

An Arboreal Cleidogonid Milliped from Chiapas

(Chordeumida: Cleidogonidae)

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During studies on the fauna of bromeliads in the Mexican state of Chiapas, Mr. Kenneth E. Lucas (California Academy of Sciences) obtained a number of millipeds which were sent to me for identification. Most of the species were represented only by immature specimens in the orders Polydesmida and Spirobolida and not identifiable with certainty, but of exceptional interest was the occurrence in large numbers of an undescribed species referable to *Cleidogona* in the present, rather broad, concept of that genus.

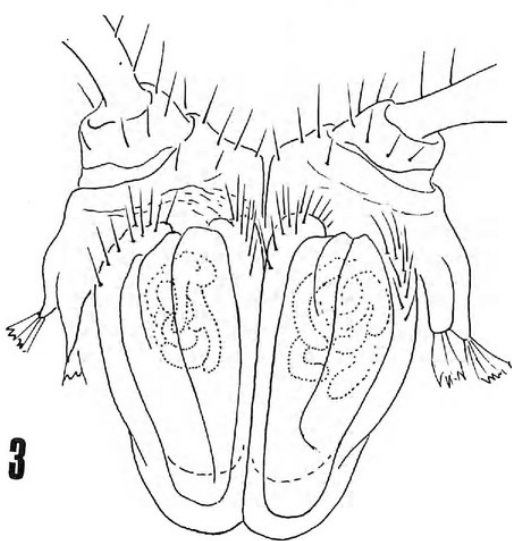
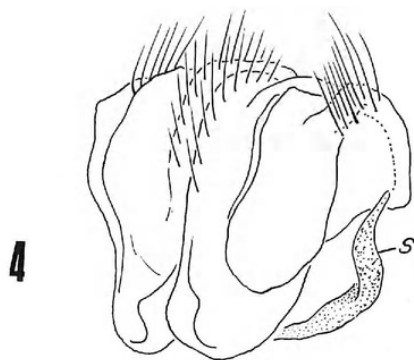
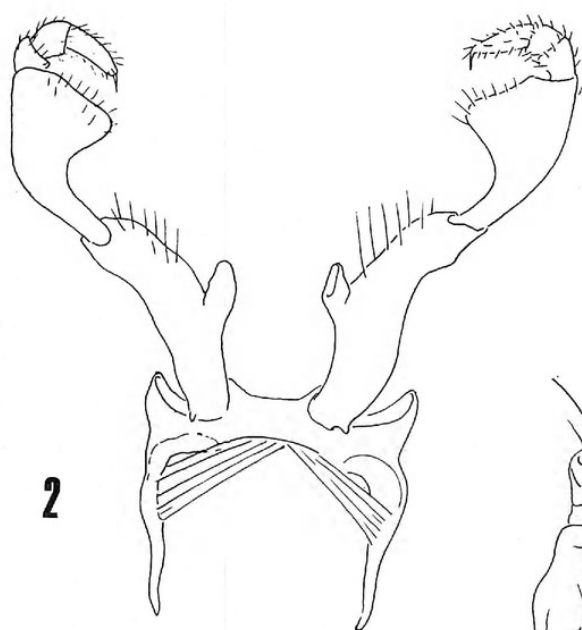
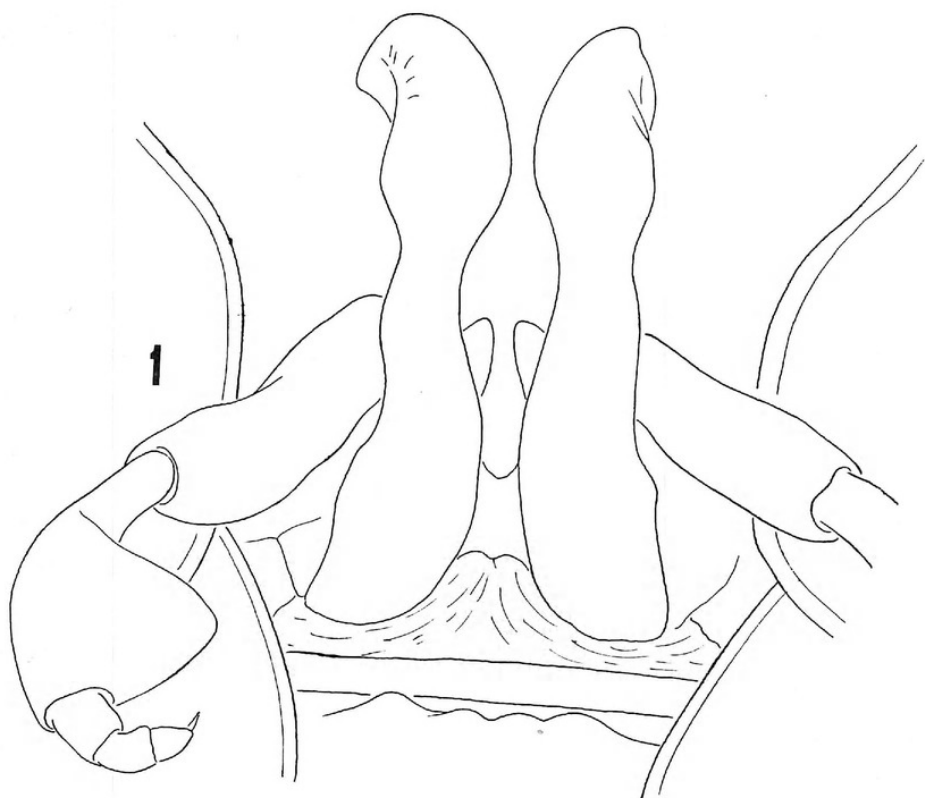
Up until 1943, only a handful of cleidogonids were known from Mesoamerica, and even these in a very inadequate way. During the past three decades, however, a considerable number of species and several genera have been described from that region, and the "Checklist of the Millipeds of Mexico and Central America" compiled by H. F. Loomis (1968) accounted 26 species dispersed through nine genera (literature surveyed through 1964).

In 1972 appeared a detailed monograph on the Cleidogonidae by William A. Shear, in which our knowledge of this group was systematized and vastly augmented in an exemplary fashion. Having access to a large quantity of new material from Middle America, as well as to types of many of the established species, Dr. Shear was able to combine the majority of the existing generic names, and listed a total of 47 species of cleidogonids from south of the Rio Grande: two species in *Solaenogona*, three in *Dybasia*, and 42 in *Cleidogona*. Although a fair number of Mexican cleidogonids are known to be troglobitic or troglophilic, none have so far, to the best of my knowledge, been recorded from any kind of arboreal habitat, such as bromeliads.

Not only is the habitat of the present species unusual, but the gonopod structure is likewise disjunct from the pattern apparently normal for the genus, so that in publishing a name for the use of Mr. Lucas's studies, I take the occasion to append some observations on the morphology of the genitalia.

CLEIDOGONA Cook

Cleidogona Cook, 1895, Ann. New York Acad. Sci., vol. 5, p. 3.—Shear, 1972, Bull. Mus. Comp. Zool., vol. 144, no. 4, pp. 195 et seq. [monographic revision].



The reader is referred to Dr. Shear's revision for a complete account of the generic synonymy, distribution, phylogeny, and species of this large and dominantly Nearctic genus.

***Cleidogona scandens*, new species**

(Figs. 1-7)

Male holotype and 46 paratypes of both sexes, from 17 KM. SE. of SAN CRISTOBAL DE LAS CASAS, 2195 m., CHIAPAS, MEXICO, collected 15 January 1973, by Kenneth E. Lucas. Deposited in the California Academy of Sciences.

Diagnosis. A moderately small, well-pigmented species in which the gonopod telopodites are strongly reduced and the colpocoxites very greatly elongated but simple in form (Figs. 1, 6); coxae widely separated from sternum by prominent peristigmal projections; females lacking postgenital plate, cyphopodal sternum small and obscure (Fig. 4).

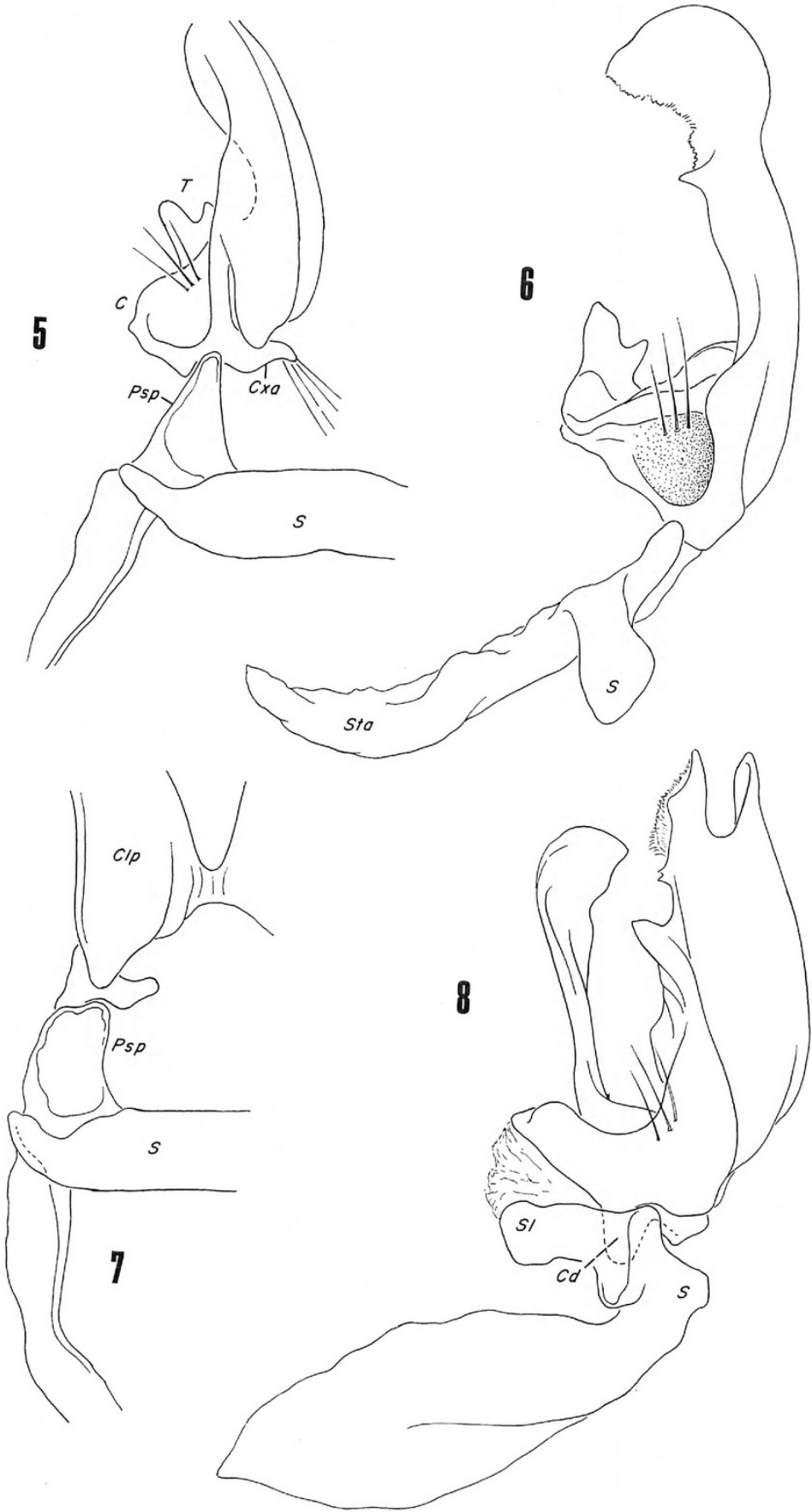
Holotype. Adult male, total length ca. 15 mm., maximum diameter (at segment 7) 1.7 mm. Color pattern to the eye appearing dark brown dorsally with a pale median stripe and pale legs; with magnification each segment is basically light horn-brown dorsally with a paramedian dark brown area on each side of midline, each such area containing two small round pale spots, the light brown area laterad to these with a larger and ovoid pale spot which is strongly areolated on anterior segments; lower sides and legs whitish-gray. Each segment thus has a transverse row of six pale spots, four small and two large, and a narrow mid-dorsal pale area. Lateral sides of femora and tarsi brown; both lateral and dorsal surfaces of postfemora brown. Antennae uniformly light brown except for some whitish mottling on articles 1 and 2.

External structure typical of the genus; body widest at segments 6 and 7, tapering very gradually caudad, metazona smooth, very slightly larger than prozona but without trace of paranotal development. Segments with 3-3 dorsal setae in a transverse row, the outermost on each end set near caudal margin, the inner two located near midlength of segment. Head evenly convex above antennae, the frons slightly but evidently concave. Mandibular bases strongly enlarged and convex. Ocellaria triangular, each with 27 ocelli in 5 rows.

Anterior legs of male unmodified, except first two pairs smaller as usual. Gonopods enormously elongated, *in situ* the apices inserted between the sterna of the 12th and 13th pairs of legs, and of the form shown in Figures 1, 5, 6, and 7.

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FIGS. 1-4. *Cleidogona scandens*. Fig. 1. Gonopods and legs of the 9th pair, anteroventral aspect, ventral ends of pleuroterga of segments 6 and 7 shown. Fig. 2. 9th pair of legs and sternum, anterior view. Fig. 3. Cyphopods and base of 2nd pair of legs, aboral view, apodemetic diverticula (seminal vesicles) indicated by dotted lines. Fig. 4. Cyphopods, oblique posterolateral view, the reduced sternum (S) shown by stipple.



Sternum distinct, transverse, strongly sclerotized, not produced medially; lateral end with a long, laminate sternal apodeme (Sta) extending dorsad nearly to inside of pleuroterga, and with a prominent triangular lobe containing the stigmal opening (Fig. 5, 7, Psp). Coxae small, pivoted upon end of the peristigmatic process and thus far removed from sternum, a small medially directed basal coxal apodeme for attachment of the tracheo-coxal muscle; colpocoxites long, slender, apically expanded, with a triangular subapical lobe on posterior edge, the latter finely lacinate distad to lobe. Lateral surface of coxae concave, with three macrosetae. Telopodites small, medially in contact but not fused, less than one-third length of colpocoxites, each with subapical triangular lobe on the anterior side.

Posterior gonopods (9th pair of legs) of the form shown in Fig. 2, the basal article with an adenostyle near midlength of ventral surface, second article narrow at base, broadly expanded distally; three small terminal segments.

Median process of 12th sternum elongate, simple, apically blunt, without peculiarities.

Female paratype. Similar in general to male except slightly larger, 17.2 mm. in length, 1.8 mm. in width, body not enlarged at segments 6 and 7. Genitalia as shown in Figs. 3 and 4; no trace of postgenital sclerite, sternum reduced to a narrow remnant (Fig. 4, S) hidden above the cyphopods. Latter with densely setose distal margins, the valves containing an intricate system of convoluted seminal vesicles.

Distribution and habitat. The species is known so far only from the type locality. A large series of specimens was taken from *Tillandsia violaceae* growing on *Quercus* sp. at elevations of 3, 6, and 12 meters above the ground. Specimens taken at the same locality in September 1972, were all immature.

Relationships. So far four species of *Cleidogona*—*C. forficula*, *C. laquinta*, *C. conotyloides*, and *C. decurva*—have been recorded from Chiapas, all named by Shear in 1972 and all from the vicinity of San Cristobal. *C. scandens* shows little close affinity with any of them, and in fact I have been unable to confidently place it in or near any of the various species-groups recognized by Dr. Shear. In the key to Mexican species, pages 206 and 207 of his monograph, it runs out to couplet 24, but in general appearance the gonopods have little re-

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FIGS. 5-7. *Cleidogona scandens*. Fig. 5. Right side of gonopods, oblique anterolateral view. Fig. 6. Right side of gonopods, lateral view. Fig. 7. Right side of gonopod bases, anterior view. Fig. 8. *Cleidogona major*, lateral view of gonopods. Abbreviations: C, coxa; Cd, condyle; Cxa, coxal apodeme; Clp, colpocoxite; S, sternum (the transverse element of the sternal apparatus); Sta, sternal apodeme; T, telopodite; Psp, peristigmatic projection of sternum. The capital letter S in Figs. 6 and 8 is placed in anatomically the same position for the two species.

semblance to those of *C. stolli* and *C. mirabilis*. There appears to be actually greater similarity between *scandens* and *C. maculata* (Verhoeff) in the shape of both pairs of gonopods, but the considerable geographic separation of these two taxa (by over 650 km. and the isthmus of Tehuantepec) would seem to militate against the likelihood of close phylogenetic affinity.

I think that a case could be made for the allocation of *Cleidogona scandens* to a monospecific group of its own, located perhaps near the "Crucis Group." The reduction of the gonopod telopodites, and loss of the cyphopodal postgenital sclerite, suggest a derivative or specialized status for the species.

REMARKS ON GONOPOD MORPHOLOGY

Examination of the gonopods of *C. scandens* following removal of extraneous tissue provided the occasion to consider this subject in some detail, and I venture to set forth here a few comments and observations.

To be sure that we were in agreement on basic concepts, I prepared by trypsin digestion a specimen of *Cleidogona major*, the species upon which Shear's account (pp. 197, 198) and figures 184 and 185 were based, to use as a standard. As Shear illustrated the gonopod from anterior and posterior aspects, I provide here a drawing (Fig. 8) made from the lateral aspect to complete the picture. I found general concordance with his treatment of anatomy, with the following exceptions (some of which merely reflect personal preferences in the derivation of terminology):

(1) In my material, the lateral ends of the sternum were not bifurcated and separate from the lateral extension, but actually formed a continuous unit somewhat broader on the sides than across the middle. I think that what Shear has called "lateral sternal sclerites" (LSS) may be regarded merely as a region of the sternum, set off by a vertical fold reflecting an internal thickening of chitin, and labeled on my drawing as "Sl."

(2) The proximomedian processes from the coxae, referred to as "coxal knobs" (CK) by Shear, I prefer to call "coxal apodemes" since they are, as he noted, the point of attachment for tracheocoxal muscles originating on the opposite side of the gonopod complex. On my figures they are labeled "Cxa."

(3) As noted by Dr. Shear, the coxae articulate against the sternum by a proximal lobe, designated by him "basal coxal bar" (CB), and shown on his Fig. 184. I could verify this structure, but because of its form (hardly a "bar") and function, suggest that it be given a more

descriptive name, such as "coxal condyle" as it obviously is a hinge point for movement of the coxa. As seen in lateral view (Fig. 8, Cd) it lies just internally to a corresponding thickened region of the sternum which may represent a pivot against which the condyle moves.

(4) Shear mentions a ". . . membranous front plate (FP) of the sternum . . ." which is said to be attached to the coxae, but no such plate is shown on his drawings. I found that the space between the colpocoxites and sternum appears to be somewhat sclerotized in untreated material, but after removal of the muscles nothing remains in that area except very thin connective tissue, the appearance being very correctly shown in Shear's Fig. 184. Perhaps there is no true "plate" in the sense of an anatomically discrete sclerite present in any cleidogonids, and even without examination of material I doubt that the sternum is medially produced in any cleidogonid.

Comparison of the cleared gonopod of *C. major* with that of *C. scandens* showed at once some interesting features, such as the absence, in the latter, of any trace of lateral extension of the sternum (compare Figures 7 and 8), and the considerable prolongation of the peristigmal region into a long projection which effectively functions as a pivot for the coxa. The normal internal coxal condyle of *C. major* appears to be quite wanting from *scandens*.

These are differences of considerable magnitude, and doubtless of more basic importance than the sometimes spectacular modifications of the colpocoxites and telopodites which have occasioned the proposal of new genera in the past. But as Dr. Shear has shown convincingly that anatomical continuities can be found between the most bizarre gonopodal extremes in this genus, I think that any move to set *scandens* off taxonomically would be undesirable, if done prior to a general re-examination of the coxosternal morphology throughout the genus. Such an enterprise, as might go without saying, would have to be predicated upon the exclusive use of genitalia cleared of all non-sclerotized tissue by the use of trypsin or dilute caustic solutions.

At the present I have neither the material nor opportunity to enter into such a project, and can only emphasize the position of *C. scandens* as a cleidogonid of considerable interest both as regards its phylogenetic position, and from the standpoint of its biotope. How many other bromeliadiculous cleidogonids remain to be found in Middle America?

LITERATURE CITED

- LOOMIS, H. F. 1968. A Checklist of the Millipeds of Mexico and Central America. Bull. United States Nat. Mus., 266: 1-137.

- SHEAR, WILLIAM A. 1972. Studies in the Milliped Order Chordeumida (Diplopoda): A Revision of the Family Cleidogonidae and a Reclassification of the Order Chordeumida in the New World. Bull. Mus. Comp. Zool., 144(4): 151-352, figs. 1-538, maps 1-18, diagrams 1-10.

ZOOLOGICAL NOMENCLATURE

Announcement A (n.s.) 94

Required six-months' notice is given of the possible use of plenary powers by the International Commission on Zoological Nomenclature in connection with the following names listed by case number:

- (see *Bull. Zool. Nom.* 31, part 3, 20th September 1974)
1888. Suppression of *Cicada cingulata* (Fabricius) var. *obscura* Hudson, 1891 (Homoptera).
2048. Suppression of *Polygramma* Chevrolat, 1837 (Coleoptera).
2057. Suppression of *Coccus sativus* Lancry, 1791, *Coccus mexicanus* Lamarck, 1801 and *Coccus silvestris* Lancry, 1791 (Homoptera).
2062. Conservation of *Aphis pyri* Boyer de Fonscolombe, 1841 and the suppression of *Aphis pyri* Kittel, 1827 and *Aphis pyri* Vallot, 1802 and seven other binominals proposed by Kittel in 1827 (Homoptera).
2091. Designation of type-species for *Dactylopius* Costa, 1835 and *Pseudococcus* Westwood, 1840; proposed suppression of *Diaprosteci* Costa, 1828 (Homoptera).
- (see *Bull. Zool. Nom.* 31, part 4, 13th January 1975 [exact publication date]).
1884. Suppression of *Parnalius* Rafinesque, 1815 (Rhopalocera).
2012. Suppression of *Calomicrus taeniatus* Wollaston, 1867 (Coleoptera).
2025. *Striglina* Guenée, 1877 to be given precedence over *Daristane* Walker, 1859 (Lepidoptera).
2036. Designation of *Hydrophorus binotatus* Fallén, 1823 as type-species of *Hydrophorus* Fallen, 1823 (Diptera).
2060. Suppression of *Xiphidium glaberrimum* Burmeister, 1838 and *Orchelimum cuticulare* Audinet-Serville, 1838 (Grylloptera).
2063. Designation of a type-species for *Kerrichiella* Rosanov, 1965 (Hymenoptera).
2067. Suppression of *Thrips rufa* Gmelin, 1790 (Thysanoptera).
2069. Suppression of *Phloeotrogus* Motschulsky, 1863 (Coleoptera, SCOLYTI-DAE).
2070. Suppression of *Anodius* Motschulsky, 1860 (Coleoptera).
2071. Suppression of *Leiparthrum* Wollaston, 1854 (Coleoptera).
2072. Suppression of *Olonthogaster* Motschulsky, 1866 (Coleoptera).
2075. Designation of type-species for *Megasternum* Mulsant, 1844 and *Cryptopleurum* Mulsant, 1844 (Coleoptera).
2078. Designation of type-species of *Platyrhacus* Koch, 1847 (Diplopoda).

Comments should be sent in duplicate, citing case number, to the Secretary, International Commission on Zoological Nomenclature, c/o British Museum (Natural History), Cromwell Road, London SW7 5BD, England. Those received early enough will be published in the Bulletin of Zoological Nomenclature.—MARGARET GREEN, Scientific Assistant.



Hoffman, Richard L. 1975. "An arboreal cleidogonid milliped from Chiapas." *The Pan-Pacific entomologist* 51(1), 31-38.

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