

A REVISION OF THE EROTYLIDAE
OF AMERICA NORTH OF
MEXICO (COLEOPTERA)

W. WAYNE BOYLE

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AMERICA NORTH OF MEXICO
(COLEOPTERA)

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INTRODUCTION

THE EROTYLIDAE of the United States and Canada have not been treated taxonomically as a whole since G. R. Crotch published his "Synopsis of the Erotylidae of Boreal America" in 1873. At that time Crotch recognized 27 species and seven genera (aside from the Languriidae). An approximately equal number of species were described between then and 1950, when the present study was begun. Descriptions of these were scattered through the literature; many were suspected of being synonyms; and adequate keys to the genera and species were not available. It was thought advisable, therefore, to study taxonomically the North American forms and to present the results of such study as an integrated whole. The present paper is the outcome.

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SCOPE OF PRESENT STUDY

A primary objective of the present investigation was to study and exploit taxonomi-

cally the following structures in particular: male genitalia, female genitalia, wings, and cephalic stridulatory files. Immature stages were available for study only in rare cases; hence these were not studied as such and are discussed only in brief and general terms. Known references to papers on immature forms, however, are given under the species or genera concerned.

Material totaling 14,010 specimens (of species treated here) was borrowed from 33 North American museums and identified or otherwise studied. More than 500 specimens were dissected for genitalic and other observations. Visits were made to three institutions for the purpose of examining types: those of Horn at the Academy of Natural Sciences of Philadelphia, those of Fall and Leconte at the Museum of Comparative Zoölogy, and those of Casey and Schaeffer at the United States National Museum.

SOURCES OF MATERIAL STUDIED

The museums from which material was borrowed are listed below. In each case the name of the institution is preceded by the abbreviation that is used throughout the text for the purpose of locating specimens.

A.M.N.H., the American Museum of Natural History
A.N.S.P., Academy of Natural Sciences of Philadelphia
C.A.S., California Academy of Sciences
C.M., Carnegie Museum
C.U., Cornell University
D.A.S.S., Department of Agriculture (Canada), Science Service, Entomological Branch
E.U., Emory University
I.N.H.S., Illinois Natural History Survey
I.S.C., Iowa State College
K.S.C., Kansas State College
M.C.Z., Museum of Comparative Zoölogy
M.S.C., Michigan State College
N.Y.S.M., New York State Museum
O.S.A.C., Oregon State Agricultural College
O.S.U., Ohio State University
P.S.U., Pennsylvania State University
R.O.M.Z.P., Royal Ontario Museum of Zoology and Palaeontology
R.U., Rutgers University
S.C.W., State College of Washington

S.D.S.C., South Dakota State College
U.A., University of Alberta
U.C.B., University of California, Berkeley
U.C.D., University of California, Davis
U.I., University of Idaho
U.K., University of Kansas
U. Mass., University of Massachusetts
U. Minn., University of Minnesota
U. Mo., University of Missouri
U.N., University of Nevada
U.S.N.M., United States National Museum
U.W.O., University of Western Ontario
U. Wis., University of Wisconsin
U.S.A.C., Utah State Agricultural College

HISTORICAL BACKGROUND

The taxonomic history of the Nearctic Erotylidae began in 1777 when Fabricius described *Megalodacne fasciata*. This was followed by the description of *Ischyryus quadripunctatus* by Oliver in 1791 and *Tritoma humeralis* by Fabricius in 1801. Thomas Say described eight species during the years 1824 to 1835, without, however, erecting any new genera. It was left for Lacordaire (1842), in his excellent monograph of the world fauna, to redefine generic and suprageneric limits essentially as they are recognized today. This author created a few synonyms of Say's species but can scarcely be criticized on this account, for he stated in his monograph (*op. cit.*, p. 68) that he had been unable to obtain copies of Say's papers.

Five years later LeConte (1847) published a paper on the North American species of *Triplax* and *Tritoma* which contained keys and descriptions of four new forms. This was followed by LeConte's "Synopsis of the Erotylidae of the United States" in 1854, which also contained descriptions of three or four new species. Horn described a new species in each of the years 1862, 1870, and 1871. Crotch's "Synopsis of the Erotylidae of Boreal America" appeared in 1873. This work contained descriptions of five new species and the genera *Megalodacne*, *Cypherotylus*, and *Cyrtotriplax*, as well as a redefinition of the subfamilies. Three species were mistakenly referred to *Mycotretus*, however, and the Languriidae were included as a subfamily. Crotch's revision of the family followed soon in 1876. This work contained important new synonymy but little else of note for the Ne-

arctic region. One new species of *Dacne* and the genus *Hypodacne* were described by LeConte in 1875.

LeConte and Horn in their "Classification of the Coleoptera of North America" (1883, pp. 122-125) treated the Erotylidae briefly at the generic and suprageneric levels; the generic keys, however, were highly unsatisfactory. Lewis described the genus *Microsternus* in 1887 and designated the single Nearctic species generotype. Gorham's 1887-1899 portion of the "Biologia Centrali-Americana" contained descriptions of the monobasic genera *Haematochiton* and *Scaeothes*, both of which were subsequently discovered in Arizona. Between 1888 and 1916 descriptions of four species were published separately by Schaeffer, Kuhnt, and Fall. A short paper by Wickham in 1894 treated the Endomychidae and Erotylidae of Ontario and Quebec. Casey's 1916 and 1924 volumes of the "Memoirs on the Coleoptera" contained descriptions of 25 new erotylid taxa (only four of which are considered tenable by the present author). Two species were described by Blatchley in 1917. From 1924 to 1950, when the present study was begun, nothing of a subgeneric taxonomic nature was published on North American Erotylidae, with the exception of a new varietal name by Mader (1938, p. 19).

TERMINOLOGY

Terminology in general accords with the definitions given by Torre-Bueno (1937). A number of terms concerning the morphology of the ventral surface of the insect are, however, newly applied here. These are illustrated in figures 2 and 3.

Terminology used in describing the male genitalia (the aedeagus) is essentially that of Sharp and Muir (1912) and Wilson (1930). The aedeagus of *Dacne* is fully described under the genus in connection with labeled figures 17 and 18. Terminology used in describing the female genitalia (the female genital tube or female terminalia) is that of Tanner (1927). As with the aedeagus, the female genital tube of *Dacne* is fully described under that genus in connection with labeled figures 30 to 32; see also figures 43 and 44. While it is realized that the terms "genitalia" and "gen-

ital tube" should be applied (*sensu stricto*) perhaps only to the testes or ovaries and their associated ducts, these terms will nevertheless be used here (as is customary in coleopterology) to designate the invaginated terminal abdominal segments which are modified into secondary, external, or accessory genital structures.

An effort has been made to distinguish pure black from piceous in color descriptions. As is customary, black with a reddish cast is termed "piceous." A few other terms or descriptive phrases perhaps in need of definition are as follows:

"Submarginal striole" signifies an impressed line near the edge of a region or sclerite that allows it to be termed "margined." Conversely, a sclerite the surface of which extends smoothly to the edge is "immarginate," which should not be confused with "emarginate," meaning notched.

"Sharply incised" punctures are those with sharp edges, such as would be produced by a metal bit entering a steel plate. "Bluntly incised" punctures are similar to impressions made in a pillow with the finger. "Punctules" are diminutive punctures. Setae that protrude beyond the edges or upper limits of the punctures in which they are situated are said to "exceed the punctures."

METHODS

The microscope used in this study was an American Optical Company "Spencer" binocular dissecting microscope. Ocular lenses were of 9 \times magnification and objective lenses were 1 \times , 3 \times , and 6 \times ; thus magnifications of nine, 27, and 54 diameters were available. The high-power (54 \times) magnification was found adequate and was used almost exclusively for the routine examination and study of all forms except the largest—*Megalodacne*, *Cypherotylus*, and *Ischyrus*. A compound microscope was used in some instances for viewing minute detail of mouth-part and genitalic preparations of the smaller species, especially *Dacne* spp.

All drawings of gross external morphology were made by use of an ocular grid ("No. 802 Whipple Micrometer Disc" manufactured by C. A. Hauser and Son, Philadelphia, Pennsylvania), marked off in equal squares, in the

binocular microscope. Graph paper, also marked off in squares, was used for the original drawing and this traced on two-ply "Strathmore" drawing board and inked.

Genitalia were prepared for study by relaxing the beetle in warm or hot water, removing the abdomen and carefully scooping out the contents along with the dorsal membrane, soaking in 10 per cent solution of potassium hydroxide on a warming plate for a period of one-half hour or longer (until the muscular tissue was largely decomposed), washing in distilled water, staining for a few minutes to several hours in a 2 per cent aqueous solution of mercurochrome, washing again in distilled water, and finally transferring to glycerine for study or indefinite storage. The genitalic structures proper were separated from other structures and everted or otherwise manipulated by use of jeweler's forceps and minuten nadeln under the binocular microscope. A satisfactory alternative method of staining was to store the potashed genitalia in distilled water to which enough of the 2 per cent mercurochrome solution had been added to impart an amber-pink color. Over a period of one to three days the structures became nicely differentially stained, and the small quantity of mercurochrome apparently prevented growth of fungi. One or more specimens of each sex were left unstained for comparison with stained preparations. After study, the genitalia were placed either in a small drop of glycerine in genitalia vials and attached to the proper pins or in a droplet of glue on a small card and the latter in turn mounted on the proper pin.

Mouth parts were prepared for study in a similar manner but were not stained. They were advantageously stored or studied in glycerine on microscope slides. Wings were prepared by simply mounting in glue or balsam on slides.

It was found useful to add a minute quantity of a surface-active agent or "detergent" ("Triton X-100" was used) to all aqueous solutions, or rinses, or water used for relaxing specimens. The resulting lowered surface tension allowed faster relaxation, quicker penetration of stain, and easier manipulation, the very small structures being less strongly gripped by the surface film. Moreover, the

water-soluble glue, of gum-arabic base, used for mounting specimens on paper points, was also improved in adhesive properties by the addition of a bit of this material (a 5 per cent stock solution was kept on hand).

All drawings of genitalia, mouth parts, and wings were made by use of the "Bioscope" microscope-slide projector ("Master Model," manufactured by the Bioscope Manufacturing Corporation, Tulsa, Oklahoma). Small specimens were placed in glycerine on an ordinary flat slide with a cover slip over them and projected. Large specimens were placed in glycerine in a sunken slide with a cover slip over them and projected (often these were propped in a desired position by bits of minuten nadeln bent in appropriate shapes). Images were projected and traced directly on onion-skin paper, fine detail was filled in later by free-hand drawing, with the specimen under the binocular microscope, and the sketch was then transferred to two-ply "Strathmore" drawing board and inked.

In the drawings of genitalia sclerotization is indicated by parallel broken lines, with the strength or darkness of the sclerotization proportional to the density of the broken lines. Membrane is indicated by clear areas, and folds in membrane are shown by dotted lines. In the many cases where sclerotization of the median lobe of the aedeagus is omitted (in order to show the position of the internal sac within), a dotted line is used to indicate the boundary between sclerotized and membranous portions. In drawings of the anterior end of the internal sac sclerotization is generally indicated by stippling or solid black, as it was necessary to show fine detail here. Genitalic drawings in general are made to show only surficial features, with those structures normally showing through from within or below (in potashed specimens) omitted for the sake of clarity, or, in some cases, structures lying within others are indicated in outline by broken lines. An exception to this rule are drawings of the anterior end of the internal sac, in which it is desired to show in detail those structures enclosed within the proximal end of the internal sac (thus lying within a membrane).

In the legends to the text figures and to the plate, the actual measurement of each specimen is given in parentheses. Unless qualified,

this is the maximum dimension of the specimen exclusive of setae.

PHYLOGENY AND DISTRIBUTION

Of the three subfamilies of Erotylidae the Dacninae are unquestionably the most primitive and generalized. Evidence for this stems from morphology (the tarsi and mouth parts are unmodified, and the female genital tube of forms such as *Microsternus* is entirely unmodified); from size and distribution (it is the smaller and more generally distributed subfamily, with forms such as *Microsternus* spp. exhibiting a distinctly relict distribution); and from color pattern (see Arrow, 1925, pp. 12-17). The Triplacinae and the Erotylinae are more closely related to each other than either is to the Dacninae, both having the mouth parts, tarsi, and female genital tube modified in the same way. The Triplacinae are the second largest subfamily, are generally distributed but show scant evidence of relict distribution, and resemble the Dacninae in color pattern and body shape. The Erotylinae are almost wholly Neotropical in distribution and are diverse, tending towards the bizarre, in color pattern and body shape. Large genera containing numerous similar species and many races are found in the Triplacinae (e.g., *Ischyryus* and *Mycotretus*), but the same thing is even more noticeable in the Erotylinae (e.g., *Brachysphaenus*, *Erotylus*, and *Cypherotylus*).

The discussion of color pattern and morphology by Arrow (1925, pp. 12-17) suggests that the Erotylidae (Dacninae) may have originated in Africa and spread over the world from that area. It would appear, then, that the Triplacinae next differentiated from the Dacninae and attained world distribution. The Erotylinae are almost certainly the last group to appear, and these seem to have evolved from the Triplacinae in the American tropics. [A recent paper, which the present author has been unable to see, has been published by Delkeskamp (1951) on the zoogeography of the Erotylidae.]

The accompanying diagram (fig. 1) presents a graphic summary of the relationships between the North American genera as suggested by the present study. Characteristics of the female genital tube separate *Microsternus* and *Dacne* from all the other genera.

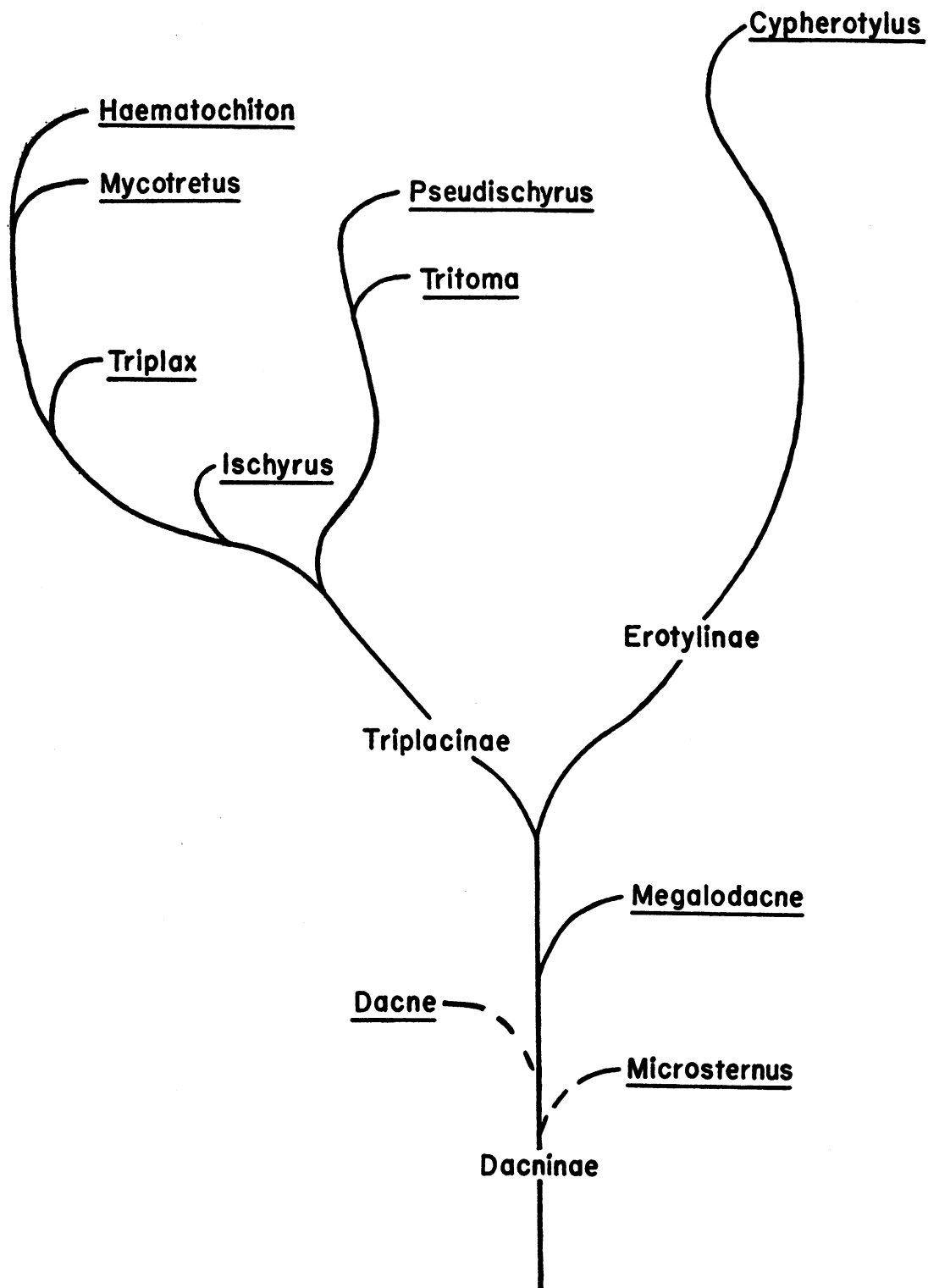


FIG. 1. Diagram illustrating phylogenetic relationships between North American genera of Erotylidae as suggested by the present study.

In *Microsternus* segment 9 is without straps and entirely membranous. In *Dacne* segment 9 bears two or three pairs of comb-rows; here also the styli are absent and the coxites undivided. On both structural and distributional grounds *Microsternus* appears to be the more primitive. The female genital tube displays the supposed primitive number of sclerites (i.e., the styli are present and the coxites divided), and the species exhibit a world distribution of a widely separated, relict nature. This genus is specialized, however, in the reduction of the mesosternum. The genus *Dacne* is probably specialized by reduction in regard to the female genital tube. The comb rows of segment 9 may be homologues of the straps appendant to segment 8 that are present in *Megalodacne* and in the Erotylinae and Triplacinae without exception.

Cypherotylus is distinct on subfamily characters. The genera *Ischyryus*, *Tritoma*, and *Pseudischyryus* are similar in having the lacinia unarmed with apical teeth. Coarsely faceted eyes are peculiar to *Pseudischyryus* and *Ischyryus*, but these would seem to have been acquired separately. *Tritoma* and *Pseudischyryus* differ scarcely at all except in the nature of the ocular facets; both have strong cephalic stridulatory files present in both sexes. *Mycotretus* and *Haematochiton* are extremely similar, and both agree with *Triplax* in having lacinial teeth and the elytra generally margined at base. All three of these genera agree with *Ischyryus* in having the tibiae not strongly dilated, the prosternal lines not produced anteriorly, the cephalic stridulatory files absent in one or both sexes, and the aedeagus with a long internal sac usually bearing a distinctive muscle attachment at its anterior end. *Triplax* is distinctive in having the strongly transverse terminal segments of the maxillary palpi armed with apical brushes, and in having strongly developed postmandibular lobes.

Three reasonably distinct faunal regions are to be recognized in North America as far as the Erotylidae are concerned: (1) Eastern North America east of the 100th meridian has a fauna composed of Holarctic elements. The relatively large genus *Tritoma* is limited to this area in North America, and close relatives of some of the species occur in the

Palearctic. Although *Triplax* is not limited to this region, some of the species found here likewise have close relatives in the Palearctic. *Megalodacne* and *Microsternus* are other cosmopolitan elements present. Few species are found extending beyond the Great Plains, with the exception of three or four species of *Triplax* that range as far north and west as Alberta, Colorado, and New Mexico. (2) Another area is the southern Rocky Mountain region, including Colorado, New Mexico, and Arizona. This area is dominated by Neotropical elements ranging northward along the mountains of western Mexico and southern Arizona. That part of Arizona lying south of the Gila River in particular is almost wholly populated by such Neotropical forms as *Cypherotylus*, *Haematochiton*, *Mycotretus*, and *Ischyryus*. (3) The third of the faunal areas is Pacific North America west of the Rocky Mountains. The fauna of this region appears to have evolved largely *in situ*. It harbors a number of species of *Dacne* and *Triplax*, for example, that have narrow ranges within this mountainous area and apparently have no close relatives anywhere else.

In addition to these "major" Nearctic regions, there is a flavor of endemism in Florida that involves such forms as *Triplax alachuae*, *Ischyryus dunedinensis*, *I. quadripunctatus*, and *Pseudischyryus* spp. (see discussions under these names). Indeed, it seems not improbable that *Pseudischyryus* evolved from a *Tritoma*-like ancestor in Florida when the Floridian peninsula was isolated from the continent during relatively recent geological time, for this genus is restricted to the southeastern United States (except for a probable introduction into California) and appears to have arisen there.

RESULTS AND CONCLUSIONS

Studies done on both male and female genitalia have proved especially useful. A number of characters of importance at various taxonomic levels have been discovered in the genitalia of both sexes. These are illustrated and are discussed in the systematic treatment that follows.

Examination of the cephalic stridulatory files has proved interesting in that the presence or absence of these structures in one or both sexes appears to be correlated with

other, more easily visible characters; thus conclusions based on the latter are reinforced.

Study of the wings, on the other hand, has proved fruitless. Very little variation is evident in the wings between species, genera, or even subfamilies; hence it can be said only that the various forms are extremely homogeneous in respect to wing characters.

Taxonomic results are as follows: Twenty-two specific, four subspecific, one generic, and several varietal names are placed in new synonymy. One specific name has been

lowered to subspecific rank. Thirteen new species and one new subgenus have been or are here described (the two papers of the author listed in the references are likewise products of the present study).

Finally, it is concluded that the known North American Erotylidae comprise 50 species and two subspecies comprehended in three subfamilies and 10 genera. These are taken up systematically in the following section, in which the order of presentation is from the primitive to the specialized.

SYSTEMATIC TREATMENT

FAMILY EROTYLIDAE LACORDAIRE, 1842

Erotyliens LACORDAIRE, 1842, p. 1.

COLOR AND PATTERN: The most common colors are undoubtedly black and reddish yellow in combination. Most of the other colors, even such unusual ones as purple and pink, are not unknown in the Erotylidae. Green, of course, is exceedingly rare (if indeed known at all), and metallic or structural colors are likewise rare. Color patterns are extremely varied and intricate within the family, especially in the rich fauna of the American tropics. Here are found forms adorned with colors and patterns as gaudy and intricate as those displayed by blankets of the Navajo Indian. (Perhaps this fact accounts for the origin of the poetic family name which, from the Greek, means "little darlings.") In temperate latitudes, however, erotylids tend to be monotonously bicolored, with the elytra black and the head and pronotum reddish yellow. Arrow (1925, pp. 12-17) quite adequately discusses color and pattern in the Erotylidae, Endomychidae, and Languriidae. He suggests that the bright coloration of these forms is warning coloration (Batesian mimicry) and cites as partial evidence the numerous other forms of Coleoptera that mimic them.

SHAPE: Within the family as a whole, body shape is quite varied, ranging from suborbicular or hemispherical (e.g., *Aegithus*) to elongate-elliptical, with the length perhaps three times the width (e.g., *Megalodacne*). Again in the American tropics, one finds bizarre embellishments of the normal shape. Certain species of *Cypherotylus*, for example, have the elytra produced dorsally into a V- or roof-shaped protuberance or even into distinct spines. The North American forms, however, exhibit what is perhaps the typical erotylid shape. Among these the body varies from broadly oval, with the length 1.5 times the width, to elongate-elliptical or subrhomboidal, with the length 2.6 times the width. In lateral view the dorsal profile is moderately convex, rather more strongly arcuate at each end than medially. The pro-

notum is typically subtrapezoidal, widest basally or rarely just in front of the base, with the sides arcuately convergent to the moderately produced apical angles, the apex transverse between the latter, and the base truncate except for a moderate lobe limited to the middle three-fifths or so. More rarely the pronotum is subquadrate or rectangular, with the sides almost straight and parallel, and the apex between the apical angles is occasionally more or less convex when the four pronotal angles are in equal focus. The head is usually hypognathous and rather short, the width at eyes 1.2 to 1.6 times the median length (between epistomal and pronotal apices), the sides in front of the eyes approximately straight and strongly convergent to the truncate or feebly concave epistomal apex. The head is immersed in the prothorax to such point that the pronotal apical angles almost equal the middle of the eyes. The legs are rather short, the knees scarcely exceeding the sides of body; the femora generally somewhat compressed, widest medially, with the dorsal and ventral profiles about evenly, equally arcuate; the tibiae often strongly widened apically; the three basal tarsal segments usually somewhat widened and bearing pads beneath.

The North American forms may be described in greater structural detail as follows:

HEAD: Ocular striae present and distinct, often extending to epistoma so that disc of head is entirely margined except at base. Eyes moderate to small in size, usually evenly orbicular but sometimes subtruncate behind, generally finely faceted, less commonly with coarse facets. Antennae short, seldom reaching beyond prothoracic base, the club always distinct and usually three-segmented, rarely four- to five-segmented; segment 3 of stem most often elongate and equal in length to the following two or three segments together. Cephalic stridulatory files present in both sexes, absent in both sexes, or present only in the male (their presence only in the males of some species suggests that they function to bring the sexes together). Head below bearing postmandibular lobes (one on each side of oral

cavity) beneath which the bases of antennal stems lie when antennae are retracted, the postmandibular lobes often strongly developed and of taxonomic importance at the species level (e.g., in *Triplax*). Terminal segments of maxillary and labial palpi commonly widened and securiform to strongly transverse-arcuate, less commonly cylindrical and not at all widened. Mentum variable—strongly transverse, triangular, or subquadrate to pentagonal, occasionally reduced and obsolescent.

PRONOTUM: Always strongly margined laterally though usually very narrowly so, the apex and base variable in margination, the margin extremely narrow here when present. Feeble basal impressions usually present on each side of basal lobe, the extreme base bearing a short row of coarse, flat-bottomed, unevenly spaced punctures in each basal impression. Pronotal angle pores always present, commonly small, inconspicuous, and not visible in dorsal view of pronotum, occasionally large and conspicuous in dorsal view.

SCUTELLUM: Always present, of moderate size, subcordate to pentagonal in shape, approximately as wide as or a little wider than long, generally bearing a few scattered punctures.

ELYTRA: Usually striate-punctate, with the intervals sparsely punctulate, often distinctly margined basally with the submarginal striae irregularly interrupted by flat-bottomed punctures, rarely entirely smooth, or confusedly punctate with large black impressions, or confusedly punctate with small punctures. Elytral epipleura well developed, lying almost in the horizontal plane.

THORACIC VENTER: Anterior coxal cavities always closed; middle coxal cavities also closed, the mesepimera not attaining the cavities. Mesopleural and metapleural sclerites distinct, not reduced or hidden. Prosternum bearing a flat basal process that overlies anterior edge of mesosternum and is truncate to feebly concave basally, the prosternal lines delimiting such process either terminating along inner edges of coxae or produced anteriorly beyond inner coxal edges for a short distance and terminating in a sharp incurved arc, rarely produced to prosternal apex and entirely delimiting a triangular or campanulate prosternal plateau. Meso-

sternum subquadrate to transversely subrectangular, very rarely more than three times as wide as long. Metasternum generally somewhat wider than long, often bearing metasternal coxal lines and a dark median suture along the posterior three-fourths or so of its length.

ABDOMEN: Composed of five sternites, of which the basal and apical are the longer, and which, taken together, are about equal in length to the three median sternites combined. Basal sternite usually bearing distinct abdominal coxal lines; the abdominal intercoxal process wide and transversely truncate in forms with widely separated coxae (and concomitantly short bodies), narrow and arcuately convex in forms with narrowly separated coxae.

LEGS: Anterior and middle coxae globular; hind coxae transverse. Trochanters triangular, attached obliquely to bases of femora. Femora weakly swollen medially, moderately compressed, shallowly grooved along ventral faces for reception of tibiae, rounded on lateral and dorsal faces. Tibiae generally with dorsal angles weakly carinate, usually flattened into a knife-like edge dorso-apically when apices are strongly widened; the corbels partially lined with a single row of flat, sharp spines; the tibial spurs very small and short. Tarsi either pentamerous with segment 4 not reduced or, more often, cryptopentamerous, with segment 4 strongly reduced, immovably united to the base of segment 5 and attached mediodorsally to segment 3; the three basal segments usually widened and padded beneath, whether tarsi are distinctly five-segmented or apparently four-segmented; segment 5 subequal in length to rest of tarsus in the cryptopentamerous type.

WINGS: Fully developed and functional in all North American species (occasionally reduced or absent in certain Old World forms). The wing of a single species, *Microsternus ulkei*, is figured here (fig. 141), and this is perhaps adequate in view of the fact that scant differences between taxa are discernible in these organs. It is highly doubtful whether any other Nearctic species, except possibly *Cypherotylus californicus*, can be distinguished from *Microsternus* on a basis of the wing structure alone. In *Cypherotylus* the wing membrane is dark colored, almost

black (as in many Neotropical forms), and the "stridulatory area" (an oval, stippled spot near the posterior middle in fig. 141) is consequently less distinct; the apical membranous portion of the wing is also slightly reduced in size. The wings of Erotylidae are discussed so well by Arrow (1925, pp. 26-28) that little is to be gained by elaborating that subject here. It is worth noting, however, that Arrow considers the "stridulatory area" referred to above as a true stridulatory organ. When the wings are folded in repose this area rests against a flat, raised area of similar shape and shagreened surface located along the suture on the under side of the elytron near the apex. These complementary areas are present on the wings and elytra of all Nearctic species. Arrow (1925, p. 27, fig. 9) presents a figure of the wing of a Ceylonese erotylid in which the wing is reduced to a narrow strip supporting the stridulatory area at its end. Such a wing is certainly useless for flight, and Arrow offers this as evidence for the stridulatory nature of the structure in question. (For a discussion of wing venation and wing folding in Coleoptera, see Forbes, 1922 and 1926.)

PUBESCENCE: Setae short and sparse or absent on body, generally strongest on abdomen. Tibiae, tarsi, and antennal stems distinctly but sparsely pubescent, the setae relatively long. Antennal clubs densely short-pubescent or pilose and bearing a few strong setae in addition.

SEXUAL DIMORPHISM: Uncommon but present in a few forms. Strictly external morphological sexual characters are diverse, and the male can sometimes be distinguished by one of the following conditions: basal abdominal sternite with an asperate-punctate spot medially; apical abdominal sternite strongly carinate at apex and tibiae bearing denticles on ventral faces; epistomal apex transverse-rectangularly concave; epistomal apex margined; cephalic stridulatory files visible on vertex in front of pronotum (or cephalic stridulatory files present but hidden by pronotum); or lateral lobes of aedeagus too long to be fully retracted, hence protruding from tip of abdomen.

MALE GENITALIA: The aedeagus is of rather uniform gross appearance throughout the Nearctic Erotylidae. It is the cavalier type ("*type en cavalier*") of Jeannel and

Paulian (1944, pp. 75, 93, fig. 88). Characteristics associated with the internal sac (its position, sclerotized areas, and anterior muscle attachment) have proved especially useful taxonomically in the present study (e.g., in *Dacne* and *Triplax*).

FEMALE GENITALIA: The female genital tube is also rather similar in structure throughout the North American erotylids. It generally bears a series of four sclerites on each side apically—valvifer, divided coxite, and stylus. The genus *Dacne*, however, is aberrant in regard to these structures (there being only two sclerites on each side apically—valvifer and undivided coxite, with stylus absent) and also in possessing two or three pairs of comb rows on membranous segment 9. These latter structures are possibly homologous to dorsal and ventral pairs of lightly sclerotized straps appendant posteriorly to tergite 8 and sternite 8 present in all other species except *Microsternus ulkei*. The female genital tube, as well as the aedeagus, is taxonomically useful in certain genera. All North American species of *Dacne* and *Pseudischyrus*, for example, can be identified with certainty on the basis of this structure alone.

BIOLOGY: Habits and life cycles of North American Erotylidae are scarcely known. In rare cases, however, papers have been published on the habits of a given species (e.g., Park and Sejba, 1935, pp. 164-172, on *Megalodacne heros*). Only a few general remarks, and these partly speculative or inferential from data on labels, can be made here. All species except one appear to be limited to unadulterated fungous food, either mycelium under bark or in decomposing wood, or sporophores, rarely fungi growing on other organic material. The single exception, *Cypherotylus californicus*, apparently feeds on the fungus-rotted wood itself. This species, moreover, has been observed by the author to be active in the daytime, but most others appear to be active at night. Two species are commonly taken at light, and both of these have coarsely faceted eyes, which are often presumed to indicate nocturnal activity in insects. Overwintering is likely accomplished in the adult stage, as adults are occasionally collected in midwinter in the northern states, and the label "hibernating under bark" is sometimes seen on specimens.

ECONOMIC IMPORTANCE: Erotylidae are not

known to be of economic importance. Dr. C. Aubrey Thomas of Pennsylvania State University, a well-known specialist on the pests of cultivated mushrooms, states that Erotylidae are unknown as mushroom pests in the United States (personal communication). In countries such as Japan, however, where wild mushrooms are actively collected for human consumption, erotylids may offer some problem as pests. Mr. Everett J. Ford, Jr., with the United States Department of Agriculture in Honolulu, Hawaii, has sent the author specimens of a species of *Dacne* intercepted on mushrooms imported from Japan. On the other hand, Erotylidae may have some beneficial importance from man's point of view. Dr. D. S. Welch (Department of Plant Pathology, Cornell University) suggests that species attacking *Polyporus* species of fungi that cause heart-rot of oak and other trees may be beneficial in causing rapid disintegration of sporophores and thus reducing spore production (personal communication). Species of *Triplax* are commonly found on sporophores of *Polyporus*, according to personal experience and data on labels.

IMMATURE STAGES: Larvae of a number of species have been described or figured in the literature. These references are cited under the species or genera concerned. It may be stated that the larvae are generally spiny or papillate dorsally and generally bear two short, recurved urogomphi at the end of the abdomen (in *Cypherotylus californicus* these are longer than the body itself). Pupae and eggs are too poorly known to admit of any general statements. [See Roberts (1939) for a general study of the larvae.]

TAXONOMIC LIMITS OF FAMILY: During the past century, two problems have confronted workers on the Erotylidae: (1) whether or not to include *Languria* and its allies, and (2) what to do with the genus *Dacne*.

The first of these has been solved by various authors by the acceptance of one or the other alternative. Those who have placed the languriids as a subfamily or tribe of the Erotylidae include Crotch (1873a, 1876), Gorham (1887-1899), Verhoeff (1895), Kuhnt (1909), Casey (1916), and Roberts (1939). Those who have taken an alternative course and excluded the languriids are Lacordaire (1842), Kuhnt (1911; an apparent reversal of opinion), Arrow (1917, 1925), and Vaurie

(1948). As is pointed out by Arrow (1925, pp. 1-17), it seems clearly evident that the two groups should be accorded separate familial status. The Languriidae differ strikingly from the Erotylidae in possessing the following characteristics: the anterior coxal cavities are open; the "stridulatory area" on the posterior edge of the wing (fig. 141) is absent; the body is much narrower and more elongate; the color pattern is simpler; and larval habits are confined to stem boring.

The second problem (what to do with *Dacne*) has likewise been solved by either inclusion or exclusion. Verhoeff (1895) excludes this genus alone and grants it family rank as a result of studies on the female genital tube. As a result of larval studies, Böving and Craighead (1931) place the Dacninae and the Triplacinae (or Tritomini) together in the family Dacnidae, thus leaving the Erotylidae to include the Erotulinae alone. Edwards (1949) elevates the subfamily Dacninae to family status on the basis of external anatomy.

Of the three classifications cited, the classification of Verhoeff appears to be the most acceptable, for the genus *Dacne* is highly aberrant in regard to female genitalic characters. Were one to assign suprageneric importance to all these cleavages occurring in the Dacninae and Triplacinae, however, it would be necessary to create four or five suprageneric taxa—a procedure seemingly unwarranted by the importance of the differences. (After all, in taxonomy it is always necessary to strike a mean between the tendencies to lump and to split!) The present work includes *Dacne* within the subfamily Dacninae of the Erotylidae.

Hetschko (*vide* Leng and Mutchler, 1933, p. 34) has synonymized *Hypodacne* LeConte with *Euxestus* Wollaston and transferred it along with the subfamily Euxestinae Arrow to the Colydiidae. This action is well justified in the opinion of the present author. Thus three taxonomically respectable subfamilies may be recognized in the Erotylidae at present: Dacninae, Triplacinae, and Erotulinae.

WORLD DISTRIBUTION AND SIZE: The most recent catalogue of the Erotylidae of the world (Kuhnt, 1911) lists 103 genera and 1541 species. Although some of the names have been synonymized since then, new descriptions have increased the numbers of both taxa by

perhaps 20 per cent. Consequently a reasonable estimate of the taxonomic size of the family at the present time is 125 genera and 1850 species.

The tropical regions of the world are especially rich in Erotylidae, as one might expect. Temperate latitudes are relatively impoverished but nevertheless support a considerable number of species. Erotylids are unknown from the true Arctic and Antarctic. Two subfamilies, the Dacninae and the Triplacinae, occur throughout the major zoogeographical regions of the world. The Erotylinae, however, are virtually limited to the Neotropical realm and, being the largest of the three subfamilies, lend a richness to this region unknown elsewhere. Members of all three subfamilies occur in America north of Mexico, yet the Nearctic realm undoubtedly contains a poorer erotylid fauna than any other major zoogeographical region.

KEY TO SUBFAMILIES OF EROTYLIDAE
(BASED ON NEARCTIC FORMS)

1. Fourth tarsal segment scarcely reduced, subequal to third and attached in normal manner to end of third segment (fig. 54); terminal segments of maxillary palpi cylindrical, not transverse or triangular (figs. 55, 57, 59); mentum strongly transverse (figs. 56, 58, 60) Dacninae (p. 78)
- Fourth tarsal segment strongly reduced, not more than half of the length or width of third, attached mediodorsally to third segment (fig. 2); terminal segments of maxillary palpi strongly transverse or triangular (figs. 73, 127); mentum not transverse 2
2. Elytra non-striate, confusedly punctate with large black punctures; prothorax at base but little more than half as wide as greatest common elytral width; size large, 12 mm. or more in length Erotylinae (p. 93)
- Elytra regularly striate-punctate; prothorax at base subequal to greatest common elytral width; size small, 8 mm. or less in length Triplacinae (p. 96)

SUBFAMILY DACNINAE CROTCH, 1873

Dacnides CROTCH, 1873a, p. 352.

Erotylini engidiformes LACORDAIRE, 1842, p. 33, in part.

Engides BEDEL, 1867, p. 4.

Three genera and eight species are included in this subfamily in North America. Among these eight are found the largest and the

smallest forms of Erotylidae in this faunal region. The smallest specimen of *Dacne* seen measures 1.98 mm. in length; the largest specimen of *Megalodacne*, 22.0 mm.

DIAGNOSTIC DESCRIPTION: Mentum large and strongly transverse, its width 1.5 or more times the median length (figs. 56, 58, 60). Maxillary and labial palpi extending forward, not reflexed, their terminal segments oval, not widened (figs. 55-60). Mandibles bearing a membranous fringe lined with setae along inner edge and a convex, heavily sclerotized, transversely striate molar area. Tarsi distinctly five-segmented, segment 4 not or scarcely smaller than preceding segments and attached to apex of third segment (fig. 54). Tibiae not strongly widened distally (fig. 54).

KEY TO NEARCTIC GENERA OF DACNINAE

1. Large forms, 9 mm. or more in length; black, the elytra bearing two reddish fasciae; body largely impunctate . . . *Megalodacne* (p. 88)
- Small forms, 6 mm. or less in length; elytra without fasciae; body distinctly punctate. 2
2. Mesosternum extremely short and transverse, about 10 times wider than long; prosternum bearing a raised, triangular plateau which almost attains prosternal apex (fig. 42); each elytron bearing four black spots; pronotal base immarginate . . . *Microsternus* (p. 87)
- Mesosternum not more than three times as wide as long; prosternum without such plateau (figs. 14-16); elytra lacking black spots; pronotal base finely margined (figs. 4, 5, 10, 11) *Dacne* (p. 78)

GENUS DACNE LATREILLE, 1796

Dacne LATREILLE, 1796, p. 12. Generotype: *Ips humeralis* Fabricius, 1787, p. 45 (= *Dermestes bipustulatus* Thunberg, 1781 [1781-1791], p. 6), by subsequent designation by Latreille, 1810, p. 427.

Engis PAYKULL, 1800, p. 349.

Dacne LATREILLE, 1796 (= *Engis* Paykull, 1800). LACORDAIRE, 1842, p. 63. [Synonymization by Lacordaire, not Crotch.]

DIAGNOSTIC DESCRIPTION: Color ranging from almost uniform ferruginous without elytral spots, or with one on each elytron, to piceous with two reddish yellow spots on each elytron; the body occasionally dark brown with the elytra vaguely subvittate. Punctures of elytral intervals equal in size to striae punctures, the entirely obsolete striae often indicated by rows of small, dark, "water-soaked"

spots. Pronotum more or less widely margined laterally, narrowly margined basally, immarginate apically (figs. 4-11). Prosternum simple, i.e., although the prosternal lines in some cases extend in front of the coxae (figs. 14, 15), they do not surround an anterior, flattened, raised plateau as is the case in *Microsternus ulkei* (fig. 42). Mesosternum varying in width between middle coxae from 1.5 to three times its median length. Metasternal coxal lines entirely absent; abdominal coxal lines present but short, V-shaped to acuminate, scarcely divergent posteriorly. Tarsi with the three basal segments bearing only a few setae ventrally, without distinct pads (fig. 54). Eyes finely faceted (pl. 8, fig. 1). Cephalic stridulatory files always present in the male, present or absent in the female, depending on the subgenus. Lacinia of maxilla armed apically with two claw-like teeth on outer side and with two smaller, sharply bent spines on the inner side (fig. 55).

OBSERVED SIZE RANGE: This genus includes the smallest of North American erotylids and is distinguished from other genera in the subfamily Dacninae by size; all three dacnine genera, as a matter of fact, are disjunct on the basis of size. The over-all range in length of all individuals of *Dacne* examined is 1.98 to 3.59 mm. The smallest specimen of *Microsternus* examined measures 3.86 mm. in length.

MALE GENITALIA: Verhoeff (1895, pp. 232-235, figs. 26, 27) has described and figured the aedeagus of *bipustulata*, the genotype (under the synonym *humeralis*). He describes this structure on the basis of its orientation when retracted within the abdomen, i.e., with the tegmen ventral and the median lobe dorsal and curving upward. It is preferred here, however, to describe and figure the aedeagus as though it were rotated 180 degrees from that position, with tegmen dorsal and median lobe ventral and curving downward, for this seems to be the normal position of the aedeagus when exerted. The aedeagus of *quadrinaculata*, the Nearctic species most closely related to the genotype, is figured fully here (figs. 17, 18), and diagnostic differences for the other four North American species are presented (figs. 19-29).

The tegmen is a membranous, ventrally concave trough strengthened by two dorsal

and two lateral struts and terminating in two lateral lobes. The dorsal struts widen basally into two plates that overlie the median lobe and lightly fuse medially (figs. 17, 18); they are less strongly widened into two smaller plates distally where they abut the bases of the lateral lobes. The membrane between the dorsal and lateral struts is lightly sclerotized on each side here. The lateral struts continue proximally as a strong arm (Verhoeff's term) around each side of the base of the median lobe. Each lateral strut is weakened by a faint oblique suture at a point approximately below the base of the dorsal strut above. Immediately in front of this suture the arm is produced dorsolaterally into a truncate lobe at a point near the base of the median lobe. The arms are tangent but do not fuse at their proximal (anterior) ends. Each lateral strut continues distally along the venter of each lateral lobe without a break between the basal piece and lateral lobe. Otherwise, the lateral lobes are closely articulated to the basal piece by membrane. The lateral lobes are moderately long and are always found lying close together, usually touching along their entire medial margins.

The median lobe is compressed and rather evenly arcuate, somewhat narrowed distally, variously pointed or rounded at its ventral apex, and bears a large median orifice along the membranous two-thirds or so of its dorsum. It is slightly constricted basally around the median foramen, and its ventral wall is the more strongly sclerotized part. The median strut is slightly thickened at its proximal end, exceeds the length of the median lobe by about one-half, and is very narrowly attached to the anterodorsal end of the median lobe. This strongly constricted attachment above the median foramen allows considerable flexion between the two parts. The median strut is compressed and bipartite in dorsal or ventral view, i.e., it bears a median, longitudinal, light suture.

The internal sac is well developed and about as long as the median lobe; it is inflated in subgenus *Dacne* and narrow in subgenus *Xenodacne*. At its proximal end the internal sac bears a sclerotized nodule which may or may not be widened dorsoventrally and to which is attached the retractor muscle of the internal sac ("*Praeputialsack-Retractor*," Ver-

hoeff, 1895, p. 234, fig. 26). The ejaculatory duct enters through this nodular muscle attachment and extends into the internal sac for some distance as a heavily sclerotized tube. It suddenly terminates, and the sperm channel is continued in one of two ways: the ventral wall of the internal sac either forms a terete, longitudinal, sclerotized channel (fig. 24), or it becomes sclerotized on each side to form a V-shaped channel (fig. 19). Such adaptations in the ventral wall of the internal sac presumably prevent accidental constriction of the sperm channel when the internal sac is partially everted during copulation. These sclerotized continuations of the sperm channel in the wall of the internal sac are here termed the "flagellum." It appears that Sharp and Muir (1912) and Wilson (1930) include both the free portion of the ejaculatory duct within the internal sac and the channel formed in the wall of the sac itself in the term "flagellum."

FEMALE GENITALIA: Verhoeff (1895, pp. 235-237, figs. 29-32) was the first author to describe and figure the interesting female genital tube in this genus. As in the case of the aedeagus, he has described the female terminalia of the European genotype. Drawings of this structure for *quadrifasciata* are presented here in dorsal, lateral, and ventral views (figs. 30-32).

Appendages of the ninth segment are represented only by a valvifer and an undivided coxite on each side. Styli are absent. Each valvifer bears a dorsal and a ventral baculum formed by longitudinal inflections of the body wall, to the distal ends of which the coxite of that side is articulated. The coxites rotate in a horizontal plane around these articulations and are perhaps used as digging organs (as suggested by Verhoeff), presumably to oviposit deep in fungous tissue. The dorsal membrane between the valvifers is stiffened by a pair of paraprocts which are

widened and fused at their distal ends to form what Tanner calls the "proctiger," or tenth tergite, but which is here termed the "proctigeral lobe." The anus lies directly beneath this. The paraprocts are merely sclerotized longitudinal strips on the membrane and not inflected double thicknesses of body wall as are the baculi. Ventrally, the vulva tends to form a lobe of more or less distinctive shape. This is here referred to as the "vulvar lobe." It lies below or forms the ventral margin of the genital aperture.

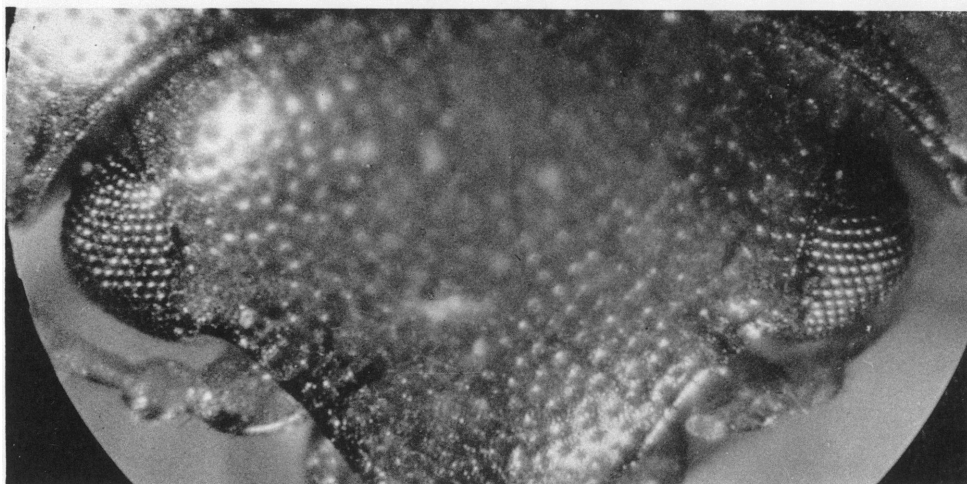
The ninth segment is entirely membranous except for four or six longitudinal rows of peculiar comb-like sclerites which here are called (after Verhoeff) simply "comb rows." These are always present as a dorsal pair and a ventral pair, and in the subgenus *Dacne* there is an additional shorter lateral pair. Each individual comb is composed of from one to 10 teeth pointing outward and forward and attached to a thickened basal portion on the membrane. The origin of the combs is clear. When one examines with a compound microscope the membrane near the posterior end of a comb row it is seen to be densely beset with minute spicules shaped like elongate, inverted V's. These probably are formed by single cells, for each bears a minute cavity basally on the inner (body-cavity) side of the membrane. The spicules all point outward and forward, as do the comb teeth, and many intermediate stages in the formation of combs from spicules are visible. A comb, then, is seen to be a group of greatly thickened spicules lying side by side in a uniseriate row.

The function, if such there be, of the comb rows is unknown. Verhoeff (1895, p. 236) states that they obviously serve to clasp the parameres (lateral lobes) of the male during copulation, but the present author cannot agree with this interpretation. Copulation may be presumed to occur when the female

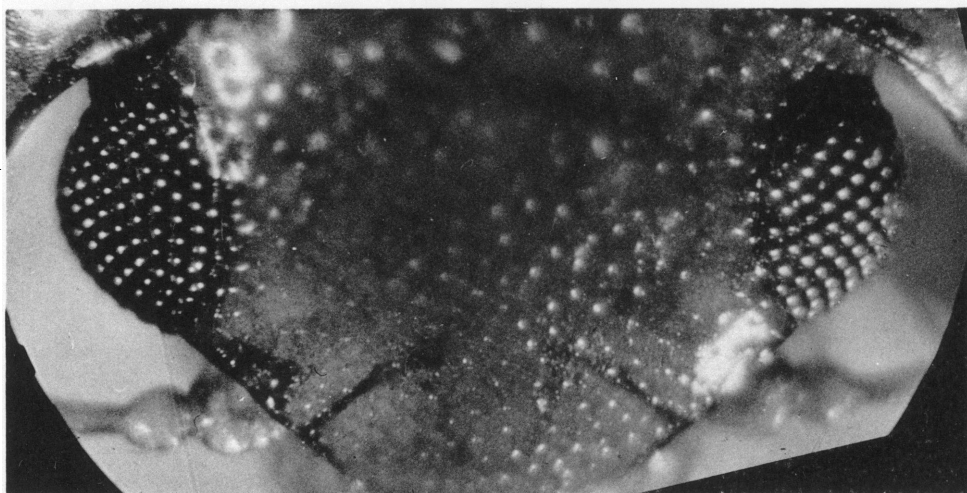
PLATE 8

PHOTOMICROGRAPHS OF HEAD AND PRONOTAL APEX, ANTERODORSAL VIEW

1. *Tritoma atriventris* LeConte, male, Texas (width of head at eyes, 1.10 mm.)
2. *Pseudischyrus extricatus* (Crotch), male, Gainesville, Florida (width of head at eyes, 1.10 mm.)
3. *Ischyrus quadripunctatus quadripunctatus* (Olivier), female, Lucedale, Mississippi (width of head at eyes, 1.63 mm.)



1



2



3

genital tube is retracted, and at this time the terminal portion of the tube including the valvifers and coxites (which are brought close together) lies enclosed within the eighth segment with the intussuscepted membranous ninth segment between the two. Thus the comb teeth are pointing inward (i.e., into the cavity formed by the invagination of the ninth segment on which they are borne) and backward! It appears more likely that the comb rows function during oviposition when the tube is everted. It seems logical that blood pressure in the body cavity may force the comb rows against the walls of the cavity in fungous tissue so that the terminal digging organs (coxites) can operate most efficiently, probably while being forced deeper by the same blood pressure.

The eighth tergite is membranous anteriorly, is sclerotized laterally and posteriorly, and bears a row of small setae along the posterior margin. The eighth sternite is completely sclerotized and sends forward a strong apodeme from the middle of its anterior margin; this process is approximately twice as long as the sternite itself. There is also a row of small setae along the posterior margin of the sternite.

WORLD DISTRIBUTION AND SIZE: Only some 21 unchallenged species are comprehended in the genus altogether. Of these, 12 are Palearctic, three Oriental, one or possibly two Ethiopian, and five are Nearctic. Species are unknown from the Australian and Neotropical realms, but one species has been collected in Hawaii and another intercepted there on mushrooms imported from Japan. Perhaps the former gained entry on mushrooms also and has become established. (Specimens of both these forms have been sent to the author by Mr. Everett J. Ford, Jr., of the United States Department of Agriculture in Honolulu.)

BIOLOGY: Little is known about the biology of *Dacne* species. They apparently feed on and develop in fungi exclusively, and adults are sometimes taken under bark. Westwood (1839, vol. 1, pp. 142, 147, fig. 11) describes and figures the larva of *rufifrons*, a European species. The larva of the generotype is described by Bedel (1867, p. 5). The adult of the generotype is figured in color by Fairmaire and du Val (1868, pl. 75, fig. 357) and by

Scheerpeltz and Höfler (1948, pl. 4, fig. 36). It is also figured in the original description by Thunberg (1781-1791, pl. 7, fig. 6).

KEY TO NEARCTIC SUBGENERA AND SPECIES OF *Dacne*

1. Pronotum strongly convex, its apex at middle surpassing apical angles when the four pronotal angles are in equal focus (figs. 4, 5); lateral beads, or margins, of pronotum not swollen but appearing like narrow flanges in lateral view (fig. 6); elytral punctures somewhat arranged in straight rows *Dacne*, 2 (p. 82)
- Pronotum relatively depressed, its apex medially not equaling apical angles when the four pronotal angles are in equal focus (figs. 10, 11); lateral beads, or margins, of pronotum weakly to strongly swollen anteriorly in dorsolateral view (figs. 7-9); elytral punctures entirely confused, not at all in straight rows. . . *Xenodacne*, new subgenus, 3 (p. 84)
2. Color black, strongly nitidous, the elytra with four large, distinct, reddish yellow spots, two humeral and two apical; antennal club compact, slightly asymmetrical, scarcely longer than wide (fig. 4); body above glabrous, the setae not exceeding the punctures *quadrifasciata* (p. 82)
- Color ferruginous or fusco-piceous, the humeral elytral spots lighter and moderately distinct, the apical elytral spots indistinct; antennal club symmetrical, considerably longer than wide (fig. 5); setae distinctly protruding from punctures on body above. *californica* (p. 83)
3. Epistoma transversely elliptical, separated from frontal region by an entire transverse suture (fig. 13); prosternal lines not extending in front of coxae (fig. 16); lateral pronotal beads weakly swollen anteriorly (fig. 9) *cyclochilus* (p. 85)
- Epistoma flat and trapezoidal, not separated from frontal region by an entire suture (fig. 12); prosternal lines extending in front of coxae (figs. 14, 15); lateral pronotal beads moderately to strongly swollen anteriorly (figs. 7, 8) 4
4. Scutellum transverse, its width 1.75 or more times its length (fig. 10); elytra finely margined basally (fig. 10); body above glabrous, the setae not exceeding the punctures; prosternal lines relatively widely separated (fig. 14); lateral pronotal beads strongly swollen anteriorly (fig. 7) . . . *picea* (p. 84)
- Scutellum almost as long as wide, its width 1.5 or less times its length (fig. 11); elytra immarginate basally (fig. 11); body above with fine but distinct pubescence; prosternal lines

relatively narrowly separated (fig. 15); lateral pronotal beads moderately swollen anteriorly (fig. 8)
 *pubescens*, new species (p. 86)

SUBGENUS **DACNE** LATREILLE, 1796

Dacne LATREILLE, 1796, p. 12.

The two Nearctic species in this subgenus display the characteristics of the European generotype, *bipustulata*. One of them, *quadrimaculata*, is limited to eastern North America, and the other, *californica*, occurs in the far West.

DIAGNOSTIC DESCRIPTION: Pronotum strongly convex, its apex medially exceeding apical angles in dorsal view (when the four pronotal angles are in equal focus; figs. 4, 5). Sexual dimorphism present externally—the males easily distinguished by anteriorly convergent continuations of cephalic stridulatory files on vertex and faintly bilobed pronotal apex at middle (fig. 5), the females without cephalic stridulatory files and with pronotal apex evenly convex at middle (fig. 4). Lateral margins of pronotum flange-like, not thickened anteriorly in dorsolateral view (fig. 6; cf. figs. 7–9). Elytral punctures forming rather straight rows except laterally.

MALE GENITALIA: The aedeagus in this subgenus differs from that in *Xenodacne* in a few minor but constant ways. The lateral lobes bear a row of small setae ventrolaterally (figs. 17, 20). The median lobe is relatively strongly narrowed and sharply pointed apically (fig. 17). The internal sac is large and inflated, and its ventral wall forms no distinct tubular continuation of the sperm channel beyond the end of the ejaculatory duct. This is provided for either by a greater length of the ejaculatory duct (fig. 17) or by the formation of distinct sclerites in the ventral wall (fig. 19).

FEMALE GENITALIA: Lateral comb rows are present, and the proctigeral lobe is bluntly rounded (figs. 30, 31).

Dacne (Dacne) quadrimaculata (Say, 1835)

Ips 4-maculata SAY, 1835, p. 169.

Dacne 4-maculata (Say), CROUCH, 1873a, p. 352.

DIAGNOSTIC DESCRIPTION: Color piceous or black, the following yellowish red: epistoma, appendages, abdomen (at least laterally and apically), and four large elytral spots—one

mediobasally and a longer apical one on each elytron; strongly nitidous. Shape elongate-oval, similar to that of *californica*, but pronotal apex generally considerably narrower than base (fig. 4; cf. fig. 5). Antennal club slightly asymmetrical, scarcely longer than wide (fig. 4). Prosternal lines not distinctly different from those of *californica*. Punctuation similar to that of *californica*, but pubescence indistinct, the setae not protruding from punctures on general body surface. Elytra with distinct, narrow basal border (as in fig. 10).

VARIATION: The observed size range, in millimeters, is 2.39 long by 1.10 wide to 3.52 long by 1.66 wide. Some specimens, especially tenerals, are lighter in color, and in some the antennal club is more symmetrical than in others.

MALE GENITALIA: The ventrolateral row of setae on each lateral lobe is less distinct than in *californica*, and the apices of the lateral lobes are bluntly rounded (fig. 18). The free portion of the ejaculatory duct within the internal sac is much longer than in *californica* and extends halfway to the base of the median lobe (fig. 17). The ventral wall of the internal sac is not distinctly sclerotized to form a continuation of the sperm channel beyond the end of the ejaculatory duct; perhaps the internal sac is everted to approximately this point during copulation. (Five specimens dissected.)

FEMALE GENITALIA: Very similar to those of *californica* but having more combs in lateral comb rows (figs. 30–32). The number of combs ranged from six to eight in each lateral comb row, with a mean of seven. (Six specimens dissected.)

BIOLOGY: Biological data observed on labels are as follows: In *Pleurotus ostreatus*, Washington, D. C., June 7; reared from *Pleurotus ostreatus*, Washington, D. C., July 11; from fungus *Lentinus lepidus*, Itasca State Park, Minnesota, August.

TYPE: Not seen; presumably destroyed with Thomas Say's collection.

TYPE LOCALITY: North America.

GEOGRAPHICAL DISTRIBUTION: Eastern North America east of the 100th meridian from North Carolina to Maine and Quebec, westward to Manitoba and Texas. No specimens have been seen from South Carolina,

Georgia, and Florida; it certainly occurs in Alabama, however, and probably also in Mississippi and Louisiana. (See Appendix for locality data.)

MATERIAL EXAMINED: Three hundred and ninety-six specimens.

***Dacne (Dacne) californica* (Horn, 1870)**

Engis californica HORN, 1870, p. 97.

Dacne californica (Horn), CROTCH, 1873a, p. 352.

Dacne cephalotes CASEY, 1916, p. 153. New synonymy.

Dacne laticollis CASEY, 1916, p. 153. New synonymy.

Dacne elongata CASEY, 1916, p. 154. New synonymy.

Dacne uteana CASEY, 1916, p. 155. New synonymy.

DIAGNOSTIC DESCRIPTION: Color ferruginous to piceous, the following lighter: head and pronotum above, appendages, and a moderately distinct basal spot on each elytron, the elytral apex gradually lighter but without distinct spots; weakly to moderately nitidous. Shape elongate-oval, the body usually widest at about one-third of the elytral length behind base; pronotal sides evenly rounded, the pronotum scarcely narrower at apex than at base (fig. 5); antennal club symmetrical, distinctly longer than wide (fig. 5). Prosternal lines similar to those of *quadrimaculata*, i.e., divergent anteriorly and posteriorly between coxae, often extending a short distance in front of coxae, and enclosing a posteriorly evenly convex basal prosternal process. Elytra with narrow but distinct basal margins (fig. 10). Punctuation moderately dense, the punctures of head and middle of pronotum somewhat finer; elytral punctures relatively coarse, as large as those of head and pronotum. Pubescence weak but distinct, the setae protruding from the punctures on body above as well as below.

MEASUREMENTS OF TYPE: These were not taken when the type was examined.

VARIATION: The observed size range, in millimeters, is 1.98 long by 0.90 wide to 3.45 long by 1.47 wide. Both these specimens are females. In color, specimens range from uniform yellow in teneralis to piceous in old adults (possibly overwintered individuals). These rare darker specimens are generally

more nitidous and virtually approach *quadrimaculata* in this respect. Moreover, a very few of these piceous individuals bear rather distinct apical elytral spots of yellow, but in such cases the head and pronotum are also yellowish, unlike those of *quadrimaculata*. The pronotum exhibits much variation in shape and in width relative to elytral width. In some specimens the pronotum is considerably wider basally than apically, with its sides sloping rather evenly and arcuately to the lateral margins and its maximum width approximately four-fifths that of the elytra, in shape much like *quadrimaculata* (fig. 4). In others the pronotum is almost as wide apically as basally, with its sides distinctly widened and explanate and its width equaling or slightly exceeding that of the elytra, in shape more typical (fig. 5). These extremes, as well as intergradations between them, are usually found in any large series from a given locality, and such variations show no correlation with size of individuals or with geographical distribution, either altitudinal or latitudinal.

Casey erected four synonyms of this species in 1916, basing his descriptions on the relative size and shape of the head, pronotum, and elytra of only nine specimens. Study of the extensive material at hand (both external and genitalic characters included) indicates that the intraspecific range of variation includes these four forms described by Casey.

MALE GENITALIA: Lateral lobes with ventrolateral row of setae more distinct than in *quadrimaculata* and with apices of lateral lobes pointed, each bearing a latero-terminal papilla surrounded by a few small setae (fig. 20). The free portion of the ejaculatory duct within the internal sac is very short and terminates in a point between the proximal ends of two bow-shaped sclerites in the ventral wall of the internal sac (fig. 19). These form a trough- or V-shaped continuation of the sperm channel beyond the end of the ejaculatory duct and must be viewed ventrally or dorsally to be distinguished; if the internal sac is viewed laterally they are superimposed and appear to be an undulate continuation of the ejaculatory duct extending almost to the base of the median lobe. (Fourteen specimens dissected.)

FEMALE GENITALIA: Similar to those of *quadrimaculata* but with fewer combs in

lateral comb rows. These varied from four to six in each lateral comb row, with a mean of five. (Eleven specimens dissected.)

BIOLOGY: Biological data on labels are as follows: [on] *Pseudotsuga taxifolia*, Trinity Valley, British Columbia, May 23; *ex Pleurotus ostreatus* on alder, Inverness, California, May 16; [on] *Pinus ponderosa*, Coeur d'Alene, Idaho, June 21; [in] wood-rat nest, Medford, Oregon, March 7; reared from *Polyporus* fungus, Garland, Utah, August; and several notations, "in fungus."

PUBLISHED ILLUSTRATIONS: The adult is figured in color by Kuhnt (1909, pl. 4, fig. 1).

TYPE: Sex not noted; labeled "Lectotype; *E. californica* Horn; Cal.; No. 3166" (collection Horn, A.N.S.P.). A specimen in the LeConte collection at the Museum of Comparative Zoölogy bears the label "*E. californica* Horn; Cala.; Type 8176"; the present author, however, considers the specimen in the Horn collection to be the holotype.

TYPE LOCALITY: California. (In the original description Horn states: "Specimens in my cabinet from Fort Crook, Sacramento, and Fort Tejon, Cal. Occurs under bark or in fungi." The type, however, bears only the locality, "Cal.")

GEOGRAPHICAL DISTRIBUTION: Western North America from Baja California to British Columbia, including Nevada, Utah, and Idaho in addition to the Pacific coast states. It is suspected that the two specimens described as *D. laticollis* ("Indiana,—Levette collection") by Casey are either mislabeled or that *californica* has been introduced into Indiana. The same may be said of four specimens labeled "McNeil, Texas, VI-6-29, J. O. Martin" and one specimen labeled "Crooked Creek, [Pennsylvania], Wickham." The genitalia of the Texas specimens (two males and two females) have been extracted and examined. (See Appendix for locality data.)

MATERIAL EXAMINED: Seven hundred and eighteen specimens.

XENODACNE, NEW SUBGENUS

SUBGENEROTYPE: *Dacne picea* LeConte (1875, p. 170).

DIAGNOSTIC DESCRIPTION: Pronotum only moderately convex, its apex medially not quite equaling apical angles in dorsal view

when the four pronotal angles are in equal focus (figs. 10, 11). Secondary sexual dimorphism not present (although the males of one species, *pubescens*, are usually recognizable by the fact that the ends of the lateral lobes protrude from the tip of abdomen). Cephalic stridulatory files present in both sexes, but these are short, subparallel, and completely covered by the pronotum (fig. 36). Lateral margins, or beads, of pronotum more or less thickened anteriorly in dorsolateral view (figs. 7-9; cf. fig. 6). Elytral punctures confused, not arranged in straight rows.

MALE GENITALIA: The aedeagi in this subgenus are remarkably uniform, yet they exhibit specific differences. They differ from those of subgenus *Dacne* in these particulars: The lateral lobes bear only two or three well-separated setae lateroventrally (figs. 23, 26, 29). The median lobe is relatively broadly rounded apically (figs. 21, 24, 27). The internal sac is narrow, with the free portion of the ejaculatory duct in its proximal region very short. The continuation of the sperm channel beyond the end of the ejaculatory duct is provided for by the tubular sclerotized ventral wall of the internal sac (fig. 24).

FEMALE GENITALIA: Lateral comb rows are absent, and the proctigeral lobe is sharply pointed (figs. 33-35).

BIOLOGY: No biological information of any kind has appeared on labels.

WORLD DISTRIBUTION AND SIZE: Only the three species treated here, all from the far western United States, are known to belong in this subgenus.

Dacne (*Xenodacne*) *picea* LeConte, 1875

Dacne picea LECONTE, 1875, p. 170.

Dacne vittata CASEY, 1916, p. 153. New synonymy.

DIAGNOSTIC DESCRIPTION: Color ferruginous, most often darker along the suture broadly, along elytral sides, and on thorax below; elytra generally bearing a few incomplete but distinct stria-like series of piceous spots not at all impressed; body moderately nitidous. Sides of body evenly arcuate, at most only faintly angulate in profile at widest point across elytra; pronotal sides subparallel basally, arcuately convergent in apical halves (fig. 10); sides of head in front of

eyes straight, strongly convergent anteriorly (fig. 12), the frontal region usually somewhat impressed on each side of middle between antennal insertions. Scutellum pentagonal, much wider than long, its width at least 1.75 times its length (fig. 10). Antennal club similar to that of *californica* (fig. 5). Prosternal lines (fig. 14) extending in front of coxae, but shorter and more widely separated than those of *pubescens* (fig. 15). Lateral margins, or beads, of pronotum strongly swollen and becoming more so anteriorly in dorsolateral view (fig. 7). Elytra with distinct basal margins (fig. 10). Punctures of pronotum distinctly flat-bottomed, becoming larger and denser laterally; those of head much smaller, a bit denser, becoming more so anteriorly; those of elytra likewise small, rather sparser. Body essentially glabrous, the short setae distinctly exceeding the punctures only on abdomen.

MEASUREMENTS OF TYPE: Length, 3.31 mm.; width, 1.52 mm.

VARIATION: The observed size range, in millimeters, is 2.39 long by 1.06 wide to 3.24 long by 1.52 wide. Both specimens showing these extremes in size are females. Most specimens are darker ferruginous broadly along the suture, along the elytral sides, and on the thorax below, but one specimen has these darker areas piceous, and three are uniformly ferruginous, with the appendages a bit lighter. Most show only a few incomplete series of dark "water-soaked" spots on the elytra, but two specimens have all series virtually complete along the obsolete striae.

MALE GENITALIA: Lateral lobes not more than half as long as median lobe and terminating in a lateroventral papilla that bears a single distinct short seta at its base (figs. 24-26). Apex of median lobe rounded but with a distinct angle ventrally (fig. 24). (Four specimens dissected.)

FEMALE GENITALIA: Apical margin of vulvar lobe obtuse-angularly concave; paraprocts relatively narrow and heavily sclerotized; coxites not distinctly concave on inner sides opposite vulvar lobe (fig. 34; cf. figs. 33, 35). (Eight specimens dissected.)

TYPE: Sex not determined; labeled "D. picea Lec., Cal., Type 6764" (collection LeConte, M.C.Z.).

TYPE LOCALITY: California.

GEOGRAPHICAL DISTRIBUTION: Known only from California and Nevada. (See Appendix for locality data.)

MATERIAL EXAMINED: Nineteen specimens.

Dacne (*Xenodacne*) cyclochilus Boyle, 1954

Dacne cyclochilus BOYLE, 1954b, p. 51.

DIAGNOSTIC DESCRIPTION: Color ferruginous or brownish red, with the elytra vaguely subvittate (similar to that of *picea* but less variable). Sides of body evenly arcuate, the pronotum similar to that of *pubescens* (fig. 11), its sides rather straight and moderately convergent anteriorly; sides of head in front of eyes strongly indented at antennal insertions, the epistoma transversely elliptical and depressed laterally, separated from the front by an entire, transverse suture (fig. 13). Scutellum similar to that of *picea* (fig. 10). Antennal club similar to that of *californica* (fig. 5), with segment 8 likewise widened and participating in formation of club. Prosternal lines not extending in front of coxae, posteriorly strongly divergent and enclosing a distinctly bilobed prosternal process (fig. 16). Lateral margins, or beads, of pronotum weakly thickened anteriorly in dorsolateral view (fig. 9). Elytra distinctly margined basally, as in *picea* (fig. 10). Punctuation and pubescence similar to those of *picea*, the body above essentially glabrous.

MEASUREMENTS OF TYPE: Length, 2.90 mm.; width, 1.24 mm.

VARIATION: The observed size range, in millimeters, is 2.19 long by 0.92 wide to 3.59 long by 1.47 wide. Both specimens showing these extremes are females. Nearly all specimens are similar in color; a few teneral, however, are yellowish.

MALE GENITALIA: Lateral lobes less than half as long as median lobe, somewhat depressed or flattened, each bearing a medio-terminal papilla surrounded by five or six setae (figs. 22, 23). Median lobe (fig. 21) with sclerotized portion evenly rounded apically, lacking the more or less strong ventro-terminal angle of *picea* and *pubescens* (figs. 24, 27). (Four specimens dissected.)

FEMALE GENITALIA: Apical margin of vul-

var lobe truncate to faintly bilobed; paraprocts relatively wide and weakly sclerotized; coxites not distinctly concave on inner sides opposite vulvar lobe (fig. 33; cf. figs. 34, 35). (Four specimens dissected.)

TYPE: Female, labeled "Alta, Ut., VI-28, Hubbard & Schwarz; *Dacne cyclochilus* Boyle, holotype" (U.S.N.M. No. 61978).

TYPE LOCALITY: Alta, Salt Lake County, Utah.

GEOGRAPHICAL DISTRIBUTION: Known only from Utah and California. This species appears to be more abundant than either *picea* or *pubescens*, it having been taken several times in large series. (See Appendix for locality data.)

MATERIAL EXAMINED: Two hundred and eighty-eight specimens.

***Dacne (Xenodacne) pubescens*, new species**

DIAGNOSTIC DESCRIPTION: Color ferruginous, with the elytra often vaguely subvittate (similar to that of *picea* in all respects). Sides of body distinctly obtuse-angular in profile at widest point across elytra, the elytral sides straight and convergent anteriorly and posteriorly for some distance from this point; pronotal sides almost straight, moderately convergent anteriorly (fig. 11); sides of head in front of eyes straight, strongly convergent anteriorly (fig. 12), with frontal region bearing a very shallow, irregular, W-shaped impression between antennal insertions which is more distinct than in *picea* and apparently always present. Scutellum subcircular, its width less than 1.5 times its length (fig. 11). Antennal club slightly asymmetrical, intermediate in shape between that of *quadrinaculata* (fig. 4) and *californica* (fig. 5), the stem more slender than in *picea* or *cyclochilus*. Prosternal lines long, narrowly separated anteriorly (fig. 15). Lateral margins, or beads, of pronotum moderately thickened anteriorly (fig. 8). Elytra without distinct basal margins (fig. 11), at most displaying a trace of the submarginal striae near each humeral callus. Punctures much smaller and considerably denser than in *picea* or *cyclochilus*, those of elytra especially minute and entirely confused. Pubescence apparent, the setae distinctly exceeding the punctures on body above and below. Males usually immediately

recognizable by the fact that the lateral lobes of the tegmen protrude beyond the apices of the abdomen and the elytra.

MEASUREMENTS OF TYPE (IN MM.): Length, 3.04; width, 1.38; width of pronotal base, 1.12; median pronotal length, 0.75; width at extremities of pronotal apical angles, 0.83; width of head at eyes, 0.76; interocular width of vertex, 0.54; length (horizontal diameter) of eye, 0.21.

VARIATION: The observed size range, in millimeters, is 2.37 long by 1.07 wide to 3.63 long by 1.63 wide. Color variation is quite like that in *picea*.

MALE GENITALIA: Lateral lobes at least two-thirds of the length of median lobe, fully half again as long as those of *picea* or *cyclochilus* (figs. 28, 29; cf. figs. 22, 23, 25, 26). The lateral lobes are so long that they seemingly cannot be wholly retracted into the abdomen; in all known male specimens examined these structures were protruding beyond the abdomen and elytra for about one-third of their length. Median lobe (fig. 27) distinctly straight ventrally for more than half of its length, more strongly angulate ventro-apically than in *picea* (fig. 24). (Four specimens dissected.)

FEMALE GENITALIA: Apical margin of vulvar lobe deeply acute-angularly concave; paraprocts relatively narrow and strongly sclerotized; coxites usually distinctly concave on inner sides opposite vulvar lobe (these concavities shown by broken lines in fig. 35). The entire structure beyond segment 9 is relatively elongate in this species (fig. 35; cf. figs. 33, 34). Some specimens do not show the concavities on the inner faces of the coxites; perhaps this depends on the condition of these structures at the death of the individual. (Four specimens dissected.)

TYPE: Male; labeled "Fallen Leaf L., L. Tahoe, Cal., VI-20-1915; holotype, *Dacne pubescens* Boyle" (collection Van Dyke, C.A.S.).

TYPE LOCALITY: Fallen Leaf Lake, near Lake Tahoe, El Dorado County, California.

PARATYPES: *California*: Southern California (LeConte; collection A. Bolter, I.N.H.S.), one. El Dorado County: Same data as type (collection Van Dyke, C.A.S.), three. Fresno County: Badger Flat, Huntington Lake,

June 27, 1948 (A. T. McClay; collection A. T. McClay, U.C.D.), 78. Shasta County: Manzanita Lake, Lassen Volcanic National Park, May 25, 1941 (P. D. Hurd; collection U.I.), two. Siskiyou County: July (collection Koebele, C.A.S.), one. Tulare County: Colony Mill, May 10, 1905 (collection R. Hopping, C.A.S.), one; Round Meadow, Giant Forest, Sequoia National Park, June 16 (R. Hopping; collection R. Hopping, C.A.S.), one.

GENUS *MICROSTERNUS* LEWIS

Microsternus LEWIS, 1887, p. 3, fig. 1. Genotype: *Megalodacne ulkei* Crotch, 1873a, p. 353, by original designation.

DIAGNOSTIC DESCRIPTION: Mesosternum (fig. 42) extremely short and transverse, its intercoxal width around 10 times its length (whence the generic name). Prosternum bearing a broad, flattened, campanulate plateau that almost attains the apex in front and virtually abuts the middle coxae behind; the front and middle coxae thus close together longitudinally but widely separated transversely (fig. 42). Metasternal coxal lines present but short (fig. 42); abdominal coxal lines entirely absent. Tarsi with the three basal segments bearing distinct ventral pads. Eyes coarsely faceted (pl. 8, fig. 2). Maxilla with lacinia and galea each terminating in a brush of flattened or thickened setae interspersed with a few much slenderer setae (fig. 59; the finer setae not shown). Pronotum immarginate apically and on basal lobe, its lateral margins strong, widest at apical angles.

OBSERVED SIZE RANGE: (See variation under *M. ulkei*).

MALE AND FEMALE GENITALIA: (See descriptions under *M. ulkei*).

WORLD DISTRIBUTION AND SIZE: A small genus, *Microsternus* comprehends only 10 species at the present time, and these apparently exhibit a relict distribution. One is Nearctic (eastern North America), four are Palearctic (Japan), four Oriental (India, French Indo-China, Sumatra, Java), and one is Australian (Queensland).

BIOLOGY: Virtually nothing is known about the biology of the various species. Arrow (1925, p. 35) states that the Indian species *cribricollis* was collected from a fungus on dry wood. The immature stages are unknown.

Microsternus ulkei (Crotch), 1873

Megalodacne ulkei CROTCH, 1873a, p. 353.

Microsternus ulkei (Crotch), LEWIS, 1887, p. 3.

DIAGNOSTIC DESCRIPTION: Color piceous, the elytra and lateral fourths of abdomen brownish red; each elytron bearing four piceous spots: a circular one about one-third as wide as elytral base on humeral callus, two of similar size and shape side by side one-third behind elytral base, and one transverse and twice as large about one-third before elytral apex. Shape elongate-oval or roughly ellipsoidal, the length approximately 2.2 times the width, the body widest at about one-fifth of the elytral length behind base; pronotum widest basally, its sides moderately, evenly convergent to apex (fig. 42). Antennae one-fifth longer than width of head at eyes, the club three-segmented, symmetrically oval, almost twice as long as wide; antennal segment 3 much shorter than segments 4 and 5 together, scarcely longer than segment 4 alone. Head with epistomo-frontal sutures impressed on upper surface and ventrally bearing a deep fovea on each side of gula, each fovea transversely oval and bearing several strong, porrect setae along its posterior edge. Cephalic stridulatory files absent in both sexes. Prosternal lines strong, extending almost to apex and enclosing a flat, elevated, campanulate prosternal plateau (fig. 42). Mesosternum extremely short and transverse, its intercoxal width about 10 times its length (fig. 42). Metasternal coxal lines distinct but short (fig. 42); abdominal coxal lines entirely absent. Punctuation generally coarse, especially so on proepisternal areas; punctures of head moderately coarse and sparse; pronotal punctures sparse medially and denser laterally, becoming progressively larger and flat-bottomed posteriorly, the basal lobe and an equal-sized area anterior to it virtually impunctate, the large pronotal punctures adjacent to this smooth area distinctly horseshoe-shaped, their open sides directed posteriorly; elytral punctures of moderate size and disposed in even striae rows, the intervals sparsely punctulate. Elytra immarginate basally. Body glabrous except on abdomen where the setae are very short.

VARIATION: The observed size range, in

millimeters, is 3.86 long by 1.79 wide to 4.90 long by 2.21 wide. Some specimens, probably tenerals, are almost uniformly reddish yellow, with faint elytral spots; others are much darker and show a stronger difference in color between the elytra and the rest of the body, with the elytral spots likewise more distinct.

MALE GENITALIA: The tegmen (figs. 40, 41) bears two dorsal struts, two lateral struts, and two short, setigerous lateral lobes. The dorsal struts widen anteriorly into two lightly sclerotized, widely separated plates that extend down and around, but do not fuse with, the lateral struts. The latter extend anteriorly in two strong arms which encircle the base of the median lobe. The dorsal and lateral struts of each side widen distally into a common plate to which is articulated the lateral lobe. The median lobe (fig. 39) is compressed, curved in its basal third, straight along its apical two-thirds, and has the ventral wall most strongly sclerotized. It bears a longitudinal, trough-like impression along the straight portion of the dorsum, and the median orifice opens along the obliquely truncate apex. What appears to be a bit of the internal sac is usually seen protruding here. The median strut is almost twice as long as the median lobe. It is strongly widened anteriorly and is distinctly bipartite in dorsal or ventral view. The internal sac (fig. 39) is interestingly modified. The sac itself is depressed, or dorso-ventrally flattened, and is only a little shorter than the median lobe. The strongly sclerotized flagellum is formed in the ventral wall, which is strongly bowed upward and results in the sac's being trough-shaped ventrally. The flagellum extends posteriorly approximately to the median foramen of the median lobe and bears a strongly sclerotized, firmly united wing on each side anteriorly. The free portion of the ejaculatory duct within the anterior portion of the internal sac is about one-fifth of the length of the flagellum, and it is so intimately attached to the base of the latter that separation of the two structures in dissections is difficult. Two accessory sclerites are found in the dorsal wall of the internal sac—a rectangular one anteriorly and a larger cordate one posteriorly (fig. 39). The nodular muscle attachment at the anterior end of the internal sac extends laterally on

each side in a short arm. (Seven specimens dissected.)

FEMALE GENITALIA: Dorsal and ventral views of the female terminalia are presented (figs. 37, 38). Appendages of the ninth segment bear the full complement of parts, i.e., valvifers, divided coxites, and styli are all present. Dorsal baculi are apparently absent, but each valvifer bears a strong, short ventral baculum. The ventral baculum of each side articulates to the strongly sclerotized anteroventral margin of the basal segment of the coxite (fig. 38). Styli are attached to the elongate distal segments of the coxites, and the latter lie crossed over one another when segments 9 and 10 are withdrawn into the abdomen. The narrow paraprocts widen distally into a very broad, apically bilobed procitigeral lobe which bears a few setae subterminally (fig. 37). The ninth segment is entirely membranous, and the eighth sternite sends forth a strong apodeme which is some four to five times as long as itself. (Two specimens dissected.)

BIOLOGY: No biological data have been seen on labels.

TYPE: Not seen; presumably in Crotch's collection at the Cambridge Zoological Museum (Horn and Kahle, 1935–1937, vol. 2, p. 48). The type material was collected and presented to Crotch by Henry Ulke.

TYPE LOCALITY: Kentucky.

GEOGRAPHICAL DISTRIBUTION: Known only from Kentucky, Ohio, Pennsylvania, Maryland, and North Carolina. It would seem likely that it occurs in Virginia and West Virginia also. This form appears to have a relict distribution as a species. The only Nearctic representative of a widely distributed genus, it is extremely limited geographically in North America and is not common where it does occur. (See Appendix for locality data.)

MATERIAL EXAMINED: One hundred and five specimens.

GENUS *MEGALODACNE* CROTCH, 1873

Megalodacne CROTCH, 1873a, p. 352. Genero-type: *Ips fasciata* Fabricius, 1777, p. 213, by original designation.

DIAGNOSTIC DESCRIPTION: Color black, with two dentate elytral fasciae reddish yel-

low—a subbasal one extending forward and isolating a black spot on each humeral callus and partially surrounding a black rectangular spot behind and including the scutellum, and a second one located about one-third of distance before elytral apex; both fasciae interrupted at the suture approximately between the first striae. Punctuation greatly reduced, the body above and below with at most sparse punctules except in basal impressions of pronotum (figs. 52, 53); that portion of head inserted in prothorax densely punctate, contrary to usual condition. Pubescence weak, the body glabrous above, but pterothorax and abdomen below bearing short, fine, sparse setae; tibiae usually bearing moderately strong golden setae but often appearing to have been rubbed smooth. Pronotum margined laterally, immarginate apically and basally (figs. 52, 53). Elytra immarginate basally. Prosternum simple, the prosternal lines scarcely extending in front of coxae, the intercoxal or prosternal process weakly bilobed basally. Mesosternum subquadrate, at most twice as wide as long. Metasternal and abdominal coxal lines obsolescent, often entirely absent. Tarsi with the three basal segments bearing distinct ventral pads. Eyes finely faceted (pl. 8, fig. 1), their posterior edges shallowly concave under pronotal apical angles. Short, deep antennal grooves present between ventral edges of eyes and strongly carinate sides of oral cavity. Maxillary galea and lacinia unarmed, each terminating in a brush of slender setae (fig. 57).

OBSERVED SIZE RANGE: The two Nearctic species display a range in length of 9.8 to 22.0 mm. The next largest North American dacnine, *Microsternus ulkei*, has not been observed to exceed 4.9 mm. in length.

MALE GENITALIA: The aedeagus (figs. 45–49) is very similar to that of *Microsternus ulkei* (figs. 39–41), but striking differences are seen in the nature of the internal sac. In *Megalodacne* the free portion of the ejaculatory duct within the internal sac is an extremely long, slender, heavily sclerotized, arcuately curved tube (indicated by a broken line in fig. 45) which extends into the base of the median lobe. There is no modification of the ventral wall of the sac into a flagellum as is the case in *M. ulkei*, but two long, nar-

row sclerites are present in the dorsal wall of the sac (fig. 45). These extend into the base of the median lobe where their apices appear to straddle the longitudinal, V-shaped sulcus along the dorsum of the median lobe. Figure 45 includes a dorsal view of the internal sac partially withdrawn from the median lobe in order to show these sclerites in their entirety. One is impressed with the possible homology of these sclerites with the cordate posterior sclerite present in the dorsal wall of the internal sac in *M. ulkei* (fig. 39). The nodular muscle attachment at the base of the internal sac is much reduced in *Megalodacne*.

FEMALE GENITALIA: As in the case of the aedeagus, the female terminalia (figs. 43, 44, 50, 51) are very like those of *Microsternus* (figs. 37, 38). The following differences, however, are worthy of note: In *Megalodacne* the membranous ninth segment appears as if divided into two parts by the development of an accessory line of folding across its middle. The widened basal part of segment 9 is strengthened by a pair of lightly sclerotized straps in both its dorsal and ventral walls. These straps are attached to the posterior edges of the eighth tergite above and the eighth sternite below. The entirely membranous distal portion of segment 9 is lightly and uniformly brown-pigmented by the presence of dense, minute setae that are visible only at magnifications of 50 times or more; this condition is not shown in the drawings. When the terminal structures are completely withdrawn into the abdomen the basal part of segment 9 is invaginated (intussuscepted) into segment 8, and the valvifers come to lie well in front of segment 8, with the wholly membranous apical half of segment 9 wrapped around them. At this time the coxites lie inside the widened basal part of segment 9 which in turn is surrounded by segment 8. The elongate distal segments of the coxites apparently do not cross over each other when retracted as they do in *Microsternus*. The proctigeral lobe bears no subterminal setae as is the case in *Microsternus*, but in both genera the anus opens at the base of this structure (beneath it) midway between the apices of the valvifers. Drawings of the female terminalia of *fasciata* are presented by Tanner (1927, pl. 9, figs. 107, 108), but these do not agree in some re-

spects with those presented here (figs. 43, 44). Tanner indicates the location of the anus as being at the apex of the proctigeral lobe and fails to show the dual nature of segment 9.

WORLD DISTRIBUTION AND SIZE: Some 61 species are included in *Megalodacne* at the present time. Of these, two are Nearctic, five Neotropical, two Palearctic, 27 Ethiopian, 23 Oriental, and two Australian.

BIOLOGY: (See under the species).

The genus *Megalodacne* has been divided into several subgenera by Heller (1918). Both North American species belong in the typical subgenus, of which *fasciata* is the subgeneric type.

KEY TO NEARCTIC SPECIES OF *Megalodacne*

- Pronotum transverse, its lateral margins wide (fig. 52); red color of subbasal elytral fascia attaining only the outer half of each elytral base *fasciata* (p. 90)
 Pronotum subquadrate, its lateral margins narrow (fig. 53); red color of subbasal elytral fascia attaining most of each elytral base, almost touching scutellum on each side . . . *heros* (p. 91)

Megalodacne fasciata (Fabricius, 1777)

Ips fasciata FABRICIUS, 1777, p. 213.

Erotylus bifasciatus OLIVIER, 1791, p. 433.

Engis fasciata (Fabricius), FABRICIUS, 1801, vol. 2, p. 582.

Dacne fasciata (Fabricius), LATREILLE, 1804, p. 14.

Megalodacne fasciata (Fabricius), CROTCH, 1873a, p. 353.

DIAGNOSTIC DESCRIPTION: Color black, with two broad, dentate, elytral fasciae reddish yellow, the subbasal fascia extending forward and isolating a circular black spot on each humeral callus and attaining the base of each elytron only along the outer half. Shape rather evenly elliptical, the body scarcely more pointed behind than in front and not distinctly widest near elytral base, the elytral sides subparallel for most of their length, the length of body about 2.25 times the width; pronotum (fig. 52) transverse, almost twice as wide as long, its lateral margins strongly swollen and as wide as basal antennal segment. Elytra with striae punctures small but distinct along first three or four striae near the base, the intervals minutely punctulate. Elytral base immarginate. Sexual dimorphism present, the males with

epistomal apex transverse-rectangularly emarginate and the three basal tarsal segments widened; females with epistomal apex arcuately concave and the three basal tarsal segments narrower. Cephalic stridulatory files absent in both sexes.

VARIATION: The observed size range, in millimeters, is 9.8 long by 4.3 wide to 15.5 long by 7.1 wide. As is the case in *heros*, the elytral fasciae are so dark in a few specimens, presumably older adults, that they are not apparent at first glance.

MALE GENITALIA: Median lobe, median strut, and internal sac (fig. 45) not distinctly different from those of *heros*. Tegmen (figs. 46, 47) bearing relatively long lateral lobes, the tegminal arms in lateral view (fig. 47) weakly sigmoid, not strongly arched downward anteriorly. (Eight specimens dissected.)

FEMALE GENITALIA: Paraprocts gradually widening and becoming less sclerotized near base of proctigeral lobe (fig. 43); eighth tergite evenly sclerotized, with relatively wide sclerotized straps appendant to posterior edge (fig. 43); dorsal baculi of valvifers distinctly wider and angularly bent near middle (fig. 44; cf. these structures in *heros*, figs. 50, 51). (Six specimens dissected.)

BIOLOGY: Beutenmüller (1890) states that the larva "lives in numbers in fungus found on stumps and decaying trees." That this species overwinters in the adult stage is indicated by the fact that adults have been collected in midwinter in the northeastern United States. Biological data appearing on labels are as follows: [on] *Taxodium distichum*, Apalachicola, Florida; [in] apple stump, Barry, Illinois, March 27, 1924; in light trap, Urbana, Illinois, July 10, 1937, and June 17, 1938; at sugar, Galesburg, Illinois, June 16, 1910; collected in sod, Knox, Indiana, August 13, 1912; [on] *Quercus nutalli*, Rolling Fork, Mississippi, September–October, 1932; [at] light, Webster Groves, Saint Louis, Missouri, June 21, 1923; [in] stump, Dudley, Missouri, March 24, 1919; under bark old stump, Elyria, Ohio, May 6, 1928; [on] bracket fungus on red oak, Pennsylvania State College Laboratory, Bustleton, Pennsylvania, May 1, 1922; and the following notes, all on specimens taken at Victoria, Texas: in dead hackberry log, January 11, 1917; under bark, February 25, 1908, and March 17, 1913; in

rotten log, March 23, 1916; on *Xanthoxylum clava-herculis*, March 28, 1911; hibernating under bark [no date].

PUBLISHED ILLUSTRATIONS: An excellent figure of the adult is presented by Froeschner and Meiners (1953, p. 22, fig. 4). The larva (questionably: "fasciata F?") is figured by Böving and Craighead (1930-1931, p. 39, pl. 42, figs. A-J). It is also described and figured by Candèze (1861, pp. 69-70, pl. 6, figs. 6, 6a, 6b). Arrow (1925, p. 7, fig. 4) presents a figure of "a North American species of *Megalodacne*" that agrees well with larval specimens of *fasciata* at hand.

TYPE: Not seen. If still extant the type material is probably in Fabricius' collection in the Zoological Museum of the University of Kiel, but possibly it is in one of the several other European collections mentioned by Horn and Kahle (1935-1937, vol. 2, p. 71) that contain Fabrician types.

TYPE LOCALITY: North America.

GEOGRAPHICAL DISTRIBUTION: Eastern North America from Florida to Connecticut, New York, and Ontario, westward to Minnesota, Iowa, Colorado, and Texas. It also ranges down the Gulf coast of Mexico for an unknown distance, as Gorham (1887-1899, p. 34) reports it from Córdoba [Cordoba], Veracruz. Five specimens from Colorado (four from Denver and one "Colo.") are the only material seen that was collected west of the 100th meridian. (See Appendix for locality data.)

MATERIAL EXAMINED: One thousand two hundred and fifty-two specimens.

***Megalodacne heros* (Say, 1823)**

Engis heros SAY, 1823 (1823-1825), vol. 3, p. 196.

Dacne heros (Say), LACORDAIRE, 1842, p. 67.

Megalodacne heros (Say), CROTCH, 1873a, p. 353.

DIAGNOSTIC DESCRIPTION: Color black, with two broad, dentate elytral fasciae reddish yellow, the subbasal fascia extending forward and isolating a crescent- or comma-shaped black spot on each humeral callus and narrowly inward along each elytral base almost to scutellum, thus leaving a transverse, rectangular black spot narrowly joined to the black pronotum mostly by the black scutellum. Shape subcuneate, the body considerably more pointed behind than in front and distinctly widest just behind elytral base, the

elytral sides converging posteriorly to lend a somewhat wedge-shaped appearance, the length of body about 2.6 times the width; pronotum (fig. 53) subquadrate, scarcely wider than long, its lateral margins narrow and not more than half as wide as basal antennal segment. Elytra entirely smooth, the obsolete stria punctures sometimes indicated by minute piceous dots. Elytral base immarginate. Sexual dimorphism present: the males with last abdominal segment strongly carinate apically, hind tibiae bearing denticles on ventral faces, and the three basal tarsal segments somewhat widened; females with last abdominal segment bearing two shallow impressions but non-carinate apically, hind tibiae lacking denticles on ventral faces, and the three basal tarsal segments narrower. Cephalic stridulatory files present only in males, these short, broad, anteriorly convergent, and covered entirely by pronotum.

VARIATION: The observed size range, in millimeters, is 14.0 long by 5.5 wide to 22.0 long by 8.5 wide. The smallest specimen is a female, the largest a male. Occasional specimens, possibly overwintered adults, exhibit very dark elytral fasciae that are distinct to the unaided eye only in good light.

MALE GENITALIA: Median lobe, median strut, and internal sac similar to those of *fasciata* (fig. 45). Tegmen (figs. 48, 49) bearing relatively short lateral lobes, the arms in lateral view (fig. 49) strongly sigmoid, sharply arched downward. (Two specimens dissected.)

FEMALE GENITALIA: Paraprocts suddenly widening and abruptly terminating near base of proctigeral lobe (fig. 50); eighth tergite bearing a V-shaped membranous emargination anteromedially, with relatively narrow sclerotized straps appendant to posterior edge (fig. 50); dorsal baculi of valvifers virtually straight, not widened or angularly bent near middle (fig. 51); dorsal vulvar lobe present as a median terminal structure (figs. 50, 51; cf. these structures in *fasciata*, figs. 43, 44). (Two specimens dissected.)

BIOLOGY: The habits of this species have been studied by Park and Sejba (1935). Inasmuch as *M. heros* is the only North American erotylid the habits of which have been noted in any detail, it appears desirable to present a résumé of these authors' findings here.

Nocturnal in habit, the adults were found to congregate in numbers during the daylight hours and to rest quietly in shelter niches located from several inches to 25 feet or more from the nightly feeding grounds. These shelter niches were located either in fungi or under bark or decaying wood near fungi, and in them the adults were sometimes piled upon one another three or four deep. At dusk (that time when a flashlight was necessary to observe marked individuals) the beetles promptly moved from their hiding places to feed upon fungi. Although individuals varied in their feeding habits, the group tendency was to feed for an hour or so at dusk from about eight to nine o'clock, to undergo a less intense feeding period of similar duration at 11 P.M. to midnight, and to perform a still weaker feeding activity at 2 A.M. to 4 A.M. At dawn the majority had retired to the shelter niches for the day.

The authors offer evidence that this daily cycle of activity is "inherent," i.e., that it is not stimulated by the environmental factors of light, temperature, or humidity. Individuals placed in cabinets under conditions of total darkness and with temperature and humidity maintained within narrow limits continued to exhibit essentially the same periodicity of activity. The insects were given fresh fungi in dark, moist containers between the 24-hour test periods. Interestingly enough, when groups of seven to 11 beetles were placed in a single cabinet under the same conditions the amount of activity (measured in minutes by a special apparatus) was reduced to about a third of that displayed by isolated individuals.

This species was observed to be non-specific in its choice of fungus food. Although most feeding was done on a small patch of soft, velvety fungus of undetermined species (growing on the observation log), some feeding was done on *Fomes applanatus* and a species of *Pezizia*. It is stated that feeding is also common on *Polyporus* species and other fungi.

The authors found *heros* to be susceptible to adverse conditions. In most cases starvation or over-stimulation proved fatal in from 72 to 96 hours, while in other animals previously tested death came only after two weeks in total darkness without food. On the other hand, 32 out of 34 beetles given their

normal food and kept in dark, roomy, humid containers remained normally active at night, feeding and copulating, for three months.

Park and Sejba's description of the copulatory act indicates that the tegmen of the aedeagus is oriented dorsally with respect to the median lobe at this time: "In copulation the male normally mounts the female directly from the rear, climbs to the latter's elytra and clasps them firmly with the mesothoracic legs, the metathoracic legs being used as accessory clasping organs, or trailing limply behind. The male's intromittent organ [the median lobe] is exerted slowly, curved downwards and usually inserted from the left side into the female's genital pore. After insertion of its apex, the abdomen of the female is extended rapidly posteriorly and envelops the intromittent organ."

Smyth (1934, p. 12) says of *heros*: "Doctor Blatchley [1910, *Erotylidae*, pp. 539-549], in his *Coleoptera of Indiana*, says of this beetle: 'Much less common than *fasciata* and seldom more than two or three found together.' The only time I have found it, however, it was in some numbers. On June 15, 1926, in a small wood at Springfield, a suburb of Philadelphia, Pa., 58 specimens were collected within a small space on polyporous fungi on the underside of a decaying log, and four days later 9 additional specimens were found on the same log. Efforts to find the larvae or pupae were not successful, however."

The following are biological data observed on labels: under bark, Urbana, Illinois, June 30, 1922, and June 16, 1926; *ex Ganoderma applanatus*, Plummer Island, Maryland, August 23, 1924 (mature larvae); on *Castanea dentata* and on *Quercus*, Tryon, North Carolina; on *Tsuga*, Charteroak, Pennsylvania, May 25, 1913; [on] *Liriodendron tulipifera*, reared September 5, 1916, West Falls Church, Virginia.

PUBLISHED ILLUSTRATIONS: The adult is figured by Comstock (1947, p. 509, fig. 608) and by Wickham (1894, p. 341, fig. 60).

TYPE: Not seen; presumably destroyed with Say's collection.

TYPE LOCALITY: Missouri River.

GEOGRAPHICAL DISTRIBUTION: North America east of the 100th meridian from Florida to Connecticut, New York, Quebec, and Ontario, west to Minnesota, Illinois,

Oklahoma, and Texas. (See Appendix for locality data.)

MATERIAL EXAMINED: Six hundred and seventy-three specimens.

SUBFAMILY EROTYLINAE CROTCH, 1873

Erotylides CROTCH, 1873a, p. 358.

Erotylini genuini LACORDAIRE, 1842, p. 243, in part.

A single species represents this subfamily in the North American fauna, and this is a relatively large form with an observed range in length of approximately 12 to 20 mm. It is approached in size only by our two species of *Megalodacne*, which are much different in external appearance.

DIAGNOSTIC DESCRIPTION: Mentum of moderate size and triangular, its basal width approximately equal to the median length (fig. 67). Maxillary and labial palpi somewhat reflexed, their terminal segments widened and triangular or transversely oval (figs. 66, 67). Lacinia of maxilla bearing two stout teeth (fig. 66). Tarsi cryptopentamerous, i.e., segment 4 strongly reduced, firmly united to base of segment 5, and attached mediodorsally to segment 3 (fig. 2). Tibiae generally not dilated apically (fig. 54).

It has been customary to note the two stout terminal teeth of the lacinia as a prime characteristic of this subfamily, but a similar character, although not so strongly developed, may be seen in the aberrant genus *Dacne* in the Dacninae (fig. 55) and in most genera of the subfamily Triplacinae (figs. 68, 70, 133). Perhaps the most concrete difference in the mouth parts between this subfamily and the Triplacinae lies in the nature of the basal segment of the maxillary palpus; in the Erotylinae this is not elongate (fig. 66); in the Triplacinae this is as long as or longer than segments 2 and 3 together (figs. 68, 70, 105, 127, 133).

GENUS CYPHEROTYLUS CROTCH, 1873

Cypherotylus CROTCH, 1873a, p. 358. Generotype: *Chrysomela gibbosa* Linné, 1763, p. 10, by original designation.

DIAGNOSTIC DESCRIPTION: Color generally black, with the elytra ochreous and bearing many black impressed spots, these confluent in some regions to form larger spots of various shapes. Shape relatively broadly oval,

the length less than twice the width; pronotal width scarcely more than half of the combined elytral width. Head with sides indented above antennal insertions between which is present an entire, transverse epistomo-frontal suture. Pronotum irregularly impressed, entirely margined. Eyes finely faceted (pl. 8, fig. 1). Males bearing an asperate-pilose dot at middle of basal abdominal segment.

A few of the tropical species have the elytra peculiarly produced dorsally into angular, roof-like processes which occasionally assume the form of large spines. *Cypherotylus* species are very closely mimicked by species of the tenebrionid genus *Cuphotes* in the American tropics. (This mimicry is so striking, indeed, that the author was prompted to rush to his collection and determine the tarsal formula of all his *Cypherotylus* specimens immediately after having seen his first *Cuphotes*!) Arrow (1925, p. 14) cites this phenomenon among others as evidence that conspicuously colored erotylids enjoy immunity from predators because of offensive odors or taste. Perhaps the names of both genera were suggested to their authors by the nature of the elytral shape.

OBSERVED SIZE RANGE: The single Nearctic species ranges in length from 12.1 to 22.0 mm.

MALE AND FEMALE GENITALIA: (See descriptions under *C. californicus*).

WORLD DISTRIBUTION AND SIZE: *Cypherotylus* is a moderately large Neotropical genus, only one species of which ranges north of Mexico. Some 40 species are known at the present time.

***Cypherotylus californicus* (Lacordaire, 1842)**

Erotylus californicus LACORDAIRE, 1842, p. 467.

Cypherotylus boisduvali var. *californicus* (Lacordaire), CROTCH, 1873a, p. 358. New synonymy.

Cypherotylus aspersus GORHAM, 1888 (1887-1899), p. 108. New synonymy.

DISCUSSION OF SYNONYMY: Lacordaire described this species immediately following *boisduvali* Chevrolat, 1834 (1834-1835, fasc. 4), and adequately noted its differences from the latter. He based his description on two specimens from "Californie," but it appears that they must have been collected in one of the Rocky Mountain-Southwestern states

or possibly in adjacent northern Mexico, inasmuch as this form questionably occurs in present-day California (see geographical distribution below). Crotch considered the form in question to be only a race of *boisduvali*. Gorham (1887-1899, p. 106) followed Crotch's interpretation in synonymizing *californicus* with *boisduvali* but noted that the form occurring in the United States might possibly be specifically distinct. He then described a Mexican form under the name *aspersus* and relegated the United States population to varietal status thereof. From their descriptions it seems clear that both Lacordaire and Gorham were concerned with the same species and that this is distinct from *boisduvali*. Indeed, Gorham implies that *aspersus* is more closely related to *fenestratus* Gorham, 1888 (1887-1899, p. 107, pl. 5, fig. 22), than to *boisduvali*. Thirteen specimens of *boisduvali* from Mexico (Jálapa and unspecified localities) and Guatemala are readily distinguished from the large number of *californicus* at hand and show scant evidence of intergradation with the latter.

DIAGNOSTIC DESCRIPTION: Color black, the elytra sordid yellow to brown in pinned specimens, purplish in life, bearing numerous black, irregularly spaced impressions, these usually confluent to form a triangular black spot at middle of each elytral side and otherwise often confluent in groups of two or three, the elytra of preserved specimens thus strongly resembling an over-ripe yellow apple pitted with many decaying sunken spots; body entirely dull, not at all nitidous. Shape obovate, the length about 1.9 times the width, body widest near elytral middle or slightly behind, approximately at location of lateral elytral spots; elytra distinctly depressed above, i.e., flattened dorsally in lateral view, rather abruptly declivous in apical third, the common apex in dorsal view forming approximately a 90-degree angle; elytral bases immarginate, striae entirely obsolete although the spots tend to form straight rows near the suture. Pronotum entirely narrowly margined, the margin a bit narrower apically and basally; pronotum widest basally or rarely subbasally, its basal width some seven-tenths greater than apical width and two-thirds that of elytra at widest point, the sides evenly arcuate to almost

straight, moderately convergent to the rather prominent apical angles; pronotal disc irregularly shallowly impressed, moderately convex. Head lacking cephalic stridulatory files in both sexes. Antennae relatively long and slender, half again as long as width of pronotum at apex, the club four-segmented, bilaterally symmetrical, over three times as long as wide, emerging gradually from the stem; segment 8 triangular and participating in formation of club. Mentum triangular, approximately as long as wide (fig. 67); labial palpi with terminal segment asymmetrical, transversely oval (fig. 67); terminal segment of maxillary palpus widened, subtriangular (fig. 66); mandibles extremely short and stout, with a membranous, non-setigerous plug in the form of a rectangular solid occupying median third of inner side, the molar area concave and non-striate. Eyes finely faceted, obliquely truncate posteriorly. Prosternal lines, metasternal coxal lines, and abdominal coxal lines absent. Punctuation reduced, the abdomen scarcely and the head above moderately punctulate, the head densely so basally; entire body and elytra minutely alutaceous or granular in microsculpture. Pubescence reduced, the ventral surface with a few minute setae, the antennae, tibiae, and tarsi lightly to moderately setigerous. Sexual dimorphism present, the males bearing a small asperate-pilose spot at middle of basal abdominal segment. Distinguished from closest known relatives as follows: the pronotum of *fenestratus* is largely red, not entirely black; *boisduvali* has more convex, dorsally evenly arcuate, somewhat nitidous elytra bearing larger spots of an otherwise similar nature.

VARIATION: The observed size range, in millimeters, is 12.1 long by 6.2 wide to 20.0 long by 10.2 wide. Exact length and width measurements mean less than usual here because of the loose union of the body regions and the nature of the elytra; these latter are large and of thin construction, and they seldom fit snugly together in pinned specimens. Mean measurements, in millimeters, for 12 specimens (10 selected at random plus the largest and smallest already noted) are as follows: length, 15.4; width, 8.0; the mean length-to-width ratio is 1.93. The smallest specimen is a male, the

largest a female. Males are generally smaller than females in this species, but there is a very wide overlap in the size ranges of the sexes. A specimen taken near Douglas, Arizona, has only some 50 spots on each elytron, while all other specimens at hand show certainly twice that number or more. Occasional specimens do not exhibit the larger lateral elytral spots. As has been mentioned, the elytra are of an attractive purplish color in life but rapidly fade to a dirty yellow or brown after death. Eight specimens collected four years ago have not yet completely faded, their elytra being light purple; others taken just a year ago are completely discolored.

MALE GENITALIA: Median lobe large, apically produced into a strong hook-like structure (fig. 63). Median strut stout, relatively short, approximately four-fifths as long as median lobe. Internal sac short and narrow, protruding from median lobe no more than one-fourth of its own length. Free portion of ejaculatory duct within internal sac thick, heavily sclerotized, and long, extending almost to median orifice. (In fig. 63 the sclerotization of the median lobe is omitted in order to show the relationships of the internal sac and free portion of ejaculatory duct within.) Free portion of ejaculatory duct attached anteriorly to a yoke-shaped sclerite by a weakly sclerotized, flexible hinge at the base of which the fine ejaculatory duct enters the internal sac (fig. 63). It is not clear whether this U-shaped sclerite belongs to the free portion of the ejaculatory duct or is formed in the wall of the internal sac, nor is it clear whether or not it constitutes a muscle attachment for the internal-sac retractor. It is perhaps noteworthy that the very long free portion of the ejaculatory duct within the internal sac is a characteristic that this species has in common with the genus *Megalodacne* (fig. 45). Tegmen (figs. 64, 65) with arms of lateral struts long, thick, and firmly united anteriorly, bearing weakly sclerotized inner flanges. [Examination of the aedeagus of a specimen of *C. boisduvali* reveals no distinct differences between it and *californicus*.] (Five specimens dissected.)

FEMALE GENITALIA: Strikingly similar in general plan and in considerable detail to those of *Megalodacne* species (figs. 61, 62; cf.

figs. 43, 44, 50, 51). In all three of these species the ninth segment is divided into two parts by the development of an accessory fold across the middle, the basal part strengthened dorsally and ventrally by two pairs of lightly sclerotized straps attached to the posterior edges of the sclerites of segment 8, and the distal portion between the ends of the straps and the bases of the paraprocts entirely pigmented (this not illustrated) by dense short setae visible only at magnifications of 50 diameters or more. (Note that these conditions are present as well in all species of the subfamily Triplacinae following.) In *C. californicus*, however, the basal segments of the coxites are of different shape and orientation (fig. 62), and the apical segments of the coxites articulate more deeply between surrounding structures and have their inner, basal, membranous portions terminating in inwardly directed points which are visible near the apex of the vulvar lobe (fig. 62). Moreover, the vulvar lobe is sclerotized and angular, and the entire distal structure beyond segment 9 is shorter, more compact. (Three specimens dissected.)

BIOLOGY: Smyth (1934, p. 12, *boisduvali*) says of *californicus*: "This Erotylid is a beetle of such frail body structure that, unless pinned with the greatest care, it is very apt to be broken in doing so. It is an inhabitant of the Canadian Zone in the mountain ranges of the southwest. I at one time collected a very large number of them in one day, grouped about fungi on the undersides of decayed logs in a damp, shady spot among pine and alder trees in Oak Creek Canyon, south of Flagstaff, Arizona, in August, 1904."

Peterson (1951, pp. 190-191) states: "Larvae associated with fungi on fallen logs from Arizona."

The present author has observed this species to occur from the Transition to the Hudsonian Zones in the mountains of southern Arizona, its range apparently correlating well with that of the western yellow pine, *Pinus ponderosa*. Adults were observed wandering about singly in the heat of the mid-afternoon sun in Chiricahua National Monument, southeastern Arizona, at an elevation of about 6000 feet, in August. The gut content of a dissected specimen con-

sisted of bits of fungus-riddled, apparently coniferous wood. Labels are notably devoid of biological data, but one specimen was collected on cottonwood at Imuris, Sonora, Mexico, July 9, 1940.

PUBLISHED ILLUSTRATIONS: The adult is figured in color by Gorham (1887-1899, pl. 6, fig. 9, *aspersus*) and by Kuhnt (1909, pl. 1, fig. 3, *aspersus*). Essig (1926, p. 410, fig. 289, *aspersus*) presents a line drawing of the adult, but the elytra do not diverge apically as suggested by his drawing save in poorly pinned specimens. Gorham (*op. cit.*) also presents colored figures of the two close relatives of *californicus-fenestratus* (pl. 5, fig. 22) and *boisduvali* (pl. 5, fig. 23). Larval structures are figured by Böving and Craighead (1930-1931, pl. 41, figs. A-C, E, G, *aspersus*). In gross aspect the larva is similar to that of *Homoeotelus confusus* figured by these authors (pl. 41, fig. D), with urogomphi extremely long. The larva is described and figured *in toto*, with some structures enlarged, by Peterson (1951, pp. 190-191, fig. C53 B, *boisduvali*).

TYPE: Not seen. Lacordaire states that the only two specimens seen "belong to M. Dupont." The fate of the Dupont collection is accounted for by Horn and Kahle (1935-1937, vol. 2, p. 64).

TYPE LOCALITY: Lacordaire gave California as the origin of his type material, but the species probably does not occur in present-day California. Most likely his specimens were taken in Arizona, New Mexico, or adjacent northern Mexico.

GEOGRAPHICAL DISTRIBUTION: Wyoming, Colorado, Kansas, New Mexico, and Arizona southward into Mexico. Three specimens (two labeled "Cal.," and one, "Laurel Co., Cal.") seem highly questionable; the label "Cal." might easily be poor longhand for "Col." (Colorado). The Kansas records, however, appear unchallengeable. These include 11 specimens from five institutions and probably represent four different lots. (See Appendix for locality data.)

MATERIAL EXAMINED: Eight hundred and thirty-four specimens.

SUBFAMILY TRIPLACINAE BEDEL, 1867

Triplacides BEDEL, 1867, p. 15.

Erotylini engidiformes LACORDAIRE, 1842, p. 33, in part.

Erotylini genuini LACORDAIRE, 1842, p. 243, in part.

Tritominae ARROW, 1925, p. 68.

This, the second largest of the three subfamilies, contains 41 of the 50 known North American species of Erotylidae and six of the 10 genera. All of these forms are rather small, not more than 9 mm. in length.

DIAGNOSTIC DESCRIPTION: Mentum variable: strongly reduced or subobsolete (figs. 69, 72) to very large and pentagonal or subquadrate (figs. 107, 133). Maxillary palpi moderately to strongly reflexed, the basal segment equal to or longer than segments 2 and 3 together (figs. 68, 133), the terminal segment moderately to strongly widened (figs. 68, 73, 127). Labial palpi weakly (fig. 106) to rather strongly widened (fig. 133), generally securiform, apparently always bearing a single strong seta on outer side (figs. 69, 71, 106, 107, 128, 134). Lacinia of maxilla usually armed with two small, incurved teeth at apex (figs. 68, 133), these in most cases being so closely juxtaposed as to appear as one, the lacinia less often unarmed (figs. 105, 127). Tarsi cryptopentamerous, i.e., segment 4 greatly reduced, firmly united to base of segment 5 and attached mediodorsally to segment 3 (figs. 2, 3). Tibiae not dilated apically (fig. 54) to very strongly so (figs. 114, 120).

KEY TO NEARCTIC GENERA OF TRIPLACINAE

1. Eyes coarsely faceted, relatively large and protuberant (pl. 8, figs. 2, 3) 2
 Eyes finely faceted, relatively small (pl. 8, fig. 1) 3
2. Pronotum and elytra particolored, bearing a piceous or black pattern on a lighter background; prosternal lines short, not or scarcely incurved anteriorly (fig. 2) . *Ischyryus* (p. 132)
 Pronotum and elytra unicolorous, without pattern; prosternal lines long, distinctly incurved anteriorly (figs. 117, 118)
 *Pseudischyryus* (p. 128)
3. Prosternal lines long, either incurved anteriorly (fig. 3) or meeting at prosternal apex; elytra immarginate basally (fig. 11); body relatively broadly oval (fig. 3) . . . *Tritoma* (p. 117)
 Prosternal lines short, not or scarcely extending in front of inner coxal edges (fig. 2); elytra most often margined basally (fig. 10); body elongate-elliptical (fig. 2) 4
4. Pronotal angle pores large and conspicuous (figs. 101, 102); terminal segments of maxillary palpi strongly transverse, each bearing

- a distinct brush at apex, the postmandibular lobes strongly developed (figs. 2, 72-84) *Triplax* (p. 97)
- Pronotal angle pores small, inconspicuous; terminal segments of maxillary palpi no more than twice as wide as long, without apical brush (fig. 133), the postmandibular lobes poorly developed, usually not visible . . . 5
5. Color reddish yellow to bright orange-red, the scutellum, antennae, and legs black; pronotal apical margin entire or obsolescent at extreme middle. *Mycotretus* (p. 137)
- Color either entirely dull black or shining black with the elytra alone red; pronotal apex immarginate between eyes *Haematochiton* (p. 138)

GENUS **TRIPLAX** HERBST, 1793

Triplax HERBST, 1793, p. 146, pl. 49, figs. 13, n. Generotype: *Silpha russica* Linné, 1758, p. 360, by subsequent designation by Curtis, 1838 (1824-1840), vol. 15, p. 706.

On a basis of the world fauna it is possible that this genus is untenable as an entity distinct from *Tritoma*. Arrow (1925, p. 121) states: "The two types [*Triplax russica* (Linné) and *Tritoma bipustulata* Fabricius] are obviously widely separated and inevitably received different generic names, but the study of their allies in all parts of the world reveals that they are connected by a long series of intermediates, so that the dividing line becomes completely obliterated." However, no North American forms are known that are truly intermediate and not readily referable to one or the other of these genera. They are therefore treated as distinct taxa in this study.

DIAGNOSTIC DESCRIPTION: Shape elongate-elliptical (fig. 2), with sides subparallel and almost straight to evenly arcuate, the ends of body approximately equally parabolically rounded, the body rarely narrowly oval, i.e., somewhat more pointed behind than in front, the length usually more than 1.8 times the width; pronotum subquadrate to subtrapezoidal, its basal width rarely as much as 70 per cent greater than apical width; antennal length generally more than one-half of the width of pronotal base, the club relatively lax, its length two or more times its width, segment 3 of stem invariably shorter than segments 4 and 5 together (fig. 2); scutellum pentagonal, rarely subcordate; terminal segments of maxillary palpi weakly to strongly

widened, their width slightly less than two to four or five times their length (figs. 2, 68, 70, 72-84); mentum (figs. 2, 72-84) varying from small, vestigial, and elongate-triangular, to larger and pentagonal, its shape and size tending to be somewhat variable even among individuals of a species; tibiae weakly to rather strongly widened apically, the dorsal (outer) edge never thin and knife-blade-like apically; coxae narrowly separated, the abdominal intercoxal process narrow and strongly arcuate (fig. 2). Color similar to that of *Tritoma*, the elytra usually uniformly black, rarely fasciate, entirely red, or gradually lighter basally; prothorax usually reddish yellow, occasionally bearing piceous pronotal spots, rarely entirely piceous or black; pterothorax and abdomen below reddish yellow or piceous. Elytra margined or immarginate basally (as in *Dacne* spp., figs. 10, 11); cephalic stridulatory files present and alike in both sexes in those species with elytra basally margined (the files similar to those of *Dacne pubescens*, fig. 36), absent in the female in those species with elytra basally immarginate. Pronotum margined laterally and basally, immarginate medio-apically between the eyes; pronotal angle pores distinctly umbilicate, of moderate to large size (figs. 101, 102). Epistomal apex not entirely, narrowly margined (figs. 103, 104; cf. figs. 113, 115, 116). Eyes finely faceted (pl. 8, fig. 1). Terminal segments of maxillary palpi each armed with a distinct brush along its truncate apex (figs. 2, 68, 70, 72-84), the brush rarely largely retracted and visible only at extreme sides of the segment (e.g., in *festiva*, figs. 68, 72, and in *russica*, the European generotype). (Under the compound microscope a brush is seen to be composed of a uniseriate, even row of fleshy, cylindrical, finger-like processes, each of which bears numerous smaller, seta-like branches along its sides. These would appear to be specialized sense organs.) Galea subtriangular, sparsely setigerous on outer side of apex, densely so on inner side (figs. 68, 70). Lacinia densely setigerous and armed apically with two stout, black, inwardly curved teeth (figs. 68, 70). Terminal segments of labial palpi sparsely short-setigerous, each armed with a brush along its truncate apex (figs. 69, 71). (This brush is much smaller than that of the maxillary palpus and is scarcely visible

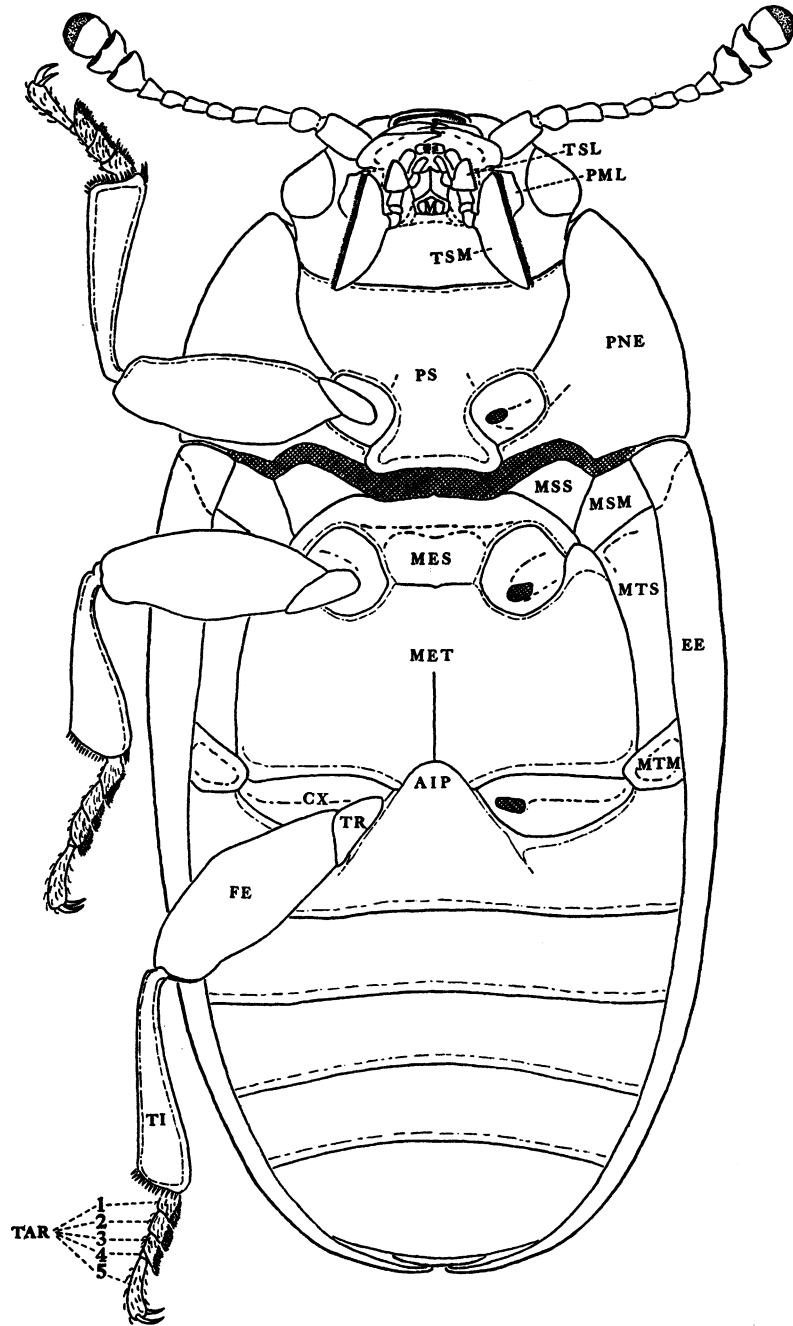


FIG. 2. *Triplax frosti* Casey, male, Itasca State Park, Minnesota, ventral view (length of body, 4.67 mm.). Abbreviations: aip, abdominal intercoxal process; cx, coxa; ee, elytral epipleuron; fe, femur; m, mentum; mes, mesosternum; met, metasternum; msm, mesepimeron; mss, mesepisternum; mtm, metepimeron; mts, metepisternum; pml, postmandibular lobe; pne, pronotal epipleuron; ps, prosternum; tar 1 to 5, tarsal segments 1 to 5; ti, tibia; tr, trochanter; tsl, terminal segment of labial palpus; tsm, terminal segment of maxillary palpus.

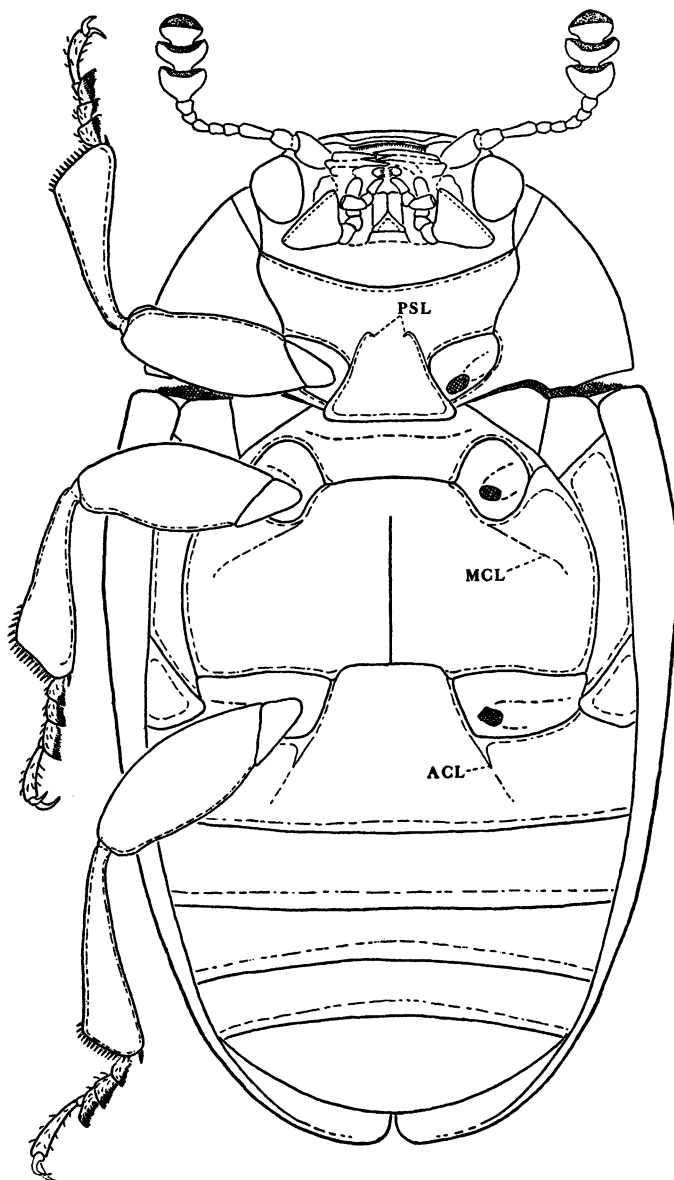


FIG. 3. *Tritoma biguttata* (Say), female, South Natick, Massachusetts, ventral view (length of body, 4.08 mm.).
 Abbreviations: acl, abdominal coxal line; mcl, metasternal coxal line; psl, prosternal lines.

under the binocular microscope. Under the compound microscope the brush is seen to be composed of a uniseriate row of short, cylindrical protuberances that are without seta-like branches along their sides, in contrast to those of the maxillary palpi.) Prosternal lines generally absent; when rarely present they are short, straight, not exceeding extreme

anterior edges of coxae. Metasternal coxal lines likewise generally absent, occasionally short, vestigial; abdominal coxal lines usually present (fig. 2). Secondary sexual characters apparently absent. (The tibiae of the males of some species have been reported to be distinctly more strongly widened apically, but any such difference appears to be too

slight to admit of certain sexual differentiation.)

OBSERVED SIZE RANGE: The range in length, all species included, is 2.28 to 6.49 mm. The size range of each species slightly to broadly overlaps that of every other species.

MALE AND FEMALE GENITALIA: (See descriptions under the species groups).

WORLD DISTRIBUTION AND SIZE: Approximately 117 species are recognized in the genus *Triplax* at the present time, exclusive of most known synonyms. Of these, 18 are Nearctic, six Neotropical, 49 Palearctic, 30 Ethiopian, 12 Oriental, and two are of uncertain origin. The genus is apparently unknown in the Australian region.

BIOLOGY: Bedel (1867, pp. 21-22) describes briefly the habits of European species. Scheerpeltz and Höfler (1948, p. 222, pl. 4, fig. 34) figure the adult of *russica*, the European generotype, in color. These authors also list the fungi on which it is found and present colored figures of them.

Favorite fungus hosts of *Triplax* species in North America are species of *Pleurotus*, a soft bracket fungus. Dr. G. E. Ball collected three species of *Triplax* together on the same sporophore of a *Pleurotus* species at Fort McMurray, Alberta, on July 2, 1952. The species were *dissimulator*, *frosti*, and *thoracica*. The author has taken *flavicollis*, *frosti*, and *thoracica* on a single sporophore of *Pleurotus* in the vicinity of Ithaca, New York. Collection data on specimens further suggest that two or more species are often taken together. Adults of the common species are seldom collected singly; they usually occur in groups. It is not uncommon to find 50 or 60 specimens feeding on a sporophore no larger than 3 or 4 inches in diameter.

INTRAGENERIC RELATIONSHIPS OF SPECIES: *Triplax* has been divided into a number of subgenera by Heller (1918). Inasmuch, however, as the present author is uncertain as to how the Nearctic forms fit into Heller's subgenera the North American species are divided into two "species groups," only for the sake of convenience, in this paper.

The 18 Nearctic species can be arranged in a linear series that indicates their taxonomic affinities rather well; they are so arranged on the following pages. Species group *macra* is placed first, more because it is closely related to (or includes) the generotype than because

it is considered primitive. Indeed, the strongly widened terminal segments of the maxillary palpi, the reduced mentum, the larger postmandibular lobes, and the somewhat more strongly dilated tibiae are all characters that could be considered derivative or specialized. *Triplax macra* closely resembles the generotype, *russica*, in color pattern and has been confused with the latter, hence is placed first. On the other hand, *festiva* agrees more closely with *russica* in having the brush on the terminal segment of the maxillary palpus largely retracted (figs. 68, 72).

Species group *thoracica* contains two rather distinct sub-groups of species, one of which agrees with species group *macra* in having the elytra margined basally and cephalic stridulatory files present and alike in both sexes. Of this sub-group, *mesosternalis* most strongly resembles species group *macra* in the shape of the pronotum, the size of the antennae, and the rather simple anterior end of the internal sac in the male genitalia (cf. figs. 85 and 94), hence is placed next after *marcescens*. Also in this sub-group, *errans* is so aberrant in the shape of the pronotum and in color pattern that it seems scarcely related to any other species; the anterior end of the internal sac of the male, however, suggests an affinity to *dissimulator* (cf. figs. 95 and 99); thus these two species are placed in juxtaposition.

The second sub-group in species group *thoracica* contains forms having the elytra basally immarginate and cephalic stridulatory files absent in the female. Of this sub-group, however, the closely related species *californica* and *antica* both bear vestiges of the basal elytral margin and short traces of cephalic stridulatory files in the female; they are thus somewhat intermediate between the two sub-groups and are placed next after *errans*. A study of figures 88 through 99 will reveal similarities in the anterior ends of the internal sacs that are more or less consistent with the linear arrangement of species on the following pages.

KEY TO NEARCTIC SPECIES GROUPS AND SPECIES OF *Triplax*

1. Sides of epistomo-frontal region of head strongly concave around antennal insertions, the epistomal sides strongly, narrowly margined, the apical angles sharp,

- approximately right-angular (fig. 103); antennae entirely black beyond segment 2, the stem clothed with moderately dense, coarse, black setae. species group *macra*, 2 (p. 102)
- Sides of epistomo-frontal region of head weakly concave around antennal insertions, the epistomal sides weakly, widely margined or immarginate, the apical angles weakly to strongly rounded, obtuse-angular (fig. 104); antennae not entirely black, at least part of the stem in addition to segments 1 and 2 lighter, the stem sparsely clothed with fine, light-colored setae . . . species group *thoracica*, 6 (p. 105)
2. Antennal club wide, segment 10 three times as wide as segment 7 3
Antennal club narrow, segment 10 no more than twice as wide as segment 7 4
 3. Elytra entirely black *macra* (p. 102)
Elytra black, with a reddish yellow fascia *festiva* (p. 103)
 4. Head above entirely reddish yellow
 *marcescens* (p. 105)
Head above mostly black, the base narrowly reddish yellow 5
 5. Strial punctures of elytra relatively small, not larger than those on prosternum, the striae unimpressed, the elytra moderately nitidous *frontalis* (p. 104)
Strial punctures of elytra extremely large, their diameters twice those of prosternal punctures, the striae distinctly impressed, the elytra dull, minutely granular in microsculpture *alachuae*, new species (p. 104)
 6. Elytra distinctly margined basally (fig. 10) 7
Elytra immarginate basally, at most with a weak vestige of a margin laterally near humeral callus 11
 7. Pronotum bearing one or more piceous spots or a median piceous stripe 8
Pronotum unicolorous 9
 8. Pronotum bearing a median apical and a median basal piceous spot, these often confluent; postmandibular lobes large, their anterior and lateral edges broadly rounded, posteriorly divergent (fig. 80)
 *dissimulator* (p. 109)
Pronotum bearing a median apical and a smaller piceous spot near the middle of each side, the latter often weak, occasionally obsolete; postmandibular lobes small, their anterior and lateral edges sharply rounded, not posteriorly divergent (fig. 78)
 *mesosternalis* (p. 106)
 9. Prothorax entirely piceous or black, its sides strongly arcuately convergent anteriorly; elytra red *errans*, new species (p. 110)
Prothorax entirely reddish yellow, its sides weakly arcuately convergent anteriorly; elytra black 10
 10. Mesothorax, metathorax, and abdomen piceous to black; terminal segments of maxillary palpi moderately widened, approximately twice as wide as long (fig. 76) *flavicollis* (p. 107)
Mesothorax, metathorax (except possibly laterally), and abdomen reddish yellow; terminal segments of maxillary palpi strongly widened, more than three times as wide as long (fig. 84) *wehrlei* (p. 108)
 11. Body underneath, except head and prothorax, piceous to black 12
Body underneath entirely yellow or reddish yellow 15
 12. Pronotal angle pores extremely large (fig. 102) 13
Pronotal angle pores of normal size (fig. 101) 14
 13. Elytra entirely, uniformly piceous or black *californica* (p. 111)
Elytra becoming lighter in color basally *antica* (p. 110)
 14. Elytra entirely, uniformly piceous or black *lacensis* (p. 112)
Elytra reddish yellow with three piceous vittae *cuneata* (p. 113)
 15. Terminal segments of maxillary palpi weakly widened, not more than 2.5 times as wide as long (figs. 79, 83) 16
Terminal segments of maxillary palpi strongly widened, more than three times as wide as long (figs. 2, 75) 17
 16. Elytra brownish yellow; mentum relatively small, its sides posteriorly divergent, the terminal segments of maxillary palpi approximately 2.5 times as wide as long (fig. 83) *microgaster* (p. 113)
Elytra black; mentum relatively large, its sides approximately parallel, the terminal segments of maxillary palpi not more than twice as wide as long (fig. 79)
 *puncticeps* (p. 114)
 17. Elytral intervals distinctly punctulate basally, the elytra moderately nitidous; scutellum darker than pronotum except rarely in tenerals, usually piceous; pronotal punctures laterobasally distinctly smaller than those of the short row along extreme base laterally; postmandibular lobes with lateral edges straight, parallel (fig. 75)
 *thoracica* (p. 115)
Elytral intervals impunctulate, smooth basally, the elytra strongly nitidous; scutellum yellow, invariably concolorous with pronotum; pronotal punctures laterobasally about equal in size to those of the short row along extreme base laterally; postman-

dibular lobes with lateral edges divergent posteriorly, often faintly concave towards apex (fig. 2) *frosti* (p. 116)

SPECIES GROUP *macra*

The European generotype, *russica*, certainly belongs to this species group, even though it does not entirely agree with the following description (see discussion and diagnosis under *macra*).

DIAGNOSTIC DESCRIPTION: Pronotum subrectangular, 30 to 45 per cent wider at base than at apex, its sides weakly arcuately convergent to apex (partially shown in figs. 72-74). Postmandibular lobes large, their lateral edges broadly rounded and equaling or slightly overlapping inner edges of eyes in ventral view, the terminal segments of maxillary palpi always strongly widened (figs. 72-74). Antennae generally longer than in species group *thoracica* and almost entirely black, the stem occasionally lighter at extreme base and always bearing relatively dense, long black setae. Head in dorsal view with sides relatively concave above antennal insertions, the apical angles of epistoma approximately right-angular and rather sharp, the epistomal apex distinctly concave, the ocular striae continuing forward approximately to apical angles of epistoma so that sides of head are entirely, sharply, but narrowly margined (fig. 103). Cephalic stridulatory files present and alike in both sexes, entirely covered by pronotum (very like those of *Dacne pubescens*, fig. 36). Legs relatively robust, the tibiae (especially the anterior ones) more strongly dilated apically than in species group *thoracica* (fig. 2). Body generally somewhat larger, relatively longer and more parallel-sided than in species group *thoracica*.

MALE GENITALIA: The characteristics of the aedeagus in this species group are illustrated by that of *macra* (fig. 85). The lateral lobes attach beneath the apex of the basal piece, and the lateral struts widen suddenly, as they emerge anteriorly from the basal piece, to form extremely wide arms. These are lightly fused anteriorly and are membranous ventrally. The median lobe is strongly curved and is membranous dorso-apically where the median orifice is located (above the dotted line in fig. 85). The internal sac bears a few

weakly sclerotized areas in its dorsal wall above the dorso-ventrally flattened, strongly sclerotized ejaculatory duct within. This latter is closely associated with the ventral wall of the internal sac, but its fusion therewith is doubtful. The muscle attachment at the anterior end of the internal sac is extremely small and appears like two black dots or a short transverse rod when viewed dorsally or ventrally. It is thus much different from the elaborate structure present in species group *thoracica* (figs. 87-99; cf. figs. 85, 86).

The aedeagus of *russica*, the European generotype, is similar to that of *macra*, but the internal sac is shorter in front of the median foramen and does not bear distinct sclerotized areas in its dorsal wall, and the median lobe is distinctly protuberant ventrally near the apex (rather like that of *frontalis*, fig. 86).

FEMALE GENITALIA: The female genital tubes in this species group are quite uniform and are so similar, except in size, to those of *Megalodacne heros* (figs. 50, 51) that illustration seems unwarranted. The basal segments of the valvifers and the paraprocts are, however, about one-fifth longer, and the eighth sternite with its posteriorly appendant straps are more like those of *Megalodacne fasciata* (fig. 61). Certain small peculiarities seeming worthy of note are mentioned under the species in which they are found.

The female genital tube of *russica* differs from that of the North American forms in being only two-thirds as long, although equally wide, with its component parts proportionally reduced in length.

***Triplax macra* LeConte, 1854**

Triplax macra LECONTE, 1854, p. 161.

DIAGNOSTIC DESCRIPTION: Color reddish yellow, the elytra and antennal club black, the scutellum and antennal stem piceous to black, the antennal stem often becoming ferruginous basally; body moderately nitidous. Antennal club three-segmented, relatively wide, its middle segment (segment 10) three times as wide as segment 8. Postmandibular lobes equaling or slightly exceeding inner edges of eyes in ventral view (fig. 73). Terminal segments of maxillary palpi greatly widened, their apices faintly concave and bearing brushes that are distinct along the

entire apex (fig. 73). Pronotal punctures sparse and excessively small, mostly separated by from three to five times their diameters; elytral striae scarcely or not impressed, the striae punctures mostly separated by flat areas extending between adjacent intervals.

The European generotype, *russica*, has been thought to occur in North America (Bedel, 1867, p. 21) and is so listed in the Leng catalogue (1920, p. 201). It appears, however, that *macra* has been confused with *russica*, as no specimens of the latter from North America have been seen during the course of the present study. While the two species have a similar superficial appearance, especially from a dorsal aspect, the following differences serve to separate them easily: the postmandibular lobes of *russica* are smaller than those of *macra* (fig. 73) and do not attain the inner margins of the eyes in ventral view, being much like those of *thoracica* (fig. 75); the mentum is very large, wider than that of any North American species of *Triplax*; the terminal segment of the maxillary palpus is relatively weakly widened, only twice as wide as long, relatively smaller indeed than that of *puncticeps* (fig. 79), with its terminal brush visible only at the extreme sides, as in *festiva* (fig. 72); and the pterothorax below is black.

MEASUREMENTS OF TYPE: Length, 6.21 mm.; width, 2.62 mm.

VARIATION: The observed size range, in millimeters, is 4.97 long by 2.14 wide to 6.42 long by 2.76 wide.

MALE GENITALIA: The aedeagus is shown in lateral view (fig. 85). The dorsal and lateral struts of the tegmen are extremely narrow but strongly sclerotized. The lateral lobes are basally constricted and bear a few setae apically. The median lobe is strongly curved and compressed, of rather uniform width, oblique at apex, and is membranous dorso-apically (above the dotted line) in the region of the median orifice. The internal sac extends anteriorly of the median foramen for a distance equal to about half of the length of the median strut. It is stiffened throughout most of this length by irregular, lightly sclerotized areas in its dorsal wall. (These are indicated by broken lines in fig. 85 and require staining to be seen without difficulty.) The enclosed

ejaculatory duct is heavily sclerotized, almost straight, and tapers gradually to a point and ends at about the median foramen. (Six specimens dissected.)

FEMALE GENITALIA: (See discussion under the species group). (Four specimens dissected.)

TYPE: Sex not determined; labeled "Type 6771, *T. macra* Lec., Guyot" (collection LeConte, M.C.Z.).

TYPE LOCALITY: Maine.

GEOGRAPHICAL DISTRIBUTION: Eastern North America from Maine and Ontario westward to Minnesota and southwestward to Tennessee and Texas. This species is widely distributed but apparently few in numbers. Although specimens from many states east of the 100th meridian have not been seen, it probably occurs over most of this region. (See Appendix for locality data.)

MATERIAL EXAMINED: Forty-four specimens.

Triplax festiva Lacordaire, 1842

Triplax festiva LACORDAIRE, 1842, p. 208.

Triplax fasciata MELSHEIMER, 1847, p. 176.

DIAGNOSTIC DESCRIPTION: Color reddish yellow, a fascia of like color occupying the second fourth or somewhat more of the black elytra and slightly extended anteriorly and posteriorly along the suture, the antennae and head black, usually with the exception of extreme base of head above and below, the palpi yellow; body moderately nitidous. Antennal club three-segmented (segment 8, however, is a bit widened and triangular) and wide, segment 10 three times as wide as segment 7. Postmandibular lobes slightly overlapping edges of eyes, the terminal segment of maxillary palpus strongly widened, its apical brush visible only at extreme sides (fig. 72). Pronotal punctures moderately small and sparse, mostly separated by from one to three times their diameters; elytral striae faintly impressed, the striae punctures separated by slightly depressed areas between adjacent intervals.

MEASUREMENTS OF TYPE: In the original description Lacordaire gives the size range for his type material (or for the species) as follows: length, 2.5–3.0 lines (5.30–6.36 mm.); width, 1.25–1.50 lines (2.65–3.18 mm.).

VARIATION: The observed size range, in

millimeters, is 4.42 long by 2.00 wide to 6.49 long by 3.04 wide.

MALE GENITALIA: The aedeagus differs from that of *macra* (fig. 85) as follows: the lateral lobes are not narrowed basally in lateral view; the median lobe is slightly narrower and is truncate at apex; and the sclerotized areas in the wall of the internal sac anteriorly are narrower and less easily seen. (Six specimens dissected.)

FEMALE GENITALIA: (See discussion under the species group). (Four specimens dissected.)

TYPE: Not seen. Horn and Kahle (1935-1937, vol. 2, p. 146) state the disposition of Lacordaire's collection.

TYPE LOCALITY: North America.

GEOGRAPHICAL DISTRIBUTION: Southern and Eastern United States from Florida to New York, west to Michigan, Indiana, Kentucky, Arkansas, and Texas. (See Appendix for locality data.)

MATERIAL EXAMINED: Two hundred and seventy-three specimens.

***Triplax frontalis* Horn, 1862**

Triplax frontalis HORN, 1862, p. 188.

Triplax occipitalis CASEY, 1916, p. 167. New synonymy.

DIAGNOSTIC DESCRIPTION: Color reddish yellow, the following black: elytra, antennae, and the head above in front of posterior margins of eyes and on genal regions below; scutellum reddish to black; body moderately nitidous. Antennal club three-segmented (segment 8 faintly widened apically) and relatively narrow, segment 10 not more than twice as wide as segment 7 and scarcely longer. Postmandibular lobes distinctly overlapping inner edges of eyes in ventral view, the terminal segment of maxillary palpus bearing a distinct brush visible along the entire apex (fig. 74). Pronotal punctures small, moderately dense, separated by from one to three times their diameters; elytral striae unimpressed, the striae punctures of normal size, not larger than those of prosternum, sharply incised, separated by about their diameters by flat areas extending between adjacent intervals.

MEASUREMENTS OF TYPE: These were not taken when the type was examined. In the original description Horn states the length to be 0.25 inch (6.35 mm.).

VARIATION: The observed size range, in millimeters, is 3.93 long by 1.75 wide to 5.87 long by 2.62 wide.

MALE GENITALIA: The tegmen is similar to that of *macra* (fig. 85). The median lobe is of a different shape at apex, and the internal sac differs from that of *macra* in several respects (fig. 86; cf. fig. 85): The internal sac extends anteriorly of the median foramen for a distance greater than the length of the median lobe, and the enclosed ejaculatory duct is proportionally longer. The latter is curved anteriorly but almost straight for the posterior two-thirds of its length. The dorsal wall of the internal sac is stiffened by two narrow sclerites lying side by side before the median foramen. (These latter require staining in order to be seen easily.) In one specimen the enclosed ejaculatory duct forms a graceful spiral of one and one-half turns in the region of the stiffening sclerites. (Three specimens dissected.)

FEMALE GENITALIA: The styli are about one-fourth narrower than those of *macra* and *festiva*. (Seven specimens dissected.)

PUBLISHED ILLUSTRATIONS: The adult is figured by Froeschner and Meiners (1953, p. 22, fig. 3).

TYPE: Sex not determined; labeled "Lectotype; *T. frontalis* Horn; Tex.; No. 3167" (collection Horn, A.N.S.P.).

TYPE LOCALITY: Texas.

GEOGRAPHICAL DISTRIBUTION: Eastern United States from Georgia to Pennsylvania, west to Michigan, Illinois, Oklahoma, and Texas. (See Appendix for locality data.)

MATERIAL EXAMINED: Fifty-five specimens.

***Triplax alachuae*, new species**

DIAGNOSTIC DESCRIPTION: Identical to *frontalis* except in the nature of the elytra. The striae are distinctly impressed and visible to the unaided eye; the striae punctures are extremely large and deep but not sharply incised, mostly separated by much less than their diameters and with distinct fissures between them. In consequence of the large striae punctures and the small fissures between them the elytra are somewhat less nitidous than those of *frontalis*, even though they do exhibit a moderate degree of nitidosity like the rest of the body.

This form was thought at first to be a prob-

able subspecies of *frontalis*, but the acquisition of more specimens of both forms renders that interpretation tenuous. Although the two forms are not known to be sympatric, they are very nearly so, yet no evidence of intergradation between them has been discovered. Specimens of *frontalis* from Paulding and Pike counties, Georgia, resemble *alachuae* (known only from Alachua County, Florida) no more closely than do others from Michigan or Texas. In view of this distributional evidence and the striking nature of the elytral differences the two forms appear to be certainly specifically disjunct.

MEASUREMENTS OF TYPE (IN MM.): Length, 5.80; width, 2.76; width of pronotal base, 2.28; median pronotal length, 1.63; width at extremities of pronotal apical angles, 1.61; width of head at eyes, 1.45; interocular width of vertex, 0.99; horizontal diameter (length) of eye, 0.37; width of terminal segment of maxillary palpus, 0.70.

VARIATION: The observed size range, in millimeters, is 4.83 long by 2.21 wide to 6.07 long by 2.83 wide.

MALE GENITALIA: The aedeagus is indistinguishable from that of *frontalis* (fig. 86). As in the latter species, the ejaculatory duct within the internal sac may be either straight or spirally curved in the region of the stiffening sclerites in the dorsal wall of the internal sac. (Three specimens dissected.)

FEMALE GENITALIA: The female genital tube is indistinguishable from that of *frontalis*, and the styli are similarly one-fourth narrower than those of *macra* and *festiva*. (Seven specimens dissected.)

TYPE: Male; labeled "Alachua County, Fla., 9-7-1953, H. V. Weems, Jr.; under bark of oak; holotype, *Triplax alachuae* Boyle" (donated to the United States National Museum by Dr. Howard V. Weems, Jr., of the State Plant Board of Florida).

TYPE LOCALITY: Alachua County, Florida.

PARATYPES: *Florida*: Alachua County: Same data as type (collection H. V. Weems, Jr.), 20; Gainesville (collection R. Hopping, C.A.S.), one; Gainesville (H. L. Dozier; collection R. Hopping, C.A.S.), one.

Triplax marcescens Boyle, 1954

Triplax marcescens BOYLE, 1954a, p. 257.

DIAGNOSTIC DESCRIPTION: Color reddish yellow, the elytra carbonarous, the following

piceous to black: antennae (the stem becoming reddish basally), mesopleural sclerites, metathorax, abdomen, and middle and hind coxae and trochanters; elytra entirely dull, contrasting rather strongly with the nitidous pronotum. Antennae (the club narrow) and ventral view of head indistinguishable from those of *frontalis* (fig. 74). Pronotal punctures relatively coarse, mostly separated by about their diameters or a bit less; elytral striae weakly impressed, the stria punctures, like those of *alachuae*, extremely large, but farther apart than in that species and more sharply incised; entire surface of elytra covered with a minutely reticulate or granular microsculpture and shallow, irregular fissures that entirely destroy the usual nitidous appearance. (Not examined for cephalic stridulatory files.)

MEASUREMENTS OF TYPE: Length, 5.18 mm.; width, 2.25 mm.

VARIATION: The observed size range, in millimeters, is 5.18 long by 2.25 wide (the type) to 5.80 long by 2.69 wide.

MALE GENITALIA: The male of this species is unknown.

FEMALE GENITALIA: At its attachment to the eighth sternite the anterior apodeme branches into two distinct rods that extend almost to the middle of each lateral edge of the eighth sternite, like the arms of a Y; the female genital tube is otherwise like that of *frontalis*. (Three specimens dissected.)

TYPE: Female; labeled "Santa Rita Mts., Ariz., VI-14" (collection Hubbard and Schwarz, U.S.N.M. No. 62003).

TYPE LOCALITY: Santa Rita Mountains, Pima or Santa Cruz County, Arizona.

GEOGRAPHICAL DISTRIBUTION: Known only from southern Arizona: the type locality and Huachuca Mountains, Cochise or Santa Cruz County, August 12.

MATERIAL EXAMINED: Three specimens.

SPECIES GROUP *thoracica*

DIAGNOSTIC DESCRIPTION: Pronotum subtrapezoidal, 45 to 75 per cent wider basally than apically, its sides arcuately rounded, strongly convergent apically (fig. 2). Postmandibular lobes small, their lateral edges usually not broadly rounded, never attaining inner edges of eyes in ventral view, the terminal segments of maxillary palpi strongly to weakly widened (figs. 2, 75-84; cf. figs. 72-74). Antennae generally shorter and not

entirely black or piceous, the two or three basal segments, at least, always much lighter, the stern bearing relatively sparse, short, silvery setae. Head dorsally with sides weakly concave above antennal insertions, the apical angles of epistoma distinctly obtuse-angular, never so sharp as in species group *macra*, the epistomal apex usually faintly concave in a shallow V, the ocular striae generally terminating above antennal insertions (fig. 104; cf. fig. 103). Cephalic stridulatory files present and alike in both sexes in those species having the elytra margined basally, absent in the female in those species having the elytra immarginate basally. Legs relatively slender (fig. 2), the tibiae (especially the anterior ones) less strongly dilated apically than in species group *macra*. Body generally smaller in size, relatively shorter and with more arcuate sides (fig. 2) than in species group *macra*.

MALE GENITALIA: The aedeagus of *thoracica* (figs. 87, 88) will illustrate the general characteristics of the male genitalia in this species group. The lateral lobes attach approximately to the apex of the basal piece, and the arms of the tegmen are relatively narrow (cf. fig. 85). The median lobe is not so strongly curved as in species group *macra*, but it bears a similar membranous area dorso-apically around the median orifice as in that group. The internal sac bears distinct stiffening sclerites in its dorsal wall. These occur as a pair of elongate sclerites lying side by side in the anterior region of the internal sac and a single, ventrally trough-shaped sclerite, with dark ventral edges, lying mostly within the median lobe (fig. 87; note that the small black sclerites lying below the union of the median strut and median lobe are peculiar to *thoracica* and *puncticeps*). The muscle attachment at the anterior end of the internal sac and the base of the enclosed ejaculatory duct are large and variously modified (figs. 88-99) and display no observed intraspecific variation.

FEMALE GENITALIA: The female genital tubes in this species group are, again, remarkably uniform and need seldom be mentioned under the species. They differ sharply, however, from those in species group *macra* in length relative to width. While the width is approximately equal to that in species group *macra*, the length is only 50 to 70 per cent as

great, and the length of the component parts is proportionally reduced. The styli, however, are scarcely reduced in size, and the proctigeral lobe remains large, extending almost or quite to the apices of the valvifers. The eighth tergite of this species group is of a different shape, and the straps attached posteriorly to it and the eighth sternite are much shortened (fig. 100). (Sixty-nine specimens dissected.)

***Triplax mesosternalis* Schaeffer, 1905**

Triplax mesosternalis SCHAEFFER, 1905, p. 145.

Triplax monostigma CASEY, 1916, p. 165. New synonymy.

Triplax coloradana CASEY, 1924, p. 179. New synonymy.

DIAGNOSTIC DESCRIPTION: Color piceous-black, the following reddish yellow: head, prothorax (except three small pronotal spots, one medio-apical and a smaller one on each side), mesosternum, mesepisterna, and appendages; the hind coxae and mesepimera piceous, the latter usually contrasting strongly with the yellow mesepisterna but sometimes darkened; antennae beyond segments 1 and 2 darker than head, somewhat ferruginous; lateral piceous spots of pronotum only slightly smaller than median apical spot, placed far laterally, slightly anterior of middle, and about equidistant from apex and side of pronotum, the median apical spot always present, the lateral spots often weak, rarely not at all detectable; the body moderately nitidous, essentially glabrous except on abdomen. Antennae relatively long, their length equal to from 85 to 95 per cent of width of pronotal base, the club three-segmented (segment 8 decidedly widened apically and triangular but slightly less than two-thirds as wide as segment 9). Epistomo-frontal region of head with sides straight, the apical angles of epistoma moderately sharp, the apex distinctly concave in a shallow V; epistomal sides vaguely margined, the apex immarginate. Postmandibular lobes short, their lateral edges somewhat rounded and subparallel; terminal segments of maxillary palpi moderately widened, their width slightly more than twice their length; mentum of medium size, its sides relatively short (fig. 78). Pronotal punctures coarse, becom-

ing larger and denser laterally where they are mostly separated by about their diameters or slightly less; cephalic punctures small and dense medially and apically, sparser and approximately as large as pronotal punctures laterobasally near eyes; elytral intervals bearing minute punctules more numerous than striae punctures and a weak meshwork of fine fissures; elytra moderately nitidous, distinctly margined basally. Pronotum subrectangular, its base occasionally only 45 to 50 per cent wider than apex. Cephalic stridulatory files present and alike in both sexes.

This species, more than any other in species group *thoracica*, approaches species group *macra* in the shape of the prothorax and in antennal length.

MEASUREMENTS OF TYPE: Length, 4.07 mm.; width, 1.84 mm. (This is the lectotype; see note under type below.)

VARIATION: The observed size range, in millimeters, is 3.31 long by 1.52 wide to 5.11 long by 2.35 wide.

MALE GENITALIA: The aedeagus is similar to that of *thoracica* (fig. 89) with the following exceptions: Only the posterior sclerite in the dorsal wall of the internal sac is distinct, the anterior sclerites being reduced to short, indistinct traces. The enclosed ejaculatory duct is long, relatively stout, and of constant diameter, abruptly narrowing to a point shortly before the middle of the median lobe. The reduced but distinctive anterior end of the internal sac is shown in figure 94. (Eight specimens dissected.)

TYPE: From a series of five cotypes at the United States National Museum (all labeled "Cotype No. 42600 U.S.N.M.; Palmerly [*sic*], Cochise Co., Ariz.; Brooklyn Museum Coll. 1929," and two of these additionally labeled "*Triplax mesosternalis* Schaefer. Type"), the present author selected one on which to take notes and measurements. This specimen is further labeled "'Lectotype,' Boyle, 1952." Its sex was not determined.

TYPE LOCALITY: Palmerlee, Cochise County, Arizona.

GEOGRAPHICAL DISTRIBUTION: Arizona, New Mexico, Colorado, and Kansas. (See Appendix for locality data.)

MATERIAL EXAMINED: Two hundred and thirty specimens.

Triplax flavicollis Lacordaire, 1842

Triplax flavicollis LACORDAIRE, 1842, p. 218.

Triplax confinis LECONTE, 1854, p. 162.

DIAGNOSTIC DESCRIPTION: Color piceous to black, the following reddish yellow to ferruginous: head, prothorax, and antennal club (the antennae usually grading from reddish yellow to piceous over segments 6 and 7 but sometimes abruptly piceous beyond segment 7), the mesothorax and abdomen apically often lighter piceous; the body moderately nitidous, essentially glabrous except on abdomen. Body shape remarkably elliptical, the anterior and posterior ends about equally parabolically rounded, the sides evenly arcuate. Antennal length equal to approximately two-thirds of width of pronotal base, the club four-segmented (segment 8 being triangular and at least two-thirds as wide as segment 9, hence belonging to the club). Epistomofrontal region of head with sides straight, the apical angles of epistoma moderately rounded to rather sharp, the apex faintly concave in a very shallow arc or V (cf. fig. 104), the epistomal sides vaguely margined basally, the apex immarginate. Postmandibular lobes short, their lateral edges somewhat rounded and divergent posteriorly; terminal segments of maxillary palpi moderately widened, their width approaching three times their length; mentum rather small, its sides short and approximately parallel (fig. 76). Pronotal punctures of medium size, not dense, a bit larger and denser laterally, mostly separated by more than their diameters; cephalic punctures much denser, those laterally near eyes of similar size to those of pronotal sides; elytral intervals bearing staggered rows of exceptionally small punctules about as numerous as striae punctures and a scarcely detectable meshwork of fine fissures; elytra rather strongly nitidous, distinctly margined basally. Cephalic stridulatory files present and alike in both sexes.

MEASUREMENTS OF TYPE: In the original description Lacordaire gives the size range (for his specimens, or for the species) as follows: length, 1.5–1.75 lines (3.18–3.71 mm.); width, 0.75–0.80 lines (1.59–1.70 mm.).

VARIATION: The observed size range, in millimeters, is 2.28 long by 1.17 wide to 4.42 long by 2.28 wide. The shape of the pronotum

and the relative length and width of the body are considerably variable in this species, especially in the southern United States, this variation being similar to that in *thoracica* but less pronounced. The type of Leconte's *confinis* is one of these variant specimens.

MALE GENITALIA: The median lobe and median strut bear similar length relationships to each other as those of *thoracica* (fig. 87). The internal sac, however, is somewhat shorter, extending anteriorly to about the middle of the median strut. The anterior sclerites in the dorsal wall of the internal sac are shorter than the posterior sclerite, and their inner edges appear to be bent downward to clasp the enclosed ejaculatory duct, thus forming a channel through which the latter runs. The enclosed ejaculatory duct is relatively short and tapers gradually and evenly to a fine posterior termination that approximately attains the median foramen. The distinctive anterior end of the internal sac is shown in figure 93. (Three specimens dissected.)

BIOLOGY: The following biological data appear on labels: [in] fungus on hemlock log, Cornwall, Connecticut, September 30, 1925; in *Pleurotus ostreatus*, Washington, D. C., June 7, 1924; in soft shelf-fungi, Urbana, Illinois, May 22, 1909; on branching fungus under bark, Taylor County, Kentucky, September 1, 1953; reared from *Pleurotus ostreatus*, Springfield, Massachusetts; poplar woods (in fungi), Hennepin County, Minnesota, May 25, 1922; [from] gill fungus on aspen log, Fillmore County, Minnesota, May 25, 1936; [on] peach foliage, Richmond County, North Carolina, May 8, 1937; [on] *Hicoria*, Harrisburg, Pennsylvania, July 22, 1914; and several notations, "in fungi."

TYPE: Not seen. Horn and Kahle (1935-1937, vol. 2, p. 146) account for the disposition of Lacordaire's collection.

TYPE LOCALITY: North America.

GEOGRAPHICAL DISTRIBUTION: North America east of the 100th meridian from Florida to New England and Quebec, west to Minnesota, South Dakota, Kansas, and Texas. This species is one of the three most common erotylids in eastern North America. (See Appendix for locality data.)

MATERIAL EXAMINED: One thousand two hundred and twenty-six specimens.

***Triplax wehrlei* Boyle, 1954**

Triplax wehrlei BOYLE, 1954a, p. 260.

DIAGNOSTIC DESCRIPTION: Color reddish yellow to ferruginous, the elytra above and antennal clubs black, the scutellum piceous, the elytral epipleura reddish yellow, the metepisterna light piceous in the type, concolorous with metasternum in the paratype; the body weakly nitidous, feebly pubescent on head and pronotum above and on entire thorax below (the setae light in color and excessively fine, but distinctly exceeding the punctures), the abdomen with much stronger pubescence, as usual. Antennal length equal to about two-thirds of width of pronotal base, the club distinctly four-segmented (or five-segmented if one includes segment 7, which is at least three-fourths as wide as 8 and also triangular, distinctly more so than in *flavicollis*). Epistomo-frontal region of head with sides straight to feebly convex, the apical angles of epistoma moderately rounded, the apex more strongly concave in a shallow V than in *flavicollis*; epistomal sides feebly margined basally, the apex immarginate. Postmandibular lobes short, their lateral edges strongly rounded, subparallel (fig. 84; cf. *flavicollis*, fig. 76); terminal segments of maxillary palpi strongly widened, their width more than three times their length; mentum similar to that of *flavicollis*. Pronotal punctures of moderate size and density, mostly separated by about their diameters; cephalic punctures of similar size but denser, each bearing a distinct seta; elytral intervals bearing moderately large punctules more than twice as numerous as stria punctures and a strong meshwork of fine fissures; the elytra margined basally. (Not examined for cephalic stridulatory files.)

MEASUREMENTS OF TYPE: Length, 4.55 mm.; width, 2.30 mm.

VARIATION: The observed size range, in millimeters, is 4.14 long by 2.12 wide to 4.55 long by 2.30 wide (the type).

MALE GENITALIA: The aedeagus is very similar to that of *flavicollis*. The enclosed ejaculatory duct is similarly broad, short, and tapering, and the anterior sclerites in the dorsal wall of the internal sac are likewise complexly folded. The muscle attachment at the anterior end of the internal sac, however,

has the dark-colored wings distinctively pincer-like in shape (fig. 96; cf. fig. 93). (One specimen dissected.)

TYPE: Male; labeled "Patagonia, Ariz., VII-9-30; holotype, *Triplax wehrlei* Boyle" (J. O. Martin; collection C.A.S.).

TYPE LOCALITY: Patagonia, Santa Cruz County, Arizona.

GEOGRAPHICAL DISTRIBUTION: *Arizona*: Gila County: Pinal Mountains. Pima or Santa Cruz County: Santa Rita Mountains, June 15. Santa Cruz County: Patagonia, July 9.

MATERIAL EXAMINED: Three specimens.

***Triplax dissimulator* (Crotch, 1873)**

Mycotretus dissimulator CROTCH, 1873a, p. 355.

Tritoma dissimulator (Crotch), LENG, 1920, p. 201.

Triplax carri CASEY, 1924, p. 180. New synonymy.

Triplax dissimulator (Crotch), FROESCHNER AND MEINERS, 1953, p. 21, footnote 3.

DIAGNOSTIC DESCRIPTION: Color black, the following reddish yellow: head, prothorax (exclusive of pronotal spots at middle of base and apex), the apical third to two-thirds of abdomen, and appendages except hind coxae; antennal club occasionally ferruginous to piceous; middle coxae rather intermediate in color; the two pronotal spots often confluent in a broad stripe along the mid-line, more rarely almost obsolete; the body moderately nitidous, glabrous except on abdomen. Shape almost evenly elliptical, the body relatively broad, less than twice as long as wide. Antennae unusually short, their length equal to about 60 per cent of width of pronotal base, the club three-segmented (segment 8 not widened apically or triangular). Epistomo-frontal region of head exceptionally wide, shallowly impressed on each side of mid-line, its sides weakly convex; apical angles of epistoma relatively broadly rounded, the apex distinctly arcuately concave; epistomal sides margined, more widely so apically, the apex still more widely, less distinctly margined. Postmandibular lobes long, their apices and lateral edges continuous in broad, posteriorly divergent arcs; terminal segments of maxillary palpi moderately widened, their width approximately 2.5 times their length; mentum of medium size, its sides approxi-

mately parallel (fig. 80). Pronotal and cephalic punctures, as well as those on body below, relatively minute, mostly separated by two to several times their diameters; surface of head and pronotum covered with a minutely reticulate or alutaceous microsculpture which renders them less nitidous than would otherwise be true; elytral intervals bearing small punctules about twice as numerous as striae punctures and a scarcely visible meshwork of minute, shallow fissures; elytra moderately nitidous, margined basally. Cephalic stridulatory files present and alike in both sexes.

MEASUREMENTS OF TYPE: In the original description Crotch states the length to be 0.18 inch (4.57 mm.).

VARIATION: The observed size range, in millimeters, is 3.04 long by 1.66 wide to 4.76 long by 2.55 wide.

MALE GENITALIA: In this species the basal piece of the tegmen bears unusually distinct sclerotized areas that are bordered by darker lines. The median lobe tapers to a sharp point ventro-apically and bears a reduced membranous strip along the opening of the median orifice dorso-apically. What are presumably the anterior sclerites in the dorsal wall of the internal sac are greatly expanded and cover virtually the entire surface of the internal sac from a point shortly behind the anterior end (fig. 95) almost to the median orifice. The enclosed ejaculatory duct is long and narrow, forms a corkscrew-like spiral in its posterior fifth, and terminates at about the middle of the median lobe. The anterior end of the internal sac is again distinctive (fig. 95). (Five specimens dissected.)

BIOLOGY: Biological and ecological data on labels are as follows: on telegraph post, June 14, 1916, and taken with *thoracica* on *Pleurotus* fungus, July 29, 1953, Edmonton, Alberta; [collected in] poplar woods, Hennepin County, Minnesota, May 22, 1922; temperature 60° [F.], wind still, partly cloudy, dry fog, summit of Mt. Washington, New Hampshire, July 7, 1939; found feeding on bracket fungus on poplar, Mer Bleue, Ontario, June 8, 1927; on *Populus tremuloides*, Duparquet, Quebec, September 2, 1936; and several notations, "in fungi."

TYPE: Not seen; presumably in Crotch's erotylid collection at the Zoological Museum

of Cambridge (Horn and Kahle, 1935-1937, vol. 2, p. 48).

TYPE LOCALITY: Illinois.

GEOGRAPHICAL DISTRIBUTION: Northeastern United States and Canada from New Jersey to Maine and Quebec, northwestward across Great Lakes region to Alberta. A single specimen labeled, "New Braunfels, Texas," is probably mislabeled. (See Appendix for locality data.)

MATERIAL EXAMINED: Three hundred and six specimens.

***Triplax errans*, new species**

DIAGNOSTIC DESCRIPTION: Color black on head above and gular region below, antennal clubs, and prothorax; the elytra and scutellum bright red, with an orange tinge; the following brownish yellow: antennal segments 1 and 2, the genae and mouth parts, pterothorax, abdomen, and legs; antennae grading from brownish yellow to black over segments 3 and 4; the body strongly nitidous, essentially glabrous above except on head. Shape elliptical, extremely short and broad for a *Triplax*, the length approximately 1.8 times the width, the sides of body appearing subparallel from middle of pronotum to near middle of elytra; pronotum scarcely narrower than elytra, widest just in front of base, its sides evenly arcuate and strongly convergent to the slightly obtuse apical angles, the basal lobe relatively strong and restricted largely to the median two-fifths of base; body widest at one-third of the elytral length behind base, parabolically rounded in the posterior third, obtuse-arcuately rounded in the anterior sixth. Antennae two-thirds as long as width of pronotal base, the club five-segmented (segment 7 apically widened, triangular, two-thirds as wide as segment 8 and displaying a similar asperate surface). Epistomo-frontal region of head rather broad, its sides straight, the apical angles of epistoma relatively rounded, the apex narrow and distinctly arcuately concave; epistomal sides distinctly margined, the margin of apex effaced by coarse, dense punctures. Postmandibular lobes, terminal segments of maxillary palpi, mentum, and ventral features of head in general much like those of *wehrlei* (fig. 84). Pronotal punctures of moderate size, somewhat larger and denser laterally as usual,

mostly separated by once to twice their diameters, each bearing a minute seta that feebly exceeds the puncture; cephalic punctures denser apically, approximately equal in size to pronotal punctures or faintly larger, scarcely denser laterobasally, each bearing a distinctly protruding seta, these longer apically; elytral intervals minutely punctulate, virtually smooth, strongly nitidous; thorax below coarsely punctate, the setae exceeding the punctures by their diameters or more, elytra basally margined. (Not examined for cephalic stridulatory files.)

MEASUREMENTS OF TYPE (IN MM.): Length, 4.14; width, 2.30; width of pronotal base, 2.09; median pronotal length, 1.10; width at extremities of pronotal apical angles, 1.24; width of head at eyes, 1.13; interocular width of vertex, 0.78; horizontal diameter (length) of eye, 0.28; width of terminal segment of maxillary palpus, 0.47.

MALE GENITALIA: The distinctive anterior end of the internal sac is shown in figure 99. The anterior sclerites in the dorsal wall of the internal sac are complexly folded and clasp the enclosed ejaculatory duct in a manner similar to that in *flavicollis* and *wehrlei*. The posterior sclerite behind is typical for the species group. The median foramen is extremely oblique, i.e., the sclerotized ventral edge of the median lobe begins at about one-third of the length of the lobe behind the attachment of the median strut. In other respects the aedeagus is similar to that of other species. (One specimen dissected.)

FEMALE GENITALIA: The female of this species is unknown.

TYPE: Male; labeled "Brownsville, Texas, VI-30-38; holotype, *Triplax errans* Boyle" (R. I. Sailer; collection U.K.).

TYPE LOCALITY: Brownsville, Cameron County, Texas.

PARATYPES: None.

***Triplax antica* LeConte, 1861**

Triplax antica LECONTE, 1861, p. 358.

Triplax mormonalis CASEY, 1916, p. 166.

DIAGNOSTIC DESCRIPTION: Color piceous to black, the head and appendages ferruginous, the basal half or less of elytra gradually becoming ferruginous anteriorly, and pellucid or not, the entire prothorax variable, either piceous to black or ferruginous. Cephalic

punctures generally smaller and sparser and elytral meshwork of fine fissures less distinct, otherwise identical in external characters to *californica* (figs. 77, 102).

This species is a very close relative of *californica* yet is certainly specifically distinct. The two forms are partially sympatric, but no specimens that are true intergrades have been seen. Moreover, the male genitalia are considerably different (see below).

MEASUREMENTS OF TYPE: Length, 4.07 mm.; width, 1.91 mm.

VARIATION: The observed size range, in millimeters, is 3.11 long by 1.59 wide to 4.62 long by 2.35 wide.

MALE GENITALIA: The anterior end of the internal sac (fig. 92) differs somewhat from that of *californica* (fig. 91). Lateral wing-like expansions also occur near the anterior end of the enclosed ejaculatory duct, but these are smaller than in *californica*. Two specimens have the internal sac greatly expanded (to around four times its "normal" diameter) and the enclosed ejaculatory duct coiled in a corkscrew-like manner along the posterior two-thirds of its length; the other specimens are normal, however, with the enclosed ejaculatory duct straight and reaching almost to the median orifice. Perhaps the two "abnormal" specimens had copulated shortly before being collected. (Six specimens dissected.)

BIOLOGY: The following biological data appear on labels: in fungus on *Populus trichocarpa*, Creston, British Columbia, June 8, 1950, and June 17, 1951; six notations, "in fungi" or "from fungi," same locality, May 9 to May 25, 1948; *ex Polyporus*, Midday Valley, Merritt, British Columbia, June 23, 1950; on grass, Farmington, Utah, May 8, 1954.

TYPE: Sex not determined; labeled "Type 6772; *T. antica* Lec." (collection LeConte, M.C.Z.).

TYPE LOCALITY: In the original description LeConte remarks simply, "Sinyak water depot, Mr. Gibbs." LeConte's paper containing the original description is entitled "New species of Coleoptera inhabiting the Pacific district of the United States." The type bears a dark blue disc indicating "Oregon & c.," according to LeConte's color key, and Leng (1920, p. 201) gives the state of origin as "Or[egon]." It has not been possible

to find a "Sinyak water depot" in the present State of Oregon in any atlas, old or new, consulted. At one time, however, there was a "Sinyakwateeh Depot" in Bonner County, Idaho, near Cocolalla and between Granite and Sandpoint, just west of Lake Pend d'Oreille (Stielers "Hand-Atlas," 1909, map 86, locus C-11). This would appear to be without question the true type locality.

GEOGRAPHICAL DISTRIBUTION: Western North America from Colorado, Utah, Nevada, and Oregon, northward to British Columbia and Saskatchewan. (See Appendix for locality data.)

MATERIAL EXAMINED: Eighty-seven specimens.

Triplax californica LeConte, 1854

Triplax californica LECONTE, 1854, p. 161.

DIAGNOSTIC DESCRIPTION: Color black, the head, prothorax, and appendages (excepting middle and hind coxae) reddish yellow, the antennae a darker red, the scutellum and apex of abdomen often reddish, the mesopleural sclerites and extreme base of prothorax below also often intermediate in color. Antennae similar to those of *frosti* (fig. 2) in length and shape, the club three-segmented. Epistomo-frontal region of head with sides straight, the apical angles of epistoma moderately sharp, the apex feebly concave (similar to that of *thoracica*, fig. 104); epistomal sides vaguely margined, the apex immarginate. Postmandibular lobes rather long, their lateral edges rounded and posteriorly divergent; terminal segment of maxillary palpus not strongly widened but at least twice as wide as long; mentum generally somewhat elongate (fig. 77). Pronotal punctures large, denser and larger laterally, mostly separated by less than their diameters; cephalic punctures smaller but denser, extremely crowded and becoming confluent along sides of head; setae weak and light-colored on body above but clearly exceeding the punctures on head and parts of elytra. Pronotal angle pores extremely large and umbilicate (fig. 102; cf. fig. 101). Elytral intervals bearing punctules slightly more numerous than the small stria punctures and an irregular meshwork of fine fissures, the elytra consequently not strongly nitidous, immarginate basally except for a weak vestige of margin near each humeral callus.

Cephalic stridulatory files present in male, much weaker and vestigial in female.

MEASUREMENTS OF TYPE: Length, 3.73 mm.; width, 1.75 mm.

VARIATION: The observed size range, in millimeters, is 2.76 long by 1.38 wide to 5.04 long by 2.35 wide.

MALE GENITALIA: The muscle attachment at the anterior end of the internal sac is smaller and of a somewhat different shape than that of *puncticeps* (fig. 91; cf. fig. 90). The enclosed ejaculatory duct bears a wing-like lateral expansion on each side near its anterior end, and these expansions are larger than those of *antica* (fig. 92). The anterior sclerites in the dorsal wall of the internal sac are extremely long, narrow, and indistinct, and they bear no distinct dark areas near their posterior ends. As does that of *puncticeps*, the internal sac extends anteriorly of the median lobe approximately as far as does the median strut, and the narrow posterior end of the enclosed ejaculatory duct may be spirally coiled or straight. (Five specimens dissected.)

BIOLOGY: The following biological data appear on labels: *ex* fungus on *Populus trichocarpa*, Creston, British Columbia, June 17, 1951; *ex* *Pleurotus ostreatus* on alder, Inverness, California, May 16, 1952; on lichens, Long Beach, California; [on] alfalfa, Davis, California, February 23, 1950; and two notations "in fungus," Medford and Corvallis, Oregon.

TYPE: Sex not determined; labeled "Type 6773; *T. californica* Lec." (collection LeConte, M.C.Z.).

TYPE LOCALITY: San José, Santa Clara County, California.

GEOGRAPHICAL DISTRIBUTION: Western North America from California and Nevada northward to British Columbia. One specimen labeled "Penn." is probably mislabeled. (See Appendix for locality data.)

MATERIAL EXAMINED: Four hundred and ninety-five specimens.

Triplax lacensis Boyle, 1954

Triplax lacensis BOYLE, 1954a, p. 255.

DIAGNOSTIC DESCRIPTION: Color brownish red or ferruginous, the following black: elytra, pterothorax, hind coxae, and abdomen; the mesothorax (especially the mesepisterna), middle coxae, scutellum, and abdominal apex

often more or less piceous and intermediate in color; the body moderately nitidous, glabrous except on abdomen. Shape faintly oval, less broadly so than in *cuneata*. Antennal length equal to about five-eighths of width of pronotal base, the club three-segmented. Epistomo-frontal region of head with sides straight, the apical angles of epistoma moderately sharp (as in fig. 104), the apex medially concave in a very shallow V; epistomal sides vaguely margined, the apex immarginate. Postmandibular lobes moderately long, their lateral edges straight and weakly divergent posteriorly; terminal segments of maxillary palpi more than twice as wide as long; mentum relatively large and wide, its sides weakly divergent anteriorly (fig. 81). Pronotal punctures large, denser and larger laterally where they are separated by less than their diameters; cephalic punctures denser, smaller than those of pronotum except laterobasally near eyes; prothoracic venter with exceptionally large, partially confluent punctures in front of coxae. Pronotal angle pores of normal size (fig. 101). Elytral intervals bearing large punctules about twice as numerous as the striae punctures and a meshwork of fine fissures, the latter shallower and less sharply incised than in *californica*; elytra moderately nitidous, immarginate basally. (Not examined for cephalic stridulatory files.)

MEASUREMENTS OF TYPE: Length, 4.21 mm.; width, 2.13 mm.

VARIATION: The observed size range, in millimeters, is 3.45 long by 1.73 wide to 4.55 long by 2.48 wide.

MALE GENITALIA: The aedeagus is somewhat similar to that of *puncticeps* (fig. 90) in the stirrup-shaped muscle attachment at the anterior end of the internal sac, but the light, swollen base of the enclosed ejaculatory duct just behind bears a distinct, brownish, circular dot medially (fig. 97). The anterior sclerites in the dorsal wall of the internal sac are narrow, as are those of *puncticeps*, but they are not so long and lack the black sections near their posterior ends; these latter are widened and form jointly a yoke-like termination. The enclosed ejaculatory duct narrows gradually and ends at about the middle of the median lobe. (Two specimens dissected.)

FEMALE GENITALIA: The styli are notably

short in this species, being scarcely more than twice as long as wide. (Three specimens dissected.)

TYPE: Male; labeled "Lake Tahoe, Calif., VII-14; holotype, *Triplax lacensis* Boyle" (collection Hubbard and Schwarz, U.S.N.M. No. 61979).

TYPE LOCALITY: Lake Tahoe, El Dorado and Placer counties, California.

GEOGRAPHICAL DISTRIBUTION: Known only from California. (See Appendix for locality data.)

MATERIAL EXAMINED: Twelve specimens.

***Triplax cuneata* Boyle, 1954**

Triplax cuneata BOYLE, 1954a, p. 252.

DIAGNOSTIC DESCRIPTION: Color reddish yellow, the following piceous to black: three elytral vittae, pterothorax, middle and hind coxae, and abdomen, the latter becoming lighter apically; the elytral vittae disposed thus: a common, wedge-shaped vitta medially which includes the scutellum and extends approximately from fifth stria to fifth stria basally and tapers to a point shortly before the elytral apex, and a much narrower one, about two intervals wide, on each elytron laterally which neither quite touches the elytral edge nor attains the apex. Body strongly nitidous, glabrous except on abdomen. Shape distinctly oval (but less broadly so than in *Tritoma* spp.), the body widest at one-fourth of the elytral length behind base, broadly rounded anteriorly, parabolically rounded posteriorly. Antennal length equal to about five-eighths of width of pronotal base, the club three-segmented. Epistomo-frontal regions of head with sides straight, the apical angles of epistoma strongly obtuse, moderately sharp (fig. 104), the apex concave in a very shallow V on median third, the epistomal sides and the apex vaguely margined, the latter more widely so. Postmandibular lobes and terminal segments of maxillary palpi similar to those of *californica* (fig. 77) and *antica*, but the lobes are slightly shorter and their lateral edges straighter, and the mentum is a bit wider, than in those two species. Prosternal apex strongly compressed but not produced into a lip-like process. Pronotal punctures large and dense, larger laterally, mostly separated by about half of their diameters on lateral thirds of pronotum; cephalic

punctures small medially, much coarser and like those of pronotum laterobasally near eyes; anterior halves of pronotal epipleura bearing excessively large punctures subequal in size to pronotal angle pores (these of normal size), the posterior halves virtually smooth; elytral intervals strongly nitidous, almost smooth, the punctules excessively small and rather sparse; the elytra immarginate basally. (Not examined for cephalic stridulatory files.)

MEASUREMENTS OF TYPE: Length, 4.20 mm.; width, 2.15 mm.

VARIATION: The observed size range, in millimeters, is 3.66 long by 1.93 wide to 4.20 long by 2.15 wide (the type).

MALE GENITALIA: The aedeagus differs from that of *californica* in that the anterior sclerites in the dorsal wall of the internal sac are reduced, very short, and are located just anterior of the median foramen, far behind the anterior end of the internal sac. The apex of the internal sac is strikingly similar to that of *californica* (fig. 91), but the lobe- or wing-like expansions of the enclosed ejaculatory duct immediately behind its anterior end are absent. (One specimen dissected.)

BIOLOGY: (See geographical distribution below for biological data on labels).

TYPE: Male; labeled "Midday Valley, Merritt, B. C., VI-21-26, [on] *Pinus ponderosa*; *Tritoma vittata* Lec. [an old determination label]; holotype, *Triplax cuneata* Boyle" (Wm. Mathers; collection R. Hopping, C.A.S.).

TYPE LOCALITY: Midday Valley, Merritt, British Columbia.

GEOGRAPHICAL DISTRIBUTION: *British Columbia*: Creston, 2300 feet, July 4, 1948 (G. S. Smith; sweeping). London Hill Mine, Bear Lake, 7000 feet, July 21 (R. P. Currie; collected upon snow). Midday Valley, Merritt, July 14, 1925, and June 21, 1926 (Wm. Mathers; [on] *Pinus ponderosa*).

MATERIAL EXAMINED: Four specimens.

***Triplax microgaster* Boyle, 1954**

Triplax microgaster BOYLE, 1954a, p. 262.

DIAGNOSTIC DESCRIPTION: Color light brownish yellow, the elytra and scutellum faintly darker, the eyes alone black; body moderately nitidous, essentially glabrous except on abdomen. (It is possible that the

type, the only specimen known, is somewhat teneral, but this seems unlikely, for the aedeagus appears to be normally sclerotized and pigmented.) Shape elongate-elliptical, typical for the genus. Antennal length equal to about two-thirds of width of pronotal base, the club three-segmented. Epistomo-frontal region of head with sides straight, the apical angles of epistoma somewhat rounded, the apex weakly concave in a shallow V; epistomal sides and apex immarginate. Post-mandibular lobes rather short, their lateral edges faintly rounded, subparallel; terminal segments of maxillary palpi moderately widened, their width slightly more than twice their length; the mentum, as in *lacensis*, rather large and wide, its sides posteriorly convergent (fig. 83; cf. fig. 81). Pronotal punctures large, not dense, denser but not larger laterally, mostly separated by approximately their diameters; cephalic punctures relatively large, scarcely smaller than those of pronotum except on epistomo-frontal region, extremely dense and almost confluent on laterobasal fourths; prothoracic venter with extremely large, dense, but not confluent punctures in front of coxae; elytral intervals bearing staggered rows of moderate punctules scarcely more numerous than striae punctures and an indistinct meshwork of shallow fissures; elytra moderately nitidous, immarginate basally. Abdomen unusually short, the hind coxae approximating the elytra laterally at a point 46 per cent of the elytral length behind the elytral base. (Not examined for cephalic stridulatory files.)

MEASUREMENTS OF TYPE: Length, 3.52 mm.; width, 1.63 mm.

MALE GENITALIA: The features of the anterior end of the internal sac are distinctive (fig. 98); otherwise the aedeagus is similar to that of *lacensis*. (One specimen dissected.)

FEMALE GENITALIA: The female of this species is unknown.

TYPE: Male; labeled "Nev." (collection Holland, C.M. No. 187).

TYPE LOCALITY: Nevada.

GEOGRAPHICAL DISTRIBUTION: Only the type, from Nevada, is known.

Triplax puncticeps Casey, 1916

Triplax puncticeps CASEY, 1916, p. 165.

DIAGNOSTIC DESCRIPTION: Color reddish yellow, the elytra black, the scutellum and

antennal club piceous to black, the antennal stem becoming piceous beyond segment 2. Antennal length equal to about two-thirds of width of pronotal base, the club three-segmented. Epistomo-frontal region of head with sides straight, the apical angles of epistoma sharply rounded, the apex faintly concave (fig. 104), the epistomal sides and apex immarginate. Postmandibular lobes short, their lateral edges somewhat rounded; terminal segment of maxillary palpus weakly widened (less so than in any other Nearctic species), its width slightly less than twice its length; mentum relatively large, its sides approximately parallel (fig. 79). Pronotal punctures of medium size, rather sparse, scarcely denser laterally; cephalic punctures large and dense, especially laterally above eyes where they are virtually confluent (not differing strongly from *thoracica* in this respect); elytral intervals bearing sparse punctules of moderate size but otherwise smooth, without fissures; elytra rather strongly nitidous, basally immarginate. Body slightly more elongate and distinctly more parallel-sided than that of *frosti* (fig. 2) or *thoracica*. Cephalic stridulatory files present in male, absent in female.

MEASUREMENTS OF TYPE: Length, 4.90 mm.; width, 2.25 mm.

VARIATION: The observed size range, in millimeters, is 3.73 long by 1.59 wide to 5.66 long by 2.62 wide.

MALE GENITALIA: The muscle attachment at the anterior end of the internal sac is stirrup-shaped. The anterior sclerites in the dorsal wall of the internal sac are long and narrow, and they bear short black regions near their posterior ends (fig. 90). These black sections are easily seen in unstained specimens and are straight in all views; they occur in the same position relative to other structures as do the arcuate ones of *thoracica* (fig. 87) and appear to be homologues of the latter. The extreme posterior ends of the anterior sclerites form arcs that describe almost a complete circle, and under these the tapering, flexible posterior end of the enclosed ejaculatory duct lies coiled in a tight spiral (this, however, is true only of the specimen selected for illustration; in others the ejaculatory duct is loosely spiral or straight and extends into the median lobe for perhaps half of the length of the latter). The internal sac is long, extending

almost as far anterior as does the median strut. In other characteristics the aedeagus is similar to that of *thoracica*. (Six specimens dissected.)

BIOLOGY: Biological data on labels are as follows: bred [from] fungus, Tallulah, Louisiana, February 6, 1910; [on] *Hicoria*, Tryon, North Carolina; hibernating under willow bark, Victoria County, Texas, December 11, 1915.

TYPE: Sex not determined; labeled "Type USNM 48811; Tex.; Casey bequest 1925; *puncticeps* Csy." (collection Casey, U.S.N.M.).

TYPE LOCALITY: Austin, Travis County, Texas.

GEOGRAPHICAL DISTRIBUTION: Southeastern United States from North Carolina to Texas. (See Appendix for locality data.)

MATERIAL EXAMINED: Thirty-four specimens.

Triplax thoracica Say, 1825

Triplax thoracica SAY, 1825 (1823–1825), vol. 4, p. 89.

Triplax melanopectera LACORDAIRE, 1842, p. 215.

Triplax thoracica antennata CASEY, 1916, p. 163.

Triplax thoracica obliqua CASEY, 1916, p. 163.

Triplax thoracica brevicollis CASEY, 1916, p. 163.

Triplax thoracica convergens CASEY, 1916, p. 164.

Triplax latiuscula CASEY, 1916, p. 164. New synonymy.

DIAGNOSTIC DESCRIPTION: Color reddish yellow, the elytra and antennal clubs black, the antennal stem becoming gradually darker from base to apex, the scutellum darker than pronotum, usually piceous and virtually concolorous with elytra; body moderately nitidous, essentially glabrous except on abdomen. Antennae similar in shape to those of *frosti* (fig. 2) but slightly longer, their length equal to about three-fourths of width of pronotal base, the club three-segmented. Epistomo-frontal region of head with sides straight, the apical angles of epistoma somewhat obtuse, rather sharply rounded, the apex faintly concave in a shallow V, the epistomal sides and apex immarginate (fig. 104). Post-mandibular lobes with lateral edges straight, parallel; terminal segments of maxillary palpi strongly widened, their width more than three times their length; mentum of moderate size, its sides subparallel (fig. 75).

Pronotal punctures of moderate size, mostly separated by about their diameters or slightly more, those adjacent to the laterobasal row of strong punctures distinctly smaller than the latter; elytral intervals bearing staggered rows of strong punctures, these slightly less numerous than the stria punctures and with diameters about half as great as the latter; the elytra moderately nitidous, basally immarginate. Cephalic stridulatory files present in the male, absent in the female.

MEASUREMENTS OF TYPE: In the original description Say gives the length as 0.2 inch (5.08 mm.).

VARIATION: The observed size range, in millimeters, is 3.04 long by 1.54 wide to 5.66 long by 2.90 wide. The shape of the prothorax and, to a lesser extent, the relative length and width of the body are extremely variable in this species. Proceeding from the New England states to Missouri and Texas, specimens with the pronotum laterally inflated and the pronotal sides strongly arcuate become more common. This sort of variation, however, occurs in an indefinite clinal pattern, and the population is not subject to subspecific division, in the modern sense, on this basis. All of Casey's synonyms are based largely on the shape and relative size of the pronotum. Three of his four subspecies are described as being sympatric in the region of St. Louis, Missouri.

MALE GENITALIA: The aedeagus is shown in figures 87 and 88. The dorsal struts of the tegmen are bent downward anteriorly (fig. 87). The paired anterior sclerites in the dorsal wall of the internal sac terminate posteriorly in short, black sections that are arcuate in lateral view (fig. 87). Sometimes the tapering apical (posterior) end of the enclosed ejaculatory duct forms a spiral of one and one-half turns beneath these black sections; in other specimens it is straight (as illustrated) or somewhat spiral within the anterior end of the median lobe. A black, V-shaped muscle attachment is borne by the anterior end of the internal sac (fig. 88). (Eight specimens dissected, including those from Colorado and New Mexico.)

BIOLOGY: The following biological data appear on labels: in fungus on hemlock, Cornwall, Connecticut, September 30, 1925; in fungus on maple, Litchfield, Connecticut, August, 1919; in *Pleurotus ostreatus*, Wash-

ington, D. C., June 7, 1924; taken by sweeping, Spring Bay region, Illinois, June 21, 1942; in gill fungus on aspen log, Fillmore County, Minnesota, May 25, 1936; from fungus *Pleurotus ostreatus*, Itasca State Park, Minnesota, August, 1936; under bark, Englewood, New Jersey, August 7, 1904; [on] *Hicoria*, Tryon, North Carolina; on *Salix*, Ardmore, Oklahoma, April, 1905.

TYPE: Not seen; presumably destroyed with Say's collection.

TYPE LOCALITY: United States.

GEOGRAPHICAL DISTRIBUTION: Eastern North America from Florida to New Brunswick, westward to Alberta, the Dakotas, Colorado, and New Mexico. Fall and Cockerell (1907, p. 172, *Triton a thoracica*) also report this species from Santa Fe, New Mexico. (See Appendix for locality data.)

MATERIAL EXAMINED: One thousand eight hundred and four specimens.

***Triplax frosti* Casey, 1924**

Triplax frosti CASEY, 1924, p. 180.

DIAGNOSTIC DESCRIPTION: Color reddish yellow, the elytra and antennal clubs black, the antennal stem reddish yellow except for segment 8 which is piceous and intermediate in color between stem and club, the scutellum invariably yellow and concolorous with pronotum. Antennal length equal to about two-thirds of width of pronotal base, the club three-segmented (fig. 2). Epistomo-frontal region of head with sides feebly convex, strongly convergent to the distinctly rounded, obtuse apical angles of epistoma, the apex rather narrow and faintly concave, the epistomal sides and apex vaguely margined. Postmandibular lobes with lateral edges distinctly divergent posteriorly and straight to weakly concave towards apex (fig. 2); terminal segments of maxillary palpi, as in *thoracica* (fig. 75), strongly widened, more than three times as wide as long (fig. 2). Pronotal punctures coarse, especially laterally where they are separated by less than their diameters, those adjacent to the latero-basal row of strong punctures approximately as large as the latter; elytral intervals virtually smooth, with at most only a few scattered, minute punctules apparent, and without fissures; elytra strongly nitidous, consid-

erably more so than in *thoracica*, likewise immarginate basally. Cephalic stridulatory files present in the male, absent in the female.

This form is closely similar to *thoracica* but differs in a number of rather subtle, but constant, characters, as indicated in the descriptions. In this particular case the late Thomas Lincoln Casey is to be thanked for having separated two remarkably similar and closely related species.

MEASUREMENTS OF TYPE: Length, 5.24 mm.; width, 2.90 mm.

VARIATION: The observed size range, in millimeters, is 3.31 long by 1.66 wide to 5.38 long by 2.90 wide. Three specimens have been seen in which the elytral striae are crooked and cross over one another in an entirely teratological manner.

MALE GENITALIA: The muscle attachment at the anterior end of the internal sac (fig. 89) is shaped much like a scoop shovel, with the blade anterior and the concavity dorsal. The ejaculatory duct enters the internal sac dorsally at the posterior edge of the "hole" in this sclerite. The short, black sections of the anterior sclerites in the dorsal wall of the internal sac are absent, but otherwise the aedeagus is similar to that of *thoracica*. (Six specimens dissected.)

BIOLOGY: The following biological data occur on labels: [in] birch fungus, Alfred, Maine, June 17, 1936; from fungus *Pleurotus ostreatus*, Itasca State Park, Minnesota, August, 1936; in gill fungus on aspen log, Fillmore County, Minnesota, May 25, 1936; in fungi in poplar woods, Hennepin County, Minnesota, May 25, 1922; on willow, Fari-bault, Minnesota, June 20, 1922; in fungus on *Populus*, Duparquet, Quebec, July 9, 1936; and numerous notations, "in fungus."

TYPE: Sex not determined; labeled "Type USNM 48810; C. A. Frost, Hopkinton, Mass., VI-2-12; Casey bequest 1925; *frosti* Csy." (collection Casey, U.S.N.M.).

TYPE LOCALITY: Hopkinton, Middlesex County, Massachusetts.

GEOGRAPHICAL DISTRIBUTION: Northeastern North America from Virginia to Maine and Quebec, westward across the Great Lakes region to Alberta. (See Appendix for locality data.)

MATERIAL EXAMINED: Three hundred and thirty specimens.

GENUS *TRITOMA* FABRICIUS, 1775

Tritoma FABRICIUS, 1775, p. 68. Generotype: *Tritoma bipustulata* Fabricius, 1775, p. 68, by subsequent designation by Latreille, 1810, pp. 239, 432.

Cyrtotriplax CROTCH, 1873b, p. 189; 1873a, p. 355. Not *Cyrtotriplax* Gorham, 1896, p. 286.

In connection with the synonymy above, Arrow (1945, pp. 117–118) states: "The familiar name *Tritoma* has suffered from a particularly regrettable duplication. In the sense in which it is at present used, it was first employed by Fabricius (1775, *Syst. ent.*) for the British *Tritoma bipustulata* F. but it was originally bestowed by Geoffroy in 1762 [1762, p. 335, pl. 6, fig. 2] upon the very different insect now called *Mycetophagus quadripustulatus*, of which an easily recognisable figure was given, although unaccompanied by any specific name. Geoffroy's name and diagnosis were reproduced two years later by Mueller, whose 1764, *Fauna Ins. Fridrichsdalina* must be accepted as of true Linnean orthodoxy, although Geoffroy's *Hist. Ins. Paris* is usually rejected. The duplication of the name was discovered by Crotch, who, in 1873, introduced the name *Cyrtotriplax* for the Erotylid genus called *Tritoma* by Fabricius. He named as its type that of *Tritoma* F. (*T. bipustulata* F.), so that Gorham's attempt (1901, *Stettin. ent. Ztg.* 1901:191) to give *Cyrtotriplax* another type and a different application can be ignored."

The present author has been unable to see a copy of Müller's rare paper (1764) but has obtained a photostat of page xiv of that work from the library of the United States Department of Agriculture. On this page Müller treats *Tritoma* wholly and precisely as follows: "*Tritoma? Antennae* extrorsum sensim crassiores, antennulis longiores: *Corpus* oblongum." In the opinion of the present author Müller's use of the mark of interrogation indicates that he considered *Tritoma* a genus *inquirendum*; thus he cannot be said to have validated the name taxonomically. Geoffroy's work is taxonomically invalid because he did not employ binomial nomenclature. We are left, therefore, to use the name *Tritoma* in the Fabrician (and orthodox) sense, and the family name Mycetophagidae cannot justifiably be changed to Tritomidae, as was done, for example, by

Everts (1898, p. 567). According to this interpretation, of course, the subsequent use of *Cyrtotriplax* by Gorham is valid.

DIAGNOSTIC DESCRIPTION: Shape oval to elongate oval (fig. 3), the body widest slightly before the middle, the posterior end more pointed (parabolically rounded) than the obtusely rounded anterior end, the length usually less than 1.8 times the width; pronotum subtrapezoidal, its basal width generally more than 70 per cent greater than apical width; antennal length always less than one-half of the width of pronotal base, the club relatively compact, its length approximately 1.5 times its width, segment 3 of stem subequal in length to segments 4 and 5 together (fig. 3); scutellum subcordate; terminal segments of maxillary palpi semicircular or subtriangular, their width less than twice their length (figs. 3, 105); mentum usually of moderate size and triangular (figs. 3, 106), rarely larger and pentagonal (fig. 107); tibiae moderately to very strongly dilated apically (figs. 3, 114), the dorsal (outer) edge distinctly thin and knife-blade-like apically; coxae widely separated, the abdominal intercoxal process wide and truncate to feebly arcuate (fig. 3). Color similar to that of *Triplax*, the elytra usually uniformly black, less often with reddish yellow basal spots, rarely largely or entirely reddish; prothorax usually unicolorous black or reddish yellow, occasionally of one color above and another below, the pronotum never spotted; pterothorax and abdomen below reddish yellow or piceous. Elytra immarginate basally except in front of humeral cali where the margin is extremely fine. Cephalic stridulatory files always present and alike in both sexes (these are similar to those of *Dacne pubescens*, fig. 36, but they are located somewhat farther posteriad and are largely limited to the sides of the foramen magnum). Pronotum margined laterally and apically, immarginate on the basal lobe; pronotal angle pores much smaller than those of *Triplax* (figs. 101, 102), inconspicuous. Eyes finely faceted (pl. 8, fig. 1). Epistomal apex entirely, narrowly margined (figs. 113, 115, 116) save in the female of *sanguinipennis*. Terminal segment of maxillary palpus (fig. 105) not armed with a brush (if actually present this is always entirely retracted within the slit-like fossa along the truncate

apex of the segment); galea and lacinia of maxilla (fig. 105) similar to those of *Triplax*, the lacinia, however, lacking the two small incurved teeth at apex; terminal segments of labial palpi (figs. 3, 106, 107) distinctly narrower than those of *Triplax* (figs. 69, 71), but each similarly bearing a single strong seta laterally and armed with a minute brush along the apex. Prosternal lines always present, usually sharply curved inward anteriorly (fig. 3), rarely not curved inward, rarely entire and completely delimiting a flat, triangular prosternal plateau; metasternal coxal lines always present and extending halfway or more between posterior edge of coxa and metasternal side; abdominal coxal lines present. Secondary sexual characters absent except in *sanguinipennis*, the male of which has the epistomal apex margined (fig. 115), the female immarginate.

MALE AND FEMALE GENITALIA: (See descriptions under the species groups).

WORLD DISTRIBUTION AND SIZE: Approximately 105 species are currently recognized in *Tritoma*. Of these, 13 are Nearctic, one is Neotropical, 34 are Palearctic, 10 Ethiopian, 46 Oriental, and one is Australian. Curiously enough, the 13 Nearctic species occur only in eastern North America east of the 100th meridian (with the exception of three extremely doubtful specimens). The closely related genus *Triplax*, on the other hand, occurs generously in both eastern and western North America. No species is known to be Holarctic.

BIOLOGY: In the experience of the present author those forms in species group *humeralis* prefer terrestrial toadstools as hosts, while those in species group *sanguinipennis* have been taken only on soft fungi on logs. Species of *Tritoma* apparently do not occur in the large numbers so typical of *Triplax* species; usually only a few individuals occur on a single sporophore.

Scheerpeltz and Höfler (1948, p. 222, pl. 4, fig. 33) discuss and figure the adult of *Tritoma bipustulata*, the European genotype, in color; colored figures of its fungous hosts are also presented. The adult is also figured in color by Olivier (1789–1808, vol. 5, p. 492, no. 89, *Triplax* pl. 1, fig. 5) and Curtis (1824–1840, vol. 11, p. 498), and in black and white by Janson (1863, p. 22, fig. 95). The larva and pupa of this species are described and the

larva is figured by Perris (1877, pp. 570–574, pl. 14, figs. 574–579), and these are compared to those of *Triplax russica*, which they closely resemble. Peterson (1951, pp. 46, 98–99, 190–191, figs. C7R, C53A) describes and figures the larva of a *Tritoma* species, probably North American.

INTRAGENERIC RELATIONSHIPS OF SPECIES: The 11 species comprised in species group *humeralis* agree so well in all important characters, both external and genitalic, that it is difficult to discern relationships between them. Such tenuous characters as color pattern, body shape, size, and degree of tibial dilation offer some clues, however, and the species are arranged on the following pages in a linear series that seems to place related forms next to one another. The two forms in species group *sanguinipennis* are highly aberrant and should, perhaps, be placed in a taxon of their own. Nevertheless, it is deemed unnecessary at the present time to erect subgenera on the basis of the North American forms alone.

KEY TO NEARTIC SPECIES GROUPS AND SPECIES OF *Tritoma*

1. Epistomal apex truncate to feebly arcuately concave, the submarginal striae transverse (fig. 113); prosternum campanulate, the prosternal lines distinctly curved inward anteriorly (fig. 3); mentum triangular (figs. 3, 106) . . . species group *humeralis*, 2 (p. 119)
- Epistomal apex either distinctly concave in a shallow V (fig. 115) or truncate, with the submarginal striae evenly arcuate between antennal insertions (fig. 116); prosternum either campanulate but with the prosternal lines not bent sharply inward anteriorly or triangular, flat, and completely margined by the prosternal lines; mentum pentagonal (fig. 107)
- . . . species group *sanguinipennis*, 13 (p. 125)
2. Body entirely reddish yellow below3
- Body piceous at least medially on pterothorax and abdomen below5
3. Pronotum piceous to black . *biguttata* (p. 121)
- Pronotum reddish yellow4
4. Elytra entirely piceous to black
- *affinis* (p. 120)
- Elytra with reddish yellow basal spots
- *carolinae* (p. 120)
5. Elytra partly reddish yellow, partly piceous to black6
- Elytra entirely piceous to black8
6. Elytra reddish yellow, with a piceous border

- *mimetica* (p. 125)
 Elytra piceous to black, with reddish yellow
 basal spots 7
 7. Pronotum reddish yellow . . . *aulica* (p. 121)
 Pronotum piceous to black . . . *humeralis* (p. 122)
 8. Body entirely dark brown to black . . . 11
 Body not entirely dark, at least the head
 reddish yellow 9
 9. Head reddish yellow, the rest of body black
 *erythrocephala* (p. 123)
 Both head and prothorax reddish yellow or
 ferruginous 10
 10. Tibiae moderately dilated apically (not more
 strongly than in fig. 3). *atriventris* (p. 122)
 Tibiae strongly dilated apically (fig. 114) .
 *angulata* (p. 123)
 11. Pronotal punctures extremely large and
 sparse on disc, rapidly becoming much
 smaller and denser laterally
 *unicolor* (p. 124)
 Pronotal punctures moderate on disc, scarcely
 smaller and denser laterally 12
 12. Hind tibiae with outer (upper) apical angles
 sharply angular (fig. 120); cephalic punc-
 tures dense, mostly separated by less than
 their diameters *tenebrosa* (p. 124)
 Hind tibiae with outer (upper) apical angles
 rounded; cephalic punctures relatively
 sparse, separated by more than their
 diameters *angulata* (p. 123)
 13. Epistomal apex distinctly concave in a shallow
 V (fig. 115); prosternum not entirely marg-
 ined; elytra entirely reddish yellow; scutel-
 lum concolorous with elytra
 *sanguinipennis* (p. 126)
 Epistomal apex transverse, the submarginal
 striole evenly arcuate (fig. 116); prosternum
 completely margined; elytra partially pice-
 ous; scutellum concolorous with pronotum
 *pulchra* (p. 126)

SPECIES GROUP *humeralis*

The 11 species in this group are remarkably homogeneous in external as well as in genitalic characters. Although they agree exactly with the generotype, *bipustulata*, in external characters, there are nevertheless some differences in the genitalia (see below). While in most cases color pattern must be relied on for specific differences, there seems little question regarding the specific integrity of any of the 11 forms recognized here. Indeed, it appears not improbable that variant forms of *angulata* and *erythrocephala* (mentioned under variation in the descriptions) will prove to be distinct species.

DIAGNOSTIC DESCRIPTION: Epistomal apex

truncate (fig. 113) to feebly arcuately concave. Mentum triangular, of moderate size (figs. 3, 106). Postmandibular lobes present but poorly developed, never attaining inner edges of eyes in ventral view, nearly always entirely covered by terminal segments of maxillary palpi (hence of scant taxonomic value). Prosternal lines always short and bent sharply inward anteriorly, the prosternum consequently distinctly campanulate (fig. 3). Tibiae moderately to strongly dilated apically (from somewhat less than in fig. 3 to somewhat more than in fig. 114).

MALE GENITALIA: The aedeagus (fig. 108) exhibits no distinct variations within the species group. The arms of the tegmen are firmly united anteriorly, each is produced dorsolaterally into a moderate tooth-like lobe just in front of the basal piece, and ventrally the arms are narrowly semi-membranous. The median strut is relatively short, no longer than the median lobe. The internal sac bears no distinct muscle attachment at its anterior end and lies entirely within the median lobe. There is no continuation of the ejaculatory duct within the internal sac, i.e., no enclosed ejaculatory duct. (In fig. 108 the sclerotization of the median lobe is omitted, and the position of the internal sac within is indicated by a broken line.) The aedeagus of *bipustulata*, the European generotype, is similar except that the internal sac protrudes through the median foramen for a distance equal to about one-third of the length of the median strut and bears a number of short, longitudinal, sclerotized areas around its anterior end. (Sixty-seven specimens dissected.)

FEMALE GENITALIA: As in the case of the aedeagus, the female genital tube displays no distinct specific differences within the species group. The entire structure (fig. 111) is extremely short, but the full complement of component parts is present. The proctiger lobe and the vulvar lobe are relatively large, and the weakly sclerotized straps appendant to the eighth tergite and sternite are short and faint but detectable. The seminal receptacle is typical for North American erotylids—small, subglobular, and bearing a short sclerotized arm (in fig. 111 it is shown at one side of the anterior apodeme of the eighth sternite; its normal position when the tube is

everted is within segment 8). The female genital tube of *bipustulata*, the generotype, is even more strongly shortened. Its parts are more strongly sclerotized, and the styli are extremely short, scarcely longer than wide. (Sixty-five specimens dissected.)

***Tritoma affinis* Lacordaire, 1842**

Tritoma affinis LACORDAIRE, 1842, p. 224.

?*Tritoma livida* LACORDAIRE, 1842, p. 227.

Tritoma nigripennis CASEY, 1916, p. 162. New synonymy.

Tritoma pinorum CASEY, 1924, p. 178. New synonymy.

Tritoma caseyi DEELDER, 1942, p. 94, new name for *Tritoma nigripennis* Casey, 1916, not *Tritoma nigripennis* Motschulsky, 1858, p. 114. New synonymy.

DISCUSSION OF SYNONYMY: Leng (1920, p. 201) lists *livida* questionably as a synonym of *affinis*, as above. It is apparent from Lacordaire's description of *livida* that he was concerned with a teneral specimen. While it appears more probable that he was dealing with *affinis*, he may nevertheless have had a teneral of *angulata*; his description also fits the latter rather well.

DIAGNOSTIC DESCRIPTION: Color bright reddish yellow, the elytra black, nitidous; antennal club fuscous, the scutellum reddish yellow to black, usually intermediate in color. Shape of body and tibial dilation similar to those of *biguttata* (fig. 3). Punctures of head and pronotum small, rather sparse, not sharply incised, moderately denser laterally.

This species is more likely to be confused with *angulata* than any other; the tibiae, however, are much less strongly dilated apically than in the latter (cf. figs. 3, 114).

MEASUREMENTS OF TYPE: In the original description Lacordaire gives the size as follows: length, 1.5 lines (3.18 mm.); width, 0.8 lines (1.70 mm.).

VARIATION: The observed size range, in millimeters, is 2.90 long by 1.66 wide to 4.21 long by 2.48 wide.

BIOLOGY: The following biological data occur on labels: [on] toadstool, Oxon Run, D. C., July 23, 1921; [on] *Morus*, Tyron, North Carolina; [in] woods trash, Florence, South Carolina, February 8, 1939; on mushrooms, Creeds, Virginia, October 13, 1944.

TYPE: Not seen. Horn and Kahle (1935-1937, vol. 2, p. 146) give the disposition of

Lacordaire's collection.

TYPE LOCALITY: North America.

GEOGRAPHICAL DISTRIBUTION: Eastern North America from Florida to Virginia, west to Iowa, Missouri, and Texas. Not known from states bordering the Great Lakes. (See Appendix for locality data.) * †

MATERIAL EXAMINED: One hundred and fifty-one specimens.

***Tritoma carolinae* Casey, 1916**

Tritoma carolinae CASEY, 1916, p. 162.

DIAGNOSTIC DESCRIPTION: Color reddish yellow, the antennal club fuscous, the scutellum and elytra piceous to black, moderately nitidous, each elytron bearing a large, subtriangular yellow spot basally that extends from side of scutellum to humeral callus and posteriorly for from one-fourth to one-third of elytral length, occasionally much reduced. Shape of body and tibial dilation similar to those of *biguttata* (fig. 3). Punctures of head and pronotum small, rather sparse, not sharply incised, moderately denser laterally.

This form is distinguished from *biguttata* by its yellow pronotum, from *affinis* by its yellow basal elytral spots. Without the basal elytral spots (and these are almost obsolete in three of the 29 specimens at hand) it would be identical to *affinis*. Although *carolinae* may be a variety of *affinis*, the data are insufficient to warrant assigning it subspecific status: morphologically, intergradation is neither complete nor common; geographically, the range of *carolinae* is almost wholly included within that of *affinis*; and statistically, the two have been taken in almost equal numbers over most of the range of *carolinae*.

MEASUREMENTS OF TYPE: Length, 3.86 mm.; width, 2.25 mm. (In the original description Casey gives the length as 3.7 mm., the width as 2.2 mm.)

VARIATION: The observed size range, in millimeters, is 2.83 long by 1.59 wide to 4.35 long by 2.48 wide.

BIOLOGY: The following biological notes appear on labels: [on] *Morus*, Tryon, North Carolina; on mushroom, Creeds, Virginia, October 13, 1944.

TYPE: Female; labeled "Type USNM 48800; Southern Pines NC, A. H. Manee; Casey bequest 1925; *carolinae* Csy." (collection Casey, U.S.N.M.).

TYPE LOCALITY: Southern Pines, Moore County, North Carolina.

GEOGRAPHICAL DISTRIBUTION: Eastern United States from North Carolina to Pennsylvania. (See Appendix for locality data.)

MATERIAL EXAMINED: Thirty specimens.

***Tritoma biguttata* (Say, 1825)**

Triplax biguttata SAY, 1825 (1823-1825), vol. 4, p. 89.

Tritoma biguttata (Say), SAY, 1826 (1825-1826), p. 301.

Tritoma basalis LACORDAIRE, 1842, p. 225.

DIAGNOSTIC DESCRIPTION: Color reddish yellow, the antennal club fuscous, the following piceous to black: disc of head, pronotum above and pronotal epipleura below, scutellum, and elytra except for a large, subtriangular yellow spot basally on each that extends from side of scutellum to humeral callus and posteriorly for from one-fourth to one-half of elytral length. Body shape elongate-oval, the tibiae moderately dilated apically (fig. 3). Punctures of head and pronotum small, rather sparse, moderately denser laterally.

Judging from the quantity of material in collections this is the most common species of *Tritoma* in North America. It is occasionally confused with *humeralis*, but in that species the basal elytral spots are displaced laterally and the body is largely black below.

MEASUREMENTS OF TYPE: In the original description Say states, "Length less than three-twentieths of an inch" (less than 3.61 mm.).

VARIATION: The observed size range, in millimeters, is 2.69 long by 1.52 wide to 4.42 long by 2.62 wide.

BIOLOGY: Biological data on labels are as follows: in cypress stump, about 4 miles southeast of Prince Frederick, Maryland, July 11, 1931; taken on *Armillaria mellea* (Vahl) ex Fries, Dorchester, Massachusetts, September 27, 1908; on *Amanita strobiformis*, Falls Church, Virginia, July 1, 1919; and several notations, "in fungi."

TYPE: Not seen; presumably destroyed with Say's collection.

TYPE LOCALITY: United States.

GEOGRAPHICAL DISTRIBUTION: Eastern North America from North Carolina to New Hampshire, west to Michigan, Illinois, Missouri, and Tennessee. Two specimens

seem highly questionable: one labeled "St. George, Utah; Chas. Palm" (A.M.N.H.), and one labeled "Tex." (collection F.C. Bowditch, M.C.Z.). Dr. P. J. Darlington, Jr., at the Museum of Comparative Zoölogy states that Bowditch collection specimens that extend ranges are not to be trusted, for Bowditch is known to have purchased a collection of Coleoptera bearing spurious locality labels (personal communication). (See Appendix for locality data.)

MATERIAL EXAMINED: Nine hundred and twenty-five specimens.

***Tritoma aulica* (Horn, 1871)**

Triplax (Tritoma) aulica HORN, 1871, p. 343.

DIAGNOSTIC DESCRIPTION: Color reddish yellow, the antennal club fusco-piceous, the following piceous to black: scutellum, elytra except for humeral spots, and pterothorax and abdomen below; middle and hind coxae and trochanters and base of prosternum variable, yellow to piceous or intermediate in color; periphery of abdomen usually lighter; humeral elytral spots subquadrate, extending from third striae to sides and including bases of elytral epipleura below, produced posteriorly farthest along inner edges for about one-third of elytral length. Shape of body more broadly oval, more distinctly pointed behind, than in *biguttata* (fig. 3), the length approximately 1.5 times the width. Tibiae slightly less dilated apically than those of *biguttata* (fig. 3). Punctures of head and pronotum similar to those of preceding species, i.e., small, rather sparse, not strongly denser laterally.

This species bears a similar relationship to *humeralis* as *carolinae* bears to *biguttata*, i.e., the only apparent difference between the members of each pair is the color of the prothorax. Indeed, Leng (1920, p. 201) lists *aulica* as a race of *humeralis*. There is, however, a complete lack of intergradation between the two forms, and they are sympatric over the entire known range of *aulica*.

MEASUREMENTS OF TYPE: These were not taken when the type was examined. In the original description Horn gives the length as ".12-.18 inch; 3-4.5 mm."

VARIATION: The observed size range, in millimeters, is 2.83 long by 1.66 wide to 4.07 long by 2.55 wide.

TYPE: Sex not determined; labeled "Lecto-type; *T. aulica* Horn; Mo.; No. 3168" (collection Horn, A.N.S.P.).

TYPE LOCALITY: Missouri (probably near St. Louis).

GEOGRAPHICAL DISTRIBUTION: Known only from Illinois, Missouri, Kansas, and, perhaps questionably, from Maryland. Ten specimens in the Otto Lugger collection of the University of Minnesota bear the printed label "Mo."; on four of these, however, a vertical line has been drawn along the right side of the "o" to make the label read "Md." With the exception of the added vertical line these labels are identical to C. V. Riley's "Mo." labels on United States National Museum specimens. (See Appendix for locality data.)

MATERIAL EXAMINED: Thirty-seven specimens.

Tritoma humeralis Fabricius, 1801

Tritoma humeralis FABRICIUS, 1801, vol. 2, p. 571.

Tritoma ruficeps LeConte, 1847, p. 72.

Tritoma vittata LeConte, 1847, p. 72.

Tritoma taeniata LeConte, 1847, p. 73.

Tritoma ornata Casey, 1916, p. 161. New synonymy.

DIAGNOSTIC DESCRIPTION: Color piceous to black, the antennal club fusco-piceous, the following reddish yellow: base of head above, subquadrate humeral elytral spots, abdominal apex, and appendages; coxae and trochanters variable, usually intermediate in color; humeral elytral spots extending from third striae to sides and including bases of elytral epipleura below, produced posteriorly farthest along inner edges for about one-third of elytral length, occasionally reduced to one-sixth of elytral length. Body shape distinctly more broadly oval, more sharply pointed behind, than in *biguttata* (fig. 3), the length scarcely more than 1.5 times the width. Tibiae somewhat less strongly dilated apically than those of *biguttata* (fig. 3). Punctures of head and pronotum small, not sharply incised, rather sparse, moderately denser laterally.

MEASUREMENTS OF TYPE: In the original description Fabricius states only that the size is similar to that of *bipustulata* (which is approximately equal to that of the preceding species here).

VARIATION: The observed size range, in

millimeters, is 2.44 long by 1.52 wide to 4.14 long by 2.55 wide. Some of the normally piceous parts of the body, especially the head and the pleural sclerites, appear to be slow in developing their full color during the life of the adult. The type of LeConte's *ruficeps* is a specimen in which the head has just begun to color up; the type of *taeniata*, however, is virtually a typical specimen! Occasionally specimens are encountered in which the reddish yellow of the humeral spots is spread unevenly over most of the elytra along the intervals. The types of *vittata* LeConte and *ornata* Casey are similar specimens of such nature.

BIOLOGY: Biological data on labels are as follows: on *Polyposus radicata*, Ames, Iowa, August 12, 1948; on toadstool, Takoma Park, Maryland, August 1931; [on] mushrooms, Wemple, New York, July 6, 1896; and several notations, "in fungi."

PUBLISHED ILLUSTRATIONS: The larva and adult are figured (rather poorly) by Wickham (1894, p. 342, figs. 62, 63).

TYPE: Not seen. See Horn and Kahle (1935-1937, vol. 2, p. 71) for the disposition of Fabricius' collection; the type material may yet be extant.

TYPE LOCALITY: "Carolina" (that part of the United States so designated around 1800).

GEOGRAPHICAL DISTRIBUTION: Eastern North America from South Carolina to Massachusetts and Quebec, west to Minnesota, Iowa, Kansas, Arkansas, and Texas. Unknown from Georgia and the Gulf coast states, with the single exception of one specimen from Texas. (See Appendix for locality data.)

MATERIAL EXAMINED: Four hundred and eighty-four specimens.

Tritoma atriventris LeConte, 1847

Tritoma atriventris LeConte, 1847, p. 71.

Tritoma evanescens Casey, 1924, p. 178. New synonymy.

DIAGNOSTIC DESCRIPTION: Color ferruginous or dark yellowish red, the antennal club fusco-piceous, the following black: elytra, pterothorax, and abdomen, the latter red apically; scutellum and middle and hind coxae red to piceous, usually intermediate in color. Body slightly more oval and more distinctly pointed behind than in *biguttata* (fig.

3), the length approximately 1.6 times the width. Tibiae less strongly dilated apically than those of *biguttata* (fig. 3). Punctures of head and pronotum of moderate size and density, those of pronotum smaller and denser laterally, not sharply incised (see variation below).

MEASUREMENTS OF TYPE: Length, 3.66 mm.; width, 2.21 mm. In the original description LeConte gives the size thus, "Long. .15 unc. lat. .08" (3.81 mm. long by 2.03 mm. wide).

VARIATION: The observed size range, in millimeters, is 2.69 long by 1.73 wide to 4.14 long by 2.62 wide. In a few specimens the cephalic punctures are extremely dense, and those of the weak pronotal basal impressions are distinctly larger than on the rest of the pronotum.

BIOLOGY: Despite the number of specimens examined only the following two notes appear on labels: on *Carduus* species, Denton, Texas, May 23; in fungi, Eastland County, Texas, March 17, 1921.

TYPE: Sex not determined; labeled "Type 6770; *T. atriventris* Lec." (collection LeConte, M.C.Z.).

TYPE LOCALITY: South Carolina.

GEOGRAPHICAL DISTRIBUTION: Southeastern United States from Florida to Virginia, west to Kansas, Oklahoma, and Texas. (See Appendix for locality data.)

MATERIAL EXAMINED: Three hundred and fifty-eight specimens.

***Tritoma erythrocephala* Lacordaire, 1842**

Tritoma erythrocephala LACORDAIRE, 1842, p. 226.

Tritoma flavipes LACORDAIRE, 1842, p. 226. New synonymy.

DIAGNOSTIC DESCRIPTION: Color piceous to black, the antennal club fuscous, the head, appendages, and extreme apex of abdomen reddish yellow, the scutellum and prosternal apex occasionally reddish and intermediate in color. Shape of body a bit more broadly oval, more pointed behind, than in *biguttata* (fig. 3). Tibiae less strongly dilated than those of *biguttata* (fig. 3). Punctures of head and prothorax small, uncommonly sparse, distinctly sharply incised, those of pronotum larger in the faint basal impressions (see variation below).

Teneral specimens of this form are likely to be confused with *angulata* on the basis of color, but the tibiae of the latter are much more strongly dilated apically (fig. 114).

MEASUREMENTS OF TYPE: In the original description Lacordaire gives the size range (for his specimens, or for the species) as follows: length, 0.75–1.25 lines (1.59–3.18 mm.); width, 0.50–0.75 lines (1.06–1.59 mm.).

VARIATION: The observed size range, in millimeters, is 3.04 long by 1.89 wide to 4.14 long by 2.69 wide. A dozen specimens having much denser, less sharply incised punctures on head and pronotum, the body below in some cases vaguely reddish, and the tibiae a little more strongly dilated than in the typical form are here assigned to this species. These come from widely separated localities in the range of the species and appear to intergrade with the typical form. Some of these, in which the head is scarcely lighter than the pronotum, are doubtless *flavipes* Lacordaire.

TYPE: Not seen. Horn and Kahle (1935–1937, vol. 2, p. 146) account for the fate of Lacordaire's collection.

TYPE LOCALITY: North America.

GEOGRAPHICAL DISTRIBUTION: Eastern North America from Florida to New York, southwestward to Texas. Two specimens labeled "C[entral] Col[orado]" (collection O. Lugger, U. Minn.), are considered extremely doubtful, likely mislabeled. (See Appendix for locality data.)

MATERIAL EXAMINED: One hundred and four specimens.

***Tritoma angulata* Say, 1826**

Tritoma angulatum SAY, 1826 (1825–1826), p. 300.

?*Tritoma unicolor* var. *A* LACORDAIRE, 1842, p. 220.

Tritoma brunnea LACORDAIRE, 1842, p. 222. New synonymy.

DIAGNOSTIC DESCRIPTION: Color uniformly brown to black, moderately nitidous, the appendages except antennal clubs yellow; head, prothorax, and scutellum occasionally somewhat lighter than rest of body (see variation below). Shape of body similar to that of *biguttata* (fig. 3), scarcely more pointed posteriorly than anteriorly, the length approximately 1.7 times the width. Tibiae very

strongly dilated apically (fig. 114). Punctures of head and pronotum small, sparse, sharply incised, scarcely denser laterally.

This form can be confused with *erythrocephala*, but the tibiae (fig. 114) are much more strongly dilated than in that species. From *unicolor* and *tenebrosa* it differs in having yellow legs, a smaller average size, and pronotal punctures of almost uniform size and distribution.

MEASUREMENTS OF TYPE: In the original description Say states, "Length nearly three-twentieths of an inch" (nearly 3.61 mm.).

VARIATION: The observed size range, in millimeters, is 2.97 long by 1.79 wide to 4.28 long by 2.55 wide. In six specimens the head, prothorax, and scutellum are distinctly yellowish and concolorous with the legs, strongly contrasting with the darker elytra and rest of body below.

BIOLOGY: Nine specimens are labeled "In fungus lott wood" (in fungus in wood-lot?), Flatbush, Long Island, New York, July 19, 1890.

TYPE: Not seen; presumably destroyed with Say's collection.

TYPE LOCALITY: United States.

GEOGRAPHICAL DISTRIBUTION: Eastern United States from Georgia to Massachusetts, west to Iowa, Nebraska, Missouri, Arkansas, and Texas. (See Appendix for locality data.)

MATERIAL EXAMINED: Three hundred and nine specimens.

***Tritoma unicolor* Say, 1826**

Tritoma unicolor SAY, 1826 (1825-1826), p. 300.

Tritoma unicolor LACORDAIRE, 1842, p. 220. New synonymy.

Evidently Lacordaire inadvertently created a homonymous synonym of this form, for he makes no reference whatever to Say's description. His variety *A* (*loc. cit.*) is almost certainly *T. angulata* Say.

DIAGNOSTIC DESCRIPTION: Color uniformly dark brown to black, moderately nitidous, the antennal stem, palpi, and tarsi somewhat lighter. Body shape slightly broader than that of *biguttata* (fig. 3), similarly scarcely more pointed posteriorly than anteriorly, the length approximately 1.65 times the width. Tibiae rather strongly dilated, intermediate between those of *biguttata* (fig. 3) and *angu-*

lata (fig. 114). Pronotal punctures excessively large, sparse, and unevenly distributed on disc, much smaller and denser laterally, scarcely larger than punctures of elytral intervals along extreme sides; cephalic punctures strong, dense, rather evenly spaced.

The extremely large, sparse, bluntly incised punctures of the pronotal disc distinguish this species at once from all others.

MEASUREMENTS OF TYPE: In the original description Say states, "Length nearly one-fifth of an inch" (*ca.* 4-4.5 mm.).

VARIATION: The observed size range, in millimeters, is 3.31 long by 1.93 wide to 5.52 long by 3.31 wide.

BIOLOGY: The following biological data appear on labels: from *Caluatiia craniiformis*, Texico, Illinois, August, 1927; in fungus at base of stump, Englewood, New Jersey, September 25, 1904; *ex Hypoloma*, Camp Humphrey, Virginia, September; *ex fungus Clitocybe illudens*, Falls Church, Virginia, August 3 to 20, 1914; and several notations, "in fungi."

TYPE: Not seen; presumably destroyed with Say's collection.

TYPE LOCALITY: United States.

GEOGRAPHICAL DISTRIBUTION: Eastern North America from Georgia to Massachusetts, New York, and Ontario, westward to Minnesota, Iowa, Kansas, and Louisiana. (See Appendix for locality data.)

MATERIAL EXAMINED: Five hundred and twelve specimens.

***Tritoma tenebrosa* Fall, 1912**

Tritoma tenebrosa FALL, 1912, p. 41.

DIAGNOSTIC DESCRIPTION: Color uniformly dark brown to carbonaceous, dull, scarcely nitidous; antennal stem, mouth parts, tarsi (and occasionally the abdomen and legs) vaguely lighter. Shape of body similar to that of *biguttata* (fig. 3), scarcely more pointed posteriorly than anteriorly, the length approximately 1.7 times the width. Tibiae very strongly dilated apically, rather more so than those of *angulata* (fig. 114), the posterior ones with the outer (upper) apical angles sharp, almost right-angular (as in fig. 120). Punctures of pronotum small, shallow, and sparse medially, becoming gradually deeper, slightly larger, and denser laterally, again smaller along extreme sides where they are distinctly

larger than the minute punctules of elytral intervals. Cephalic punctures larger than pronotal, extremely dense, mostly separated by less than their diameters. Entire surface of body and appendages covered by a distinct, minutely reticulate or granular microsculpture that destroys virtually all nitidosity (this characteristic present but less strongly developed in most other species).

The uniformly small pronotal discal punctures, greatly dilated tibiae, with the outer apical angles of the posterior ones sharp-angled, and dull surface separate this form easily from *unicolor* and *angulata*.

MEASUREMENTS OF TYPE: Length, 4.97 mm.; width, 2.90 mm. In the original description Fall gives the length as 4.8 mm., the width as 2.75 mm.

VARIATION: The observed size range, in millimeters, is 3.80 long by 2.42 wide to 5.66 long by 3.45 wide.

TYPE: Sex not determined; labeled "Southern Pines, N. C., IX-8-11, A. H. Manee; *T. tenebrosa* Fall; M.C.Z. Type 24492" (collection Fall, M.C.Z.).

TYPE LOCALITY: Southern Pines, Moore County, North Carolina.

GEOGRAPHICAL DISTRIBUTION: Eastern United States from Alabama to Florida, north to Pennsylvania and New York. (See Appendix for locality data.)

MATERIAL EXAMINED: Thirty-nine specimens.

Tritoma mimetica (Crotch, 1873)

Cyrtotriplax mimetica CROTCH, 1873a, p. 355.

Tritoma mimetica (Crotch), KUHN, 1911, p. 57.

DIAGNOSTIC DESCRIPTION: Color reddish yellow, the following piceous to black: head above and gular region below, antennal clubs, entire prothorax, mesosternum, metasternum, disc of abdomen, trochanters, and an even elytral border about two intervals wide beginning just behind humeral calli and including elytral epipleura below; extreme base of head above red when head is bent downward. Shape of body more broadly oval than that of *biguttata* (fig. 3), distinctly more pointed posteriorly than anteriorly, the length approximately 1.6 times the width. Tibiae moderately dilated apically, similar to those of *biguttata* (fig. 3). Pronotal punctures moderately strong and deep, denser laterally

where they are separated by less than their diameters; punctures of head similar to those of pronotal sides.

The typical tritomine prosternum (fig. 3) and epistoma (fig. 113) separate this species readily from *pulchra* and *sanguinipennis*.

MEASUREMENTS OF TYPE: Length, 4.62 mm.; width, 2.97 mm. In the original description Crotch states the length to be 0.18 inch (4.57 mm.).

VARIATION: The observed size range, in millimeters, is 3.17 long by 1.93 wide to 4.83 long by 3.04 wide.

TYPE: Sex not determined; labeled "Type 6769; Ill.; *mimetica* Cr. type" (collection LeConte, M.C.Z.).

TYPE LOCALITY: Illinois.

GEOGRAPHICAL DISTRIBUTION: Eastern North America from Georgia to New York, west to Kansas and Arkansas. (See Appendix for locality data.)

MATERIAL EXAMINED: One hundred and forty-three specimens.

SPECIES GROUP *sanguinipennis*

The two species in this group are evidently much more closely related to each other than either is to species group *humeralis* on the basis of external characters. While the genitalia of the female supply no evidence of their close relationship, those of the male agree in at least one characteristic.

DIAGNOSTIC DESCRIPTION: Epistomal apex distinctly concave in a shallow V (fig. 115) and the elytra entirely reddish yellow, or epistomal apex truncate with the submarginal striae evenly arcuate (fig. 116) and the elytra parti-colored. Mentum pentagonal, very large (fig. 107) to somewhat smaller. Postmandibular lobes well developed, attaining or overlapping inner edges of eyes in ventral view of head. Prosternal lines either equal in length to those of species group *humeralis* (fig. 3) but not bent sharply inward anteriorly or extending forward and meeting at prothoracic apex to delimit completely a flat, equilateral-triangular prosternal plateau. Tibiae scarcely dilated apically, much less strongly so than is generally true in species group *humeralis* (they are approached in this character, however, by *erythrocephala* in that species group).

MALE GENITALIA: The aedeagi of the two

species in this group have little in common, yet both differ from those of species group *humeralis* in having the internal sac protruding through the median foramen for a considerable distance. (See descriptions under the species.)

FEMALE GENITALIA: (See descriptions under the species).

***Tritoma sanguinipennis* (Say, 1825)**

Triplax sanguinipennis SAY, 1825 (1823–1825), vol. 4, p. 89.

Tritoma sanguinipennis (Say), SAY, 1826 (1825–1826), p. 301.

Mycotretus sanguinipennis (Say), CROTCH, 1873a, p. 354.

DIAGNOSTIC DESCRIPTION: Color piceous to black, the antennal clubs fuscous, the following bright reddish yellow: elytra, scutellum, abdomen (the base variable—sometimes entirely reddish yellow, sometimes the two basal segments piceous, usually intermediate between these extremes), palpi, and antennal stems. Shape of body more broadly oval than that of *biguttata* (fig. 3), distinctly more pointed posteriorly than anteriorly, the length approximately 1.5 times the width; pronotal sides strongly convergent anteriorly, feebly arcuate, the pronotal apex weakly convex medially; epistomal apex concave in a shallow V (fig. 115); mentum extremely large, pentagonal (fig. 107); postmandibular lobes attaining inner edges of eyes in ventral view, their lateral edges weakly arcuate, convergent anteriorly, but short, approximately half as long as eyes; prosternal lines straight, not bent sharply inward anteriorly (cf. fig. 3). Tibiae scarcely dilated apically, much less strongly so than in *biguttata* (fig. 3). Pronotal punctures of moderate size, rather sparse on disc becoming gradually smaller and denser laterally, largest in feeble basal impressions; cephalic punctures similar in size and density to those of pronotal sides; striae punctures of elytra sub-piceous or “water-soaked” in appearance. Sexual dimorphism: epistomal apex margined in males (fig. 115), immarginate in females.

The V-shaped concavity of the epistomal apex (fig. 115) and the entirely reddish yellow elytra separate this form from all others.

MEASUREMENTS OF TYPE: In the original

description Say states, “Length less than one-fifth of an inch” (ca. 4–4.5 mm.).

VARIATION: The observed size range, in millimeters, is 3.17 long by 2.00 wide to 5.04 long by 3.17 wide.

MALE GENITALIA: The aedeagus differs from that in species group *humeralis* (fig. 108) in being somewhat more robust and more strongly sclerotized, and the internal sac extends anteriorly of the median lobe for a distance equal to about one-third of the length of the median strut. The anterior end of the internal sac bears no distinct muscle attachment, but it resembles that of the generotype, *bipustulata*, in bearing several short, longitudinal sclerotized areas in this region. (Five specimens dissected.)

FEMALE GENITALIA: The female genital tube is similar to that of species group *humeralis* (fig. 111) in gross appearance, but it is more strongly sclerotized. The valvifers, moreover, are somewhat triangular, and their sides are distinctly convergent posteriorly in dorsal or ventral view. (Five specimens dissected.)

BIOLOGY: The following biological data appear on labels: on *Favolus canadensis*, Ames, Iowa, August 12 and 19, 1948; mixed mesophytic [woodland], northwest sweeps, Kentucky Ridge State Forest, 1200 feet, June 11, 1947; in fungi, *Hexagonia alveraris*, Linden, Maryland, May 20, 1919.

PUBLISHED ILLUSTRATIONS: An excellent figure of the adult is presented by Froeschner and Meiners (1953, p. 22, fig. 2).

TYPE: Not seen; presumably destroyed with Say's collection.

TYPE LOCALITY: United States.

GEOGRAPHICAL DISTRIBUTION: Eastern North America from Georgia to New York and Ontario, westward to Minnesota, Iowa, Kansas, and Arkansas. (See Appendix for locality data.)

MATERIAL EXAMINED: Two hundred and ninety-seven specimens.

***Tritoma pulchra* Say, 1826**

Tritoma pulchrum SAY, 1826 (1825–1826), p. 301.

Tritoma cincta LACORDAIRE, 1842, p. 223. Not *Tritoma cincta* ARROW, 1925, p. 135.

Tritoma dimidiata LACORDAIRE, 1842, p. 224.

Tritoma basale MELSHEIMER, 1847, p. 175.

Mycotretus pulchra (Say), CROTCH, 1873a, p. 354.

Tritoma sellata KUHN, 1910, p. 247. New synonymy.

Mycotretus pulcher (Say), KUHN, 1911, p. 52.

DISCUSSION OF SYNONYMY: Lacordaire's descriptions of *cincta* and *dimidiata* leave no doubt that he had specimens of *pulchra*, in which the elytral color pattern is variable, before him. The type material of *basale* could not be located in the Melsheimer-Ziegler collection at the Museum of Comparative Zoölogy, but the same may be said for Melsheimer's description of that form. Dr. Kurt Delkeskamp of the Royal Museum of the University of Berlin has kindly compared specimens of *pulchra* with Kuhn's type of *sellata* and pronounced them conspecific; Dr. Delkeskamp suggests, moreover, that Kuhn was misled at the time he described *sellata* by Crotch's having transferred *pulchra* to *Mycotretus* (personal communication).

DIAGNOSTIC DESCRIPTION: Color piceous to black, strongly nitidous, the antennal club fuscopiceous, the stem lighter, the palpi and mediobasal half or so of elytra reddish yellow (this light area of elytra highly variable—occasionally occupying all of elytra except a narrow piceous border behind humeral calli, at other times reduced to a short, basal, triangular area embracing the humeri—its posterior edge usually V-shaped and extending posteriorly farthest along the suture, rarely almost transverse across the middle). Shape of body more broadly oval than that of *biguttata* (fig. 3), distinctly more pointed posteriorly than anteriorly, the length approximately 1.6 times the width; pronotal sides moderately arcuate, the apex transverse, lacking a median convexity; epistomal apex transverse, the submarginal stria almost evenly arcuate between antennal insertions (fig. 107); postmandibular lobes extremely large, as long as the eyes, their lateral edges overlapping inner edges of eyes in ventral view of head and broadly, evenly arcuate, somewhat convergent anteriorly, visible around the entire apex of the terminal segment of maxillary palpus when this in normal position upon the lobe (the postmandibular lobes are similar to those of *Triplax festiva*, fig. 72, but are rather longer, their lateral edges more broadly rounded and convergent

anteriorly); prosternal lines convergent to a common point at apex of prothorax, completely delimiting a flat, approximately equilateral-triangular prosternal plateau (reminiscent of that of *Microsternus ulkei*, fig. 42). Tibiae scarcely dilated apically, much less so than those of *biguttata* (fig. 3). Pronotal punctures strong, very sparse, gradually smaller but only a little denser laterally; punctures of head similar in size to those of pronotal sides but considerably denser; stria punctures on light portion of elytra sub-piceous or not. Sexual dimorphism not apparent.

The epistoma (fig. 116) and the entirely margined, triangular prosternum separate this species immediately from all others.

MEASUREMENTS OF TYPE: In the original description Say states, "Length three-twentieths of an inch, nearly" (nearly 3.81 mm.).

VARIATION: The observed size range, in millimeters, is 2.62 long by 1.52 wide to 4.00 long by 2.42 wide.

MALE GENITALIA: The aedeagus (fig. 109) is distinctly aberrant in this form and has much in common with that of *Triplax* species. The internal sac protrudes through the median foramen and extends anteriorly of the median lobe for a distance equal to about one-half of the length of the median strut. The enclosed ejaculatory duct is long and strongly sclerotized and extends posteriorly approximately to the median orifice. The proportional sizes of the median strut and median lobe and the presence of the tooth-like lobe near the base of each terminal arm are characters similar to those of species group *humeralis* (fig. 108), but the median lobe is less strongly curved and the lobes of the tegmental arms are much longer than in that species group. The distinctive muscle attachment at the anterior end of the internal sac is shown in dorsal view, enlarged, in figure 110. (Five specimens dissected.)

FEMALE GENITALIA: The female genital tube (fig. 112) is considerably more elongate than that of species group *humeralis* (fig. 111). The seminal receptacle (shown alongside the anterior apodeme of the eighth sternite in fig. 112) is extremely large and of irregular shape and somewhat similar to that of *Ischyryus* (fig. 130). (Five specimens dissected.)

BIOLOGY: Weiss (1920b, pp. 18–19, *Myco-treus pulchra*) describes the larva, pupa, adult, and fungous host of this species. He also gives interesting information on rearing it. In all of the material examined a single specimen bears a biological label: from fungus *Polyporus betulinus*, Itasca State Park, Minnesota, August, 1936.

TYPE: Not seen; presumably destroyed with Say's collection.

TYPE LOCALITY: United States.

GEOGRAPHICAL DISTRIBUTION: Eastern North America from Alabama and North Carolina to New Hampshire and Quebec, west to Minnesota, Iowa, Kansas, and Texas. (See Appendix for locality data.)

MATERIAL EXAMINED: Two hundred and fifty-six specimens.

GENUS *PSEUDISCHYRUS* CASEY, 1916

Pseudischyrus CASEY, 1916, p. 156. Generotype: *Ischyrus nigrans* Crotch, 1873a, p. 354, by original designation.

DIAGNOSTIC DESCRIPTION: When he described the first known forms of this genus Crotch was greatly impressed by the coarsely faceted eyes and was thus led to place them in the genus *Ischyrus*. However, the eyes are even more coarsely faceted than in that genus (pl. 8, fig. 2; cf. pl. 8, fig. 3), and it is clear that *Pseudischyrus* has far more in common with *Tritoma* than with *Ischyrus*. Indeed, *Pseudischyrus* may be adequately described as species group *humeralis* of *Tritoma* with the eyes coarsely faceted and the body somewhat elongated. The mouth parts are indistinguishable from those of *Tritoma unicolor* (figs. 105, 106); the aedeagus (figs. 124, 125) is extremely similar to that of *T. biguttata* (fig. 108); the female genital tube, especially that of *P. ventriloquax*, new species (fig. 123), is much like that of *T. humeralis* (fig. 111); the pronotum is likewise immarginate only basally on the median lobe; and the tibiae are similarly strongly dilated apically (figs. 119, 120; cf. figs. 3, 114). The eyes, however, are larger than in *Tritoma*, and the vertex, as delimited by the ocular striae, is narrower between the eyes than in front of them (pl. 8, fig. 2; cf. pl. 8, fig. 1, and text fig. 113). In connection with the more elongate body shape of *Pseudischyrus* the following differences from *Tritoma* may also be noted: the

coxae are less widely separated, being intermediate between *Tritoma* (fig. 3) and *Triplax* (fig. 2) in this respect; the prosternum is similarly campanulate, but the campanulum (figs. 117, 118) is narrower than that of *Tritoma* (fig. 3); the length of the body ranges from 1.75 to 2.1 times the width, as compared to from 1.5 to 1.8 for *Tritoma*; and the pronotal sides are less strongly convergent anteriorly (figs. 117, 118; cf. fig. 3). Cephalic stridulatory files are well developed and similar in both sexes, and the metasternal coxal lines, though strong, are somewhat shorter than those of *Tritoma*. The disc of the epistoma, moreover, is rather strongly tumid or convex just behind the apex. The color differs little between species and ranges from uniform stramineous in tenerals through clear reddish brown and mahogany to piceous and black, with the appendages vaguely lighter in color in the dark specimens. The body is moderately nitidous. The over-all observed size range, in millimeters, is 3.04 long by 1.47 wide to 4.83 long by 2.76 wide. The forms exhibit no significant differences in size. Secondary sexual characters are not apparent.

DISCUSSION OF SPECIFIC SYNONYMY: The material of *Pseudischyrus* at hand falls into three species. One of these ranges from Texas to Florida and North Carolina and has probably been introduced into southern California; another appears only in Florida and Georgia; and the third is known only from Georgia and North Carolina.

Five species descriptions are known to have been based on material belonging to the genus. But if one were to follow the interpretation of Casey (1916, p. 156), there would be six names with which to deal. In his description of the genus (*loc. cit.*) Casey states: "The type of this genus is *Ischyrus nigrans* Cr[otch], which is however synonymous with *Tritoma brunnea* Lac[ordaire] (Mon. Erot., p. 222)." The present author cannot think that Lacordaire, careful worker that he was and monographing the Erotylidae of the world, overlooked the extremely coarse ocular facets and described a specimen of *Pseudischyrus* as a *Tritoma*, for Lacordaire (1842, p. 218) listed finely granulated eyes as a prime characteristic of the genus *Tritoma*. Lacordaire's description of *brunnea* agrees better with specimens of *Tritoma angulata*

Say, and *brunnea* is here accordingly synonymized therewith. Moreover, a specimen of *T. angulata* Say in the Leconte collection is labeled "*T. brunnea* Lac." in LeConte's handwriting. We are thus left with five specific names to account for.

The description of *Ischyryus nigrans* Crotch (1873a, p. 354) leaves much to be desired, but it appears most likely to be based on material of the form that ranges from southern Georgia to southern Florida. Crotch's description of *I. extricatus* (*loc. cit.*) is unquestionably based on the Texas form of *Pseudischyrus*, for his type is typical of that population and bears a red disc indicating "Texas" according to LeConte's color key, not "Middle States" as stated by Crotch in the description. What Casey (1916, pp. 156-158) considered to be *Tritoma brunnea* Lacordaire is undoubtedly the Florida form of *P. extricatus* (Crotch).

The type of Casey's *P. acuminatus* is a specimen of *P. nigrans* (Crotch). The type of Casey's *Tritoma pallens* (1924, p. 178) is a teneral specimen of *P. extricatus* (Crotch), and one of Casey's paratypes of *pallens* is a specimen of either *P. nigrans* (Crotch) or *P. ventriloquax*, new species. The type of *Tritoma dissimilis* Blatchley (1917, p. 140) has not been seen during the course of this study, but his description and type locality leave little doubt that he was dealing with material of *P. nigrans* (Crotch). Indeed, specimens of both *P. nigrans* and *P. extricatus* are at hand bearing the label "*Tritoma dissimilis* Blat." in Blatchley's hand (the specimens also collected by Blatchley). Apparently Blatchley was unfamiliar with *Pseudischyrus* (described only a year previously in a privately printed series) when he described *Tritoma dissimilis*. That the two genera are extremely similar is also attested by Casey's mistaking *Pseudischyrus* for *Tritoma* eight years after having described the former (the allusion is to *Tritoma pallens* Casey, 1924, p. 178).

MALE AND FEMALE GENITALIA: The female genital tube is peculiar in lacking ventral baculi of the valvifers; otherwise the genitalia of both male and female (figs. 121-125) are quite similar to those of species group *humeralis* in *Tritoma* (figs. 108, 111). Interestingly, a new species must be recognized on the basis of genitalic characters

alone. This is the first case of such a phenomenon in the Erotylidae known to the present author.

WORLD DISTRIBUTION AND SIZE: The genus contains only three species and, aside from a probable introduction into southern California, is limited to the southeastern United States.

BIOLOGY: Virtually nothing is known about habits and immature stages. A few specimens have been taken under the bark of dead oak in Florida, and others at light in Georgia. One might suspect the large ocular facets to indicate nocturnal activity in the adults.

INTRAGENERIC RELATIONSHIPS OF SPECIES: One can easily derive *Pseudischyrus* from the *angulata-unicolor-tenebrosa* segment of *Tritoma*. A common ancestor may well have given rise to *Tritoma tenebrosa* and *Pseudischyrus ventriloquax*—the two being very similar in body shape, color, characteristics of the genitalia (both male and female), and tibial dilation and shape. From this presumed primitive, *ventriloquax*-like population geographical isolation may have allowed the specific differentiation of *nigrans* and *extricatus*, the former possibly having been isolated in Florida when that land mass was insular during relatively recent geologic times. Perhaps *extricatus* evolved from a segment of this primitive form isolated farther west and later invaded the ranges of *ventriloquax* and *nigrans*.

KEY TO SPECIES OF *Pseudischyrus*

1. Prosternal lines not strongly convergent anteriorly (fig. 117), the prosternal apex sharply compressed medially like the pouring-lip of a beaker; sides of body distinctly arcuate before and behind widest point of body, the elytra parabolically rounded posteriorly; hind tibiae rounded at apex (fig. 119) *extricatus* (p. 130)
- Prosternal lines strongly convergent anteriorly (fig. 118), the prosternal apex scarcely compressed medially; sides of body relatively straight before and behind widest point of body, the elytra appearing subtruncate at apex; hind tibiae approximately truncate at apex (fig. 120) 2
2. Median lobe of aedeagus intermediate in stoutness and shape between that of *extricatus* (fig. 124) and that of *nigrans* (fig. 125); female genital tube (fig. 123) very short, the styli subglobular, scarcely longer than wide

. *ventriloquax*, new species (p. 130)
Median lobe of aedeagus (fig. 125) relatively stout, distinctly convex ventrally near apex; female genital tube (fig. 122) relatively long, the styli reduced to extremely short parallelograms. *nigrans* (p. 131)

***Pseudischyrus extricatus* (Crotch, 1873)**

Ischyrus extricatus CROTCH, 1873a, p. 354.

Tritoma pallens CASEY, 1924, p. 178. New synonymy.

DIAGNOSTIC DESCRIPTION: Color (not generally different from other species) uniform reddish yellow or stramineous in teneral to dark piceous in older specimens, the appendages lighter; numerous specimens, especially from Texas and Louisiana, with the elytra darker in color and contrasting somewhat with rest of body. Shape elongate-oval, the sides of body distinctly arcuate before and behind the widest point of body (behind elytral base), the elytra parabolically rounded behind this point; prothorax (fig. 117; cf. fig. 118) relatively short and wide, its sides short and arcuate, the prosternal lines widely separated and scarcely convergent anteriorly, the prosternal apex at middle sharply compressed, resembling the pouring-lip of a beaker; hind tibiae (fig. 119) with apex oblique, rounded, the outer (upper) apical angle obtuse, the setae on anterior face and around corbel relatively long and narrow. Pronotal punctures not sharply incised, scarcely to moderately denser laterally, distinctly interspersed with minute punctules to form an asperate-punctulate spot on each pronotal side behind apical angle and slightly ahead of the transverse middle; cephalic punctures most often denser, not sharply incised, separated by less than their diameters.

MEASUREMENTS OF TYPE: Length, 4.21 mm.; width, 2.39 mm. In the original description Crotch states the length to be 0.16 inch (4.06 mm.).

VARIATION: The observed size range, in millimeters, is 3.04 long by 1.66 wide to 4.83 long by 2.76 wide. Specimens that intergrade with *nigrans* and *ventriloquax* in one or more characters are common, but the shape of the prosternal campanulum (figs. 117, 118) seems to be invariably reliable.

MALE GENITALIA: The aedeagus (fig. 124) is very like that of *Tritoma*, species group *humeralis* (fig. 108). The internal sac is sim-

ilarly entirely membranous, lacking both a muscle attachment at its anterior end and an enclosed ejaculatory duct, and is enclosed entirely within the median lobe (it is shown by a broken line in fig. 124, the sclerotization of the median lobe having been omitted). The arms of the tegmen also bear tooth-like lobes just in front of the basal piece. The median lobe differs from that of *P. nigrans* (fig. 125) in being much more slender and perfectly straight ventrally before the apex. (Fifteen specimens dissected.)

FEMALE GENITALIA: The female genital tube (fig. 121) differs from that of *nigrans* (fig. 122) in having well-developed styli and relatively short, non-sigmoid apical segments of the coxites. It differs from that of *ventriloquax* (fig. 123) in being considerably longer and in having longer styli. From both it differs in bearing a median longitudinal sclerite on the vulvar lobe. (Eleven specimens dissected.)

BIOLOGY: A single biological note occurs on three specimens: [collected at] light, Emory University Field Station, Newton, Georgia, August 11, 1951.

TYPE: Male; labeled "Type 6765; *extricatus* Cr. Type" (collection LeConte, M.C.Z.).

TYPE LOCALITY: Texas. [The type bears a red disc indicating "Texas" according to LeConte's color key, not "Middle States" (indicated by a pinkish red) as stated by Crotch in the description.]

GEOGRAPHICAL DISTRIBUTION: Southeastern United States from North Carolina to Florida, west through the Gulf states to Texas. Two records from San Diego County, California, seem unchallengeable; one can only assume that the species has been introduced into that area (the genitalia of these two specimens have been examined). (See Appendix for locality data.)

MATERIAL EXAMINED: One hundred and fifty-six specimens.

***Pseudischyrus ventriloquax*, new species**

DIAGNOSTIC DESCRIPTION: Identical in external form and color to *P. nigrans* (Crotch) with the following feeble exceptions: Three specimens have the elytra somewhat darker than the rest of the body, thus resembling numerous specimens of *extricatus* from Louisiana and Texas, and although a distinct asper-

ate-punctulate spot seems more often present on each pronotal side in this form than in *nigrans* the two species intergrade, and in some specimens are reversed, in this character. The genitalia (see below) must be examined before positive identification can be made.

MEASUREMENTS OF TYPE (IN MM.): Length, 4.14; width, 2.12; width of pronotal base, 1.84; median pronotal length, 1.08; width at extremities of pronotal apical angles, 1.13; width of head at eyes, 1.04; interocular width of vertex, 0.58; vertical diameter (width) of eye, 0.35.

VARIATION: The observed size range, in millimeters, is 3.59 long by 2.00 wide to 4.62 long by 2.48 wide.

MALE GENITALIA: The aedeagus is intermediate in form between that of *extricatus* (fig. 124) and that of *nigrans* (fig. 125) but is recognizably different from both. The median lobe is more slender than that of *nigrans* and is faintly convex ventrally near the apex, not straight as in *extricatus*. (Three specimens dissected.)

FEMALE GENITALIA: The female genital tube (fig. 123) is distinctive. It is much shorter than in either *nigrans* (fig. 122) or *extricatus* (fig. 121). The styli are subglobular, distinctly shorter than those of *nigrans*, and the vulvar lobe bears no median longitudinal sclerite as does that of *extricatus*. (Five specimens dissected.)

TYPE: Female; labeled "Geo[rgia]" (collection M.S.C.).

TYPE LOCALITY: Georgia.

PARATYPES: *Georgia:* Same data as type (M.S.C.), two. Decatur County: Spring Creek, July 16–29, 1912 (C.U.), one. *North Carolina:* Moore County: Southern Pines, September 8, 1911 (A. H. Manee; collection Blanchard, M.C.Z.), one; Southern Pines, October 19, 1911 (A. H. Manee; collection Blanchard, M.C.Z.), one; Southern Pines (collection Blanchard, M.C.Z.), two.

***Pseudischyrus nigrans* (Crotch, 1873)**

Ischyrus nigrans CROTCH, 1873a, p. 354.

Pseudischyrus acuminatus CASEY, 1916, p. 157. New synonymy.

Tritoma dissimilis BLATCHLEY, 1917, p. 140. New synonymy.

DIAGNOSTIC DESCRIPTION: Color (not generally different from other species) uniform

reddish yellow or stramineous in teneralis to dark piceous or black in older specimens, the appendages lighter. Shape elongate-subrhomboidal, the sides of body relatively straight before and behind the widest point of body (behind the elytral base), the elytra appearing subtruncate at apex; prothorax (fig. 118; cf. fig. 117) relatively long and narrow, its sides long and feebly arcuate, the prosternal lines narrowly separated and strongly convergent anteriorly, the prosternal apex at middle scarcely compressed; hind tibiae (fig. 120) truncate at apex, the outer (upper) apical angle approximately right-angular, the setae on anterior face and around corbel relatively short and wide. Pronotal punctures sharply incised, becoming much denser laterally along extreme sides, the pronotal sides most often without distinct asperate-punctulate spots behind apical angles; cephalic punctures generally sharply incised, not dense, mostly separated by more than their diameters.

MEASUREMENTS OF TYPE: In the original description Crotch gives the length as 0.18 inch (4.57 mm.).

VARIATION: The observed size range, in millimeters, is 3.04 long by 1.47 wide to 4.83 long by 2.76 wide.

MALE GENITALIA: The aedeagus (fig. 125) is distinct from that of *extricatus* (fig. 124) in that the median lobe is much stouter and is convex ventrally before the apex. It differs from that of *ventriloquax* in the same ways but in lesser degree. (Six specimens dissected.)

FEMALE GENITALIA: The female genital tube (fig. 122; cf. figs. 121, 123) is extremely distinctive. The styli are greatly reduced, much wider than long, and shaped like small parallelograms. The apical segments of the coxites are relatively long, distinctly sigmoid, and their apices are produced beyond the insertions of the styli so that they equal the apices of the latter. The basal segments of the coxites bear dark anterolateral borders. (Twelve specimens dissected.)

BIOLOGY: A single biological note occurs on three specimens: [collected at] light, Emory University Field Station, Newton, Georgia, September 5–10, 1952. (Three specimens of *extricatus* are similarly labeled, but the date is different.)

TYPE: Not seen. Horn and Kahle (1935-1937, vol. 2, p. 48) state that Crotch's erotylid collection is in the Zoological Museum of Cambridge.

TYPE LOCALITY: Florida.

GEOGRAPHICAL DISTRIBUTION: Known only from Florida and Georgia. (See Appendix for locality data.)

MATERIAL EXAMINED: Thirty-one specimens.

GENUS *ISCHYRUS* LACORDAIRE, 1842

Ischyryus LACORDAIRE, 1842, p. 89. Generotype: *Erotylus quadripunctatus* Olivier, 1791, p. 437, by subsequent designation by Crotch, 1873c, p. 144; 1873a, p. 358.

DIAGNOSTIC DESCRIPTION: Shape elongate-elliptical, the elytral sides subparallel for half of their length, beginning shortly behind the base, the two ends of body about equally parabolically rounded, the anterior occasionally more obtusely rounded, the length 2.2 to 2.3 times the width; pronotum subtrapezoidal, the basal width 60 to 70 per cent greater than apical width, the sides moderately arcuately convergent anteriorly, occasionally much more strongly so on anterior halves (as in *aleator*); antennal length equal to from 55 to 65 per cent of pronotal basal width, the club three-segmented (fig. 126), relatively lax, a little more than twice as long as wide, densely clothed with fine setae, segment 3 of stem elongate, longer than segments 4 and 5 together; scutellum subcordate; terminal segments of maxillary palpi securiform (fig. 127), scarcely wider than long and relatively small, not greatly larger than those of labial palpi (fig. 128); tibiae not dilated apically, feebly arcuate; coxae moderately separated, similar to those of *Triplax* (fig. 2) in this respect. Color reddish yellow and black, the elytra usually fasciate, rarely vittate, the pronotum variously adorned with black spots or other pattern. Elytra immarginate basally. Cephalic stridulatory files short and poorly developed in the male, absent in the female (only *quadripunctatus*, however, has been closely examined for this character). Pronotum margined laterally, immarginate basally and between eyes apically; pronotal angle pores small, inconspicuous. Eyes rather coarsely faceted (pl. 8, fig. 3), moderately large, the vertex somewhat nar-

rower between eyes than in front of them. Ocular striae terminating at or behind antennal insertions, the epistoma consequently immarginate. Terminal segment of maxillary palpus not armed with a brush; galea and lacinia of maxilla (fig. 127) similar to those of *Tritoma* and *Pseudischyrus*, the lacinia without apical teeth. Terminal segments of labial palpi (fig. 128) wide as are those of *Triplax* (figs. 69, 71), each bearing a minute brush along the truncate apex. Body below similar to that of *Triplax* (fig. 2), with the following exceptions: the prosternal apex at middle is either sharply compressed into a pitcher-like lip or evenly arcuate (in the vertical plane); the prosternal lines along the inner edges of the coxae are strong but straight, subparallel, scarcely divergent posteriorly; metasternal coxal lines are present but short, extending less than halfway between posterior edges of coxae and metasternal sides; and the abdominal intercoxal process is slightly wider and less strongly arcuate. Secondary sexual characters not apparent.

OBSERVED SIZE RANGE: The extremes in length are 4.83 and 8.56 mm., with the size ranges of the species broadly overlapping.

MALE GENITALIA: The aedeagi of two species are figured here (figs. 129, 131, 132). Similarities to *Cypherotylus californicus*, *Triplax* species, and *Tritoma pulchra* will be noted in the presence of a long internal sac with an anterior muscle attachment and a long, heavily sclerotized, enclosed ejaculatory duct. The tegmental arms also bear dorsal lobes as in species of *Triplax* and *Tritoma*.

FEMALE GENITALIA: The female genital tube of only one North American form is shown (fig. 130). This, however, scarcely differs from that of *Cypherotylus* and *Megalodacne* species except for the presence of a large seminal receptacle (cf. *Tritoma pulchra*, fig. 112).

WORLD DISTRIBUTION AND SIZE: A strictly New World genus, *Ischyryus* contains approximately 61 known species. Virtually all of these are Neotropical; only the four treated here are known to occur north of Mexico.

BIOLOGY: Little has been published concerning the habits and immature stages of *Ischyryus* species. The larva and pupa of the generotype, *quadripunctatus*, have been described by Weiss (1920a, pp. 14-15), however,

and this author refers to an illustration of the larva as follows: "1855, Larva (Fig.) Chapuis et Candeze. Mem. Soc. Sc. Liege VIII, 22 pl." (reference not seen). The adult is figured in color by Olivier (1789-1808, vol. 5, p. 484, no. 89, *Erotylus* pl. 3, fig. 37) and in black and white by Wickham (1894, p. 341, fig. 61). Adults have been taken on fungi, under bark, and in Florida and Alabama on rotten oranges (presumably fungus-attacked). They are often taken at light, and their rather coarse ocular facets are possibly correlated with nocturnal activity.

INTRAGENERIC RELATIONSHIPS OF SPECIES: Three of the four North American species are closely related and belong to a large segment of *Ischyrus* in which the species are characterized by a number of black spots on the pronotum and two large, black elytral fasciae—one basal and one submedian. One of these, *I. dunedinensis* Blatchely, probably reached Florida from the West Indies; a number of specimens of apparently closely related forms from this region have been examined. The remaining species, *I. aleator*, stands alone and is not known to be closely related to any other form.

KEY TO NEARCTIC SPECIES AND SUBSPECIES OF *Ischyrus*

1. Elytra bearing three piceous vittae; pronotum adorned with a light, median, trefoil-shaped spot surrounded by a piceous framework. *aleator* (p. 136)
- Elytra bearing basal and submedian black fasciae, the basal fascia often interrupted on each side; pronotum adorned with three or four black spots disposed in a transverse row across the middle 2
2. Pronotum with three black spots across the middle, the median one as large as the two lateral ones together; submedian elytral fascia about half as wide as the elytral length *dunedinensis* (p. 136)
- Pronotum with four black spots across the middle, the middle two slightly larger; submedian elytral fascia no more than one-fourth as wide as elytral length except along the suture 3
3. Basal elytral fascia composed of three black spots, together resembling a fat X enclosed in single quotation marks ('X'); elytra without short medio-apical vittae. *chasticus* (p. 135)
- Basal elytral fascia either entire or ruptured into three black spots with the middle one

- subquadrate; short medio-apical elytral vittae present. *quadripunctatus*, 4
4. Disc of head entirely black; range, North America east of the 100th meridian except the 13 southernmost Texas counties *quadripunctatus quadripunctatus* (p. 133)
 - Disc of head red anteromedially; range, the 13 southernmost Texas counties and southward into Central America *quadripunctatus graphicus* (p. 135)

Ischyrus quadripunctatus quadripunctatus (Olivier, 1791)

- Erotylus quadripunctatus* OLIVIER, 1791, p. 437.
Ischyrus quadripunctatus (Olivier), LACORDAIRE, 1842, p. 127.
Ischyrus quadripunctatus var. *A* LACORDAIRE, 1842, p. 127.
Ischyrus quadripunctatus var. *alabamiae* SCHAEFFER, 1931, p. 175.
Ischyrus quadripunctatus a. *antedivisa* MADER, 1938, p. 19.
Ischyrus quadripunctatus quadripunctatus (Olivier), BOYLE, 1954b, p. 39.

DIAGNOSTIC DESCRIPTION: Color piceous to black, the palpi and tarsi often rufescent, the following reddish yellow: pronotal epipleura and periphery of abdomen below, pronotum save for four circular spots in a transverse, slightly anteriorly concave row across the middle and a narrow border along median three-fifths of base, and elytra except for the following black pattern: a basal fascia either entire or ruptured into three spots (a large, subquadrate median one extending back one-fourth of elytral length from base and including scutellum and basal pronotal border, and a somewhat shorter humeral one on each side not quite touching lateral elytral edges), a submedian fascia, dentate anteriorly and posteriorly, widest along the suture and extending narrowly along the suture between the first striae to apex, also produced to apex very narrowly along extreme sides and on epipleura below, and a medio-apical vitta on each elytron extending anteriorly for from one-fifth to one-fourth of the elytral length. Shape almost evenly arcuately convex above in lateral view, the length 2.2 times the width, the sides approximately straight but distinctly, feebly convergent anteriorly and posteriorly from widest point of body, the anterior and posterior ends about equally parabolically rounded; elytral bases not depressed (flattened); pronotum without dis-

tinct basal impressions but bearing a few large punctures along the base on each side of basal lobe, the pronotal sides feebly, evenly arcuately convergent anteriorly; prosternal apex strongly compressed at middle into a pitcher-like lip; antennae as in figure 126, with segment 3 of stem subequal in length to segments 4, 5, and 6 together. Pronotal punctures subequal in size over most of disc, rather denser laterally.

MEASUREMENTS OF TYPE: These are not given in the original description.

VARIATION: The observed size range, in millimeters, is 4.83 long by 2.21 wide to 8.14 long by 3.86 wide. Occasional specimens have the body below largely invaded by red. This variation along with that noted in the basal elytral fascia (whether interrupted or entire) accounts for the varietal names listed in the synonymy. Specimens from the northeastern United States and adjacent Canada nearly always have the basal elytral fascia interrupted; specimens from the Gulf states most often have the fascia entire; and the Florida population appears to be nearly homogeneous in having the basal fascia entire. One strongly suspects that a segment of the population of the immediately ancestral form became isolated in Florida, when that land mass was insular, and differentiated somewhat in color pattern. A westward and northward flow of genetic material consequent upon the reunion of the two land masses and populations would produce the pattern of variation in this form observed in eastern North America today. The clinal nature of the variation in the basal elytral fascia, from south to north, precludes the recognition of subspecies on a basis of this character.

MALE GENITALIA: The aedeagus is shown in lateral view (fig. 129). The median strut is of moderate length, only slightly longer than the median lobe. The latter is strongly curved, bears a ventral convexity preapically, and is subtruncate at apex. The internal sac protrudes anteriorly through the median foramen for a distance subequal to the length of the median lobe and at its anterior end bears a small muscle attachment that resembles two black dots in dorsal view. The enclosed ejaculatory duct extends approximately to the median orifice and is strongly widened and flattened in the horizontal plane along

the anterior half or more of its length. It appears to be attached to (and probably is secreted by) the ventral wall of the internal sac, as it is separated from the latter with difficulty. The arms of the tegmen bend sharply upward just as they emerge from the basal piece. (Seven specimens dissected.)

FEMALE GENITALIA: The female genital tube is shown in ventral view in figure 130. It is notably similar to that of the larger forms of Nearctic Erotylidae, *Megalodacne* and *Cypherotylus* species. An important difference, however, is seen in the seminal receptacle (shown in fig. 130 at one side of the anterior apodeme of sternite 8); this bears a turgid, U-shaped, strongly sclerotized extension that is similar only to that of *Tritoma pulchra* (fig. 112). Segment 9, as usual, is densely covered with minute spicules externally and is consequently dark in color. In specimens that have died with the genital tube everted segment 9 is often stretched to two or three times the length shown in figure 130. (Five specimens dissected.)

BIOLOGY: (See biology under the genus for references on immature stages). Biological data on labels are as follows: on *Quercus rubra*, Hazen, Alabama, March 10, 1921; on oak, Hazen, Alabama, May 2, 1923; in fungus on orange, Wilson Dam, Alabama, June 12, 1941; in rotten orange, Florida, May, 1898; at light, Elizabethtown, Illinois, June 22, 1927; under log, airport region, Peoria, Illinois, August 3, 1941; under bark, Havana, Illinois, August 11; [on] *Taxodium distichum*, Gibson, Louisiana; light trap, Houston County, Minnesota, May 24, 1936; at light in window, Olmstead County, Minnesota, September 16, 1904; fungus-covered stump, Chaffee, Missouri, June 21, 1919; [on] *Pinus*, Tryon, North Carolina, April 20, 1903; at light, Tryon, North Carolina, June 21; under old leaves, Houston, Texas, December 10, 1918; at light, Victoria, Texas, July 31, 1916; hibernating under bark, Victoria, Texas; and several notations, "in fungi."

PUBLISHED ILLUSTRATIONS: (See biology under the genus).

TYPE: Not seen; probably not extant (see Horn and Kahle, 1935-1937, vol. 3, p. 197).

TYPE LOCALITY: Georgia (that portion of the United States so designated in 1791).

GEOGRAPHICAL DISTRIBUTION: Eastern

North America east of the 100th meridian, exclusive of New England, from Quebec, Ontario, and Minnesota southward to Florida and Texas. The northern boundaries of the Texas counties of Webb, Duval, Jim Wells, and Nueces approximately separate this subspecies from *quadripunctatus graphicus* to the south. (See Appendix for locality data.)

MATERIAL EXAMINED: Seven hundred and ninety-four specimens.

Ischyryus quadripunctatus graphicus
Lacordaire, 1842

Ischyryus graphicus LACORDAIRE, 1842, p. 125.

Ischyryus quadripunctatus graphicus Lacordaire, BOYLE, 1954b, p. 41.

DIAGNOSTIC DESCRIPTION: The southern Texas population differs from *q. quadripunctatus* to the north and east in having the disc of the head red medio-apically, the prosternal apex rufescent, and the abdominal black somewhat reduced. Farther southward in Mexico and Central America specimens become rather smaller in average size, acquire two black denticular spots near the middle of the pronotal apex and a narrower submedian elytral fascia, and lose even more of the prosternal and abdominal black. The red spot on the disc of the head is the major characteristic of this subspecies, as opposed to the entirely black cephalic disc in *q. quadripunctatus*.

MEASUREMENTS OF TYPE: In the original description Lacordaire states the length to be 2.75 lines (5.83 mm.) and the width 1.25 lines (2.65 mm.).

VARIATION: The observed size range, in millimeters, is 5.52 long by 2.35 wide to 7.25 long by 3.24 wide.

BIOLOGY: The following biological data occur on labels: collected at light, San José, Costa Rica, November 9, 1925; at light, Hamburg Farm, Santa Clara Province, Costa Rica, October 31, 1927, December 1, 1931, and January 29, 1932; under trash, river bank, Brownsville, Texas, December 7, 1911.

PUBLISHED ILLUSTRATIONS: Gorham (1887-1899, pl. 2, fig. 17) presents a good figure of the adult in color.

TYPE: Not seen. The disposition of Lacordaire's collection is accounted for by Horn and Kahle (1935-1937, vol. 2, p. 146).

TYPE LOCALITY: Mexico.

GEOGRAPHICAL DISTRIBUTION: Central America and Mexico northward to the northern boundaries of the Texas counties of Webb, Duval, Jim Wells, and Nueces. (See Appendix for locality data.)

MATERIAL EXAMINED: Nineteen specimens.

***Ischyryus chiasticus* Boyle, 1954**

Ischyryus chiasticus BOYLE, 1954b, p. 43.

DIAGNOSTIC DESCRIPTION: Resembles *quadripunctatus graphicus*, its closest relative, in gross color pattern of reddish yellow and black, and more specifically as follows: the disc of the head is red; the pronotum bears two black denticles medio-apically, four circular black spots in a transverse row across the middle, and a narrow black basal border; the elytra bear black submedian and basal fasciae; and the abdominal sternites are largely red. In size, however, *chiasticus* averages somewhat larger. The ranges in length and width (in mm., followed by the arithmetic mean in parentheses) of 27 specimens are as follows: length, 6.69 to 8.56 (7.56); width, 2.90 to 3.80 (3.37). These measurements for 16 *q. graphicus* specimens are: length, 5.52 to 7.25 (6.36); width, 2.35 to 3.24 (2.89). In color pattern *chiasticus* differs from both subspecies of *quadripunctatus* as follows: the pronotal apex is narrowly bordered with black between the eyes; the basal elytral fascia is ruptured into three black spots (a large median one that is concave laterally and posteriorly and a smaller, comma-shaped one occupying each humeral angle and touching the side; thus, together, the three spots resemble a fat X enclosed in single quotation marks, 'X'); the submedian elytral fascia is wider and less strongly undulate and extends more broadly along the suture to the apex; the narrow, black peripheral border of the elytra behind the submedian fascia suddenly increases to twice its width at a point about halfway to the apex; the black medio-apical vitta on each elytron is absent; and the prosternum, mesosternum, and lateral thirds of metasternum are red, not black.

MEASUREMENTS OF TYPE: Length, 7.45 mm.; width, 3.45 mm.

VARIATION: The observed size range, in

millimeters, is 6.69 long by 2.90 wide to 8.56 long by 3.80 wide.

MALE GENITALIA: The aedeagus is scarcely different from that of *q. quadripunctatus* (fig. 129). Although the median lobe is slightly narrower and the preapical ventral convexity weaker the two must be placed side by side to see such differences, and even then positive identification would be hazardous. (Four specimens dissected.)

FEMALE GENITALIA: Indistinguishable from those of *q. quadripunctatus* (fig. 130). (One specimen dissected.)

TYPE: Male; labeled "Patagonia, Santa Cruz Co., Ariz., July 1936; holotype, *Ischyryrus chiasticus* Boyle" (E. S. Ross; collection E. S. Ross, C.A.S.).

TYPE LOCALITY: Patagonia, Santa Cruz County, Arizona.

GEOGRAPHICAL DISTRIBUTION: Known only from southern Arizona and the Mexican State of Sinaloa, but probably ranges farther south in Mexico. (See Appendix for locality data.)

MATERIAL EXAMINED: Thirty-one specimens.

***Ischyryrus dunedinensis* Blatchley, 1917**

Ischyryrus tripunctatus BLATCHLEY, 1917, p. 238.

Ischyryrus dunedinensis BLATCHLEY, 1917, p. 279, new name for *Ischyryrus tripunctatus* Blatchley, 1917, not *Ischyryrus tripunctatus* Crotch, 1873c, p. 144.

This species is apparently known only from the type, which has not been seen by the present author. Thus all that can be done here is to repeat Blatchley's original description: "Form and size of the well-known *I. 4-punctatus* Oliv., from which it differs in sculpture and colour as follows: Head much more coarsely punctate and with a reddish-yellow spot each side between the eyes; thorax less coarsely punctate than head, but more so than in *4-punctatus* and with three instead of four round, black spots, the median one twice the size of the lateral ones, the latter more distant from the margin than in *4-punctatus*. Elytra more distinctly alutaceous and with fine, scattered punctures along the intervals; the common scutellar black spot larger and more evenly quadrate, separated by a narrow, yellow cross-bar from a black space which extends three-fourths to apex and

which is partially broken by a yellow line extending backward to apical third along the fifth interval; apex yellow, the oblong, black, sub-apical spots of *4-punctatus* lacking. Length 7 mm.

"Described from a single specimen taken near Dunedin, February 8, from between the leaves of a large air plant, *Tillandsia utriculata* L."

The type of this species is undoubtedly in the Blatchley collection at Purdue University, Lafayette, Indiana.

TYPE LOCALITY: Dunedin, Pinellas County, Florida.

GEOGRAPHICAL DISTRIBUTION: Known only from the type.

MATERIAL EXAMINED: None.

***Ischyryrus aleator* Boyle, 1954**

Ischyryrus aleator BOYLE, 1954b, p. 46.

DIAGNOSTIC DESCRIPTION: Color light brownish yellow, the legs and thorax below somewhat darker, the following fusco-piceous: antennal club, epistoma, the periphery of a large trefoil-shaped spot of the ground color occupying median third of pronotum, a common elytral vitta along the suture which includes the scutellum and narrows gradually to the apex, a wider vitta along the middle of each elytron largely limited to fifth and sixth intervals and not quite attaining the apex, the lateral elytral borders, and the elytral epipleura. Shape moderately depressed, the length 2.3 times the width, the body semi-circularly rounded anteriorly, parabolically rounded posteriorly; elytral sides evenly parallel for one-half of their length, beginning shortly behind the base, each elytral base medially flattened as though the weak basal impressions of pronotum were extended well over onto the elytra, these flat areas skirted laterally by the bases of the lateral elytral vittae; pronotal sides parallel along basal halves, strongly arcuately convergent along apical halves; prosternal apex evenly rounded in the vertical plane, not at all compressed medially; antennae similar to those of *quadripunctatus* (fig. 126), with segment 3 of stem, however, only slightly longer than segments 4 and 5 together. Pronotal punctures small and sparse medially, suddenly much stronger on lateral thirds.

MEASUREMENTS OF TYPE: Length, 5.80 mm.; width, 2.55 mm.

MALE GENITALIA: The aedeagus (fig. 131) is extremely distinctive in several ways: the arms of the tegmen are bent upward medially into very large lobes; the median strut is exceptionally long, more than twice as long as the median lobe; the internal sac is likewise unusually long, protruding through the median foramen for a distance equal to almost twice the length of the median lobe, and the internal sac bears an anterior muscle attachment (fig. 132) reminiscent of that in *Tritoma pulchra* and in *Triplax* species. The median lobe is gently curved and apically broadly rounded. (One specimen dissected.)

FEMALE GENITALIA: The female of this species is unknown.

TYPE: Male; labeled "Cave Creek, Chiricahua Mts., Cochise Co., Ariz., 7000 ft., June 24, 1927; holotype, *Ischyrys aleator* Boyle" (J. A. Kusche; collection Van Dyke, C.A.S.).

TYPE LOCALITY: Cave Creek, 7000 feet, Chiricahua Mountains, Cochise County, Arizona.

GEOGRAPHICAL DISTRIBUTION: Known only from the type locality in southeastern Arizona, but probably ranges southward far into Mexico.

MATERIAL EXAMINED: One specimen.

GENUS MYCOTRETUS LACORDAIRE, 1842

Mycotretus LACORDAIRE, 1842, p. 132. Genero-type: *Erotylus lesueuri* Chevrolat, 1835, cent. 2, fasc. 8, no. 175, by present designation.

DIAGNOSTIC DESCRIPTION: Shape elongate-elliptical, the sides of body evenly arcuate, the anterior and posterior ends about equally parabolically rounded, the length approximately 2.1 times the width; pronotum subtrapezoidal to subquadrate, the median length almost equal to apical width, the sides moderately arcuately convergent anteriorly; antennal length equal to from 65 to 70 per cent of pronotal basal width, the club four- or five-segmented, lax, gradually emergent from the stem, rarely three-segmented and abrupt; segment 3 of antennal stem subequal in length to segments 4 and 5 together; scutellum subcordate to pentagonal; epistomal apex feebly arcuately concave; terminal

segments of maxillary palpi semicircular, wider than long, the width rarely three times the length, always much larger than the securiform terminal segments of labial palpi (these latter similar to those of *Haematochiton*, fig. 134); mentum large, broadly rounded anteriorly to subpentagonal, with the apex feebly oblique on each side (scarcely differing from that of *Haematochiton*, fig. 134); tibiae not dilated apically, straight except at base; coxae moderately separated, approximately as in *Triplax* (fig. 2). Color not generally different from that of *Ischyrys*, the body often adorned with spots and stripes of black on a reddish background. Elytra strongly margined basally in many cases, but this character perhaps not constant in the genus. (Not examined for cephalic stridulatory files, but these likely absent in both sexes.) Pronotum entirely finely margined, the apical margin occasionally obsolescent medially; pronotal angle pores small, inconspicuous. Eyes finely faceted, small, similar to those of *Tritoma* (pl. 8, fig. 1), the vertex, as delimited by the ocular striae, not constricted between eyes. Ocular striae terminating at antennal insertions, the epistoma consequently immarginate. Terminal segment of maxillary palpus not armed with a brush; terminal segments of labial palpi similar to those of *Haematochiton* (fig. 134) each bearing a single stronger seta laterally and armed with a minute brush along the truncate apex. (The mouth parts have not been dissected out and examined for fine detail but are presumed similar to those of *Haematochiton*, figs. 133, 134; in the original description of the genus, however, Lacordaire states that the lacinia is unarmed with teeth apically.) Body below similar to that of *Triplax* (fig. 2) with the following exceptions: the prosternal apex at middle is either compressed into a pitcher-like lip or evenly rounded in the vertical plane; the prosternal lines along the inner edges of the coxae are strong and straight, subparallel, scarcely divergent posteriorly; and metasternal coxal lines are present. Sexual dimorphism: males often (as in the single North American species) bear an asperate-punctate dot on the middle of the basal abdominal sternite. Size rather variable for the genus as a whole, the single North American form with an approximate range in length of from 4.5 to 6.5 mm.

MALE AND FEMALE GENITALIA: (See discussion under *M. nigromanica*).

WORLD DISTRIBUTION AND SIZE: This genus is limited to the New World with but a single species known to occur north of Mexico. Comprehending 200 species at the present time, *Mycotretus* is surpassed in size in the Erotylidae only by *Brachysphaenus* with its approximately 240 species, which are likewise limited to the New World.

BIOLOGY: The author has encountered no information on the habits or immature stages of *Mycotretus* species. The adult of *lesueuri*, the generotype, is figured in color by Gorham (1887-1899, pl. 3, fig. 20).

Mycotretus nigromanica Boyle, 1954

Mycotretus nigromanica BOYLE, 1954b, p. 48.

DIAGNOSTIC DESCRIPTION: Color reddish yellow to bright red with an orange tinge, the antennae, scutellum, and legs except coxae black; strongly nitidous, essentially glabrous. Shape evenly elliptical, the length 2.1 times the width; scutellum subcordate; antennal club five-segmented (segment 7 subtriangular, widened apically, hence participating in the formation of club); mentum large, subquadrate, feebly oblique on each side of apex; terminal segments of maxillary palpi approximately twice as wide as long; prosternal apex not compressed but feebly convex medially in ventral view. Pronotal and cephalic punctures moderately small, shallowly impressed, rather sparse, mostly separated by two to three times their diameters except on base of vertex; elytral intervals moderately punctulate; punctures small and sparse on body below.

MEASUREMENTS OF TYPE: Length, 4.83 mm.; width, 2.30 mm.

VARIATION: The observed size range, in millimeters, is 4.83 long by 2.30 wide to 5.73 long by 2.78 wide. Only two specimens (both males) of this form are known. Judging by the color of the larger Mexican specimen (a very bright red with an orange tinge), the type is probably somewhat teneral, being a lighter reddish yellow. Other than in size and color this specimen differs from the type in having the pronotal apical margin obsolete medially.

MALE GENITALIA: The aedeagus of the Mexican specimen is shown in lateral view in figure 139 (that of the type is poorly sclerotized and is somewhat distorted as a result of

being partly exerted at death). The tegminal arms are narrow and gently bent upward medially; the median lobe is feebly curved, tapers gradually to a truncate apex, and is almost wholly sclerotized (the sclerotization omitted in fig. 139). The internal sac is long, opens broadly along the dorsum and apex of the median lobe (thus forming median orifice), and surrounds a rather long enclosed ejaculatory duct which appears to be entirely free of the wall of the internal sac. The distinctive anterior end of the internal sac is shown in dorsal view in figure 140. (Two specimens dissected.)

FEMALE GENITALIA: The female of this species is unknown.

TYPE: Male; labeled "Pinery Canyon, 6000 feet, Chiricahua Mts., Cochise Co., Ariz., VII-19-1919; holotype, *Mycotretus nigromanica* Boyle" (Witmer Stone; collection A.N.S.P. No. 10701).

TYPE LOCALITY: Pinery Canyon, 6000 feet, Chiricahua Mountains, Cochise County, Arizona.

GEOGRAPHICAL DISTRIBUTION: Known only from southeastern Arizona and the State of Veracruz, Mexico. The Mexican specimen is labeled "[on] orchid from Huatusco, Ver[a-cruz], Mex., 14-I-49, El Paso 57823." (U.S.N.M.).

MATERIAL EXAMINED: Two specimens.

GENUS *HAEMATOCITON* GORHAM, 1888

Haematochiton GORHAM, 1888 (1887-1899), p. 81. Generotype: *Haematochiton elateroides* Gorham, 1888 (1887-1899), p. 81, pl. 5, fig. 4, by monotypy.

Scaeothe GORHAM, 1888 (1887-1899), p. 82. New synonymy.

DISCUSSION OF SYNONYMY: Gorham's *Haematochiton elateroides* and *Scaeothe carbonarius* differ from each other mainly in punctuation and color, and they cannot constitute two genera on this account. On the other hand, they strongly resemble each other in a number of important ways, especially in characteristics of the female genital tube, in general features of the aedeagus, in their identical mouth parts, and in their similar sizes and shapes. These two species together, as a matter of fact, form a genus that is only weakly generically distinct from *Mycotretus*, as appears in the descriptions following.

DIAGNOSTIC DESCRIPTION: Shape elongate-

elliptical, the sides of body almost evenly arcuate, the anterior and posterior ends about equally parabolically rounded to slightly more obtusely so anteriorly, the length 2.0 to 2.2 times the width, the dorsal profile in lateral view somewhat flattened medially; pronotum subquadrate to subtrapezoidal, the apical width subequal or equal to median length, the sides moderately arcuately convergent anteriorly; antennal length equal to from 60 to 75 per cent of pronotal basal width, the club four- to five-segmented, lax, gradually emergent from the stem (exactly like the typical shape in *Mycotretus*), with segment 3 of stem subequal in length to segments 4 and 5 together; scutellum subcordate to subpentagonal; epistomal apex feebly arcuately concave; terminal segments of maxillary palpi (fig. 133) semicircular, less than twice as wide as long, much larger than the securiform terminal segments of labial palpi (fig. 134); mentum moderately large (fig. 134), distinctly tridentate at apex; tibiae not or very slightly dilated apically, feebly arcuate; coxae moderately separated, the body below approximately as in *Triplax* (fig. 2). Color either uniformly dull, carbonarius black, with the tarsi, palpi, and antennal stem vaguely lighter, or nitidous black with the elytra blood-red. Elytra distinctly margined basally. Cephalic stridulatory files absent in both sexes (with the possible exception of the male of *carbonarius*, which has not been examined for this character). Pronotum finely margined except apically between the eyes; pronotal angle pores small, inconspicuous. Eyes small, finely faceted, similar to those of *Tritoma* (pl. 8, fig. 1), the vertex, as defined by the ocular striae, not constricted between the eyes. Ocular striae terminating at or behind antennal insertions, the epistoma consequently immarginate. Terminal segment of maxillary palpus not armed with a brush, the lacinia armed with two small, incurved teeth at apex (fig. 133); terminal segments of labial palpi (fig. 134) securiform, each bearing a single stronger seta laterally and armed with a minute brush along the truncate apex. Prosternal apex evenly rounded in the vertical plane, not at all compressed at middle. Body below similar to *Triplax* (fig. 2) with the following exceptions: the prosternal lines along inner edges of coxae are subparallel, scarcely divergent posteriorly, and metasternal

and abdominal coxal lines are either very weak or entirely absent. Sexual dimorphism: males with an asperate-punctate spot at middle of basal abdominal sternite (this larger than in *Mycotretus*). The observed range in length, both species included, is 4.65 to 6.14 mm.

As can be seen by a comparison of the descriptions, there is little concrete difference between the genera *Mycotretus* and *Haematochiton*. The most tangible differences are those of color and punctuation (see under the species) and in the absence in *Haematochiton* of the pronotal margin at apex between the eyes.

MALE GENITALIA: The aedeagi of both species (figs. 135-138) are rather similar to the aedeagus of *Mycotretus nigromanicaus* (figs. 139, 140). Each of the three species has a distinctive anterior end of the internal sac, but the differences here are no greater than are those between species of *Triplax* (figs. 88-99).

FEMALE GENITALIA: The female genital tubes of the two species (not figured) are similar to each other and to those of *Triplax* species in characteristics of the eighth tergite. This is similar to that of *Triplax thoracica* (fig. 100) in bearing a deep, narrow, membranous indentation medio-apically and strongly sclerotized lines laterally.

WORLD DISTRIBUTION AND SIZE: *Haematochiton* contains only the two species treated here. Both are known only from southern Arizona and Mexico.

BIOLOGY: Nothing is known regarding the habits and immature stages of *Haematochiton* species. The adults of both species are figured in color by Gorham (1887-1899, pl. 5, figs. 4, 5).

KEY TO SPECIES OF *Haematochiton*

- Elytra blood-red, moderately nitidous, the rest of body shining black *elateroides* (p. 139)
- Elytra black, dull, concolorous with rest of body *carbonarius* (p. 140)

Haematochiton elateroides Gorham, 1888

Haematochiton elateroides GORHAM, 1888 (1887-1899), p. 81, pl. 5, fig. 4.

Haematochiton bisculptum CASEY, 1916, p. 168. New synonymy.

DIAGNOSTIC DESCRIPTION: Color black, the elytra blood-red except at extreme apices, the body nitidous, lacking obvious microsculp-

ture. Shape elongate-elliptical, the two ends of body about equally parabolically rounded, the length approximately 2.2 times the width; pronotum subtrapezoidal, widest basally, the sides moderately arcuately convergent anteriorly, the median length about one-eighth shorter than apical width, the apex approximately transverse between apical angles when the four pronotal angles are in equal focus. Metasternal and abdominal coxal lines absent, or occasionally present as extremely short basal traces. Pronotal punctures relatively small and shallow medially, suddenly much larger and distinctly flat-bottomed and oblong on lateral thirds; cephalic punctures relatively large and flat-bottomed along base, becoming smaller and denser apically; elytral intervals smooth, impunctulate; scutellum smooth to rather strongly punctulate.

MEASUREMENTS OF TYPE: In the original description Gorham gives the length as 6.0 mm.

VARIATION: The observed size range, in millimeters, is 4.69 long by 2.21 wide to 6.14 long by 2.90 wide. Casey's type and two paratypes of *bisculptum* (all from Arizona) agree as well with Gorham's descriptions of *Haematochiton* and *H. elateroides* as with Casey's description of *bisculptum*. The variation among these three specimens in respect to the lateral elytral striae completely encompasses the difference between Gorham's and Casey's descriptions of this character. Gorham was not wont to describe punctuation in fine detail; his statement concerning the pronotum, "... the surface very even, and with oblong, deep, flat-bottomed punctures," is quite adequate in view of the fact that such punctuation is virtually unique among erotylids. Moreover, Casey is simply mistaken in his statement that "there is no indication of anything like an obvious compression in the femora of *bisculptum*." (Gorham's correct statement regarding the femora is, "femora a little compressed, not much thickened, keeled on their posterior edges.")

MALE GENITALIA: The aedeagus (fig. 135) is quite similar to that of *Mycotretus nigromanicatus* (fig. 139) in gross characteristics. The median lobe is narrowly membranous along the broad opening of the median orifice (above the dotted line). The distinctive anterior end of the internal sac with its

muscle attachment is shown in dorsal view in figure 136. (Two specimens dissected.)

FEMALE GENITALIA: The female genital tube is identical to that of *carbonarius* except for being a little larger in size and in that tergite 8 is only one-half wider than long. (Two specimens dissected.)

PUBLISHED ILLUSTRATIONS: The adult is figured in color by Gorham (1887-1899, pl. 5, fig. 4).

TYPE: Not seen; presumably in Gorham's type material of Erotylidae and Languriidae in the British Museum (*vide* Horn and Kahle, 1935-1937, vol. 2, p. 92).

TYPE LOCALITY: "Ciudad in Durango, 8100 feet," Mexico.

GEOGRAPHICAL DISTRIBUTION: *Mexico*: Durango: "Ciudad in Durango, 8100 feet" (type locality). *United States*: Arizona: Cochise County: Chiricahua Mountains, July 20, 1950, July, 1936, and June 24; Pine Creek, Chiricahua Mountains, June 24, 1897; Rustler Park, 8000-9000 feet, Chiricahua Mountains, July 20, 1950. Maricopa County: Phoenix.

MATERIAL EXAMINED: Seventeen specimens.

Haematochiton carbonarius (Gorham, 1888),
new combination

Scaeothe carbonarius GORHAM, 1888 (1887-1899), p. 82, pl. 5, fig. 5.

Scaeothe opacus SCHAEFFER, 1915, p. 236. New synonymy.

DIAGNOSTIC DESCRIPTION: Color carbonaceous black, the tarsi, palpi, and five basal antennal segments somewhat lighter, the body covered with a strong, minutely reticulate microsculpture that destroys virtually all nitidosity. Shape elongate-elliptical, the body somewhat more obtusely rounded anteriorly than posteriorly, the length approximately 2.1 times the width; pronotum subquadrate, a bit inflated, widest slightly before the base, the sides feebly, evenly arcuately convergent anteriorly, the median length equal to apical width, the apex feebly convex between apical angles when the four pronotal angles are in equal focus. Metasternal and abdominal coxal lines present but fine and weak. Pronotal and cephalic punctures moderately strong and deep, rather uniform in size and density, mostly

separated by about their diameters; elytral intervals distinctly punctulate, the scutellum similarly punctulate.

MEASUREMENTS OF TYPE: In the original description Gorham states the length to be 5.0 mm.

VARIATION: The observed size range, in millimeters, is 4.49 long by 2.19 wide to 4.65 long by 2.21 wide. The type of *opacus* Schaeffer has not been located; it is not with Schaeffer's material either at the United States National Museum or at the California Academy of Sciences, and numerous other inquiries have produced negative results. This form, however, is unquestionably a synonym of *carbonarius* Gorham, as the differences described by Schaeffer are minor and are characters that customarily show considerable intraspecific variation in Erotylidae. Of the two specimens at hand the one from Sonora (a female) is less strongly punctate dorsally and shows the extremely feeble median pronotal carination noted by Gorham. The one from Oaxaca (a male), on the other hand, is more strongly punctate above and shows no pronotal carination.

MALE GENITALIA: The aedeagus (fig. 137) is similar to that of *elateroides* in general characteristics. The tegminal arms, however, bear distinct dorsal lobes medially, and the enclosed ejaculatory duct is of much larger diameter (the internal sac appears to be

partially withdrawn into the median lobe in the specimen illustrated), and the median lobe is scarcely membranous dorso-apically, more pointed at apex. The distinctive anterior end of the internal sac with its muscle attachment is shown in dorsal view in figure 138. (One specimen dissected.)

FEMALE GENITALIA: The female genital tube is similar to that of *Ischyrus quadri-punctatus* (fig. 130) in general shape and proportions, but the seminal receptacle bears a much smaller (rather typical) extension. Each stylus bears a single, much longer, median seta as in *Tritoma pulchra* (fig. 112). Tergite 8 is twice as wide as long, but otherwise it resembles that of *Triplax thoracica* (fig. 100). (One specimen dissected.)

PUBLISHED ILLUSTRATIONS: The adult is figured by Gorham (1887-1899, pl. 5, fig. 5).

TYPE: Not seen; presumably in Gorham's type material of Erotylidae and Languriidae in the British Museum (*vide* Horn and Kahle, 1935-1937, vol. 2, p. 92).

TYPE LOCALITY: Toluca, State of Mexico, Mexico.

GEOGRAPHICAL DISTRIBUTION: *Mexico*: Mexico: Toluca (type locality). Oaxaca: Oaxaca, July 15 to 21. Sonora: Bokachaka, Río Mayo, July 5. *United States*: Arizona: No further data (type locality of *opacus* Schaeffer).

APPENDIX

DISTRIBUTIONAL DATA

IN THE FOLLOWING LISTS of localities appearing on labels of specimens examined, place names are arranged alphabetically from country, to state or province, to county, parish, or district, to specific locality. Biological and ecological data, other than altitude, are given under the species concerned in the Systematic Treatment. The names of collectors and collections are not included, and only the earliest and latest annual dates for a given state or province are given. Species are arranged in the same systematic order in which they are taken up in the text.

Dacne quadrimaculata (Say)

CANADA: *Manitoba*: Winnipeg. *Ontario*: Carleton Co.: Ottawa. Middlesex Co.: Strathroy. Prince Edward Co. Welland Co.: Ridgeway. York Co.: Toronto, Apr. 18, Oct. 17. *Quebec*: Brome Dist.: Patton Springs, July 3.

UNITED STATES: *Alabama*: Clay Co.: Cheaha State Park, Apr. 26. *Arkansas*: Southwest Arkansas. *District of Columbia*: Washington, June 7, July 11. *Illinois*: Central Illinois. McLean Co.: Funks Grove, May 8. *Indiana*: Marion Co., Sept. 30. Posey Co. Vanderburgh Co.: Evansville, May 9. *Iowa*: No further data. *Kansas*: Shawnee Co.: Topeka. *Kentucky*: No further data. *Maine*: Cumberland Co.: Casco, Aug. 1 and 13. *Maryland*: Montgomery Co.: Plummer Island, Apr. 24, July 5. *Michigan*: Eaton Co.: Grand Ledge. Marquette Co.: Huron Mountain Club; Huron Mts., Sept. 8. Midland Co., June 19. Wayne Co.: Detroit. *Minnesota*: Clearwater Co.: Itasca State Park, Aug. Houston Co.: May 27; Mississippi Bluff, $\frac{1}{2}$ mile north of state line; Winnebago Creek. Olmsted Co. Ramsey Co.: Saint Paul. Winona Co. *New Jersey*: No further data. *New York*: Albany Co.: Albany. Erie Co.: Buffalo; Hamburg; Lancaster, Jan. Fulton Co.: Johnstown, Aug. 14. Genesee Co.: Batavia. Niagara Co.: Olcott. Onondaga Co.: Elbridge. Saratoga Co.: Ballston Spa. Tompkins Co.: Ithaca; Groton; Six-Mile Creek, Ithaca. *North Carolina*: Haywood Co.: Retreat. *Ohio*: Cuyahoga Co.: Cleveland. Hamilton Co.: Cincinnati, Sept. 2. Licking Co.: Newark. *Pennsylvania*: Allegheny Co.: May 3; Pittsburgh. Monroe Co. Westmoreland Co.: Jeannette, Sept. 20. *Texas*: Travis Co.: Austin, Mar. 12. *West Virginia*: Greenbrier Co.: White Sulphur Springs.

Marion Co.: Fairmont. *Wisconsin*: Dodge Co.: Beaver Dam. Milwaukee Co., Aug. 20.

Dacne californica (Horn)

CANADA: *British Columbia*: Creston; Midday Valley, Merritt; Salmon Arm, May 5 and Sept.; Trinity Valley.

MEXICO: *Baja California*: 15 miles south of San Domingo, Oct. 4.

UNITED STATES: *California*: Alameda Co.: Berkeley; Haywards; Oakland Hills. Calaveras Co.: Mokelumne Hill. Contra Costa Co.: Antioch; Moraga Valley; Vine Hill, Alhambra Valley; Walnut Creek. El Dorado Co.: Fallen Leaf, Lake Tahoe, 6500 ft. Fresno Co.: Fresno; Kings River Canyon; Paradise Valley, Kings River, 7000 ft. Inyo Co.: Lone Pine. Kern Co. Lake Co. Lassen Co.: Duck Lake. Los Angeles Co.: Glendale; Los Angeles; Pasadena, Dec. 23; Pomona; Rancho Escondido, Catalina Island; San Marino. Madera Co.: Bass Lake; Chiquito Creek, 4100 ft. Marin Co.: Inverness; Lagunitas; Lake Lagunitas; Muir Woods. Mendocino Co. Modoc Co.: Goose Lake. Monterey Co.: Carmel; Jamesburg; Pacific Grove, Jan. 7. Napa Co.: Napa. Placer Co.: Lake Tahoe. Riverside Co.: Idyllwild, San Jacinto Mts. Sacramento Co.: Folsom; Sacramento. San Bernardino Co.: Colton; Upland. San Diego Co.: Poway. San Francisco Co.: San Francisco. San Mateo Co.: San Mateo; Santa Cruz Mts. Santa Clara Co.: Los Gatos; Palo Alto; Santa Cruz Mts.; Stevens Creek. Santa Cruz Co.: Santa Cruz. Shasta Co.: Castlecrag; Palo Cedro. Siskiyou Co.: Dunsmuir. Sonoma Co.: Cazadero; Duncan Mills; Sebastopol; Sylvania. Stanislaus Co. Trinity Co.: Carrville. Tulare Co.: Ash Mountain River, Sequoia National Park; Sequoia National Park, 3000–5000 ft. Ventura Co.: Ojai. Yolo Co.: Putah Canyon. *Idaho*: Ada Co.: Boise, 2739 ft. Kootenai Co.: Coeur d'Alene, June 12. Nez Percé Co.: Lenore, 1000–1500 ft., Mar. 8. *Indiana*: No further data [locality questionable; see remarks under geographical distribution]. *Nevada*: No further data. *Oregon*: Benton Co.: Corvallis, Jan. 16. Jackson Co.: Medford, Mar. 7. *Pennsylvania*: Tioga Co.: Crooked Creek [locality questionable; see remarks under geographical distribution]. *Texas*: Travis Co.: McNeil, June 6 [locality questionable; see remarks under geographical distribution]. *Utah*: Box Elder Co.: Garland. Salt Lake Co.: Brighton. Utah Co.: Provo, June 10, Aug. 20. Washington

Co.: Saint George. *Washington*: [Locality illegible], July 24.

***Dacne picea* LeConte**

California: Fresno Co.: Huckleberry Meadow, 6500 ft., July 20. Marin Co.: Inverness, May 16. Siskiyou Co. Trinity Co.: Carrville. Tulare Co.: Wolverton, Sequoia National Park, 7000-9000 ft. *Nevada*: Douglas or Ormsby Co.: Lake Tahoe.

***Dacne cyclochilus* Boyle**

California: Siskiyou Co.: Horse Camp, Mt. Shasta, July 15; Mt. Shasta, 8000 ft., July. *Utah*: [Cache Co.?]: Logan Canyon. Salt Lake Co.: Alta, June 28; Brighton; Salt Lake City, July 21.

***Microsternus ulkei* (Crotch)**

Kentucky: Boone, Campbell, or Kenton Co.: "Ky. opposite Cincinnati." Jefferson Co.: Louisville. [Sixty-nine specimens are labeled simply "Ky."] *Maryland*: No further data. *North Carolina*: New Hanover Co.: Wilmington. *Ohio*: Hamilton Co.: Cincinnati, Apr. 8, July 23. *Pennsylvania*: Westmoreland Co.: Jeannette, July 2, Sept. 4.

***Megalodacne fasciata* (Fabricius)**

CANADA: *Ontario*: Essex Co.: Point Pelée; Windsor. Lincoln Co.: Grimsby. Prince Edward Co.: Aug. 31. Welland Co.: Fort Erie, Jan. 11.

UNITED STATES: *Alabama*: Jefferson Co.: Birmingham. Mobile Co.: Kushla, July 23; Mobile; Spring Hill. *Tuscaloosa* Co.: Tuscaloosa, Jan. 8. *Arkansas*: Benton Co.: Jan. 8; Bentonville, Sept. 11; Rogers. *Hempstead* Co.: Hope. *Prairie* Co.: Washington Co. *Colorado*: Aug. 28. *Denver* Co.: Denver. *Connecticut*: Hartford Co.: Suffield. *Litchfield* Co.: Cornwall, July 27. *New Haven* Co.: New Haven. *District of Columbia*: Washington, Aug., Oct. 15. *Florida*: Alachua Co.: Archer. *Flagler* Co.: Haw Creek. *Franklin* Co.: Apalachicola. *Seminole* Co.: Osceola; Sanford. *Volusia* Co.: Enterprise, May 14; New Smyrna Beach, Dec. 10. *Georgia*: Stephens Co.: Toccoa. *Illinois*: Champaign Co.: Urbana. *Cook* Co.: Chicago, Oct. 20; La Grange. *Du Page* Co.: Glen Ellyn. *Knox* Co.: Galesburg. *La Salle* Co.: Starved Rock Springs. *Marion* Co.: Centralia. *Mason* Co.: Havana. *McHenry* Co.: McHenry. *McLean* Co.: Bloomington. *Ogle* Co.: Oregon. *Peoria* Co.: Piatt Co.: Atwood. *Pike* Co.: Barry, Jan. 3. *Pope* Co.: Herod. *Pulaski* Co.: Pulaski; Pulaski Bluff. *Putnam* Co.: Rock Island Co.: Moline. *Vermilion* Co.: Muncie. *Wayne* Co.: Jeffersonville. *Indiana*: Bartholomew Co.: Columbus, Apr. 22. *Starke* Co.: Knox. *Vermillion* Co.: Clinton, Dec. 22. *Iowa*: Johnson Co.: Iowa City; Solon. *Story* Co.: Ames, Mar. 31, Oct. 15. *Warren* Co.: Indianola.

Kansas: Cherokee Co., 888 ft. Coffey Co., Nov. Crawford Co., 993 ft. Douglas Co.: 900 ft.; Lawrence, Apr. 6. *Franklin* Co.: Ottawa. *Johnson* Co.: Pottawotomie Co.: Onaga. *Riley* Co.: Manhattan. *Shawnee* Co.: Topeka. *Kentucky*: Jefferson Co.: Louisville, June 3. *Ohio* Co.: Fordsville, Aug. 25. *Louisiana*: Mar. 15; Acadia Par.: Crowley. *Madison* Par.: Mound; Tallulah. *Orleans* Par.: New Orleans. *Union* Par.: Farmerville, Sept. 25. *Maryland*: Baltimore. *Charles* Co.: Marshall Hall. *Montgomery* Co.: Boyds, May 5. *Queen Annes* Co., Aug. 20. *Michigan*: Eaton Co.: Grand Ledge, May 1. *Ingham* Co.: Aurelius; East Lansing, Oct. 10. *Saginaw* Co.: Saginaw. *Shiawassee* Co.: Owosso. *Van Buren* Co.: South Haven. *Wayne* Co.: Detroit. *Minnesota*: Hennepin Co., Sept. 10. *Houston* Co.: Eitzen, May 23. *Mississippi*: George Co.: Lucedale, Oct. 10. *Hinds* Co.: Utica. *Jackson* Co.: Oktibbeha Co.: Mississippi Agricultural and Mechanical College, May 4. *Perry* Co.: New Augusta. *Sharkey* Co.: Rolling Fork. *Missouri*: Boon Co.: Columbia, Apr. 4. *Carroll* Co.: Carrollton, Nov. 15. *Greene* Co.: Willard. *Howard* Co.: New Franklin. *Pike* Co.: Louisiana. *Pulaski* Co.: Waynesville. *Saint Charles* Co.: Dardennes Slough. *St. Louis* [independent city]: Forrest Park; Webster Groves. *Scott* Co.: Pefferkorn Field, Chaffee. *Stoddard* Co.: Dudley. *New Jersey*: Bergen Co.: Englewood; Fort Lee; Passaic Junction. *Burlington* Co.: Riverton. *Essex* Co.: Newark. *Morris* Co.: Boonton, Oct. 24. *Union* Co.: Berkeley Heights, May 8; Springfield. *New York*: Bronx Co.: Morrisania. *Erie* Co.: Buffalo; Hamburg; Lancaster. *Niagara* Co.: Olcott. *Orange* Co.: New Windsor; West Point. *Oswego* Co.: Minetto. *Queens* Co.: Bayside; Cold Spring Harbor; Flushing, Dec. 29; Jamaica; Woodside. *Rockland* Co.: West Nyack. *Tompkins* Co.: Ithaca, Jan. 2. *Washington* Co.: Hudson Falls. *Wayne* Co.: Westchester Co.: New Rochelle; Pelham. *North Carolina*: June 30; Columbus Co.: Boardman. *Ohio*: Ashtabula Co.: Jefferson. *Columbiana* Co.: Millport. *Cuyahoga* Co.: Berea; Cleveland. *Franklin* Co.: Columbus. *Lorain* Co.: Elyria, May 6. *Montgomery* Co.: Dayton, Sept. 2. *Summit* Co.: Hudson. *Oklahoma*: Cleveland Co.: Apr. 5; Norman. *Craig* Co.: Vinita, June 8. *Pennsylvania*: Allegheny Co.: Oak Station, Nov. 20; Pittsburgh. *Centre* Co.: State College. *Chester* Co.: Honey Brook. *Cumberland* Co.: Allen. *Dauphin* Co.: Harrisburg. *Indiana* Co.: Indiana. *Luzerne* Co.: Wyoming, Nov. 20. *Monroe* Co.: Delaware Water Gap. *Philadelphia* Co.: Angora; Overbrook; Bustleton. *Westmoreland* Co.: Jeannette, Apr. 24. *South Carolina*: Oconee Co.: Clemson College, Jan. 31. *Tennessee*: Shelby Co.: Memphis, Nov. 3. *Smith* Co.: Elmwood. *Texas*: Bosque Co.: Clifton. *Cameron* Co.: Esperanza

Ranch and Santo Tomás, Brownsville. Chambers Co.: Wallisville. Colorado Co.: Columbus. Comal Co.: New Braunfels. Dallas Co.: Dallas. Eastland Co. Harris Co.: Houston; Seabrook. Jefferson Co.: Beaumont. Kleberg Co.: Kingsville. Matagorda Co.: Bay City. Newton Co.: Deweyville, Refugio Co.: Tivoli. Travis Co.: Austin, Dec. 10. Victoria Co.: Black Bayou; Victoria, Jan. 4. Wharton Co.: Wharton. *Virginia*: Arlington Co.: Arlington; Rosslyn. Fairfax Co.: Falls Church, Mar. 9. Nelson Co. Spotsylvania Co.: Fredericksburg, Oct. 4. *West Virginia*: Kanawha Co.: Kanawha Station. Mercer Co.: Athens. Summers Co.: near Talcott, July.

***Megalodon heros* (Say)**

CANADA: *Ontario*: Carleton Co.: Ottawa. Middlesex Co.: London, July 8. Perth Co. Stormont Co.: Avonmore, Aug. 14. York Co.: Toronto. *Quebec*: Covey Hill, June 29.

UNITED STATES: *Arkansas*: Southwest Arkansas. Hempstead Co.: Hope, Aug. 16. *Connecticut*: Fairfield Co.: Brookfield, July 27. Litchfield Co.: Cornwall, May 14, July 27. Pike Co. *District of Columbia*: No further data. *Florida*: Alachua Co.: Gainesville, May 3. Duval Co.: Ortega, June 15. Hillsborough Co.: Lutz. Volusia Co.: Enterprise. *Georgia*: Fulton and De Kalb Cos.: Atlanta, Aug. 4. Paulding Co.: Dallas, Apr. 18. Stewart Co.: Lumpkin. *Illinois*: Champaign Co.: Brownfield Woods, Urbana, Apr. 16; Urbana, Sept. 21. McLean Co.: Funk's Grove. Ogle Co.: Oregon. Putnam Co. *Indiana*: Bartholomew Co.: Columbus, July 8. Posey Co.: Golden Chain, May 16. *Kentucky*: Bell Co.: Cumberland Gap. Harlan Co.: Black Mountain, 4150 ft., Sept. 5. Jefferson Co.: Louisville, Sept. 16. *Louisiana*: Madison Par.: Mound, July 11, Aug. 4. *Maryland*: [Garrett Co.?]: Offutt's Island, Oct. Montgomery Co.: Plummer Island, Apr. 27. *Michigan*: Cheboygan Co.: Douglas Lake. Ingham Co.: East Lansing, May 30. Kalkaska Co. Kent Co.: Grand Rapids, Sept. 5. Wayne Co.: Detroit. Wright Co.: South Haven. *Minnesota*: Chisago Co., June 18. *Mississippi*: Perry Co.: New Augusta, Nov. 12. *Missouri*: Central Missouri. St. Louis [independent city], June 10. *New Jersey*: No further data. *New York*: Albany Co.: Albany. Cattaraugus Co.: Allegany State Park; Crystal Lake. Cortland Co.: Virgil. Erie Co.: Buffalo; Colden; Hamburg. Essex Co.: Rockland. Greene Co.: Herkimer Co.: Newport. Niagara Co.: Olcott. Oneida Co.: Trenton Falls. Onondaga Co.: Elbridge. Lawrence Co.: Canton. Sullivan Co.: White Lake. Tompkins Co.: Ithaca, May 6, Sept. 6; McLean; McLean Bogs Reserve; Newfield; Van Natta's Dam, Ithaca. Warren Co.: Lake George. Wayne Co. Wyoming Co.: Pike. *North Carolina*: Buncombe Co.: Black Mountain.

Haywood Co.: Mt. Sterling. Macon Co.: Highlands; Nantahala Gorge. McDowell Co.: Old Fort. Polk Co.: Tryon. Swain Co.: Hazel Creek, June 8; Smokemont, Oct. *Ohio*: Columbiana Co.: Millport. Cuyahoga Co.: Cleveland. Hamilton Co.: Cincinnati. Hamilton or Licking Co.: Montgomery. Licking Co.: Newark, July 12. Richland Co.: Shelby. Summit Co., May 21. Wayne Co.: Jefferson. *Oklahoma*: Payne Co.: Stillwater, Apr. 12. *Pennsylvania*: Allegheny Co.: Pittsburgh, Oct. 9. Centre Co.: Rebersburg; State College, Apr. 27. Dauphin Co.: Harrisburg; Inglenook. Fayette Co.: Ohiopyle; Uniontown. Huntingdon Co.: Charteroak. Indiana Co.: Indiana. Lawrence Co.: Near Elwood City. Monroe Co.: Pocono Pines. Northampton Co.: Easton. Snyder Co.: Middleburg. Susquehanna Co.: Montrose. Tioga Co.: Crooked Creek. Union Co.: Hartleton. Westmoreland Co.: Jeannette; Trafford. *Tennessee*: Carter Co.: Crabtree. Davidson Co.: Nashville. Robertson Co.: Green Brier. Sevier Co.: Chimney Camp, 3000 ft., May 12; Clingman's Dome; Mt. Le Conte, July 24. *Texas*: Colorado Co.: Rock Island; 3.5 miles northwest of Rock Island. Comal Co.: New Braunfels. Eastland Co. Harris Co.: Seabrook, Aug. 7. Lee Co.: Fedor. Washington Co.: Brenham, May 26. *Virginia*: Arlington Co.: Rosslyn. Fairfax Co.: Dead Run; West Falls Church. Lee Co.: Penington Gap. Nansemond or Norfolk Co.: Lake Drummond. [County?]: Mouth of Scott's Run, Apr. 23; Virginia near Plummer Island, Maryland, Oct. 2. *West Virginia*: Greenbrier Co.: White Sulphur Springs, July 11. Monongalia Co. Pendleton Co.: Franklin, June. Randolph Co.: Cheat Mts., June.

***Cypherotylus californicus* (Lacordaire)**

MEXICO: *Mexico*: Toluca. *Morelos*: Cuernavaca, June. *Oaxaca*: Oaxaca, 5000 ft. *Sonora*: Imuris, July 9. *Tamaulipas*: Rancho Ciclo, 5 miles northwest of Gomez Farias, cloud forest, 3200 ft.

UNITED STATES: *Arizona*: Apache Co.: 12 miles south of Alpine; McNary, 7200 ft.; White Mts. Cochise Co.: Cave Creek Canyon, Chiricahua National Monument, Pinery Canyon (6800–7000 ft.), Rucker Canyon, and South Fork, Cave Creek, 5 miles west of Portal (5000–5500 ft.), Chiricahua Mts.; Douglas; Carr Canyon (5800–7500 ft.), Garden Canyon (6000 ft.), Miller Canyon, 1 mile west of Montezuma Pass (6000 ft.), Ramsey Canyon, and Sunnyside Canyon, Huachuca Mts.; Palmerlee; Portal. Coconino Co.: Flagstaff; Fort Valley; Oak Creek Canyon; Williams, 6800 ft. Gila Co.: Payson; Pinal Mts.; Sierra Ancha Mts.; Young. Graham Co.: Ash Creek (6100–8400 ft.), Gowdy Creek, Grant Creek, Pincrest, and Post Creek, Pinaleno Mts. Greenlee Co.: Casper Ranch, Blue River. Navajo Co.: Holbrook; Pine-

dale; White Mts.; White River; 8–15 miles north-east of White River. Pima Co.: Apache Camp, Bear Canyon (7000 ft.), Mt. Lemmon, Mt. Lemmon Lodge, and Sabino Canyon, Santa Catalina Mts.; Stone Cabin Canyon and Madera Canyon, Santa Rita Mts.; Tucson [probably Santa Catalina Mts.], Feb. 23. Santa Cruz Co.: Huachuca Mts.; Patagonia, Oct. 3; upper Madera Canyon, Santa Rita Mts., 6000–6500 ft.; Sonoita River. Yavapai Co.: Clarkdale; Prescott. *California*: three specimens labeled "Cal.," "Cal., June 1893," and "Laurel Co., Cal., June 1893" [localities questionable: see remarks under geographical distribution]. *Colorado*: Archuleta Co.: vicinity of Pagosa Springs, 8000–9000 ft. Boulder Co.: Boulder. Denver Co.: Denver. El Paso Co.: Cascade; Colorado Springs, 6000–7000 ft., May 15–30; Manitou, 6124 ft.; North Cheyenne Canyon; Pike's Peak, 7000–8000 ft. Jefferson Co.: Chimney Gulch. La Plata Co.: Granite Peaks Camp, Bayfield, 9000 ft.; vicinity of Durango. Larimer Co.: Estes Park, Aug. 14; Glen Haven. Mineral Co.: Wolf Creek Pass. Montezuma Co.: Raymond; 3 miles north of Raymond. Park Co.: Bailey. Teller Co.: Victor. *Kansas*: Sept.; Russell Co. *New Mexico*: Catron Co.: continental divide, Datil; Pine Lawn Camp, Saliz Valley, 6100 ft.; West Fork of Gila River. Colfax Co.: Koehler Junction. Luna Co.: Deming. McKinley Co.: Coolidge. Sandoval Co.: Frijoles Canyon, Bandelier National Monument, 6000 ft.; Jemez Mts., 9000 ft., June 6; Jemez Springs, 6200–8500 ft. San Miguel Co.: Gallinas River, Santa Fe National Forest northwest of Las Vegas, 7500 ft.; Las Vegas; Arnold Ranch, Pecos. Santa Fe Co.: Santa Fe. Sierra Co.: Hillsboro; San Mateo Mts. 30 miles northwest of Engle, Nov. 29. Socorro Co.: Magdalena; Socorro. *Wyoming*: [County?]: North Cheyenne Canyon, Aug. 13.

***Triplax macra* LeConte**

CANADA: *Ontario*: Prince Edward Co., June 10. [County?]: Merivale [near Smith's Falls?], June 21.

UNITED STATES: *Maine*: Hancock Co.: Bar Harbor, Sept. 19. *Massachusetts*: Middlesex Co.: Tyngsboro, June 20. *Michigan*: Marquette Co.: Huron Mountain Club; Marquette, June 26. Wayne Co.: Detroit, Aug. *Minnesota*: Lake Co.: Two Harbors, Gooseberry River, Aug. 11. *New Hampshire*: Grafton Co.: Franconia. *New York*: Greene Co.: Stony Clove, Catskill Mts., July. Herkimer Co.: Newport. Saint Lawrence Co.: Canton, June 12. *Ohio*: No further data. *Pennsylvania*: Allegheny Co.: Pittsburg, Aug.; Wilmerding. Cambria Co.: Patton, July. *Tennessee*: Unicoi Co.: Erwin, June 21. *Texas*: Dallas Co.: Dallas.

***Triplax festiva* Lacordaire**

Alabama: Mobile Co.: Chunchula; Mobile, Nov. 29; Mount Vernon, Feb. 5. Montgomery Co.: Montgomery. *Arkansas*: Southwest Arkansas. Lonoke Co.: Carlisle. *District of Columbia*, Sept. 6. *Florida*: Alachua Co.: Gainesville. Putnam Co.: Crescent City, June 13. *Georgia*: Paulding Co.: Dallas, July 19. *Indiana*: Knox Co., June 11. *Kentucky*: Boone, Campbell, or Kenton Co.: Kentucky near Cincinnati, Ohio. Franklin Co.: Frankfort, Aug. 18. Jefferson Co.: Louisville, Apr. 26. *Louisiana*: Ouachita Par.: Monroe, Aug. 10. Vernon Par.: Leesville, Oct. [Parish?]: Hart. *Maryland*: Harford Co.: Edgewood, Sept. 11, Oct. 20. *Michigan*: Wayne Co.: Detroit, Sept. *Mississippi*: Clay Co.: West Point. George Co.: Lucedale, Jan. 1, Nov. 28. Pearl River Co.: Picayune. Perry Co.: New Augusta. *New York*: Central New York, June 10. Erie Co.: Buffalo. Onondaga Co., Nov. 13. Tompkins Co.: Ithaca. *North Carolina*: Jackson Co.: Balsam; Dillsboro, Aug. *Ohio*: Delaware Co.: Franklin Co.: Columbus, May 3, June 14. *Pennsylvania*: Westmoreland Co.: Jeannette, July 2, Aug. 4. *Tennessee*: Franklin Co.: Decherd, Aug. 18. *Texas*: Bexar Co.: San Antonio, June 1. Colorado Co.: Columbus. Travis Co.: Austin, Dec. 4. *Virginia*: Fairfax Co.: Great Falls, Sept. 7. *West Virginia*: Marion Co.: Fairmont, Aug. 13.

***Triplax frontalis* Horn**

Georgia: Paulding Co.: Dallas, July 19. Pike Co.: Zebulon, Apr. 14. *Illinois*: Putnam Co., June 26. *Kentucky*: Franklin Co.: Frankfort, Aug. 18. *Maryland*: Harford Co.: Edgewood, Sept. 11. *Michigan*: Marquette Co.: Marquette. *Mississippi*: Clay Co.: West Point, Aug. 10. *Oklahoma*: McCurtain Co., June 10. [County?]: Wichita National Forest, June 14. *Pennsylvania*: No further data. *Texas*: Lee Co.: Fedor, June, July. Travis Co.: Austin, Mar. 12. *Virginia*: Fairfax Co.: Great Falls, Sept. 7.

***Triplax mesosternalis* Schaeffer**

Arizona: Cochise Co.: Palmerlee. Cochise or Santa Cruz Co.: Huachuca Mts. Coconino Co.: Williams, May 30. Gila Co.: Workman Canyon, Sierra Ancha Mts., Aug. 24. Pima Co.: Bear Wallow (about 8000 ft.) and Mt. Lemmon, Santa Catalina Mts. Yavapai Co.: Prescott. *Colorado*: Arapahoe Co.: Littleton. Archuleta Co.: vicinity of Pagosa Springs, Aug. 9. Boulder Co.: Boulder. Denver Co.: Denver. El Paso Co.: Colorado Springs, 6000–7000 ft.; Colorado Springs and vicinity. Gunnison Co.: Gunnison, 7500 ft. Huerfano Co.: La Veta. Larimer Co.: Fort Collins, May 2. *Kansas*: Douglas Co., 900 ft. *New Mexico*: Grant Co., July 4. Otero Co.: Cloudcroft. San-

doval Co.: Jemez Mts. San Miguel Co.: Las Vegas, Aug. 19. Santa Fe Co.: Santa Fe. [County?]: Ponil Canyon.

Triplax flavicollis Lacordaire

CANADA: *Ontario*: Carleton Co.: Ottawa, Sept. 15. Essex Co.: Leamington, July 6. Lanark or Leeds Co.: Rideau Lake. Muskoka Co. York Co.: Toronto. *Quebec*: Saint Jean Dist.: Saint Jean, Oct. 10.

UNITED STATES: *Alabama*: Lee Co.: Auburn, Apr. 18. *Arkansas*: Clay Co.: Knobel, June 11. Hempstead Co.: Hope, Nov. 24. Sebastian Co.: Fort Smith. *Connecticut*: Fairfield Co.: New Canaan, Sept. 12; Stamford. Litchfield Co.: Cornwall, Sept. 30. *Delaware*: No further data. *District of Columbia*: Mt. Hamilton, Sept. 21; Washington, June. *Florida*: Alachua Co.: Gainesville, Feb. 9. Highlands, Glades, Okeechobee, or Osceola Co.: Kissimmee River, Nov. 21. Levy Co. Putnam Co.: Crescent City. Volusia Co.: Enterprise. *Georgia*: Fulton Co.: Atlanta, July 12. Thomas Co.: Thomasville, Apr. 7. *Illinois*: Champaign Co.: Urbana. Cook Co.: Chicago; Willow Springs. McLean Co.: Bloomington. Piatt Co.: White Heath, May 9. Putnam Co. Woodford Co.: Spring Bay region. Vermilion Co.: Oakwood. *Indiana*: Tippecanoe Co.: Lafayette, July 4. *Iowa*: Boone Co.: Boone. Davis Co. Johnson Co.: Iowa City, May 12. Linn Co.: Mount Vernon. Lucas Co.: Chariton. Page Co.: Shenandoah. Story Co.: Ames, Oct. 6. [County?]: Atwood. *Kansas*: Douglas Co., Oct. 18. Pottawatomie Co.: Onaga, May 19. Riley Co. Shawnee Co.: Topeka. *Kentucky*: Taylor Co., Sept. 1. *Louisiana*: Orleans Par.: New Orleans, Oct. 20. *Maryland*: Anne Arundel Co.: Odenton. Baltimore [independent city]: June 11; Sparrows Point, Sept. 24. Montgomery Co.: Plummer Island, Sept. 24. Prince Georges Co.: Beltsville. *Massachusetts*: Hampden Co.: Springfield, July 29. *Michigan*: Eaton Co.: Grand Ledge. Ingham Co., June 4. Van Buren Co.: Paw Paw, Sept. Wayne Co.: Detroit, Sept. *Minnesota*: Clearwater Co.: Itasca State Park. Fillmore Co. Goodhue Co., Aug. 28. Hennepin Co. Houston Co.: May 20; Winnebago Creek Valley $\frac{3}{4}$ mile northeast of Eitzen. Olmsted Co.: Rochester. Pine Co. Washington Co.: Afton. *Mississippi*: George Co.: Lucedale, Jan. 28. Perry Co.: New Augusta, Feb. 12. *Missouri*: Pike Co.: New Hartford, June 15. St. Louis [independent city], Sept. 20. *New Jersey*: Bergen Co. Essex Co.: Irvington. Middlesex Co.: Bonhamtown; Monmouth Junction, May 30. Morris Co.: Boonton, Aug. 23. Union Co.: Springfield. [County?]: Orange Mts. *New York*: Albany Co.: Albany. Cattaraugus Co.: Gowanda. Cayuga Co.: Springlake. Erie Co.: Buffalo; Hamburg; Colden. Greene Co. Herkimer Co.: Newport. Niagara Co.: Olcott. Orange Co.: West Point,

Sept. 14. Richmond Co.: Staten Island. Suffolk Co.: Riverhead. Tompkins Co.: Six-Mile Creek, Ithaca. Wayne Co. Wyoming Co.: Pike, Apr. 12. *North Carolina*: Buncombe or Yancey Co.: Black Mts., Sept. 25. Jackson Co.: Balsam. Moore Co.: Southern Pines. Polk Co.: Tryon. Richmond Co., May 8. *Ohio*: Delaware Co. Franklin Co.: Columbus, July 10. Hamilton Co.: Cincinnati, Aug. 14. *Pennsylvania*: Allegheny Co.: Pittsburgh, Oct. 4; Wall. Allegheny or Philadelphia Co.: Overbrook. Armstrong, Chester, or Dauphin Co.: Rockville. Bucks Co. Dauphin Co.: Harrisburg; Hummelstown. Fayette Co.: Ohiopyle. Montgomery Co.: Edge Hill. Philadelphia Co.: Angora; Frankford; Philadelphia, May 21; Roxborough. Tioga Co.: Holiday. Westmoreland Co.: Jeannette. *South Carolina*: Oconee Co.: Clemson College, July 9. *South Dakota*: Brookings Co.: Brookings, June 16. Union Co.: Elk Point, June 19. *Tennessee*: Shelby Co.: Memphis, Mar. 7. *Texas*: Bexar Co.: San Antonio. Colorado Co.: Columbus. Harris Co.: Houston. Travis Co.: Austin, Dec. 24. Victoria Co.: Victoria, Mar. 15. *Virginia*: Arlington Co.: Glencarlyn. Fairfax Co.: West Falls Church; Vienna, Sept. 15. Lee Co.: Jones Creek; Penington Gap; Stone Creek. Prince Edward Co.: Farmville, May 1. *West Virginia*: East Panhandle, June 15. Hampshire Co.: near Romney. Marion Co.: Fairmont. *Wisconsin*: Wood Co.: Nekoosa, Sept. 3-7.

Triplax dissimulator (Crotch)

CANADA: *Alberta*: Edmonton, June 2; Edwaud; Fort McMurray, June 2, July 29; Olds; Wabamun. *Manitoba*: Aweme, June 11, June 24. *Ontario*: Carleton Co.: Ottawa, May 24. Kenora Co.: Malachi. Muskoka Co.: Gravenhurst, July 30. Renfrew Co.: Chalk River. York Co.: Toronto. [County?]: Mer Bleue. *Quebec*: Abitibi Dist.: Duparquet, Nov. 2. Hull Dist.: Hull, May 27.

UNITED STATES: *Connecticut*: Litchfield Co.: Cornwall, June 10. *Illinois*: No further data. *Maine*: Hancock Co.: Mount Desert Island, June 4. Oxford Co.: Paris, July 4. *Massachusetts*: Hampden Co.: Springfield, Aug. 20. Hampshire Co.: Amherst. Middlesex Co.: Sherborn, May 23; Tyngsboro. *Michigan*: Cheboygan Co. Gladwin Co., July 29. Lake Co., June 9. *Minnesota*: Clearwater Co.: Itasca State Park. Cook Co. Fillmore Co. Hennepin Co.: Minneapolis, July 14. Houston Co.: Mississippi Bluff $\frac{1}{4}$ mile north of state line. Olmsted Co. Ramsey Co.: Battle Creek, Saint Paul, May 20. Saint Louis Co.: Duluth. Washington Co.: Afton. *New Hampshire*: Carroll Co.: North Conway. Coos Co.: Mt. Washington, June 24; summit of Mt. Washington, July 7. Grafton Co.: Franconia. Rockingham Co.: Kingston. *New Jersey*: Essex Co.: Newark. *New York*: Albany Co.: Albany. Essex Co.: Heart Lake; Wilmington.

Orange Co.: West Point. Tompkins Co.: McLean Bogs Reserve; Six-Mile Creek, Ithaca, May 2, July 15. *Pennsylvania*: Northeastern Pennsylvania, July 21. Dauphin Co.: Harrisburg, July 4. *Wisconsin*: Dodge Co.: Beaver Dam.

***Triplax antica* LeConte**

CANADA: *British Columbia*: Creston, May 9 and June 23; Midday Valley, Merritt. *Saskatchewan*: Redfield, June 28.

UNITED STATES: *Colorado*: Denver Co.: Denver, July. Gunnison Co., 7500 ft., June 26–30. *Idaho*: Latah Co.: Joel; Juliaetta; Moscow, May 20. Nez Percé Co.: Lewiston Grade, Lewiston; Webb, Mar. 28. [See also discussion under type locality.] *Nevada*: Churchill Co.: Fallon, Dec. 17. Washoe Co.: Reno, Apr. 26. *Oregon*: Hood River Co.: Hood River, May 20. [See also discussion under type locality.] *Utah*: Box Elder Co.: Willard, Mar. 27. Cache Co.: Blacksmiths Fork Canyon. Davis Co.: Farmington. Utah Co.: Provo, Aug. 20; Vineyard. Washington Co.: Saint George. *Washington*: Walla Walla Co.: College Place, Apr. 18; 3 miles south of College Place, Mar. 20.

***Triplax californica* LeConte**

CANADA: *British Columbia*: Courtenay, Vancouver Island; Creston; Langley, Mar. 20; Midday Valley, Merritt, June 22; Terrace.

UNITED STATES: *California*: Calaveras Co.: Mokelumne Hill. Contra Costa Co.: Moraga Valley; Orinda; Pinehurst, Jan. 3. Fresno Co.: Fresno. Kern Co.: Los Angeles Co.: mountains near Claremont; Elizabeth Lake; Long Beach; Los Angeles; Pasadena; San Gabriel. Madera, Mariposa, or Tuolumne Co.: Yosemite National Park. Marin Co.: Inverness; Lake Lagunitas. Mariposa Co.: Miami Ranger Station. Monterey Co.: Carmel. Napa Co.: Monticello. Riverside Co.: Riverside. Sacramento Co.: Folsom. San Bernardino Co.: San Diego Co.: San Diego. San Francisco Co.: San Francisco, Dec. 20. Santa Clara Co.: San José. Solano Co.: Green Valley; Green Valley Falls. Trinity Co.: Hayfork. Tulare Co.: Atwell's Mill, 6600 ft.; Kaweah; Sequoia National Park, 2000–5000 ft.; Visalia. Tuolumne Co.: Tuolumne Meadows; Yosemite, 3800–4000 ft. Ventura Co.: Ojai; Ojai Valley. Yolo Co.: Davis. *Nevada*: Churchill Co.: Fallon, Dec. 17. *Oregon*: Benton Co.: Corvallis, July 2. Coos Co.: Hauser. Hood River Co.: Hood River. Jackson Co.: Medford; Talent, Feb. 1. Yamhill Co.: Dayton. *Washington*: Clallam Co.: Port Angeles. King Co.: Seattle. Whitman Co.: Almota.

***Triplax lacensis* Boyle**

California: El Dorado Co.: Fallen Leaf Lake, Lake Tahoe. El Dorado or Placer Co.: Lake Tahoe, July 14. Mariposa Co.: Yosemite, 3880–

4000 ft., Jan. 26. Placer Co.: Baxters. Plumas Co.: Mohawk. Shasta Co.: Manzanita Lake, Lassen Volcanic National Park. Tulare Co.: Round Meadow, Giant Forest, Sequoia National Park.

***Triplax puncticeps* Casey**

Alabama: Mobile Co.: Mobile. *Louisiana*: Madison Par.: Tallulah, Feb. 6, 17. *North Carolina*: Polk Co.: Tryon. *Tennessee*: Shelby Co.: Memphis, Dec. 11. *Texas*: Dallas Co.: May 28; Dallas. Travis Co.: Austin. Victoria Co., Dec. 11.

***Triplax thoracica* Say**

CANADA: *Alberta*: Beaverlodge, June 11; Calgary; Fort McMurray, June 11, July 29; Wabamun. *Manitoba*: Aweme, June 20. *New Brunswick*: Gloucester Co.: Bathurst, June 21. York Co.: Fredericton, Aug. 19. *Ontario*: Bay Co.: Nipigon. Bruce Co.: Bruce Peninsula. Carleton Co.: Metcalfe, June 1; Ottawa, Oct. Imcoe or Muskoka Co.: Severn. Lanark or Leeds Co.: Rideau Lake. Middlesex Co.: London. Muskoka Co.: Parry Sound Co.: Kearney. Peel Co.: Port Credit. York Co.: Toronto. [County?]: Degra Point; Mer Bleue. *Quebec*: Abitibi Dist.: Duparquet, Aug. 2. Brome Dist.: Patton Springs. Brome or Stanstead Dist.: Lake Memphremagog. Hull Dist.: Hull, May 27. Huntingdon Dist.: Hemmingford. Wright Dist.: Alcove. [District?]: Covey Hill.

UNITED STATES: *Alabama*: Dallas Co.: Selma. Lee Co.: Auburn, Apr. 18, 20. *Arkansas*: Hempstead Co.: Hope, Nov. 24. *Connecticut*: Fairfield Co.: Stamford. Litchfield Co.: Cornwall, July 27, Sept. 30; Litchfield. *Colorado*: Custer Co.: Brush Creek. *District of Columbia*: Mt. Hamilton; Washington, June 7, Sept. 28. *Florida*: Alachua Co.: Gainesville, Feb. 9. Jefferson Co.: Monticello, Mar. 19. Lake Co. *Georgia*: Fulton Co.: Atlanta, Oct. 5. Thomas Co.: Thomasville, Apr. 7. *Illinois*: Northern Illinois, Sept. 12. Campaign Co.: Urbana. Cook Co.: Willow Springs. Knox Co.: Galesburg. McLean Co.: Bloomington. Putnam Co., May 4. Scott Co.: Manchester. Woodford Co.: Spring Bay region. *Indiana*: Porter Co.: Chesterton, July 9. *Iowa*: Buchanan Co.: Independence. Fremont Co.: Hamburg. Johnson Co.: Iowa City, Oct. 9. Lucas Co.: Chariton. Story Co.: Ames, May 1; Soper's Mill Dam 3 miles east of Gilbert. Washington Co.: Washington. Winnebago Co.: Thompson. *Kansas*: Western Kansas. Douglas Co., 900 ft., Oct. 19. Pottawatomie Co.: Onaga. Riley Co.: Shawnee Co.: Topeka, Feb. *Louisiana*: Madison Par.: Tallulah, Feb. 17. *Maine*: Cumberland Co.: Casco, Aug. 1–13. Kennebec Co.: Monmouth. Oxford Co.: Paris; Streaked Mountain, 1500 ft., June 15. Penobscot Co.: Camp Luksoos, Stacyville. Penob-

scot or Piscataquis Co.: Wassataquoik River. Washington Co.: Meddybemps. *Maryland*: Baltimore [independent city]: Baltimore; Sparrows Point, Sept. 24. Montgomery Co.: Glen Echo, June 18; Plummer Island. *Massachusetts*: Berkshire Co.: Monterey, Aug. 1. *Michigan*: Baraga Co.: Pequaming. Eaton Co.: Grand Ledge. Ingham Co.: June 4; Agriculture College [East Lansing?]. Keweenaw Co.: Isle Royale, Lake Superior. Marquette Co.: Huron Mountain Club; Huron Mts., Sept. 8; Marquette. Van Buren Co.: Paw Paw. Wayne Co.: Detroit. *Minnesota*: Chicago Co., Oct. 13. Clearwater Co.: Itasca State Park. Douglas Co.: Camp Carlos, Alexandria. Fillmore Co. Goodhue Co. Hennepin Co.: Lake Minnetonka. Houston Co.: May 23; Mississippi Bluff $\frac{1}{2}$ mile north of state line; Winnebago Creek Valley $\frac{1}{4}$ mile northeast of Eitzen. Olmsted Co. Ramsey Co.: Fort Snelling. Saint Louis Co.: Duluth. Washington Co.: Afton. *Mississippi*: Perry Co.: New Augusta, Oct. 27. *Missouri*: Boone Co.: Columbia, Dec. 9. Cape Girardeau Co.: Cape Girardeau. Greene Co.: Springfield, Apr. 12. Jackson Co.: Kansas City. St. Louis [independent city]. *New Hampshire*: Belknap Co. Coos Co.: Mt. Washington; Vaney's, White Mts. Grafton Co.: Franconia. Strafford Co.: Farmington, Aug. 21. [County?]: Three Mile Island, May 30. *New Jersey*: Bergen Co.: Englewood; Fort Lee district. Essex Co.: Newark. Middlesex Co.: Mar. 30; Dunellen. Morris Co.: Boonton, Sept. 4; Chester. Warren Co.: Phillipsburg. *New Mexico*: Santa Fe Co.: Santa Fe, Aug. *New York*: Albany Co.: Huyck Preserve, Rensselaerville. Clinton or Franklin Co.: Chateaugay Lake, Adirondack Mts., 2000 ft. Delaware Co.: 2 miles northeast of Delhi. Erie Co.: Buffalo; Colden; East Aurora. Essex Co.: Heart Lake. Essex or Warren Co.: Schroon Lake. Greene Co. Kings Co.: Flatbush, Oct. Nassau Co.: Roslyn. Niagara Co.: Olcott. Onondaga Co.: Manlius, Oct.; Skaneateles. Orange Co.: Huguenot; West Point. Rockland Co.: Ramapo Mountains. Sullivan Co.: Mountain Dale. Tompkins Co.: Cornell University campus and Six-Mile Creek, Ithaca; Enfield; Ithaca, May 22; McLean Bogs Reserve. Warren Co.: Jabes Pond, Lake George, 1100 ft. Wayne Co. Wyoming Co.: Pike. *North Carolina*: Buncombe or Yancey Co.: Black Mts., Sept. 25. Guilford Co.: Climax, Mar. 20. Jackson Co.: Balsam. Polk Co.: Tryon. Transylvania Co.: Lake Toxaway. *North Dakota*: Grand Forks Co.: University, June 1. *Ohio*: Columbiana Co.: Millport. Delaware Co., June 2. Greene Co., Sept. 20. *Oklahoma*: Carter Co.: Ardmore, Apr. Payne Co.: Stillwater, May. *Pennsylvania*: Allegheny Co.: Pittsburgh. Allegheny or Philadelphia Co.: Overbrook. Armstrong, Chester, or Dauphin Co.: Rockville. Bucks Co. Chester

Co.: Unionville, Mar. 30. Dauphin Co.: Harrisburg. Delaware Co.: Collingdale, Nov. 25; Media. Fayette Co.: Ohiopyle. Franklin Co.: St. Thomas. Monroe Co.: Pocono Lake. Montgomery Co.: Glenside. Philadelphia Co.: Philadelphia; Roxborough; Wyoming. Westmoreland Co.: Jeanette. *South Dakota*: Union Co.: Elk Point, June 19. *Tennessee*: Shelby Co.: Memphis, Sept. 27. *Texas*: Bastrop Co.: Bastrop State Park. Bexar Co.: San Antonio. Brazos Co.: College Station. Dallas Co.: Dallas. Travis Co.: Austin. Victoria Co.: Victoria, Mar. 12, Dec. 28. *Vermont*: Lamoille Co.: Mt. Mansfield, 4000 ft. Windham Co.: Laurel Lake, Jacksonville, June 19; Stratton, Aug. 25. *Virginia*: Fairfax Co.: West Falls Church. Lee Co.: Pennington Gap. Norfolk Co.: Norfolk, June 10. Prince William Co.: Occoquan, Nov. 4. *West Virginia*: Hampshire Co.: near Romney, June. Marion Co.: Fairmont, June 12. Randolph Co.: Cheat Mts. *Wisconsin*: Oct. Bayfield Co.: Bayfield. Dane Co.: June 4; Madison. Washington Co.: West Bend.

Triplax frosti Casey

CANADA: *Alberta*: Edwaud, July 14; Fort McMurray, July 2. *Manitoba*: Aweme, June 12, 20; Teulon. *Ontario*: Carleton Co.: Ottawa. Kenora Co.: Malachi. Leeds Co.: Portland. York Co.: Toronto, Aug. 24. [County?]: Mer Bleue, June 8. *Quebec*: Abitibi Dist.: Duparquet, July 9. Brome Dist.: Patton Springs. Pontiac Dist.: Fort Coulonge, June 3. Wright Dist.: Alcove. *Saskatchewan*: Redfield, June 28.

UNITED STATES: *Connecticut*: Litchfield Co.: Cornwall, June 10. *Illinois*: Northern Illinois. *Maine*: Cumberland Co.: Casco, Aug. 1-13. Oxford Co.: Paris. York Co.: Alfred, June 17. *Maryland*: Garrett Co.: Oakland, July 9. *Massachusetts*: Hampden Co.: Springfield; Westfield, Aug. 6. Hampshire Co.: Amherst. Middlesex Co.: Framingham, May 25; Hopkinton; Tyngsboro. Suffolk Co.: Wellesley. Worcester Co.: Berlin. *Michigan*: Cheboygan Co. Ingham Co., June 4. Livingston Co. Marquette Co.: Marquette, June 27. Midland Co. Wayne Co.: Detroit. *Minnesota*: Clearwater Co.: Itasca State Park. Douglas Co.: Camp Carlos, Alexandria. Fillmore Co. Hennepin Co. Houston Co.: May 23; Mississippi Bluff $\frac{1}{2}$ mile north of state line; Winnebago Creek Valley $\frac{1}{4}$ mile northeast of Eitzen. Olmsted Co., Sept. 19. Pine Co. Red Lake Co.: Plummer. Rice Co.: Faribault. Washington Co.: Afton. *New Hampshire*: [County?]: Three Mile Island, June 10. *New York*: Albany Co.: Albany. Greene Co. Orange Co.: Huguenot; West Point, Apr. 28. Tompkins Co.: Ithaca, Aug. 15; Six-Mile Creek, Ithaca. *North Dakota*: Grand Forks Co.: University, June 1. *Pennsylvania*: No further data. *Virginia*: Lee

Co.: Penington Gap. *Wisconsin*: Dodge Co.: Beaver Dam.

***Tritoma affinis* Lacordaire**

Alabama: Baldwin Co.: Gulf Shores. Mobile Co.: Chickasaw; Citronelle, June 25; Mobile, Nov. 10. Randolph Co.: Wadley. *District of Columbia*: Oxon Run, July 23. *Florida*: Alachua Co.: Gainesville. Duval Co.: Jacksonville. Jefferson Co.: Monticello, Oct. 4-8. Palm Beach Co.: Lake Worth. *Georgia*: Clarke Co.: Athens, June 12-28. Fulton Co.: Atlanta, Oct. 6. Stephens Co.: Toccoa. Thomas Co.: Thomasville. *Iowa*: Linn Co.: Palisades-Kepler State Park, July 8. *Louisiana*: Winn Par.: Winnfield, July 6. *Mississippi*: George Co.: Lucedale, May 28, Sept. 25. *Missouri*: Central Missouri. *North Carolina*: Buncombe Co.: Asheville, June 3; Black Mountain. Moore Co.: Southern Pines, Oct. 21. Polk Co.: Tryon. *Pennsylvania* Co.: Lake Toxaway. Wake Co.: Raleigh. *South Carolina*: Florence Co.: Florence, Feb. 8. *Tennessee*: Northeastern Tennessee. *Texas*: Colorado Co., Apr. 14. Goliad Co.: Goliad. Lee Co.: Fedor, June. *Virginia*: Norfolk Co.: Ocean View, Norfolk, Sept. 23. Princess Anne Co.: Creeds, Oct. 13.

***Tritoma carolinae* Casey**

District of Columbia: Washington. *Maryland*: Montgomery Co.: Cabin John Bridge, Sept. 18. *North Carolina*: Buncombe Co.: Asheville, June 3. Buncombe or Yancey Co.: Black Mountains, July 4. McDowell Co.: Round Knob. Moore Co.: Southern Pines. Polk Co.: Tryon. *Pennsylvania*: Westmoreland Co.: Jeannette, May. *Virginia*: Albemarle Co.: Charlottesville. Fairfax Co.: Falls Church, July 24. Norfolk Co.: Ocean View, Norfolk. Princess Anne Co.: Creeds, Oct. 13. [County?]: Barcroft.

***Tritoma biguttata* (Say)**

Connecticut: Fairfield Co.: New Canaan, Sept. 18; Westport, Sept. 2. *District of Columbia*: Oxon Run, July 23; Washington, June 12. *Illinois*: Cook Co.: Chicago, June 25; Cicero; Palos Park; Willow Springs, June 25. McLean Co.: Heyworth, July 12. *Indiana*: Noble Co.: Cromwell, Aug. 10. Vigo Co.: Terre Haute. *Kentucky*: Trigg Co.: Cadiz, June 30. *Maryland*: Baltimore [independent city]: Sparrows Point. Calvert Co.: about 4 miles southeast of Prince Frederick. Frederick Co.: S. [?] Mountains near Myersville. Montgomery Co.: Cabin John Run, June 18; Glen Echo; Plummer Island, Oct. 5; Takoma Park. Prince Georges Co.: Bladensburg. [County?]: Winthrop. *Massachusetts*: Barnstable Co.: North Falmouth; Wellfleet; Woods Hole. Bristol Co.: Fall River; Westport. Essex Co.: North Saugus. Hampden Co.:

Agawam; Chicopee; Springfield. Middlesex Co.: Framingham; Middlesex Fells Reserve; South Natick. Norfolk Co. Suffolk Co.: Boston, July 21; Dorchester, Sept. 27; Newton; Stoneham. *Michigan*: Wayne Co.: Detroit. *Missouri*: St. Louis [independent city]. *New Hampshire*: Strafford Co.: Durham, July 27. *New Jersey*: Atlantic Co.: Weymouth. Bergen Co.: Fort Lee; Ridgewood; Westwood. Burlington Co.: June 16; Cinnaminson; Riverton. Camden Co.: Merchantville. Cape May Co.: Anglesea; Bennett Station. Essex Co.: Belleville; Newark; South Orange. Gloucester Co.: Glassboro; Malaga; Westville. Mercer Co.: Trenton. Middlesex Co.: Dunellen; Old Bridge. Morris Co.: Boonton; Madison. Ocean Co.: Lakehurst; Lakewood. Union Co.: Murray Hill. [County?]: Ballingers Mill; Lahaway, Oct. 7. *New York*: Dutchess Co.: Poughkeepsie. Erie Co.: Hamburg. Kings Co.: Water works, Ocean Avenue, Flatbush, Oct. 10. New York Co.: Pelham. Orange Co.: New Windsor; West Point. Richmond Co.: Staten Island. Suffolk Co.: Quogue; Riverhead; Yaphank, July 4. Tompkins Co.: Six-Mile Creek, Ithaca. Westchester Co.: Harrison; Peekskill; Yonkers. *North Carolina*: Buncombe Co.: Asheville, June 3; Black Mountain, July 4. Randolph Co.: Julian, July 15. *Ohio*: Columbiana Co.: Millport. Delaware Co., May 28, Aug. 3. Summit Co. *Pennsylvania*: Allegheny Co.: Pittsburgh; West View. Delaware Co.: Glen Olden. Lancaster Co.: Manheim. Monroe Co.: Delaware Water Gap. Montgomery Co.: Glenside. Northampton Co.: Bethlehem. Philadelphia Co.: Frankford; Philadelphia. Westmoreland Co.: Hillside; Jeannette, June 2, Oct. 2. *Rhode Island*: Newport Co.: Tiverton, Aug. 26. *Tennessee*: No further data. *Virginia*: Albemarle Co.: Charlottesville. Arlington Co.: Barcroft, Oct. 8; Glencarlynn. Fairfax Co.: Falls Church; Pimmit Run, Apr. 17. *West Virginia*: Eastern Panhandle, June 15. Greenbriar Co.: White Sulphur Springs. Preston Co.: Aurora, Aug. 20.

***Tritoma aulica* (Horn)**

Illinois: Illinois; southern Illinois. *Kansas*: Pottawatomie Co.: Onaga, Apr. 19. Riley Co. Shawnee Co.: Topeka, Aug. 8. Wyandotte Co.: Argentine. *Maryland*: No further data [locality possibly questionable; see remarks under geographical distribution]. *Missouri*: Missouri; central Missouri, Nov. St. Louis [independent city]: Forrist Park?, Apr. 7.

***Tritoma humeralis* Fabricius**

CANADA: *Ontario*: Carleton Co.: Ottawa, June 10, Aug. 22. *Quebec*: Joliette Dist.: Lanoraie, Aug. 27.

UNITED STATES: *Arkansas*: Clay Co.: Knobel,

June 9. Lee Co., Oct. 12. *Connecticut*: Litchfield Co.: Cornwall, June 14, Aug. 17. *District of Columbia*: Eastern Branch near Bennings; Mt. Hamilton, Sept. 21; Rock Creek; Washington, June 3. *Illinois*: Northern Illinois, Sept.; Southern Illinois. Champaign Co.: Urbana. Cook Co.: Chicago; Edgebrook, July 4. Rock Island Co.: Rock Island. *Indiana*: No further data. *Iowa*: Buchanan Co.: Independence. Clayton Co.: Guttenberg, Sept. 28. Guthrie Co., May 14. Henry Co.: Mt. Pleasant, Sept. 28. Johnson Co.: Iowa City. Linn Co.: Cedar Rapids. Madison Co. Story Co.: Ames. *Kansas*: Pottawatomie Co.: Onaga, Apr. 19, May 9. *Kentucky*: Jefferson Co.: Louisville, Aug. 24. Meade Co.: Rock Haven, Aug. 8. *Maryland*: Baltimore [independent city]: Sparrows Point. Harford Co.: Edgewood, Sept. 22. Montgomery Co.: Plummer Island, June 3; Tokoma Park. *Massachusetts*: Hampden Co.: Springfield. Middlesex Co.: Dracut; Framingham, Sept. 27; Hopkinton; Natick, May 10; Tyngsboro. Worcester Co.: Northboro. *Michigan*: Wayne Co.: Detroit. *Minnesota*: No further data. *Missouri*: Central Missouri. St. Louis [independent city]: Creve Coer Lake; St. Louis, May 14. *New Jersey*: Bergen Co.: Englewood; Westwood. Middlesex Co.: Amboy Mdw [Meadow, Midway?], Sept. 11. Ocean Co.: Lakehurst, June 20. *New York*: Albany Co.: Albany; Wemple. Orange Co.: West Point. Rensselaer Co.: Rensselaer. Richmond Co.: Staten Island, Sept. Saratoga Co.: Corinth. Suffolk Co.: Yaphank, June. Tompkins Co.: Ithaca; North Spencer. *North Carolina*: Buncombe or Yancey Co.: Black Mts. Madison Co.: Hot Springs. McDowell Co.: Round Knob. Moore Co.: Southern Pines, Apr. Polk Co.: Tryon. *Ohio*: Delaware Co., July 27. Hamilton Co.: Cincinnati. *Pennsylvania*: Adams Co.: Arendtsville. Allegheny Co.: Pittsburgh, Sept. 21. Monroe Co.: Delaware Water Gap. Northampton Co.: Wind Gap, June 10. Philadelphia Co.: Philadelphia. Westmoreland Co.: Jeannette. *South Carolina*: No further data. *Tennessee*: Davidson Co.: Madison, Apr. *Texas*: No further data. *Virginia*: Fairfax Co.: Falls Church, Sept. 3; Great Falls, May 23. Lee Co.: Stone Creek. Nelson Co. *West Virginia*: Greenbrier Co.: White Sulphur Springs, July. *Wisconsin*: Bayfield Co.: Bayfield. Milwaukee Co., Aug. 10.

***Tritoma atriventris* LeConte**

Arkansas: Hempstead Co.: Hope, Oct. 30, Dec. 10. *Florida*: Alachua Co.: Waldo. Duval Co.: Baldwin. Escambia Co.: Pensacola. Lake Co. Orange Co., Nov. 1. Osceola Co.: Kissimmee. Pinellas Co.: Largo. Volusia Co.: Enterprise. [County?]: Centerville. *Georgia*: Floyd Co.: Rome, May 11. Fulton Co.: Atlanta, Oct. 6. *Kansas*:

Douglas Co.: Lawrence. Riley Co.: Shawnee Co.: Topeka, May 8. Wyandotte Co.: Muncie, July 8. *Louisiana*: Rapides Par.: Alexandria. Vernon Par.: Leesville, Aug. 18. *Mississippi*: George Co.: Lucedale, Mar. 22. Greene Co.: Leakesville, Sept. 30. Perry Co.: Richton. *Missouri*: Central Missouri. Boone Co.: Columbia, May 15. Crawford Co., Oct. 15. *Oklahoma*: Craig Co.: Vinita. Major Co.: Cedar Springs, Sept. 5. Payne Co., Oct. 10. *South Carolina*: No further data. *Texas*: Bowie Co.: Texarkana. Brazos Co.: College Station. Cherokee Co.: Jacksonville. Colorado Co.: Columbus. Dallas Co.: Dallas. Denton Co.: Denton. Eastland Co.: Mar. 17; Cisco. Goliad Co.: Goliad, Nov. 15. Harris Co.: Houston. Kerr Co.: Kerrville. Lee Co.: Fedor. McLennan Co.: Waco. Newton Co.: Call. Red River Co.: Avery. Travis Co.: Austin. Victoria Co.: Victoria. [County?]: Belfrage. *Virginia*: Norfolk Co.: Duke, July 4.

***Tritoma erythrocephala* Lacordaire**

Alabama: Mobile Co.: Chickasaw, Apr. 6; Mobile, Oct. 21. *Arkansas*: Lee Co., Oct. 12. *District of Columbia*: Mt. Hamilton, Sept. 21; Rock Creek, June 27. *Florida*: Escambia Co.: Pensacola, Oct. 11-14. Putnam Co.: Crescent City, July 6. *Georgia*: Fulton Co.: Atlanta, May 24, Oct. 6. *Louisiana*: Orleans Par.: New Orleans, Oct. 18. St. Tammany Par.: Covington, Apr. 28. *Mississippi*: George Co.: Lucedale, Apr. 7. Greene Co.: Leaf, Oct. 9; Leakesville. Hancock Co.: Waveland. Jackson Co.: Ocean Springs. *New Jersey*: Gloucester Co.: Williamstown. *New York*: Richmond Co.: Staten Island. *North Carolina*: Buncombe or Yancey Co.: Valley of Black Mts. Moore Co.: Southern Pines, May 6, Oct. 20. Polk Co.: Tryon. Wake Co.: Raleigh. *Pennsylvania*: Northampton Co.: Easton, July 8. Westmoreland Co.: Jeannette, July 22. *South Carolina*: No further data. *Tennessee*: No further data. *Texas*: Harris Co.: Houston.

***Tritoma angulata* Say**

Arkansas: Washington Co., Sept. 7. *Connecticut*: Hartford Co.: Burnside, Sept. 16. *District of Columbia*: Washington, July 22. *Georgia*: Fulton Co.: Atlanta, June 19, July 8. *Illinois*: Northern Illinois, July 8. La Salle Co.: Utica, July 3. *Indiana*: Lawrence Co.: Mitchell, July 16. Vigo Co.: Terre Haute. *Iowa*: Johnson Co.: Iowa City. *Kentucky*: Edmonson Co., July 16. Jefferson Co.: Louisville, Aug. 24. *Louisiana*: Orleans Par.: New Orleans, Oct. 17. *Maryland*: Baltimore [independent city]: Sparrows Point, July 8. Montgomery Co.: Plummer Island. Prince Georges Co.: Bladensburg, Aug. 17. [County?]: Glover. *Massachusetts*: Hampden Co.: Chicopee. Middlesex Co.: Framingham, Aug. 29; Natick, July 20; Wake-

field. Norfolk Co.: Canton. Suffolk Co.: Newton. *Michigan*: Wayne Co.: Detroit, Aug. *Mississippi*: George Co.: Lucedale, June 17. Perry Co.: Beaumont, Oct. 2; New Augusta. *Missouri*: Central Missouri. St. Louis [independent city], June 1. *Nebraska*: [County?]: Kenosha. *New Jersey*: Bergen Co.: Fort Lee. Camden Co.: Clementon. Essex Co.: Montclair; Newark. Gloucester Co.: Malaga, Sept. 10. Morris Co.: Madison. Ocean Co.: Lakehurst, July 4. Union Co.: Summit. Warren Co.: Phillipsburg. *New York*: Kings Co.: Flatbush, Mar. 1; Parkville. Orange Co.: Huguenot, Aug. 5. Richmond Co.: Staten Island. *North Carolina*: Moore Co.: Southern Pines, May. Polk Co.: Tryon. Transylvania Co.: Lake Toxaway. Wake Co.: Raleigh, Sept. 21. *Ohio*: No further data. *Pennsylvania*: Allegheny Co.: Pittsburgh, Sept. 22. Carbon or Northampton Co.: Lehigh Gap. Delaware Co.: Glen Olden, June 16. Monroe Co.: Delaware Water Gap. *Tennessee*: Wayne Co.: Waynesboro, Aug. 4. *Texas*: Central Texas. *Virginia*: Fairfax Co.: Falls Church, July 16, Sept. 3. Spotsylvania Co.: Fredericksburg.

Tritoma unicolor Say

CANADA: *Ontario*: Lincoln Co.: Grimsby. Welland Co.: Ridgeway.

UNITED STATES: *Alabama*: De Kalb Co.: Valley Head, Aug. 2. *Connecticut*: Middlesex Co.: Cromwell, Sept. 20. *District of Columbia*: Washington, Aug. 19, Sept. 30. *Georgia*: Fulton Co.: Atlanta, Oct. 6. *Illinois*: Central Illinois, Oct.; southern Illinois, June 14. Champaign Co.: Urbana. Cook Co.: Chicago. Jefferson Co.: Texico. McLean Co.: Heyworth. Rock Island Co.: Rock Island. Vermilion Co.: Muncie. *Indiana*: Fulton Co., Oct. 20. Vanderburgh Co.: Evansville, May 9. Vigo Co.: Terre Haute. *Iowa*: Johnson Co.: Iowa City, Sept. 3, Oct. 10. *Kansas*: Shawnee Co.: Topeka. *Kentucky*: Franklin Co.: Frankfort, Aug. 18. *Louisiana*: No further data. *Maryland*: Garrett Co.: Oakland, Aug. 7. Montgomery Co.: Plummer Island, May 20. [County?]: Glover. *Massachusetts*: No further data. *Michigan*: Kalamazoo Co.: Galesburg. Oakland Co., Sept. 5. Wayne Co.: Detroit, Oct. *New Jersey*: Bergen Co.: Englewood, Sept. 25; Fort Lee. Essex Co.: Newark; South Orange; Woodside. Morris Co.: Boonton, June 25. *New York*: Albany Co.: Delmar. Erie Co.: Buffalo. Fulton Co.: Johnstown. Kings Co.: Flatbush, Sept. 20. Tompkins Co.: Ithaca, July 9. *North Carolina*: Buncombe Co.: Asheville, June 9. Buncombe or Yancey Co.: Black Mts.; Valley of Black Mts., Sept. 15. McDowell Co.: Round Knob. Moore Co.: Southern Pines. *Ohio*: Columbiana Co.: Millport, Sept. 4. Hamilton Co.: Cincinnati, June 24. *Pennsylvania*: Allegheny Co.: Pittsburgh. Armstrong, Chester, or Dauphin Co.:

Rockville, July 5. Monroe Co.: Delaware Water Gap. Northampton Co.: Bethlehem. Westmoreland Co.: Jeannette, Sept. 25. *Tennessee*: No further data. *Virginia*: Albemarle Co.: Cobham. Fairfax Co.: Falls Church; East Falls Church, June 18. Lee Co.: Jone's Creek. Nelson Co. [County?]: Camp Humphrey, Sept. *West Virginia*: Greenbriar Co.: White Sulphur Springs, Aug. 1. *Wisconsin*: Milwaukee Co.: Milwaukee.

Tritoma tenebrosa Fall

Alabama: Mobile Co.: Chickasaw, Sept. 21; Spring Hill, Sept. *Florida*: Citrus Co.: Duval Co.: Baldwin, Aug. 1. Lee Co.: Fort Myers, Apr. 25. Osceola Co.: Kissimmee. Polk Co.: Lakeland. *Georgia*, May 9. *Maryland*: Montgomery Co.: Plummer Island, Aug. 8. *Mississippi*: George Co.: Lucedale, Sept. 25. *New York*: Vicinity of New York City. *North Carolina*: Moore Co.: Southern Pines, May 6, Oct. 27. *Pennsylvania*: Allegheny Co.

Tritoma mimetica (Crotch)

Arkansas: Southwest Arkansas. *District of Columbia*: No further data. *Georgia*: No further data. *Illinois*: Illinois, Sept. 11. Cook Co.: Chicago; Willow Springs, July 5. Putnam Co. *Indiana*: Bartholomew Co.: Columbus, June 24. *Kansas*: Shawnee Co.: Topeka, Sept. 6, 19. *Kentucky*: No further data. *Maryland*: Montgomery Co.: Plummer Island, June 23. *Michigan*: Eaton Co.: Grand Ledge. Oakland Co., Sept. 5. Wayne Co.: Detroit. *Missouri*: Boone Co.: Columbia. *New Jersey*: No further data. *New York*: Cortland Co.: South Cortland. Erie Co.: Buffalo. Herkimer Co.: Newport. Niagara Co.: Niagara Falls. Onondaga Co.: May 15; Elbridge, Sept. 5. Tompkins Co.: McLean Bogs Reserve; Six-Mile Creek, Ithaca. Wyoming Co.: Pike. *North Carolina*: Buncombe or Yancey Co.: Black Mts., June-July. *Pennsylvania*: Allegheny Co.: Pittsburgh. Washington Co., June. Westmoreland Co.: Jeannette, Sept. 21; St. Vincent. *Tennessee*: Cumberland Co.: Black Mt., May-Aug. *West Virginia*: [County?]: Fort Pendleton, July 9.

Tritoma sanguinipennis (Say)

CANADA: *Ontario*: Carleton Co.: Ottawa, Aug. 8. Lincoln Co.: Grimsby. Perth Co.: Welland Co.: Ridgeway.

UNITED STATES: *Arkansas*: Washington Co., Apr. 9. *District of Columbia*: Washington, June 3. *Georgia*: No further data. *Illinois*: Carroll Co.: Savanna, June 15. McLean Co.: Bloomington; Funks Grove. Putnam Co., Mar. 16. Saint Clair Co. Vermilion Co.: Oakwood. *Indiana*: Fountain Co.: Turkey Run State Park, June 20. *Iowa*: Johnson Co.: Iowa City, Sept. 9. Monroe Co.:

Foster. Story Co.: Ames, Apr. 25. Woodbury Co.: Sioux City. *Kansas*: Douglas Co.: Lawrence, June 6. Riley Co. Shawnee Co.: Topeka, May 8. *Kentucky*: [County?]: Northwestern Kentucky Ridge State Forest, 1200 ft., June 11. *Maryland*: Montgomery Co.: Cabin John, July 23; Linden, May 20; Plummer Island. *Michigan*: Eaton Co.: Grand Ledge. Wayne Co.: Detroit, Sept. *Minnesota*: Houston Co.: May 29; Winnebago Creek Valley $\frac{3}{4}$ mile northeast of Eitzen, June 2. *Missouri*: Boone Co.: Columbia, Apr. Washington Co.: Onyx, June 19. *New Jersey*: Essex Co.: Newark. *New York*: Cortland Co.: South Cortland. Erie Co.: Buffalo. Fulton Co.: Johnstown, Sept. 8. Herkimer Co.: Newport. Niagara Co.: Olcott. Tompkins Co.: Groton; Ithaca; Slaterville Wildflower Preserve. Wyoming Co.: Pike. [County?]: Catskill Mts., Mar. 22. *North Carolina*: Buncombe Co.: Black Mountain, June, July. *Ohio*: Delaware Co., May 2. Greene Co. Hamilton Co.: Cincinnati, Aug. 15. Hocking Co. *Pennsylvania*: Allegheny Co.: May 9; Pittsburgh. Indiana Co.: Indiana. Monroe Co.: Delaware Water Gap. Westmoreland Co.: Jeannette, Oct. 4. *Virginia*: Lee Co.: Penington Gap, June 30. Loudon Co.: Bluemont. Spotsylvania Co.: Fredericksburg, Apr. 29. *West Virginia*: Marion Co.: Fairmont. [County?]: Cheat Mts., June.

Tritoma pulchra Say

CANADA: *Ontario*: Carleton Co.: Ottawa. Parry Sound Co.: Kearney. Welland Co.: Ridgeway, July 15. York Co.: Toronto, Aug. 26. *Quebec*: Abitibi Dist.: Duparquet, July 1.

UNITED STATES: *Alabama*: Cleburne Co.: Cheaha State Park, Apr. 24. Mobile Co.: Mobile, Dec. 18. *Connecticut*: Litchfield Co.: Cornwall, July 20. *District of Columbia*: Washington, Sept. 1. *Illinois*: Northern Illinois. Champaign Co.: University Forest, Urbana, Aug. 28. *Indiana*: Elkhart Co.: Elkhart. Marion Co., July 14. *Iowa*: Boone Co.: Ledges State Park. Linn Co.: Palisades-Kepler State Park. Story Co.: Experiment Station, Ames, May 26. Winneshick Co.: Bluffton, Sept. 16. Woodbury Co.: Sioux City. *Kansas*: Doniphan Co., July 20. Shawnee Co.: Topeka. *Kentucky*: No further data. *Maryland*: Montgomery Co.: Kensington, Oct. 24; Plummer Island, Aug. 27. *Massachusetts*: Suffolk Co.: Boston. *Michigan*: Marquette Co.: Marquette. Wayne Co.: Detroit. *Minnesota*: Clearwater Co.: Itasca State Park, Aug. *Mississippi*: Perry Co.: New Augusta, Nov. 19. *New Hampshire*: Grafton Co.: Franconia. Strafford Co.: Durham, Aug. 24. *New Jersey*: Essex Co.: Newark; South Orange; Woodside. Ocean Co.: Lakehurst, Apr. 23. *Sussex* Co.: Lake Lackawanna, Stanhope, Sept. 17. *New York*: Erie Co.: Lancaster. Herkimer Co.: New-

port. Niagara Co.: Niagara Falls; Olcott. Tompkins Co.: Forest Lawn, Feb. 12; Ithaca, Oct. 18; Slaterville Wildflower Preserve; Taughannock State Park. *North Carolina*: Buncombe Co.: Black Mountain, Sept. 26. *Ohio*: Delaware Co., Aug. 6, Sept. 10. Hamilton Co.: Cincinnati. *Pennsylvania*: Allegheny Co.: Pittsburgh. Carbon or Northampton Co.: Lehigh Gap. Delaware Co.: Morton, Sept. 26. Philadelphia Co.: Chestnut Hill. Westmoreland Co.: Jeannette, June. *Texas*: No further data. *Vermont*: Washington Co.: Camel's Hump. Windham Co.: Jacksonville; Laurel Lake, July 24. *Virginia*: Arlington or Fairfax Co.: Hunter, July 10. Fairfax Co.: Falls Church. Spotsylvania Co.: Fredericksburg, Oct. 23.

Pseudischyrus extricatus (Crotch)

Alabama: Mobile Co.: Citronelle, June 25. *California*: San Diego Co.: Alpine, July 9; San Diego, July 5. *Florida*: Alachua Co.: Gainesville, Aug. 26–Oct. 2. Broward Co.: Deerfield. Dade Co.: Miami. Duval Co.: Jacksonville. Lake Co.: Palm Beach Co.: Lake Worth. Pinellas Co.: Dunedin, Apr. 1; Largo. Seminole Co.: Sanford. Volusia Co.: Enterprise. *Georgia*: Baker Co.: Emory University Field Station, Newton, Aug. 11. Charlton, Clinch, or Ware Co.: Okefenokee Swamp. Rabun Co.: Clayton, May 28. *Louisiana*: Orleans Par.: New Orleans, Aug. 15. St. Landry Par.: Opelousas, June 2. *Mississippi*: George Co.: Lucedale, July 17, Oct. 23. *North Carolina*: Moore Co.: Southern Pines, July 3, Sept. 8. *Texas*: Blanco Co.: Cypress Mill. Brazos Co.: College Station. Burnett Co.: Colorado Co., Apr. 14. Goliad Co.: Goliad, Nov. 15. Harris Co.: Houston. Lee Co.: Fedor. Travis Co.: Austin. [County?]: Mount; Peeler.

Pseudischyrus nigrans (Crotch)

Florida: Alachua Co.: Gainesville. Dade Co.: Miami. Lake Co.: Fruitland Park, Nov. Pinellas Co.: Dunedin, Apr. 1. Putnam Co.: Crescent City. St. Lucie Co.: Fort Pierce. Seminole Co.: Sanford. *Georgia*: Baker Co.: Emory University Field Station, Newton, Sept. 5–10.

Ischyrus quadripunctatus quadripunctatus (Olivier)

CANADA: *Ontario*: Eastern Ontario. Carleton Co.: Ottawa, June 21. Perth Co.: Stratford. *Quebec*: [District?]: Norway Bay, Aug. 20.

UNITED STATES: *Alabama*: Colbert Co.: Wilson Dam. Dallas Co.: Hazen. Jefferson Co.: Mobile Co.: Mobile, Jan. 10, Dec. 22. Tuscaloosa Co.: Tuscaloosa. *Arkansas*: Benton Co.: July 5; Bentonville, June 7. Hempstead Co.: Hope. Prairie Co.: Sebastian Co.: Huntington. Washington Co.: Mt. Sequoyah. *District of Columbia*: Washington. *Florida*: Dixie Co.: Suwannee River,

Jan. 11. Duval Co.: Pablo Beach, Nov. 4. Highlands Co.: Lake Placid. Manatee Co.: Oneco. Osceola Co.: Kissimmee. Putnam Co.: Crescent City. St. Johns Co.: St. Augustine. Suwannee Co.: Branford. Volusia Co.: Enterprise. *Georgia*: Charlton, Clinch, or Ware Co.: Okefenokee Swamp, July 30. Clarke Co.: Athens. Floyd Co.: Mount Berry, Apr. 15. Fulton Co.: Atlanta. [County?]: Prattsburg. *Illinois*: Adams Co.: Quincy. Alexander Co.: Cairo. Bureau Co.: Spring Valley. Calhoun Co.: Kampsville. Champaign Co.: Homer; Urbana. Hardin Co.: Elizabethtown. Mason Co.: Havana, Aug. 11. Peoria Co.: Airport region, Peoria. Putnam Co.: Rock Island Co.: Rock Island. Vermilion Co.: Oakwood. Wabash Co.: Mt. Carmel, Apr. 15. [County?]: Starved Rock. *Indiana*: Knox Co., June 13. Tippecanoe Co.: Lafayette, June 29. *Iowa*: Black Hawk Co.: Waterloo. Boone Co.: Ledges State Park; The Ledges. Clayton Co.: Guttenberg. Johnson Co.: Iowa City, Sept. 9; Solon. Muscatine Co.: Muscatine. Polk Co.: Herrold. Story Co.: Ames, Apr. 11; 4 miles east of Gilbert. *Kansas*: Doniphan Co.: Douglas Co.: Lawrence. Pottawatomie Co.: Onaga. Riley Co.: Manhattan, Apr. 19, Sept. 26. Shawnee Co.: Topeka. *Kentucky*: Henderson Co.: Henderson, Apr. 3. *Louisiana*: De Soto Par.: Logansport, June 7. Madison Par.: Tallulah. Orleans Par.: New Orleans. Terrebonne Par.: Gibson. [Parish?]: Mount, Oct. 6. *Maryland*: [County?]: Chain Bridge, May 5. *Michigan*: Berrien Co.: Lakeside, May 26. Cheboygan Co.: Douglas Lake, June. Wayne Co.: Detroit, May 25. Ingham Co.: Michigan State College, East Lansing. *Minnesota*: Hennepin Co.: Houston Co.: Mississippi Bluff $\frac{1}{2}$ mile north of state line; Winnebago Creek Valley, May 22; Winnebago Creek Valley $\frac{3}{4}$ mile northeast of Eitzen. Olmsted Co., Sept. 16. Ramsey Co.: St. Paul. Redwood Co.: Lamberton. Winona Co. *Mississippi*: George Co.: Lucedale, Jan. 26, Dec. 30. Greene Co.: State Line. Perry Co.: New Augusta. *Missouri*: Bollinger Co.: Marble Hill, Dec. 31. Boone Co.: Columbia, May 11. Jackson Co.: Atherton; Kansas City. Morgan Co.: Versailles. St. Charles Co.: Dardenne Slough. St. Louis [independent city]: Howard Bend; St. Louis. Scott Co.: Pefferkorn Field, Chaffee. *New Jersey*: Gloucester Co.: Westville, Apr. 24. *New York*: Tompkins Co.: McLean Bogs Reserve, June 5. Wyoming Co.: Pike, May 29. *North Carolina*: Moore Co.: Southern Pines, Apr. 15. Polk Co.: Tryon. Wake Co.: Raleigh, Apr. 30. *Ohio*: Hamilton Co.: Cincinnati.

Knox Co.: Gambier, July 17. Summit Co.: Hudson. *Oklahoma*: Craig Co.: Vinita, June 7-8. *Pennsylvania*: Allegheny Co.: June 9; Pittsburgh. Dauphin Co.: Harrisburg. Fayette Co.: Ohiopyle. Philadelphia Co.: Angora. Westmoreland Co.: Jeannette, Sept. 21. *South Carolina*: Sumter Co.: Sumter, Oct. 20. *South Dakota*: Clay Co.: Vermilion, May 28. Bon Homme Co.: Springfield, June 18. *Tennessee*: Central Tennessee, Mar. 31; Tennessee. *Texas*: Bosque Co.: Clifton. Brazos Co.: College Station, Dec. 22. Caldwell Co.: Palmetto Swamp State Park, Luling. Colorado Co.: Comal Co.: New Braunfels. Dallas Co.: Mar. 12; Dallas. Harris Co.: Houston. Kerr Co.: Kerrville. Lee Co.: Fedor. Pecos Co.: Fort Stockton. Tarrant Co.: Eagle Mountain Lake, Fort Worth. Travis Co.: Austin. Uvalde Co.: Concan. Victoria Co.: Victoria. *Virginia*: Alexandria Co.: Alexandria. Arlington Co.: Arlington, June 9. Fairfax Co.: Mount Vernon. Nelson Co., June 27. *West Virginia*: Greenbrier Co.: White Sulphur Springs, July 10. *Wisconsin*: Wood Co.: Griffith State Nursery, June 28, July 29.

***Ischyryus quadripunctatus graphicus* Lacordaire**

BRITISH HONDURAS: M-Tee District, Aug.

COSTA RICA: *San José Province*: San José, Nov. 9. *Santa Clara Province*: Reventazón Ebene Limón, Hamburg Farm, Jan 29, Dec. 3.

MEXICO: *Nuevo León*: Rancho Presa Nueva, June.

UNITED STATES: *Texas*: Cameron Co.: Brownsville, Dec. 7; Esperanza Ranch. Hidalgo Co.: Weslaco, Apr. 2. Kleberg Co.: Kingsville.

***Ischyryus chiasticus* Boyle**

MEXICO: *Sinaloa*: Venedio, June 17, 1918 [research done by Irving J. Cantrall (at the Edwin S. George Reserve, Pinckney, Michigan), to be published soon, indicates that this specimen was undoubtedly taken by J. A. Kusche at El Venadillo, a foothill locality about 5 miles northeast of Mazatlán].

UNITED STATES: *Arizona*: Cochise Co.: Paradise, Chiricahua Mts., 5000-6000 ft. Cochise or Santa Cruz Co.: Carr Canyon, Huachuca Mts., June 6; Huachuca Mts. Pima Co.: Baboquivari Mts., Sept. 15-30; Brown's Canyon and Elkhorn Ranch, Baboquivari Mts.; Pepper Sauce Canyon, Santa Catalina Mts. Pima or Santa Cruz Co.: Santa Rita Mts. Santa Cruz Co.: Nogales; Patagonia; Washington Mts. near Nogales [Mt. Washington?].

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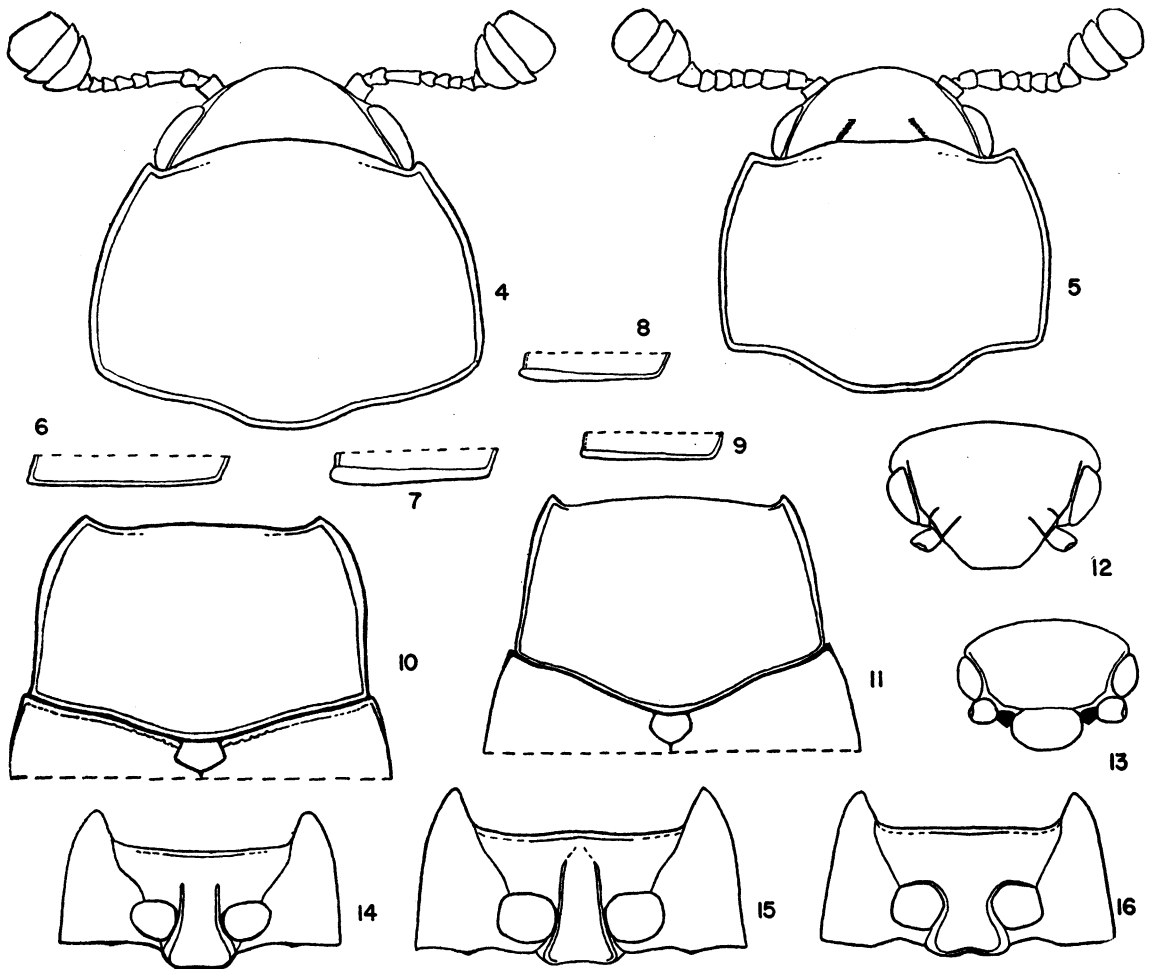
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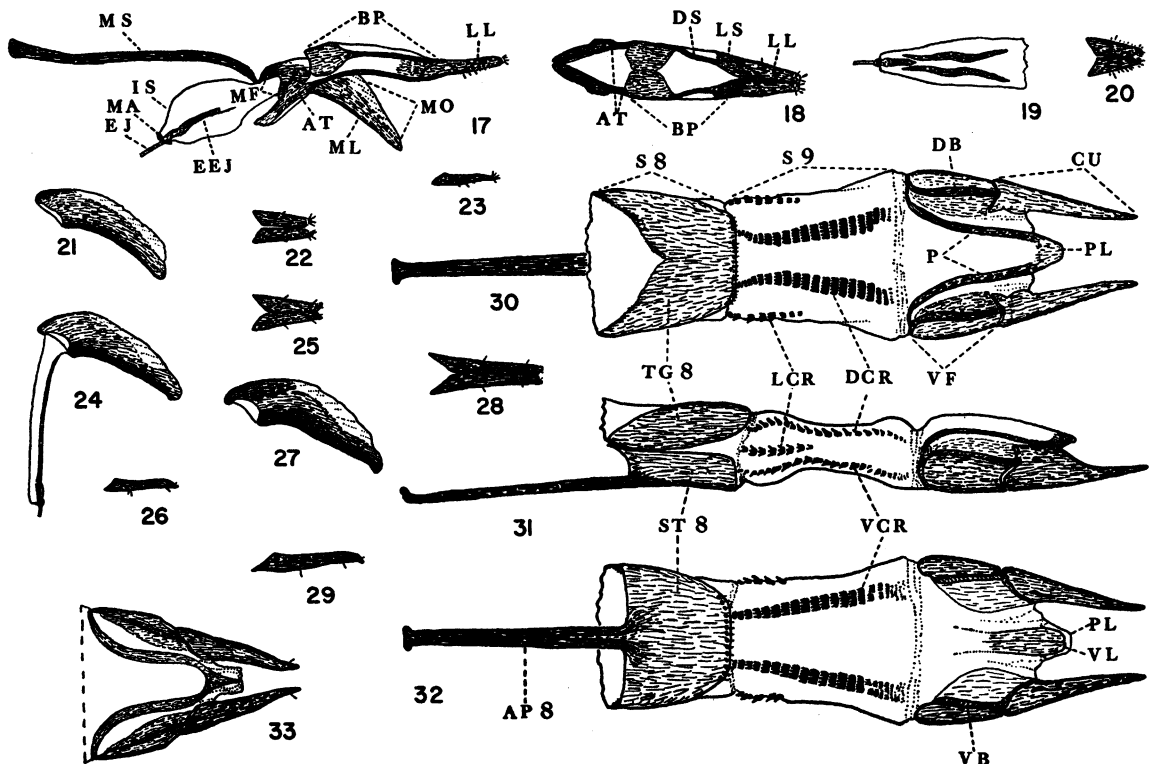
FIGS. 4, 5. Head and pronotum, dorsal view. 4. *Dacne (Dacne) quadrimaculata* (Say), female, Six-Mile Creek, Ithaca, New York (maximum pronotal width, 1.42 mm.). 5. *Dacne (Dacne) californica* (Horn), male, Berkeley, California (maximum pronotal width, 1.20 mm.).

FIGS. 6-9. Side of pronotum, left laterodorsal view. 6. *Dacne (Dacne) quadrimaculata* (Say), female, Six-Mile Creek, Ithaca, New York (length of pronotal side, 0.70 mm.). 7. *Dacne (Xenodacne) picea* LeConte, female, Carrville, California (length of pronotal side, 0.57 mm.). 8. *Dacne (Xenodacne) pubescens*, new species, male, Fallen Leaf Lake, Lake Tahoe, California (length of pronotal side, 0.51 mm.). 9. *Dacne (Xenodacne) cyclochilus* Boyle, holotype, female, Alta, Utah (length of pronotal side, 0.48 mm.).

FIGS. 10, 11. Pronotum and elytral base, dorsal view. 10. *Dacne (Xenodacne) picea* LeConte, female, Carrville, California (pronotal basal width, 1.23 mm.). 11. *Dacne (Xenodacne) pubescens*, new species, male, Fallen Leaf Lake, Lake Tahoe, California (pronotal basal width, 1.06 mm.).

FIGS. 12, 13. Head exclusive of mouth parts, anterodorsal view. 12. *Dacne (Xenodacne) pubescens*, new species, male, Fallen Leaf Lake, Lake Tahoe, California (width at eyes, 0.76 mm.). 13. *Dacne (Xenodacne) cyclochilus* Boyle, holotype, female, Alta, Utah (width at eyes, 0.64 mm.).

FIGS. 14-16. Prothorax, ventral view. 14. *Dacne (Xenodacne) picea* LeConte, male, Carrville, California (basal width, 1.01 mm.). 15. *Dacne (Xenodacne) pubescens*, new species, female, southern California (basal width, 1.20 mm.). 16. *Dacne (Xenodacne) cyclochilus* Boyle, female, Utah (basal width, 1.06 mm.).



FIGS. 17, 18. *Dacne (Dacne) quadrimaculata* (Say), source unknown. 17. Male genitalia, left lateral view (1.45 mm.). 18. Tegmen, dorsal view (0.74 mm.). *Abbreviations:* at, arms of tegmen; bp, basal piece of tegmen; ds, dorsal strut of tegmen; eej, enclosed ejaculatory duct; ej, ejaculatory duct; is, internal sac; ll, lateral lobes of tegmen; ls, lateral strut of tegmen; ma, muscle attachment at anterior end of internal sac; mf, median foramen; ml, median lobe; mo, median orifice; ms, median strut.

FIGS. 19, 20. *Dacne (Dacne) californica* (Horn), parts of male genitalia. 19. Provo, Utah, anterior end of internal sac, ventral view (0.50 mm.). 20. Berkeley, California, lateral lobes, dorsal view (lateral length, 0.17 mm.).

FIGS. 21-23. *Dacne (Xenodacne) cyclochilus* Boyle, Utah, parts of male genitalia. 21. Median lobe, left lateral view (0.44 mm.). 22. Lateral lobes, dorsal view (lateral length, 0.20 mm.). 23. Lateral lobes, left lateral view (0.20 mm.).

FIGS. 24-26. *Dacne (Xenodacne) picea* LeConte, Carrville, California, parts of male genitalia. 24. Median lobe and internal sac, left lateral view (length of median lobe, 0.46 mm.). 25. Lateral lobes, dorsal view (lateral length, 0.21 mm.). 26. Lateral lobes, left lateral view (0.21 mm.).

FIGS. 27-29. *Dacne (Xenodacne) pubescens*, new species, Fallen Leaf Lake, Lake Tahoe, California, parts of male genitalia. 27. Median lobe, left lateral view (0.50 mm.). 28. Lateral lobes, dorsal view (lateral length, 0.33 mm.). 29. Lateral lobes, left lateral view (0.33 mm.).

FIGS. 30-32. *Dacne (Dacne) quadrimaculata* (Say), Texas, female genitalia (2.17 mm.). 30. Dorsal view. 31. Left lateral view. 32. Ventral view. *Abbreviations:* ap8, anterior apodeme of sternite 8; cu, undivided coxite; db, dorsal baculum of valvifer; dcr, dorsal comb row; lcr, lateral comb row; p, paraprocts; pl, proctigeral lobe; s8, segment 8; s9, segment 9; st8, sternite 8; tg8, tergite 8; vb, ventral baculum of valvifer; vcr, ventral comb row; vf, valvifer; vl, vulvar lobe.

FIG. 33. *Dacne (Xenodacne) cyclochilus* Boyle, Utah, female genitalia beyond segment 9, dorsal view (lateral length, 0.66 mm.).

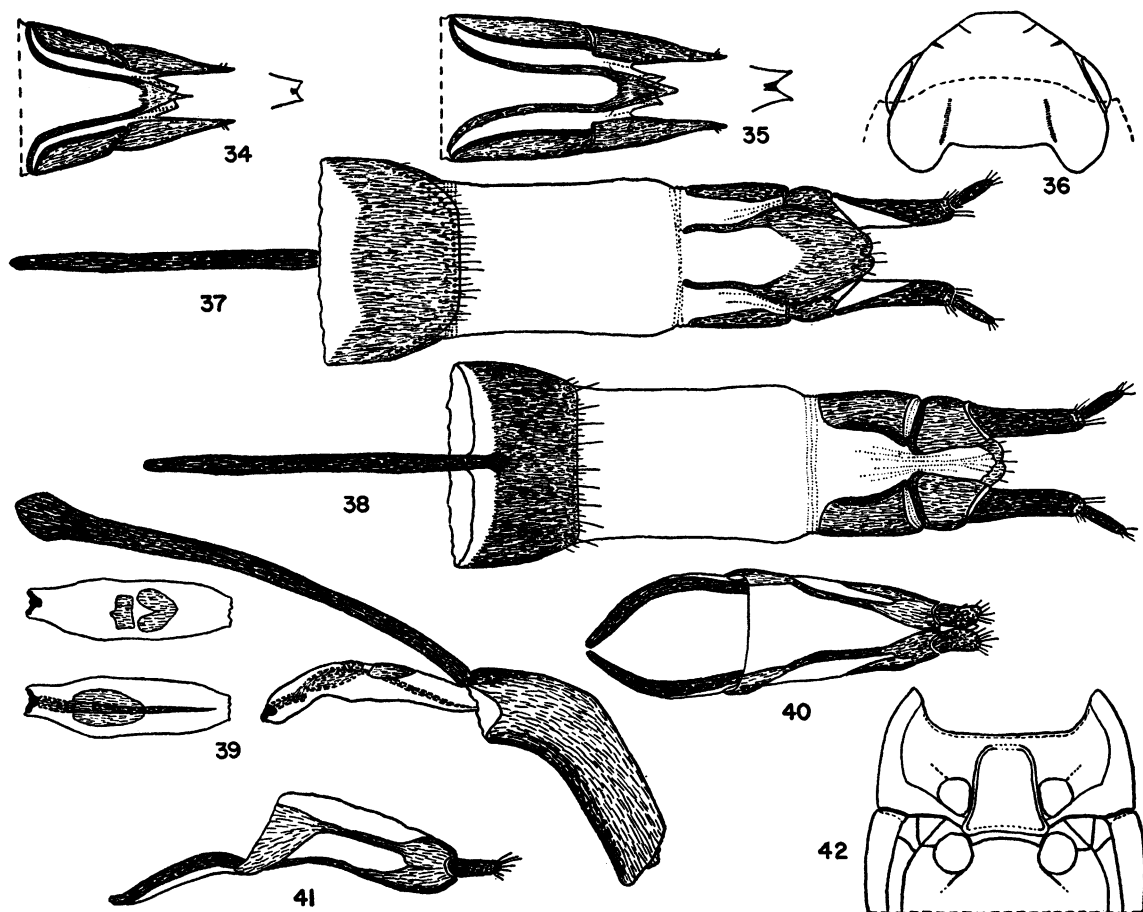


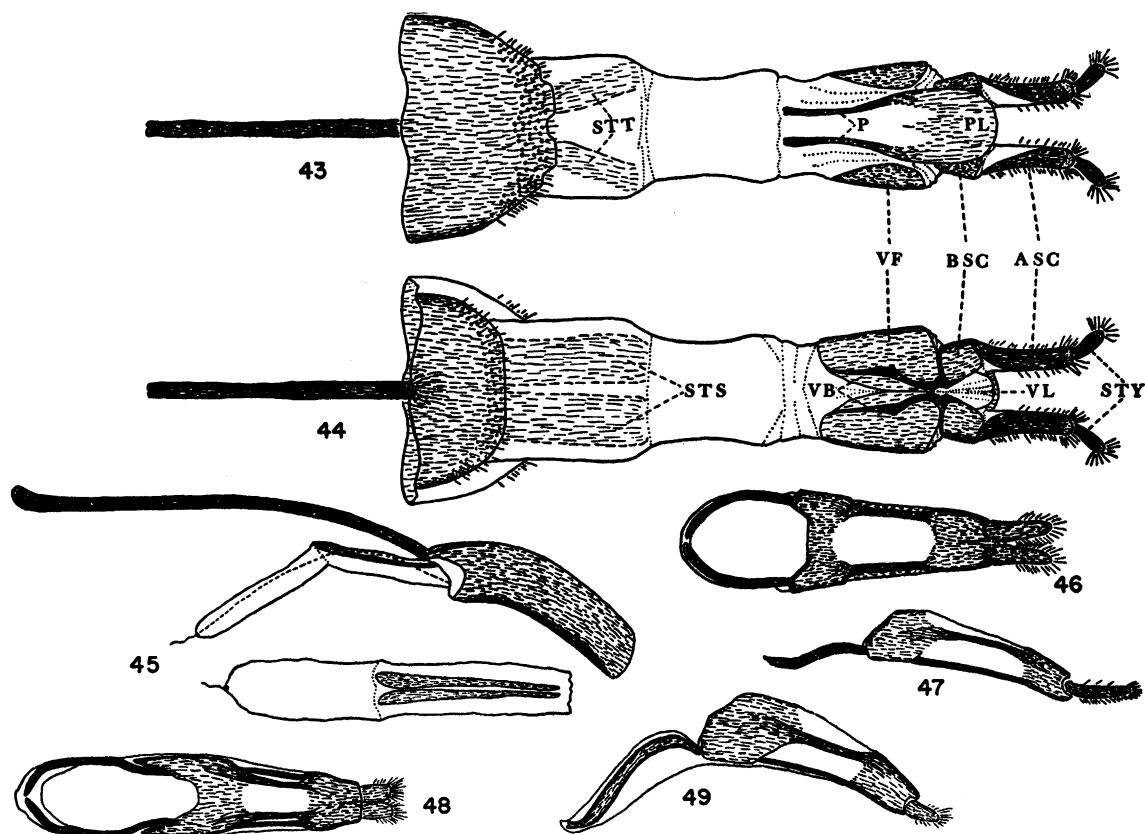
FIG. 34. *Dacne (Xenodacne) picea* LeConte, Carrville, California, female genitalia beyond segment 9, dorsal view (lateral length, 0.65 mm.); at right, vulvar lobe in ventral view.

FIGS. 35, 36. *Dacne (Xenodacne) pubescens*, new species. 35. Siskiyou County, California, female genitalia beyond segment 9, dorsal view (lateral length, 0.83 mm.); at right, vulvar lobe in ventral view. 36. Female, southern California, head in posterodorsal view to show stridulatory files, with normal position of pronotal apex indicated by broken line (width of head at eyes, 0.65 mm.).

FIGS. 37, 38. *Microsternus ulkei* (Crotch), Maryland, female genitalia (3.70 mm.). 37. Dorsal view. 38. Ventral view.

FIGS. 39-41. *Microsternus ulkei* (Crotch), male genitalia. 39. Ohio, median strut, median lobe, and internal sac, left lateral view (2.13 mm.); upper left, anterior portion of internal sac in dorsal view (0.60 mm.); lower left, anterior portion of internal sac and enclosed ejaculatory duct in ventral view (0.60 mm.). 40, 41. Maryland, tegmen (1.11 mm.). 40. Dorsal view. 41. Left lateral view.

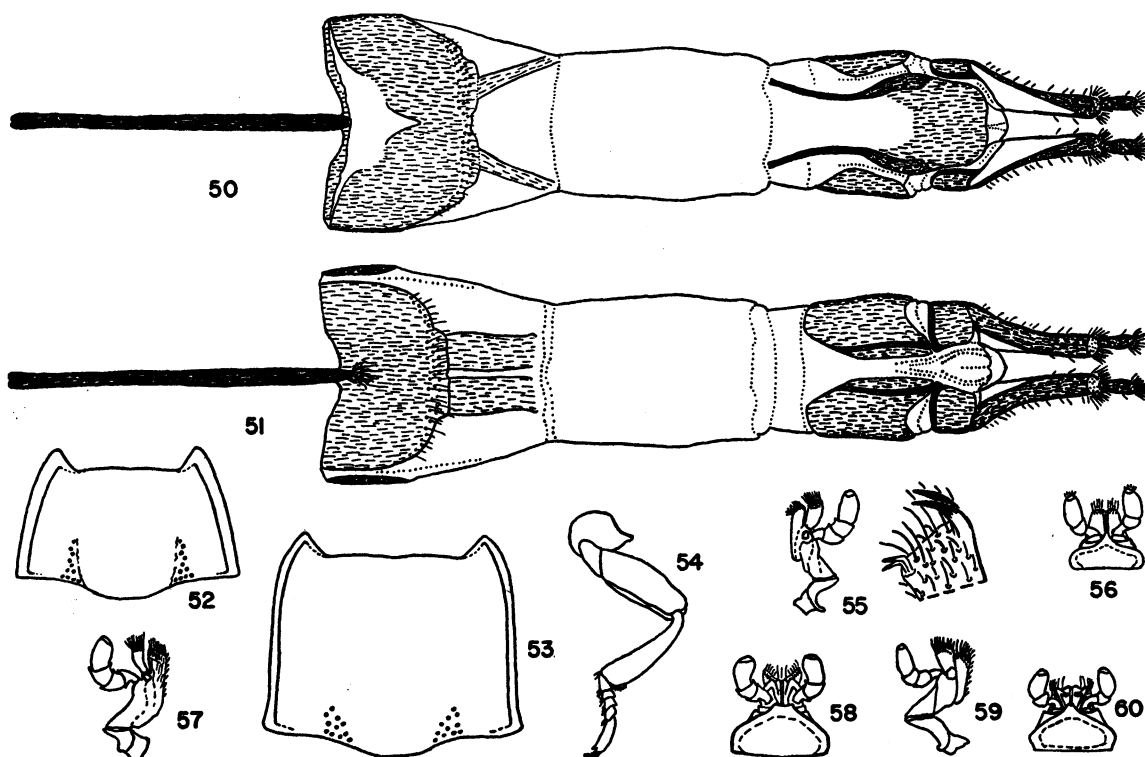
FIG. 42. *Microsternus ulkei* (Crotch), male, Kentucky, thorax except posterior part of metathorax, ventral view (prothoracic basal width, 2.00 mm.).



FIGS. 43, 44. *Megalodacne fasciata* (Fabricius), Tuscaloosa, Alabama, female genitalia (7.62 mm.). 43. Dorsal view. 44. Ventral view. *Abbreviations:* asc, apical segment of coxite; bsc, basal segment of coxite; p, proctigers; pl, proctigeral lobe; sts, straps appendant to sternite 8; stt, straps appendant to tergite 8; sty, styli; vb, ventral baculi; vf, valvifer; vl, vulvar lobe.

FIGS. 45-47. *Megalodacne fasciata* (Fabricius), Tuscaloosa, Alabama, male genitalia. 45. Median strut, median lobe, and internal sac, left lateral view (5.02 mm.); below, internal sac partially withdrawn from median lobe, dorsal view (2.90 mm.). 46, 47. Tegmen (3.00 mm.). 46. Dorsal view. 47. Left lateral view.

FIGS. 48, 49. *Megalodacne heros* (Say), Van Natta's Dam, Ithaca, New York, tegmen (3.05 mm.). 48. Dorsal view. 49. Left lateral view.



FIGS. 50, 51. *Megalodacne heros* (Say), Great Smoky Mountains National Park, Tennessee, female genitalia (13.65 mm.). 50. Dorsal view. 51. Ventral view.

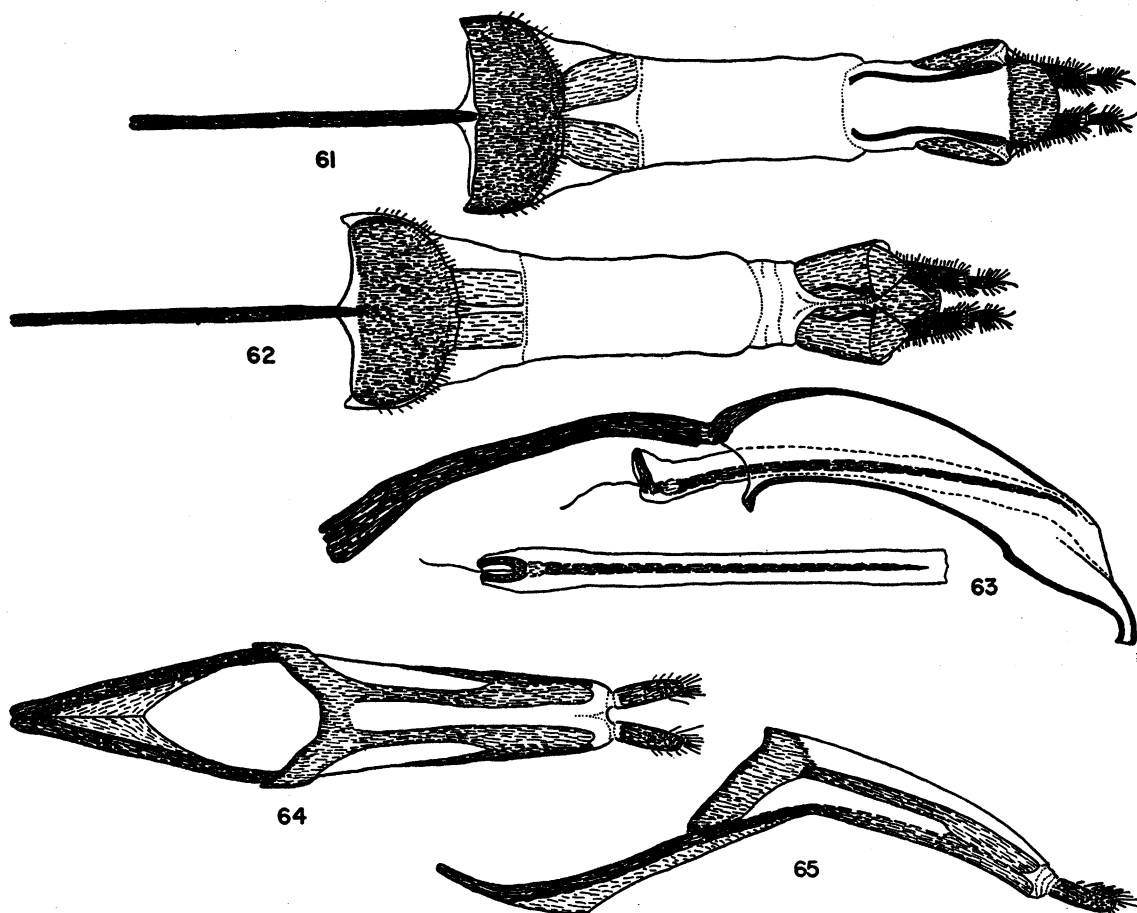
FIGS. 52, 53. Pronotum, dorsal view. 52. *Megalodacne fasciata* (Fabricius), female, Tuscaloosa, Alabama (basal width, 4.67 mm.). 53. *Megalodacne heros* (Say), male, Van Natta's Dam, Ithaca, New York (basal width, 5.40 mm.).

FIG. 54. *Dacne* (*Dacne*) *californica* (Horn), female, Berkeley, California, middle leg (1.28 mm.).

FIGS. 55, 56. *Dacne* (*Xenodacne*) *cyclochilus* Boyle, male, Utah, mouth parts. 55. Maxilla (0.31 mm.); right, apex of lacinia much enlarged. 56. Labium (width of mentum, 0.17 mm.).

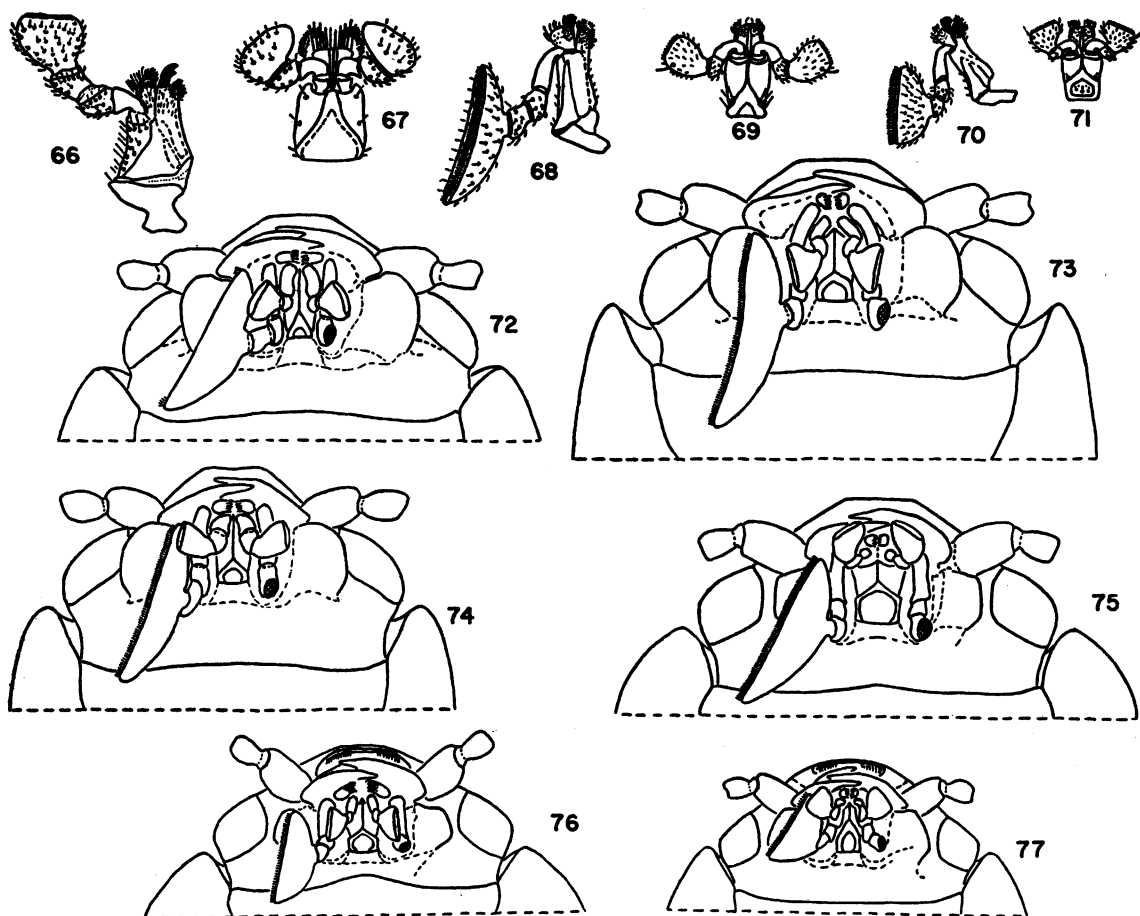
FIGS. 57, 58. *Megalodacne fasciata* (Fabricius), sex unknown, Tuscaloosa, Alabama, mouth parts. 57. Maxilla (1.17 mm.). 58. Labium (width of mentum, 0.85 mm.).

FIGS. 59, 60. *Microsternus ulkei* (Crotch), female, Kentucky, mouth parts. 59. Maxilla (0.45 mm.). 60. Labium (width of mentum, 0.30 mm.).



FIGS. 61, 62. *Cypherotylus californicus* (Lacordaire), Pinaleno Mountains near Fort Grant, Arizona female genitalia (13.21 mm.). 61. Dorsal view. 62. Ventral view.

FIGS. 63-65. *Cypherotylus californicus* (Lacordaire), Santa Catalina Mountains, Arizona, male genitalia. 63. Medium strut, median lobe, and internal sac, left lateral view (6.45 mm.); below, internal sac removed from median lobe, ventral view (4.15 mm.). 64, 65. Tegmen (5.50 mm.). 64. Dorsal view. 65. Left lateral view.

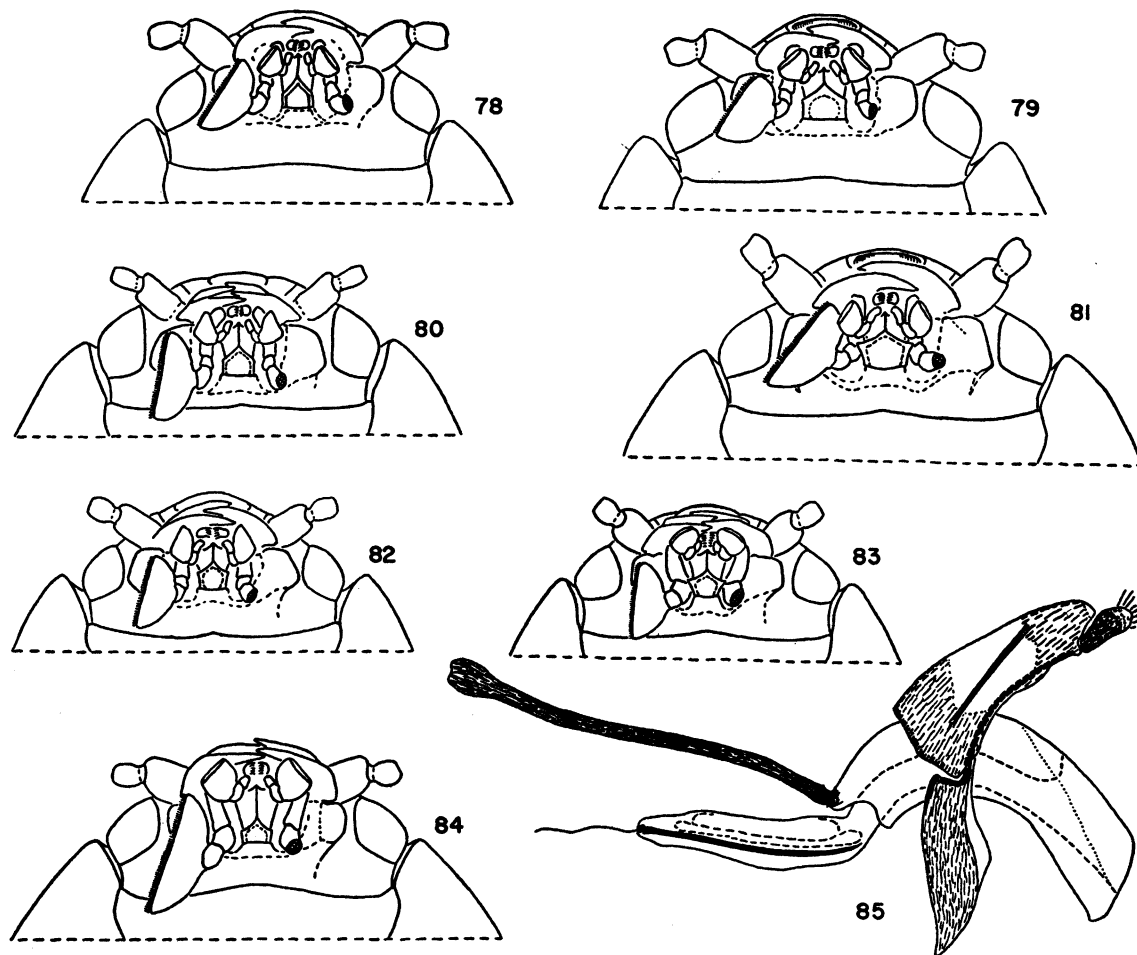


FIGS. 66, 67. *Cypherotylus californicus* (Lacordaire), sex unknown, Santa Catalina Mountains, Arizona, mouth parts. 66. Maxilla (1.77 mm.). 67. Labium (total width, 1.26 mm.).

FIGS. 68, 69. *Triplax festiva* Lacordaire, male, Fairmont, West Virginia, mouth parts. 68. Maxilla (width of terminal palpal segment, 0.55 mm.). 69. Labium (total width, 0.63 mm.).

FIGS. 70, 71. *Triplax dissimulator* (Crotch), male, Six-Mile Creek, Ithaca, New York, mouth parts. 70. Maxilla (width of terminal palpal segment, 0.29 mm.). 71. Labium (total width, 0.40 mm.).

FIGS. 72-77. Head and prothoracic apex, ventral view. 72. *Triplax festiva* Lacordaire, male, Fairmont, West Virginia (width of head at eyes, 1.28 mm.). 73. *Triplax macra* LeConte, female, Tyngsboro, Massachusetts (width of head at eyes, 1.39 mm.). 74. *Triplax frontalis* Horn, female, Texas (width of head at eyes, 1.23 mm.). 75. *Triplax thoracica* Say, sex unknown, Jabes Pond, Lake George, New York (width of head at eyes, 1.29 mm.). 76. *Triplax flavicollis* Lacordaire, male, Ohlerville, Pennsylvania (width of head at eyes, 1.08 mm.). 77. *Triplax californica* LeConte, male, San Francisco, California (width of head at eyes, 0.93 mm.).



FIGS. 78-84. Head and prothoracic apex, ventral view. 78. *Triplax mesosternalis* Schaeffer, male, New Mexico (width of head at eyes, 1.01 mm.). 79. *Triplax puncticeps* Casey, female, Austin, Texas (width of head at eyes, 1.13 mm.). 80. *Triplax dissimulator* (Crotch), female, Fort McMurray, Alberta (width of head at eyes, 1.01 mm.). 81. *Triplax lacensis* Boyle, male, Round Meadow, Giant Forest, Sequoia National Park, California (width of head at eyes, 1.20 mm.). 82. *Triplax cuneata* Boyle, sex unknown, Creston, British Columbia (width of head at eyes, 0.94 mm.). 83. *Triplax microgaster* Boyle, holotype, male, Nevada (width of head at eyes, 0.95 mm.). 84. *Triplax wehrlei* Boyle, female, Santa Rita Mountains, Arizona (width of head at eyes, 1.07 mm.).

FIG. 85. *Triplax macra* LeConte, Huron Mountain Club, Michigan, male genitalia, left lateral view (length of median strut and median lobe together, 2.72 mm.).

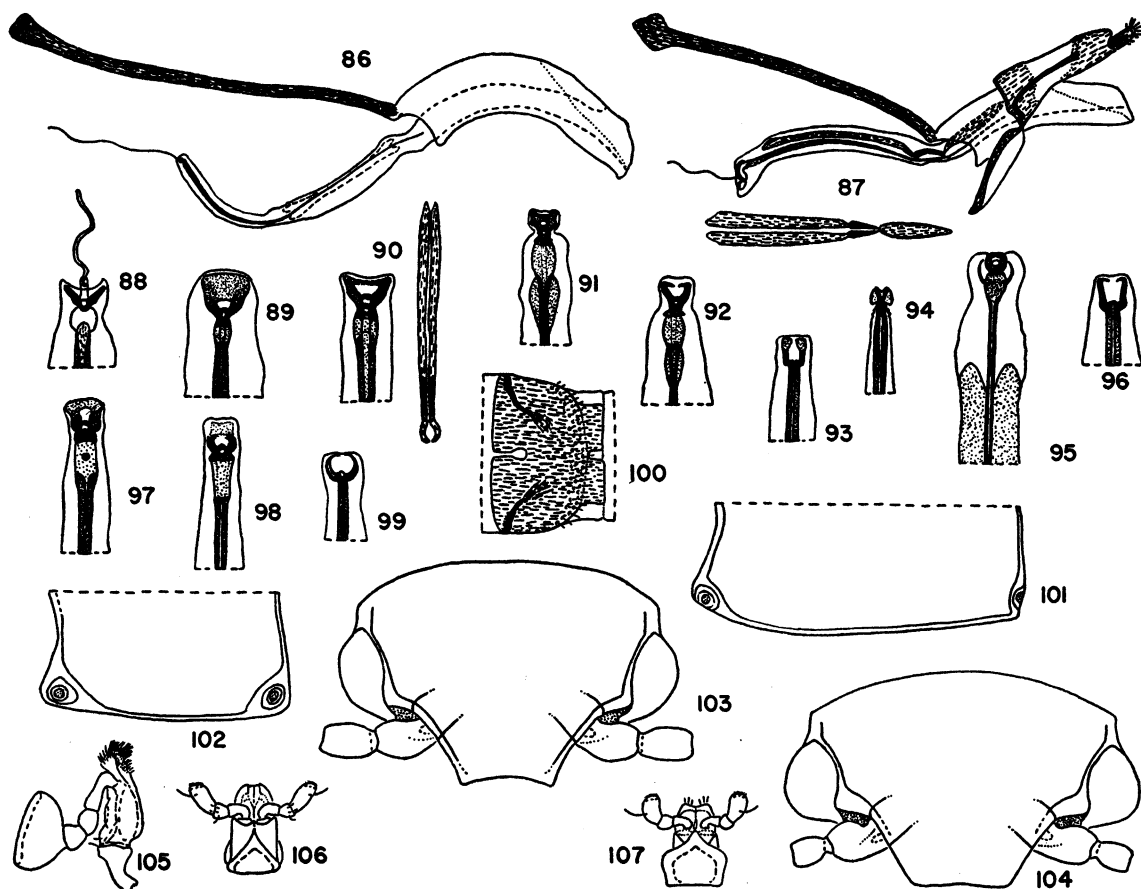


FIG. 86. *Triplax frontalis* Horn, Edgewood, Maryland, median strut, median lobe, and internal sac, left lateral view (2.46 mm.).

FIG. 87. *Triplax thoracica* Say, Columbia, Missouri, male genitalia, left lateral view (1.95 mm.); lower left, Ithaca, New York, sclerites in dorsal wall of internal sac, dorsal view (0.95 mm.).

FIGS. 88-99. Anterior end of internal sac, anterodorsal view, all to same scale. 88. *Triplax thoracica* Say, Ithaca, New York, ejaculatory duct shown entering internal sac anteriorly (0.35 mm.). 89. *Triplax rosti* Casey, Six-Mile Creek, Ithaca, New York (0.25 mm.). 90. *Triplax puncticeps* Casey, Memphis, Tennessee (0.25 mm.); at right, sclerites in dorsal wall of internal sac, dorsal view (0.46 mm.). 91. *Triplax californica* LeConte, Inverness, California (0.26 mm.). 92. *Triplax antica* LeConte, Creston, British Columbia (0.25 mm.). 93. *Triplax flavicollis* Lacordaire, Gainesville, Florida (0.20 mm.). 94. *Triplax mesosternalis* Schaeffer, New Mexico (0.20 mm.). 95. *Triplax dissimulator* (Crotch), Six-Mile Creek, Ithaca, New York (0.41 mm.). 96. *Triplax wehrlei* Boyle, holotype, Patagonia, Arizona (0.17 mm.). 97. *Triplax lacensis* Boyle, Lake Tahoe, California (0.30 mm.). 98. *Triplax microgaster* Boyle, holotype, Nevada (0.29 mm.). 99. *Triplax errans*, new species, holotype, Brownsville, Texas (0.17 mm.).

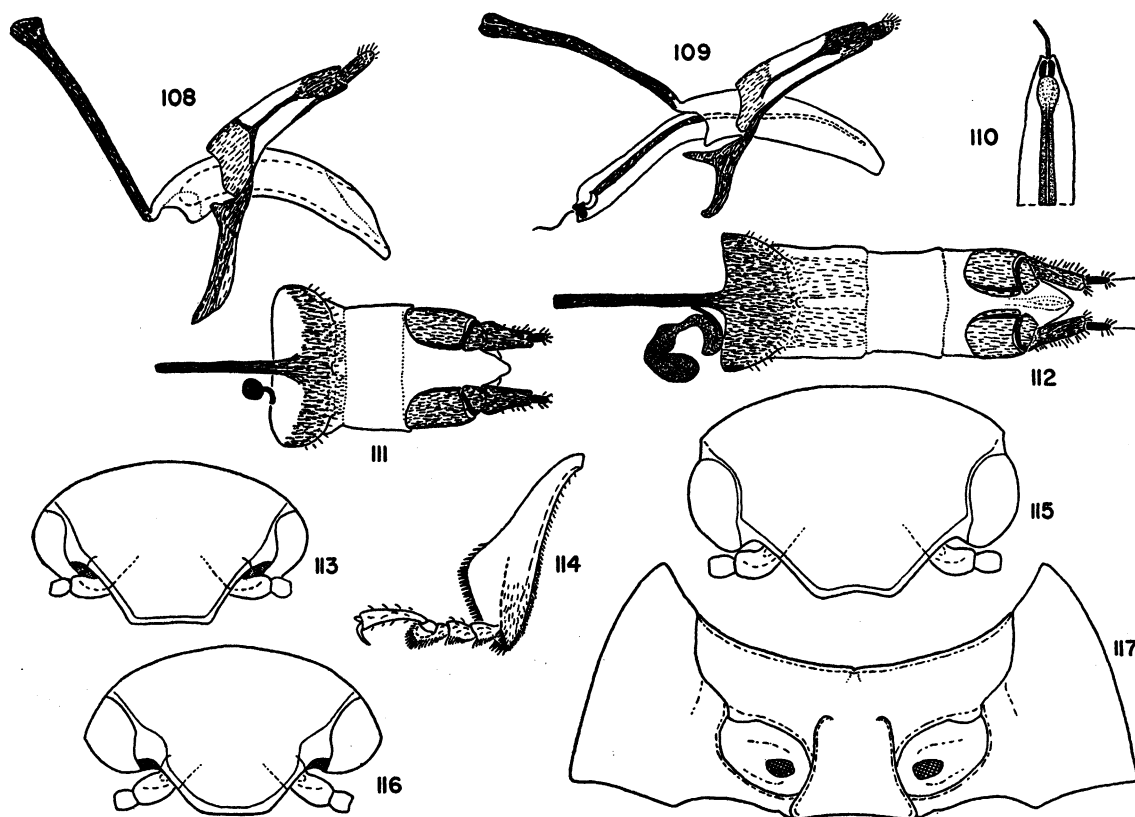
FIG. 100. *Triplax thoracica* Say, Ithaca, New York, eighth tergite of female genital tube, dorsal view (total width, 0.62 mm.).

FIGS. 101, 102. Side of pronotum, left laterodorsal view. 101. *Triplax thoracica* Say, female, Jabes Pond, Lake George, New York (length of pronotal side, 1.17 mm.). 102. *Triplax californica* LeConte, female, Inverness, California (length of pronotal side, 0.91 mm.).

FIGS. 103, 104. Head exclusive of mouth parts, anterodorsal view. 103. *Triplax macra* LeConte, male, Michigan (width at eyes, 1.23 mm.). 104. *Triplax thoracica* Say, female, Jabes Pond, Lake George, New York (width at eyes, 1.28 mm.).

FIGS. 105, 106. *Tritoma unicolor* Say, male, Muncie, Illinois, mouth parts. 105. Maxilla (width of terminal palpal segment, 0.30 mm.). 106. Labium (total width, 0.49 mm.).

FIG. 107. *Tritoma sanguinipennis* (Say), male, Olcott, New York, labium (total width, 0.40 mm.).



FIGS. 108, 109. Male genitalia, left lateral view. 108. *Tritoma biguttata* (Say), Ithaca, New York (1.72 mm.). 109. *Tritoma pulchra* Say, Slaterville, New York (1.67 mm.).

FIG. 110. *Tritoma pulchra* Say, Slaterville, New York, anterior end of internal sac, anterodorsal view (0.36 mm.).

FIGS. 111, 112. Female genitalia, ventral view. 111. *Tritoma humeralis* Fabricius, Maryland (1.53 mm.); at lower left, seminal receptacle. 112. *Tritoma pulchra* Say, Slaterville, New York (2.15 mm.); at lower left, seminal receptacle.

FIG. 113. *Tritoma humeralis* Fabricius, sex unknown, Maryland, head exclusive of mouth parts, anterodorsal view (width at eyes, 1.00 mm.).

FIG. 114. *Tritoma angulata* Say, female, Maryland, right front tibia and tarsus, anterior view (1.05 mm.).

FIGS. 115, 116. Head exclusive of mouth parts, anterodorsal view. 115. *Tritoma sanguinipennis* (Say), male, Funks Grove, Illinois (width at eyes, 1.18 mm.). 116. *Tritoma pulchra* Say, female, Forest Lawn, New York (width at eyes, 1.07 mm.).

FIG. 117. *Pseudischyrus extricatus* (Crotch), male, Houston, Texas, prothorax, ventral view (basal width, 2.02 mm.).

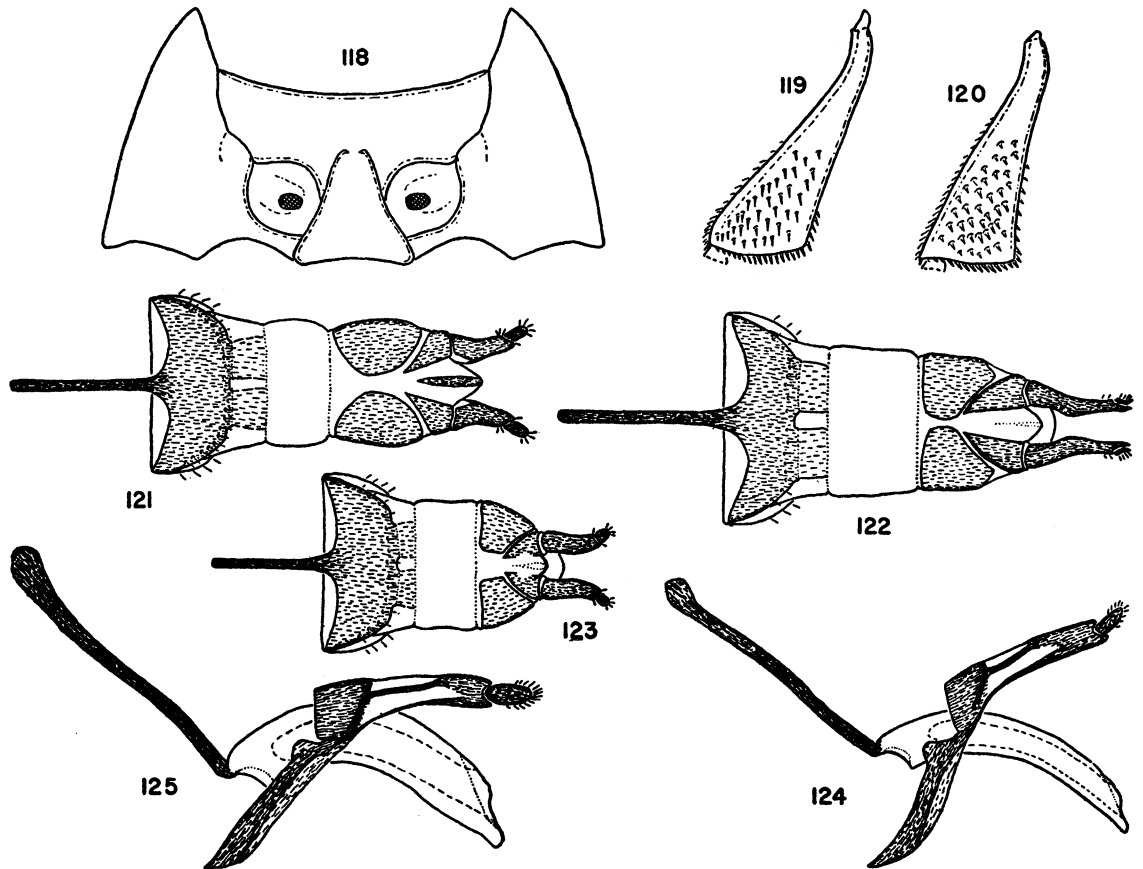
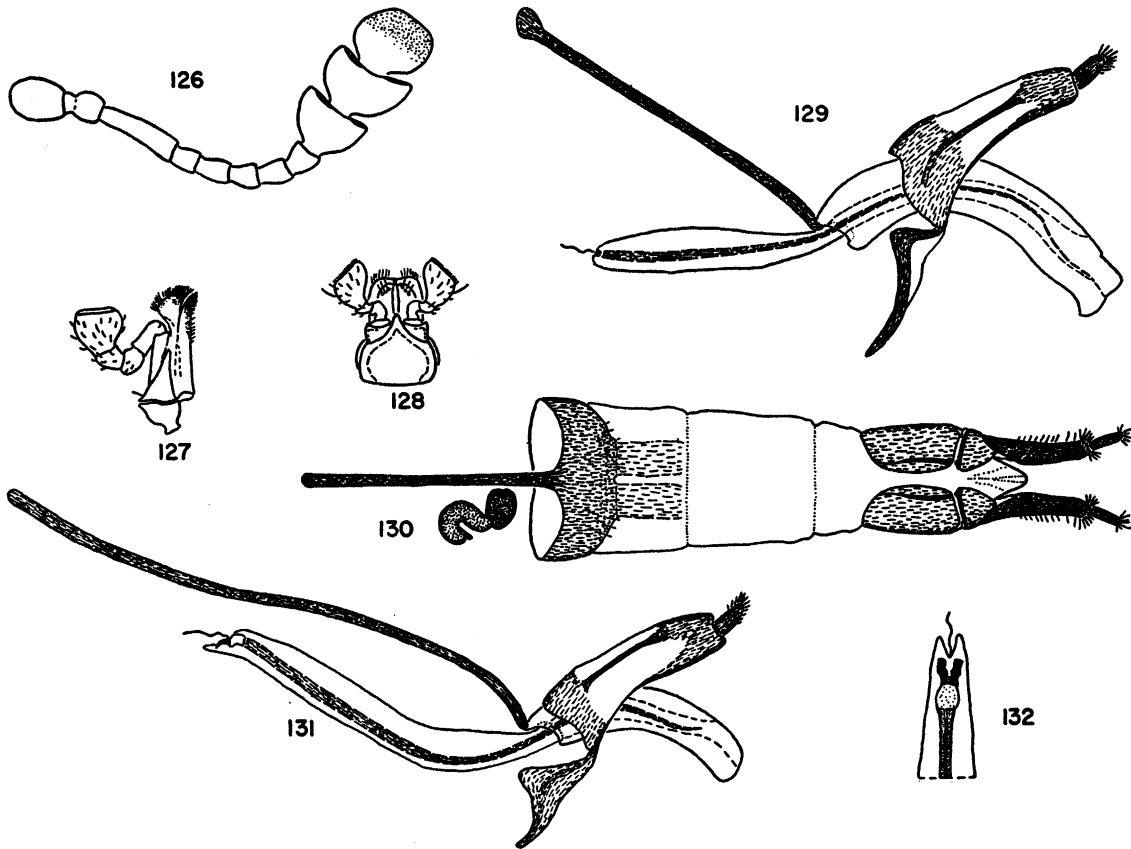


FIG. 118. *Pseudischyrus nigrans* (Crotch), female, Dunedin, Florida, prothorax, ventral view (basal width, 1.82 mm.).

FIGS. 119, 120. Left hind tibia, anterior view. 119. *Pseudischyrus extricatus* (Crotch), male, Houston, Texas (1.05 mm.). 120. *Pseudischyrus nigrans* (Crotch), female, Dunedin, Florida (0.94 mm.).

FIGS. 121-123. Female genitalia, ventral view. 121. *Pseudischyrus extricatus* (Crotch), Southern Pines, North Carolina (2.01 mm.). 122. *Pseudischyrus nigrans* (Crotch), Newton, Georgia (2.22 mm.). 123. *Pseudischyrus ventriquoax*, new species, Southern Pines, North Carolina (1.54 mm.).

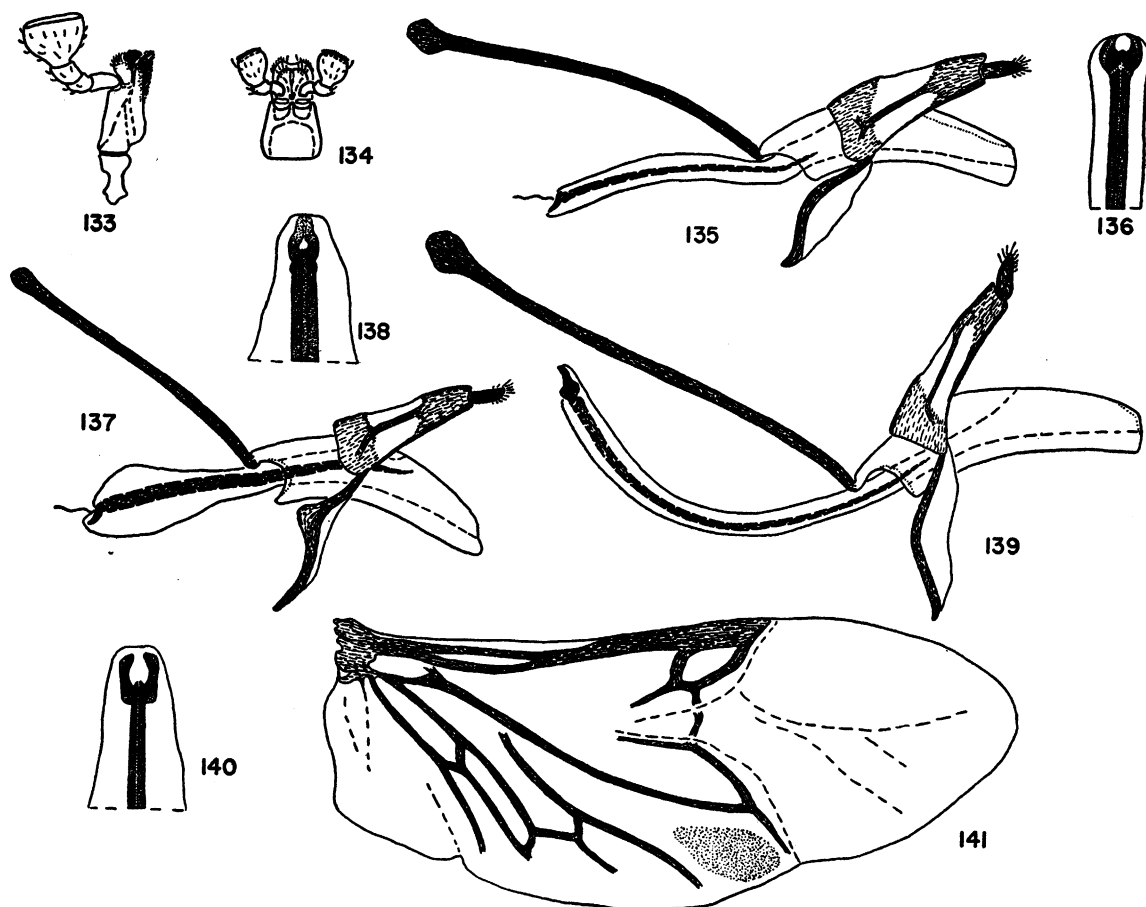
FIGS. 124, 125. Male genitalia, left lateral view. 124. *Pseudischyrus extricatus* (Crotch), Houston, Texas (2.02 mm.). 125. *Pseudischyrus nigrans* (Crotch), Fort Pierce, Florida (2.20 mm.).



FIGS. 126-128. *Ischyryus quadripunctatus quadripunctatus* (Olivier), male, Lucedale, Mississippi. 126. Antenna (1.67 mm.). 127. Maxilla (total width, 0.46 mm.). 128. Labium (total width, 0.47 mm.).

FIGS. 129, 130. *Ischyryus quadripunctatus quadripunctatus* (Olivier). 129. Tallulah, Louisiana, male genitalia, left lateral view (3.45 mm.). 130. Ames, Iowa, female genitalia, ventral view (4.30 mm.); at lower left, seminal receptacle.

FIGS. 131, 132. *Ischyryus aleator* Boyle, holotype, Chiricahua Mountains, Arizona. 131. Male genitalia, left lateral view (3.02 mm.). 132. Anterior end of internal sac, anterodorsal view (0.34 mm.).



FIGS. 133-136. *Haematochiton elateroides* Gorham, male, Chiricahua Mountains, Arizona. 133. Maxilla (0.78 mm.). 134. Labium (total width, 0.43 mm.). 135. Male genitalia, left lateral view (2.36 mm.). 136. Anterior end of internal sac, anterodorsal view (0.33 mm.).

FIGS. 137, 138. *Haematochiton carbonarius* (Gorham), Oaxaca, Oaxaca, Mexico. 137. Male genitalia, left lateral view (2.11 mm.). 138. Anterior end of internal sac, anterodorsal view (0.28 mm.).

FIGS. 139, 140. *Mycotretus nigromaniscatus* Boyle, Huatusco, Veracruz, Mexico. 139. Male genitalia, left lateral view (2.87 mm.). 140. Anterior end of internal sac, anterodorsal view (0.32 mm.).

FIG. 141. *Microsternus ulkei* (Crotch), female, Cincinnati, Ohio, wing (4.91 mm.).

SYSTEMATIC INDEX

Synonyms, homonyms, and suprageneric taxa are not italicized. New names are printed in bold face.

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aleator Boyle, *Ischyrus*, 136
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