify of the one species of *Apsida* which has been found north of the Rio Grande, a moderate series of specimens from various sources was accumulated. Through the generous efforts of Mr. J. Balfour-Browne of the British Museum, it was possible to borrow cotypes of all but one of Champion's species and to have specimens compared with those of Bates.

The most confusing element in understanding the components of this genus is the status of *A. purpureomicans*, a widely distributed, evidently polymorphic species, which Champion refers to as "one of the most perplexing species of Tenebrionidae I have yet had to deal with." He was able to recognize three distinct varieties, separated entirely on coloration and dorsal surface lustre. To further cloud the issue, there is a smaller species (*A. terebrans* Champion) which apparently falls well within the range of variation exhibited by *A. purpureomicans* and which has been taken in several localities in company with it. The male aedeagus of *A. terebrans* is deeply cleft apically and quite distinct from any other known species in the genus. In all other species studied, the form of the aedeagus is not at all diagnostic. Until more specimens of this complex can be studied, it seems best to defer any comprehensive review of this genus, since it is impossible at this time to add any consequential information beyond what Champion has already contributed.

Apsida belti Bates

PLATES 6 (FIGS. 49, 50, 51), 7 (FIG. 65)

Apsida belti Bates, 1873c, p. 16.
Hapsida belti Champion, 1886, p. 213; 1893, p. 539.
Hapsida purpureo-micans Bates.—Schaeffer, 1905, p. 174 [misidentification].

DESCRIPTION.—Elongate oval to broadly oval, strongly convex, dark shining. Head dark brown to almost black, epistomal margin broadly but very shallowly emarginate; eyes narrow, shallowly and broadly emarginate anteriorly, dorsal margin narrowly rounded, not at all angulate medially; head surface finely and very sparsely punctulate. Pronotum twice as broad as long, widest at base, apex deeply and evenly arcuate, base broadly rounded, slightly produced in region of scutellum; lateral margins rather strongly arcuate, strongly convergent toward apex, bead well developed and abruptly reflected, both basal and apical angles slightly abtuse, narrowly rounded, entire surface dark brown to almost black, very minutely and sparsely punctulate. Elytra dark with red, gold, and green iridescent stripes and blotches, lateral margins broadly rounded to subparallel, narrowly and horizontally expanded, feebly beaded; striae not impressed, composed of fine, widely spaced punctures which becomes obsolete laterally, basally and apically; intervals minutely but distinctly reticulate, with a few very minute, widely scattered punctures. Ventral surface of pronotum feebly concave, perfectly smooth; prosternal process broad, blunt apically and prominently grooved on each side of middle; mesosternum deeply and angularly notched in front, inner portion depressed, leaving margins standing in bold relief as a distinct M-shaped configuration; metasternum, pleural sclerites and abdominal sternites all smooth and shining with minute pattern of reticulations. Male aedeagus (pl. 6, figs. 50, 51) with lateral lobes fused but individually distinct, prolonged and acute apically. Measurements: length 6.1–7.6 mm.; width 3.5–4.4 mm.

REMARKS.—In 1905, Charles Schaeffer reported specimens of an *Apsida* taken near Brownsville, Tex., on dead branches of *Acacia flexicaulis*. These he referred to Champion's "variety three" of *A. purpureomicans* Bates, a polymorphic species which is poorly understood taxonomically.

Two of Schaeffer's specimens from Brownsville were submitted to J. Balfour-Browne for comparison with the Bates type in the British Museum. It is his opinion that they should be referred to *A. belti* Bates, rather than to *A. purpureomicans*, primarily on the basis of the microreticulations on the elytra which causes a duller lustre in the former species. This character is variable but

quite reliable within limits. In all of the Texas specimens, three specimens from Costa Rica (USNM), and the type from Nicaragua, a definite pattern of these microreticulations is clearly evident over the entire elytra even at moderate magnifications. In the specimens of *A. purpureomicans* available for study from several localities in Central America, the microreticulations are entirely absent or so very obsolete as to be scarcely evident even at high magnifications. The type of *A. purpureomicans* is without reticulations, as are most of Champion's specimens (Balfour-Browne, in litt.).

The Nicaragua specimens (fide Bates) and those from Costa Rica (USNM) are slightly larger than any from Texas, and in most of the latter, the elytral margins are more parallel. Otherwise they are indistinguishable.

TYPE.—Not seen; material compared with type in British Museum by J. Balfour-Browne; type locality, Chontales, Nicaragua (3 specimens). Lectotype not selected.

SPECIMENS EXAMINED.—From the following localities, 22:

United States: Texas (Brownsville).
Costa Rica: El Limón, Santa Clara, Hamburg Farm, Reventazón River.

Genus *Alphitophagus* Stephens

Alphitophagus Stephens, 1832, p. 12.—Redtenbacher, 1858, pp. cvi, 602; 1874, pp. ii, cxviii, 106.—Lacordaire, 1859, p. 306.—Thomson, 1859, p. 116; 1864, p. 254.—Jacquelin du Val, 1861, p. 298.—Horn, 1870, p. 385.—Seidlitz, 1875, p. 97; 1891, p. 131; 1898, pp. 212, 215 (larva), 509, 533.—Fowler, 1891, p. 16.—Desbrochers, 1902, p. 12.—Everts, 1901, p. 258.—Reitter, 1911a, pp. 330, 340; 1911b, p. 268.—Kuhnt, 1913, pp. 740, 746.—Portevin, 1934, pp. 24, 25.

Phyletes Redtenbacher, 1845, p. 128; 1849, p. 52.

Phylethus Redtenbacher, 1849, p. 589.—Mulsant, 1854, p. 203.—LeConte and Horn, 1883, p. 383.

Alphitobius [error for *Alphitophagus*], Reitter, 1914, p. 81.

TYPE SPECIES.—*Diaperis bifasciata* Say (= *Alphitophagus quadripustulatus* Stephens) (monobasic).

Elongate oval, moderately convex, shining; entire dorsal surface uniformly clothed with fine but distinct, light colored, short, recumbent setae arising from rather widely spaced, minute punctures. Antennae long, extending well beyond base of pronotum, stout; basal segment robust, sharply curved outwardly, second segment small, third and fourth subequal in length and slightly elongate, segments 5–10 gradually broader, each distinctly transverse apically, terminal segment largest, subconical; maxillary palpi extremely narrow basally, terminal segment thickened, elongate oval, obliquely truncate api-

cally. Prosternal process narrow, convex between coxae, its apex acute and secondarily reflected; epipleura entire, very narrow at apex; tibiae all slender, tarsi relatively long, hindtarsus with basal segment the longest but only slightly longer than fourth.

The above description has been purposely kept brief since only one species of the genus (fortunately the type species) has been studied, rendering it difficult to establish generic limits with any certainty. This species resembles a small *Platydema* in general appearance, but may be distinguished from members of the latter genus by the distinct vestiture of fine recumbent setae clothing the entire dorsal surfaces. The antennae are longer and more slender than is true of most species of *Platydema*, and the terminal segment of the maxillary palpus is elongate. Both of these characters, however, fall well within the range of variation observed among species of *Platydema*.

Gebien (1940) lists eight species of *Alphitophagus* in the world fauna. No less than six of these have the same general color pattern, and it would not be surprising to discover some synonymy involved among these names. It is possible that the system of coloration should be listed among the generic characters, but this has resulted in confusion in the past. Marseul (1876) described four species which he placed in *Alphitophagus*, partly, at least, because of the color pattern. Three of these have been transferred to *Platydema* by subsequent workers and the fourth is retained somewhat doubtfully in *Alphitophagus* (Gebien, 1940).

The peculiar development of the male clypeus described below perhaps deserves consideration as a generic character, but its status is unknown in other members of the genus. As far as can be determined, it has no counterpart in *Platydema* or related genera. Until further information is available, it seems advisable to reserve judgment on this character. Thus it can be seen that in the final analysis, the genus *Alphitophagus* is retained as distinct from *Platydema* on the basis of but one rather poor criterion—the dorsal vestiture. There are too many gaps in our knowledge of either of these genera on a worldwide basis to justify lumping them together, so the present distinction is herein retained. Considering only the Nearctic and Palaearctic fauna, this appears to be quite valid, and will suffice for the present treatment.

Alphitophagus bifasciatus (Say)

PLATE 6 (FIGS. 55, 56, 57)

Diaperis bifasciata Say, 1824, p. 268.

Alphitophagus quadripustulatus Stephens, 1832, p. 12, pl. 24, fig. 1.—Redtenbacher, 1858, p. 603; 1874, p. 107.—Jacquelin du Val, 1861, p. 299, tab. 73, fig. 363.—Thomson, 1864, p. 255.—Seidlitz, 1875, p. 362; 1891, p. 517, p. 554;

1898 [often cited as 1894], p. 534.—Baudi, 1876b, p. 106; 1876a, p. 229.—Fowler, 1891, p. 16.—Schilsky, 1893, p. 355.—Desbrochers, 1902, p. 12.
Diaperis picta Ménétriés, 1832, p. 203.—Mäklin, 1872, p. 247.
Neomida picta (Ménétriés).—Faldermann, 1837, p. 65.
Platydema bifasciatus (Say).—Haldeman, 1848, p. 102.
Phylethus populi Redtenbacher, 1849, p. 589.
Phylethus quadripustulatus (Stephens).—Mulsant, 1854, p. 204.—Schiødte, 1879, pp. 555, 586, tab. 9, figs. 17–27.
Platydema pictum (Ménétriés).—Gemminger and Harold, 1869, p. 1952.
Alphitophagus bifasciatus (Say).—Horn, 1870, p. 385.—Fauvel, 1889, p. 155.—Hamilton, 1890, p. 43.—Heyden, 1890, p. 132.—Champion, 1895, p. 283.—Everts, 1901, p. 258; 1922, p. 376.—Reitter, 1911a, p. 340, tab. 128, fig. 23; 1911b, p. 268.—Kuhnt, 1913, p. 746, fig. 67.—Chittenden, 1917, p. 282.—Back and Cotton, 1922, p. 39, fig. 58; 1938, p. 36; 1953, p. 36, fig. 50; 1955, p. 36, fig. 50.—Zacher, 1927, p. 113, tab. 4, fig. 18.—Portevin, 1934, p. 26, fig. 51.—Cotton, 1941, p. 39, fig. 35; 1950, p. 39, fig. 35; 1956, p. 65, fig. 48.—Daggy, 1946, p. 254.
Alphitophagus picta (Ménétriés).—Faust, 1875, p. 251.
Phylethus bifasciatus (Say).—Blatchley, 1910, p. 1265.
Alphitobius (lap. cal.) *quadripustulatus* (Stephens).—Reitter, 1914, p. 81.
Alphitophagus bifasciatus Say aber. *unifasciatus* Donisthorpe, 1925, p. 115.
Alphitophagus quadripustulatus Stephens ssp. *judaeus* Roubal, 1929, p. 97.

DESCRIPTION.—Elongate oval, light reddish brown dorsally with two dark, transverse bands on elytra, shining. Head of male (pl. 6, fig. 57) peculiarly sculptured as follows: clypeus greatly swollen, reflected, grooved dorsally on each side for reception of genae which are prolonged in front of eyes and above antennal insertions to form prominent, flattened, slightly recurved tubercles; two longitudinal, parallel, carinate ridges extending from middle of frons to epistomal suture; surface finely and densely punctulate. Head of female simple, clypeus prolonged in front, genae slightly raised above antennal insertions; surface coarsely and densely punctured. In both sexes, antennae, mouthparts, and legs yellowish; eyes large, convex, broadly but shallowly emarginate anteriorly, posterior margin abruptly elevated. Pronotum reddish, sometimes with obscure dark mottling, slightly more than 1½ times as broad as long, sides strongly arcuate, widest just anterior to middle, finely beaded, apical margin truncate, base broadly and feebly bisinuate, both basal and apical angles obtuse, apical angles broadly rounded, basal angles rectangular; surface rather coarsely and densely punctured. Elytra reddish, a considerable portion of base, a median and subapical transverse band black, these often connected by a more or less complete sutural stripe of the same color; scutellum reddish; striae scarcely impressed, finely and distantly punctured; intervals subconvex to flat, minutely but rather densely punctulate, each puncture bearing a minute seta. Ventral surface of pronotum thickened, coarsely and shallowly punctured; mesosterna, metasterna, pleura, and first four abdominal segments

coarsely and densely punctured; terminal two abdominal sternites with sparse, very fine punctures, each of which bears a fine seta. Male aedeagus (pl. 6, fig. 55) with massive, heavily sclerotized struts extending well beyond basal sclerite; lateral lobes narrow, feebly sclerotized except at base, acutely pointed and slightly divergent apically; penis with a pair of heavily sclerotized basolateral processes which protrude laterally when penis is everted (pl. 6, fig. 56). Measurements: length 2.2–3.1 mm.; width 1.0–1.4 mm.

Remarks.—The color pattern consisting of two dark elytral crossbands against a reddish-brown ground color, the vestiture of fine setae clothing the dorsal surface, and the distinctive development of the male clypeus separates this species from its relatives.

Neither Say nor Stephens mentioned the male clypeus, which leads one to suspect that they had only females before them. It was Jacquelin du Val (1861) who first alluded to this character.

The species was well known for many years both in the United States and in Europe, the only point of confusion being in the name. Almost every faunal list contains a reference to it under any one of about a dozen names. A number of fine illustrations, many of them in color, are available, notably those of Stephens (1832), Reitter (1911a), Zacher (1927), Back and Cotton (1922, 1953, 1955) and Cotton (1941, 1950, 1956). The immature stages are figured by Schiødte (1879). Many notes on the biology and economic importance have appeared and are nicely summarized by Chittenden (1917).

Horn (1870) was apparently the first to use the name in its present combination. *Phyletes* and *Phylethus* of Redtenbacher are direct synonyms which were later (Redtenbacher, 1858) refuted by the author himself, along with his trivial name, *populi*.

The color pattern is constant enough to be quite reliable, but occasionally specimens are encountered in which the two dark elytral crossbands are united, leaving the elytra black except for an uninterrupted light crossband near the base. It is this phase that was called "aberration *unifasciatus*" by Donisthorpe (1925). At the other extreme in pigmentation are teneral examples in which the entire pattern is more or less obliterated, of which *Alphitobius* [sic] *quadripustulatus* Stephens *judaeus* Roubal (1929), based on a single male, should prove to be an example.

A survey of the literature indicates that *A. bifasciatus* is primarily fungivorous and may be found out-of-doors under bark, in decaying vegetable matter, and other debris in natural situations. It may become locally abundant in granaries, mills, warehouses, stables, and other places where spoiled grain is allowed to accumulate and mold. In no instance has it been actually observed attacking sound grain or freshly milled products (Chittenden, 1917). It has been suc-

cessfully reared on moist cornmeal and spoiled cereals (Cotton, 1941). Schuster (1946) reports that it is "one of the most frequently present and abundant tertiary pests (in stored grain and cereals) in New York [State]."

The origin of this species is unknown. Champion (1895) considered it to be American, basing his assumption on its having been originally described by Say from this country.

TYPES.—None seen. Say's *Diaperis bifasciata* was collected at "Engineer Cantonment." The first specimens of *Alphitophagus quadripustulatus* that Stephens saw were reared on flour; later, he acquired a large series from Cambridge, England. *D. picta* was described by Ménétriés from the Caucasus and Redtenbacher's *populi* from Austria. The aberration *unifasciatus* Donisthorpe was collected at Burwell Fen, England, and Roubal's subspecies *judaeus* came from Palestine.

SPECIMENS EXAMINED.—From the following localities, 412:

United States: Arkansas (Mount Sequoyah). California (Chino, Echo Mt., El Mirador, Hanford, Kaweah, Mokelumne, Hill, Morgan Hill, Pasadena, Santa Ynez, Stockton, Woodlake, Kern Co., Sonoma Co.). District of Columbia. Georgia (Atlanta). Idaho (Coeur D'Alene, Hansen). Illinois (Thomasboro, Urbana). Indiana (Hovey Lake, Lawrence Co., Marion Co., Rush Co., Starke Co., Vigo Co.). Iowa (Ames, Fairfield, Fernald, Fort Madison, Greenfield, McCallsburg, Menlo, Nevada, Panora, Peru, Shelby, Stockport, Wapello, Washington, Wilton, Winterset, Clinton Co., Ida Co., Madison Co., Monona Co., Sac Co., Story Co., Wright Co.). Kansas (Lawrence, McPherson, Onaga, Topeka, Wellington, Kingman Co., Labette Co., Stafford Co.). Maryland (Lakeland). Minnesota (Mankato, Saint Paul). Missouri (Columbia, Fulton, Saint Charles). Nebraska (Central City, Wauneta). New Jersey (Boonton). New York (Brooklyn, Dansville, Ithaca, Springfield). North Carolina (Black Mts.). Ohio (Champaign Co.). Oregon (Adams, Condon, Corvallis, Dallas, Forest Grove, Hood River, Independence, McMinnville, Pendleton). Pennsylvania (Easton, Jeannette, Pittsburgh, Wyoming, Allegheny Co., Washington Co.). South Dakota (Brookings, Elk Point, Highmore, Revillo, Vermillion). Tennessee. Texas (Fuller). Virginia (Fredericksburg). Washington (Perry).

Canada: Ontario (Chatham, Keewatin).

Genus *Pentaphyllus* Dejean

Pentaphyllus Dejean, 1821, p. 68.—Latreille, 1829, p. 30.—Redtenbacher, 1845, p. 128; 1849, pp. 52, 589; 1858, pp. cvi, 602; 1874, pp. cxviii, ii, 107.—Mulsant, 1854, p. 196.—Lacordaire, 1859, p. 312.—Thomson, 1859, p. 116; 1864, p. 256.—Jacquelin du Val, 1861. p. 299.—Horn, 1870, p. 378.—Seidlitz, 1875, p. 96; 1891, p. 132; 1894, pp. 509, 536.—Desbrochers, 1901, p. 187.—Everts, 1901, p. 258.—Blatchley, 1910, p. 1265.—Reitter, 1911a, pp. 330, 340.—Kuhnt, 1913, pp. 740, 746.—Chatanay, 1914, p. 475.—Gebien, 1925, pp. 120, 142.—Portevin, 1934, p. 26.

Iphicorynus Jacquelin du Val, 1861, p. 299.

767-659—65——7

TYPE SPECIES.—*Mycetophagus testaceus* Hellwig (1792, p. 400). Designated as *M. testaceus* Gyllenhal (1813, p. 401) by Chevrolat, 1847, in D'Orbigny's "Dictionnaire universel d'histoire naturelle" (vol. 9, p. 573). Gyllenhal himself credited the species to Hellwig; Chevrolat and several other earlier workers were incorrect in assigning it to Gyllenhal.

Small, oblong oval, pale reddish brown, shining. Head short, eyes globose, small (in North American species) to very large, anterior margin entire; terminal segment of maxillary palpus thickened, oval, outer angle attenuate, apex truncate; antennae short, extending only to about middle of prothorax, terminal five segments abruptly expanded to form loose club. Pronotum transverse. Elytra rather short, convex, sides subparallel, lateral margins narrowly expanded, strongly reflected, prominently beaded; surface estriate, coarsely, shallowly, and densely punctured. Entire dorsal surface clothed with short, very fine, yellowish setae, each arising from a puncture. Epipleura abbreviated.

The abruptly expanded, 5-segmented antennal club, the estriate and confusedly punctured elytra clothed with fine yellowish setae, and the entire anterior margins of the eyes are, in combination, sufficient to distinguish *Pentaphyllus* from all other genera in the tribe.

The name *Pentaphyllus* was first coined by Mégerle who cannot receive credit for it because it was published in a sales catalog. Dejean (1821) adopted the name in his catalog and validated it by including *P. testaceus* (Hellwig) as one of its members. Thus Dejean receives the authorship of the generic name, not Latreille, who published 8 years later and did not include a single species.

Pentaphyllus is worldwide in distribution. Gebien (1940) lists 31 species in the world fauna, most of which appear to be valid. Only the two European species, *P. testaceus* (Hellwig) and *P. chrysomeloides* (Rossi), are at all well known.

The genus *Iphicorynus* was erected by Jacquelin du Val for *P. chrysomeloides*. This division is not without considerable merit, since all of his characters do, in fact, distinguish this species from the type species which agrees quite well with our two North American forms. In *P. chrysomeloides*, the epipleura are abruptly abbreviated at a considerable distance from the apices of the elytra, the tibiae are all slightly expanded apically, the first segment of the hindtarsus is shorter than the two following combined and notably shorter than the last, and the eyes are large and narrowly separated ventrally. However, since it falls well within the generic limits as defined above, it shall be considered a member of *Penta-*

phyllus until a broader study of the Old World components can be undertaken.

The insect from Atlanta, Ga., described as *P. americanus* by Motschoulsky, is unrecognizable. It is smaller then either of our two known species and probably represents some other genus, perhaps even another family such as Ciidae, to which members of this genus bear a striking resemblance. A. Zhelokovtsev (UMMZ) reports that all that remains of the type is the pin, the specimen itself having been lost.

Key to North American Species of *Pentaphyllus*

1. Lateral margins of pronotum not at all expanded; frons of male with two distinct median tubercles; northeastern North America . . **pallidus** LeConte
   Lateral margins of pronotum distinctly expanded; frontal tubercles absent in both sexes; known only from California . . . . . **californicus** Horn

Pentaphyllus pallidus LeConte

PLATE 3 (FIGS. 16, 17)

Pentaphyllus pallidus LeConte, 1866, p. 126.—Horn, 1870, p. 387.—Hamilton, 1895, p. 373.—Blatchley, 1910, p. 1265.

DESCRIPTION.—Oblong oval, strongly convex, pale reddish brown, shining. Head with clypeus well defined, prolonged beyond genae, anterior margin arcuate; genae rounded, slightly raised above antennal insertions; frons evenly convex; male with two short but prominent, sharply pointed, widely separated tubercles on frons between eyes and in line with lateral margins of clypeus; head of female unarmed; eyes very small, widely separated both dorsally and ventrally; surface coarsely and densely punctured. Pronotum 1.5 times as broad as long, widest near middle, lateral margins feebly rounded, slightly convergent anteriorly, not at all expanded, finely beaded; apical margin truncate, base nearly straight with lateral portions broadly expanded, thin and overlapping bases of elytra, slightly reflected in front of scutellum; both basal and apical angles obtuse and broadly rounded; entire surface coarsely, shallowly, and rather densely punctured. Elytra with lateral margins parallel, abruptly attenuate and declivitous behind; surface coarsely, shallowly, uniformly, and densely punctured. Scutellum relatively large, broadly triangular, sparsely punctulate. Ventral surface of pronotum concave, smooth; prosternal process narrow between coxae, grooved medially, slightly deflected behind, apex prolonged caudally, acutely pointed, prominent; mesosternum flat, not forming V-shaped ridge in front of mesocoxae; remainder of ventral surface very coarsely and densely punctured, concolorous with dorsum; tibiae all slender; hindtarsus with basal

segment slightly longer than two following combined and subequal to fourth; epipleura gradually narrowed, almost attaining apices of elytra. Aedeagus of male relatively narrow and elongate (pl. 3, fig. 17). Measurements: length 1.9–2.4 mm.; width 0.9–1.2 mm.

Remarks.—The two North American species of *Pentaphyllus* are very similar in appearance and difficult to characterize individually. *P. pallidus* may be separated from *P. californicus*, in addition to the characters presented in the key, by its relatively shorter and more convex body and the less robust aedeagus of the male (pl. 3, fig. 17). The species occupy widely separated ranges.

LeConte (1866) in his description of *P. pallidus* states that it "differs from that species (*P. testaceus* (Hellwig)) by the body beneath being not black, but of the same color as the upper surface." This is an inconstant character. Specimens of both species have been studied in which the ventral surface is totally or in part black. Most specimens studied had both surfaces of the same color. Only eight specimens of *P. testaceus* have been seen. They have the short, robust body of *P. pallidus* but have the lateral margins of the pronotum even more broadly expanded and reflected than in *P. californicus*. The dorsal vestiture of fine pale setae in *P. testaceus* is at least twice as long as in either of the North American species and is quite conspicuous, even at low magnification. Since specimens were not available for dissection, it is not known whether or not the male genitalia might prove diagnostic.

Horn (1870) was the first to call attention to the frontal tubercles of the male. Otherwise, he merely repeats the remarks of LeConte and states that it is "Abundant in Canada West." Blatchley (1910) collected this species by sifting the debris of beech and maple stumps. It is probably much more abundant than available cabinet material would indicate. Hamilton (1895) took as many as 30 specimens from under bark of elm in southwestern Pennsylvania.

Type.—MCZ 4701, female. Bears a pink "Southern States" label, but according to the original description, it is from Pennsylvania. The ventral surface of the specimen is embedded in glue, but the diagnostic characters are all clearly visible. Also in the LeConte collection are 1 male and 2 females labelled "Can[ada]."

Specimens examined.—From the following localities, 57:

United States: Connecticut (Cornwall). Illinois. Indiana (Dubois Co., Marion Co., Monroe Co., Spencer Co.). Kentucky (Edmonton). Maryland (Riverdale). Michigan (Detroit, Grand Ledge). New Jersey (Berkeley Heights). Ohio (Cincinnati). Pennsylvania (Jeannette, Pittsburgh).

Canada: Ontario, (Grimsby, Leamington).

Pentaphyllus californicus Horn

PLATE 3 (FIG. 18)

Pentaphyllus californicus Horn, 1870, p. 387.

DESCRIPTION.—Elongate oval, moderately convex, pale reddish brown, shining. Head with clypeus well defined, slightly prolonged beyond genae, anterior margin arcuate; genae rounded, slightly raised above antennal insertions; frons rather strongly convex in female, almost flat in male, unarmed in both sexes; eyes very small, widely separated both dorsally and ventrally; surface coarsely and densely punctured. Pronotum 1.5 times as broad as long, widest near middle, lateral margins uniformly feebly rounded, narrowly but distinctly expanded, very finely beaded; apical margin truncate, base nearly straight with lateral portions broadly expanded, thin and overlapping bases of elytra, slightly reflected in front of scutellum; both basal and apical angles obtuse and broadly rounded; entire surface coarsely, shallowly, and moderately densely punctured. Elytra with lateral margins parallel, abruptly attenuate and declivitous behind; surface coarsely, shallowly, and uniformly densely punctured. Scutellum relatively large, broadly triangular, sparsely punctulate. Ventral surface of pronotum deeply concave, smooth; prosternal process narrow between coxae, strongly carinate medially, horizontal, acutely pointed and prolonged apically; mesosternum flat, not forming V-shaped ridges in front of mesocoxae; remainder of ventral surface very coarsely and densely punctured, concolorous with dorsum; legs somewhat lighter, tibiae all slender, hindtarsus with basal segment slightly longer than two following combined and subequal to fourth; epipleura gradually narrowed, almost attaining apices of elytra. Aedeagus of male relatively broad and robust (pl. 3, fig. 18). Measurements: length 2.1–2.4mm.; width 0.9–1.2mm.

REMARKS.—Horn characterizes this species as "similar to *P. pallidus* in form, color, and sculpture, differing in being more depressed and with the centres of the first two abdominal segments brown, almost black."

It is indeed quite similar to *P. pallidus* and is relatively more depressed than that species. Horn's second character, on the other hand, is worthless taxonomically and may be ignored. The dark centers of the abdominal sternites to which he alludes occur with apparently equal frequency in both *P. pallidus* and the European *P. testaceus* as well as in *P. californicus*. It appears to be only a discoloration caused perhaps by food in the gut and may actually involve almost the entire abdomen.

The salient differences between *P. californicus* and *P. pallidus* have been discussed under the latter species. In one male specimen of *P. californicus* from Lake Tahoe, Calif. (USNM), there are very feeble, blunt indications of frontal tubercles. These could perhaps be construed as frontal tubercles by one who is unfamiliar with the development of these structures in males of *P. pallidus*. Otherwise this character is quite constant and useful.

The only ecological data available is that accompanying a male and female from Shasta County, Calif. (UCal) which were taken from under bark of mountain hemlock, *Tsuga mertensiana*.

TYPE.—ANSP 3991. Labeled "Cala", stated as Fort Crook by Horn in the original description.

SPECIMENS EXAMINED.—From the following localities, 35:

United States: California (Bass Lake, Kings Creek Meadow, Lake Tahoe, Miami, Sugar Pine, Tallac, Truckee).

Literature Cited

BACK, E. A., and COTTON, RICHARD THOMAS
1922. Stored grain pests. U.S. Dept. Agric. Farmer's Bull. 1260, 47 pp., illustr. (rev., 1925, 48 pp., illustr.; rev., 1927, 48 pp., illustr.; rev., 1938, 48 pp., illustr.; rev., 1953, 46 pp., illustr.; rev., 1955, 46 pp., illustr.).

BATES, FREDERICK
1873a. Notes on Heteromera, and descriptions of new genera and species (no. 5). Ent. Monthly Mag., vol. 9, pp. 201–204.
1873b. Notes on Heteromera, and descriptions of new genera and species (no. 6). Ent. Monthly Mag., vol. 9, pp. 233–238.
1873c. Notes on Heteromera, and descriptions of new genera and species (no. 8). Ent. Monthly Mag., vol. 10, pp. 14–17.

BAUDI DI SELVE, FLAMINIO
1876a. Europaeae et circummediterraneae faunae tenebrionidum specierum, quae comes Dejean in suo catalogo, editio 3ª, consignavit, ex ejusdem collectione in R. Taurinensi Musaea asservato, cum auctorum hodierne recepta denominatione collatio. Deutsche Ent. Zeitschr., vol. 20, pp. 225–267. [Pars tertia.]
1876b. Coleotteri tenebrioniti delle collezioni Italiane. Bull. Soc. Ent. Italiana, vol. 8, pp. 98–119.

BLACKWELDER, RICHARD ELIOT
1945. Checklist of the coleopterous insects of Mexico, Central America, the West Indies, and South America, pt. 3. U.S. Nat. Mus. Bull. 185, pp. 343–550.

BLAISDELL, FRANK ELLSWORTH
1909. A monographic revision of the Coleoptera belonging to the tenebrionide tribe Eleodini inhabiting the United States, Lower California, and adjacent islands. U.S. Nat. Mus. Bull. 63, pp. 1–524, illustr.
1923. Expedition of the California Academy of Sciences to the Gulf of California in 1921: The Tenebrionidae. Proc. California Acad. Sci., ser. 4, vol. 12, no. 12, pp. 201–288.

1929. Miscellaneous studies in the Coleoptera, 4. Pan-Pacific Ent., vol. 6, no. 2, pp. 57–62.

1939. Studies in the relationships of the subfamilies and tribes of the Tenebrionidae based on the primary genital characters, also descriptions of new species. Trans. American Ent. Soc., vol. 65, pp. 43–60, illustr.

1943. Contributions toward a knowledge of the insect fauna of Lower California, no. 7: Coleoptera: Tenebrionidae. Proc. California Acad. Sci., ser. 4, vol. 24, pp. 171–287, illustr.

Blatchley, Willis Stanley

1910. An illustrated descriptive catalogue of the Coleoptera or beetles (exclusive of the Rhynchophora) known to occur in Indiana. Bull. Indiana Dept. Geol. Nat. Res., no. 1, 1386 pp.

1912. On some undescribed forms of Florida Coleoptera. Canadian Ent., vol. 44, pp. 330–332.

Candèze, Ernst Charles Auguste

1861. Histoire des metamorphoses de quelques coléoptères exotiques. Mém. Soc. Roy. Sci. Liége, vol. 16, pp. 1–86, pls. 1–6.

Carter, Herbert James

1917. Some new Heteromera, and a new Stigmodera from tropical Australia. Proc. Linn. Soc. New South Wales, vol. 42, pt. 4, no. 168, pp. 701–719, 10 figs.

Casey, Thomas Lincoln

1884. Contributions to the descriptive and systematic coleopterology of North America, pt. 1, pp. 1–60, illustr.; pt. 2 pp. 61–198.

1889. Coleopterological notices, I. Ann. New York Acad. Sci., vol. 5, pp. 39–198.

1890. Coleopterological notices, II. Ann. New York Acad. Sci., vol. 5, pp. 307–504, illustr.

1891. Coleopterological notices, III. Ann. New York Acad. Sci., vol. 6, pp. 9–214.

Champion, George Charles

1884–1893. Heteromera (part). Part 1 *of* vol. 4 *in* Coleoptera *in* Godman and Salvin, Biologia Centrali-Americana, pp. 1–88 (1884); pp. 89–136 (1885); pp. 137–264 (1886); pp. 265–352 (1887); pp. 353–384 (1888); pp. 477–524 (1892); pp. 525–563, 572 (1893); 23 col. pls.

1895. *Alphitophagus quadripustulatus* Steph. Ent. Monthly Mag., vol. 31, p. 283.

Chatanay, Jean

1914. Tenébrionides de Mahatsinjo (Madagascar). Ann. Soc. Ent. France, vol. 83, pp. 458–554.

Chevrolat, Louis Alexandre Auguste

1877a. Diagnoses de diapérides nouveaux. Pet. Nouv. Ent., vol. 2, pp. 170, 173, 177–178.

1877b. Diagnoses de diapérides: *Platydema* de Columbie. Pet. Nouv. Ent., vol. 2, pp. 181–182.

1878a. Diagnoses de diapérides du Mexique. Pet. Nouv. Ent., vol. 2, pp. 194–195.

1878b. Diagnoses de diapérides nouveaux. Pet. Nouv. Ent., vol. 2, pp. 209–210, 214–215, 221–222, 242–243.

Chittenden, Frank Hurlburt
1917. The two-banded fungus beetle. Journ. Econ. Ent., vol. 10, pp. 282–287.
Cotton, Richard Thomas
1941. Insect pests of stored grain and grain products; identification, habits and methods of control, 242 pp., illustr. (rev., 1950, 244 pp., illustr.; rev. 1956, 306 pp., illustr.).
Daggy, T.
1946. Notes on the ecology and taxonomy of certain pupae of the family Tenebrionidae (Coleoptera). Indiana Acad. Sci. Proc., vol. 56, pp. 253–260.
Dejean, Pierre François Marie Auguste
1821. Catalogue de la collection de coléoptères de M. le baron Dejean, 136 pp.
Desbrochers des Loges, Jules
1901. Faunule des coléoptères de la France et de la Corse: Tenebrionidae, pt. 2, (Suite). Frelon, vol. 10, pp. 165–188.
1902. Faunule des coléoptères de la France et de la Corse: Tenebrionidae (Suite). Frelon, vol. 11, pp. 1–112.
Donisthorpe, Horace St. John K.
1925. Notes on collecting, etc.: A few general notes and records of Coleoptera. Ent. Record, vol. 37, pp. 115–116.
Everts, Edouard Jacques Guillaume
1901. Coleoptera Neerlandica: De Schildvleugelige Insecten van Nederland en het aangrenzend Gebied, vol. 2, pt. 1, pp. 1–400, illustr.
1922. Coleoptera Neerlandica. De Schildvleugelige Insecten van Nederland en het aangrenzend Gebied, vol. 3, pp. 1–668, illustr.
Fabricius, Johann Christian
1776. Genera insectorum, 310 pp.
1781. Species insectorum, vol. 1, 552 pp.; vol. 2, 517 pp.
1787. Mantissa insectorum sistens eorum species nuper detectas adjectis characteribus, genericis, differentiis specificis, emendationibus, observationibus, vol. 1, 348 pp.; vol. 2, 382 pp.
1790. Nova insectorum genera. Skriftes Nat. Hist. Selskabet, vol.1, pp. 213–228.
1792. Entomologia systematica emendata et aucta, secundum classes, ordines, genera, species, adjectis synonymis, locis, observationibus, descriptionibus, vol. 1, 538 pp.
1798. Supplementum entomologiae systematicae, 572 pp.
1801. Systema eleutheratorum secundum ordines, genera, species; adjectis synonymis, locis, observationibus, descriptionibus, vol. 1, 506 pp., vol. 2, 687 pp.
Faldermann, Franz
1837. Fauna entomologica Trans-Caucasica, 2: Coleoptera. Nouv. Mém. Soc. Imp. Nat. Moscou, vol. 5, pp. 1–433, tabs. i-xvi.
Faust, Johannes
1875. Beiträge zur Kenntnis der Käfer des Europäischen und Asiatischen Russlands mit Einschluss der Küsten des Kaspischen Meeres. Horae Soc. Ent. Rossicae, vol. 11, pp. 163–252.
Fauvel, Charles Adolphe Albert
1889. Liste des coléoptères communs a l'Europe et a l'Amérique du Nord (d'après la catalogue de M. J. Hamilton), avec remarques et additions. Rev. Ent., vol. 8, pp. 92–163.

Fowler, William Weekes
1891. The Coleoptera of the British Islands: A descriptive account of the families, genera, and species indigenous to Great Britain and Ireland, with notes as to localities, habitats, etc., vol. 5, pp. 1–940, pls. 143-180.

Gebien, Hans
1906. Ueber die von Fabricius beschriebenen Typen von Tenebrioniden in den Museen von Kopenhagen und Kiel. Deutsche Ent. Zeitschr., no. 1, pp. 209–237.
1911. Tenebrionidae, 3. *In* Schenkling, Coleopterorum catalogus, vol. 18, pt. 28, pp. 355–585.
1920. Die Tenebrioniden Westafrikas. Archiv. Naturg., vol. 86, sec. A, no. 6, pp. 1–256, illustr.
1925. Die Tenebrioniden (Coleoptera) des Indo-malayischen Gebietes, unter Berücksichtigung der benachbarten Faunen, 4. Philippine Journ. Sci., vol. 27, pp. 131–156, pl. 1; pp. 257–288, pl. 1; pp. 423–452, pl. 1; pp. 539–593, pl. 1; vol. 28, pp. 101–129, pl. 1.
1939. Katalog der Tenebrioniden. Mitt. Münchener Ent. Ges., vol. 29, pp. 765–770. [Diaperini, in part.]
1940. Katalog der Tenebrioniden. Mitt. Münchener Ent. Ges., vol. 30, pp. 405–429. [Diaperini, concluded.]

Gemminger, Max, and Harold, E. von
1869. Catalogus coleopterorum hucusque descriptorum synonymicus et systematicus, vol. 6, pp. 1609–2179.

Geoffroy, Etienne Louis
1762. Histoire abrégée des insectes qui se trouvent aux environs de Paris, dans laquelle ces animaux sont rangés suivant un ordre méthodique, vol. 2, pp. 1–690, pls. 11-22.

Gyllenhal, Leonard
1810. Insecta Suecica descripta . . . Classis 1. Coleoptera sive Eleutherata, vol. 1, pt. 2, 660 pp.
1813. Insecta Suecica . . . , vol. 1, pt. 3, 730 pp.

Haldeman, Samuel Stehman
1848. Descriptions of North American Coleoptera, chiefly in the cabinet of J. L. LeConte, M. D., with references to described species. Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 1, pt. 2, art. 8. pp. 95–110.

Hamilton, John
1890. Proposed corrections of specific names to harmonize Mr. Henshaw's catalogue of the North American Coleoptera, with the generally accepted European nomenclature, with relation to the species common to the two continents. Ent. Americana, vol. 6, no. 3, pp. 41–44.
1895. Catalogue of the Coleoptera of southwestern Pennsylvania with notes and descriptions. Trans. American Ent. Soc., vol. 22, pp. 317–381.

Hellwig, Johann Christian Ludwig
1792. Dritte Nachricht von neuen Gattungen im entomologischen System. Neu. Mag. Ent., vol. 1, no. 4, pp. 385–408.

Heyden, Lucas Friedrich Julius Diminicus von
1890. Europäischnordamerikanische Coleopteren-Synonyma. Wiener Ent. Zeit, vol. 9, pp. 131–132.

Horn, George Henry
1870. Revision of the Tenebrionidae of America, north of Mexico. Trans. American Philos. Soc., ser. 2, vol. 14, pp. 253–404, pls. 14, 15.

HORN, GEORGE HENRY—Continued
1874. Descriptions of new species of United States Coleoptera. Trans. American Ent. Soc., vol. 5, pp. 20-43.
1885. Synonymical notes, 3. Ent. Americana, vol. 1, no. 6, pp. 108–113.
1894. The Coleoptera of Baja California. Proc. California Acad., Sci., ser. 2, vol. 4, pp. 302–449, pls. 7, 8.

INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE
1954. Opinion 228. *In* vol. 4 *of* Opinions and Declarations rendered by the International Commission on Zoological Nomenclature, pp. 209–220.

JACQUELIN DU VAL, PIERRE NICOLAS CAMILLE
1859-1863. Manuel entomologique: Genera des coléoptères d'Europe . . ., vol. 3, pp. 1–464, 125–200, 100 col. pls. [Tenebrionidae, pp. 241–340, 1861.]

KIRBY, WILLIAM
1837. Insects: Coleoptera. Pt. 4 *in* Richardson, Fauna Boreali-Americana; or the zoology of the northern parts of British America, 249 pp. [Tenebrionidae, pp. 233–238.]

KUHNT, PAUL
1913. Illustrierte Bestimmungs-Tabellen der Käfer Deutschlands, 1138 pp., illustr.

LACORDAIRE, JEAN THÉODORE
1859. Histoire naturelle des insectes. Genera des coléoptères ou exposé méthodique et critique de tous les genres proposés jusqu'ici dans cet ordre d'insectes, vol. 5, 750 pp., illustr.

LAPORTE, FRANÇOIS LOUIS NOMPAR DE CAUMONT DE [COMTE DE CASTELNAU]
1840. Histoire naturelle des animaux articulés, vol. 1, 324 pp., vol. 2, 564 pp.

LAPORTE, F. L. DE, AND BRULLÉ, GASPARD AUGUSTE
1831. Monographie du genre *Diaperis*. Ann. Sci. Nat., vol. 23, pp. 325–410, pl. 10.

LATREILLE, PIERRE ANDRÉ
1796. Précis des caractères génériques des insectes, disposés dans un order naturel, 201 pp.
1804. Histoire naturelle, générale et particulière des crustaces et des insectes, vol. 10, 445 pp., illustr.
1807. Genera crustaceorum et insectorum . . ., vol. 2, 280 pp.; vol. 3, 258 pp.
1817. [Insects]. Vol. 3 *in* Cuvier, Règne animal . . ., 653 pp.
1829. Suite et fin des insectes. Vol. 5 *in* Cuvier, Règne animal . . .(deuxième édition), 556 pp., illustr.

LECONTE, JOHN LAWRENCE
1850. General remarks upon the Coleoptera of Lake Superior. *In* Agassiz, Lake Superior, its physical characters, vegetation and animals, pp. 201–242, illustr.
1857. Insects. No. 1 *of* pt. 3 *of* bk. 2 *of* vol. 12 *in* Report of explorations and surveys to ascertain the most practicable and economical route for a railroad from the Mississippi River to the Pacific Ocean, pp 1-72, pls. 1, 2. [A preprint; the report was published in 1860.]
1862. Classification of the Coleoptera of North America, 1 (cont.). Smithsonian Misc. Coll., vol. 3, no. 136, pp. 210–286.
1866. New species of North American Coleoptera, 1 (concl.). Smithsonian Misc. Coll., vol. 6, no. 167, pp. 87-168.
1878. Additional descriptions of new species. *In* Schwarz, The Coleoptera of Florida. Proc. Amer. Philos. Soc., vol. 17, pp. 373–434.

LeConte, John Lawrence, and Horn, George Henry
1883. Classification of the Coleoptera of North America. Smithsonian Misc. Coll., vol. 26, pt. 4, no. 507, pp. i-xxxvii, 1–567.

Leng, Charles William
1920. Catalogue of the Coleoptera of America, north of Mexico. Mt. Vernon, New York, 470 pp.

Lindroth, Carl H., and Palmén, Ernst
1956. Coleoptera. *In* S. L. Tuxen, Taxonomist's glossary of genitalia in insects, pp. 69–76.

Linell, Martin Larsson
1899. Descriptions of new species of heteromerous Coleoptera. Proc. Ent. Soc. Washington, vol. 4, no. 3, pp. 180–185.

Mäklin, Friedrich Wilhelm
1872. Synonymische und systematische Bemerkungen. Stettiner Ent. Zeit., vol. 33, pp. 242–247.

Marseul, Sylvain Augustin de
1876. Coléoptères du Japon recueillis par M. Georges Lewis (2e mémoire). Énumération des hétéromères, avec la description des espèces nouvelles, part 1. Ann. Soc. Ent. France, ser. 5, vol. 6, pp. 93–142.

Melsheimer, Friedrich Ernst
1846. Descriptions of new species of Coleoptera of the United States. Proc. Acad. Nat. Sci. Philadelphia, vol. 3, pp. 53–66.

Ménétriés, E.
1832. Catalogue raisonné des objets de zoologie recueillis dans un voyage au Caucase et jusqu'aux frontières actuelles de la Perse, pp. 1–271.

Motschoulsky, Victor von
1873. Énumération des nouvelles espèces de coléoptères rapportés de ses voyages. Bull. Soc. Imp. Nat. Moscou, vol. 46, no. 2, pp. 466–482.

Müller, Othone Friderico
1764. Fauna insectorum fridrichsdalina, sive methodica descriptio insectorum agri fridrichsdalensis, cum characteribus genericis et specificis, nominibus trivialibus, locis natalibus, iconibus allegatis, novisque pluribus speciebus additis, pp. i-xxiv, 1–96.
1776. Zoologiae danicae prodromus, seu animalium daniae et norvegiae indigenarum characteres, nomina, et synonyma imprimis popularium, pp. i-xxxii, 1–282.

Mulsant, Etienne
1854. Histoire naturelle de coléoptères de France, pt. 5, (Latigènes), pp. 1–396.

Olivier, Guillaume Antoine
1791. Histoire naturelle: Insectes. Vol. 6, pt. 1, *in* Encyclopédie méthodique, pp. 1–368.
1795. Entomologie, ou histoire naturelle des insectes, avec leurs caractères génériques et spécifiques, leur description, leur synonymie et leur figure enluminée. Coléoptères, vol. 3 (genres 35–65), pp. 1–557, pls. 1–65.

Orbigny, Alcide C. V. D'.
1847. Dictionnaire universel d'histoire naturelle . . . , vol. 9, p. 573.

Palisot de Beauvois, Ambroise Marie François Joseph
1805–1821. Insectes recueilles en Afrique et en Amérique, pp. i-xvi, 1–276, 90 pls.

Pascoe, Francis Polkinghorne
1869. Descriptions of new genera and species of Tenebrionidae from Australia and Tasmania. Ann. Mag. Nat. Hist., ser. 4, vol. 3, art. 37, pp. 277–296.

Pic, Maurice
1926. Nouveautés diverses. Mél. Exot.-Ent., fasc. 46, pp. 1–32.

Portevin, Gaston
1934. Histoire naturelle des coléoptères de France, vol. 3 (Polyphaga, Heteromera, Phytophaga). Encyclopédie entomologique, ser. A, vol. 17, 374 pp., illustr.

Redtenbacher, Ludwig
1845. Die Gattungen der deutschen Käfer-Fauna nach der analytischen Methode bearbeitet, nebst einem kurz gefassten Leitfaden, zum Studium dieses Zweiges der Entomologie, pp. 1–177, 2 pls.
1849. Fauna Austriaca: Die Käfer, nach der analytischen Methode bearbeitet, pp. 1–883.
1858. Fauna Austriaca: Die Käfer, nach der analytischen Methode bearbeitet, ed. 2, pp. 1–1017, 2 pls.
1874. Fauna Austriaca: Die Käfer, nach der analytischen Methode bearbeitet, ed. 3, pp. 1–571.

Reitter, Edmund
1885. Bemerkungen zu den Catalogs-Berichtigungen des Herrn A. Fauvel in der Revue d'Entomologie (1884). Wiener Ent. Zeit., vol. 4, pt. 5, pp. 151–156, illustr.
1911a. Fauna Germanica: Die Käfer des Deutschen Reiches, nach der analytischen Methode bearbeitet, vol. 3, 436 pp., pls. 81–128.
1911b. Übersicht der palaeartischen *Alphitophagus*-Arten (Col., Tenebrionidae). Wiener Ent. Zeit, vol. 30, p. 268.
1914. Neue Übersicht der palaeartischen *Alphitobius*-Arten (Col., Tenebrionidae). Coleopt. Rundsch., vol. 3, no. 5, pp. 81–82.

Roubal, Jan
1929. Coleoptera nova Asiatica. Boll. Soc. Ent. Italiana, vol. 61, pp. 96-98.

Say, Thomas
1824. Descriptions of coleopterous insects collected in the late expedition to the Rocky Mountains, performed by order of Mr. Calhoun, Secretary of War, under the command of Major Long (continued). Journ. Acad. Nat. Sci. Philadelphia, vol. 3, pt. 2, pp. 238–282.

Schaeffer, Charles Frederic August
1905. Some additional new genera and species of Coleoptera found within the limit of the United States. Sci. Bull. Mus. Brooklyn Inst. Arts and Sci., vol. 1, no. 7, pp. 141–179.

Schilsky, Julius
1893. Beitrag zur Kenntnis der deutschen Käferfauna, 8. Deutsche Ent. Zeit., Heft 2, pp. 353–357.

Schiødte, Jørgen Matthias Christian
1879. De metamorphosi eleutheratorum observationes: Bidrag til insekternes udviklingshistorie. Naturist. Tidsskr., vol. 11, pp. 479–598, tabs. v-xii.

Schuster, Rudolph M.
1946. The insects associated with stored grains and cereals in New York State, with especial reference to the Coleoptera and their larvae. Unpublished thesis, Cornell Univ., June 1946, 341 pp., 11 pls.

Seidlitz, Georg von
1875. Fauna Baltica: Die Käfer (Coleoptera) der Ostseeprovinzen Russlands. Arch. Naturk. Kurlands, ser. 2, vol. 5, pp. i-xlii, 1–142, 1–560.
1887-1891. Fauna Baltica: Die Käfer (Coleoptera) der deutschen Ostseeprovinzen Russlands, 192 pp., 818 pp.
1894. Naturgeschichte der Insecten Deutschlands, Coleoptera, Band 5, pt. 1, Lief. 3, Bogen 26–38, pp. 401–608 [Tenebrionidae.]
1898. Naturgeschichte der Insecten Deutschlands, Coleoptera, Band 5, pt. 1, Lief. 5, Bogen 51–55, pp. 801–877.
Sharp, D., and Muir, F.
1912. The comparative anatomy of the male genital tube in Coleoptera. Trans. Ent. Soc. London, Mem. 11, pp. 477–642, pls. 42–78.
Staig, Robert A.
1940. The Fabrician types of insects in the Hunterian Collection at Glasgow University: Coleoptera, pt. 2, pp. 1–164, pls. 29–59.
Stephens, James Francis
1832. Illustrations of British entomology; or a synopsis of indigenous insects: Containing their generic and specific distinctions; with an account of their metamorphoses, times of appearance, localities, food, and economy, as far as practicable. Mandibulata, vol. 5, pp. 1–240, pls. 24–26.
Sturm, Jacob
1826. Catalog meiner Insecten-Sammlung, pt. 1, 207 pp., 4 pls.
1843. Catalog der Käfer-Sammlung von Jacob Sturm, 386 pp., 6 pls.
Thomson, Carl Gustaf
1859. Skandinaviens Coleoptera, synoptiskt bearbetade, vol. 1, 290 pp.
1864. Skandinaviens Coleoptera, synoptiskt bearbetade, vol. 6, 385 pp.
1868. Skandinaviens Coleoptera, synoptiskt bearbetade, vol. 10, 420 pp.
Triplehorn, Charles A.
1952. The darkling beetles of Ohio (Coleoptera: Tenebrionidae). Unpublished thesis, Ohio State Univ.
1961. The genus *Phaleromela* Reitter in North America (Tenebrionidae). Coleopterists' Bull., vol. 15, no. 4, pp. 125–127.
Weiss, Harry B.
1919. Notes on *Platydema ellipticum* Fab., and its fungus host. Canadian Ent., vol. 51, no. 12, pp. 276–277.
Westwood, John Obadiah
1839. An introduction to the modern classification of insects; founded on the natural habits and corresponding organization of the different families, vol. 1, 462 pp., illustr.
Wolcott, George Norton
1948. The insects of Puerto Rico: Coleoptera. Journ. Agric. Univ. Puerto Rico, vol. 32, no. 2, pp. 224–416.
Zacher, Friedrich
1927. Die Vorrats-, Speicher- und Materialschädlinge und ihre Bekämpfung, 366 pp., illustr.

U.S. GOVERNMENT PRINTING OFFICE:1965

PLATES

PLATE 1

Fig. 1. *Diaperis maculata* Olivier, ♂ (line=1 mm.).
Fig. 2. *Diaperis maculata* Olivier, ♂, dorsal view of aedeagus (same scale as fig. 3).
Fig. 3. *Diaperis maculata* Olivier, ♂, lateral view of aedeagus (line=1 mm.).
Fig. 4. *Diaperis nigronotata* Pic, left elytron (same scale as fig. 1).
Fig. 5. *Diaperis rufipes* Horn, left elytron (same scale as fig. 1).
Fig. 6. *Diaperis rufipes* Horn, ♀, lateral view of ovipositor (line in fig. 3=0.5 mm.).
Fig. 7. *Diaperis rufipes* Horn, ♂, dorsal view of aedeagus (same scale as fig. 3).
Fig. 8. *Diaperis rufipes* Horn, ♂, lateral view of aedeagus (same scale as fig. 3).


1


2


3


4


5

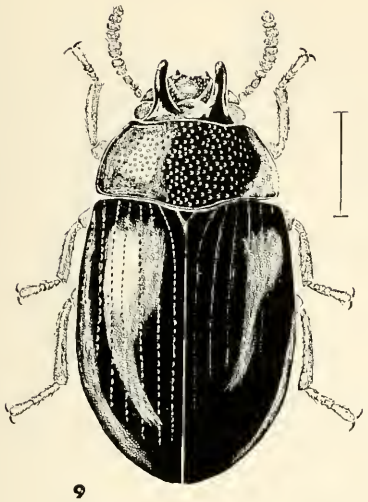

6


7

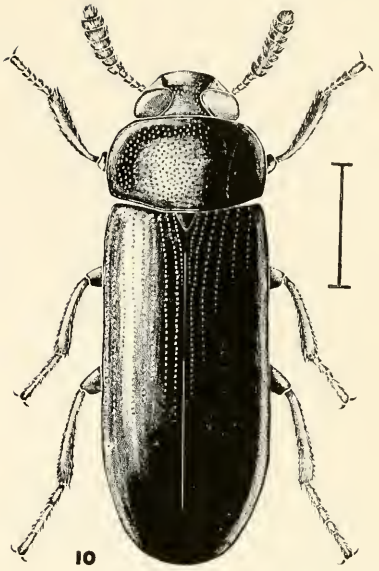

8

PLATE 2

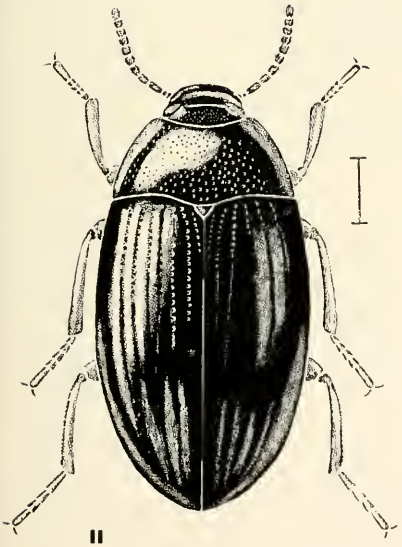
Fig. 9. *Neomida bicornis* (Fabricius), ♂ (line=1 mm.).
Fig. 10. *Palembus ocularis* Casey, ♂ (line=1 mm.).
Fig. 11. *Platydema subcostatum* Laporte and Brullé (line=1 mm.).
Fig. 12. *Scaphidema aeneolum* (LeConte) (line=1 mm.).



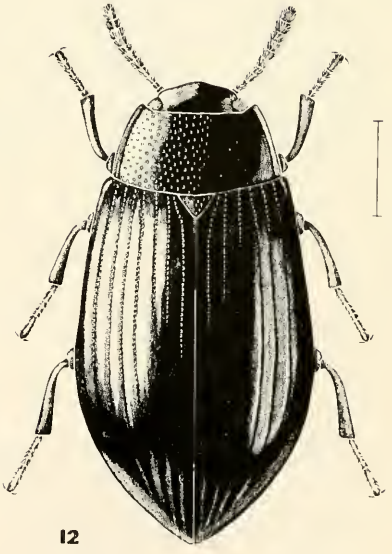
9



10



11



12

PLATE 3

Fig. 13. *Liodema laeve* (Haldeman) (line=1 mm.).

Fig. 14. *Liodema laeve* (Haldeman), ventral view of thorax, legs removed (same scale as fig. 13).

Fig. 15. *Liodema laeve* (Haldeman), ♂, ventral view of aedeagus (line=0.5 mm.).

Fig. 16. *Pentaphyllus pallidus* LeConte (line=1 mm.).

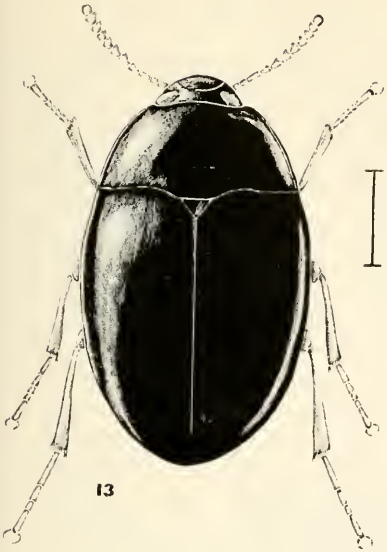
Fig. 17. *Pentaphyllus pallidus* LeConte, ♂, dorsal view of aedeagus (same scale as fig. 18).

Fig. 18. *Pentaphyllus californicus* Horn, ♂, dorsal view of aedeagus (line=0.25 mm.).

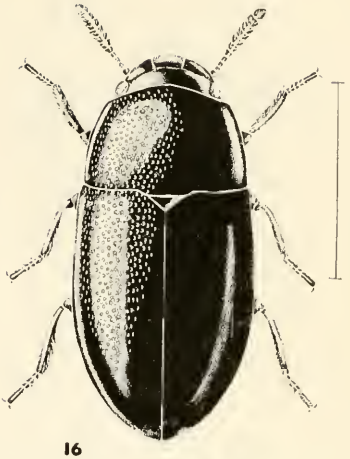
Fig. 19. *Scaphidema metallicum* (Fabricius), ♂, dorsal view of aedeagus (same scale as fig. 15).

Fig. 20. *Scaphidema aeneolum* (LeConte), ♂, dorsal view of aedeagus (same scale as fig. 15).

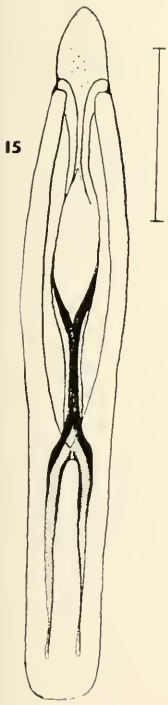
Fig. 21. *Palembus ocularis* Casey, ♂, dorsal view of aedeagus (same scale as fig. 15).



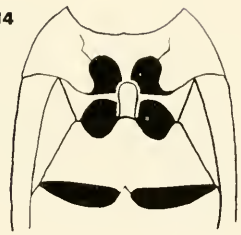
13



16

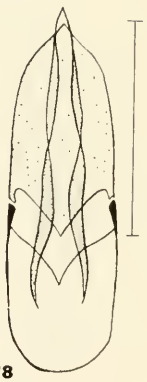


15



14

17



18

21

19

20

PLATE 4

Fig. 22. *Platydema excavatum* (Say), ♂, dorsal view of aedeagus.
Fig. 23. *Platydema excavatum* (Say), ♂, dorsal view of aedeagus with penis extended.
Fig. 24. *Platydema cyanescens* Laporte and Brullé, ♂, dorsal view of aedeagus.
Fig. 25. *Platydema americanum* Laporte and Brullé, ♂, dorsal view of aedeagus.
Fig. 26. *Platydema mexicanum* Champion, ♂, dorsal view of aedeagus.
Fig. 27. *Platydema oregonense* LeConte, ♂, dorsal view of aedeagus.
Fig. 28. *Platydema neglectum* new species, ♂, dorsal view of aedeagus.
Fig. 29. *Platydema laevipes* Haldeman, ♂, dorsal view of aedeagus.
Fig. 30. *Platydema picilabrum* Melsheimer, ♂, dorsal view of aedeagus.
Fig. 31. *Platydema subcostatum* Laporte and Brullé, ♂, dorsal view of aedeagus.
(line=0.5 mm.)

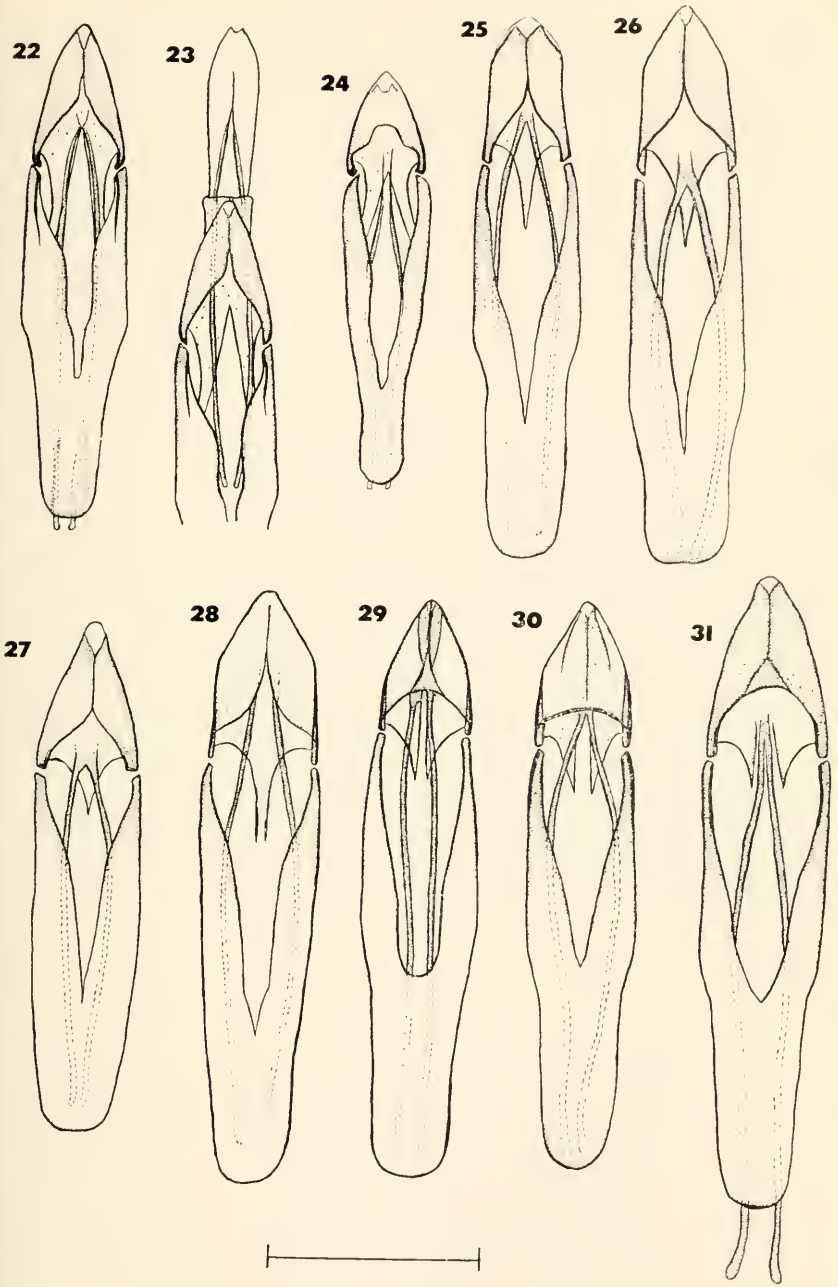

22
23
24
25
26
27
28
29
30
31

PLATE 5

Fig. 32. *Platydema wandae* new species, ♂, ventral view of aedeagus.
Fig. 33. *Platydema micans* Zimmerman, ♂, dorsal view of aedeagus.
Fig. 34. *Platydema micans* Zimmerman, ♂, lateral view of aedeagus.
Fig. 35. *Platydema inquilinum* Linell, ♂, dorsal view of aedeagus.
Fig. 36. *Platydema inquilinum* Linell, ♂, lateral view of aedeagus.
Fig. 37. *Platydema ellipticum* (Fabricius), ♂, ventral view of aedeagus.
Fig. 38. *Platydema nigratum* (Motschoulsky), ♂, ventral view of aedeagus.
Fig. 39. *Platydema nigratum* (Motschoulsky), ♂, dorsal view of aedeagus.
Fig. 40. *Platydema ruficorne* (Sturm), ♂, ventral view of aedeagus.
Fig. 41. *Platydema ruficorne* (Sturm), ♂, lateral view of aedeagus.
Fig. 42. *Platydema americanum* Laporte and Brullé, ♀, dorsal view of ovipositor.
Fig. 43. *Platydema erythrocerum* Laporte and Brullé, ♂, ventral view of aedeagus.
Fig. 44. *Platydema erythrocerum* Laporte and Brullé, ♂, lateral view of aedeagus.
Fig. 45. *Platydema flavipes* (Fabricius), ♂, ventral view of aedeagus.
Fig. 46. *Platydema flavipes* (Fabricius), ♂, dorsal view of aedeagus.
Fig. 47. *Platydema ruficolle* Laporte and Brullé, ♂, ventral view of aedeagus.
Fig. 48. *Platydema ruficolle* Laporte and Brullé, ♂, lateral view of aedeagus.
(line=0.5 mm.)

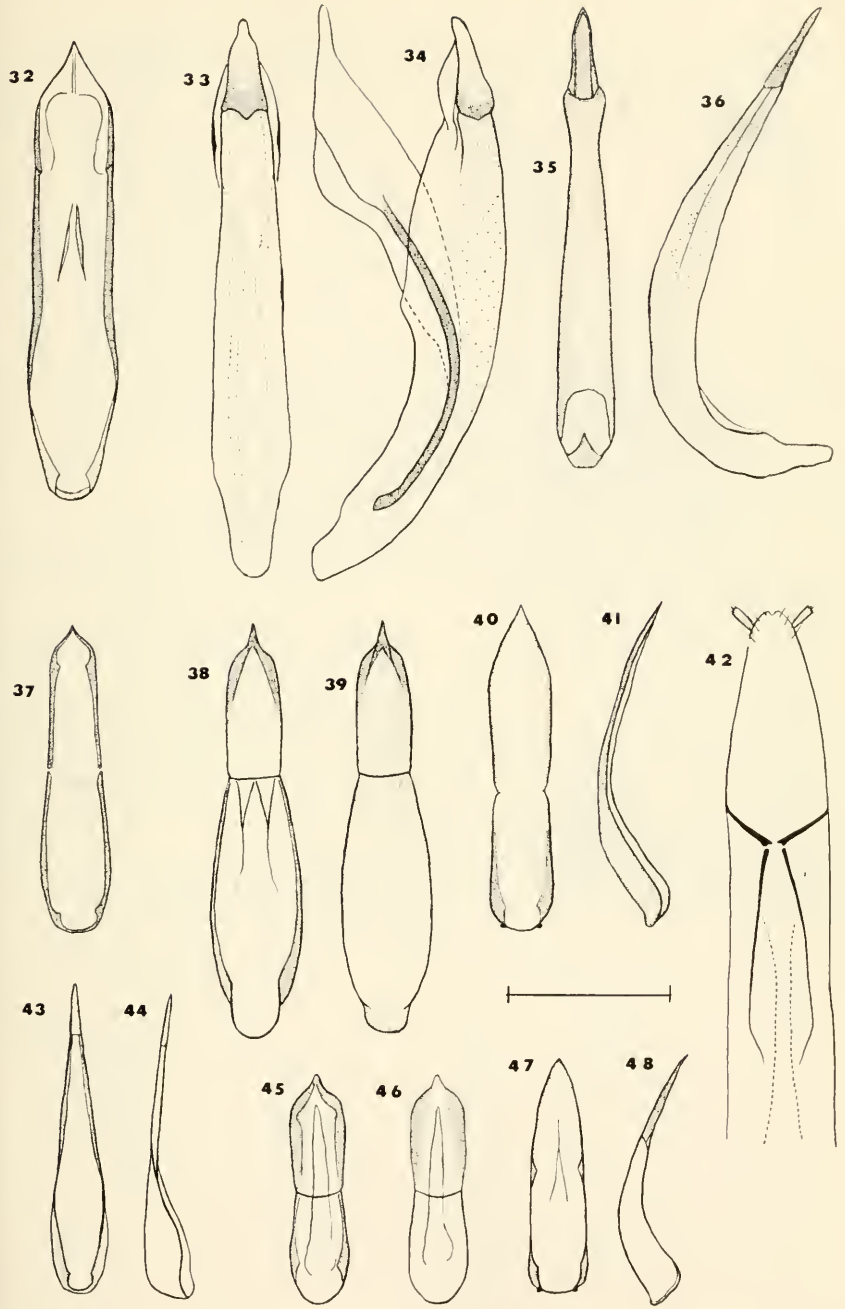

32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48

PLATE 6

Fig. 49. *Apsida belti* Bates, ♀, dorsal view of ovipositor (line=0.5 mm.).
Fig. 50. *Apsida belti* Bates, ♂, lateral view of aedeagus (same scale as fig. 49).
Fig. 51. *Apsida belti* Bates, ♂, ventral view of aedeagus (same scale as fig. 49).
Fig. 52. *Platydema neglectum* new species, pronotum.
Fig. 53. *Platydema americanum* Laporte and Brullé, pronotum.
Fig. 54. *Platydema neglectum* new species, terminal two antennal segments.
Fig. 55. *Alphitophagus bifasciatus* (Say), ♂, dorsal view of aedeagus (same scale as fig. 49).
Fig. 56. *Alphitophagus bifasciatus* (Say), ♂, dorsal view of apex of aedeagus with penis extended (same scale as fig. 49).
Fig. 57. *Alphitophagus bifasciatus* (Say), ♂, dorsal view of head (line=0.5 mm.).
Fig. 58. *Neomida haemorrhoidalis* (Fabricius), ♂, dorsal view of aedeagus (same scale as fig. 59).
Fig. 59. *Neomida myllocnema* new species, ♂, dorsal view of aedeagus (line=1 mm.).
Fig. 60. *Neomida ferruginea* (LeConte), ♂, dorsal view of aedeagus (same scale as fig. 59).
Fig. 61. *Neomida bicornis* (Fabricius), ♂, dorsal view of aedeagus (same scale as fig. 59).
Fig. 62. *Neomida aeneipennis* new species, ♂, dorsal view of aedeagus (same scale as fig. 59).
Fig. 63. *Neomida bicornis* (Fabricius), ♂, clypeus.
Fig. 64. *Neomida aeneipennis* new species, ♂, clypeus.
Fig. 64a. *Uloporus ovalis* Casey, ♂, ventral view of aedeagus (line=0.5 mm.).
Fig. 64b. *Uloporus ovalis* Casey, ♂, right metathoracic leg (same scale as fig. 64a).

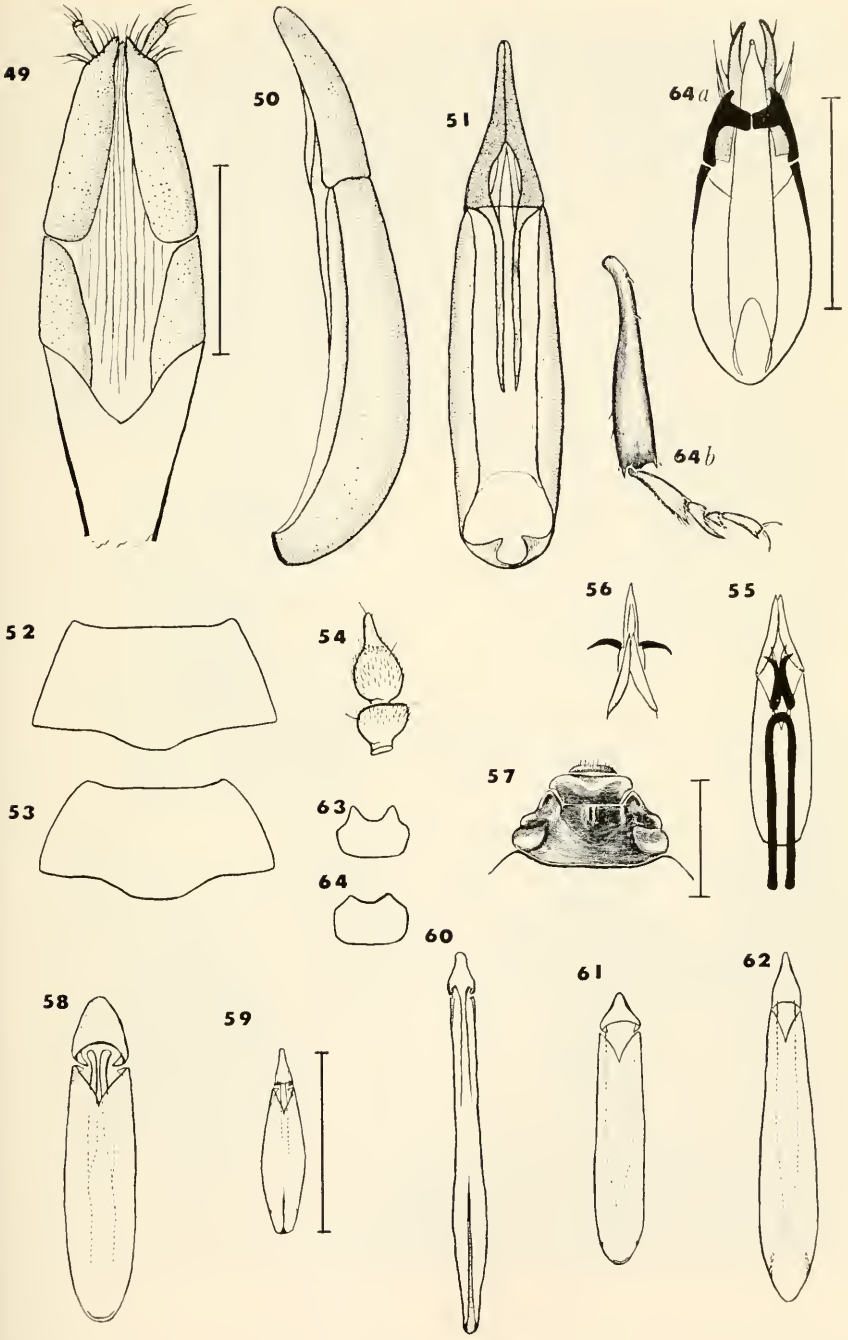

49
50
51
64a
64b
52
54
56
55
53
63
57
64
60
61
62
58
59

PLATE 7

Fig. 65. *Apsida belti* Bates, ♂.

Fig. 66. *Platydema teleops* new species, showing eyes separated ventrally by more than three times the longer axis of one eye.

Fig. 67. *Platydema excavatum* (Say), ♂.

Fig. 68. *Platydema teleops* new species, holotype, ♂ (above) and allotype, ♀ (below).

Fig. 69. *Platydema mexicanum* Champion, Lectotype (BMNH).


65


66


67


68


69