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GEOLOGICAL SURVEY OF ALABAMA

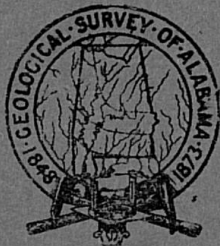
WALTER B. JONES, State Geologist

MUSEUM PAPER 35

**NEW GENERA AND SPECIES OF
CAVERNICOLOUS DIPLOPODS
FROM ALABAMA**

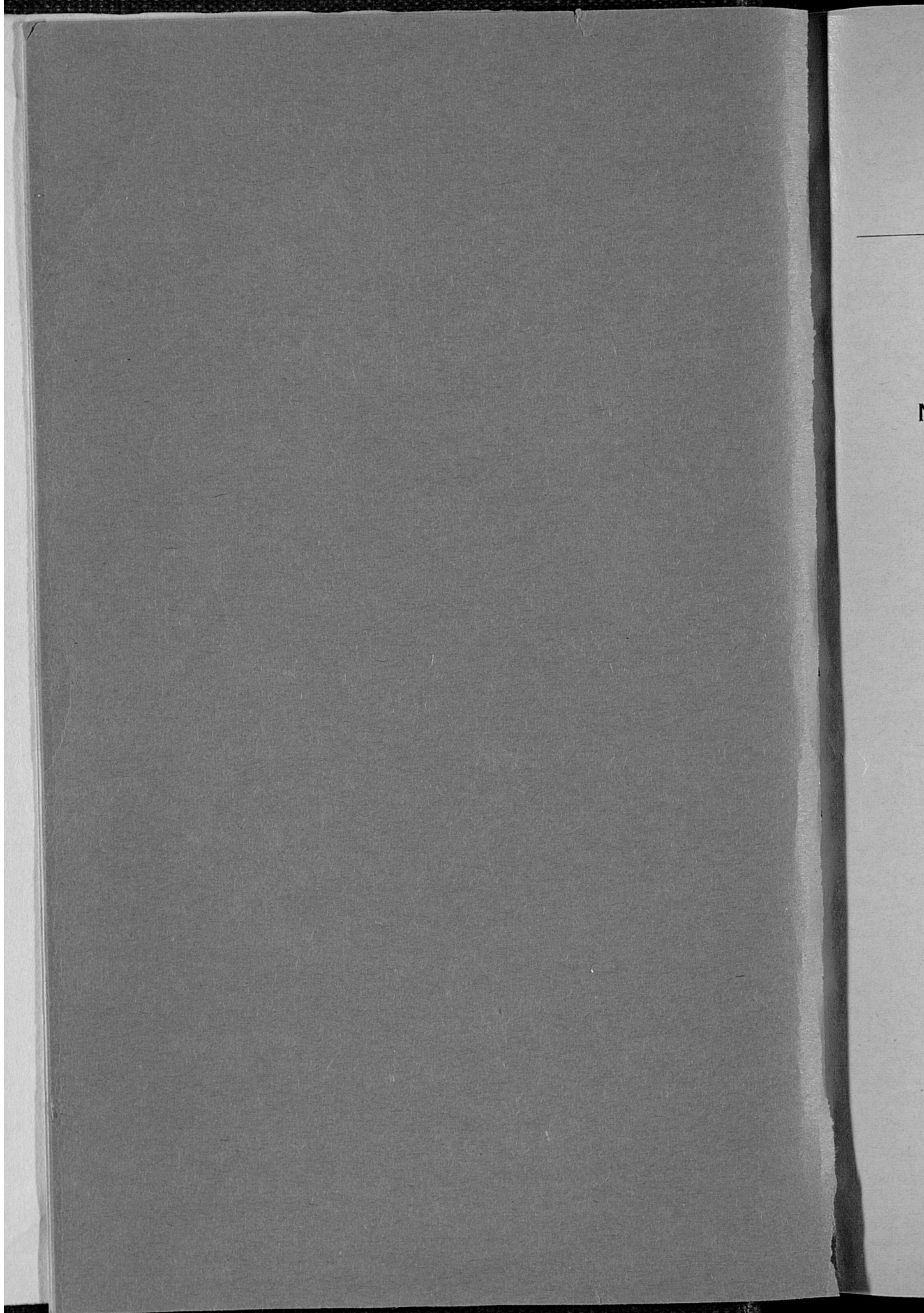
by

RICHARD L. HOFFMAN



UNIVERSITY, ALABAMA

February, 1956



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LETTER OF TRANSMITTAL

University, Alabama

February 3, 1956

Honorable James E. Folsom,
Governor of Alabama,
Montgomery, Alabama.

Sir:

I have the honor to transmit herewith the manuscript of a report on "New Genera and Species of Cavernicolous Diplopods from Alabama," by Richard L. Hoffman. It is requested that this be printed as Museum Paper 35 of the Geological Survey of Alabama.

Respectfully submitted,

WALTER B. JONES,
State Geologist.

**New genera and species of cavernicolous diplopods from
Alabama**

By Richard L. Hoffman

Department of Entomology, Cornell University

Among the diplopod material collected in various Alabama caves and sent to me for study by Dr. Walter B. Jones, State Geologist of Alabama, are specimens representing new species and genera in the families Lysiopetalidae and Cambalidae. Both of these groups have been treated in thorough revisions by H. F. Loomis, and it has been accordingly possible to work up the specimens with a minimum of effort and doubt.

Order CHORDEUMIDA

Family Lysiopetalidae

Tetracion, new genus

Diagnosis.—A genus characterized by the presence of only four primary crests on the tergites, this number being constant from the fifth to the antepenultimate segment. Secondary crests eight, very much smaller than the primary series, but fully as long, reaching the caudal margin of the tergites; no tertiary crests present. Poriferous swellings very large, directed obliquely upward on the anterior segments and becoming almost vertical on the posterior part of the animal. Collum with twelve short crests. Antennae long and slender, reaching back to the 7th segment. Ocelli reduced in size, number, and pigmentation. Very large species, adult females usually more than 55 mm in total length.

Male gonopods suggesting those of **Delophon**; proximally with short acicular sternal and prefemoral processes, a slender unmodified femur, and a broad laminate tibiotarsus. There is a distinct, distally free solenomerite subtended basally by an unequally bifid parsolenomerite.

Type species.—**Tetracion jonesi**, new species.

Remarks.—This is the only lysiopetaloid genus known to me which has four primary crests on all of the segments. In all other genera the number is greater, and is not constant throughout the length of the body. Loomis (1937: 99) indicates that difference in the size of primary and secondary crests, well shown in **Tetracion**, is a specialized character. However, the secondary crests in the present genus are not

shortened, in contrast to the condition prevailing in the lysiopetaloid genera of western North America. The large size, complex gonopod structure, and departure from the variable crest formula seem to indicate a somewhat primitive status. I am inclined to think that **Tetracion** is not improbably an old stock which has become isolated in caves and has specialized in directions of its own, resulting in a genus quite different in most respect from the other two known from eastern United States. The male genitalia alone indicate affinity with **Abacion** and **Delophon**.

The forms of **Tetracion** are of added interest in being the first known American lysiopetaloids modified to a subterranean existence, although many European species are cavernicolous. The antennae are somewhat longer than in epigaeic forms, the ocelli are greatly reduced, and the animal itself appears to be pigmentless or nearly so.

The two subspecies of **Tetracion jonesi** herein described may be diagnosed by the following key:

Tibiotarsus of male gonopod elongate and slender, considerably exceeding the major branch of the parsolenomerite; prefemoral process abbreviated, not reaching past tip of coxal process; ocelli about 24 in a rather loose patch, mostly unpigmented **T. j. jonesi**

Tibiotarsus of male gonopod broad and rather short, scarcely exceeding the major branch of the parsolenomerite; prefemoral process elongate, extending past tip of coxal process when seen in caudal aspect; ocelli about 20 in a compact cluster, mostly pigmented **T. j. antraeum**

Tetracion jonesi jonesi, new species and subspecies

Figs. 1-5

Type specimens.—Holotype male allotype female, Alabama Museum of Natural History, from Bat Cave, near Grant Marshall County, Alabama; collected by Walter B. Jones on September 17, 1952. Topoparatype female deposited in the U. S. National Museum no. 2152.

Diagnosis.—With the characters of the genus. Separable from **T. j. antraeum** by the characters cited in the foregoing key.

Description.—A very large lysiopetaloid species, the largest female 58.8 mm in length and 3.3 mm wide; length of male undeterminable due to breakage but of approximately the same dimension. Male with 56, female with 58 segments.

Front of head convex, smooth, densely pilose with fine short hairs; basal plates of mandibles much enlarged, extending much past sides of head; ocelli in a deltoid patch, usually in seven rows, as follows (front to back): 1, 2, 3, 4, 5, 5, 4 = 24. Antennae very long (6.1 mm) and slender, reaching back to the 7th segment when laid along the back; articles in decreasing order of length: 4, 3, 6, 5, 7, 1, 2, the basal two articles very small.

Collum small, semicircular in dorsal aspect, its lateral portions turned under and concealed by a margination of the front edge; most of the surface smooth with a few clavate setae, posterior fourth with twelve short indistinct crests, laterad of which on each side is a somewhat larger ridge connecting the front and rear margins of the collum; front edge with a prominent marginal sulcus.

Body segments with very pronounced pore swellings, on the 6th to antepenultimate segments, these knob-like and reminiscent of those of *Cambala*, directed up- and outwards at about a 45° angle at midbody, and becoming almost vertical in going towards the caudal end of the animal, the peritreme thus nearly horizontal. All tergites with only four primary crests, these very high and as long as the posterior subsegment; between them are eight small, fine, secondary crests which are, however, quite as long and distinct as those of the primary series. Below the pore swelling on each side of the body are two large lateral crests, each tipped with a seta, below these are a dozen or so smaller ridges, becoming indistinct ventrad. Sternites very small, almost concealed, without ornamentation. Legs long, slender, densely setose. Pretarsi long and slender.

First two pairs of legs of male conspicuously smaller than those following. None of the other legs specially modified except for the presence of tarsal pads in the male, as far back as the 13th legpair.

Anal segment hoodlike, smooth, concealing the valves in dorsal aspect, with two large terminal and six smaller lateral setae.

Male gonopods large and conspicuous, partly carried outside the body, the distal elements black. Coxites large and

boxlike, somewhat receptacular, with the outer anterior margin produced upward into a coxal projection (fig. 4, CP). Prefemur (PF) small, with a small acicular prefemoral process (PFP). A distinct joint between prefemur and femur. Latter (F) strongly curved proximad and then distad, slender, slightly arcuate, without modifications. Tibiotarsal elements strongly reflexed proximad. Tibiotarsal blade (TT) a broad, distally acuminate lamina, from the base of which arises a large, unequally furcate parsolenomerite (PS) which partly conceals the small free solenomerite (fig. 5, SLM), a structure best seen from the oral side of the gonopods.

Preserved specimens entirely pale testaceous, probably their color in life as the dark pigmentation of lysiopetaloids is not affected by alcohol.

I take considerable pleasure in naming this striking species for Dr. Walter B. Jones, State Geologist and Director, Alabama Museum of Natural History, in recognition of his interest and diligence in advancing the knowledge of the fauna of Alabama caves.

***Tetracion jonesi antraeum*, new subspecies**

Figs. 6-8.

Type specimens.—Holotype male and allotype female, Alabama Museum of Natural History, from Barclay Cave, Madison County, Alabama; collected on September 18, 1952, by W. B. Jones.

Diagnosis.—Separable from *T. j. jonesi* as stipulated in the foregoing key.

Description.—Similar to *jonesi* in almost all external features, and in size and segment number. Gonopods slightly smaller with the tibiotarsal blade of a shorter and proportionately broader outline.

Although intermediate material has not been seen, the quality level of the differences between the two named forms is such as to make it entirely likely that they are subspecifically related. It remains for diligent collectors to obtain specimens in the intervening areas between Marshall and Madison counties.

An Observation on Zoogeography

There is an increasing volume of information to indicate close affinity of the diplopod faunas of southern Europe and the Piedmont region of Georgia and Alabama. In addition to the cavernicolous lysiopetaloids occurring in both areas, we have in southeastern United States the greatest diversity of both polydesmids and glomerids, belonging to dominantly Palearctic families.

Order CAMBALIDA

Family Cambalidae

Troglocambala, new genus

Diagnosis.—A genus most closely related to *Cambala*, to which it runs in Loomis's key (1938: 32) to the North American genera of the family. From *Cambala*, it differs in the following particulars: ornamentation of dorsum much reduced, pores opening in low swellings instead of rounded knobs and dorsal crests correspondingly diminutive; second segment without a lateral crest behind the caudal angle of the collum; antennae longer and more slender, the distal articles being much longer than broad; telopodite of the posterior gonopod three-jointed and the entire shape of the appendage different; 6th and 7th segments of male enormously swollen to accommodate the disproportionately large gonopods; second joint of first pair of legs of male without a process.

Type species.—*Troglocambala loomisi*, new species.

Remarks.—Perhaps the most unusual superficial feature of this genus is the curiously enlarged genitalia. These are half again as large as those of specimens of *Cambala* of equal body size. The first few segments behind the head are reduced to form a sort of "neck," after which the 5th, 6th, and 7th segments form a considerable enlargement of the body contour. The rest of the segments are much smaller, and the body is essentially parallel-sided and slender. The anterior gonopods are similar to those of *Cambala cristula*, but the posterior pair differs generically in that the digitiform lobe representing the telopodite is here three-jointed and much larger than in *Cambala* and other genera, and the two distal processes of the coxite are much reduced in size and approximate at the base instead of being widely separated.

Other characters stipulated in the generic diagnosis, such as the reduction of sculpture, may be only specific in value,

but at the present represent departures from all of the known species of **Cambala**.

As a result of cavernicolous life, the color of the animals is uniformly testaceous, and the eyes are reduced in size and are unpigmented. The antennae are also longer than in epigaeic species of this family.

Troglocambala loomisi, new species

Figs. 9-11.

Type specimens.—Holotype male, Alabama Museum of Natural History, from Turk's (Brooklyn) Cave, at Brooklyn, Conecuh County, Alabama; collected by Walter B. Jones on October 2, 1952. Topoparatype male deposited in the U. S. National Museum.

Diagnosis.—With the characters of the genus; specific features obtain in the shape of the male genitalia.

Description.—A moderate sized cambaloid species, adults ranging from 40 to 50 mm in length and up to 2.5 mm in width, with from 55 to 62 segments.

Body cylindrical, slender, about 19-20 times as long as broad; segments 2 to 4 constricted, 5 to 7 enlarged, others smaller and of nearly equal diameter throughout the body.

Front of head smooth, convex; sides nearly straight, converging very slightly distad and weakly margined; clypeus smooth with four widely separated setae; labrum with a transverse row of about 14 fine hairs. Mandibular stipes large, almost two-thirds as long as exposed portion of head, not concealed or excavated, distally mucronate. Eyes poorly developed, each consisting of a linear series of about eight small, weakly pigmented ocelli, partly covered by the front edge of the collum. Antennae long, reaching back to the 5th segment, densely setose; joints in order of decreasing length, 2, 6, 3, 4, 5, 1, 7; 4th through 6th almost twice as long as broad; 4 terminal sensory cones. Gnathochilarium typical for family.

Collum large, smooth, broader than succeeding segment, posterior corner nearly rectangular, with 3 or 4 short longitudinal striae from the caudal margin; front edge slightly sinuate in outline, margined up to the middle of the ocelli.

Second segment extending below level of ends of the column; without a conspicuous lateral crest but with four or five weak lateral striae on each side. Dorsal surface smooth. Third segment very similar to second. Fourth with two lateral tubercles and four weak dorsal crests.

Fifth segment with a tear-drop shaped swelling for the pore and with the dorsal crests more prominent. Sixth segment as large as preceding three combined, pore swelling larger and lower than that of fifth. Seventh segment somewhat smaller than the 6th but otherwise similar. Both are produced ventrally into two tab-like processes, those of the 6th segment overlapping along the midventral line, those of the 7th merely in contact mesially. Succeeding segments equal in width back to the antepenultimate. Anterior subsegments scarcely exposed, posterior subsegment finely fluted in front of the transverse sulcus.

Last two segments legless. Telson smooth, barely equaling anal valves. Latter smooth, inflated, meeting at a re-entrant angle. Preanal scale broadly transverse, with two paramedial tubercles and a tiny one at each corner.

Legs without special modifications except those affecting the first pair of the male sex, which are reduced in size as usual in the family.

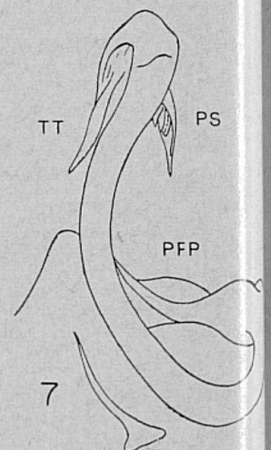
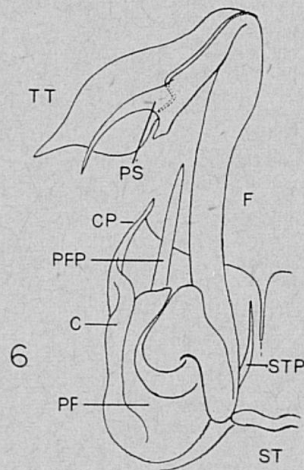
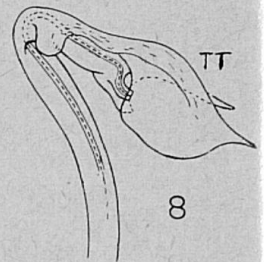
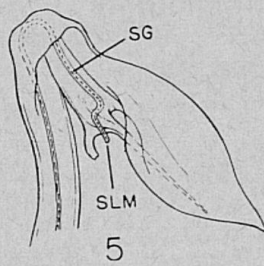
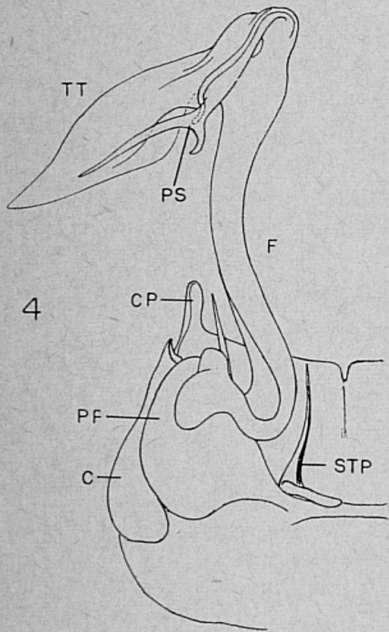
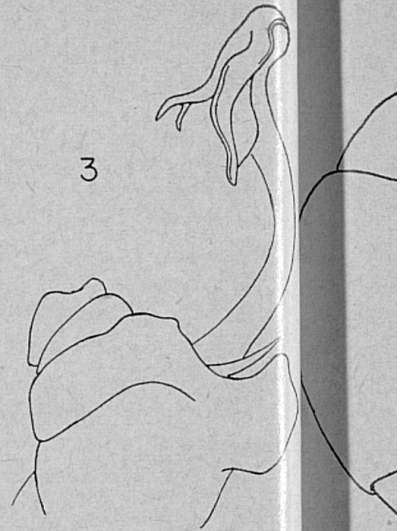
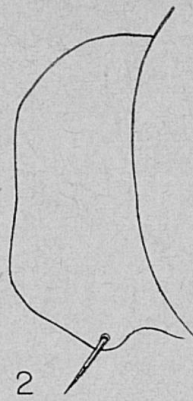
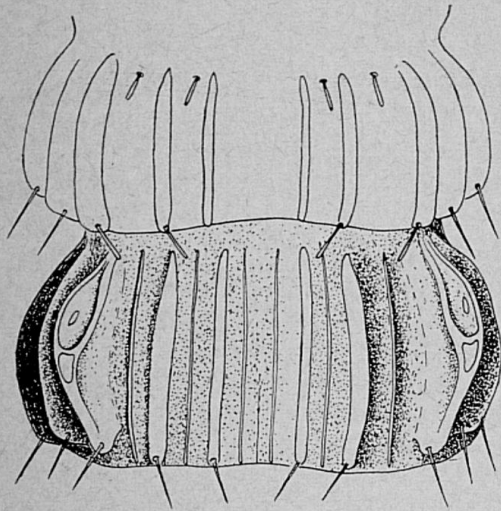
This unusual animal is named for Mr. H. F. Loomis, Senior Agronomist, U. S. Plant Introduction Station, Coconut Grove, Florida, the only American worker who has in recent years made any attempt to prepare useful summaries of various diplopod groups.

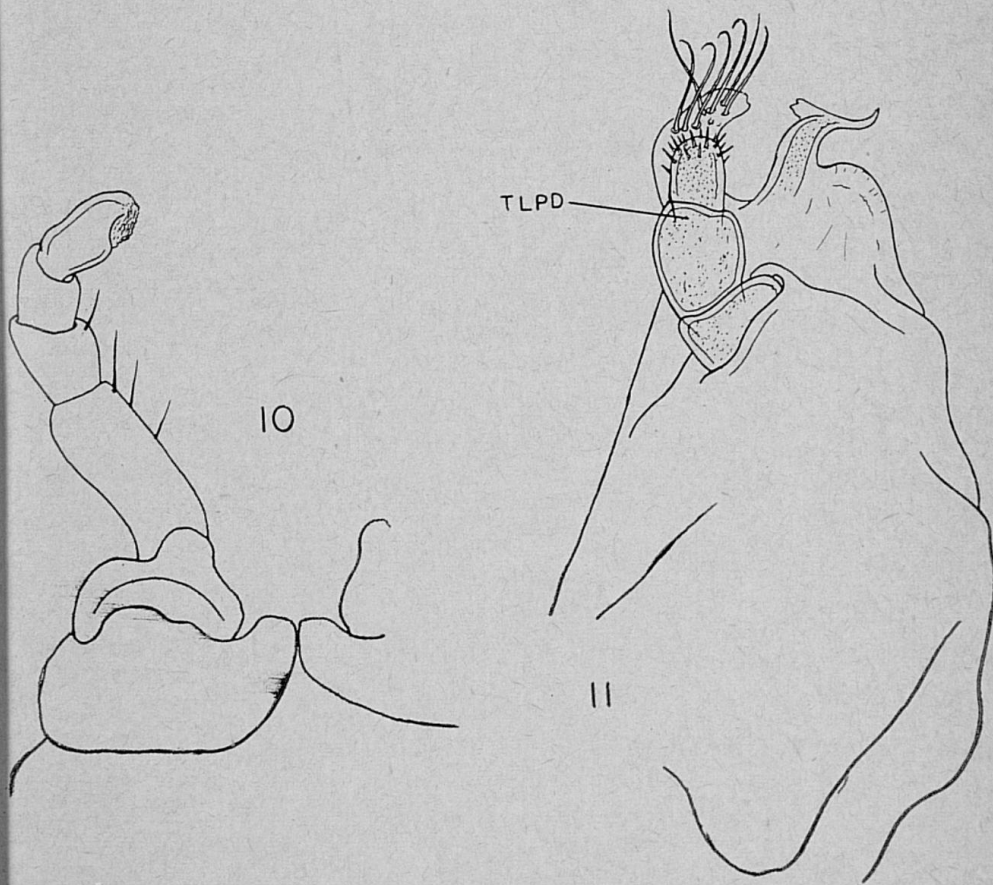
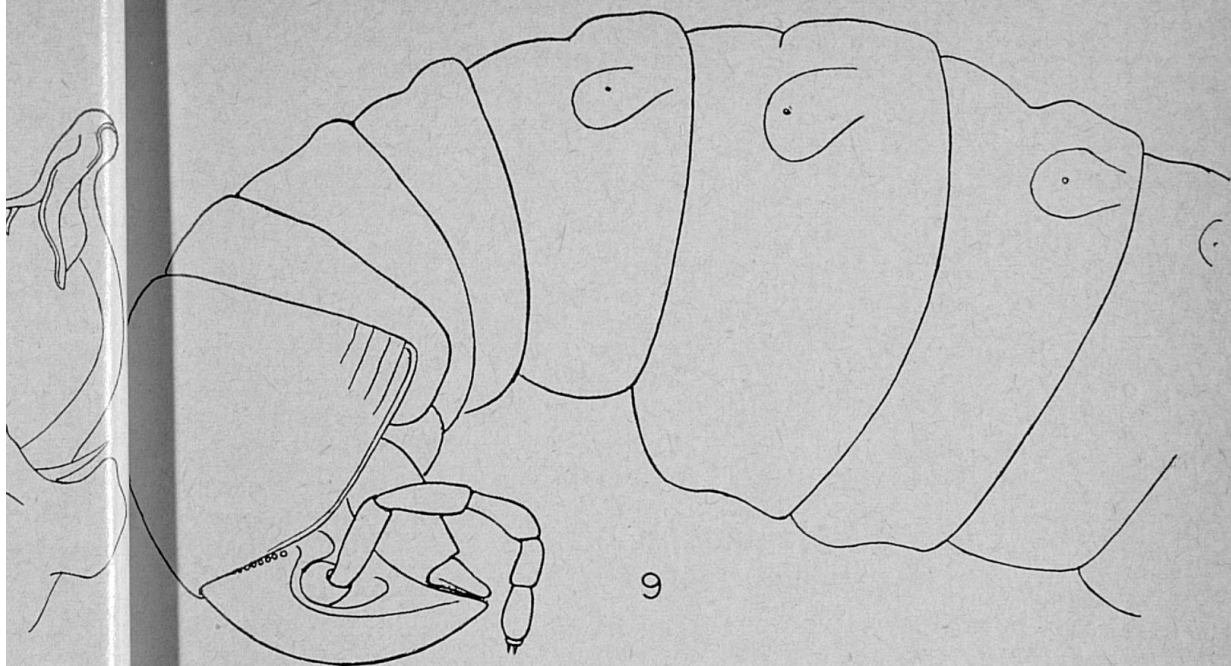
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