A revision of the Hypnoidinae of the world
(Col. Elateridae)

PART II. THE HYPNOIDINAE OF NORTH AND SOUTH AMERICA. THE GENERA ASCOLIOCERUS, DESOLAKERRUS, MARGAIOSTUS, HYPOLITHUS AND HYPNOIDUS

BY

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The present paper is the second in a series dealing with the revision of the Hypnoidinae of the world. Part I was published in 1976: Eos, LI (1975), pages 143-223. This second part deals with the genera Ascoliocerus, Desolakerrus, Margaiostus, Hypolithus and Hypnoidus.

Maps and all figures will appear in the V and final Part.

Ascoliocerus (Mequignon, 1930).


This genus is separated from members of the genus Ligmargus by its shining thorax, which has a more or less well-impressed median line; and by a convex body. The somewhat elongate and serrate an-
tennal segments distinguish it from *Rhigisbernus*, while the squared metacoxal plate and acute triangular shape of the last maxillary segment distinguish it from other members of the *Hypnoidinae*.

\( \delta \) : Size-range 5-7 mm; oblong, moderately convex; color piceous to fusco-piceous; moderately laevis.

**Head** : Antennal scape normally expanded; 4th to 10th segments feebly serrate; last segment ovate-oblong. Apical segment of maxillary palpus in form of an acute triangle.

**Thorax** : Pronotum with slender, acute hind angles, these distinctly to only slightly divergent; disc convex, median line present from base almost to apex; sparsely, finely punctate in middle and at base, sometimes moderately, coarsely punctate in front and sides. Mesepimeron produced to mesocoxal cavity, cutting off mesepisternum from cavity. Hind coxal plate suddenly dilated internally, but scarcely narrowing again mediad. Scutellum flat, with heavy dark border on all sides, nearly square.

**Abdomen** : Five visible sternites, these closely and finely punctate; pubescence fine, cinereous.

\( \delta \) **genitalia** : Trilobate, parameres fused to penis. Penis extremely thick, wide, and stout, gradually narrowed to apex; two lateral struts only these long, straight, and converging on base. Parameres moderate in size, blunt and scalloped at apex; setae present, sides uneven, fused to penis about 1/2 distance from base. Pars basalis convex, with U-shaped posterior emargination. Tegmenite one complete plate, but with signs of degeneration.

**Larva** : Shape cylindrical, elongate, somewhat flattened. Moderate in size (12 mm). Color light, uniformly tan.

**Head** : Posterior epicranial setae present; posterior lobe of frontoclypeal region acuminate to apex. Nasale tridentate, narrow, all denticles more or less directed forward. Labial palpus with one prominent seta on lower ventral half of basal segment; two accessory setae also present.

**Abdomen** : Last tooth before urogomphi prominent, more so than preceding teeth, of which some are also prominent.

\( \varphi \) **genitalia** : Bursa copulatrix U-shaped, sac-like and narrowly joined to vulva; plates present, one pair at bottom of turn, the larger pair at base of bursa, both sets of plates heavily armed with alternate
rows of short and long spines. Colleterial glands moderate in size, sac-like and located on bursa copulatrix next to median oviduct.

Ecology: Habitat colder parts of North America, exists in high mts. further south to Wyoming. Taken by sweep net in mountain meadows.

The type species of the genus is *S. basalis* Mots.; designated by Motschulsky, 1859; type locality Siberia—not restricted further—.

Distribution: Found throughout North America above 42° N latitude, but never common.

Status: The ♂ genitalia of this genus show features, specially that of the penis with only two lateral struts, which distinctly remove this group from any close relationship to the other genera. This is an easily recognized taxon for the experienced observer, but others will have trouble with the generic keys. *A. sanborni* is a rather plastic species which makes identification difficult. *A. basalis*—known only from Asia—, does not possess such plasticity and is easily delimited.

6. **Ascoliocerus sanborni** (Horn, 1871) new combination.

(Figs. 6, 19, 20, 21 d, 22 c, 26 f, 38; map 11).


*Hypnoidus sanborni* (Horn).—In Wytsman, 1906. Gen. Inst., pág. 154.—


Var. *Hypnoidus sanborni intermittus* new variety.

This species is distinguished from other members of the subfamily by the shallow punctures in the median impression at the base of the pronotum.
♂: Length 5.5-7 mm; oblong, moderately convex; piceous to nearly testaceous; thorax and head sometimes darker than body; moderately laevis; vestiture very slight and wiry; rufous on dorsum, flavous ventrally.

Head: Not quite twice as wide as long (2/3.5); frons sparsely punctate; antennal scape expanded; pedicel ½ length of third; fourth to tenth feebly serrate, all longer than wide; joints rufotestaceous to piceous. Apical segment of maxillary palpus expanded halfway from base, forming an acute triangle.

Thorax: Pronotum as wide as head, as wide as long, widest at middle; sides feebly arcuate, sinuate in front of hind angles, these slender, acute, distinctly divergent and carinate above; disc moderately curved, sparsely, coarsely punctate; median line vaguely impressed from base to apex, basal incisures distinct, closely, finely punctate, laevis; pubescence sparse, wiry and rubineous, sometimes dense and niveus at base of hind angles and median impression. Pleural region rather densely punctate and more opaque, with coarse and fine punctures intermixed; prosternal lobe moderately prominent, the border distinctly beaded, a faint transverse impression posteriorly, coarsely punctate in front, more finely and sparsely towards apex; punctuation at sides denser and intermixed with coarse and fine punctures; prosternal muro scarcely, if at all, concave. Metasternum rather densely punctate with coarser punctures intermixed; pubescence flavous, sparse; metacoxal plate suddenly dilated internally, but not narrowing again mediad, continuing on more or less straight across internally, without forming a broad tooth; ratio of length of second abdominal segment to length of metasternum (1.25/3.5 or .357). Scutellum flat, with heavy dark border on all sides, almost square (2.73/3); pubescence sparse to dense, flavous to niveus, arrangement various. Elytra slightly wider than thorax, oblong-oval, widest behind middle, humeri oblique; striae distinctly punctate; intervals flat, sparsely punctate, but more coarsely so than thorax.

Abdomen: Rather densely punctate with coarser punctures intermixed; pubescence flavous, sparse.

♀ genitalia: Trilobate. Penis pointed at apex; parameres narrow and straight, fused slightly more than ⅔ their length to penis (3.7/6.2). Tegmenite a flat plate, somewhat attenuated both anteriorly and posteriorly.

♀: Similar to ♂.
**Pupa:** Exarate, width 2 mm. Otherwise similar to larva described below.

**Larva:** Shape cylindrical, elongate, somewhat flattened, length 12 mm, width 1.75 mm —last stages—. Color uniformly tan.

**Head:** Fairly flat dorsally, moderately arcuate ventrally. Posterior epicranial setae present; posterior lobe of frontoclypeal region acuminate to apex. Nasale narrow, tridentate, all denticles more or less directed forward; subnasale with 4-5 denticles in a narrowly lunate arrangement. Galea with one prominent, two moderate, and one rather minute setae surrounding apex; labial palpus with one prominent seta on lower ventral half of basal segment, one accessory seta more or less on apical ventral half of basal segment, and one accessory seta on medial side of apical half of basal segment.

**Thorax:** Mediotergite of metathorax —left side— with five intermediate setae slightly increasing in size mediolaterad along anterior edge; one minute, one moderate, and a pair of one small and one large setae mediolaterad along posterior border; one small and one very long setae on lateral border.

**Abdomen:** Urogomphi prongs of ninth abdominal segment unequal; outer prongs short, erect; inner prongs twice length of outer prongs, with moderately prominent setaceous tubercule near apex. Caudal notch moderately broad, sides straight. Last tooth before urogomphi prominent, more so than preceding teeth, of which some are also prominent.

**Type Material:** I have examined seven cotypes in the LeConte collection, Museum of Comparative Zoology, Mass; and one cotype in the Horn collection, Phil. Academy of Sciences, Philadelphia, Penn. These were collected in the White Mountains of New Hampshire (not restricted further). There is no doubt as to the identity of the species.

As Horn has designated only cotypes of this species, it is prudent, especially in view of the pronounced variability of *A. sanborni* in various areas of North America, to name a lectotype. This distinction goes to the single specimen in the Horn collection, which is labeled as follows; "*C. sanborni* Horn", "N. H., Wh. Mt.", "Type no. 3348".

**Distribution:** Three hundred and thirty-seven specimens were examined. They were taken between June 20 and Sept. 11 at the following localities (see map 11):

**Alaska:** Atkasuk; Cold Bay; Alaska Peninsula; Goodnews Bay; Eagle Summit; Mile 108.5, Steese Hwy.; McKinley; New Rampart

There is a single specimen proportedly from Greenland. It is labeled “Gronland”, “Coll. C. Felsche, Geschenk, 1907”, “Stattl. Museum fur Tierkunde, Dresden”. Such a specimen is suspect (see the Introductory Section Under Distribution) and at this time I am not ascribing that A. sanborni exists on Greenland.

Status: After examining the large Canadian National Collection—and several smaller collections—, the specimens have been divided into several groups as shown on the accompanying chart. The basis of these divisions rests on the usually distinctive niveus and dense pubescence exhibited by groups “B” and “C”; and the separation of the latter two groups by the arrangement of the setae (see fig. 20). The consequent arrangement rather neatly dovetails with longitudinal distribution from Russia—Siberia—, to Greenland. Group “D” is eliminated from this discussion, as these specimens are simply aberrant. Sahlberg’s types of A. barbatu.s agree with Group “C”. Horn’s types of A. sanborni agree with Group “A”. No recognized taxon is known for Group “B”.

These groups are at best only simple geographical varieties of a single species. I am so treating them here, and thus under the present code, A. barbatis is regarded as a virtual synonym of A. sanborni.

The chart should suffice for both a means of identification and a description of these varieties. Inasmuch as Group “B” is without a name, I am designating it intermittus new variety. This is done only to provide a handle for the form, as a matter of convenience. In my collection there is one specimen designated as a “Typical Example”. It is labeled “Mt. Katahdin, Me., Summit el. 5215 ft., Aug. 26, 1902”, “H. G. Barber coll.”, “Ascoliocerus sanborni, var. intermittus Stibick, Dt. J. N. L. Stibick 1966”, “JNLS Coll.”. This specimen was previously given to me as a gift from the Canadian National Collection,
Ottawa, Ontario (Dr. E. C. Becker), and future studies should take into consideration the specimens located there.

There are 11 syntypes of *A. barbatus*, labeled as follows: "Sin. St. Lawr." or "Porte Clarence", "Exped. Vega", "Spec. type". These are the original labels. One specimen (from Sin. St. Lawr.), sent to Dr. Horn years ago (Horn, 1891 and now at the Phil. Academy of Sciences, Philadelphia), bears the following labels: "Horn Coll., H10048", "Cryptohypnus barbatus J. Sahlb.". The other ten are located in the Riksmuseum, Stockholm, Sweden, and bears additional Green Riksmuseum labels. They also bear Red labels with numbers from "453 to 468" and "66". Finally, someone other than the author (Sahlberg), has labeled 8 of these specimens with various type labels. Five are named paratypus, one is named as an allotypus, and two are labeled typus. The typus specimens also have labels with "Cryptohypnus barbatus, J. Sahlb.". One label corresponds with the label on the Horn specimen and these are probably Sahlberg labels. The third is on poor paper, without an edged boundary, and it is doubtful, but still possible, that Sahlberg labeled it. I have not been able to find a publication designating these specimens and at any rate, cannot see how one can designate two typus —holotype— specimens. Therefore the typus specimen from Porte Clarence, with an edged Sahlberg label; is here designated the lectotype. The specimen labeled allotypus, from Sin. St. Lawr. is here designated the allolectotype. The other nine specimens, including Horn's, are all designated paralectotypes.

**Discussion:** By way of general interest, it should be noted that the distribution of *A. sanborni* sensu stricto is apparently limited to local, widely separated areas and gives every evidence of being a relict population. This theory gains support from the New Hampshire specimens and two other specimens I have seen; the controversial Greenland specimen and one specimen from the Medicine Bow Mts. Wyoming (?). Both appear to be *A. sanborni* sensu stricto and both appear in isolated areas on the fringe of the usual range. If true, it would seem that var. *intermittus* has replaced the nominate throughout Canadá, in a West to East movement. It may also be that var. *barbatus* may be replacing var. *intermittus* in its turn, and in the same general direction. Proof of this will have to come with many specimens collected over many years in a systematic manner.
CHART 10.

SUMMARY OF VARIATION IN A. sanborni EXCLUDING TYPE SPECIMENS.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pubescence of scutellum</th>
<th>Thorax angulation</th>
<th>Internal female morph.</th>
<th>Locality No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Dense, niveus setae directed caudad.</td>
<td>Not divergent (variable).</td>
<td>Normal.</td>
<td>Maine Canadá</td>
</tr>
<tr>
<td>C</td>
<td>Dense, niveus setae directed outward, caudad.</td>
<td>Not divergent (variable).</td>
<td>Normal.</td>
<td>Alaska Yukon</td>
</tr>
<tr>
<td>D</td>
<td>Sparse, yellow.</td>
<td>Obtuse, very short, straight.</td>
<td>Unique arrangement of B.C. plates &amp; terminal end.</td>
<td>Alaska 2</td>
</tr>
</tbody>
</table>

Desolakerrus nov. gen.

Type species: Hypolithus pallidus Becker, 1966. Can. Ent., t. XCVIII, pág. 204 (Nevada, U. S. A.) —present designation—.

The elongate, convex scutellum; flattened, nonpetiolate antennal segments; strongly carinate frons; bisinuate metacoxal plate; and concave dorsum of the hind angles serve to separate this genus.

♂: Shape elongate, somewhat convex. Sculpture smooth, laevis.

Head: Convex; frons moderately arcuate, prominent; antennal segments eleven; scape expanded; fourth to tenth segments nonpetiolate, flattened, with parallel sides. Apical segment of maxillary palpus expanded halfway from base, forming an acute triangle.

Thorax: Pronotum longer than wide (5/6), scarcely narrowed in front, sides regularly arcuate from base of hind angles to apex. Posterior forth strongly declivous, hind angles very thin dorsolaterally, strongly carinate, carina very close and parallel to side margin except at base of hind angles. Prosternum elongate. Mesepimeron produ-
ced to mesocoxal cavity, cutting off mesepisternum from cavity. Metasternum slightly longer than second and third abdominal segments; metacoxal plate bisinuate at inner third and outer third. Scutellum convex, longer than wide. Elytra wider than thorax, elongate oblong-oval, humeri rounded, disc moderately convex. Wings normal for subfamily.

*Abdomen*: Closely punctate, punctures elongate; pubescence moderate.

*♂ genitalia*: Trilobate, parameres fused along part of base, but flexible, long and narrow; penis also slender, long and narrow, lateral struts long, median strut short and broad.

*♀ internal genitalia*: Bursa copulatrix straight, saclike, and narrowly joined to vulva; plates present as scattered forks pointing inwardly. Colleterial glands moderate in size, saclike, and separate from bursa copulatrix, towards vulva. Accessory gland and diverticulum of spermathecal duct both present.

*Ecology*: *Habitat*: Semiarid areas. Probably around oases or other such places where water may be found.

The type species of this genus is *Hypolithus pallidus* Becker, present designation.

*Distribution*: As of now; confined to the Mohave biotic area.

*Status*: *Desolakerrus* is the most aberrant member of the subfamily. Many of the morphological and ecological characteristics are not known to occur in any other group. Consequently, it is unquestionably distinct and quite remote in terms of relationship.


(Figs. 7, 8, 30, 39; map 12).


Many features distinguish this species from other species of the subfamily. Most prominent are the elongate, convex scutellum; non-petiolate, flattened, antennal segments; bisinuate hind coxal plate; concave dorsum of the hind angles of the thorax; and uniform tan color.

*♂*: Length 6.5 mm; greatest width 1.7 mm. Body more elon-
gate than usual for the subfamily. Color uniformly tan. Pubescence moderate in length and density, flavous.

**Head:** Convex; clypeus same length throughout. Antenna more slender than usual, extending one segment beyond apex of hind angle of prothorax; second and third segments subequal and elongate, each about three-fourths as long as fourth, nearly conical, with sides gradually diverging throughout length; fourth segment slightly longer than fifth; fourth to tenth segments flattened, each with parallel sides. Apical segment of maxillary palpus expanded halfway from base, forming an acute triangle.

**Thorax:** Pronotum 1.2 times longer than wide —length and width measured at median—; widest at middle; side margin arcuate from base of hind angle to apex; punctation double with larger punctures simple, moderate in size, separated by two to three times their own diameters on disc, slightly closer on sides; smaller punctures fine, close; interspaces laevis; posterior margin smooth, without basal fissures; posterior fourth more strongly declivous than in other species, the declivity extending laterally to hind angles; hind angles very thin dorsolaterally; hind angles slightly divergent, strongly carinate, the carina very close to, and parallel to side margin except at base of hind angle. Propleuron rather long and narrow; punctures elongate, a little wider than those on sides of prothorax but twice as long, separated by one or two times their own width; punctures absent from side margins and posterior edge. Prosternum elongate, with anterior portion extending beyond anteriormost part of pronotum by a distance equal to the second and third antennal segments combined; punctation similar to that on pronotum; prosternal mucro slightly concave between procoxae, suddenly declivous just behind procoxae, and thence strongly convex posteriorly. Metasternal punctation similar to that on pronotum; hind coxal plate bisinuate, suddenly narrowed by two-fifths at inner third and suddenly narrowed again at outer third; concave portion of coxa —recessed to receive trochanter and femur— with a few large punctures on outer third; ratio of length of second abdominal segment to length of metasternum (1.8/4.5 or .400). Scutellum longer than wide, convex, with a vague longitudinal ridge —quadrate and flat in other species—. Elytra 2.3 times longer than greatest width and slightly wider than prothorax; sides slightly divergent on basal two-thirds then rounded to apex; striae represented by rows of large punctures on basal half, the
punctures suddenly becoming smaller and fading into fine lines on apical half, especially on disc; intervals flat, indistinctly punctate, slightly duller than prothorax.

**Abdomen:** Punctures elongate, prominent on sides of first sternite, gradually becoming smaller towards apex of abdomen.

**♀ genitalia:** (Fig. 39) with long, narrow median and lateral lobes (much longer and narrower than in other species).

**♂:** Similar to ♀, but generally larger.

**Larva:** Unknown.

This description is largely emended from Becker’s original description, but changed to follow the format used in this paper, and with a few additional characters.

**Ecology/Habitat:** The species has been collected in the arid lowlands of the Southwest, rather than on or near the summits of mountains. This biotic feature sharply separates *D. pallidus* from all other members of the subfamily and is a major reason for the establishment of a monobasic genus. All the type localities are oases; and this conforms to the usual preference of the *Hypnoidinae* for —usually— areas with readily available water.

**Type Material:** I have seen all the type material used by Dr. Becker. The holotype, allotype and 27 paratypes are from ALAMO, Lincoln Co., Nevada (F. D. Parker); the first two and 15 paratypes collected on 13 July 1958, 5 paratypes on 10 July 1958, 7 paratypes on 21 July 1958. An additional paratype came from Ehrenberg, Arizona, 12 Feb. 1939 (F. H. Parker) and another from Inyokern, Kern Co., California, 14 March 1941 (E. C. Van Dyke). The holotype and allotype, plus 7-8 paratypes are at the University of California, Davis; the other Alamos paratypes are in the Canadian National Collection (Type No. 9135). The Arizona and California paratypes are in the Univ. of Arizona, Tucson and the California Academy of Sciences, San Francisco, respectively. A specimen in the University of California (Ri.) a ♀ from Deep Canyon, Riverside Co., California, 7-8-1964 (Fred G. Andrews), may prove to be another species.

**Distribution:** The known distribution is plotted on map 12. It is of interest to note that this range is largely confined to the Mohavian Province—as now known—. The long collection period represented by this limited sample is greater than that known for most other species of the subfamily and occurs earlier in the year.
The early dates may be due to the warmer areas inhabited by *D. pallidus*, and also to the lack of summer rain, which leaves winter precipitation as the chief source of moisture. Most of the specimens were collected in July, but this occurred at one locality and may reflect local climatic conditions at the time.

**Margaiostus** nov. gen.

Type species: *Cryptohypnus grandicollis* LeConte, 1863. *Smith, Misc. Coll.* (1863), pág. 83 (Canadá) —present designation—.

This genus is distinguished from the other members of the subfamily by the distinctive δ external genitalia and internal ♀ genitalia; basally expanded maxillary palpi; smooth shiny surface; monocolored brown or piceous appearance; and by the distribution of its North and South American representatives.

δ: Length 8-11 mm; moderately convex or depressed; color piceous to nearly fulvous; laevis; vestiture sparse.

*Head*: One half as wide as long, nearly prognathous, inserted into prothorax to eyes, front flat. Antennal scape expanded, pedicel 1/2 to 2/3 length of 3rd; 4th to 10th feebly serrate to square; last segment ovate-oblong. Apical segment of maxillary palpus expanded at base, forming a right triangle.

*Thorax*: Pronotum twice width of head, sides slightly convergent anteriorly, slightly sinuate in front of hind angles, these acute, slightly divergent and carinate; surface laevis; punctuation coarse to sparse; pubescence sparse. Pleural region coarsely punctate. Prosternum sparsely punctate. Mesosternum somewhat concave, densely punctured; mesepimeron produced to mesocoxal cavity, cutting off mesepisternum from cavity. Metasternum moderately closely punctate with coarse and fine punctures intermixed; metacoxal plate suddenly dilated internally to form a broad rectangular plate, with posterior border more or less straight to internal posterior corner. Scutellum flat, oblong-oval, heavy dark border on more or less truncated anterior edge. Elytra slightly wider than thorax; disc convex or concave, striate. Wings normal for subfamily, size 9.5 mm length, 3.5 mm width.

♂ genitalia: Trilobate, parameres free from penis, movable.
Penis a slender, narrow rod, straight or bent ventrally, just surpassing parameres; lateral struts short and slender, moderately curved toward base, length from 1/3 to 1/4 of penis length. Parameres straight, narrowing to abrupt beginning of lobe, inflexed internally and ridged externally. Penis trough from base almost to apex; articulate to penis near base; lobes flattened and inflexed, narrowing to point at apex. Pars basalis concave, emargination of apex V-shaped. Tegmenite square to oblong, widest at posterior border.

♀ genitalia: Saccular. Paraprocts two slender lateral rods (3 mm); valvifers a pair of narrow plates (1/2 mm); coxite of two narrow rods (2 mm); stylus articulate and bearing setae. Bursa copulatrix straight, saclike, and moderately to broadly joined to vulva, colletorial glands small, saclike, and located on bursa copulatrix on both sides of median oviduct; accessory glands present as a thin slightly swollen tube near end of bursa copulatrix; diverticulum of the spermathecal duct present near base of duct as a slender tube.

Larva: Shape cylindrical, elongate, somewhat flattened. Size intermediate (9-10 mm). Uniformly light flavous in appearance.

Head: Posterioepicranial setae present; posterior lobe of fronto-clypeal region strongly acuminate to apex. Nasale broad, tridentate, lateral denticles more or less divergent. Labial palpus with one prominent setae on ventral side, apical half of basal segment.

Abdomen: Last tooth before urogomphi feeble, as feeble as preceding teeth of which some are practically obscure.

Ecology: In North America this group appears to be confined to forested areas. One, *M. valens*, apparently lives in redwood forests along the California coast. Another, *M. glacialis*, is found at higher elevations further North in Pine forests of the Rocky Mountains—Canada, Montana, Washington, Wyoming—. In South America *M. magellanicus* has been found in barren, wind-swept areas well above the tree line of the Chilean Andes.

The type species of this genus is *Elater grandicollis* LeConte—present designation—.

Distribution: In North America, two western species occurring in the Pacific and Rocky Mountain States and Provinces, and one eastern species in the Central States to Ontario, Canada. In South America, two species confined to southern Chile and Argentina.
**Status:** The species listed here show a combination of characters, i.e., the ♂ and ♀ genitalia, maxillary palpi, body shape, and color, more than sufficient to demonstrate the validity of the new generic taxon erected to contain them.

**Key to the Subgenera.**

1. Scutellum with sparse, wiry setae, anterior edge straight; metasternum with long, wiry setae only; North America ... ... ... ...
   — Scutellum with dense, niveus setae, anterior edge arcuate; metasternum with short niveus pile in addition to long wiry setae; South America ... ... ... ... ... Mesemiostus nov. subg.

**Margaiostus sensu stricto.**

This group is identified by the characters given in the key, and also by the absence of a secondary pile on the abdomen and the features of the ♂ and ♀ genitalia.

**Thorax:** Pronotum with setae directed either medial-caudad or mediad. Metasternum with wiry, long setae; metacoxal plate forming a definite tooth or square plate. Scutellum straight along anterior edge, pubescence sparse and wiry.

**Abdomen:** Pubescence of long to moderately long wiry setae.

♂ genitalia: Sides of parameres straight to lobes; lateral struts no longer than 1/3 of total length of parameres.

♀ internal genitalia: Bursa copulatrix straight, saclike, and broadly joined to vulva, one plate opposite from colleterial glands partly divided into heartlike form.

**Key to the Species.**

1. Pronotal punctures fine and circular, separated by at least their own diameters at the sides and still finer and more remote at the middle (fig. 15) ... ... ... ... ... ... ... ... ... ... (2).
   — Pronotal punctures coarse throughout, punctures elongate and
<table>
<thead>
<tr>
<th></th>
<th>valens</th>
<th>glacialis</th>
<th>grandicollis</th>
<th>magellanicus</th>
<th>andicola</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color</strong></td>
<td>Fuscous to dark testaceous</td>
<td>Shining piceous to rarely dark fuscous</td>
<td>Fulvescent</td>
<td>Piceous to fuscous</td>
<td>Fulvescent</td>
</tr>
<tr>
<td><strong>Size.</strong></td>
<td>9-11 mm length</td>
<td>8-10 mm length</td>
<td>8.9 mm length.</td>
<td>6.5-11.2 mm length.</td>
<td>7.5-9 mm length.</td>
</tr>
<tr>
<td><strong>Shape.</strong></td>
<td>Elongate and depressed.</td>
<td>Elongate broad, flattened.</td>
<td>Oblong, moderately convex.</td>
<td>Elongate, broad and flattened.</td>
<td>Elongate, somewhat broad, flattened.</td>
</tr>
<tr>
<td><strong>Head.</strong></td>
<td>Flat but slightly concave.</td>
<td>Medial sulcus.</td>
<td>Flat.</td>
<td>Flat.</td>
<td>Flat, slightly concave.</td>
</tr>
<tr>
<td><strong>Metacoxal plate.</strong></td>
<td>Broad rectangular plate.</td>
<td>Broad tooth.</td>
<td>Broad rectangular plate.</td>
<td>Plate of no particular shape.</td>
<td>Plate of no particular shape.</td>
</tr>
<tr>
<td><strong>Genitalia ♂.</strong></td>
<td></td>
<td>Strut 1/4 of penis length.</td>
<td>Strut 1/3 of penis length.</td>
<td>Strut 1/2 of penis length.</td>
<td>Strut 1/2 of penis length.</td>
</tr>
<tr>
<td><strong>Scutellum.</strong></td>
<td>Anterior edge straight, pubescence sparse, surface flat.</td>
<td>Anterior edge straight, pubescence sparse, surface with carina.</td>
<td>Anterior edge straight, pubescence sparse, surface flat.</td>
<td>Anterior edge arcuate, pubescence dense, surface with carina.</td>
<td>Anterior edge arcuate, pubescence dense, surface flat.</td>
</tr>
</tbody>
</table>
nearly in contact laterally, about twice as numerous as in preceding species (fig. 14) ... ... ... ... ... ... valens (Fall, 1934).

2. Rocky Mountain region; head usually with medial depression; piceous, rarely darkly fuscosus ... glacialis (Van Dyke, 1932).
   — Northeastern U. S., head never depressed mediad; fulvescent ...
   ... ... ... ... ... ... ... ... ... ... ... grandicollis (LeConte, 1863).

8. Margaiostus (Margaiostus) valens (Fall, 1934) new combination.
   (Fig. 14; map 13).

_Hyprolithus valens_ (Fall).—Lane, 1948. Proc. ent. Soc. Wash., t. I, núm. 8, pág. 223.

Without exception this species is readily distinguished from the others by the elongate and numerous punctures of the pronotum, especially along the sides.

♀: Length 9-11 mm; shape elongate and depressed; color fuscosus to dark-testaceous; laevis. Head and thorax coarsely punctate; vestiture short, fulvous and obscure, ventrally denser, greyer and appressed.

_Head:_ Length one half of width (2.5/4.5), front slightly concave; rather coarsely but not very closely punctate; antennal scape expanded, pedicel straight, 1/2 length of scape; succeeding segments feebly serrate, 4th to 10th expanded; last segment ovate-oblong. Apical segment of maxillary palpus expanded at base, forming a right triangle.

_Thorax:_ Pronotum twice width of head, slightly longer than wide (7/7.5), widest just behind middle; sides slightly convergent and feebly arcuate anteriorly, sinuate behind, the hind angles slender, divergent and carinate; disc flattened and impressed mediad; coarsely punctate throughout, the punctures elongate, nearly in contact laterally, but more widely separated mediad; pubescence sparse, setae deflexed caudad, appearance cinnamomeous. Pleural region very coarsely punctate; pubescence flavous and moderately dense. Prosternum more sparsely punctate except on lobe; pubescence flavous and moderately dense; prosternal micro flat. Mesosternum shallowly punctured; pubescence moderately dense. Metasternum with shallow,
scattered punctures, fine punctures in intervals between large punctures; pubescence moderately dense and flavous; hind coxal plate suddenly dilated internally to form a broad rectangular plate with posterior border straight to internal posterior corner; ratio of length of second abdominal segment to length of metasternum (1.9/5 or .380). Scutellum flat, heavy dark border on truncated anterior edge, oblong-oval (3/4.2). Elytra scarcely wider than thorax, 2.4 times longer (mediad), twice as long as wide; disc moderately convex; 9 indistinctly punctate striae; intervals nearly flat with numerous irregularly placed fine punctures; pubescence sparse, of deflexed cinnamonous setae, these somewhat sparser and shorter than pronotal setae.

**Abdomen:** Finely and sparsely punctured, pubescence yellowish, moderately dense.

δ: No known specimens.

**Larva:** Unknown.

Described by Dr. Fall from two female cotypes, both from Sylvania, California, near Santa Rosa, on 4-13-96; collected by Kicksecker. I have seen these specimens in the Fall collection, Museum of Comparative Zoology, Cambridge, Mass., and have no doubt as to the identity of the species. The first specimen in the series is here designated the lectotype.

**Distribution:** Only 9 specimens of this rare species were examined, all ♀♀. They were apparently found in deeply wooded areas between April 13 through Sept. 6 from following localities (see map 13):

**California:** Mill Valley, Muir Woods, Lagunitas, of Marin County; Eldorado Co.; Los Gatos, Santa Cruz Co.; Blair’s Ranch at Redwood Creek, Humbolt County.

**Status:** *M. valens* is large for the genus, and the only species with elongate pronotal punctures on the sides. The costal deep woods habitat is definitely damper, but otherwise similar to the habitats of the other two species. So far they have only been found in or near redwood stands throughout California, with one exception. As no δ δ have yet been found, pathogenesis may be involved, but the number of specimens now available does not yet invite such a conclusion.

**(Figs. 15, 16, 22 b, 24 d, 40; map 14).**


Most prominent in this species is the immediately noticeable medial sulcus of the head. This species is, on the average, usually piceous although some specimens tend to a brownish-red shade tinged with black. One feature is a broadly toothed metacoxal plate, usually found in the Genus *Hypnoidus*.

\[\delta:\] Length 8-10 mm; shape elongate, broad and flattened; color shining piceous to darkly fuscous above, rufopiceous beneath; laevis; fine to sparsely punctured; vestiture with short suberect black setae, ventrally with very fine appressed grey setae.

**Head:** Twice as wide as long, front flat, usually with medial sulcus; finely, sparsely punctured. Antennal scape expanded; pedicel straight, twice as long as broad, 2/3 length of 3rd; 4th to 10th feebly serrate; last segment oblong-oval. Apical segment of maxillary palpus expanded at base, forming a right triangle.

**Thorax:** Pronotum twice as wide as head, about as wide as long (8/8.1), sides markedly arcuate, narrowed and sinuate in front of hind angles, the latter narrowed, elongate, divergent, and with a fine carina extending forward and near the margin about 1/3 length of pronotum; disc slightly convex, well impressed median canaliculation near base; finely, sparsely punctured; pubescence of erect, mediad directed black setae. Pleural region moderately punctate with mixture of large and small punctures; pubescence of short, suberect gray setae. Prosternum more sparsely punctate except on lobe, transverse impression limiting lobe posteriorly; prosternal mucro broadly, shallowly concave with median carina, sides broad, surface micro-reticulate. Metasternum with shallow scattered coarse and fine intermixed punctures; pubescence of short sub-erect gray setae; metacoxal plate suddenly dilated internally, narrowing again mediad to form a broad tooth; ratio of length of second abdominal segment to metasternal length (2/5.3 or .377). Scutellum flat, with vague narrow medial carina,
form oblong-oval (3.25/4.25), heavy dark border on truncated anterior edge. Elytra slightly wider than prothorax, sides arcuate from humeri to near base and gradually rounded at apex, disc slightly convex; striae sharply impressed and finely punctured; intervals convex and very finely punctured; pubescence of short, suberect black pile.

*Abdomen:* Finely, sparsely punctured; pubescence of very fine, closely appressed, gray pile.

*§ genitalia:* Trilobate, parameres freely movable on penis. Penis slender, narrow, just surpassing parameres, lateral strut length about 1/4 of penis length. Tegmenite square, serrate posteriorly, slightly narrowed anteriorly.

*$♀:* Similar to §.

*Larva:* Shape cylindrical, elongate, somewhat flattened, length 9.25 mm, width 1.75 mm —last stages—. Completely flavous.

*Head:* Fairly flat dorsally, feebly arcuate ventrally. Posterioropicranial setae present; posterior lobe of frontoclypeal region strongly acuminate to apex. Nasale broad, tridentate, lateral denticles more or less divergent, strong median dентicle directed forward; subnasale with eight denticles in a broadly lunate arrangement. Galea with one prominent and three accessory setae surrounding apex; labial palpus with one prominent seta on ventral side, apical half of basal segment.

*Thorax:* Mediotergite of metathorax —left side— with five intermediate setae increasing in size mediolaterad along anterior edge; one moderate, two pairs of one long, one short, and one minute seta mediolaterad along posterior border.

*Abdomen:* Urogomphi prongs of ninth abdominal segment unequal; outer prongs short, suberect; inner prongs twice length of outer prongs, with feeble setaceous tubercule near apex. Caudal notch broad, sides practically straight. Last tooth before urogomphi feeble, as feeble as preceding teeth of which some are practically obscure.

*Type Material:* Material in the California Academy of Science was made available to me by Mr. Leech. Although the type (at CAS) was not examined, there were two paratypes and most of the specimens examined by Dr. Van Dyke at the time of this study. One other paratype at the Smithsonian was seen. The locations of the remaining five paratypes are not known to me. The holotype came from Lake MacDonald, Glacier National Park, Montana, July 7, 1930, and the paratypes from near Eureka, Montana, July 9, 1930.
Distribution: In all, 23 specimens were examined. They have been taken between April 13 through July 11 from the following localities (see map 14):


Status: *M. glacialis* has a number of interesting features. The frontal sulcus is not apparent in other related species, and the broad metacoxal tooth is otherwise known only in the genus *Hypnoidus*. Examination of this tooth shows only the usual features, save for size. If *Margaiostus* has in fact diverged from the main evolutionary line (see section seven), then this tooth was perhaps retained from an earlier ancestor, despite expansion of the metacoxae as a whole. It is, at any rate, a distinct and interesting species.

10. *Margaiostus (Margaiostus) grandicollis* (LeConte, 1863) new combination.


The species is best distinguished by its solid piceous brown color and eastern distribution as compared with the other two North American species. The lack of any medial sulcus on the head and the sparse pronotal punctation also separate it.

♂: Length 8-11 mm; shape oblong, moderately convex; color fulvescent. Surface laevis with faint metallic lustre; head and thorax sparsely pubescent above, denser beneath.

Head: Twice as wide as long, front flat; coarsely but not closely punctate. Antennal scape expanded; pedicel straight, 1/2 length of
3rd, succeeding segments feebly serrate to square 4-10 expanded externally; last segment ovate-oblong. Apical segment of maxillary palpus expanded at base to form right triangle.

**Thorax:** Pronotum twice width of head, length longer than width (6.5/7), sides scarcely arcuate in front of hind angles which are slightly divergent and with short carina. Surface laevis, median line vaguely impressed posteriorly; disc moderately convex; punctuation sparse, more closely so in front of and near front angles; pubescence very sparse; setae flavous, directed caudad. Pleural region moderately, closely, coarsely punctate with finer punctures intermixed; not opaque and distinctly pubescent. Prosternum moderately, coarsely punctate; the lobe moderately prominent, arcuate in front with transverse impression behind; prosternal micro flat. Mesosternum somewhat concave, densely punctate. Metasternum moderately closely punctate with coarse and fine punctures intermixed; pubescence moderate, flavous; hind coxae suddenly dilated internally to form a broad rectangular plate with posterior border, more or less straight to internal posterior corner; ratio of length of second abdominal segment to length of metasternum (1.5/3.5 or .428). Legs rufotestaceous in appearance. Scutellum flat, oblong-oval form, longer than wide (2.5/3.5) with heavy dark border on truncated anterior edge. Elytra slightly wider than prothorax, oblong-oval, widest at middle, humeri obtusely rounded; disc moderately convex with sparsely punctate intervals; pubescence moderately sparse, flavous.

**Abdomen:** Moderately closely punctate with coarse and fine punctures intermixed, the last segment more coarsely so; pubescence flavous and moderately dense.

♂ *genitalia:* Trilobate, parameres freely movable on center piece, moderately straight; penis slender, narrow, somewhat arcuate ventrally, lateral strut length 1/3 of penis length; tegmenite a truncate, oblong plate; widest at apex.

♀: Similar to ♂.

Larvae and ecology are unknown.

**Type Material:** I have seen the type ♀ in the LeConte Cabinet at the Museum of Comparative Zoology, Cambridge, Massachusetts. The type locality is Canadá—not restricted further—. The other specimen in the LeConte Collection is a ♂ of *M. glacialis* Van Dyke and not *M. grandicollis* LeConte as Dr. Horn believed (1891, pág. 5). As this was the only specimen reported from Oregon —where *M. gla-
cialis occurs—, this finding places M. grandicollis LeConte as an entirely Eastern species.

The specimen now identified as the only remaining type of M. grandicollis is labeled as follows: in LeConte’s handwriting “C. grandicollis LeC.”, “Type 2400”. Since two, rather than one specimen, were originally involved in the author’s concept and description of the species, I prefer to designate this remaining type as the lectotype of M. grandicollis.

**Distribution**: Only 10 specimens of this rare species were examined. The labels of some specimens are extremely unsatisfactory as to location. These specimens were collected between April 10 and July 2, localities as follows (see map 15):

**North America**: (No locality). **Canada**: Ontario, in or near Ottawa, Eastview, Beechwood, Ridgeway and Quebec, Fairy Lake, Eastview Hull; Montreal, Ste Foy, Arthabaski. **United States**: St. Louis, Missouri.

**Status**: This well delimited species, the smallest and most convex of the genus, is the only Eastern representative known. It is rare, and doubtless occurs elsewhere in the East than is shown on the accompanying map.

**Mesemiostus** nov. subg.

Type species: *Agriotes magellanicus* Blanchard, 1853. *Voyage de M. Dumont d'Urville au Pole Sud*, t. IV, pág. 90 (Estrecho de Magallanes, Tierra del Fuego, Chile).

This group may be identified by the characters given in the key, and also by the presence of a secondary pile on the abdomen as well as by the features of the ♂ and ♀ genitalia.

**Thorax**: Pronotum with medial setae directed anterio-laterally, lateral setae directed medial-laterally, both meeting halfway from sides, setae along line of meeting and those in canalization tending to be more or less directed anteriorly. Metasternum with wiry, long setae intermixed with denser, closely appressed pile. Scutellum arcuate along anterior edge; pubescence dense and practically niveus.

**Abdomen**: Pubescence of long and wiry setae intermixed with short and largely niveus pile.
8 genitalia: Sides of parameres arcuate in basal half, thence straight to lobes; lateral struts \( \frac{1}{2} \) of total length of parameres.

9 internal genitalia: Bursa copulatrix straight, saclike, moderately broadly joined to vulva; with accessory bursa at terminal end, this end and connection with scleritized areas; scleritized areas covering connection of bursa parts, comb-like plate just above entrance to spermathecal duct.

Type Species: The type species of this genus is here designated as *Agriotodes magellanicus* Blanchard —present designation—.

Status: This new taxon is sufficiently different from the nominate subgenus to warrant erection as a subgenus. It is not a separate genus, since the 8 genitalia do not show differences of a different articulate or structural type, but differ as a group only in shape. The 9 genitalia show far greater modifications from a common ancestor by the partial division of the bursa copulatrix and elaboration of the ancestral plate, but with no difference in function that can be deduced from the morphology. The existence of an expanded first maxillary segment also tend to unite the two groups together, as well as general body shape, size, and general ground color, and other features.

However, the differences in the features cited above, plus a set and unvariable constellation of other correlated characters as given in the description, are such that make necessary the establishment of a recognized taxonomic group to properly maintain the generic concepts that I recognize in this paper. (See Status of the Classification under the subfamily discussion.)

**Key to the Species.**

1. Pronotum about as long as wide; scutellum vaguely carinate; color piceous to fuscous ... ... *magellanicus* (Blanchard, 1853).
   — Pronotum visibly longer than wide; scutellum without carina; color fulvescent ... *andicola* (Fairmaire and Germain, 1860).
11. **Margaiostus (Mesemiostus) magellanicus** (Blanchard, 1853).

(Figs. 31, 42; map 16).


This species may be identified by the piceous to rarely fuscous color; by a vaguely carinate scutellum; and by a pronotum that is about as long as wide.

*$\delta$*: Length 6.5-11.2 mm; shape elongate, broad and flattened; color piceous to fuscous; surface laevis; punctuation moderate to sparse, punctures coarse to moderately impressed; vestiture rufous to niveus, texture moderately wiry.

*Head*: One-third wider than long, less than $\frac{1}{2}$ width of thorax; front flat, border feebly elevated; coarsely, not closely punctate. Antennal scape expanded; pedicel slightly more than $\frac{2}{3}$ as long as third, both cylindrate; fourth to tenth feebly serrate; last segment oblong-oval. Apical segment of maxillary palpus expanded at base, forming a right triangle.

*Thorax*: Pronotum scarcely longer than wide (7.2/7.5), somewhat narrowed in front; sides moderately convergent in anterior two-thirds, widest near base, and scarcely sinuate in front of hind angles, these scarcely divergent, narrow and with a short carina; disc slightly convex, with well impressed median canaliculation near base; surface laevis, moderately punctate; pubescence rufous, medial setae directed anterio-laterally, lateral setae directed medial-laterally, both meeting halfway from sides, setae along line of meeting and those in canaliculation tending to be more or less directed anteriorly. Pleural region very sparcely, coarsely punctate with a few rare and very fine punctures intermixed; surface laevis; prosternal muero scarcely, broadly concave, sides vaguely defined. Metasternum with moderately coarse punctures, intermixed with fine, indistinct, sparse
punctures; pubescence of moderately dense, long, wiry niveus—sometimes flavous—setae, intermixed with a denser, closely appressed pile of short, wiry, and niveus setae; metacoxal plate suddenly dilated internally to form a moderately defined plate of no particular shape; ratio of length of second abdominal segment to length of metasternum (2.5/5.8 or .431). Scutellum flat, with a vague longitudinal median carina; pubescence of closely appressed, fine, niveus—scarce flavous—, and dense setae directed caudad on each side of carina; shape oblong-oval (2.8/3), heavy dark border on arcuate anterior edge. Elytra slightly wider than prothorax, sides arcuate from humeri to near base and gradually rounded to apex; disc slightly convex; striae well impressed and heavily punctate; intervals flat and finely punctured, with two, sometimes three rows of rufous to flavous setae.

Abdomen: Rather sparsely, moderately punctate with finer punctures intermixed; pubescence of long, wiry, flavous to niveus setae intermixed with slightly denser, short, closely appressed, niveus setae.

♂ genitalia: Trilobate, parameres freely movable on penis. Penis moderately slender, almost stout, parameres scarcely shorter than penis, length of lateral strut ½ of penis length.

♀: Similar to ♂.

Larva: Unknown.

Ecology: Dr. and Mrs. Charles W. O'Brien have collected several series of this species under rocks and other shelter in protected spots of nearly barren, wind-swept areas well above the tree line in the mountains.

Type Material: I have not seen any type material of this species. However, I have seen several specimens examined by Candèze, including a specimen of the erstwhile C. fuegensis. The specimens agree in every particular with the original description.

The type locality, based on the published evidence, is restricted to the Estrecho de Magallanes, Tierra del Fuego, Chile.

Distribution: Fifty-three specimens were examined. They come from the following localities (and see map 16). Most specimens were collected between Nov. 17 and Jan. 10.

Argentina: Patagonia. Chile: Magallanes; Tierra del Fuego, Rusphen 30 Km. SE. of Cameron, 20 Km. S. Cameron, Port of Famine, Puerto Puynhnapi; Osorno; Antillanca 4500'; Valdivia; Punta Arenas.
Status:  The features given in the diagnosis and embodied in the description do not leave any doubt about the identity of this species. These characters suggest that the C. fuegensis specimen is, as Fleutiaux says, conspecific with M. magellanicus. In the absence of proof to the contrary, C. fuegensis remains a synonym of M. magellanicus.

It is evident from the synonym that this species was misidentified as to its generic placement. Candèze had listed it in Agriotes, based on the placement by Blanchard, but he had not yet seen a specimen at that time. Fleutiaux, however, did have a specimen from Chevrolet, and had also seen specimens of M. andicola which was correctly placed, forming with M. magellanicus an easily recognized group with the North American forms (which Fleutiaux had also seen).

Six specimens from the British Museum seem to be somewhat paler in color. This feature is at best populational, but the possibility exists that the collector, Charles Darwin, had stored them in alcohol or other preservation which causes bleaching.

12. Margaiostus (Mesemiostus) andicola (Fairmaire and Germain, 1860).

(Fig. 43).


This species may be identified by the fulvescent color, smooth scutellum, and a visibly oblong pronotum.

\[ \delta \]: Length 7.5-9.5 mm; shape elongate, somewhat broad, flattened; color fulvescent, sometimes testaceous to fuscous; laevis; punctation coarse to moderate, densely to sparsely spaced; vestiture lightly flavous to rarely niveus, texture moderately wiry.

Head:  Twice as wide as long, about \( \frac{1}{2} \) width of thorax; front flat, slightly concave mediad, border feebly elevated; coarsely, very closely punctate. Antennal scape expanded; pedicel about 2/3 as long as third, both cylindrate; fourth to tenth feebly serrate; last segment oblong-oval. Apical segment of maxillary palpus expanded at base, forming a right triangle.
Thorax: Pronotum longer than wide (6.5/8.5), very slightly, but surely, narrowed in front; sides very moderately convergent in anterior two-thirds, widest near base, and moderately sinuate in front of hind angles, these moderately divergent, slender, acute, and with a short carina; disc slightly convex, moderately impressed median calalculcation from base almost to apex; surface laevis; moderately punctate; pubescence lightly flavous, medial setae directed anterio-laterally, lateral setae directed medial-laterally, both meeting halfway from sides, setae along line of meeting and those in calcalculcation tending to be more or less directed anteriorly. Pleural region moderately, coarsely punctate, more sparsely so at sides and with a very few finer punctures intermixed, surface laevis; prosternal micro scarcely, if at all, concave, metasternum with moderately coarse punctures intermixed with a few fine indistant punctures; pubescence of moderately dense, long, wiry, flavo-niveus setae, intermixed with a denser, closely appressed pile of short, wiry setae; metacoxal plate suddenly dilated internally to form a moderately defined plate of no particular shape; ratio of length of second abdominal segment to length of metasternum (1.9/4.6 or .413). Scutellum flat; pubescence of closely appressed, fine, niveus, and dense setae, directed lateral-caudad; shape oblong-oval (3.2/3.4), heavy dark border on arcuate anterior edge. Elytra scarcely wider than prothorax, arcuate from humeri to near base and gradually rounded to apex; disc slightly convex; striae well impressed and heavily punctate; intervals rather flat and finely punctured, with two, sometimes three rows of flavous setae.

Abdomen: Rather sparsely, moderately punctate with finer punctures intermixed; pubescence of long, wiry, flavous setae intermixed near median line with short, closely appressed, somewhat niveus setae. 

♂ genitalia: Trilobate, parameres freely movable on penis. Penis scarcely slender, almost stout; parameres scarcely shorter than penis, length of lateral strut 1/2 of penis length.

♀: Unknown.

Larva: Unknown.

Ecology/Habitat: I suspect this species also inhabits the south-temperate rain forests.

Type Material: From the Candèze collection, Belgium, I have had the pleasure of seeing two original types that Candèze had acquired. Inasmuch as these are types, I here proceed to describe the

**Discussion**: Since these two specimens are from the original type series, and since Fairmaire and Germain did not designate any specific type as type specimen of the species, I do so here; naming the first specimen described above as a lectotype, and the second specimen as a paralectotype.

The type locality is Chile —Not restricted further—.

**Distribution**: Only the two type specimens were seen, both —as stated above— known only from Chile, probably from southern Chile, since the notion, "Mg" may refer to the Magallanes.

**Status**: This species is so sharply distinguished from its relative *M. magellanicus*, as given in the diagnosis and description, that there is no question about its identity.

**Hypolithus** (Eschscholtz, 1829).


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This genus is readily distinguished in North America by the short metasternum; convex shape; transversely oblong scutellum; wings reduced to veinless, membranous stubs; male aedeagus; and habitat on North Pacific Beaches.

♂: Length 7-11.5 mm; shape robust, greatly to moderately convex; color from flavo-testaceous to fusco-piceous; scarcely shining; coarsely to sparsely punctate; vestiture fulvous to flavous.

Head: Twice as wide as long, front flat. Antennal segments 6-10 as broad as long. Apical segment of maxillary palpus elongate oval, obliquely truncate at apex.

Thorax: Pronotum nearly twice as wide as head, wider than long, sides arcuate, sometimes with band of lighter color along sides, disc sparsely to moderately punctate. Pleural region usually of same color as pronotal sides. Mesosternum slightly convex; mesepimeron produced to mesocoxal cavity, usually cutting off mesepisternum from cavity—except in one species—. Metasternum short, only slightly longer than second abdominal segment; metacoxal plate gradually dilated internally from halfway point to median line. Scutellum flat, heavy dark border on truncated anterior edge, shape rectangular, wider than long. Elytra wider than prothorax, oval and decidedly convex; striate. Wings vestigial, membranous, and present only as flaps.

♀ genitalia: Trilobate, parameres free, movable on penis. Penis a wide median lobe, gradually narrowing to apex, lateral struts broad and slightly curving mediad, median strut broad and tapering to base, parameres arcuate to straight, penis trough from base to near lobe.
articulate to median strut almost at base, lobes flattened, produced laterally to form strong, broad tooth.

♀: Genitalia saccular. Bursa copulatrix straight, saclike with secondary sac at end, narrowly joined to vulva, plates completely absent. Colleterial glands very large, each larger than bursa copulatrix, saclike and located on opposite sides of bursa copulatrix. Thin, narrow, and elongate accessory gland at end of secondary bursa copulatrix. Two diverticula of the spermathecal duct present, both at base of spermathecal duct.

Larva: Shape cylindrical, elongate, somewhat flattened. Generally large (10-14 mm). Color uniform (?), generally dark infuscated to light reddish-brown.

Head: Posterioroepicranial setae present or absent; posterior lobe of frontoclypeal region either strongly acuminate or abruptly truncate. Nasale either tridentate with lateral denticles directed forward or broadly unidentate. Labial palpus without setae on basal segment.

Abdomen: Last tooth before urogomphi moderate in size at best, some preceding teeth more prominent, others more obscure.

Ecology/Habitat: For North America, the single representative is found along the seashore, under debris.

The type species of this Genus is Hypolithus littoralis Esch., so designated by Hyslop in 1921.

Status: The other species occur only in Japan, and H. littoralis has apparently spread around the rim of the Northern Pacific. There are many endemic sub-species on these islands.

I have elected to retain this genus as recognized by the workers in this area, especially Ohira, Miwa, and Nakane. This recognition is based on the features of the ♀ genitalia, and the presence of a greatly shortened metasternum, convex body shape, and restricted habitats. Such a complex of important characters is sufficient for recognition of a genus, as the generic concept is understood in this paper. For further discussion on the group, see section 11 under Hypolithus, concerning the status of H. littoralis; as well as the status discussed below.
13. **Hypolithus littoralis** (Eschscholtz, 1829).

(Figs. 5, 21a, 26g, 44; map 17).


This species is unique in North America, having vestigial wings; short metasternum; convex shape; stout spinulose tibiae; and in its habitat on the beaches of Alaska and outlying islands.

 español

**: Length 8-9 mm; shape, robust, convex; color fuscous or darker ferruginous, flavo-testaceous on sides of thorax and elytra; scarcely shining; coarsely to sparsely punctate; vestiture fulvous to flavous.

**Head**: Twice as wide as long, frons flat; sparsely, rather coarsely punctate. Antennal scape expanded; pedicel rather stout; 6th to 10th as broad as long; last segment oblong-oval. Apical segment of maxillary palpus elongate oval, obliquely truncate at apex.

**Thorax**: Pronotum nearly twice as wide as head (5/8.5), wider than long (7/8.5); sides flavo-testaceous, arcuate, sinuate in front of hind angles, these acute and feebly divergent, with short but well marked carina; disc sparsely punctate, basal margin without trace of incisure; pubescence wavy but short, flavous, directed more or less caudal.

Prosternal mucro flat between procoxae, rather suddenly declivous just behind procoxae, and thence flat posteriorly. Mesosternum slightly convex; sparsely punctate; fulvo-pubescent; open to coxal
cavity. Mesepimeron produced to mesocoxal cavity. Metasternum short, only slightly longer than 2nd abdominal segment; ratio of length of second abdominal segment to length of metasternum (2.3/3.18 or .606); Metacoxal plate gradually dilated internally from halfway point to median line. Legs flavo-testaceous; the tibia stout, outer side beset with short spinules, spurs distinct. Scutellum flat, heavy dark border on truncated anterior edge, shape rectangular, wider than long (3.75/5.33). Elytra appreciatively wider than prothorax; humeri oval, obliquely rounded; disc rather deeply striate, these not punctate; intervals convex and sparsely punctate near base, gradually becoming granulate towards the apex; fulvo-pubescent. Wings vestigial and reduced to membraneous rectangular flaps.

**Abdomen:** Sparsely punctate except on last ventral segment which is quite rugose. Fifth sternum usually slightly produced posteriorly and sometimes emarginate.

*♀ genitalia:* Trilobate; parameres movable on penis. Penis a wide median piece gradually narrowing to apex with apex slightly lobed; lateral struts broad and slightly curving mediad. Median strut broad and pointed at base. Parameres straight from base to lobe, penis trough from base to near lobe, movable on penis almost at base; lobes flattened, produced laterally to form a strong, broad tooth. Pars basalis concave, V-shaped, with V-shaped emargination. Tegmenite a septagon shape with notch between posterior sides, three sides anteriorly.

♀: Length 9-11.5 mm; otherwise similar.

**Larva:** Shape cylindrical, elongate, somewhat flattened, length 10.7-12.5 mm, width 1.9 mm —last stages—. Uniformly light to dark reddish-brown.

**Head:** Fairly flat dorsally, moderately arcuate ventrally. Posterioroepicranial setae absent; posterior lobe of frons-clypeal region initially acuminate, then abruptly truncate at greatly inflexed posterior border of head. Nasale narrow, tridentate in early instars, all denticles directed forward, later instars showing a blunt, moderately broad lobe —erosion—; subnasale a smooth lunate ridge beneath nasale. Galea with five moderate and subequal setae surrounding apex; labial palpus without setae on basal segment.

**Thorax:** Mediotergite of metathorax —left side— with five setae increasing in size from minute to moderate mediolateral along anterior edge; one minute, a pair of one long and one small, and one moderate
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seta mediolaterad along posterior border; and with a paired long and moderate seta on lateral border.

Abdomen: Urogomphi prongs of ninth abdominal segment equal in size; outer prongs suberect; inner prongs same length as outer prongs, with moderate setaceous tubercule near base. Caudal notch broad and shallow —less so in early instars—, sides somewhat narrowing towards end. Last tooth before urogomphi moderate in size at best, same preceding teeth more prominent, others nearly obscure.

Ecology/Habitat: Both adults and larvae are to be found under driftwood and other debris on the North Pacific beaches where the life-cycle is apparently completed. They are probably scavengers.

Type Material: I have not seen any types, but the numerous specimens I have seen agree perfectly with the unique characteristics put forth by the literature so that there is little question as to the identity of the species.

The type locality is Kamschatkae, U. S. S. R. —not restricted further—.

Distribution: Two hundred and fifty-three specimens were examined. They have been taken between April 30 and August 4. The larva, which appear to be one of the final stages before the pupa, were taken on the 30th of May. Examined specimens came from the following localities (see map 17):

ALASKA: Adak Is.; Akutan; Aleutian Islands; Ambor, Unalaska; Cold Bay, Alaska Penins; Kenai; Kodiak; Kukak Bay; Homer Spit, Homer; Nazan Bay, Atka; Nicoley; St. Paul's Island; Sitka.

Status: This species is remarkably distinct. There are no evident variations in the nominate subspecies. I have not seen the Japanese subspecies, but it is said to differ in the following respects:

1. Pronotum broader —usually broader than long—.
2. Disc of pronotum more densely punctured.
3. Nodule-like tubercles on posterior halves of elytra more sparsely and indistinctly set.

I cannot agree with Ohira on the first characteristic, inasmuch as the thorax of the nominate subspecies is also broader than long. A comparison of his drawing the nominate H. littoralis shows the thorax of convexum to be noticeably more arcuate on the sides. The first
antennal segments of his drawing also appear to be more slender than in specimens of *H. littoralis littoralis*.

The very interesting open mesocoxal cavity in this species would seem to be a secondary characteristic derived in consequence of its specialization, as are other features of this remarkable animal. Close comparison of the *arrangement* of the mesocoxal plates to the other species in the subfamily demonstrate their similarities, in comparison to that of *Ctenicera latus* F., which (also see status under *Hypolithus* in section 11) belongs to the *Ludias aeripennis* group whose larvae seems superficially similar.

**Hypnoidus** (Dillwyn, 1829).


**Type species:** *Elater riparius* Fabricius, 1792. *Ent. Syst.*, t. I, pág. 232 (Europa) (designed by Westwood in 1840).
This genus can be separated on the basis of the \( \delta \) genitalia, the stout scarcely divergent hind angles of the thorax, acutely triangulate apical segment of the maxillary palpus, and the oblong, moderately convex shape.

\( \delta \) : Length 4-8.5 mm; moderately convex; color piceous to lightly flavous; usually lucidus; punctuation various; vestiture rubineous, flavous, or niveus, sometimes scale-like.

**Head:** Twice as wide as long, frons flat; punctuation various. Antennal scape expanded; pedicel various; 3rd to 10th segments feebly serrate; last segment ovate-oblong. Apical segment of maxillary palpus expanded 1/2 distance from base, forming an acute triangle.

**Thorax:** Pronotum about twice width of head; sides always arcuate, sometimes subangulate anteriorly; disc feebly convex, basal incisures distinct; punctuation moderate to sparse, rarely dense and rugous; surface usually lucidus; pubescence various but usually rubineous to flavous, rarely niveus. Metasternum with large scattered punctures among finer and more numerous smaller punctures; hind coxal plate suddenly dilated internally and very slightly narrowing again mediad to form a vague and broad tooth. Scutellum flat and oblong-oval with heavy dark border on truncated anterior edge. Elytra slightly wider than prothorax, humeri oblique, sides feebly arcuate, disc slightly convex, wings normal for subfamily.

\( \delta \) **genitalia:** Trilobate; parameres movable on center piece. Penis moderately wide and gradually narrowing to apex; apex surpassing parameres; lateral struts short and curving slightly mediad, very small; broad median strut. Parameres straight or curved to lobe, penis trough extending from base almost to apex; lobes flattened and strongly arcuate outward, when present. Pars basalis concave, V-shaped emargination. Tegmenite a squared or oblong plate.

\( \Omega \) **genitalia:** Saccular. Bursa copulatrix straight, saclike, secondary sac at end and narrowly joined to vulva; plates absent. Colleterial glands very large, each larger than bursa copulatrix; saclike and located on opposite sides of bursa copulatrix. Accessory gland present as a thin, narrow, elongate gland at end of secondary bursa copulatrix. Two slender diverticulums of the spermathecal duct located at base of duct.

**Larva:** Shape cylindrical, elongate, somewhat flattened. Usually
small, but sometimes rather elongate (4-14 mm). Color always a uniform shade, usually flavous, rarely reddish-brown.

**Head**: Posterioepicranial setae present; posterior lobe of frontoclypeal region obese at apex (one exception). Nasale moderately broad, tridentate, lateral denticles more or less divergent. Labial palpus without setae on basal segment.

**Abdomen**: Last tooth before urogomphi moderately prominent, preceding teeth generally subequal in size.

**Ecology/Habitat**: This genus appears to have a very extensive range, and is found in a great variety of situations. Chief among these are (1) high mountains to the arctic circle; alpine and tundra lands; (2) grasslands and woodlands of Northern and Northwestern areas; (3) warmer woods and fields as found in Indiana or the Redwoods of California.

**Food**: Of adult: Adults appear to subsist on various herbaceous plants and one species from India occurs (?) in rotten pine wood.

Of larva: Known larvae subsist on the roots of various grasses such as wheat, perhaps also on larva of maggots of other insects, notably **Diptera**.

The type species of this genus is *Elater riparius* F. and was so designated by Westwood in 1840.

**Status**: Examination of the included species has shown them to be readily distinct taxa. The discovery of *H. leei*, the recognition of *H. rivularius* in N. America, and the separation of *H. bicolor* from *H. nocturnus* have eliminated the earlier difficulties of identification.

This is the largest and most active genus, and is in the main stream of evolutionary descent as indicated by its general, non-specialized aedeagus, its profuse adaptability, numbers, wide range, and several subgroups throughout the world. It constitutes the third great radiation of the *Hypnoidinae*, with origins in Central Asia. This new development has largely replaced the older genera in Eurasia, and is more recently replacing the North American genera. Eventually, it may diverge—as did the older groups—into a number of distinct genera (*Hypolithus* is an early offshoot) that promises to have a wide range and reach into most corners of the world. (See also Biogeographical History.)
### Chart 12.

**Hypnoidus - Summary of characters - North America.**

<table>
<thead>
<tr>
<th></th>
<th>abbreviatius</th>
<th>impressicollis</th>
<th>squalidus</th>
<th>riparius</th>
<th>bicolor</th>
<th>rivularius</th>
<th>nocturnus</th>
<th>leci</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thorax shape.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>B</td>
<td>Sides arcuate.</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>Arcuate regular.</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td><strong>Thorax pubescence.</strong></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>A</td>
<td>Fine arrangement regular.</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
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<tr>
<td><strong>Thorax punctuation.</strong></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>A</td>
<td>Opaque.</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td><strong>Antennal segments.</strong></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>A</td>
<td>Pedicel ½ length of 3rd</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td><strong>Scutellum.</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>A</td>
<td>Pubescence dense, scale-like.</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td><strong>Striae of elytra.</strong></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>A</td>
<td>Punctate.</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td><strong>Pubescence of abdomen.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>Fine.</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td><strong>Size.</strong></td>
<td>5.25-6.5 mm (M).</td>
<td>5-6 mm (L).</td>
<td>7.2-8.5 mm (M).</td>
<td>5.25-6.5 mm (M).</td>
<td>4-6 mm (S).</td>
<td>4-6 mm (S).</td>
<td>6-8 mm (L).</td>
<td>6-8 mm (L).</td>
</tr>
</tbody>
</table>
The features of the ♂ genitalia and other characters of the diagnosis and description, plus the obvious evolutionary and ecological cohesion of this large group make Hypnoidus a well-defined and acceptable generic taxon.

**Key to the Species.**

1. Body opaque; thorax coarsely and closely punctate, rugose ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 
   - Body shining; thorax more sparsely punctate, smooth ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 2.
2. Scutellum conspicuously clothed with pale pubescence, that of the elytra somewhat scale-like ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 3.
   - Scutellum sparsely punctate and smooth, pubescence sparse on scutellum and body, not scale-like ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 4.
3. Pronotum narrowed in front in its apical two-thirds; sides often obtusely subangulate in front of the angular sinuation (fig. 9) ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...  ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ......
Dorsal setae lying transversely as well as parallel, usually crisscrossing with each other along median of thorax; more erect, fine, and longer in appearance, laterally niveus (fig. 13) ... ... ... ... ... ... ... ... bicolor (Eschscholtz, 1829).

Key to the Larvae 1.

1. Inner prongs of urogomphi subequal to outer prongs (fig. 26a) ... ... ... ... ... ... ... ... ... ... ... ... 2.
— Inner prongs of urogomphi longer than outer prongs (fig. 26b) ... ... ... ... ... ... ... ... ... ... ... ... 3.

2. Galea with only one prominent seta (i.e., fig. 23b) ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... abbreviated (Say, 1823).
— Galea with five to seven prominent setae (fig. 23c) ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... impressicollis (Mannerheim, 1853).

3. Caudal notch narrowly V-shaped (fig. 26b) ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... rivularius (Gyllenhal, 1827).
— Caudal notch broadly U-shaped (fig. 26c) ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 4.

4. Subnasale with seven denticles (fig. 24f) 2 ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... squalidus (LeConte, 1853).
— Subnasale with 3-4 denticles ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 5.

5. Head wedge-shaped, venter flat when viewed from side (fig. 21f); terminal seta of galea shorter than last segment; subnasale with four denticles ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... leei Stibick, 1968.
— Head gently arcuate beneath (fig. 21g) ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 6.

6. Terminal seta of galea longer than last segment; subnasale with four denticles (fig. 23a) 3 ... ... ... ... riparius (Fabricius, 1792).
— Terminal seta of galea shorter than last segment; subnasale with three denticles (fig. 23b) ... ... ... bicolor (Eschscholtz, 1829).

1 The larval form of nocturnus Eschscholtz is unknown to me. It is found in our Pacific States and may be expected to go to couplets 5 or 6 in this Key.
2 The subnasale teeth are sometimes absent through erosion, but the remaining bases can usually still be counted.
3 riparius is generally larger (7.8-9.8 mm vs 4.8-8.4 mm), and a pale yellow to white color; bicolor is smaller and a darker shade of yellow. But these features may be ambiguous.
14. Hypnoidus riparius (Fabricius, 1792).

(Figs. 23a, 45).


This species is readily separated from all others in N. America by the relative absence of punctation in the elytral striae; and by a rather suddenly declivous pronotum.

Description and synonymy is given in section eleven on the Eurasian *Hypnoidinae*.

*Distribution*: If at all in North America, in Greenland, Nova Scotia, and perhaps the polar regions, where plant life may be found.

*Discussion*: I have seen four specimens of *H. riparius*, purportedly from Greenland, that are in the cabinets of the British Museum. These specimens are labeled “Coll. Jansen, Ex. Laferte”, and “C. riparius, Grönland”. Candèze (1860), in his discussion about *H. riparius* noted, “Elle se rencontre également dans les terres polaires de ‘11’ Amerique septentrionale”. Horn (1891), noted Candèze’s record, but stated that he had not seen any specimens that could be referred to *H. riparius*. Schenkling (1925), listed *H. riparius* among the North American species, but with the note, “Siehe palaarktische Arten!” Henrichsen (1939) did not list any *Elateridae* in his list of the insects of Greenland. At any rate, Lindroth (1968) shows that while natural invasion of the North American Continent from Greenland is highly unlikely, Greenland itself is subject to invasion from Europe, especially be way of Iceland where *H. riparius* does occur.

However a number of specimens, 3 larvae, 2 ♀♀, have been intercepted on ships from Europe (Stibick, 1969). Transportation apparently is providing this species with a chance for establishment (see Eidt, 1953). For the moment, *H. riparius* appears to be restricted to the palearctic region and I am not including it in the North American fauna. It should also be noted that the extensive arctic and subarctic collections at the Canadian National Collection, Ottawa, Canada, does not contain any specimens of *H. riparius*. The inclusion in the key and subsequent diagnosis is to aid in identification of any possible specimens; these perhaps associated with *H. nocturnus*, *H. leei*, *H. bicolor*, or *H. rivularius*. There is, however, no doubt as to the identity of the species in the specimens before me.
15. **Hypnoidus squalidus** (LeConte, 1853).

(Figs. 21 e, 24 f, 46; map 18).


This interesting species is readily distinguished by the sparsely-scattered scale-like setae on the venter of the abdomen, and a rather opaque, rugose, and closely punctate thorax.

♀: Length 7.2-8.5 mm; shape oblong, semi-flattened; color piceous black to rufous; surface opaque to scarcely shiny; densely punctured; pronotum rugous; vestiture piceous to flavous.

**Head**: Twice as wide as long, front flat; coarsely, not closely punctate. Antennal scape expanded; pedicel 1/2 length of 3rd; 4th-10th feebly serrate, longer than wide; last segment oblong-ovate and obliquely truncate at apex. Apical segment of maxillary palpus expanded 1/2 distance from base, forming an acute triangle.

**Thorax**: Pronotum twice as wide as head, wider than long (5.9/7) along median length, distinctly narrowed in front; sides regularly arcuate, sinuate in front of the hind angles, these slightly divergent, acute and distinctly carinate; disc feebly convex; with distinct basal incisures; longitudinally strigose, moderately, closely, but not densely punctate; pubescence piceous to rufous, setae directed caudad. Pleural region scarcely shining to opaque; coarsely, sparsely punctate and distinctly pubescent. Prosternal lobe long, apex feebly beaded; prosternal macro shallowly concave, vague median canalization usually evident, surface micro-reticulate. Metasternum sparsely, coarsely punctate with extremely fine punctuation between; pubescence of pale fuscous, fine setae intermixed with scale-like, flavous setae; ratio of length of second abdominal segment to metasternum (1.8/4.5 or .400). Scutellum flat, oblong-oval form (2.5/3), heavy dark border on truncated anterior edge. Elytra slightly wider posteriorly than thorax,
humeri oblique, sides feebly arcuate; disc subdepressed; striae punctured, more closely so at sides, especially near humeri; intervals flat and rather closely punctate.

Abdomen: Sparsely, coarsely punctate, with extremely fine punctuation between; pubescence pale fuscous, fine, with intermixed scale-like, flavous setae.

♂ genitalia: Trilobate, parameres freely movable on penis, parameres straight; lobes variable but usually present; if present, small and flat. Tegmenite, a rectangular plate, slightly longer than broad.

♀: Similar to ♂.

Larva: Shape cylindrical, elongate, somewhat flattened, length 11.15 mm, width 1.55 mm —last stages—. Uniformly flavous.

Head: Fairly flat dorsally, arcuate ventrally. Posterior epicranial setae present; posterior lobe of frontoclypeal region broadly acuminate to apex. Nasale moderately broad, tridentate, lateral denticles more or less divergent, strong median denticle directed forward; subnasale with eight denticles in a broadly lunate arrangement. Galea with one prominent apical seta shorter than last segment and three accessory setae surrounding apex; labial palpus without setae on basal segment.

Thorax: Mediotergite of metathorax —left side— with one intermediate, one minute, and two more intermediate setae mediolaterad along anterior border; two pairs of one short and one long seta along posterior border; and one long seta on lateral border.

Abdomen: Urogomphi prongs of ninth abdominal segment unequal; outer prongs short, erect; inner prongs somewhat less than twice as long as outer prongs, obscure setaceous tubercule near apex. Caudal notch moderate in size, U-shaped, sides straight. Last tooth before urogomphi moderate in size, preceding teeth subequal in size.

Ecology: There is evidence that *H. squalidus* may be occupying a roughly similar ecological niche to *Ligmargus funebris*, perhaps competitively. Specimens have been taken along with *L. funebris*, and it may be that *Hypnoidus* is replacing the other, older genera in North America, as it seems to have done in Eurasia. This, however, appears to be the first time —in the *Hypnoidinae*— such a replacement is being accomplished by the convergent development of morphological features; to a degree where even experts are confounded (see Lane, 1966, also see sections seven and eight of this paper). Even the larva, with a somewhat tapered lobe to the frontoclypeal region
is surprising. But it also possesses a non-setosus labial palpus, and
the lobe is not the same as those of the other genera.

_Type Material:_ I have examined the type in the LeConte collection at the Museum of Comparative Zoology, Cambridge, Mass. This type has the following labels: in LeConte's handwriting "Cryp-
tohypnus squalidus, S. Jose, Lec.", "Type 2403", and a gold LeConte locality label. There are also seven other specimens next to it, all labeled "squalidus" (2-8). But these are not types, for the locality labels state "Cal." or "W. T.". As the first specimen is a type and is specifically mentioned as a single specimen in LeConte's original description, I have placed a holotype label on it to indicate its identity.

The type locality is more clearly stated as San Jose, California—not further restricted—.

_Distribution:_ One hundred and eighty specimens were examined. They have been taken between April 23 through October from the following locations (see map 18):

_British Columbia:_ Cowichan Lake; Duncan; Edgewood; Fernie; Indian River; Lavington; Quamichan Lake; Spious Creek; Soldier Rd.; Victoria, Vancouver; Garibaldi; Kamloops. _California:_ Alamedo Co.; Atascadero, S. L. Obispo Co.; Ben Lomond; Berkeley; Blair's Ranch, Redwood Creek, Humbolt County; Big Sur, Monterey Co.; Brittt. Springs; Butte Meadow, Butte Co.; Canyonville; Castle Crag; Del Norte Co.; Duan Mills, Sonoma Co.; Fairfax, Marin Co.; Franklin Lake, Tulare Co.; Gilroy Hot Springs; Guerneville; Lagunitas, Marin Co.; Lake Co.; Lake Tahoe, El Dorado Co.; Licking Fork; Los Angeles; Los Gatos, Santa Cruz Co.; Los Gatos, Santa Clara Co.; Mendocino Co.; Mill Valley; Mokel Hill; Napa Co.; Niles Canyon; Pasadena; Sacramento Co.; Siskiyou Co.; Sonol; Sonora Pass, Mono Co.; Strawberry Valley, Eldorado Co.; Summit; Sunal; Tassajara, Monterey Co.; Trinity Co.; Pom Mts.; Mark West Sp.; Walnut Creek; Willow Creek, Humboldt Co.; Yakima Ind. Res. _Idaho:_ Coeur d'Alene, Kootena Co. _Montana:_ Crescent Lake; Easton; Eureka; Glacier National Park; Lake St. Mary, Glacier Nat. Pk.; LaSalle, Flathead Co.; Lostine River; Rexford. _Oregon:_ Canyonsville; Cottonwood Creek, Blue Mts.; Dead Indian Soda Springs, Jackson Co.; Elk Creek, Cascade Mts.; Humbug St. Rd.-Brush Creek, Curry co.; Mary's Peak; Pine Creek, Baker; Richland, Baker Co.; Rock Creek; Sand Creek, Mt. Hood; Spring Creek, Jefferson Co.; Vine Creek. _Washington:_ Adams
Chapparal Creek; American River; Crescent Lake, Easton; Dayton; Guler; Hell's Crossing; Index; Kooskooskie, Walla Walla; Lake Cleelum; Leavenworth, Chelan Co.; Longmire, Rainier Nat. Pk.; Mill Creek, Walla Walla; Monroe; Mount Adams; Port Angles; Renton; Riggins; Seattle; Snoqualmie Falls, King Co.; Snoqualmie Pass; Walla Walla; Yakima, Yakima Co. Wyoming: Yellowstone Park.


**Status:** The large size, rugose pronotum, and rather flattened body is a unique combination in the genus.

**Discussion:** I have examined some noticeable variations within this species, but these do not seem to be consistent with other noticeable features, either morphological or by locality. Four groups were separated which differ from the description in some particular. The specimens have been labeled by group and are deposited in the U. S. National Museum.

**Chart 13.**
**Variation in H. squalidus.**

<table>
<thead>
<tr>
<th>Group</th>
<th>Characteristic</th>
<th>Number</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>Setae, stiff, suberect and black in color.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Body yellowish-red in color.</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Absence of red setae.</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>Thorax only slightly rugose, striate, and with copper taint.</td>
<td>7</td>
</tr>
</tbody>
</table>

16. **Hypnoidus bicolor** (Eschscholtz, 1829).

(Figs. 13, 21 b, 21 g, 22 a, 23 b, 26 c, 47; map 19).


Hypolithus vestitus (Mann.).—Schödte, 1865. *Naturhist. Tidsskr.*, 3rd series, pág. 79.

Hypolithus fallax (Mann.).—Schödte, 1865. *Naturhist. Tidsskr.*, 3rd series, pág. 79.

Hypolithus limbatus (Mann.).—Schödte, 1865. *Naturhist. Tidsskr.*, 3rd series, pág. 79.

Hypolithus scarificatus (Mann.).—Schödte, 1865. *Naturhist. Tidsskr.*, 3rd series, pág. 79.

Hypolithus picesens (LeC.).—Schödte, 1865. *Naturhist. Tidsskr.*, 3rd series, pág. 79.


Hypnoidus (Hypnoidus) nocturnus var. bicolor (Esch.).—Schenkling, 1925. *In Junk, I, Col. Cat.*, Berlin, núm. 80, pág. 28.


The scarcely pubescent and sparsely punctate scutellum, the transversely directed, laterally niveus setae of the pronotum, and the small size (6 mm or less) serve to separate this species.

♂ : Length 4-6 mm; shape oblong, moderately convex; color variable but usually bicolored between a piceous pronotum to fuscous or flavous elsewhere; coarsely, but not closely punctate; laevis; vestiture flavous to niveus, texture wiry.

*Head*: Twice as wide as long, almost ½ width of thorax; front flat, border feebly elevated; coarsely, not closely punctate. Antennal scape expanded, pedicel ½ length of third; fourth to tenth feebly serrate, last segment ovate-oblong. Apical segment of maxillary palpus expanded halfway from base, forming an acute triangle.
Thorax: Pronotum slightly wider than long (4/4.5), slightly narrowed in front; sides arcuate and widest at middle, a slight sinuation in front of hind angles, these feebly everted and carinate; disc moderately convex, median impression feeble; moderately punctate; pubescence sparse to dense, long and wiry, variably niveus laterally to median impression, otherwise flavous; setae usually crossing over at median impression or directed caudad and then mediad. Pleural region opaque, closely and very finely punctate with coarser punctures intermixed. Prosternal lobe moderately prominent, punctuation moderate; prosternal mucro usually flat, rarely, vaguely concave, surface feebly micro-reticulate. Metasternum with fine indistinct punctures intermixed with slightly larger punctures; ratio of length of second abdominal segment to length of metasternum (1/2.5 or .400). Scutellum flat, oblong-oval form (1.7/2.2), heavy dark border on truncated anterior edge; scarcely pubescent with fine wiry setae; sparsely punctate. Elytra wider at middle than thorax, oblong, humeri obtusely rounded; striae punctate; intervals flat and sparsely punctate; pubescence fine and flavous.

Abdomen: Piceous to flavous; punctures fine and indistinct, intermixed with slightly larger punctures.

♀ genitalia: Trilobate; parameres freely movable on penis. Parameres short and stubby, with ratio of width to length (1/5); lobes present and prominent.

♂: Similar to ♀.

Larva: Shape cylindrical, elongate, somewhat flattened, length 4.8-8.4 mm, width 1.2 mm —last stages—. Uniformly flavous.

Head: Moderately arcuate both dorsally and ventrally. Posteroepicranial setae present; posterior lobe of frontoclypeal region obese at apex. Nasale moderately broad, tridentate, lateral denticles more or less divergent, strong median denticle directed forward; subnasale with three denticles in a narrowly lunate arrangement. Galea with one prominent apical seta shorter than last segment and three-four accessory setae surrounding apex; labial palpus without setae on basal segment.

Thorax: Mediotergite of metathorax —left side— with five minute to intermediate setae increasing in size mediolaterad along anterior border; one minute, and two pairs of one minute and one long seta mediolaterad along posterior border; and one long seta on lateral border.
Abdomen: Urogenomphi prongs of ninth abdominal segment unequal; outer prongs short, erect; inner prongs three times length of outer prongs, tubercule near apex obsolete. Caudal notch moderately broad, U-shaped, sides straight. Last tooth before urogenomphi moderately prominent, preceding teeth subequal in size.

Note: A detailed morphological study of this larva is given in Arnason (1931, M.S. thesis), under the name Cryptohypnus nocturnus Eschscholtz.

Ecology: This species has one of the widest ranges and distribution of any of the known species of Hypnidae. It is an important pest of wheats and other farm crops in the great prairie regions, where the larvae feed on the roots while the adults consume, with little damage, the fruit. In natural areas both larvae and adults are found on grass, and for the adult, under rocks or dung in clearings.

Zacharuk (1958, pág. 567) notes that two forms of H. bicolor occur in Saskatchewan, one bisexual, the other parthenogenetic. The following three paragraphs are condensed from his paper.

About 2,000 beetles were collected near White Fox from hibernation cells in the soil of native sod, summer-fallow, and crop during frostfree periods. All were ♀♀, as were those reared from larvae in the area. 300 beetles from near Meadow Lake and in other small collections were also ♀♀. ♀♀, collected in May near White Fox, laid eggs which hatched into more ♀♀. These, after four months, laid viable eggs without mating.

Beetles from near Saskatoon, Rosthern, and Cochin had a 1.1 sex ratio. These were observed to mate. No apparent morphological differences from the parthenogenetic forms were noted.

Between the two areas is a zone of intergradation where ♀♀ outnumber ♂♂. Parthenogenetic forms were usually associated with the Punget Sound wireworm, Ctenicera aeripennis aeripennis (Kby.), and the bisexual form with the prairie grain wireworm, C. destructor Brown.

In 1962, Zacharuk discussed the temperature, moisture and food requirements of several Elaterid larvae, including H. bicolor. H. bicolor larvae apparently do not survive above temperatures of 98° C; showing a preference for low temperatures (median 64° F). They prefer moist soils (preference, 19.4-22.8 % moisture content); and eat at only 10% the rate of some other known species. Peaks of feeding activity comes in early June and August on wheat seeds placed
in the soil. Beetles from Alberta, near Lethbridge, also demonstrate an intergrading form. All the evidence suggests that the parthenogenetic form occurs in the Montane forest Region —grey-soil forest zone—, the bisexual form in the Grassland formation, and the intergrading form in the western portion of the grassland.

Zacharuk —personal correspondence— gives the life cycle as follows: egg state 14 days; larval stage 5 months —minimum—; pupal stage 10-15 days —after short prepupal stage—. The number of larval instars is unknown. Adults overwinter in pupal soil cells with larval and pupal exuviae, emerging in April or May to lay eggs. Larvae may develop to prepupae in one season, but usually two or more years are needed in northern areas; giving an average life span of three years, with a minimum of two years.

Another interesting study was reported by Burrage (1963). Potatoes were used to compare feeding rates of *H. bicolor* larvae to *Ctenicera destructor* (Brown) larvae. The *H. bicolor* larvae accounted for only 2% of the destruction, even though they constituted 25% in number of specimens. —Although he separated the larvae on the basis of small, medium, and large; it is possible that total biomass for each species might give a partial explanation for this divergence in results—. There were three peaks of tunneling, in June, July, and especially August, falling off thereafter. The cycles were explained on a basis of temperature and moisture, secondarily modified by past and present food consumption. Burrage concludes that summer fallow be kept free of green growth in June and July to starve the larvae.

Wilkinson (1963) indicated a larval preference for loam soils in British Columbia. Populations were said to be usually low, but "moderate damage" to cultivated land could occur. By comparison, Brooks (1960) states that the species is common throughout Alberta, Saskatchewan, and Manitoba, and that it is considered "one of the most destructive garden and field crop species".

Doane (1963) conducted a study on dispersal of marked adults of *H. bicolor* and another species. By releasing specimens from a common center and trapping them at various distances from the center on a time plan, he was able to obtain 3% of 475 ♂♂ and 2% of 1,852 ♀♀. They were trapped at distances up to 60 yards in a minimum time period of six days. Flight was the instrument of disper-
sal, and apparently correlated with weather rather than oviposition. Wind was responsible for direction of flight in only one case.

Zacharuk again, in 1959 discussed abnormalities in some Elateridae, including *H. bicolor*. Prothelely in 12 larvae was observed, but he ascribed this to laboratory effects, i.e., reared in soil they do not inhabit in nature, or in soil abnormally saline from additions of tap water. Of much greater import was abnormal ecdysis caused by molting in nearly air-dry soil. While the old cuticle split normally along the dorsal mid-line, it still encased the ninth segment. This segment was consequently deformed, being wrinkled, smaller, and more rounded than is normal, with deflexion of the urogomphi. All *H. bicolor* larvae were unable to free themselves of the exuviae and died. This report gives at least one reason for the absence of the Hypnoidinae from normally dry areas.

It should be noted that this is the only species in which sufficient material was available to show any particular population concentration; that in Canada's central grasslands. This concentration probably extends throughout the adjacent American grain states; but lack of adequate collecting prevents any definition of southern boundaries.

Finally, mention should be made of one record of a larva entering the United States from Canada by ship: ex. Canada, Hoboken, N. J., V-4-44, 12181, in *Lilium* bulbs (lily, fam. Liliaceae). This specimen is in the U. S. N. M., Washington, D. C.

*Type Material:* I have not seen any type material of this species. The type locality is Kamtschatka—now Kamchatka—, Siberia, U. S. S. R. However, examination of conspecific North American, and topotypical specimens, and their comparison with the literature leaves little doubt as to their identity.

*Distribution:* Between two and three thousand specimens were examined. They were collected between April 23 and October 12, at the following localities (see map 19):

**Alaska:** Anchorage; Glacier River, Unalaska; Fairbanks; Goodnews Bay, Kuskokwim; Kenai; Kirsch; Kuskekwin; Kusiloff; Kodiak; Metanuska; New Rampart House; S. Waskesso, Aleutian; Skagway; Old Woman's Mt.; Big Geratie River, Alaska Highway.

**Alberta:** Banff Springs; Consort; Cypress Hills; Edmonton; Gull Lake; Jasper; Kananaskis; Lake Louise; Lethbridge; Medicine Hat; Pincher Creek; S. Consort.

**Arizona:** Grand Canyon.

**British Columbia:** Crown Mt. Pass, Vancouver; Barkerville; Beaton River;
Emerald Mine; Fernie; Field; Glenora; Little White Mt., Lorna; Merritt, Midday Valley Co.; Nicomin Ridge; Nth. Bend; Princeton; Revelstoke Mt.; Trinity Valley; Stanley; Stickeen R. Can.; Victoria; Vancouver; Terrace. **CALIFORNIA:** Bubb's Creek Canyon, Fresno Co.; Leng Co.; Rea Lake, Fresno Co.; San Luis Obispo; Sonora Pass, Mono Co.; Steven's Creek Gorge, Santa Clara Co.; Yosemite Valley. **COLORADO:** Alma; Antonio; Argentine Road; Berthond Pass; Breckenridge, Summit Co.; Buena Vista; Cirque Lakes; Colorado Springs; El Paso Co.; Florissant; Georgetown; Longs Pk. Inn; Grand Lake; Kenosha Pass; Leadville, Lake Co.; Leavenworth Valley; Long Pk. Inn; Medicine Bow Pass; Medicine Bow Range; Molas Lake Pass; Monarch Pass; Mt. Lyell; Mt. Revelstoke; Ouray, Ouray Co.; Pike's Peak; Prairie Hills; Red Cliff; Salida; Silverton; Snowden, Lake Co.; Winter Park, Gilpin Co.; Wolf Creek Pass; Georgetown, Clear Creek Co.; Little Willow Creek, Gunn Co. **IDAHO:** Coeur d'Alene, Kootena Co.; Pocatello. **ILLINOIS:** (No locality). **INDIANA:** (No locality). **LABRADOR:** Big Caribou Is., Battle Harbor; Carter Basin; Horsedale; Red Bay; West St. Modest. **MAINE:** Mt. Katahdin, Piscataquis Co. **MANITOBA:** Aweme; Makinak. **MICHIGAN:** Alger Co.; Eagle Harbor; Marquette, Marquette Co.; Sault Ste. Marie; Whitefish Pt., Chippewa Co. **MINNESOTA:** Crow Wing Co.; Duluth; St. Louis Co.; Garrison; Millelacs Co.; Norman Co.; Ottertail Co.; Roseau Co.; Two Harbors. **MONTANA:** Bozeman; Logan Pass, Glacier Nat. Pk.; Swiftwater Lake, Glacier Nat. Pk.; Yellowstone Co. **NEVADA:** (No locality). **NEWFOUNDLAND:** Codroy; Ferryland; Flower's Cove. **NEW HAMPSHIRE:** Franconia; Mt. Washington; White Mts. **NEW MEXICO:** S. Fe Canon. **NEW YORK:** Mt. Marsey; Whiteface Mt. **NORTH DAKOTA:** Beach; Dickinson; Mott. **ONTARIO:** Ottawa; Sault Ste. Marie. **OREGON:** Corvallis, Benton Co.; Fish Lake, Steens Mts., Harney Co.; Little Applegate River, Jackson Co.; Mt. Hood; Mt. McKinley Pk.; Sister's Mt. **QUEBEC:** Duparquet; Hudson Bay; Montreal; Saquenay River. **SASKATCHEWAN:** Cochin; Rosthern; Saskatoon; White Fox. **SOUTH DAKOTA:** (No locality). **UTAH:** Alta, Salt Lake Co.; Mt. Timpanogos; Hidden Lake Camp, Utah Co.; Park City, The Mammoth, Parawan Mts.; Utah Lake. **WASHINGTON:** Chinook Pass; Glacier; Mt. Baker; Mt. Rainer; Paradise Peak; Paradise Valley, Rainer Nat. Pk.; Sunrise Peak, Rainer Nat.
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Pk.; Twin Lakes; White Rock Springs, Steven Pass, Cascade Mts. WISCONSIN: Bayfield, Bayfield Co.; Brule. WYOMING: Cheyenne; Green River; Laramie; Medicine Bow Mts.; Mt. Washburn, Yellowstone Pk.; Sierra M. Mts.; Togwotee Pass.

Additional localities from examined specimens in the Canadian National Collection: ALASKA: McKinley Nat. Park; Igooy Creek, Mi. 36, McKinley; Big Geratie River; Little Geratie River; Tiekel River, Richardson Hwy.; Delta R., Rich Hwy.; Roberson R.; Alaska Hwy.; Circle; Nome; Kodiak; Paxson; Mammoth Creek; Steese Hwy.; L. Boulder Creek, Haines Hwy.; Haines. ALBERTA: Kananaskis. BRITISH COLUMBIA: Agassiz; White River; Lizard River; Musquwa River, Alaska Hwy.; Kitwanga; Keremess; Little Prairie. NEWFOUNDLAND: Calvert; N. E. Margaree. QUEBEC: Pte-du-LaC, Les Escoumains. UTAH: Uintah Mts., Mirror Lake. YUKON TERRITORY: White River.

Status: After a study of all the characters involved, H. bicolor is fully restored to species rank, removing it from varietal status under H. nocturnus, based on the following considerations: (1) a size gap. H. bicolor is less than 6 mm while H. nocturnus is more than 6 mm; (2) the position and arrangement of the pronotal setae, which is distinctive; (3) most important, the 8 genitalia differ in a fundamental respect; the parameres are short and blunt in appearance, with a ratio of 5 to 1, length to width respectively, but in H. nocturnus the length to width ratio is greater than 7 1/3 to 1, usually 8 or more to 1.

Much time and effort has been expanded in locating and identifying the types of the various species said to exist as synonyms of H. bicolor. To this end, the collection at the Museum of Comparative Zoology, Cambridge, Mass. in 1965 and again in 1966 was examined. The University Zoological Museum, Helsinki, Finland, sent the Mannerheim types available in their collection. Finally, this material was discussed at length with Dr. E. C. Becker, presently of the Canadian National Collection, Ottawa, Canada, who has been well acquainted with the Hypnoidinae for years. As a result, I have reached the following conclusions:

MANNERHEIM SPECIES.

Cryptohypnus fallax: There are three specimens from Helsinki. The first bears an inked, handwritten label; “Cryptohypnus fallax
Mannerh., Nik. Red.”. Two other labels are of later date. One says “Holmberg”, the other “Nik. Red.”. These are printed. The second specimen has one label with “Bai Woskr.”. Two other recent printed labels again state “Holmberg” and “Bai Woskr.”. The third specimen has one label, handwritten on paper of different quality; saying “fallax, Nik. Red.”. Another label, handwritten by pencil, says “lucidulus”. The last label is a recent Helsinki number designation label (No. 15461). In the LeConte collection there are also three specimens. The first has a red type label on it (Type 8338), a label with LeConte’s handwriting saying “C. fallax, nic R. Mann.”. It also has a plain label with “bicolor” on the bottom —placed there by Horn?— a white LeConte locality label, and a plain label with “23” that probably came from LeConte, as judged by similar labels in the rest of his collection. The second specimen has a blue LeConte locality label only; the third has one label, as follows: “9-10,000 ft., Leavenworth Valley, ab. Georgetown, Col., July 14, 17, 1877”.

DISCUSSION.

The last two specimens in the LeConte cabinet may be completely discounted; as the second is surely LeConte’s own specimen and third has been added at a much later date (1877 vs. 1853). The first specimen, while labeled type, could hardly be so, for it bears LeConte’s labels and there is no evidence that Mannerheim ever saw it. The last specimen in the Mannerheim collection (no. 15461) may not be a type either, for it does not bear his label. The first two specimens again may not be types as they do not bear Mannerheim’s labels. These are, however, topotypes, and I have so labeled them.

Finally, Horn (1891), stated that C. fallax was a synonym of C. lucidulus Mann., which I consider in turn a synonym of H. rivularius Gyll. (see discussion under H. rivularius). Here I disagree with Horn and in concurrence with Dr. Becker (personal correspondence), place C. fallax as a synonym of H. bicolor Esch. on the basis of the very distinctive pronotal characters exhibited by the types.

Cryptohypnus limbatus: The Mannerheim Collection has six specimens. The first and second specimens bear Mannerheim’s species identification labels. The first specimen has been identified as a holotype by M. C. Lane. I am not aware of any published notice of
this designation, but consider this specimen the lectotype. The second specimen has a "Holmberg" label; one saying "Kenai, Sin. Woskresensk"; another with "Coll. Mannerh."; a Mannerheim label, "Cryptohypnus limbatus Mannerh."; and a Helsinki label no. 15451. The third specimen is similar to the second, save for lack of a species label, and bears a Helsinki no. 15452. The fourth has a label in writing I cannot attribute to Mannerheim, saying "Cr. limbatus, Bai Woskresk.". There is a Helsinki label no. 15453. The fifth has two printed labels, saying "Kenai" and "Holmberg". There is an inked label with "88" on it, and a Helsinki no. 15454. The sixth again has "Kenai" and "Holmberg" on two labels, and Helsinki no. 15455.

The LeConte collection has nine specimens. Only the first one is of importance as it bears a red label, without wording. In addition, there is a label in LeConte's writing, "C. limbatus, Sitka, Mann.". There is also a white LeConte locality label.

**DISCUSSION.**

I can, for the same reasons as before, dismiss the LeConte specimen. It and two others with the white LeConte locality label are topotypes at best, and are so designated here. The last of the specimens in Mannerheim's collection are not primary types either, they are topotypes and are so designated here. The first three are types; and since Lane has not designated the latter two as such, I am here designating them as paralectotypes.

Horn (1891) placed C. limbatus as a synonym of H. bicolor. After an examination of all the preceding specimens, I feel that they indeed appear to be conspecific with H. bicolor and leave this synonymy intact.

**Cryptohypnus scarificatus:** Twenty-one specimens are found in the Mannerheim collection. Eighteen are found in a separate series and all bear the printed labels, "Kadjak" and "Holmberg". The first specimen of this series bears an inked, handwritten label by the same unknown author responsible for the other unknown labels: "Cryptohypnus scarificatus Menetr., Kadjak". The three other specimens are as follows: the first is a lectotype so designated by a Lane label; the second has two labels only, an inked, handwritten label—by some unknown worker—, "scarificatus Menetr., Bai. Woskresk, and a Helsinki label no. 15457".
I also have two specimens from the Museum of the Polish Academy. One bears a silver heart-shaped label; a label with, "Mus. Zool. Polonicum, Wasszowa 12/45", a handwritten label with, "bicolor Esch., scarificatus Mannerh., Kadjak Mannh.", a red "Typus" label; and a label with, "Hypnoidus bicolor Eschs., scarificatus Mannerh., det. ex. coll. Mus. Stettin". The other specimen lacks and the heart and handwritten labels.

**Discussion.**

The series of eighteen specimens before me cannot be types, but they are topotypes and are here so designated. All three specimens of the second group were mentioned by Mannerheim in his original paper, and Lane has apparently designated the first as lectotype. The other two have not been designated by him, but as these are without doubt lectoparatypes, I am so designating them here. The two Polish specimens are a surprise, but the handwritten label of the first seems to be Mannerheim's. I conditionally designate them here as lectoparatypes. I also wish to note that Mannerheim is the author of this name, not Menetries, since Mannerheim followed the not unknown practice of publishing a description for another worker (Menetries in this case).

Candèze (1860) and Horn (1891), both placed C. scarificatus as a synonym of H. bicolor. This agrees with my own observations, and the synonymy remains unchanged.

**Cryptohypnus vestitus:** I have not seen any specimens referable to this species. There are no specimens in either the Mannerheim or LeConte collections, and the judgment of Horn (1891) must be followed here; leaving C. vestitus a synonym of H. bicolor. I have, however, read the original description, and noted the reference to long, heavy pubescence. Such a reference might fit my Group "B" of H. bicolor, and I have seen these from the type locality of C. vestitus (Kenai peninsula).

**LeConte species.**

**Cryptohypnus picescens:** I have seen two of the three mentioned specimens (LeConte, 1853) in the LeConte collection. The location
of the third is unknown to me. The first bears three labels: in LeConte's handwriting "C. bicolor Germ. (Esch., picescens LeC.)," another with, "Type 2402", and a white LeConte locality label. The second specimen bears only the locality label.

DISCUSSION.

The label on the first specimen is initially confusing, but it appears that LeConte changed his mind and decided that the specimen was another —new— species, so he then put down a new name on this label; since "picescens LeC." does not appear to have been added to this label at the same time as the "C. bicolor" designation. There is little doubt here as to the identity of the types and I take advantage of this opportunity to designate the first specimen a lectotype and the second specimen a paralectotype.

C. picescens has been named a synonym of H. bicolor by Candèze (1860) and Horn (1891). As I find that LeConte's specimens appear to be conspecific with H. bicolor, this synonymy remains intact.

Cryptohypnus lacustris: One specimen only, in the LeConte collection. There are four labels, as follows: "C. lacustris LeC., var. riparius?". "Type 2401", a white LeConte locality label, and bicolor.

DISCUSSION.

This is the only known specimen and it fits the data and description given by LeConte (1853); who said there was only one specimen before him. I think there is no question as to the identity of the type; and for this reason I have placed a holotype label on the specimen to indicate its identity.

Horn (1891) gave C. lacustris as a synonym of H. abbreviatus Say, but this may have been an error, since the last label with "bicolor" appears to be his. At any rate, a careful examination of the specimen leaves no doubt in my mind as to the identity of the species as a synonym of H. bicolor and so I have here transferred the synonymy from H. abbreviatus to H. bicolor.
Dejean species.

*Cryptohypnus pumilus*: I have never seen a reliable specimen ascribed to this name. The description fits that of *H. bicolor*, and so I must rely on Candèze's judgment (1860) for the correct placement of this name as a synonym of *H. bicolor*.

**Discussion.**

The study of this seemingly difficult species has been greatly complicated by the many synonyms and apparent variety of specimens in the fields. Horn's treatment (1891) of *H. bicolor* as a variety of *H. nocturnus* had the unfortunate effect of discouraging further study—for taxonomic purposes—because the species, *H. nocturnus*, as he defined it was quite variable in appearance and size. Consequently, I have spent much time in study on this problem and have inspected thousands of specimens in the Canadian National Collection, the Harvard Collection, the Mannerheim collection, the Horn collection, and all material sent to me.

After separation of *H. bicolor* sensu stricto from *H. nocturnus* and *H. rivularius* (see summary of study of *H. nocturnus*), I undertook an analysis of the remaining material. There is only one really consistent characteristic, the arrangement of pubescence on the pronotum. This is a prominent feature, and is probably partly responsible for the many synonyms under *H. bicolor*—especially in the 19th century when few specimens were available—. I have not been able to correlate the three basic setal arrangements (see figs. 12, 13) with any other physical feature; but there is a very strong correlation to geographical locality (see map and chart). It is plain that the “B” variety is a Montane form, restricted to the Canadian Rockies. The “C” variety is found on the great plains and includes the bisexual and pathogenetic forms of Zacharuck. Our typical variety is found in all the Western States, Southern Alaska, and Eastern North America, apparently without correlation to any special habitat. I wish to make it clear, however, that only a few incidental specimens are found in the ranges of the other two forms, and some of these may be suspect. Another chief feature involves length of the pronotal setae. This is variable
from specimen to specimen in all three arrangements noted on chart. As this is not a consistent character, I will not consider it further, save to note that this, combined with arrangement, is probably also responsible for the synonyms. A final reason is ignorance, by the authors, of the publications and true identity of the species cited by each.

**Chart 14.**

**Variation in H. bicolor**

<table>
<thead>
<tr>
<th>Group</th>
<th>Characteristic</th>
<th>Locality</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Setae dense, directed caudad and then mediad.</td>
<td>Alaska. British Columbia. Yukon.</td>
<td>116</td>
</tr>
<tr>
<td>C₁</td>
<td>As in C, but setae arranged more as in <em>bicolor</em>, though still sparse.</td>
<td>Saskatchewan. Manitoba.</td>
<td>12</td>
</tr>
<tr>
<td>C₂</td>
<td>As in C, but setae arranged more as in <em>rivularius</em>; distinguishable only by presence of wiry, niveus setae.</td>
<td>Manitoba. Alberta. Saskatchewan.</td>
<td>18</td>
</tr>
</tbody>
</table>

*Excludes approximately 1,000 specimens that were also examined, since these came from many smaller collections. The specimens herein listed are in the Canadian National Collection or the Smithsonian Collection.*
**Hypnoidus rivularius** (Gyllenhal, 1827). New locality.

(Figs. 12, 26 b, 48; map 20).


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**Hypolithus lucidulus** (Mann.).—Schlödte, 1865. *Naturhist. Tidsskr.*, 3rd series, pág. 79.

**Cryptohypnus frigidus** Buysson, 1887. *Bull. Soc. ent. Fr.*, pág. 213.—Guillebeau, 1892. *Echange*, t. VII, pág. 68. (Syn. and Hyn.).


The predominantly longitudinally arranged and deflexed setae of the pronotum, their usually short length, and reddish color serve to separate this species. The $\delta$ may be distinguished by the subapical teeth on the parameres.

$\delta$ : Length 4-6 mm; shape oblong, moderately convex; color variable, usually bicolored from piceous to fuscous or flavous; coarsely, not closely, punctate; laevis, occasionally strigose; vestiture rubineous, setae short and appressed.

**Head** : Twice as wide as long (1.5/2.8), front flat, border feebly elevated; coarsely, not closely, punctate. Antennal scape expanded; pedicel same length as 3rd, diameter greater than 3rd in North American specimens; 4th to 10th feebly serrate; last segment ovate-oblong. Apical segment of maxillary palpus expanded halfway from base, forming an acute triangle.

**Thorax** : Pronotum wider than long (4/4.8), slightly narrowed in front; sides arcuate, widest at middle, a slight sinuature in front of hind angles, these feebly, everted and carinate; disc moderately convex; median impression feeble; moderately punctate, occasionally strigose; pubescence sparse, usually short, rubineous and longitudinally caudad in arrangement. Pleural region opaque; closely and very finely punctate with coarser punctures intermixed. Prosternal lobe moderately prominent; punctuation moderate; pubescence fine and flavous; prosternal mucro vaguely, feebly concave, surface micro- reticulate. Metasternum with fine indistinct punctures intermixed with slightly larger punctures; pubescence moderately heavy, fine and flavous; ratio of length of second abdominal segment to length of
metasternum (1/2.5 or .400). Scutellum flat, oblong-oval (2/2.5), heavy dark border on truncated anterior edge; with sparse pubescence. Elytra wider at middle than thorax, oblong with obtusely rounded humeri; striae punctate; intervals flat and sparsely, finely punctate; pubescence rubeus, deflexed and short.

**Abdomen:** Piceous to fuscous; punctures fine and indistant, intermixed with slightly larger punctures; pubescence fine, flavous, long and moderately dense.

♂ genitalia: Trilobate; parameres freely movable on penis. Parameres short and stubby, ratio of width to length about (1/5); lobes present and prominent, with evident "tooth" on lateral edge.

♀: Similar to ♂.

**Larva:** Shape cylindrical, elongate, somewhat flattened, length 4-8 mm, width 1.3 mm—last stages—. Uniformly flavous.

**Head:** Moderately arcuate both dorsally and ventrally. Posterior epicranial setae present; posterior lobe of frontoclypeal region obese at apex. Nasale moderately broad, tridentate, lateral denticles more or less divergent, strong median denticle directed forward; subnasale with four denticles in a narrowly lunate arrangement. Galea with apparently only one prominent subapical seta that is shorter than last segment, no accessory setae; labial palpus without setae on basal segment.

**Thorax:** Mediotergite of metathorax—left side— with five minute to intermediate setae increasing in size mediolaterad along anterior border; two pairs of one minute and one long seta mediolaterad along posterior border; and one long seta on lateral border.

**Abdomen:** Urogomphi prongs of ninth abdominal segment unequal; outer prongs short, suberecit; inner prongs twice length of outer prongs, tubercule near apex small, not prominent. Caudal notch narrow, V-shaped, sides fairly straight. Last tooth before urogomphi fairly prominent, preceding teeth subequal in size.

**Ecology:** Generally discussed by European workers (see section 11). One American specimen has been recorded from *Pinus ponderosa* Laws. (fam. Pinaceae); Merritt, B. C., Midday Valley, V-12-1926. This record is probably accidental, since *H. rivularius* seems to favor herbaceous plants.

A number of larvae appear to have been brought in by ships from Europe: ex. Scotland via Boston, Mass, V-7-43, 4318, with sod,
ballast, 2 larvae; ex. Iceland via New York, V-1-43, 14187, sod, 1 larva. All specimens in the U. S. N. M., Washington, D. C.

Type Material: I have seen Gyllenhal’s types from his collection in the drawers of the University of Uppsala, Uppsala, Sweden. There are two specimens, as follows: First specimen with one label saying “Mannerheim”. Second specimen without a label of any sort.

Discussion: These two specimens form a part of Gyllenhal’s collection put together after his death by Dr. Marklin. Since this part holds the type material to the “Insecta Suecica”, I believe that these specimens are the original types, and therefore —since no holotype was designated or implied— designate the first specimen as lectotype and the second specimen as a paralectotype.

I am indebted to Dr. Hedstrom, of the University of Uppsala, for the above information on Gyllenhal’s collection.

The type locality, as defined in Gyllenhal’s original description is Lapland. This is a vaguely defined area which includes the northern parts of Sweden, Norway, Finland, and Northwestern U. S. S. R.

Distribution: A wide ranging and not uncommon species. Found between April 28 and Sept. 7 in various localities (see map 20). Sixty-one specimens were examined.


Status: As a species, *H. rivularius* seems to be distinct and well separated from related forms. In North American specimens the antennal pedicel is as long as, and with a greater diameter than the 3rd segment. In the European specimens I have seen, the pedicel is slightly shorter and of the same diameter as the 3rd segment. However, this is probably of little import, for the pedicel in *H. bicolor* and certain other related species show a tendency to vary as to length and form.

I have looked for the types of *C. lucidulus* Mann. in the Mannerheim Collection. There are six specimens, three with species labels, "Cryptohypnus lucidulus Mannerh.", "Bai Woskeni.". These labels are not Mannerheim's. Two of the labeled ones have Helsinki no. 15459 and 15460 respectively. The former also has two printed labels saying, "Woskress", and "Holmberg.". The third labeled specimen has two printed labels with, "Bai Woskr.", and "Holmberg.". These two labels also appear on the remaining three specimens which carry no other labels.

The LeConte collection has one specimen labeled "C. lucidulus Mann.". There is also a white LeConte locality label, a label with "24" on it, and a red label with "Type 8134".

Discussion: None of the specimens above appear to be primary types. They are, however, topotypes and are so designated here.

Horn (1891) treated *C. lucidulus* as a variety of *H. nocturnus* Esch. The specimens before me are conspecific with *H. rivularius* and cannot be distinguished from that species. For this reason, I am here designating *C. lucidulus* as a synonym of *H. rivularius* NEW SYNONYMY.

Note: The European names listed in the synonymy are discussed in section 11.

18. **Hypnoidus nocturnus** (Eschscholtz, 1829).

(Figs. 11, 17, 29, 49; map 21).


This species is most readily separated by the peculiar arrangement of its pronotal setae into transverse bars of pubescence over the entire surface. Another characteristic is the scattering of larger ventral setae among a carpet of shorter setae.

δ: Length 6-8 mm; shape oblong, moderately convex; color piceous, seldom fusco-piceous; laevis; sparsely punctate; vestiture flavous to fulvous.

Head: Nearly twice as wide as long (1.9/3.5); front flat, border feebly elevated; coarsely, not closely, punctate. Antennal scape expanded; pedicel 1/2 length of 3rd; 4th to 10th feebly serrate; last segment ovate-oblong. Apical segment of maxillary palpus expanded halfway from base, forming an acute triangle.

Thorax: Wider than long (4.5/5.5), slightly narrowed in front; sides arcuate, widest at middle, a slight sinuation in front of the hind angles, these feebly everted, carinate; disc moderately convex; median impression very feeble; moderately punctate; pubescence sparse, deflected to surface, setae directed mediad and forming definite transverse rows. Pleural region opaque; closely and very finely punctate with coarser punctures intermixed; pubescence with dense, short and sparsely intermixed long setae. Prosternal lobe moderately prominent, punctuation moderate; prosternal mucro shallowly concave, surface micro-reticulate. Metasternum with fine indistinct punctures intermixed with slightly larger punctures; pubescence usually with scattered large flavous setae among shorter, dense flavous setae; ratio of length of second abdominal segment to length of metasternum (1.5/3.5 or .428). Scutellum flat, oblong oval form (2.25/2.75), heavy dark border on anterior edge; pubescence sparse; punctuation sparse. Elytra wider at middle than thorax, oblong, humeri obtusely rounded; disc rather depressed and flat; striae punctate and rather sparsely so in middle; intervals flat, sparsely, finely punctate.

Abdomen: Piceous; punctures fine and intermixed with slightly larger punctures; pubescence fine, moderately dense and short, flavous, occasionally with larger scattered flavous setae.

δ genitalia: Trilobate; parameres freely movable on penis. Parameres long, ratio of width to length (1/7.3) or more; sides almost straight to apex; lobes absent.

♀: Similar to δ.

Larva: Unknown.
**Ecology/Habitat:** Generally high subalpine areas, but also found near the coast as far south as Santa Cruz.

**Type Material:** I have not seen any type material of this distinctive species, but I have examined numerous topotypical specimens and there is little doubt as to the identity of the species.

**Distribution:** Ninety specimens were examined. These were taken between April 10 and August 13 from the following localities (see map 21):

**Alaska:** Sitka. **Alberta:** Medicine Hat (? questionable locality from American Mus., N. Y.). **Arizona:** (Locality unknown); White Mts. **British Columbia:** Bowser; Cowichan Lake; Diamond Head Trail; Garibaldi Park, Squamish; Inverness; Telegraph Point, Kwinitsa; Metlakatl; Tyee, SE Prince, Rupert; Victoria; Vancouver. **California:** Davis Creek, Modoc Co.; Lagunitas, Marin Co.; Lake Tahoe, El Dorado Co.; Los Gatos, Santa Cruz Co.; Mill Valley; Monte Bello Ridge, Palo Alto; Muir Woods, Modoc Co.; Redwood Creek, Blair’s Ranch, Humbolt Co.; Tahoe City. **Nevada:** (Locality unknown); White Mts. **Oregon:** Mary’s Peak; Mt. Hood. **Washington:** Crescent Lake; Horse Creek, Rainer Nat. Pk.; Longmire, Rainer Nat. Pk.; Stimson Creek, Mason Co.; Port Angles; Wellington; West Drive Mt., Rainer Nat. Pk.

**Status:** This species has been the source of much confusion in the genus, with authors placing various other species as synonyms or varieties under this name. Horn (1891) lists two varieties and five synonyms for *nocturnus*. Among these is *H. bicolor* Esch., considered by most entomologists to be a separate species even though its status for the last 76 years has been as a variety of *H. nocturnus*. The picture has been confused by the supposed variability of the species which leads to acceptance of Horn’s definition. But the recent discovery\(^5\) that another species, *H. rivularius* Gyll., was identified in North America as *H. nocturnus* var. *bicolor* focused attention on certain key characters separating it from *H. nocturnus* var. *bicolor* Esch. and thus on the characters of the other forms under the label *H. nocturnus* in North American collections.

As a result of this study, I have separated the species shown in

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\(^5\) All credit for this discovery is due to Dr. Becker of the Canadian Department of Agriculture, who kindly informed me, and loaned some of his specimens.
### Chart 15.

**Study summary of *H. nocturnus***.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Range &amp; size</th>
<th>Thorax setae</th>
<th>$\delta$ genitalic</th>
<th>Abdominal setae</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A.</td>
<td>West Coast - 6 mm or over.</td>
<td>Arrangement in transverse rows.</td>
<td>Parameres long in comparison to width. Lobe absent.</td>
<td>With scattered scale-like setae, sometimes barely evident.</td>
<td>Species <em>H. nocturnus</em>.</td>
</tr>
<tr>
<td>Group B.</td>
<td>6 mm or over - SW to Wyo.</td>
<td>Very sparse, arrangement regular.</td>
<td>Parameres long in comparison to width. Lobe present, prominent.</td>
<td>Fine &amp; regular.</td>
<td><em>H. leei</em>.</td>
</tr>
<tr>
<td><em>H. lucidulus.</em></td>
<td>6 mm or less general.</td>
<td>Short &amp; appressed, reddish, sparse to moderately dense arrangement, longitudinal in anterior half.</td>
<td>Not examined type only reliable.</td>
<td>Fine &amp; regular.</td>
<td><em>New synonymy of H. rivularius</em>.</td>
</tr>
<tr>
<td>Group C.</td>
<td>6 mm or less general.</td>
<td>Usually short &amp; appressed, reddish, sparse to moderately dense, arrangement longitudinal on anterior half.</td>
<td>Parameres short in comparison to width. Lobe present, tooth on lateral edge.</td>
<td>Fine &amp; regular.</td>
<td>Species <em>H. rivularius</em>.</td>
</tr>
</tbody>
</table>
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the accompanying chart, based on the morphological and distributional data available. The true *H. nocturnus* appears to be a very well distinguished species restricted to the West Coast. In the specimens I have seen there are no further significant variations.

It can be seen from this chart that the apparent heterogenous arrangement of the pronotal setae, \( \delta \) genitalia, and abdominal setae is resolved by these groups into definite patterns. It is evident that the arrangement of the pronotal setae provides a major clue to species in this group. With the separation of *H. rivularius* from forms of *H. bicolor*, the other 3 types were recognized and further study has proved the validity of the arrangement. Only the Mannerheim specimens of *C. lucidulus* were reliable, as forms under "lucidulus" have been demonstrated to be either *H. bicolor* or *H. rivularius*.

19. **Hypnoidus leei** (Stibick, 1968).

(Figs. 21f, 50; map 22).


This species can be distinguished from its close relatives by the very sparse longitudinal-mediad arranged pubescence of the pronotum, these setae so sparse as to preclude crisscrossing of setae medially; the sparse pubescence of the scutellum, and by comparison, the sparse pubescence of the elytra and the body size of 6 mm or more.

\( \delta \): Length 6-8 mm; shape oblong, moderately convex; color piceous to testaceous; laevis; sparsely punctate; vestiture flavous, very sparse above, flavous and somewhat sparse beneath.

**Head**: Twice as wide as long; front flat, border feebly elevated; coarsely, not closely, punctate. Antennal scape expanded; pedicel 1/2 length of third; 4th to 10th feebly serrate; last segment ovate-oblong. Apical segment of maxillary palpus expanded halfway from base, forming an acute triangle.

**Thorax**: Pronotum not quite twice as wide as head (3.25/5.5), wider than long (4.75/5.5), slightly narrowed in front; sides arcuate, widest at middle, slightly or not at all sinuate in front of hind angles, these feebly everted, carinate; disc moderately convex; median impression very feeble; moderately punctate; pubescence very sparse, arrangement of setae pointing longitudinal-mediad, no crossing on
median line. Pleural region opaque, large and small punctures closely intermixed. Prosternal lobe moderately prominent; punctuation moderate; prosternal mucro narrowly, sharply concave, surface vaguely micro-reticulate. Metasternum with fine indistinct punctures intermixed with slightly larger punctures; pubescence sparse, flavous; ratio of length of second abdominal segment to length of metasternum (1.3/3.5 or .371). Scutellum flat, form oblong-oval (2.25/2.7), heavy dark border on truncated anterior edge; surface scarcely pubescent, with flavous setae; sparsely punctate. Elytra wider at middle than thorax, shape oblong, humeri obtusely rounded; disc moderately convex; striae deep and well formed, punctate, rather sparsely so in middle; intervals flat, sparsely, finely punctate.

**Abdomen:** Piceous to testaceous; punctures fine and intermixed with slightly larger punctures; pubescence flavous, somewhat sparse.

**♀ genitalia:** Trilobate; parameres freely movable on the penis. Parameres long, ratio of width to length (1/7.3 or more), sides sinuate near lobe; lobes present and moderately large.

**♂:** Similar to ♀.

**Larva:** Shape cylindrical, elongate, somewhat flattened, but very robust from side view, length 12.25-12.5 mm, width 1.25 mm —last stages—. Uniformly flavous.

**Head:** Small in proportion to body, wedge-shaped, dorsal and ventral sides fairly flat. Posterior epicranial setae present; posterior lobe of frontoclypeal region obese at apex. Nasale moderately broad, tridentate, lateral denticles more or less divergent, strong median denticle directed forward; subnasale with four denticles in a narrowly lunate arrangement. Galea with one prominent and four accessory setae surrounding apex, prominent seta shorter than last segment; labial palpus without setae on basal segment.

**Thorax:** Mediotergite of metathorax —left side— with three minute to intermediate setae increasing in size mediolaterad along anterior border; two pairs of one minute and one long seta mediolaterad along posterior border; and one long seta on lateral border.

**Abdomen:** Urogomphi prongs of ninth abdominal segment unequal; outer prongs short, stubby, and erect; inner prongs three times as long as outer prongs, obscure setaceous tubercule near apex. Caudal notch moderately broad, U-shaped, sides straight. Last tooth before urogomphi moderately prominent, preceding teeth subequal in size.
Type Material: The holotype, a \( \delta \), is from Cambrea Pass, Colorado. The date is June 21, 1935, and it was taken at 10,000 ft. altitude by Dr. Van Dyke along with six paratypes and the allotype. Thirty-seven other paratypes came from various localities. The holotype, allotype, and eleven paratypes are in the California Academy of Science, San Francisco. Five paratypes are in the collection of the U. S. National Museum, Washington, D. C., six in the Museum of Comparative Zoology, Cambridge, Mass.; three in the University of California, Berkeley, California; four in the Canadian National Collection at Ottawa, Canada; four in the Philadelphia Academy of Sciences, Philadelphia; one in the University of Kansas, Lawrence, Kansas; and one in the University of Michigan, Ann Arbor, Michigan. Six paratypes are in the author's collection, one in the Purdue Entomological Research Collection, and one in the British Museum.

Distribution: Forty-five specimens were examined. They were taken between April 22 and July 24 from the following localities (see map 22):


Status: The identity of this species is clear. There is little discernable variation, other than color, between individual specimens.

20. Hypnoidus impressicollis (Mannerheim, 1853).

(Figs. 10, 23 c, 26 c, 26 d, 51; map 23).


Hypnoidus (Cryptohypnus) impressicollis (Mann.).—Schenkling, 1925. In Junk. Col. Cat., Berlín, núm. 80, pág. 20.

This species is readily separated by the parallel sides of the pronotum and the pale scaly pubescence on the scutellum.

\( \delta \): 5-6 mm length; shape oblong, moderately convex; color piceous to lightly flavous. Elytra usually paler; surface slightly aeneous, moderately closely punctate; vestiture sparse, pale fuscous to flavous or almost niveus.

**Head**: Twice as long as wide; front flat; coarsely, moderately closely, punctate; frontal margin scarcely elevated. Antennal scape expanded; pedicel subequal in length to third; 4th to 10th feebly serrate, usually piceous with basal joints paler. Apical segment of maxillary palpus expanded halfway from base, forming an acute triangle.

**Thorax**: Pronotum twice as wide as head, wider than long (4.5/5); sides nearly straight, arcuately narrowed near the front, a faint trace of a sinuation near the angles, these acute, scarcely divergent, carina feeble; basal incisures distinct; disc convex, median channel distinct from base to apex; moderately, closely punctate; pubescence fulvous, lateral setae directed more or less caudad, medial-lateral setae directed more or less medio-caudad, color variability and setal density giving rise to sometimes striking, apparent differences in different specimens. Pleural region opaque; with dense fine punctures and coarser ones intermixed. Prosternum sparsely punctate, more coarsely in front and more finely at the sides; prosternal mucro broadly, deeply concave, sides prominent, surface slightly rugose, lucidus. Metasternum with fine, indistinct punctures, these of mixed sizes; ratio of length of second abdominal segment to length of metasternum (1.35/3.5 or .385). Scutellum flat, oblong-oval (2.5/3), heavy dark border on truncated anterior edge; densely clothed with pale flavous setae; punctuation dense. Elytra slightly wider than prothorax, oblong-oval shape, widest near middle, humeri rounded; disc convex, striae moderately deep and punctate, intervals flat, rather closely punctate and posteriorly, slightly asperate, sometimes with pale flavous spot.

**Abdomen**: Densely, finely punctate with intermixed coarser punctures along sides.

\( \delta \) **genitalia**: Trilobate, parameres freely movable on center piece. Parameres with external border straight to apex; no lobe.

\( \varphi \): Similar to \( \delta \).

**Larva**: Shape cylindrical, elongate, somewhat flattened, length
11-13 mm, width 1.25 mm —last stages—. Uniformly reddish-brown.

**Head:** Fairly flat dorsally, moderately arcuate ventrally. Posterioepicranial setae present; posterior lobe of frontoclypeal region obese at apex. Nasale moderately broad, tridentate, lateral denticles more or less divergent, strong median denticle directed forward; subnasale with six denticles in a narrowly lunate arrangement. Galea with five to seven prominent apical setae, all somewhat shorter than last segment; labial palpus without setae on basal segment.

**Thorax:** Mediotergite of metathorax —left side— with one intermediate, one minute, and two more intermediate setae mediolaterad along anterior border; one minute and two pairs of one short and one long seta mediolaterad along posterior border; and a pair of one short, one long seta on lateral border.

**Abdomen:** Urogomphi prongs of ninth abdominal segment subequal; outer prongs suberect at best, directed posteriorly; inner prongs straight, with strong setaceous tubercule near apex. Caudal notch U-shaped, sides fairly straight. Last tooth before urogomphi prominent, preceding teeth subequal, all teeth somewhat like rather broad and elongate ridges.

**Ecology/Habitat:** Apparently in the mountain regions of the U. S., occurring at lower levels in Canada and Alaska. It is possible that this species confines itself to river clearings in largely coniferous areas as indicated by distribution. Wilkinson (1963) has found larvae in the Fraser River Delta, British Columbia, more specifically in low, poorly kept fields. They cause damage to potato seed pieces in Spring, but do not affect the mature crop. I have seen several larvae in the U. S. N. M., Washington, D. C., that were taken from roots of locoweed (W. Leadville, Colorado, Aug. 6, 1915, C. M. Granger, Coll.).

**Type Material:** I have examined the Mannerheim collection, which has two types: The first is a lectotype and the second a para-type, both designated as such by Mr. Lane. These appear to be conspecific with numerous other specimens before me, and there appears to be no doubt as to the identity of the species.

**Distribution:** Two hundred and forty-two specimens were examined. Not common, this species has been taken between June 3 and October 5, from the following localities (see map 23):

**Alaska:** Eagle; Metanusak, Tanana River; Circle 343; Rampart
House; Seward. **ALBERTA**: Banff Springs. **BRITISH COLUMBIA**: Creston; Merritt, Midday Valley Co.; Revelstoke Mt.; Stanley. **COLORADO**: Breckenridge, Summit Co.; Durango; Garland; Georgetown; Kenosha Pass; Leavenworth Valley; Ouray, Ouray Co.; Red Cliff; Silverton; Winter Park, Gilpin Co.; Wolf Creek Pass; Estes Park. **IDAHO**: Coeur d’Alene; Harvard; Smith Ferry. **MONTANA**: Mile 332, H. B. T. **BRITISH COLUMBIA**: Assinbue; Cook City; Revelstoke Mt. **NEw MEXICO**: Jemez Mts. Santa Fe Co.; Santa Fe Canyon. **NORTH-WESTERN TERRITORY**: Reindeer Depot, Mackenzie Delta. **OREGON**: Green Lake, Sistas Mts.; Mt. Hood; Squaw Springs, Blue Mts.; Tollgate Rd., Blue Mts. **QUEBEC**: Rupert House, East Hudson Bay. **UTAH**: Alta, Salt Lake Co.; Mt. Timpanogos, Utah Co. **WASHINGTON**: Easton; Entiat, Chelan Co.; Eutiah; Mt. Baker; Mt. Rainier; Sprague Lake; White Rock Springs, Steven Pass, Cascade Mts. **WYOMING**: Gros Ventra River; Medicine Bow Mts., Carbon Co.; Yellowstone Park; Togwotee Pass. **YUKON**: Selkirk.

Unexamined specimens from the Canadian National Collection had the following additional localities: **ALASKA**: Mile 76, Steese Hwy.; Circle; Anchor pt.; mi. 197 Rich Hwy., Summit Lake; McKinley Peak; Tanana River; Haines. **BRITISH COLUMBIA**: Creston; Ladner; Keremeos; Christina Lake; Chilkat Pass; Blanchard R., mi. 93; Terrace. **NORTHWEST TERRITORY**: Reindeer Depot.

**Status**: This species appears to be very closely related to *H. abbreviatus*. It is probable that *H. impressicollis* and *H. abbreviatus* represent the modern-day descendants of a common ancestor with a wide distribution in which the population was separated by the Pleistocene glaciations for a sufficient period of time to allow speciation to take place (see section eight). It is probable that the specimens of Group "B" of the following study are retrogressive hybrids. It is also probable that they demonstrate genetic compatibility, in which case, speciation was not complete and the separate gene pools are again merging in our postglacial times. However, the larva seem to be easily separated. Studies of the chromosomes and natural populations in the field may help to settle this interesting question. For the time being, with lack of any real data to the contrary, *H. impressicollis* and *H. abbreviatus* are regarded as two good, separate, and distinct species; demonstrating all the usual, acceptable and morphological characters of valid specific taxa.
A small number of specimens varied from the description in some particular, and were set in the groups charted below. There do not seem to be any relative constants, either morphological or by locality. The specimens have been labeled and deposited in the U. S. National Museum.

Chart 16.

Variation in *H. impressicollis*.

<table>
<thead>
<tr>
<th>Group</th>
<th>Characteristic</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Medium channel in prothorax absent scutellar setae unusually dense.</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>Prothorax narrowing, but not as in <em>abbreviatus</em>.</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>Albino (?).</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>Pronotum rather flat and setae reddish in appearance.</td>
<td>2</td>
</tr>
<tr>
<td>E</td>
<td>Legs piceous, dark over all of body; much setae.</td>
<td>3</td>
</tr>
<tr>
<td>F</td>
<td>Gray in color; humeri distinctly lighter in color.</td>
<td>1</td>
</tr>
</tbody>
</table>

The remaining specimens (136), varied little in specific characters from descriptions in the literature.


(Figs. 9, 18, 26 a, 52; map 24).

Hypnoidus (Cryptohypnus) abbreviatus (Say).—Schenkling, 1925. In Junk. Col. Cat., Berlin, núm. 80, pág. 200.

The attenuate form of the thorax and the pale, scaly pubescence on the scutellum usually serve to separate this species.

♀: Length 5.25-6.5 mm; shape oblong, moderately convex; color piceous to testaceous, elytra usually paler, occasional atrovirens to atroceruleous bronze lustre; coarsely, not closely punctate; vestiture of flavo-cinerous pubescence.

Head: Twice as wide as long; front flat, coarsely, not closely punctate; frontal margin scarcely distinct from the clypeal region. Antennal scape expanded; pedicel variable but usually similar to 3rd; 4th to 10th feebly serrate, last segment ovate-oblong. Apical segment of maxillary palpus expanded halfway from base, forming an acute triangle.

Thorax: Twice as wide as head, broader than long (4.5/6), narrowed in front; sides scarcely arcuate, but obtusely subangulate behind the middle, then sinuate in front of hind angles, these acute but not slender, scarcely divergent, carinate; disc convex with a median impression usually extending from base to apex, deeper behind; basal incisures feeble; surface lucidus; moderately closely, not coarsely punctate; pubescence usually somewhat fulvous; lateral setae directed more or less caudad, medial-lateral setae directed more or less medio-caudad, color variability and setal density giving rise to sometimes striking, apparent differences in different specimens. Pleural region opaque; finely and closely punctate. Prosternum sparsely punctate at middle, at sides intermixed, finely pubescent; prosternal lobe very coarsely punctate, moderately prominent; prosternal mucro broadly, very shallowly concave, concavity almost obsolete, surface highly micro-reticulate. Metasternum moderately, coarsely punctate with coarser punctures intermixed; ratio of length of second abdominal segment to length of metasternum (1.35/3.5 or .385). Scutellum flat, oblong-oval (2.5/3), heavy dark border on truncated anterior edge; rather densely clothed with pale flavous setae. Elytra slightly wider than prothorax, widest 1/3 from base, humeri rounded, sides arcuate, gradually narrowed in apical 2/3; disc convex; striae punc-
tate; intervals flat, moderately closely, and finely punctate; elytral apex frequently with pale flavous spot.

*Abdomen*: Piceous to lightly fuscous; very finely and closely punctate; finely fulvo-pubescent.

♀ *genitalia*: Trilobate; parameres freely movable on center piece. Parameres somewhat arcuate on external border; lobes present, large and flattened.

♀: Similar to ♂.

*Larva*: Shape cylindrical, elongate, somewhat flattened, length 11-14 mm, width 1.25 mm —last stages—. Uniformly flavous.

*Head*: Fairly flat dorsally, arcuate ventrally. Posterior epicranial setae present; posterior lobe of frontoclypeal region obese at apex. Nasale moderately broad, tridentate, lateral denticles more or less divergent, strong median denticle directed forward; subnasale with seven denticles in a narrowly lunate arrangement. Galea with one prominent seta shorter than last segment and three accessory setae surrounding apex; labial palpus without setae on basal segment.

*Thorax*: Mediotergite of metathorax —left side— with one intermediate, one minute, and two more intermediate setae mediolaterad along anterior border; one minute and two pairs of one short and one long seta mediolaterad along posterior border; and one long seta on lateral border.

*Abdomen*: Urogomphi prongs of ninth abdominal segments subequal; outer prongs erect; inner prongs with —at best— moderate setaceous tubercule near apex. Caudal notch rather ovate, partly enclosed by inner prongs. Last tooth before urogomphi moderate in size, preceding teeth generally somewhat smaller in size, scarcely subequal.

*Pupa*: Unknown to me, but Hyslop (1915) reported a pupal stage of nine days.

*Ecology/Habitat*: This species appears to live at any altitude in its range, and probably thrives in the temperate zone. The adults are said to feed on various grasses, and the larvae are considered an important pest in fields and gardens. They have been taken in such places as an onion field, on cabbage, chives, and at bait traps in a potato field. Brooks (1960) reports finding the adults in parklands and forest margins in S. E. Manitoba to Big River, Sask. (Major form), and in Sandy Parkland areas (Minor form) of the same general area.
Hyslop (1915), págs. 19-20, calls the larva "the abbreviated wire-worm", and lists it as a pest of minor importance, although destructive in restricted localities. A cited example was lowlying peaty muck-land, reclaimed by tile draining and then planted to corn (Watertown, Wisconsin). Here, the larvae were present by the millions so that the furrows appeared white.

This same author recommended, "plowing sodland intended for corn the succeeding year, during late August. Cultivate the corn as late as possible, and plow small grain stubble during August, if possible".

*H. abbreviatus* is, like *H. riparius*, partly predaceous. One larval specimen, in the U. S. N. M., Washington, D. C., was found consuming the pupa of a sawfly, *Diprion polytomum (Diprionidae)*, Hancock, Me., 1936, Stevens.

*Type Material:* I have seen the reputed Say collection at the Museum of Comparative Zoology, Cambridge, Mass., and am unable to locate the type of this species. I have seen specimens in the LeConte collection, numerous topotypical specimens, and examined the literature; consequently I feel little doubt about the identity of this species.

*Distribution:* Five hundred and twenty specimens were examined. This species has been taken between April 4 and Oct. 30 from the following localities (see map 24):

**ALASKA:** Circle; Mile 9, Steese Hwy.; Saidovia; Upper Russian Lake, Kenai Peninsula. **ALBERTA:** Banff Springs; Medicine Hat; North Bay; Pincher. **BRITISH COLUMBIA:** Creston; Merritt, Midday Valley; Revelstoke Mt.; Stanley; Terrace. **CONNECTICUT:** Darien; Stanford; West Point. **ILLINOIS:** Algonquin; Chicago, Cook Co.; Niles Center; Palos Park; Wolf Lake. **INDIANA:** Beverly Shrs., Porter Co.; Dune Park; Hessyville; Indiana Harbor; Knox Co.; Lake Co.; Long Lake; Miller; Pine; Starke Co.; Whiting. **IOWA:** Algona, Kossuth Co.; Lake Okoboji, Dickinson Co. **MAINE:** E. Macbias; Greenville; Hancock; Isle-au-Haut; Kineo; Mt. Katahdin, Piscataquis Co.; Norway, Oxford Co.; Orono, Penobscot Co.; Sherman. **MASSACHUSETTS:** Agawam, Hampton Co.; Arlington; Bolster; Boston; Cambridge; Fall River; Milmington; Secneca Lake; Springfield; Tyngsboro; W. Roxbury; Watertown; Wellesley; Woburn. **MANITOBA:** Awesome. **MICHIGAN:** Alcoma Co.; Alger Co.; Alpena; Ann Arbor; Belding; Benson Creek, Isle Royale, Keweenaw.
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Co.; Berrien Co.; Charity Is.; Cheboygan Co.; Chippewa Co.; Deharb; E. Lansing; Eagle Harbor; Holly, Genesee Co.; Hrn. Mtn. Club; Iosco Co.; Jr. Junction; Marquette; Merrill; Midland Co.; Newaygo Co.; Ottawa Co.; Sanilac Co.; Sault; Whitefish point. MINNESOTA: Cokato; Crow Wing Co.; Duluth, St. Louis Co.; Garrison; Hennepin Co.; Itasca Park; Kanabec Co.; Mille Lacs Co.; Mora; Ramsey Co.; St. Paul; Vineland; Wyoming. MISSOURI: Montgomery City (locality unknown). NEBRASKA: West Point, Cuming Co. NEWFOUNDLAND: Codroy. NEW HAMPSHIRE: Anfrim; Durham; Franconia; Grafton Co.; Hampton; Manchester; Mt. Washington, Coos Co.; White Mts., Grafton Co. NEW BRUNSWICK: Bathurst; Makinak. NEW JERSEY: Arlington; Hackensack, Bergen Co.; Mantoloking; South Orange; Skake Hill. NEW MEXICO: (Locality unknown). NEW YORK: Angala; Bear Mt.; Browerville Mts.; Buffalo, Erie Co.; Catskill Mt.; Cayuga Co.; Cranberry Lake; Howland; Ithaca, Tompkins Co.; Lancaster; Ludus; L. Tear, Mt. Marsey; McLean Bogs; N. Y. City; Peekskill; Pelham; Pike; Potsdam; Rock Beh, L. I.; Rockaway B., L. I.; S. Fallsburg; Stanhope; Uphill Brook; West Point; Yonkers. NEVADA: (No locality, questionable; from Phil. Ac. Sciences). NOVA SCOTIA: Baso River. OHIO: (No locality). ONTARIO: Toronto; Prince Edward Co.; Brinley; Ft. Williams; Ottawa; Ridgeway; Trout Creek. OREGON: Baker. PENNSYLVANIA: Scranton; Tyler Hill. QUEBEC: Duparquet; Hudson Bay; Joliette; Lake Opasatika; Mt. Royal; Montreal; Ottawa; St. Anne's; St. Hilaire; St. John's; Wright. SOUTH DAKOTA: Volga, Brookings Co. TENNESSEE: (Locality unknown). TEXAS: (Locality unknown). VERMONT: Chelsea, Orange Co.; Manchester. WASHINGTON: E. Stevens Pass. WISCONSIN: Bayfield; Beaver Dam, Dodge Co.; Cranmoor; Green Bay, Brown Co.; Milwaukee, Watertown, Jefferson Co.; Mountain.

Status: On the basis of the present morphological evidence, a distinct species (see status under H. impressicollis). The distribution in the Southwest should not be ignored. I do not have specimens from any of the centrally located states (i.e., Wyoming, Colorado); but see no reason why they might not occur there. It is not impossible that H. impressicollis is slowly displacing this species which would account for the, apparent, distribution.

Discussion: Certain variations found in this species were examined. Among the several groups that were set up, one, group “C”
—chiefly specimens from Illinois and Indiana—, has a definitely shortened antennal pedicel and rather sparse pubescence. In addition, Brooks (1960) set up two forms, called Major and Minor, that may be separated as follows:

Pronotal setae very fine, dark brown or black, antenna, elytra, and ventral surface blackish brown; sides of pronotum more obviously and more angularly convergent in front; generally larger; parkland and forest margins from S. E. Manitoba to Big River Sask.

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