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AND FOUR SUBGENERA OF GENUS
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CARABIDAE)

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ABSTRACT

THE PRESENT PAPER is a revision of the subgenera *Neocyclus*, *Stenocantharus*, *Pseudonomaretus*, and *Nomaretus* of the genus *Scaphinotus*, and of the American species of the genus *Cyclus*.

The following nomenclatural changes are made: *Scaphinotus* (*Stenocantharus*) *angusticollis* Mannerheim (1824), *Scaphinotus* (*Stenocantharus*) *velutinus* Ménétériés (1844), *Scaphinotus* (*Pseudonomaretus*) *relictus* Horn

(1881), and *Scaphinotus* (*Pseudonomaretus*) *regularis* LeConte (1884) are considered to be valid species. *Scaphinotus* (*Pemphus*) *longipes* Casey (1897) is reduced to a junior synonym of *Scaphinotus* (*Stenocantharus*) *velutinus* Ménétériés (1844). The genitalia of both males and females of each species were studied. Some new localities have been added, and maps of distribution, keys, and illustrations are presented.

INTRODUCTION

IN THIS PAPER I give a revision of the four subgenera of *Scaphinotus* (*Neocyclus*, *Stenocantharus*, *Pseudonomaretus*, and *Nomaretus*) and the three forms of the genus *Cyclus* in America. The subgenus *Scaphinotus*, *sensu stricto*, was partly revised by Ball (1966) who is still working on this group. Barr (personal commun.) has written a paper on *Irichroa*, *Steniridia*, and *Maronetus*.

Since the description of the genus *Cyclus* by Fabricius (1794), this large group of snail-eaters has undergone many taxonomic changes. It has been divided into genera and subgenera, which have been described, redescribed, or rearranged by different authors. Most of these changes were made in the Cychnini of America; fewer, in those of the Old World. Although the number of the species is almost the same, about 40 in Europe and Asia together, and a little more than 40 in the United States, the Cychnini of the Old World seem to be more uniform, with the exception of *Cyclus* (*Cychropsis*) *sikkimensis* Fairmaire. The American species are very different in appearance and can be divided easily into several groups, which are separable by obvious characters.

At present the tribe Cychnini is most frequently divided into three genera: *Cyclus*, *Sphaeroderus*, and *Scaphinotus*, the last-named usually having several subgenera (Roeschke, 1907; Csiki, 1927; Van Dyke, 1936; Ball, 1960; and Lindroth, 1962). Other authors preferred to divide the Cychnini into more than three genera (Motschulsky, 1865; Géhin, 1885; Leng, 1920; Casey, 1914, 1920; and Lapouge, 1932). For example, Lapouge (1932) rearranged the Cychnini into six genera: *Cyclus*, *Cychropsis*,

Nomaretus, *Brennus*, *Scaphinotus*, and *Sphaeroderus*, with *Neocyclus* and *Pemphus* as subgenera of the genus *Brennus*; *Pseudonomaretus*, with *Maronetus* as a synonym, as a subgenus of *Nomaretus*; and *Irichroa*, with *Megaliridia* as a synonym, as a subgenus of *Scaphinotus*.

It is not the purpose of this work to revise the whole Cychnini, and I prefer to follow the classification of Roeschke (1907), Van Dyke (1936), and Ball (1960). Several species of each subgenus of *Scaphinotus* have characters that link the subgenera. For instance, Bell (1959) described *Scaphinotus webbi* as being more or less intermediate between *Scaphinotus*, *sensu stricto*, and *Scaphinotus* (*Irichroa*). *Scaphinotus* (*Brennus*) *johnsoni* Van Dyke resembles *Scaphinotus* (*Stenocantharus*) *angusticollis* Mannerheim in its elytral pattern. *Scaphinotus* (*Pseudonomaretus*) *manni* Wickham has only one middle seta on each side of the pronotum, as do all species of *Scaphinotus* (*Brennus*), but the other species of *Pseudonomaretus* have a basal seta also. *Scaphinotus* (*Pseudonomaretus*) *merkelii* Horn has a pubescent fourth antennal segment, making it intermediate in this character between the species of the subgenera *Nomaretus* and *Maronetus*, in which the antennae are pubescent from the third segment, and the species of the subgenus *Pseudonomaretus* which have pubescent antennae from the fifth segment. *Scaphinotus* (*Neocyclus*) *longiceps* Van Dyke has moderately dilated genae and no carina on the head, as do other species of *Neocyclus*, more or less placing it between the subgenera *Neocyclus* and *Brennus*. *Scaphinotus* (*Neocyclus*) *longiceps* was originally placed (Van Dyke, 1924) in the subgenus *Neocyclus* because

it lacks the notched genae and soft hair between the teeth of the inner part of the maxillae, which are characters of the species of the subgenus *Brennus*. In every subgenus of *Scaphinotus* are species that share characters of another, probably closely related, subgenus. Of course, all species belonging to any group have the quite distinct characters of their own subgenus. Apparently, the links among subgenera influenced Lindroth (1962) to dispense with all subgenera in the genus *Scaphinotus*.

The main changes made in *Scaphinotus* are as follows: *Neocyclus* and *Pseudonomareus* were described as subgenera by Roeschke (1907) and have been recognized as such by most entomologists. *Stenocantharus* Gistel (1857) was described from a single species, *Cychnus angusticollis* Mannerheim. Later Motschulsky, apparently not knowing Gistel's work, described *Pemphus* for the same species. For a long period *Stenocantharus* was overlooked by many entomologists. Csiki, in 1927, was the first to re-establish the old name, but, even so, some authors (Lapouge, 1932; Leng, 1933) continued to use the name *Pemphus*. LeConte (1853) described *Nomareus* and two new species: *Nomareus fissicollis* and *N. cavicollis*, and transferred *Sphaeroderus bilobus* Say to *Nomareus*. Horn (1879), Géhin (1885), Schwarz (1895), Leng (1920), Darlington (1931) Lapouge (1932), and Valentine (1935) recognized *Nomareus* as a full genus; but Roeschke (1907), Csiki (1927), Van Dyke (1936), and Ball (1960) considered it a subgenus of *Scaphinotus*.

Species closely related to *Nomareus*, but with fewer elytral striae, were placed by Casey (1914) in *Maronetus*. Casey later described *Steniridia* and *Megaliridia* (1920, 1924), chiefly to include his seven new species and subspecies. Of these three genera, *Maronetus* has been recognized as valid by Leng (1920) and Barr (personal communication). Darlington (1931) treated *Maronetus* as a subgenus of *Nomareus*; Ball (1960), as a subgenus of *Scaphinotus*. Casey's *Steniridia* was placed as a synonym of *Scaphinotus* (*Irichroa*) by Csiki (1927), and as a subgenus of *Scaphinotus* by Leng (1927), Valentine (1935), and Ball (1960). Casey's *Megaliridia* has been considered invalid by virtually all entomologists who have studied it.

Motschulsky's *Brennus* (1865) was recognized as a genus by Horn (1878), Géhin (1885), Casey (1914, 1920), and Lapouge (1932); as a subgenus of *Cychnus* by Rivers (1890b), and as a

subgenus of *Scaphinotus* by Van Dyke (1902), Roeschke (1907), Hatch (1953), Ball (1960), and Gidaspow (1968). Newman described *Irichroa* in 1838, yet many authors have reduced it to a synonym of *Scaphinotus* (Lacordaire, 1845; Horn, 1878; Géhin, 1885; and Ball, 1960). Roeschke (1907), Leng (1920), Lapouge (1932), and Valentine (1935), however, have considered *Irichroa* to be a subgenus of *Scaphinotus*.

Scaphinotus, *sensu stricto*, was described by Dejean (1826), but earlier (in 1822 and 1825), the name "Scaphinote" appeared in the literature for *Cychnus elevatus* Fabricius (Latreille and Dejean, 1822, p. 87; and Latreille, 1825, p. 241). Some entomologists considered Dejean to be the author (Roeschke, 1907; Leng, 1920; Van Dyke, 1938; and Lindroth, 1962). Others (Horn, 1878; Csiki, 1927; Hatch, 1953; and Ball, 1960) ascribe the name to Latreille.

As mentioned above, four subgenera of *Scaphinotus* are revised: *Neocyclus*, *Stenocantharus*, *Pseudonomareus*, and *Nomareus*. The last revision of *Nomareus* was published in 1936 by Van Dyke. In 1944 he revised *Stenocantharus* and *Neocyclus*. *Pseudonomareus*, although mentioned by Van Dyke (1936) and considered to be a subgenus by Lapouge (1832), has not been revised since Roeschke's work (1907). Van Dyke's papers included few illustrations, or none at all, and the genitalia of these subgenera were not studied, but important characters were associated with the shape of the aedeagus and the pattern of the armature of the internal sac. For instance, *Scaphinotus* (*Pseudonomareus*) *relictus* and *S. (Pseudonomareus)* *regularis*, which are regarded as synonyms by some entomologists, including Lindroth (1962), can be separated by aedeagal characters and are undoubtedly different species. The armature of the internal sac, which in *Scaphinotus* (*Nomareus*) *fissicollis* is invariably violin-shaped, is quite different in other species of the subgenus. There is some variation in the female genitalia of *Scaphinotus* (*Pseudonomareus*) *manni* and *S. (Pseudonomareus)* *relictus*. The female genitalia of species of the genus *Cychnus* have a triangular depression on the coxite, which is absent from those of *Scaphinotus*.

For the present study, 1723 specimens were examined. When possible, more than a dozen males and females of each species were dissected for study of the genitalia. All LeConte's, Horn's, Casey's, and Van Dyke's types were carefully

studied, and a detailed description of Motschulsky's type of *Sphaeroderus palpalis* was received from Moscow University.

There are 13 species in the revised four subgenera of *Scaphinotus* and two species, one with two subspecies, in the genus *Cychrus*.

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KEY TO THE GENERA OF THE TRIBE CYCHRINI OF THE UNITED STATES

1. Proepisternum and proepimeron divided by suture, even if not complete. Dorsal side of tarsi with sparse hair, at least on third and fourth segments of middle and hind tarsi. Base of labrum with four setae (except in *Maronetus*) *Scaphinotus* Dejean
Proepisternum and proepimeron not divided by suture, epimeron often coarsely punctate. Dorsal side of tarsi glabrous. Base of labrum with two setae 2
2. Head and pronotum densely punctate. Elytra not distinctly striate. Penultimate segment of palpi labialis with more than two setae *Cychrus* Fabricius
Head and pronotum impunctate, head either smooth or wrinkled, pronotum smooth, with punctures at base only. Elytra usually distinctly striate. Penultimate segment of palpi labialis with two setae *Sphaeroderus* Dejean

KEY TO THE SUBGENERA OF THE GENUS SCAPHINOTUS DEJEAN

1. Antennae pubescent from fifth segment; lateral margin of pronotum with no more than two setae, or without setae, rarely with two middle setae; hind angles variable 2
Antennae pubescent from third or fourth segment; lateral margin of pronotum usually with two or more setae (bisetose or plurisetose); if setae absent, or only one middle seta present, then hind angles of pronotum pointed, produced, and disk coarsely punctured (fig. 63) 8
- 2(1). Pronotum broader toward base, hind angles pointed, produced beyond base (fig. 63) . . . *Scaphinotus*, *sensu stricto*, Dejean (in part)
Pronotum narrowed toward base, hind angles not produced beyond base, or only feebly so, usually not pointed (figs. 9-14, 64-72) 3
- 3(2). Genae either widened laterally into more or less prominent process (fig. 9), or notched (fig. 11), as seen underneath and in front of eyes; elytral epipleura smooth or sparsely, finely punctate 4
Genae simple (fig. 8); elytral epipleura densely, in many cases coarsely, punctate 7
- 4(3). Genae strongly or moderately widened in form of undivided plate (figs. 9, 10); head at front either with crest (fig. 9) or strongly, transversely wrinkled (fig. 10); pronotum either with angulated sides (fig. 9) or long

- and narrow (fig. 10); front tarsi in males feebly dilated, almost as in females (fig. 31) *Neocychnus* Roeschke
- Genae notched (fig. 11); head at front except in *Brennus rugiceps* and *Brennus cristatus*, without crest; pronotum rarely with angulated sides, about as long as wide; front tarsi in males moderately or strongly dilated (figs. 32-38) 5
- 5(4). Elytra with feebly or moderately impressed and partly irregular striae, either not shiny and velvety, or, if more shiny, then color of pronotum and elytral margin metallic violet red. Number of elytral striae 18-20, mostly 19 (figs. 53, 54); pronotum about as long as wide, except when expanded at front or brilliant violet red (figs. 67-72). Setae orbitalis and front seta on metacoxa present. Legs long and slender *Stenocantharus* Gistel
- Elytra, usually shiny, with well-impressed striae. Number of striae variable. Color of pronotum different, never violet red. If striae feebly impressed and elytral punctures scattered, then either pronotum distinctly wider than long, although not expanded at front (fig. 66), or seta orbitalis and front seta on metacoxa absent. Legs normal 6
- 6(5). Elytra with sparse, shallow foveae on fourth and eighth intervals. If striae irregular and foveae inconspicuous, then pronotum bisetose and front tarsi in males strongly dilated (fig. 49) *Pseudonomareetus* Roeschke
- Elytra without foveae on fourth and eighth intervals; striae either regular or merging (impossible to count); pronotum unisetose (one middle seta on each side); front tarsi in males moderately dilated *Brennus* Motschulsky
- 7(3). Pronotum with wide, strongly reflexed margin (fig. 64) *Irichroa* Newman
- Pronotum with narrow margin (fig. 65). *Steniridia* Casey
- 8(1). Base of labrum with four setae; penultimate segment of palpi labialis with more than two setae; number of elytral striae not fewer than 10 or 11. 9
- Base of labrum with two setae; penultimate segment of palpi labialis with two setae; number of elytral striae reduced, not more than 10, in many cases fewer *Maronetus* Casey
- 9(8). Elytral epipleura densely, in many cases coarsely, punctate; beetles with purple or metallic luster. 10
- Elytral epipleura smooth or with a few shallow punctures; beetles without purple or metallic luster *Pseudonomareetus* Roeschke (in part)
- 10(9). Pronotum with produced, pointed hind angles; without side setae or with middle seta only (fig. 63) *Scaphinotus*, *sensu stricto*, Dejean (in part)
- Pronotum with hind angles not extending beyond base, plurisetose or bisetose (figs. 73-77) *Nomareetus* LeConte

SYSTEMATIC ACCOUNTS

GENUS *SCAPHINOTUS*

SUBGENUS *NEOCYCHRUS* ROESCHKE

Scaphinotus (*Neocyclus*) ROESCHKE, 1907, p. 197.

TYPE SPECIES: *Cychrus angulatus* Harris.

DESCRIPTION: Black beetles, in many individuals with purple luster on elytra. Head longer than pronotum with dilated, but not incised genae; labrum with long, slender lobes, and four setae at base, rarely only three setae; mandibles also long and slender; eyes flat; front

either with crest or strongly convex and with transverse wrinkles or creases; antennae long, reaching well beyond humeri, pubescent from fifth segment, third and fourth segments glabrous and with two rows of setae, one seta in middle of segment, another on tip; basal segment slightly stouter, shorter than second and third together; second segment about one-third shorter than third, but slightly longer than fourth segment, rarely of same length.

Pronotum with angulated sides, although side angles may be rounded; one seta near side angle, at margin; sides of pronotum feebly arcuate at front, in some species almost straight, in their posterior part oblique, at base parallel or even diverging, propleura quite often seen from above; base straight and hind angles not projecting; apical angles small, slightly protruding forward, side margin narrow from apex to base; apical marginal bead either narrow or much broader than side margin, in many cases incomplete or indistinct; disk divided by well-impressed median line, each side of disk quite convex or even spherical, smooth or with transverse wrinkles; apical and basal lines also impressed, longitudinal wrinkles conspicuous beyond basal line (figs. 9, 10).

Elytra oblong-oval, humeri obliterated, or more rounded; elytral striae with small punctures in *angulatus* and *longiceps*, quite regular, 14–15 in number, intervals smooth and slightly convex; in *behrensi* striae irregular, intervals merging, punctures larger; elytral margin in all species of *Neocyclus* narrow.

Seta orbitalis usually present, seta gularis absent from *angulatus* and *behrensi*, present in *longiceps*, both setae, anterior and posterior, on metacoxa present,¹ seta on metatrochanter also present. Males and females with two setae analis on each side of anal segment, although in some specimens within the same species and in both sexes only one seta analis present; abdominal segments with two setae on each side.

Ventral side smooth and shiny, especially elytral epipleura in all species; prosternal process bent toward body; legs slender, anterior

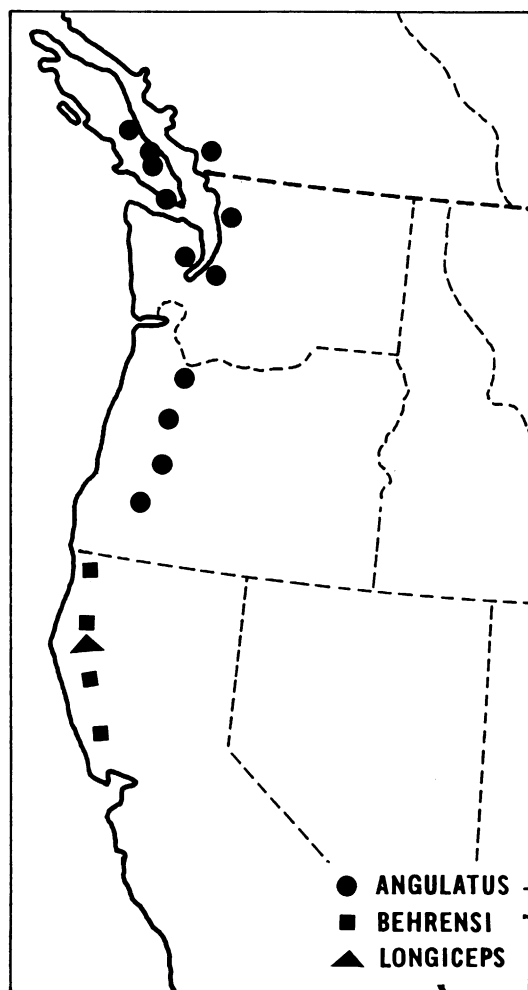


FIG. 1. Distribution of *Scaphinotus* (*Neocyclus*) *angulatus* Harris, *S. (N.) behrensi* Roeschke, and *S. (N.) longiceps* Van Dyke.

¹Roeschke (1907, p. 197) was in error in stating that the posterior seta on the metacoxa was absent.

tarsi of male hardly dilated, almost as narrow as in female, entirely glabrous, or with brushes of papillae on tip of first and third segments, but second segment with narrow patch of papillae in apical part, in some specimens third segment also having narrow brush of papillae, like second segment, in that case first segment usually glabrous; fourth segment either glabrous or with a few papillae on tip. All these variations occur within species, even in same series, without obvious differences among species.

Male and female genitalia not showing any differences among species. Aedeagus toward tip apparently more slender in *behrensi*, stouter in *longiceps*, without sclerotized armature in internal sac of aedeagus. Female genitalia of usual form, without depression of any kind on basal sclerites.

Species of *Neocyclus* are found in the Pacific coastal region from the southwestern part of British Columbia to northern California.

DISCUSSION: This subgenus was described by Roeschke (1907) for two species, *angulatus* and *behrensi*, because of the peculiar head with a crest in front, and strongly dilated genae. Later Van Dyke (1924) added a new species (*longiceps*) and two subspecies (*angulatus maritimus* and, in 1944, *behrensi malkini*). *Neocyclus longiceps* was erroneously placed by Csiki (1927, p. 323) in the subgenus *Brennus*, although it was described by Van Dyke as belonging to the subgenus *Neocyclus*. Csiki's error was noticed by Van Dyke (1944).

All species of *Neocyclus* occur, apparently, in dense forests, and *longiceps* was found in the redwood forests of Humboldt County, California.

KEY TO THE SPECIES OF THE GENUS *SCAPHINOTUS* (SUBGENUS *NEOCYCLUS*) ROESCHKE

1. Head very long and narrow, about three times longer than wide; genae moderately dilated; front of head strongly convex but without crest or carina (fig. 10)
 *longiceps* Van Dyke
 Head not more than twice longer than wide;
 genae strongly dilated; front carina usually
 present (fig. 9) 2
- 2(1). Elytra with 14–16 regular striae, with small
 punctures, intervals more or less smooth
 (fig. 51) *angulatus* Harris
 Elytral striae irregular, more than 18–20
 in number, seldom less; intervals contorted

and merging, puncture of striae larger
 (fig. 52) *behrensi* Roeschke

Scaphinotus (Neocyclus) angulatus (Harris)

Figures 1, 9, 20, 31, 51, 78, 79, 124

Cyclus angulatus HARRIS, 1839, p. 200 (type locality, western Oregon. Type lost: Roeschke, 1907; Lindroth, 1962).

Scaphinotus (Neocyclus) angulatus maritimus VAN DYKE, 1924, p. 5 (type locality, Port Angeles, Washington. Type in California Academy of Sciences, San Francisco. Synonymized by Csiki, 1927).

DESCRIPTION: Black or dark brown, in many cases with brilliant purple luster on elytra. Head about twice longer than wide, and longer than pronotum; average length 5.6 mm., range from 5 to 6 mm.; width of head, in its widest part, from 3.0 to 3.5 mm.; genae dilated and conspicuously projecting below and in front of eyes; front with comblike carina and deep, transverse wrinkles or creases, between eyes convex, rounded, often spherical; clypeus convex; mandibles straight and narrow (fig. 9).

Pronotum slightly wider than long, average length 4.0 mm., range from 3.8 to 4.8 mm.; average width 4.3 mm., range from 3.8 to 5.5 mm. Males having slightly narrower and smaller pronotum; disk divided by strongly impressed median line into two spheres, convex and smooth, at base with longitudinal and transverse wrinkles, but smoother than in *behrensi* (fig. 9).

Elytra with rounded, not completely obliterated humeri, striae very regular, 14–16 in number, and small, closely set punctures in striae; last striae, near margin, and all of them near apex becoming irregular and merging; intervals not strongly convex, more so on sides, smooth or with faint, transverse wrinkles here and there (fig. 51). Prosternal process mostly with more slender, rounded tip than in *behrensi*, but this character is variable (fig. 20).

Length from 17 to 22 mm., average 19.1 mm.; width from 6 to 8 mm., average 6.9 mm. Females usually stouter than males, average length of male 17.9 mm., width 6.5 mm.; average length of female 20.3 mm., width 7.2 mm.

DISTRIBUTION: Near coast of Pacific Ocean on mainland and neighboring islands, from southwestern British Columbia and southern part of Vancouver Island to northern Oregon. I have seen specimens from the following localities:

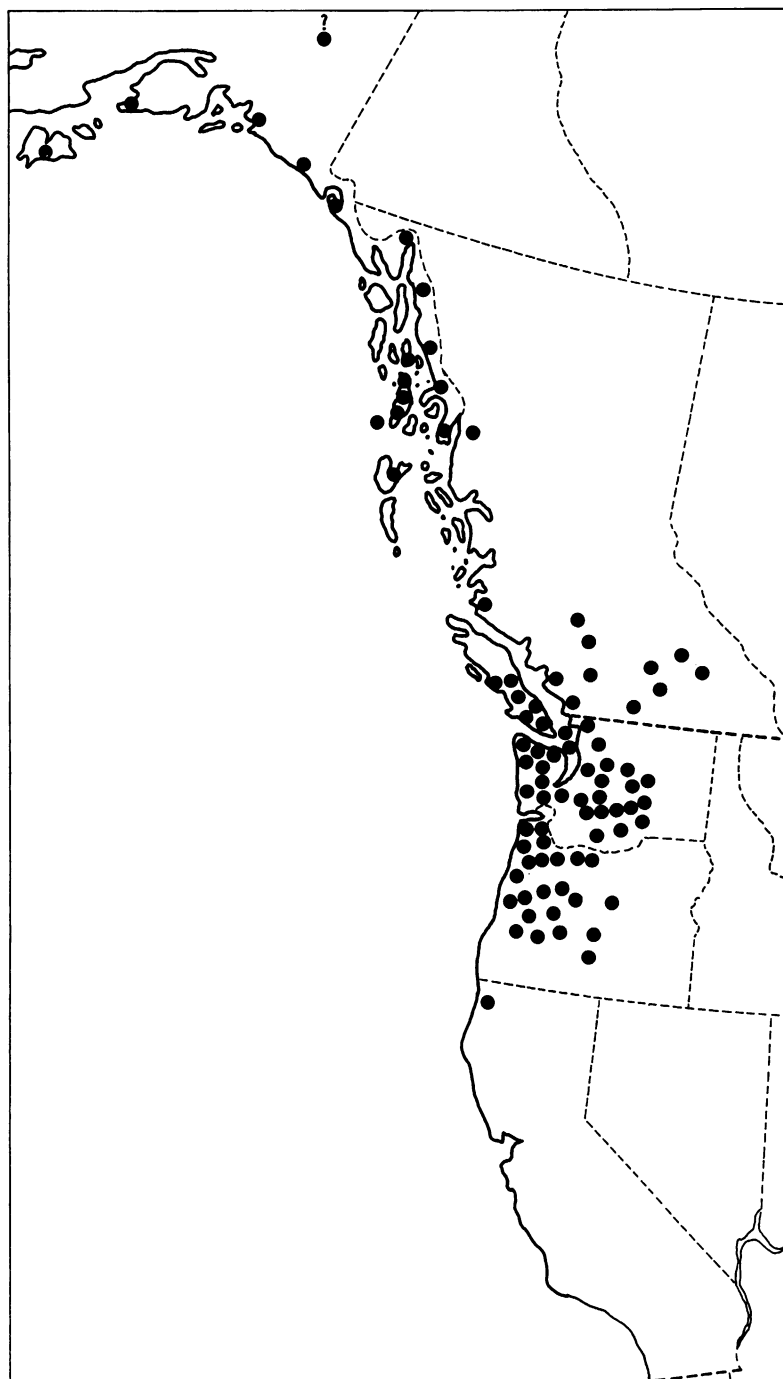


FIG. 2. Distribution of *Scaphinotus* (*Stenocantharus*) *angusticollis* Mannerheim.

Canada: British Columbia: Vancouver Island: Wellington, Victoria, Departure Bay, Mt. Arrowsmith, Pt. Grey, Wigwam Inn at Burrard

Inlet, Motel Lake at Pender Harbour. Steelhead (Fraser Valley District). Washington: King County: Seattle. Pierce County: Tacoma.

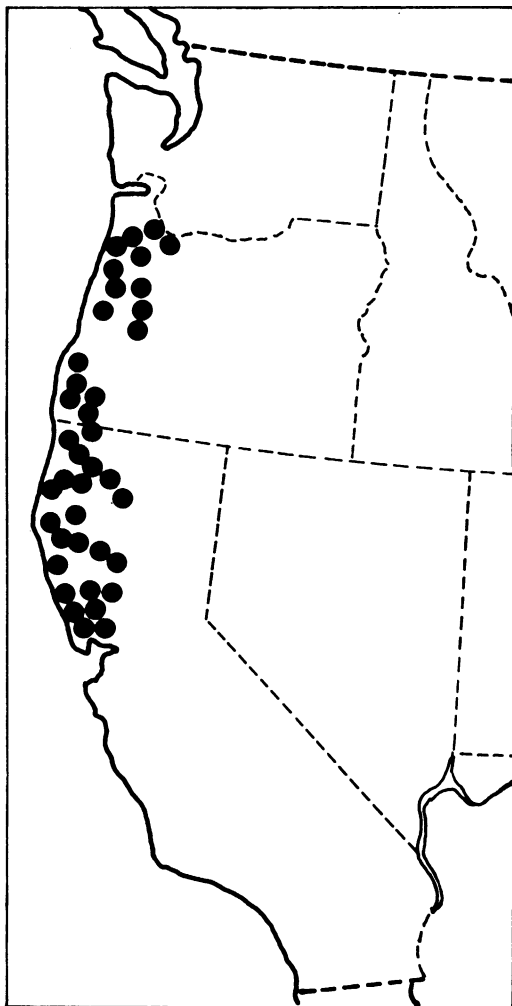


FIG. 3. Distribution of *Scaphinotus* (*Stenocantharus*) *velutinus* Ménétriés.

Thurston County: Olympia National Forest Reservation, Melbourne. Snohomish County: Chase Lake. Oregon: Multnomah County: Portland. Marion County: Salem. Lane County: McCredie Springs, Vida. Douglas County.

Most specimens were collected from late May or early June, through summer, to early September. Lindroth (1962) gave the last date as November 18.

DISCUSSION: This species is very much like *behrensi*, except for the shape and sculpture of the elytra, which in *angulatus* have more distinct humeri and regular elytral striae, 14 to 16 in number. In *behrensi* the humeral angles are completely obsolete, and the elytral striae are

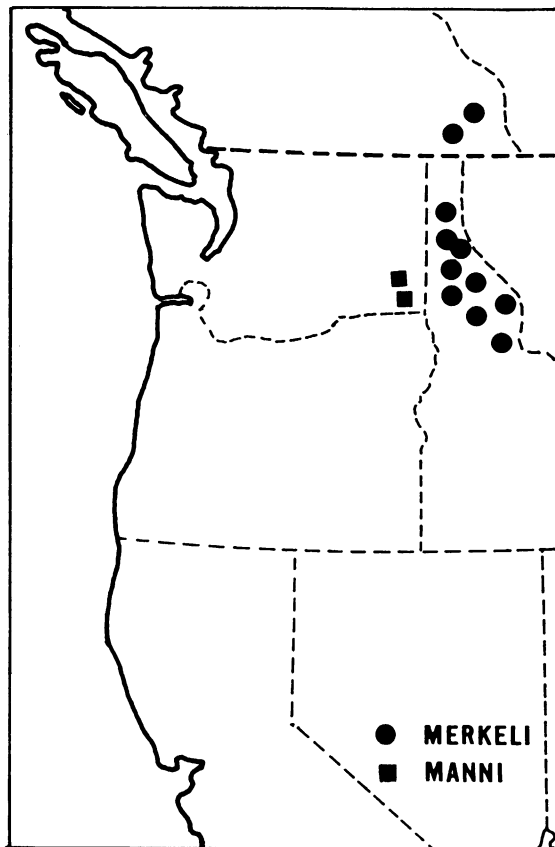


FIG. 4. Distribution of *Scaphinotus* (*Pseudonomareetus*) *merkeli* Horn and *S. (P.) manni* Wickham.

irregular and more numerous because the intervals are divided by additional rows of punctures or incomplete striae. This character, although the only one dividing the two species, is very distinct and constant.

According to Roeschke (1907), who described *behrensi*, the species differs from *angulatus* mainly by the absence of a crest at the front of the head, by the presence of a seta gularis, absent in *angulatus*, and by the round pronotum. These differences, if any, are relative in both species. Some specimens of *angulatus* have a small crest on the head and a quite round pronotum.

The subspecies *angulatus maritimus* Van Dyke (1924), with black elytra, supposedly restricted to the Olympic Peninsula in Washington, is a synonym, as stated by Lindroth (1962). I have seen beetles with pure black elytra also from British Columbia, Oregon, and Washington, together with beetles that had purple elytra, or

at least a faint purple luster. The "subspecies" is only a color variety.

MATERIAL EXAMINED: Fifty-nine specimens, 22 males and 37 females.

Scaphinotus (Neocyclus) behrensi Roeschke

Figures 1, 30, 52, 80, 81

Scaphinotus (Neocyclus) Behrensi ROESCHKE, 1907, p. 199 (type locality, northern Sonoma, California. Type in Vogt collection, Zoologisch Museum, Amsterdam).

Scaphinotus (Neocyclus) behrensi malkini VAN DYKE, 1944, p. 13 (type locality, Myrtle Point and Waldport, Oregon. Type in the California Academy of Sciences, San Francisco. New synonymy).

DESCRIPTION: Very much like *angulatus*. Head with crest at front not invariably sharp, but conspicuous and with heavy, transverse wrinkles; between eyes convex, occiput transversely wrinkled, more strongly than in *angulatus*; second antennal segment in many cases of same length as fourth, or slightly longer; in *angulatus*, as a rule, second antennal segment slightly longer than fourth.

Pronotum as in *angulatus*, side angles either not sharply angulated or rounded; average length of pronotum 3.9 mm., range from 3.8 to 4.3 mm., average width 4.3 mm., range from 4.0 to 4.8 mm., females slightly stouter than males; apical marginal bead broader than in *angulatus*, although not invariably complete; both spheres of disk more strongly and transversely wrinkled than in *angulatus*, in some specimens quite conspicuously.

Elytra distinctly wider toward apex; humeri almost or entirely obsolete; striae, if possible to count, more numerous than in *angulatus*, 19–22 in number, very irregular, especially toward sides and apex, elytral punctures closely set and larger than in *angulatus*, spreading on adjacent intervals; intervals merging and contorted, narrow, broken by additional rows of punctures or striae (fig. 52). Prosternal process slightly stouter, more rounded (fig. 30).

Ventral side as in *angulatus*; tip of aedeagus in most specimens of *behrensi* slightly more acute. Length from 15 to 22 mm.; average 17.9 mm.; width from 6 to 8 mm., average 6.8 mm. Females larger and stouter than males, average length of male 16.3 mm., of female 19.5 mm.

DISTRIBUTION: Rare species, found in coastal

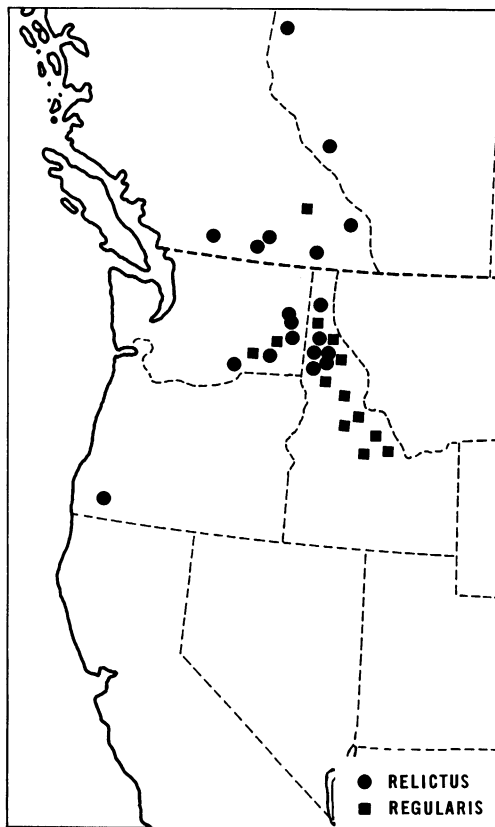


FIG. 5. Distribution of *Scaphinotus (Pseudonomaretes) relictus* Horn and *S. (P.) regularis* LeConte.

regions of Oregon and California, south of Tillamook County of Oregon, to Humboldt County and possibly to Mendocino County, California. I have seen specimens from the following localities: *Oregon*: Lincoln County: Waldport; Coos County: Myrtle Point; Lane County: Spenser Butte near Eugene, Glendale; Curry County: Pistol River. *California*: Del Norte County: Crescent City and in the redwoods near it; Humboldt County: mountain east of Orick. Van Dyke believes that *behrensi* may also occur in Mendocino County, but neither he nor I have seen specimens from there.

Most beetles are found in May.

DISCUSSION: The type of *behrensi*, according to Roeschke (1907), was found in northern Sonoma, California. This statement was confirmed by Van Dyke (1944).

As stated under *angulatus*, Roeschke's *behrensi* presumably differs in the absence of a crest at

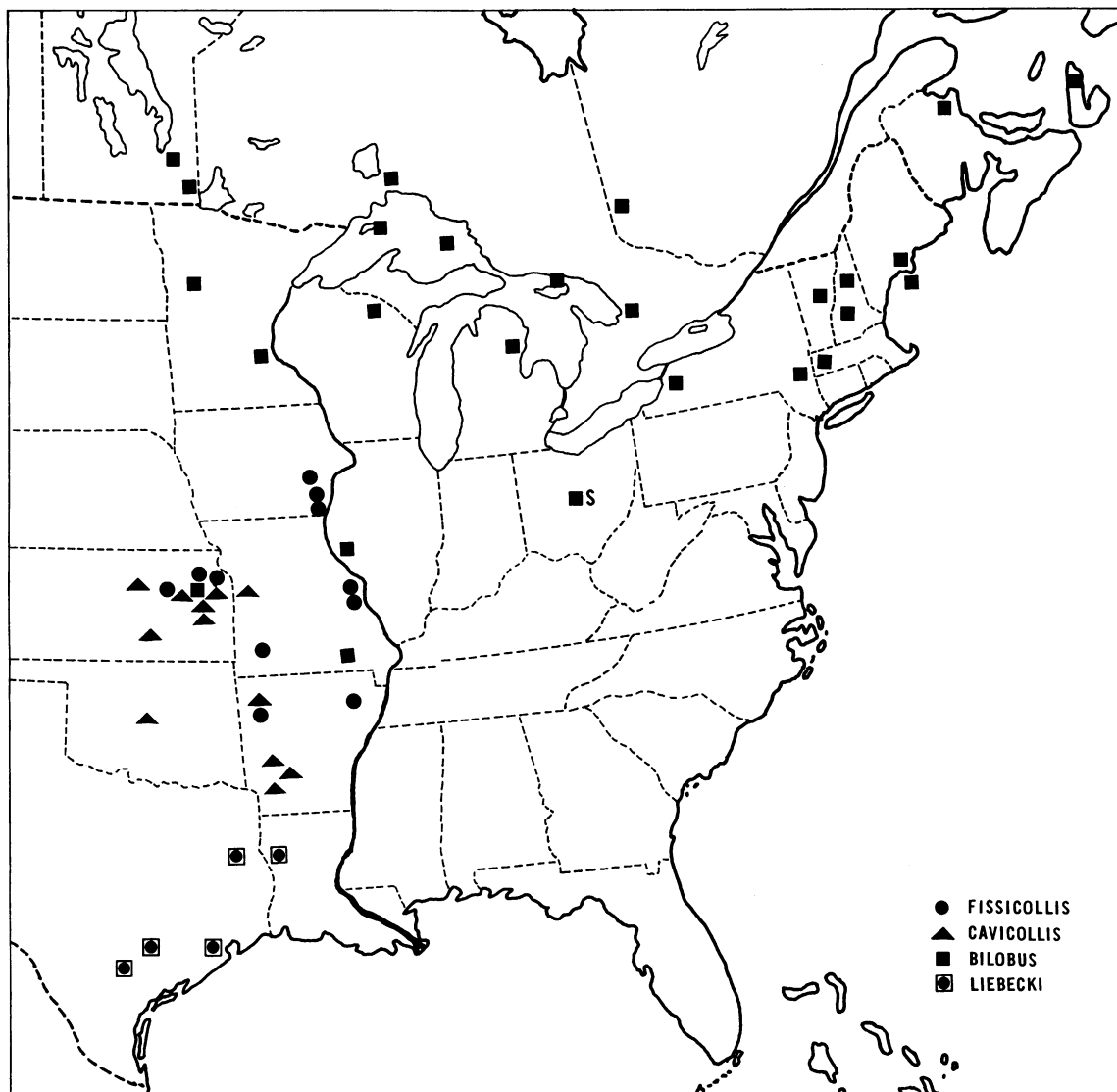


FIG. 6. Distribution of *Scaphinotus* (*Nomaretus*) *fissicollis* LeConte, *S.* (*N.*) *cavicollis* LeConte, *S.* (*N.*) *bilobus* Say and *S.* (*N.*) *liebecki* Van Dyke.

the front of the head, in the presence of a seta gularis, in the more convex, spherical disk of the pronotum, and in the black, shiny elytra without purple luster. Roeschke had only one specimen, a male. Actually, the main and quite obvious difference between the two species is in the form and sculpture of the elytra, *behrensi* having obsolete humeri, irregular elytral striae, merging intervals, larger punctures, whereas *angulatus* has rounded humeri, regular striae, smooth, larger intervals, and smaller punctures.

The front of the head in *behrensi* is like that in *angulatus*, a character noticed by Van Dyke (1924); the seta gularis is absent from both species; the pronotum is very much the same, only the disk of the pronotum in *behrensi* is more wrinkled than that in *angulatus*, and the apical margin is broader.

Van Dyke subspecies *behrensi malkini* from Oregon is, in my opinion, a synonym of *behrensi*. According to Van Dyke, it differs from *behrensi* in having more acute carina and more regular

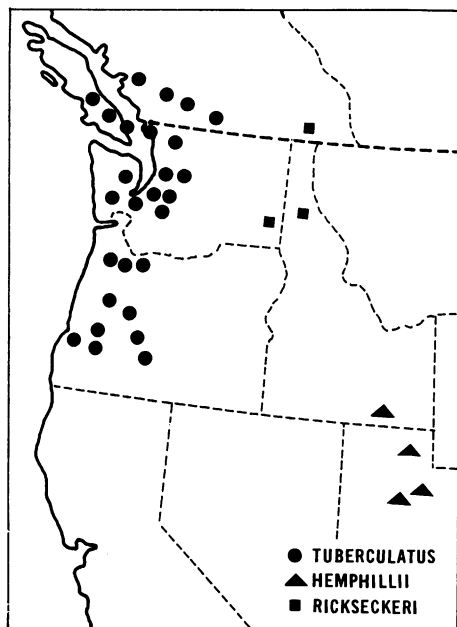


FIG. 7. Distribution of *Cychnus tuberculatus* Harris, *C. hemphillii hemphillii* Horn and *C. hemphillii rickseckeri* LeConte.

elytral striae, which become broken and merge on the declivity only, but, as admitted by Van Dyke (1944), the ninth, eleventh, and thirteenth intervals are not quite regular because of broken merging striae. All these characters seem to be relative, indistinct, and not constant. I have seen specimens from Glendale and Pistol River, Oregon, which have extremely irregular elytral striae and intervals, starting from the fifth, and in some specimens the third striae, quite the same as those from California.

MATERIAL EXAMINED: Fifteen specimens, nine males and six females.

Scaphinotus (Neocychnus) longiceps Van Dyke

Figures 1, 10, 82, 83.

Scaphinotus (Neocychnus) longiceps VAN DYKE, 1924, p. 5 (type locality, Humboldt County, California. Type in the California Academy of Sciences, San Francisco).

DESCRIPTION: Black or dark brown, with very faint purple luster on elytra, not invariably conspicuous. Head long and narrow, from 6.5 to 7.0 mm., at least three times longer than wide, distinctly longer than pronotum; portion of

head behind eyes very long, about two-fifths entire length of head. Genae moderately prominent, not so strongly dilated as in *angulatus* and *behrensi*; front of head quite convex, with long, transverse wrinkles, no carina at front, as in other two species of *Neocychnus* (fig. 10).

Pronotum typical for *Neocychnus*, angles of lateral sides of type rounded, paratypes with more strongly angulated lateral sides, showing propleura; disk, divided by median line, strongly convex and smooth, or with fine, transverse wrinkles. Length of pronotum from 4.0 to 4.5 mm.; width from 3.5 to 4.5 mm. (fig. 10).

Elytra as in *angulatus*, striae 14–16 in number, regular, and finely punctate, near margin broken into more or less scattered punctures; intervals moderately convex. Aedeagus in the single male that I examined with shorter and stouter tip than in *angulatus* and *behrensi* (figs. 82, 83). Length 19–20 mm.; width 8–10 mm.

DISCUSSION: This species is similar to *angulatus* in all characters, but the head, which is very long, is distinctly longer than the pronotum (fig. 10), and the aedeagus has only a slightly stouter tip. The species is rare; it has been found only in Humboldt County, California. The type, described by Van Dyke in 1924, was found in the interior part of Humboldt County, May 15, 1901.

I have seen only four specimens of *longiceps*, the type, a male, another male, and two females, found later, July 3, 1931, and May 7, 1939, in the same area.

SUBGENUS *STENOCANTHARUS* GISTEL

Stenocantharus GISTEL, 1857, p. 92.

Pemphus MOTSCHULSKY, 1865, p. 312.

Scaphinotus (Stenocantharus) VAN DYKE, 1944, p. 1.

TYPE SPECIES: *Cychnus angusticollis* Mannerheim.

DESCRIPTION: Dark brown or black, in northern varieties of *angusticollis* elytra usually lighter than head and pronotum; elytral margin metallic green, golden green, coppery, or purple. Head smooth or feebly wrinkled, genae incised, eyes not prominent, but not flat, as in the species of *Neocychnus*; front slightly convex, sulcus finely, longitudinally wrinkled, labrum with four setae at base, and with stout lobes, hardly twice longer than wide; mandibles stouter than those in *Neocychnus*; antennae long,

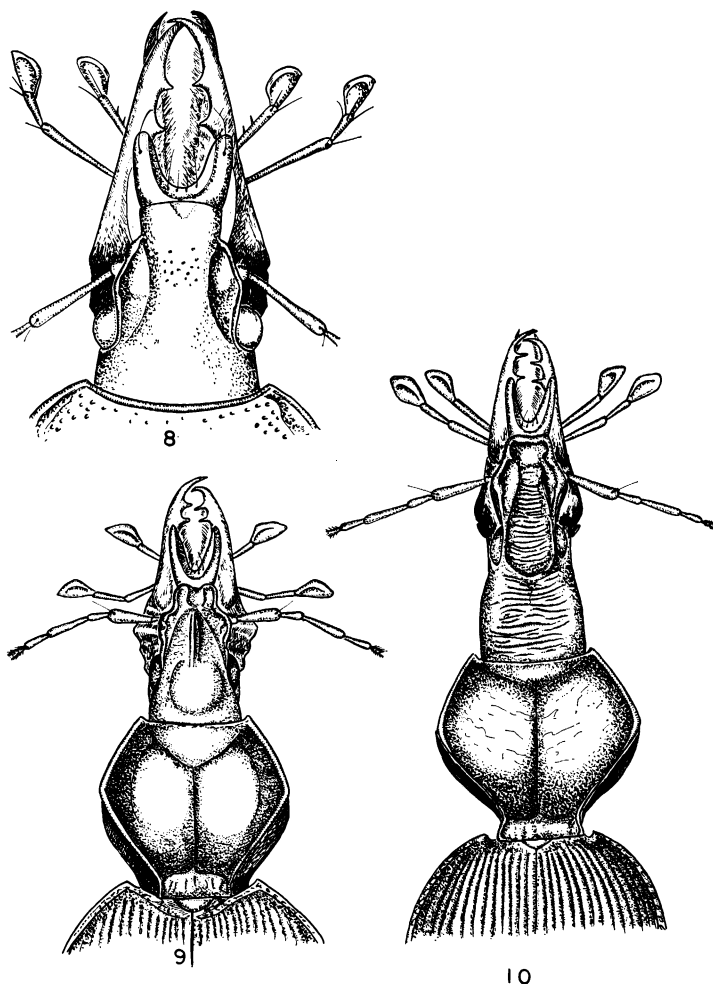


FIG. 8. Head of *Scaphinotus (Irichroa) viduus*.

FIGS. 9, 10. Heads and pronota of *Scaphinotus (Neocychrus)*. 9. *angulatus* from Willington, British Columbia. 10. *longiceps* from Humboldt County, California.

reaching well beyond humeri, first segment slightly stouter than following two segments, and shorter than both together; second segment a little shorter than fourth or as long as it; third and fourth segments with two rows of setae, one row on tip, another in middle of segment, otherwise glabrous; from fifth segment antennae pubescent.

Pronotum about as long as wide or slightly wider than long, sides either arcuate or slightly angulated, sculpture variable; apical marginal bead narrow, often incomplete; side margins also narrow, one middle seta on each side, close

to middle of lateral margin; median line, dividing disk, well impressed, apical and basal lines less so. In northern forms disk usually slightly convex, finely wrinkled, in southern forms flat, or barely convex, and sides of pronotum with heavy, transverse wrinkles, at least at base, or whole pronotum strongly, transversely wrinkled (figs. 67-72).

Elytra velvety; humeri rounded or obliterated and with sharp angle, as in *Pseudonomareus*; elytral striae either more or less regular, or irregularly punctate, and with merging intervals, except for two or three intervals more

distinct, slightly more elevated, not merging with adjacent ones. Prosternal process bent toward body.

Setae orbitalis, anterior and posterior setae on metacoxa, and seta on metatrochanter present, seta gularis variable. Males, as a rule, with one seta on each side of anal segment, rarely with two setae; females usually with two setae on each side, rarely with one seta, and seldom with three. Ventral side smooth, in some species faintly metallic; sides of abdomen slightly wrinkled; legs long and slender, front and middle femurs with or without pore punctures; dorsal side of tarsi bearing sparse, short hair; three segments of front tarsi in male dilated, on ventral side with brush of papillae, in some specimens fourth segment also bearing a few papillae; first segment covered either entirely or in its apical two-thirds, one-half, or one-third, basal part being glabrous.

Aedeagus long and slender, tip more or less pointed, internal sac without any obvious armature (figs. 84–87). Female genitalia of usual form, without difference between species.

DISCUSSION: The subgenus *Stenocantharus* resembles the subgenera *Pseudonomareetus* and *Brennus* in having incised genae, and often a few pore punctures at the front and middle femurs. It differs, however, in having velvety, not shiny, elytra, usually with feebly impressed striae, in the long and slender legs, the middle and hind ones being twice as long as the elytra, in the fact that the inner part of maxillae has long, strong teeth, not moderate teeth as in *Pseudonomareetus* and *Brennus*, and in not having silky hair between the teeth, as in *Brennus*.

There are three species in this subgenus, *hatchi*, *angusticollis*, and *velutinus*, each with slight or more distinct varieties. Until now it had been assumed that *velutinus* was a subspecies of *angusticollis* (Roeschke, 1907; Van Dyke, 1944; Hatch, 1953). I prefer to treat them as different species for the following reasons: both forms differ in the sculpture and, partly, in the shape of the pronotum, and in the form and sculpture of the elytra. It is easy to separate them, and, in Oregon, where they often occur together in many localities, there are virtually no specimens with intermediate characters of the pronotum or the elytra. Of 217 beetles of *Stenocantharus* from Oregon that I examined (168 *angusticollis* and 49 *velutinus*), only five can be considered as intermediate between these species, and even

these might be ascribed to one or the other species.

Although the great majority of the beetles of *angusticollis* from Oregon are as black as *velutinus*, they differ from the latter in a number of characters. The pronotum in *angusticollis* has arcuate sides, the disk is slightly convex and usually has meshlike wrinkles that disappear, or become smoother, on the sides; the elytra has rounded, more conspicuous humeri than those in *velutinus*, the sides of the elytra are more parallel, and the elytra are not broader toward the apex; the elytral margin is dark or faintly metallic, not brilliant purple as in *velutinus* from Oregon and *angusticollis* is also smaller.

Scaphinotus (*Stenocantharus*) *velutinus* from Oregon has a quite variable shape of the pronotum, the sides of which can be arcuate or angulated, expanded at the front or narrow, often with purple luster, and invariably has heavy, transverse wrinkles on the sides at the base. The elytra are bulbous, broader toward the apex, the elytral striae are less regular, the intervals merging, and two, rarely three, intervals are more distinct, more elevated, and do not merge with adjacent ones; the elytral margin is very often wide, brilliant purple or bluish purple.

Scaphinotus (*Stenocantharus*) *hatchi* was recently described by Beer; it is a distinct species which differs from the other two *Stenocantharus* in the coppery red or brilliant violet-red color of the pronotum, parts of the head and the elytral margin, also in more shiny, not velvety elytra. In other characters it fits well in this subgenus.

KEY TO THE SPECIES OF THE GENUS

Scaphinotus (*Stenocantharus*) GISTEL

1. Pronotum, elytral margin and parts of head brilliant metallic violet-red; elytra slightly or moderately shiny *hatchi* Beer
 Pronotum brown or black with golden green or purple luster not always distinct, elytral margin and head never metallic violet-red; elytra not shiny, velvety. 2
- 2(1). Disk of pronotum with fine wrinkles disappearing or becoming smoother on sides; sides of pronotum arcuate (fig. 67); elytra not bulbous, sides more or less parallel, slightly or not widening toward apex; two more elevated, more distinct intervals absent; humeri rounded, rarely obliterated (fig. 53); smaller beetles, 16–24 mm.
 *angusticollis* Mannerheim
 Disk of pronotum with transverse wrinkles, or

smooth; sides heavily, transversely wrinkled more strongly than disk; in smooth specimens at least a few creases on sides at base; shape of pronotum variable, often slightly angulated on sides or expanded at front (figs. 68-72); elytra bulbous, widening toward apex; striae and intervals often irregularly punctured; intervals merging, except for two or three more elevated, more distinct intervals. If striae more regular, elevated intervals less conspicuous and often incomplete; humeri often quite obsolete; larger beetles, 18-28 mm.
 *velutinus* Ménétriés

Scaphinotus (Stenocantharus) hatchi Beer

Scaphinotus (Stenocantharus) hatchi BEER, 1971, p. 257 (type locality, 2 miles east of Islet Campground at Waldo Lake, Lane County, Oregon. The holotype, allotype, and six paratypes are in the museum of the California Academy of Sciences, San Francisco).

DESCRIPTION: Very dark brown with coppery red or brilliant metallic violet-red pronotum, parts of head and elytral margin. Pronotum slightly wider than long, 3.4 to 4.0 mm. long and from 4.0 to 4.5 mm. wide; sides broadly rounded at front, oblique or slightly sinuate in their posterior half; median line, dividing disk, apical and basal lines well impressed; disk finely or moderately wrinkled, smoother toward sides; base with strong longitudinal wrinkles beyond basal line; color coppery red or violet-red becoming golden or golden green on sides mostly toward base. Elytra as in *angusticollis* but not velvety and more shiny, often with faint purplish luster; striae irregular with scattered punctures, yet easy to count; intervals partly merging. Front tarsi of males with three segments slightly dilated and bearing brush of papillae on ventral side, first segment in its apical half only. Aedeagus with more slender and longer tip than in *angusticollis* (in two males I dissected). No obvious armature in internal sac. Length from tip of mandibles to elytral apex from 17.5 to 23 mm.; width of elytra from 7.7 to 9.0 mm.

Found in Oregon, Lane County 2 miles east of Campground, Waldo Lake, from June 2 to August 4, some beetles also taken in September.

DISCUSSION: This is a new species described by Beer, and quite rightly placed in the subgenus *Stenocantharus*. Except for the coppery red or

violet-red color it is like *angusticollis*, however, its elytra are more shiny and darker than in northern specimens of *angusticollis*, and the head is lighter, not black as in *angusticollis*. The genitalia also seem to be different.

MATERIAL EXAMINED: Six paratypes, three males and three females.

Scaphinotus (Stenocantharus) angusticollis
 (Mannerheim)

Figures 2, 11, 33, 53, 67, 84, 85

Cychrus angusticollis Mannerheim, 1824, p. 46 (type locality, Unalaska, Aleutian Islands. As pointed out by Van Dyke [1944], the type locality should be Sitka, Alaska. The type, according to Roeschke [1907] is in the Academy of Sciences in St. Petersburg [now the Museum of Zoology in Leningrad], but, according to Lindroth [1962], is in the Zoological Museum of the University of Helsingfors, Finland).

Scaphinotus (Pempbus) angusticollis var. *nigripennis* Roeschke, 1907, p. 165 (type locality, as given by Roeschke [1907] from Alaska to northern California. Type in Vogt collection, Zoologisch Museum, Amsterdam. Synonymized by Csiki [1927]).

Scaphinotus (Stenocantharus) angusticollis olympiae Van Dyke, 1944, p. 5 (type locality, Sol Duc Hot Springs, Olympic Peninsula, Washington. Type in the California Academy of Sciences, San Francisco. Synonymized by Lindroth [1962]).

DESCRIPTION: Black or dark brown, in many cases with lighter elytra (northern area of its distribution). Seta gularis present with a few exceptions. Pronotum about as long as wide, slightly wider than long, or barely longer than wide. Average length 3.8 mm., range from 3.0 to 4.5 mm.; average width 4.0 mm., range from 3.5 to 4.7 mm. Females only slightly stouter than males. No obvious difference in size of pronotum in area of species distribution (see table 1). Sides of pronotum feebly arcuate, rarely slightly angulated, in posterior half oblique or sinuate, at base almost parallel; disk slightly convex, smooth or with fine, irregular, often meshlike wrinkles disappearing on sides, even in coarse specimens sides invariably smoother than disk; color dark brown or black, same as head, with or without green luster on sides of pronotum (fig. 67).

Elytra from rufous to light or dark reddish brown, and from brownish black to pure black. Black specimens generally found in southern area of species distribution (see table 2).

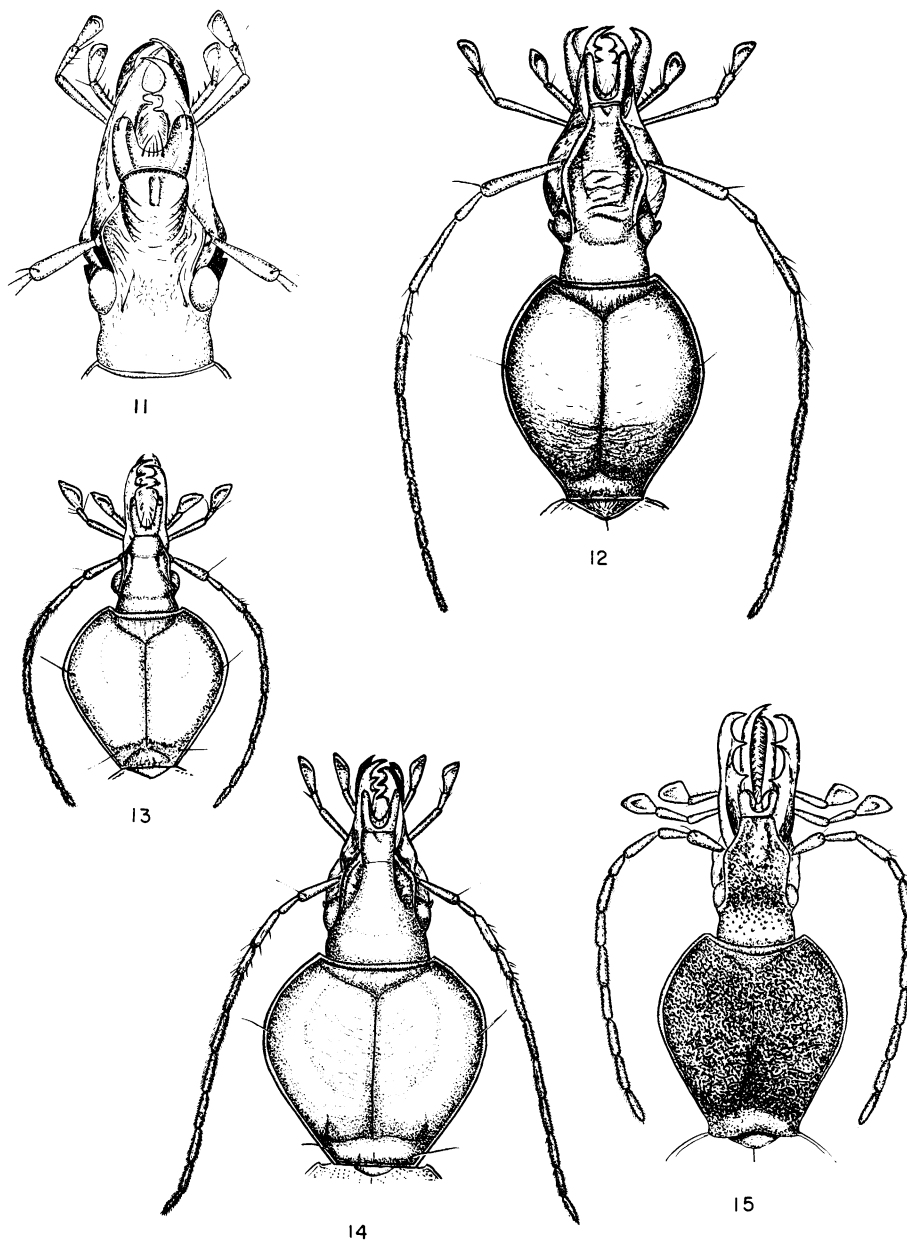


FIG. 11. Head of *Scaphinotus* (*Stenocantharus*) *angusticollis*.

FIGS. 12-15. Heads and pronota. 12-14. *Scaphinotus* (*Pseudonomaretus*). 12. *manni* from Asotin, Washington. 13. *merkei* from Cedar Mountains, Idaho. 14. *relictus* from British Columbia. 15. *Cychrus tuberculatus* from Oregon.

Elytral margin golden green or coppery, rarely bluish green, very seldom faint purple; darker specimens usually with less brilliant, coppery margin. Humeri rounded or obliterated, sides of elytra more or less parallel, not or barely

widening toward apex; striae more regular than in *velutinus*, often quite regular, and about 18-19 in number; punctures of striae small, numerous, more obvious in smoother beetles, not invariably conspicuous in specimens with strongly impressed

TABLE 1
AVERAGE MEASUREMENTS (IN MM.) OF THE PRONOTUM OF SPECIMENS OF *angusticollis*

State	Number of Specimens	Males		Number of Specimens	Females	
		Length	Width		Length	Width
Alaska	49	3.7	4.1	34	3.9	4.2
British Columbia	30	4.0	4.2	24	4.1	4.4
Washington	70	3.8	3.9	64	3.9	4.2
Oregon	65	3.8	3.9	91	4.1	4.1
California	3	3.8	4.0	—	—	—

striae and convex intervals; intervals mostly moderately convex, merging in specimens with less regular striae (fig. 53). Epipleura smooth, with a few shallow punctures.

Front tarsi of males with three segments dilated and a brush of papillae on ventral side, base of first segment glabrous, three-quarters usually papillose, in some specimens nearly whole first segment covered with papillae (more than 200 males were examined, fig. 33).

Length of males, average 17.8 mm., range from 16.5 to 22.0 mm.; average width 7.4 mm., range from 6.0 to 8.5 mm.; females stouter, average length 20.2 mm., range from 17.0 to 24.0 mm.; average width 8.1 mm., range from 7.0 to 10.0 mm. There is no obvious difference in size among specimens from various localities (see table 3).

DISTRIBUTION: From southwestern Alaska, west and southwest of British Columbia to Washington and Oregon and, although rare to northern California. The species does not occur east of the above-mentioned states, or is extremely rare there. I have seen specimens from the following localities: *Alaska*: Kodiak Island, Seldovia, Cordoba, McKinley Park [according

to Lindroth (1962) it is doubtful that *angusticollis* is to be found in McKinley Park], Yakutanga Beach, Yakutat, Haines; Baranof Island: Sitka, Tanakee Springs (north of Sitka); Hunters Bay, Juneau (Cold Creek Base); Prince of Wales Island: Craig and, apparently, also on the whole island; Whales Pass, 45 mi. from Petersburg; Ketchikan; Orka; Nichawack Mountain; Rose Inlet, Abalone Park on Dall Island; Fort Wrangel. *Canada*: *British Columbia*: Vancouver Island, where this species is common in southern part, Pt. Gray, Victoria; Nanaimo District: Pender Harbour (Bear Lake), Sidney, Nanaimo; Wellington, Genoa Bay (Duncan), Tofino (west coast of Vancouver Island). Puget Island; Prince Rupert Island; Metlakatla (Annette Island); Masset Queen (Charlotte Island). Stikine River (southeast of Juneau); Skeena District: Sugar Lake, Ocean Falls. Cariboo District: Vavenby. Yale District: Spious Creek, Trinity Valley (Lumby), Vernon, mountains between Hope and Okanagan. Fraser Valley District: Steelhead. New Westminster District: Alert Bay, Green Timber. Revelstoke Mountain, Hunters' Range, Eagle River. *Alberta*: Red Deer District: Torrington.

TABLE 2
COLOR OF THE ELYTRA IN *angusticollis* FROM DIFFERENT STATES, IN NUMBER OF SPECIMENS

State	Rufous or Light Reddish Brown	Medium Reddish Brown	Dark Brown	Black
Alaska	32	63	48	3
British Columbia	34	71	10	1
Washington	56	131	92	113
Oregon	15	17	11	107
California	—	—	3	—

TABLE 3
MEASUREMENTS (IN MILLIMETERS) OF *angusticollis* FROM DIFFERENT STATES, IN NUMBER OF SPECIMENS

State	Number of Specimens	Males		Number of Specimens	Females	
		Length	Width		Length	Width
Alaska	49	18.3	7.0	34	20.1	7.8
British Columbia	30	17.3	7.6	25	21.3	8.7
Washington	70	17.8	7.0	64	20.5	7.6
Oregon	65	17.5	7.6	91	21.0	8.6
California	3	18.3	7.5	—	—	—

(If there is no error in the label, this is the easternmost locality of *angusticollis*). *Washington*: Clallam County: Port Angeles, Sol Duc Hot Springs, Olympic Hot Springs, North Fork and Forks (tributary of Quinault River). Jefferson County: Olympic Mountains, Hurricane Hill in Olympic Mountains, Hoh River, Forks of Hoh River. Grays Harbor County: Lake Quinault (all above-mentioned localities are in or near the Olympic National Park Forest); Hoquiam, Montesano, Humptulips, Melbourne, Aberdeen, McCleary. Mason County: Lake Cushman. San Juan Islands. Kitsap County: Keyport. Whatcom County: Glacier. Snohomish County: Monroe. King County: Seattle, Kent, North Bend. Pierce County: Tacoma, Puyallup, Tahoma Creek on Mt. Rainier, Paradise Park on the same mountain, Longmire, Green Water Camp, Mt. Jacoma. Thurston County: Olympia. Kittitas County: Easton. Yakima County: Yakima Forest, Bumping River, American River, Mt. Adams. Skamania County: Carson, Stevens Pass, Columbia National Forest. Klickitat County: Klickitat, Lake Wana. Clark County: Vancouver. Cascade Mountains. Denny Creek (this last locality not found on the map). *Oregon*: Clatsop County: Astoria, Olney, Seaside, Cannon Beach. Columbia County: Mist, Globe. Tillamook County: Tillamook. Washington County: Dilley, Beaverton. Multnomah County: Portland. Hood River County: Mt. Hood. Polk County: Valsetz. Marion County: Lake Leone, Mehama, Jefferson. Clackamas County: Colton, Adler Creek. Lincoln County: Tidewater. Benton County: Mary's Peak, Blodgett. Lane County: Triangle Lake, Snow Peak. Linn County: Santiam River. Grant County: Austin. Klamath County: Crescent Lake, McCord Creek. Salmon River. Cascade Mountains.

The three specimens from California unfortunately have no other locality on the labels. In Alaska most of the specimens were collected between the last part of May and the first part of September, but some beetles were found as late as October 10. In Washington and Oregon specimens were found from the beginning of May until the beginning of October, but a few were collected as early as March 6 and as late as November 30.

DISCUSSION: Contrary to the opinion of Roeschke (1907), Van Dyke (1944), Hatch (1953), and some other entomologists, I think that *angusticollis* shows little variation in characters, except in the color of the elytra and its margin. Subspecies were described, however, by Roeschke (1907) and Van Dyke (1944), and they treated *velutinus* and its variety *longipes* as subspecies of *angusticollis*. I believe that *velutinus* and *angusticollis* are different, and the former has more varieties than the latter.

The species *angusticollis* differs from *velutinus* in the sculpture and in the shape of the pronotum, in having finer, often meshlike wrinkles on the disk, in its arcuate sides, which are neither expanded at the front nor angulate on the sides; in having more rounded and more prominent humeri, the sides of the elytra more nearly parallel, the elytra not wider toward the apex, or only slightly so, and in the more regular elytral striae, the two more elevated, better outlined intervals being absent. Males of *angusticollis* have a larger brush of papillae on the first segment of the front tarsi. This species is smaller than *velutinus*.

No specimens with intermediate characters have been recorded from localities where these two species meet, as in Oregon. In addition to the different shape and sculpture of the pronotum and elytra, most of the specimens of *velutinus*

from Oregon have a brilliant purple margin of the elytra, a color not found in *angusticollis*. Of all the beetles examined by me, only one of *angusticollis*, from Alaska, had a faint, although distinct, purple margin on the elytra.

In general, *angusticollis* shows only distinct variation in color, beetles with light-colored elytra, from rufous to medium reddish brown, occurring in the northern area of the species distribution (Alaska, British Columbia, and Washington), and beetles with darker elytra, brownish black in the Olympic Peninsula of Washington, and pure black in Oregon. The change in color is gradual, and no distinct line can be drawn between these varieties. Often one finds mixed populations with all intergrades. The elytral margin is usually brilliant green or golden green in specimens with lighter elytra, and coppery, often very faint, in darker beetles. Quite black specimens often have only traces of metallic luster.

Roeschke's *nigripennis* (1907), which Van Dyke (1944) treated as a subspecies of *angusticollis*, is actually a black variety of *angusticollis*, and a synonym of it. I have not seen the type of *nigripennis*, but Roeschke's description of it does not give any clear difference between *nigripennis* and *angusticollis*, except the dark color of the former. Van Dyke (1944) mentioned a few other characters, such as brilliant green elytral margin, wider pronotum (in some examples), regular, seldom confused elytral striae. All these characters are relative and are found in typical *angusticollis*. As for the females of *nigripennis*, which, according to Van Dyke (1944), have irregularly punctate elytral striae and several intervals distinctly elevated, these are characters of *velutinus*, not found in black specimens of *angusticollis*.

Van Dyke's *olympiae* (1944), which is found in the Olympic Peninsula in Washington, does not differ from *angusticollis* in any way except in having darker elytra, and, according to Van Dyke, in being smaller. It is true that most of the black specimens in Washington are from the Olympic Peninsula. Of 168 specimens examined, 111, or 68 percent, were black or brownish black; 36, or 22 percent, were dark reddish brown; and only 15, or 10 percent, were light or medium reddish brown. In the main part of Washington State, of 199 beetles examined, only 52, or 26 percent, were dark brown, and only one beetle, or 0.5 percent, was deep black, the

remaining 146 specimens, or 73.5 percent, being light or medium reddish brown. In Oregon, outside the range of *olympiae*, black beetles prevail; of 150 specimens 107, or 71 percent, were black, many lacking the brownish tint common in the specimens from Olympic Peninsula.

The size of *olympiae*, which, according to Van Dyke (1944) is smaller, is the same in all of Washington state. The average length of beetles from the Olympic Peninsula (51 specimens measured) is 19.0 mm., the average width 7.5 mm. In specimens from the mainland the average length is 19.2 mm., the average width 7.4 mm. (65 beetles measured). I consider *olympiae* only a color variety of *angusticollis* and therefore a synonym of it. This variety occurs not only in the Olympic Peninsula, but also in Oregon and, although rare, in Alaska and British Columbia (see table 2).

As for the first segment of the front tarsi of males, to which Van Dyke attaches so much importance, it is, according to him, in his typical *angusticollis* and in the subspecies *olympiae*, covered with a brush of papillae for the whole two-thirds of the segment, leaving only one-third of it glabrous. In Roeschke's "*nigripennis*" the brush of papillae covers the whole first segment. I have examined more than 200 males and found that males with reddish brown or brownish black elytra invariably have the first segment of the front tarsi papillose for the whole two-thirds, or, rarely, slightly more than two-thirds. Males with black elytra, from any locality, have either two thirds papillose or slightly more; in some specimens the whole segment is papillose.

MATERIAL EXAMINED: 832 specimens, 401 males and 431 females.

Scaphinotus (Stenocantharus) velutinus (Ménétriés)

Figures 3, 34-36, 54, 68-72, 86, 87

Cychrus velutinus MÉNÉTRIÉS, 1844, p. 53 (type locality, probably Russian Fort Ross in Sonoma County, California. Type, one female, in the Academy of Sciences in St. Petersburg [Roeschke, 1907], now probably in the Museum of Zoology, Leningrad).

Pemphus longipes CASEY, 1897, p. 399 (type locality, Humboldt County, Hydesville, California. Type in Casey's collection, National Museum of Natural History, Smithsonian Institution, Washington, D.C. Synonymized by Csiki [1927]).

Pemphus opacus CASEY, 1899, p. 97 (type locality, California [Sonoma County]). Type in Casey's

collection, National Museum of Natural History, Smithsonian Institution, Washington, D.C. Synonymized by Roeschke [1907]).

DESCRIPTION: Black, elytra as dark as head and pronotum. Seta gularis, in many individuals, absent, of 149 specimens examined for this character, 61, or 41 percent, had lost the seta gularis. Pronotum either narrow or expanded at front, with sides arcuate or slightly angulated, rarely distinctly angulated, and regardless of shape of pronotum (figs. 68–72). Average length of pronotum 4.7 mm., range from 3.7 to 6.0 mm.; width about same as length, average 4.7 mm., range from 3.8 to 6.0 mm.; females larger and stouter than males, average length of male 4.5 mm., range from 3.7 to 5.5 mm.; average width 4.5 mm., range from 4.0 to 5.5 mm.; in female average length of pronotum 4.9 mm., range from 4.5 to 6.0 mm.; average width 4.8 mm., range from 3.8 to 6.0 mm. Even in specimens with expanded pronotum width of pronotum barely or not exceeding its length because of longer posterior part. Disk flat or feebly convex, smooth or transversely wrinkled, especially on sides, toward base. Smooth specimens having at least a few deep, transverse wrinkles at base, some beetles with short, deep creases on sides. Specimens with meshlike wrinkles on disk extremely rare. Of 192 examples, only three were smooth on sides, and four had fine wrinkles (see table 4). Some beetles with pronotum only slightly expanded, although still distinctly so.

Elytra usually with humeri more obliterated than in *angusticollis*, in many specimens irregu-

larly punctate, intervals merging, except for two, rarely three or one, not merging with adjacent ones, slightly more elevated, more conspicuous (fig. 54). In specimens with more regular striae these intervals less conspicuous. Elytral margin in *velutinus* from California as black as elytra, although more shining, or very faintly metallic. In Oregon the majority of beetles with wide, brilliant purple or bluish purple margin.

First segment of front tarsi in males with smaller brush of papillae than in *angusticollis*, not more than one-half, often one-third, of segment being papillose, very seldom a little more than one-half of segment covered with a brush of papillae (figs. 34–36). Males with smaller brush of papillae prevail in Mendocino and Sonoma counties, those with larger brush in Humboldt County. Mixed populations often found in same or nearby localities, especially in Oregon (see table 5).

Larger than *angusticollis*, average length 23.3 mm., range from 18 to 28 mm.; average width 9.5 mm., range from 7.5 to 12.5 mm. Females stouter than males, average length of male 22.1 mm., range from 18 to 26 mm.; average width 9.0 mm., range from 7.5 to 10.5 mm.; average length of female 24.6 mm., range from 21 to 28 mm.; average width 10.4 mm., range from 9.0 to 12.5 mm.

DISTRIBUTION: This species occurs in western Oregon and northern California. I have seen specimens from the following localities: *Oregon:* Clatsop County: Seaside, Cannon Beach. Columbia County: Mist, Marshfield. Tillamook

TABLE 4
SHAPE AND SCULPTURE OF PRONOTUM IN *velutinus*, IN NUMBER OF SPECIMENS

State and County	Sides of Pronotum			Pronotum at Front		Transverse wrinkles on	
	Arcuate	Angulate Slightly	Distinctly	Expanded	Narrow	Sides of Pronotum Present	Absent or Very Fine
Oregon	23	14	14	24	27	49	2
California (no other locality given)	7	2	—	2	7	9	—
Del Norte County	1	1	1	—	3	3	—
Trinity County	—	—	1	—	1	1	—
Humboldt County	24	31	9	7	57	64	1
Mendocino County	21	3	—	19	5	24	2
Sonoma County	35	2	—	36	1	35	2

TABLE 5
FIRST SEGMENT OF FRONT Tarsi of *velutinus*
MALES COVERED WITH A BRUSH OF PAPILLAE,
IN NUMBER OF SPECIMENS

States and Counties	Two-thirds Covered	One-half Covered	One-third Covered
Oregon	—	7	12
California (no other locality given)	—	1	3
Trinity County	—	1	—
Humboldt County	—	22	7
Mendocino County	—	2	11
Sonoma County	—	—	16

County: Netarts, Tillamook. Washington County: Dilley. Multnomah County: Portland. Lincoln County: Newport, Tidewater, Waldport. Benton County: Mary's Peak, Philomas, Blodgett, Corvallis. Lane County: West of Elmira. Coos County: Camas Mountain, Myrtle Point. Curry County: Harbor, Senslaw Forest. Coastal Range. *California*: Del Norte County: Smith River, Fort Dick, Crescent. Trinity County: Trinity Alps. Humboldt County: Orick, Trinidad, Fieldbrook, Arcata, Korbelt, Eureka, Hydesville, Green Point, Deer Lodge, Prairie. Mendocino County: Contra Costa, Little River, Anchor Bay, Gualala, Caspar, Mendocino. Sonoma County: Annapolis, Fort Ross, Healdsburg, Sonoma, Plantation, Stewarts Port.

The majority of beetles were found from the beginning of May to late September. Some specimens were taken as early as March 12 and as late as October 22.

DISCUSSION: Although *velutinus* resembles *angusticollis*, and until now was treated as a subspecies of it, I am inclined to believe that these forms are separate species, as they were originally described. As stated above, they differ distinctly in the shape and sculpture of the pronotum and the elytra, in the size of the body, and in the size of the brush of papillae on the ventral side of the first segment of the front tarsi of males. There are virtually no specimens with intermediate characters, particularly in Oregon, where these two species meet. *Scaphinotus* (*Stenocantharus*) *velutinus* is a more southern species and extends no farther north than

Oregon, whereas *angusticollis*, although rarely, occurs in California.

The species *velutinus* is invariably black, whereas individuals of *angusticollis* vary in the color of the elytra from north to south. The shape and sculpture of the pronotum, and partly the shape of the elytra, change in *velutinus* from place to place or, in many cases, vary in the same population. Apparently, Van Dyke (1944) placed five varieties of this form as subspecies of *angusticollis* for this reason.

Casey's *longipes*, recognized by Van Dyke as a subspecies of *angusticollis*, differs from *velutinus* in the following characters: narrow pronotum slightly angulate on sides, front tarsi of males with papillose area closing about one-half of first tarsal segment, and elytral striae rarely regular, even in males. These typical specimens, according to Van Dyke (1944), are confined to the redwood belt of Humboldt County, but others extend to southwestern Oregon. Because at the present time there is a break in the redwood belt, near the boundaries of Humboldt and Mendocino counties, Van Dyke believes that *velutinus* is thus isolated from *longipes*. It is true that the majority of beetles from Humboldt County have a narrow pronotum slightly angulate on the sides (see table 4), and the front tarsi of males have a larger area of papillae than do the southern varieties from Mendocino and Sonoma counties, many also having irregular elytral striae and merging intervals (see table 6), but there is no distinct line dividing the two Van Dyke "subspecies," and in Oregon the population is mixed. Large beetles with the front part of the pronotum strongly expanded may also have angulate sides, and beetles with narrow pronotum often have arcuate sides, even in Humboldt County, and also regular elytral striae. Therefore I believe that *longipes* is only a variety of *velutinus*, found often in Humboldt County, California, and also in Oregon, more rarely in Mendocino and Sonoma counties in California. The typical *velutinus* occurs often in Mendocino and Sonoma counties, and in Oregon, but is rare in Humboldt County.

Van Dyke (1944) wrote, "At the center of distribution of each good subspecies, the forms are rather distinct and might easily pass as a good species but in the intermediate areas between the subspecies the forms are of intermediate type and thus connecting links . . ." This is quite true, but it does not explain the

TABLE 6
FORM AND SCULPTURE OF THE ELYTRA IN *velutinus*, IN NUMBER OF SPECIMENS

States and Counties	Elytral Striae		Two or Three Intervals		
	Regular	More or Less Irregularly Punctate	More elevated, Conspicuous	Barely Seen	Absent
Oregon	22	25	25	3	—
California (no other locality given)	5	5	8	—	—
Del Norte County	—	2	—	—	1
Trinity County	1	—	—	—	1
Humboldt County	14	43	34	12	2
Mendocino County	14	12	15	5	2
Sonoma County	25	9	20	4	3

often mixed population in Oregon, and even in California it is not possible to say where one "subspecies" ends and another begins, or even which is which. Also *angusticollis* and *velutinus* have no intermediate forms.

Casey's *opacus* (1899) from Sonoma does not differ from the typical *velutinus*. I have examined it, as well as *longipes*, and there is absolutely no ground to treat *opacus* even as a subspecies. Roeschke (1907), Van Dyke (1944), and other authors also synonymized it.

In general all subspecies recognized by Van Dyke (1944) are found in California but they are synonyms either of *velutinus* or of *angusticollis*.

MATERIAL EXAMINED: one hundred eighty-nine specimens, 94 males, and 95 females.

SUBGENUS *PSEUDONOMARETUS* ROESCHKE

Scaphinotus (*Pseudonomaretus*) ROESCHKE, 1907, p. 154

TYPE SPECIES: *Cychrus relictus* Horn.

DESCRIPTION: Dark brown or black. Head and pronotum without punctation. Head smooth or with more or less conspicuous wrinkles between eyes, behind eyes slightly constricted, less so than in *Nomaretus*, in some specimens more strongly constricted, in others without any constriction. Eyes not prominent; genae, except in *manni*, feebly incised; labrum with four setae at base, lobes stouter than in *Nomaretus*. Antennae long, reaching beyond humeri, third and fourth segments glabrous, but with two rows of setae, one at middle of segment, another on its tip; fourth segment on tip often with numerous setae. In

merkeli fourth segment, and in some cases also tip of third segment, pubescent; basal antennal segment about as long as second and third together, except in *manni*, and slightly stouter than following segments; second antennal segment about half of length of third one, and about a quarter shorter than fourth segment, or nearly of same length.

Pronotum heart-shaped, barely convex, sides rounded in front part, oblique or slightly sinuate in posterior half; base and apex more or less straight; front angles barely projecting, hind angles not extending beyond base; disk smooth, base and apex usually with longitudinal wrinkles or creases, mostly beyond basal line; median line strongly impressed, apical and basal lines less so; lateral margin narrow and with middle and basal setae, only *manni* without basal setae; apical marginal bead slightly stouter than lateral margin, mostly distinct.

Elytra oblong-oval, with 11 to 14 or more striae, regular or confluent, broken by merging intervals; intervals feebly convex close to suture, well convex toward sides, merging if striae incomplete or interrupted. Humeri not entirely obliterated, and with small, sharp angles. Epipleura smooth, with shallow punctures, not coarsely punctate as in *Nomaretus*.

Setae orbitalis, gularis, metacoxalis anterior and posterior, and on metatrochanter present; males and females with two, seldom more, setae on each side of anal segment. Ventral side smooth or finely wrinkled; legs normally long, not stout, front and middle femur with pore punctures, not invariably conspicuous; front

tarsi of males strongly dilated in *relictus* and *regularis*, less so in *merkei* and *manni*, and with three segments bearing brush of papillae on ventral side (in *merkei* four segments). Prosternal process well bent toward body. Aedeagus different in every species (figs. 88–101); female genitalia of usual type, without strong variations among species.

DISCUSSION: All the species of *Pseudonomareetus*, except *merkei*, differ from those of *Nomareetus* and *Maronetus* in being larger, in having the antennal segments, the third and fourth of which are glabrous, with two rows of setae only, and in the number of striae on the elytra, 13 to 16 or more, not 10 to 12 as in *Nomareetus*, or fewer than 10 as in *Maronetus*.

Scaphinotus (*Pseudonomareetus*) *merkei* occupies a position between the species of *Pseudonomareetus* and those of *Nomareetus*. It is smaller than the other three species of *Pseudonomareetus*, its fourth antennal segment, and also the apex of the third segment, are pubescent, and, as in *S.* (*Nomareetus*) *bilobus*, the number of elytral striae is reduced to 11–13. In spite of all these characters which link *merkei* with the species of *Nomareetus*, it belongs to the subgenus *Pseudonomareetus*, because of its smooth, impunctate pronotum, quite smooth ventral side, and absence of metallic or purple luster. All species of *Nomareetus* have the pronotum coarsely punctate at the base, and some species also on the apex, and have coarsely punctate elytral epipleura, and a distinct purple luster on the dorsal side. From the species of *Maronetus*, in addition to the large size, those of *Pseudonomareetus* differ in the number of labral setae (four at base of the labrum in *Pseudonomareetus*, two in *Maronetus*) and in the more numerous elytral striae.

Roeschke described the subgenus *Pseudonomareetus* for six species: *imperfectus* Horn, *hubbardi* and *incompletus* Schwarz, *debilis* LeConte, *merkei* Horn, with its variety *idahoensis* Webb, and *relictus* Horn, with its variety *regularis* LeConte. The first four species were transferred by Casey (1914) to *Maronetus*, which includes all smaller species, with fewer elytral striae. Casey left *merkei* and *relictus* in *Pseudonomareetus*, and designated *relictus* as its type species.

At present four species may be included in *Pseudonomareetus*: *relictus* Horn, *regularis* LeConte, *manni* Wickham, and *merkei* Horn. Webb's *idahoensis* is a variety of *merkei*, and it was synonymized by Lindroth (1962).

KEY TO THE SPECIES OF THE GENUS *Scaphinotus* (SUBGENUS *Pseudonomareetus*) ROESCHKE

1. Fourth antennal segment, in some specimens also apex of third segment, pubescent; smaller beetles, 10–12 mm. *merkei* Horn
Fourth and third antennal segments glabrous, with only two rows of setae, tip of fourth segment may also be pubescent; larger beetles, 14–22 mm., seldom 13 mm. 2
- 2(1). Pronotum slender, as long as wide, or longer, basal seta absent; head distinctly longer than pronotum (fig. 12). *manni* Wickham
Pronotum stouter, slightly wider than long, basal seta present; head about same length as pronotum (fig. 14) 3
- 3(2). Elytra with irregular striae, difficult to count (fig. 58), or at least with additional punctures dividing intervals. Aedeagus with slender tip (figs. 92, 93) *relictus* Horn
Elytra with regular striae, easy to count, intervals not divided by punctures (fig. 59). Aedeagus with stouter, bent-down tip (figs. 97, 98) *regularis* LeConte

Scaphinotus (*Pseudonomareetus*) *merkei* (Horn)

Figures 4, 13, 22, 55, 56, 88, 89

Sphaeroderus merkei HORN, 1890, p. 71 (type locality, Idaho, Coeur d'Alene, as designated by Lindroth, 1962. Type in the Academy of Natural Sciences of Philadelphia, Pennsylvania).

Cychrus idahoensis WEBB, 1901, p. 133 (type locality not designated, "types" from Cedar Mountain, Latah County, Idaho, and from Collins, Idaho. Syntypes in Washington Agricultural College, Pullman. Synonymized by Roeschke, 1907).

DESCRIPTION: Dark brown or piceous, with traces of bronze luster on elytra; smallest (10–12 mm.) of all species of *Pseudonomareetus*. Head smooth, slightly longer than pronotum; labrum bifurcate, with lobes more than two and a half times longer than wide; genae incised, but not strongly, barely seen in front and beneath eyes (fig. 13); antennae with fourth segment entirely pubescent, yet less densely than fifth segment; third segment either glabrous, with a few setae on apex, or pubescent in its apical part (fig. 22); second antennal segment about one-third, rarely one-half, shorter than fourth segment, and one-half shorter than third segment (fig. 22).

Pronotum only slightly wider than long, average length 3.0 mm., range from 2.8 to 3.5 mm.; average width 3.3 mm., range from 3.0 to

3.8 mm.; difference in size of pronotum between males and females insignificant.

Elytra with regular, well-impressed striae, interrupted on sides and apex by merging intervals (figs. 55, 56); punctures of striae small, but conspicuous in beetles from Idaho, but barely seen in specimens from British Columbia; most specimens with 12 striae, rarely 11 or 13. Northern beetles having uninterrupted striae and minute punctures. Horn's type resembles more northern specimens, but striae on apex broken, as in examples from Idaho. Aedeagus slender, tip broadly rounded, sides either nearly parallel or slightly widening in middle; middle part broad, gradually narrowing toward base; internal sac, when exposed, without distinct inner armature (figs. 88, 89). Female genitalia of usual form.

Average length 11.1 mm., range from 10 to 12 mm.; average width 4.5 mm., range from 4.0 to 5.5 mm.; females a little stouter than males, average length of male 10.8 mm., width 4.5 mm.; average length of female 11.4 mm., width 5.0 mm.

DISTRIBUTION: This species is known from two restricted and widely separated areas—northern Idaho and southern British Columbia in the Creston area. I have seen specimens from the following localities: *Canada: British Columbia:* Head of Lizard Creek, Wynndel. (Lindroth also gave Goat Mt. Lake, Creston area.) *Idaho:* Kootenai County: Coeur d'Alene, Hayden Lake, and Honeysuckle. Benewah County: Emida. Shoshone County: St. Joe National Forest. Latah County: Cedar Mountain, Moscow, Tatuna Hills. Clearwater County: Pierce. All these localities are in the northern part of the state. Most of the beetles I have seen were collected in June, July, and August (Idaho); specimens from British Columbia have been taken on July 22.

DISCUSSION: *Pseudonomarethus merkeli* differs from all the species of the same subgenus in being smaller in size, in having the fourth antennal segment pubescent, and in the male genitalia, which resembles the aedeagus of *Maronetus* species. The species *merkeli* should, however, be placed with *Pseudonomarethus*, because it has four setae at the base of the labrum, not two setae as in the species of *Maronetus*, three to four setae on the palpi labialis, not two as in *Maronetus*, and because *merkeli* has more elytral striae than the *Maronetus* species. This species seems to bridge the gap between these two subgenera.

Webb's *idahoensis* differs from Horn's *merkeli* in having broken elytral striae with larger punctures than in *merkeli*, the intervals merging not only on the sides and apex, but also on the disk, and close to the suture. The type of *merkeli*, as mentioned above, has uninterrupted elytral striae, broken only on the apex, smaller punctures, and the intervals do not merge, except on the apex. The two species from British Columbia, which I saw had very regular, continuous elytral striae, with minute punctures, but one of the beetles had broken striae, starting from the eighth striae. When series of examples from Idaho are examined, all transitions between the two varieties are found. It is true that in the Cedar Mountains, Latah County (type locality of *idahoensis*), most specimens have broken elytral striae, and many beetles from Coeur d'Alene, Kootenai County (type locality of *merkeli*) have continuous elytral striae; however, in the same county, in Coeur d'Alene, in St. Joe Forest, and in Honeysuckle examples occur with intermediate characters. Therefore Hatch (1953) and Lindroth (1962) were right in placing *idahoensis* as a synonym of *merkeli*.

MATERIAL EXAMINED: 61 specimens, 32 males and 29 females.

Scaphinotus (Pseudonomarethus) manni Wickham

Figures 4, 12, 25, 26, 37, 47, 48, 57, 90, 91, 125, 126
Scaphinotus (Pseudonomarethus) manni WICKHAM, 1919, p. 170 (type locality, Wawawai, Washington. Type in National Museum of Natural History, Smithsonian Institution, Washington, D.C.).

DESCRIPTION: Dark brown, long and slender. Head obviously longer than pronotum, average length 4.9 mm., range from 4.0 to 5.5 mm., impunctate, but with more or less transverse wrinkles at front, slightly constricted behind eyes; eyes not entirely flat; genae incised, more prominent than in other species of *Pseudonomarethus*, well seen underneath and in front of eyes; labrum with long lobes, about three to four times longer than wide (fig. 12), more slender than in *regularis* or *relictus*; last segment of labial palpi of male only slightly wider than that of female, less dilated than in *regularis* and *relictus* (figs. 25, 26); antennae long, reaching well beyond humeri; third and fourth segments with two rows of setae, otherwise glabrous, beginning from fifth segment pubescent; basal antennal segment distinctly shorter than two

following ones, slightly stouter; second antennal segment as long as one-half of third, and a little shorter than fourth, segment.

Pronotum about as long as wide, or longer, average length 4.0 mm., range from 3.8 to 4.5 mm.; average width 4.1 mm., range from 4.0 to 4.8 mm.; basal seta absent; disk narrower posteriorly than flanks, exposing them conspicuously (fig. 12).

Elytra elongated; striae from 14 to 16 in number, with minute punctures, and either regular or, after ninth to twelfth striae broken, merging, on sides incomplete; intervals not or feebly convex on disk, more convex toward sides; fourth and eighth with a few shallow foveae (fig. 51). Ventral side smooth; front tarsi of male with three segments moderately dilated, bearing dense brush of papillae on ventral side, all three segments fully covered (figs. 37, 47). Aedeagus long and slender, with pointed tip, not strongly bent down, as in *regularis* (figs. 90, 91); internal sac without sclerotized armature, no hooks or spines near base of aedeagus as in *relictus* and *regularis*. Female genitalia with slender styli (figs. 125, 126).

Average length 19.2 mm., range from 16.5 to 22.5 mm.; average width 7.2 mm., range from 6.0 to 8.0 mm., no significant difference in sexes.

DISTRIBUTION: This is a rare species restricted to southern Washington and northern Oregon. I have seen specimens from the following localities: *Washington*: Asotin, in same county. *Whitman County*: Wawawai. Hatch (1953) gave northern Oregon as the area of *manni*. This species was collected from April to June.

DISCUSSION: *Scaphinotus (Pseudonomarethus) manni* resembles *S. (Pseudonomarethus) regularis* and *S. (Brennus) crenatus*. It differs from *regularis* in its more elongated form, longer head, and narrower pronotum, without basal setae. From *S. (Brennus) crenatus* it differs in the less convex elytra, with less numerous striae, often irregular on sides, in the less prominent eyes, and more convergent at base sides of the pronotum; the front tarsi of *S. (Pseudonomarethus) manni* in the males are wider than those in the males of *crenatus*, and the genitalia in both species are different. Also *S. (Brennus) crenatus* does not occur so far north.

MATERIAL EXAMINED: Sixteen specimens, eight males and eight females.

Scaphinotus (Pseudonomarethus) relictus (Horn)

Figures 5, 14, 21, 27, 28, 38, 49, 50, 58, 92-96, 127, 128
Cychrus (Sphaeroderus) relictus HORN, 1881, p. 188
(type locality, Spokane, Washington. Type in the Academy of Natural Sciences of Philadelphia, Pennsylvania).

DESCRIPTION: Black or dark brown. Head slightly longer than, or as long as, pronotum; average length 4.1 mm., range from 3.8 to 4.5 mm., smooth, except for front sulcus, being slightly elevated and more distinctly wrinkled; labrum stout, lobes not more than twice longer than wide (fig. 14); antennae long, third and fourth segments glabrous, with two rows of setae, in some specimens fourth segment pubescent on its very tip; second antennal segment as long as one-half of third segment, and about a quarter shorter than fourth segment (fig. 21).

Pronotum bisetose, with basal setae, slightly wider than long, seldom as long as wide, average length 3.9 mm., range from 3.3 to 4.5 mm.; average width 4.2 mm., range from 3.3 to 5.0 mm.; many females having wider pronotum, from 3.8 mm. to 5.0 mm., whereas that of males varies from 3.3 to 4.8 mm. (fig. 14). Elytra oblong-oval, striae from 14 to 16 in number, irregular, often doubled, confluent, especially on sides and apex; punctures small, but quite conspicuous and closely set; intervals feebly convex on disk, much more so on sides, merging and in many cases with sparse punctures dividing intervals; some specimens with quite regular striae, merging only after eighth striae, or, rarely after tenth striae, differing from *regularis* only by punctures dividing intervals, at least on apical half of elytra (fig. 58). Epipleura sparsely but distinctly punctate, mostly along epipleural and elytral margins, and with a few punctures in middle.

Anterior tarsi of male with three segments broadly dilated and bearing brush of papillae on ventral side, fourth segment small, glabrous or with a few papillae; both sexes with two setae analis on each side of anal segment, seldom with one seta or three setae. Of 67 males examined for this character, 92 percent had two setae analis, 4 percent one seta, and 4 percent three setae. Of 63 females examined, 76 percent had two setae, 15 percent three setae, and 4 percent one seta. Aedeagus slender, tip often slightly compressed on sides, not strongly bent or truncate as in *regularis* (figs. 92, 93); internal sac,

when exposed, with feebly sclerotized armature, even in very old beetles. This armature generally resembles slightly arcuate sticks, but if the internal sac is inflated, or cut in the middle, and the armature exposed it is like a hollow dish with sides bent inward (figs. 94–96). Female genitalia with moderately stout styli, less slender than in *manni*, and mostly stouter than in *regularis* (figs. 127, 128). Unfortunately, some females are intermediate between those of *relictus* and those of *regularis*.

Average length 16.3 mm., range from 13.0 to 19.5 mm.; average width 6.6 mm., range from 5.0 to 7.5 mm.; females larger and stouter than males, average length of male 15.5 mm., average width 6.2 mm.; in females average length 17.0 mm., average width 6.9 mm. No distinct difference in size among beetles from various localities.

DISTRIBUTION: This species is found mostly in southern British Columbia, southern Alberta, eastern Washington, and northern Idaho. I have seen specimens from the following localities: *Canada: British Columbia:* Kooteney West District: Riondel, Head of Lizard, Wynndel near Creston. Yale District: Vasseau, and Mt. Intyre Rd., both places near Oliver. Copper Mountains (west of Oliver), Vernon. Emerald Yoho National Park, Rock Creek. *Alberta:* Peace River District: Jasper Mt. Sack View, Point Banff. *Washington:* Lincoln County: Sprague. Spokane County: Spokane Mountains, Spokane Falls, Newmans Lake. Adams County: Ritzville. Whitman County: Pullman, Wawawai. *Oregon:* Josephine County: Kerby. *Idaho:* Bonner County: Sandpoint, Priest River, Clark's Peak. Kootenai County: Coeur d'Alene. Latah County: Cedar Mountain, Moscow, Troy. St. Joe River. I also saw specimens labeled "California," which could be northern California, close to Josephine County in Oregon.

In Canada beetles of *relictus* were collected from May to September, and as late as November 6 (Point Banff). In the United States the majority of beetles were found from the middle of May (Sprague, Washington, May 15), through June and July. Undoubtedly, they could be found much later, probably until late in the autumn.

DISCUSSION: *Scaphinotus (Pseudonomareetus) relictus* is similar to *S. (Pseudonomareetus) regularis*. The latter was made a synonym of *relictus* by Lindroth (1962). Roeschke (1907) and Hatch (1953)

considered them to be varieties, but retained both names. They differ distinctly, however, in elytral sculpture and the male genitalia. The elytral striae in *relictus* are irregular, broken by merging intervals, with additional punctures, either scattered or dividing the intervals. Of 58 specimens examined for this character, 43 beetles, or 74 percent, had completely irregular striae, impossible to count, starting from the second, third, or fourth striae; six beetles, or 10 percent, had irregular striae after the seventh and eighth striae; nine beetles, or 16 percent, after the ninth or tenth striae, or even closer to the elytral margin. These specimens with almost regular striae nevertheless have them wavy, not straight as in *regularis*, and the intervals, as a rule, are divided by additional punctures. However, I have seen two specimens from Coeur d'Alene, Idaho, with the elytra quite the same as those of *regularis*; they are differentiated only by the typical aedeagus of *relictus*.

Webb (1901) said that there were all sorts of gradation in the irregularity of the elytral striae, which is true, but only to a certain extent. I saw no beetles of *regularis* with such wavy striae as those in *relictus*, except at the very margin, and of course, the great majority of specimens of *relictus* are quite easily identified by the different, irregular pattern of the elytra, even overlooking the great difference in the male genitalia. The aedeagus of *relictus* is slender at the tip, not considerably bent down or truncate as in *regularis*, and the inner armature is quite different in shape (figs. 92–96). Therefore I believe the two are separate species.

MATERIAL EXAMINED: One hundred forty-seven specimens, 76 males and 71 females.

Scaphinotus (Pseudonomareetus) regularis (LeConte)

Figures 5, 59, 97–101, 129, 130

Cychrus (Sphaeroderus) regularis LECONTE, 1884, p. 2 (type locality, Coeur d'Alene Mountains, Idaho. Type in the Museum of Comparative Zoology, Harvard Univ., Cambridge, Massachusetts).

DESCRIPTION: Head and pronotum as in *relictus*, except that second antennal segment more distinctly shorter than fourth. Length of pronotum (average) 3.7 mm., range from 3.3 to 4.0 mm.; average width 4.2 mm., range from 3.5 to 4.5 mm., not much difference between sexes.

Elytra with 12–13 striae, fewer than in *relictus*, striae regular and straight, near margin incomplete, formed by separate punctures; intervals convex, especially toward margin; fourth and eighth, or third and seventh, intervals with sparse, shallow foveae, but without punctures dividing intervals, form of elytra same as in *relictus* (fig. 59).

Aedeagus stouter than in *relictus*, with short, strongly bent-down, almost truncate tip (figs. 97, 98); armature of internal sac, also closer to base of aedeagus, strongly sclerotized, resembling crab's claw (figs. 99, 100), quite different from that of *relictus*; females usually with more slender styli (figs. 129, 130). Males with two setae analis on each side of anal segment; of 36 males examined only 5 percent bear one seta. Females mostly with two setae, but some individuals with three setae; of 31 females examined 13 percent had three setae on each side of anal segment.

Average length 16.4 mm., range from 12.0 to 17.5 mm.; average width 6.6 mm., range from 5.5 to 7.0 mm.; females slightly stouter and larger, average length of male 15.6 mm., average width 6.3 mm.; average length of female 17.2 mm., average width 7.0 mm.

DISTRIBUTION: This species occupies almost the same area as *relictus* (eastern Washington and northern Idaho), but is rare in Canada. I have seen specimens from the following localities: *Canada: British Columbia:* Mt. Kaslo, Hedley Mountains (southwest of Penticton). *Washington:* Whitman County: Almota, Wawawai. *Idaho:* Kootenai County: Coeur d'Alene. Latah County: Cedar Mountain, Moscow, Kendrick, Viola, Juliaetta, Collins, Thatuna Hill. Clear Water County: Pierce, Greer. Idaho County: White Sand Lake, Selway Falls. St. Joe River. Lave Slide, 2 miles from Kenshia (this locality not found on the map). The majority of beetles were collected from the end of May to the end of August; in Idaho some were taken in April.

As stated under *relictus*, these two species differ in the elytral sculpture and the genitalia, especially those of the males.

MATERIAL EXAMINED: Ninety-eight specimens, 44 males and 54 females.

SUBGENUS *NOMARETUS* LeCONTE

Nomaretus LeCONTE, 1853, p. 399.

TYPE SPECIES: *Cychrus bilobus* Say (designated by Lindroth, 1969).

DESCRIPTION: Small beetles, usually about 10 to 12 mm. Dark or light brown with distinct metallic, violet or purple, luster. Head slender, about same length as pronotum, constricted behind very prominent eyes, smooth, without punctation or wrinkles; labrum bifurcate, with long lobes and four setae at base; mandibles slender, with two small terebral teeth, more or less widely separated; eyes with one long seta near each; genae simple, rarely with tiny, inconspicuous tubercle; antennae long, reaching beyond humeri, second antennal segment not longer than half of third segment, often less than that, and about one-half of length of fourth segment; fourth segment only slightly shorter than third segment. In all species of *Nomaretus* antennae pubescent from third segment; in *bilobus*, however, half of third segment, or at least base of it, glabrous.

Pronotum slightly wider than long or, in *fissicollis*, as long as wide, sides evenly arcuate at front, straighter, feebly arcuate, or slightly sinuate in posterior half; apical and lateral margins narrow, only in *bilobus* apical marginal bead broader; pronotum with two or more lateral setae, basal seta invariably at some distance before hind angles; front angles slightly protruding, especially in *cavicollis* and *liebecki*, less so in *fissicollis* and *bilobus*; hind angles convergent and often rounded, mostly so in *liebecki*, not extending beyond base; median line, dividing pronotum into two spheres, distinct, basal and apical lines often inconspicuous because of large punctures on apex and base; disk smooth and convex, in *cavicollis* strongly convex and with punctures not only at apex and base, but also with setigerous punctures at front part of disk (fig. 73).

Elytra oblong-oval, in *fissicollis* rather slender, in other species stouter, striatopunctate, with very regular striae and moderately large punctures; number of striae from 10 to 12, one or two striae, close to margin, often incomplete; elytral humeri rounded; epipleura coarsely punctate. Setae orbitalis, gularis, metacoxalis anterior and posterior, and seta on metatrochanter present; males and females with two setae on each side of anal segment, more rarely males having one seta. Ventral side with punctures on elytral epipleura, on sides of abdomen, and partly on thorax; proepisternum smooth or with only a few punctures; legs not long, anterior and middle femur with setigerous

Nomaretus cavicollis LECONTE, 1859a, p. 3 (type locality, Fort Riley, Kansas. Type in the Museum of Comparative Zoology, Cambridge, Massachusetts).

DESCRIPTION: Brown, with distinct purple luster. Pronotum quite convex, cordiform, slightly wider than long, average length 3.0 mm., range from 2.5 to 3.3 mm.; average width 3.3 mm., range from 2.8 to 4.0 mm., not much difference between sexes in size of pronotum. Sides of pronotum arcuate at front, more or less straight in posterior part; lateral margin thin and with numerous setae, middle and basal setae longer than others; apex more arcuate than in *fissicollis* and *bilobus*, front angles, because of arcuate apex, projecting; hind angles not extending beyond straight base, subangulate, usually more pointed than in *fissicollis* and *liebecki*; quite a few specimens with round hind angles (Muncie, Wyandotte County, Kansas); base of pronotum, as a rule, shorter than apex, or at least of same length; front part of disk with coarse, setigerous punctures; base of pronotum with numerous simple punctures, usually more punctate than in other species of *Nomaretus* (figs. 16, 73).

Elytra as in *bilobus*, stouter than in *fissicollis*, humeri more obliterated than in *bilobus*; striae deep, mostly 12, in some specimens 11 in number, punctures of striae numerous, large; intervals smooth, slightly convex close to suture, more so on sides. In specimens from Arkansas (three males and two females) elytra with sparse, erect hair on apex of elytra or all over (fig. 16).

Prosternal process slightly, in some specimens more strongly, bent toward body. Ventral side more coarsely punctate and with more setigerous punctures than in other species of *Nomaretus*; proepisternum, proepimeron, mesosternum, and metasternum, first and second abdominal segments, and parts of following segments on sides with large punctures. In some specimens all abdominal segments and metacoxa with rows of setigerous punctures (Magazine, Hot Springs, and Sevier County in Arkansas, and also Muncie and Douglas in Kansas). Usually metacoxa with one anterior and one posterior seta, in many cases with two anterior and two posterior setae, or with three to five posterior setae, in some specimens, mentioned above, with as many as 10 setae in rows. Middle femur, especially in males, bearing numerous setae; front femur with setigerous punctures. Males with tarsi slightly dilated, less so than in *bilobus* and *fissicollis*, and with three to four segments bearing brush of papillae on ventral side, first

segment only on its tip, not more than one-third of segment papillose (figs. 39, 40).

Aedeagus stout, tip rounded, armature of internal sac sclerotized, placed close to middle of aedeagus, with two arcuate, long pieces, and two stout spines forming a pattern in some cases not distinct, depending on how internal sac was exposed (figs. 102–107). Styli of female genitalia less stout than in *bilobus*, but not so slender as in *fissicollis* (figs. 135, 137).

Average length 11.9 mm., range from 11 to 13 mm.; average width 5.0 mm., range from 4.5 to 6.0 mm.; males smaller and more slender, average length of male 11.6 mm.; average width 4.7 mm.; average length of female 12.0 mm., average width 5.1 mm.

DISTRIBUTION: Eastern Kansas, western Arkansas, Missouri, and Oklahoma. I have seen specimens from the following localities: *Kansas*: Shawnee County: Topeka and Auburn. Riley County: Riley. Greenwood County: Eurica. Franklin County. Douglas County: Lawrence. Wyandotte County: Muncie and Argentina. *Arkansas*: Benton County: Rogers. Logan County: Magazine. Hot Spring County. Sevier County. *Missouri*: Jackson County: Kansas City. *Oklahoma*: Cleveland County: Norman. According to Roeschke (1907), the species occurs also in Wilson County (Benedict) in Kansas, which is undoubtedly true, and in Texas. However, the Texas locality is probably for *liebecki*, which Roeschke mistook for *cavicollis*.

DISCUSSION: *Scaphinotus* (*Nomaretus*) *cavicollis* is easily distinguished from all other species of the subgenus by the coarse setigerous punctures at the front part of the pronotum, and the abdominal segments. The stout aedeagus resembles that of *liebecki*; the latter, however, has no setigerous punctures on the pronotum, and its elytral striae are less impressed than in *cavicollis*.

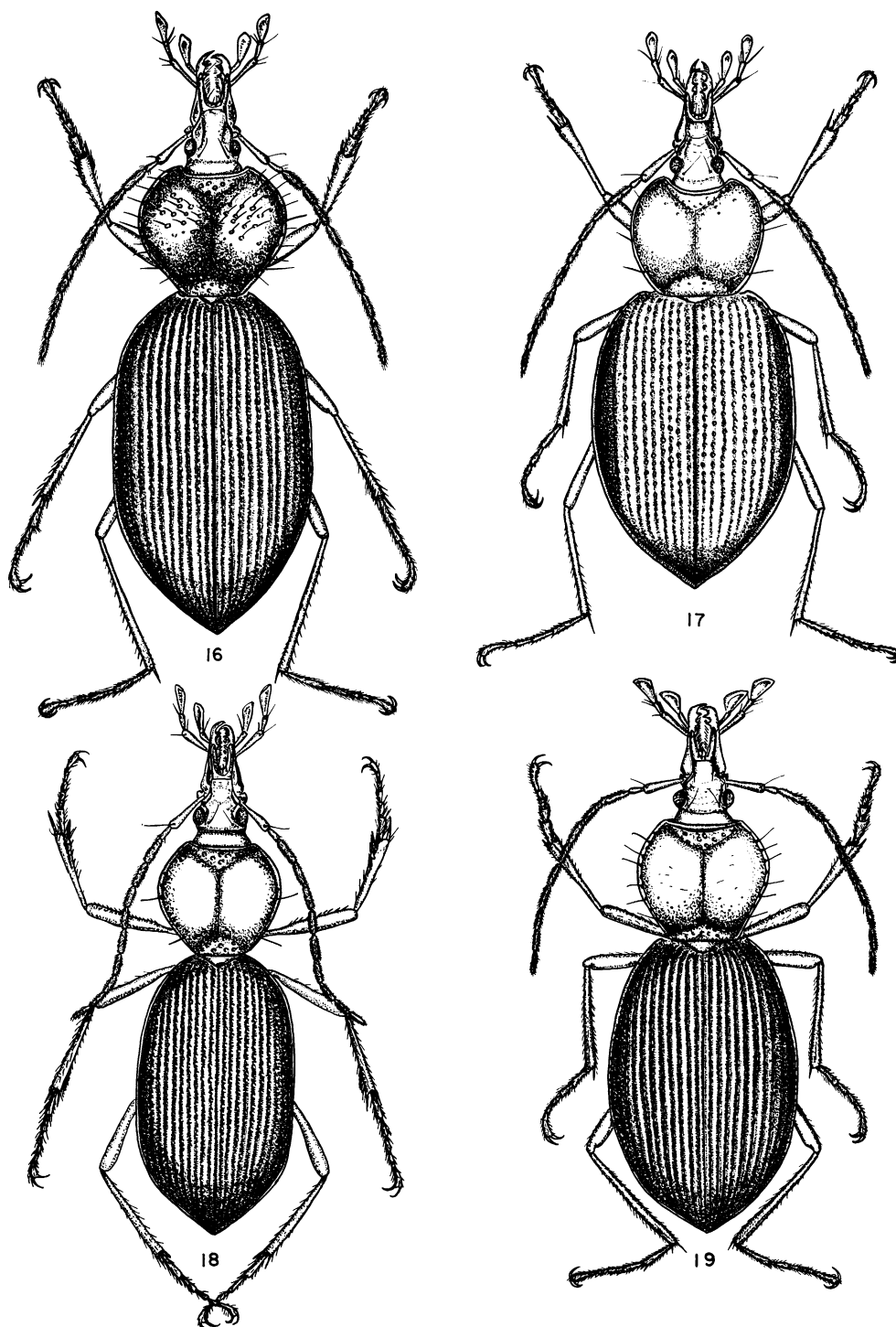
MATERIAL EXAMINED: Thirty-seven specimens, 10 males and 27 females.

Scaphinotus (*Nomaretus*) *liebecki* Van Dyke

Figures 6, 17, 41, 42, 74, 75, 108–110, 131–133

Scaphinotus (*Nomaretus*) *liebecki* VAN DYKE, 1936, p. 40 (type locality, Texas. Type in the California Academy of Sciences, San Francisco).

DESCRIPTION: Brown, with purple luster. Pronotum slightly or more distinctly wider than long, average length 3.0 mm., range from 2.5 to 3.3 mm.; average width 3.5 mm., range from



FIGS. 16-19. *Scaphinotus* (*Nomaretus*), dorsal view. 16. *cavicolis* from Muncie, Kansas. 17. *liebecki* from Texas. 18. *fissicolis* from Imboden, Arkansas. 19. *bilobus* from White Mountains, New Hampshire.

3.0 to 4.0 mm.; sides evenly arcuate, or slightly straighter in posterior half; lateral margin narrow, with two to five, rarely six, setae on each side, of 19 beetles examined for this character 14, or 74 percent, had only two setae; apex slightly or considerably arcuate, and front angles broadly rounded, projecting; base straight or feebly arcuate, hind angles also broadly rounded not extending beyond base; both base and apex punctate; disk smooth, feebly or moderately convex (figs. 17, 74, 75).

Elytra conspicuously wider than those in *fissicollis*; humeri rounded, striae regular, 10 to 11 in number, mostly not strongly impressed, much less so than in *bilobus* and *cavicollis*, even less so than in *fissicollis*; punctures of striae large and sparse, intervals, in majority of beetles, feebly convex.¹

Prosternal process hardly bent toward body. Proepimeron, metaepisternum, sides and base of abdominal segments with sparse punctures. Some specimens with two posterior setae on metacoxa. One female from Nacogdoches, Texas, and a male from Louisiana, with rows of setae, five and seven setae on metacoxa. First segment of front tarsi of males with brush of papillae on its very tip only (figs. 41, 42); second and third segments fully covered with papillae; all segments of front tarsi of males feebly dilated, less so than in *bilobus* and *fissicollis*.

Aedeagus resembles that of *cavicollis*, tip broadly rounded, armature of internal sac more or less like that in *cavicollis* (figs. 108–110). Female genitalia with styli less slender than in *fissicollis* (figs. 131–133). Average length 11.5 mm., range from 10 to 13 mm.; average width 4.9 mm., range from 4.5 to 5.0 mm. As in *cavicollis* females only slightly larger and broader than males.

DISTRIBUTION: This species is apparently localized in Texas, but is present, although rare, in Louisiana. I have seen specimens from the following localities: *Texas*: Hays County: San Marcos. Comal County: New Braunfels. Houston County: Nacogdoches County: Nacogdoches. *Louisiana*: Natchitoches County: Vowells Mill.

DISCUSSION: *Scaphinotus (Nomaretus) liebecki* differs from all other species of this subgenus in

the shape of the pronotum, with its evenly arcuate sides and broadly rounded hind angles, and in the less-impressed elytral striae with large, sparse punctures. From *fissicollis* it differs not only in having much broader elytra, but also a quite different aedeagus and armature of the internal sac. Specimens from Louisiana resemble *fissicollis* more than do those from Texas; they have a more slender pronotum, with sides straighter posteriorly, more strongly impressed elytral striae, and convex intervals. This variety of *liebecki* differs from *fissicollis* in having a more convex pronotum with arcuate apex, broader tip of aedeagus, different armature of internal sac, and much smaller brush of papillae on the first segment of the front tarsi of the male (figs. 41, 42). From *bilobus*, which also has stout elytra, *liebecki* differs in having less-impressed elytral striae, with large, sparse punctures, a stout aedeagus with rounded tip, not pointed as in *bilobus*, and, of course, in the armature of the internal sac (figs. 108–110). As said above, *liebecki* has no setigerous punctures on the pronotum and is easily distinguished from *cavicollis*, in spite of the more or less identical armature of the internal sac of the aedeagus.

MATERIAL EXAMINED: Twenty-one specimens, nine males and 12 females.

Scaphinotus (Nomaretus) fissicollis (LeConte)

Figures 6, 18, 43, 44, 76, 111–114, 134–135

Nomaretus fissicollis LECONTE, 1835, p. 399 (type locality, Illinois. Type in the Museum of Comparative Zoology, Cambridge, Massachusetts).

DESCRIPTION: Most slender of all species of *Nomaretus*. Brilliant purple, rarely with bluish elytra and purple margin. Head as usual in this subgenus. Pronotum slightly wider than long, in some specimens as long as wide; average length 2.7 mm., range from 2.5 to 3.0 mm.; average width 3.2 mm., range from 2.8 to 3.5 mm. In some females pronotum distinctly wider than long, yet difference in sexes not significant. Sides of pronotum not strongly arcuate at front, straighter in posterior half, lateral margin thin, with limited number of setae, but with large punctures not necessarily bearing setae. Of 43 specimens examined for this character, 21, or 49 percent, had one middle and one basal seta on each side, 17, or 40 percent, three setae on each

¹Only four specimens (two from Houston County, Texas, and two from Louisiana) of 19 examined had well-impressed striae and convex intervals.

side, and only four, or 9 percent, four setae; apical marginal bead thin, front angles hardly projecting beyond more or less straight apex; disk smooth, large punctures beyond apical and basal lines only; base in majority of beetles shorter than apex, in some of equal length (figs. 18, 76).

Elytra oblong-oval, sides more or less parallel, humeri rounded, often almost obliterated; striae 10 or 11 in number, seldom nine or 12, close to margin incomplete and less distinct; punctures of striae conspicuous, smaller than in *cavicollis* and *liebecki*; intervals feebly convex and smooth (fig. 18). Epipleura moderately densely punctate, same as sides of thorax and abdomen. Prosternal process mostly slightly bent toward body, of 38 beetles examined for this character, 23 specimens, or 61 percent, having prosternal process slightly bent, seven beetles, or 18 percent, almost straight, and eight, or 21 percent, strongly bent toward body, almost as in the genus *Cychrus*. Legs with slender femur bearing a few setigerous punctures at front. Anterior tarsi of male slightly dilated, with four segments covered by brush of papillae on ventral side, first segment in its apical third or half, fourth segment not in every case fully covered. Brush of papillae in *fissicollis* on first segment of front tarsi of male invariably conspicuously larger than in *cavicollis* or *liebecki* (figs. 43, 44).

Aedeagus more slender than in *cavicollis* and *liebecki*, but tip rounded, not pointed as in *bilobus*, armature of internal sac violin-shaped (figs. 111–113); if armature poorly sclerotized (young beetles), only two elongated ends of armature conspicuous. Female genitalia with more slender styli than in any other species of *Nomaretus* (figs. 134, 135), coxitae feebly convex, not so sharply as in *bilobus*, and mostly with fewer setigerous punctures.

Average length 10.9 mm., range from 9.5 to 12.5 mm.; average width 4.6 mm., range from 4.0 to 5.0 mm. All females larger than, although almost as slender as, males; average length of male 10.5 mm., average width 4.5 mm.; average length of female 11.4 mm., average width 4.6 mm.

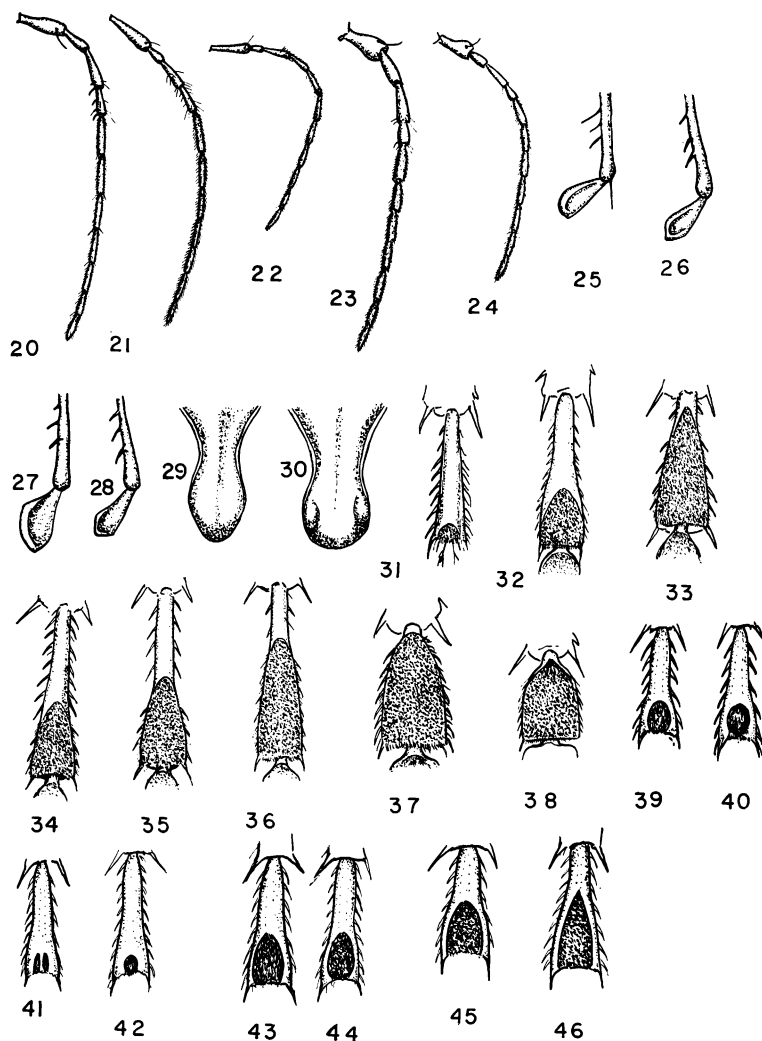
DISTRIBUTION: Southwestern corner of Iowa, Missouri, northwestern Kansas, and northern Arkansas. I have seen specimens from the following localities: *Iowa*: Johnson County: Iowa City. Henry County: Mt. Pleasant. Lee County: Fort

Madison. *Kansas*: Leavenworth County: Tonganoxie. Wyandotte County: Kansas City, Muncie, Argentina. Shawnee County: Willard. *Missouri*: St. Charles County: Waldron. Greene County: Willard. Jefferson County: Pevely. *Arkansas*: Washington County: Cove Creek near Fayetteville. Lawrence County: Imboden.

Beetles were collected in April and May, but were also found in August, September, and as late as October 29 (Waldron, Missouri).

DISCUSSION: This species differs from all other species of *Nomaretus* in its more slender form (fig. 18), narrower pronotum, which is about as long as wide (fig. 76), and narrower elytra. The males have a slender aedeagus with a distinct violin-shaped armature of the internal sac, quite obvious in mature beetles; females have more slender styli than in the other species of *Nomaretus*. Also, although not so conspicuous, there is a tendency for the elytral punctures to become smaller on the last one or two marginal striae, in comparison with the elytral punctures on the disk of the elytra, or even on its sides. Of 54 specimens examined for this character, 56 percent had distinctly smaller punctures on the last striae, close to the margin. This character is not found in *bilobus* and *cavicollis*, and is rare in *liebecki*. From *liebecki*, which seems to resemble *fissicollis* more than any other species, *fissicollis* differs also in the shape of the pronotum, with sides more oblique in their posterior half, not arcuate as in *liebecki*, and in the hind angles of the pronotum, which are either blunt, or narrowly rounded, not broadly rounded as in *liebecki* (figs. 74–76). Also, of course, *liebecki* is stouter than *fissicollis*. Males of *fissicollis* have a larger brush of papillae on the first segment of the anterior tarsi; males of *liebecki*, a very small brush on the tip of the first segment only (figs. 41–44). As for *bilobus*, which also resembles *fissicollis* more than *cavicollis*, mostly because of the impunctate disk of the pronotum, it differs from *fissicollis*, as said above, in its stouter form, smaller elytral punctures, partly hidden in more convex elytral striae, in having more numerous lateral setae of the pronotum, in the partly glabrous third antennal segment, the pointed aedeagus with quite different inner armature (figs. 115–118), and in the stouter female genitalia (figs. 136, 137).

MATERIAL EXAMINED: Fifty-four specimens, 29 males and 25 females.



FIGS. 20-24. Antennae. 20-22. *Scaphinotus*. 20. *S. (Neocyclus) angulatus*. 21, 22. *S. (Pseudonomareus)*. 21. *relictus*. 22. *merkeli*. 23, 24. *Cychrus*. 23. *tuberculatus*. 24. *hemphillii hemphillii*.

FIGS. 25-28. Palpi labialis of *Scaphinotus (Pseudonomareus)*. 25, 26. *manni*. 25. Male. 26. Female. 27, 28. *relictus*. 27. Male. 28. Female.

FIGS. 29, 30. Prosternal process of *Scaphinotus (Neocyclus)*. 29. *angulatus*. 30. *behrensi*.

FIGS. 31-46. First segments of front tarsi of male of *Scaphinotus* (ventral view). 31. *S. (Neocyclus) angulatus*. 32. *S. (Brennus) ventricosus* from California. 33-36. *S. (Stenocantharus)*. 33. *angusticollis* from Tidewater, Oregon. 34-36. *velutinus*. 34. From Tidewater, Oregon. 35, 36. From Humboldt County, California. 37, 38. *S. (Pseudonomareus)*. 37. *manni* from Asotin, Washington. 38. *relictus* from Mt. Spokane, Washington. 39-46. *S. (Nomareus)*. 39, 40. *cavicollis*. 39. From Muncie, Kansas. 40. From Topeka, Kansas. 41, 42. *liebecki*. 41. From Ruston, Louisiana. 42. From Texas. 43, 44. *fissicollis*. 43. From Imboden, Arkansas. 44. From Muncie, Kansas. 45, 46. *bilobus*. 45. From Ontario. 46. From Mt. Desert Island, Maine.

Scaphinotus (Nomarethus) bilobus (Say)

Figures 6, 19, 45, 46, 77, 115–118, 136, 137

Cychrus bilobus SAY, 1823,¹ p. 73 (type locality, Missouri and Northern Territory [According to Van Dyke, 1936, it is now northern Nebraska and Minnesota]. Type lost. Neotype designated by Lindroth [1969] from Nipigon, Western Ontario, is in the Museum of Comparative Zoology, Cambridge, Massachusetts).

Sphaeroderus palpalis MOTSCHULSKY, 1865, p. 322 (type locality, Hudson Bay. Type in the Motschulsky collection, Moscow University, U.S.S.R. Synonymized by Lindroth [1962]).

DESCRIPTION: Darker than *fissicollis* and *liebecki* with fainter violet or purple luster, head often dark; antennae with third segment half glabrous, or at least with glabrous base. Of 49 specimens examined for this character, 65 percent having third segment half glabrous, 16 percent with one third glabrous, 18 percent with nearly whole third segment pubescent, glabrous only at base. Genae, as a rule, simple, without even smallest tubercle.

Pronotum cordiform, slightly wider than long, the widest place before middle, average length 3.0 mm., range from 2.5 to 3.5 mm.; average width 3.4 mm., range from 3.0 to 4.0 mm.; males and females without much difference in size of pronotum; sides of pronotum slightly arcuate at front, in posterior half oblique or sinuate; lateral margin narrow, with more numerous setae than in *fissicollis* and *liebecki*, most specimens with five to six setae on each side, rarely three to four, or seven to 10. None of specimens examined had fewer than three setae, also all setae approximately of same length, with more or less equal intervals between them, last seta at some distance before hind angles, as is usual for *Nomarethus*. Apical marginal bead broader than in other species of *Nomarethus*, rarely incomplete or narrow; front angles mostly slightly projecting, hind angles blunt or narrowly rounded, not extending beyond straight or slightly arcuate base; disk feebly convex, smooth, base of pronotum with coarse punctures, apex with a few smaller punctures, with minute punctures along apical line, in some specimens nearly smooth (fig. 77).

Elytra oblong-oval, convex, humeri rounded,

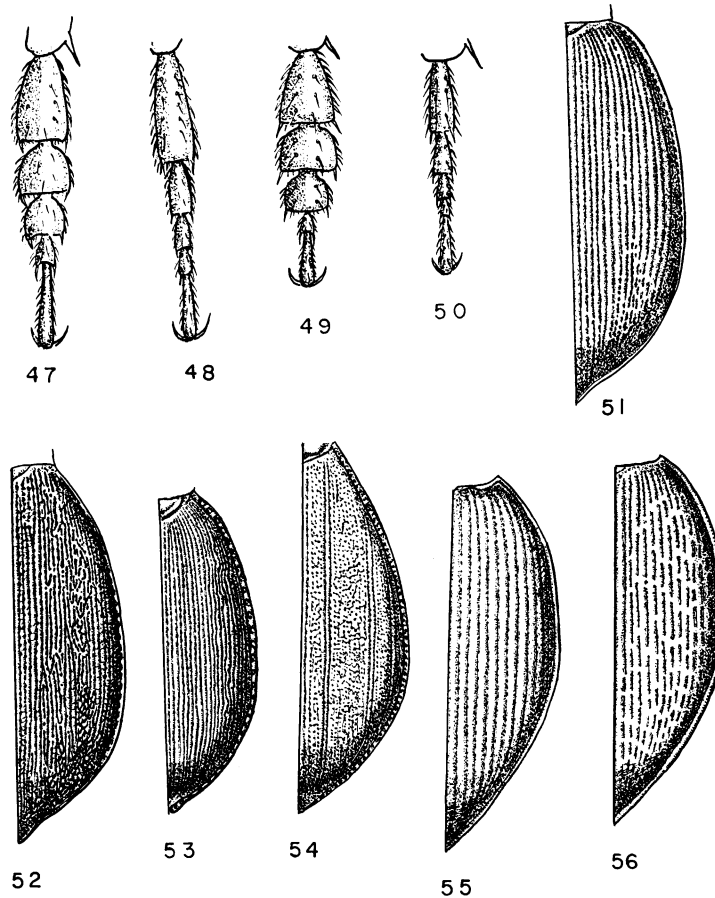
¹The year of the original description of *bilobus* was given by Leng (1920), Roeschke (1907), and some other entomologists as 1825. Lindroth and Freitag (1969) wrote, however, that LeConte was right in assuming the year to be 1823.

usually distinct, not obliterated; striae deep, 10 to 12, rarely 13 in number; punctures of striae small and numerous; intervals convex; last two striae, close to margin, incomplete. Of 57 beetles examined, 74 percent had 11 striae; 16 percent, 12 striae; 7 percent, 10 striae; and 3 percent, 13 striae (fig. 19). Ventral side coarsely punctate on epipleura, sparsely punctate on proepimeron, parts of mesosternum, parts of or whole metasternum, and with finer punctures on sides of first three or four abdominal segments. Prosternal process quite bent toward body. Legs moderately slender, anterior femur not invariably with pore punctures at front. Beetles with or without these pore punctures often found in same localities. Front tarsi of males moderately dilated, usually all four segments with brush of papillae on ventral side, first segment covered with papillae in its apical half or two-thirds, only one-third being glabrous; fourth segment either less densely papillose than other three segments, or only with a few papillae, very seldom glabrous (figs. 45, 46). Males with two, rarely one, setae analis on each side of anal segment, females with two setae; of 33 males examined not more than 21 percent with one seta.

Aedeagus with slender tip, more pointed than in other species of *Nomarethus* (figs. 115, 116); armature of internal sac less strongly sclerotized, heart-shaped, less distinct than in other species, when extracted from the internal sac and divided in middle resembling valves of clams (figs. 117, 118). Styli of female genitalia stouter than in *fissicollis* or *liebecki*, coxites quite convex (figs. 136, 137).

Average length of body 12.3 mm., range from 11.0 to 14.5 mm.; average width 5.3 mm., range from 4.5 to 7.0 mm. Not much difference in size between sexes, females, as usual, slightly stouter. In one case, however, two males from Isle Royal, Michigan, were larger, 14.5 mm., than the females.

DISTRIBUTION: Southeastern part of Canada and northern United States, in the Great Lakes region, and in the mountains of the northeast. In the west as far as Manitoba and northern Kansas. I have seen specimens from the following localities: *Canada*: Nova Scotia: Cheticamp and Cape Breton Island. *New Brunswick*: Bathurst. *Ontario*: Near and around Lake Superior (Ingolf, Kenora, Rainy River), Lake Nipigon, Sioux Lookout, Michipicoten, and Royal Island. Cochrane, Macdiarmid. District



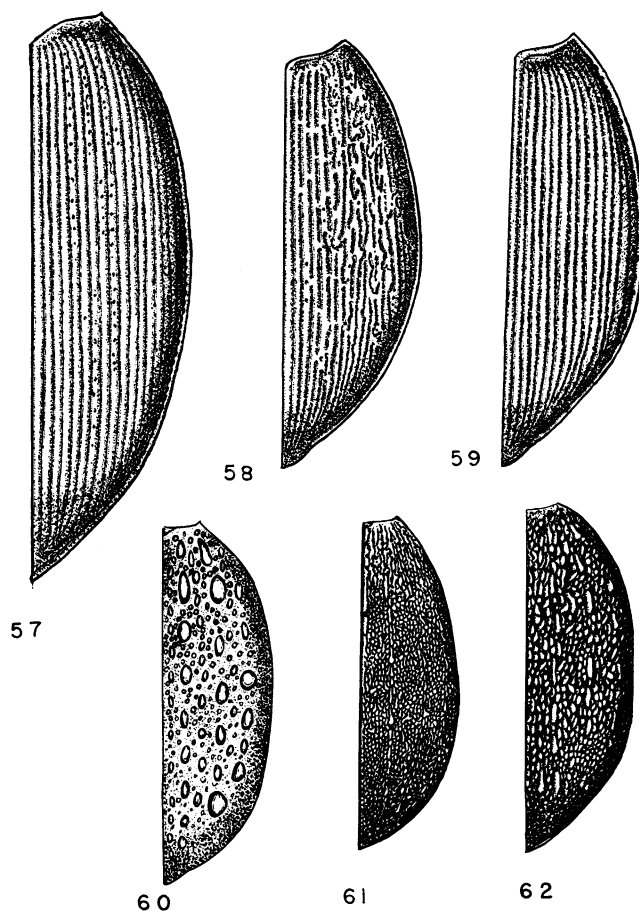
FIGS. 47-50. Front tarsi of *Scaphinotus* (*Pseudonomareetus*). 47, 48. *manni* from Asotin, Washington. 47. Male. 48. Female. 49, 50. *relictus* from Washington. 49. Male. 50. Female.

FIGS. 51-56. Right elytron of *Scaphinotus*. 51, 52. *S. (Neocyclus)*. 51. *angulatus* from McCredie Springs, Oregon. 52. *behrensi* from Redwood near Creston, California. 53, 54. *S. (Stenocantharus)*. 53. *angusticollis* from Cordoba, Alaska. 54. *velutinus* from Mary's Peak, Oregon. 55, 56. *S. (Pseudonomareetus) merkeli*. 55. From British Columbia. 56. From Cedar Mountains, Idaho.

Nipissing near junction of highways 11 and 17. *Quebec*: District Pontiac: Duparquet. *Manitoba*: Township 7, Range 11 E. Rennie, Springfield District. *Maine*: Mt. Desert Island, Isle au Haut. *New Hampshire*: Grafton County: Grafton. White Mountains: Mt. Washington, Mt. Madison, Pinkham Notch, and Tuckerman's Ravine. *Vermont*: Washington County: Camel's Hump Mountain. *Massachusetts*: North of Berkshire County in Greylock Range. *New York*: Greene County: Catskills; Whiteface and Wallface

Mountains. Erie County: Buffalo. *Ohio* (no other locality given). *Michigan*: Alpena County: Alpena. Marquette County: Marquette. *Wisconsin*: Vilas County: Eagle River. *Illinois*: Adams County: Quincy. *Missouri*: Wayne County: Mackenzie. *Kansas*: Douglas County: Lawrence. According to Cutler (1967), it occurs also in *Minnesota*: Clearwater County: Itasca State Park, and in Ramsey County.

Beetles of *Scaphinotus* (*Nomareetus*) *bilobus* were collected in Manitoba and Ontario in the



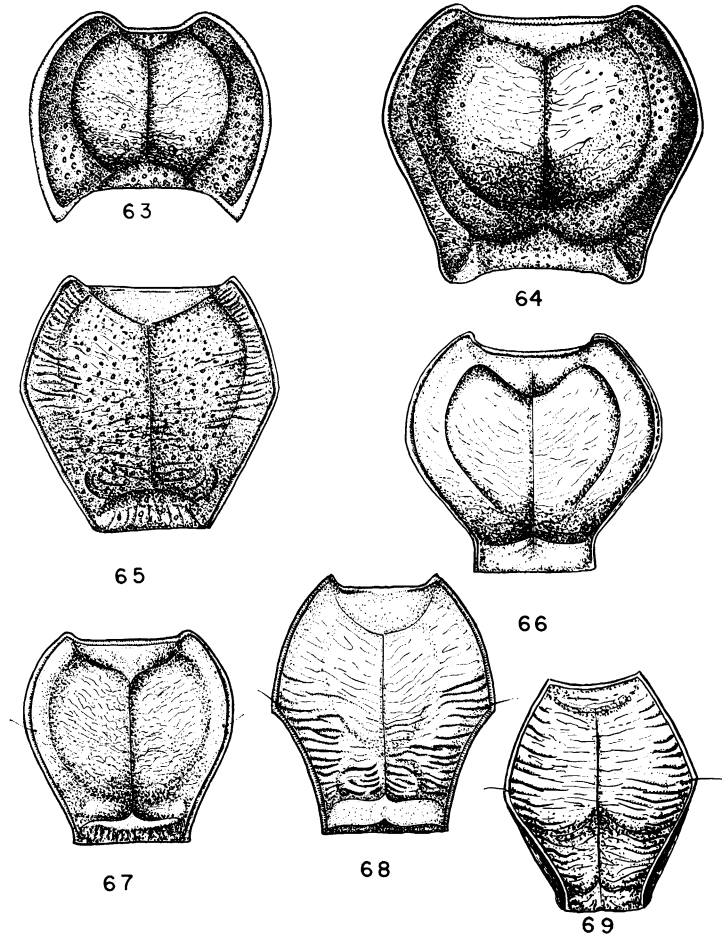
FIGS. 57-62. Right elytron. 57-59. *Scaphinotus* (*Pseudonomaretus*). 57. *manni* from Asotin, Washington. 58. *relictus* from British Columbia. 59. *regularis* from Greer, Idaho. 60-62. *Cychrus*. 60. *tuberculatus* from British Columbia. 61. *hemphillii* from Logan Canyon, Utah. 62. *hemphillii rickseckeri* from Wynndel, British Columbia.

second part of June through July, and in Quebec from the end of May to the beginning of September ("IX-17," Lindroth, 1962). In the United States most specimens that I saw were found in June, July, or August, but some beetles were collected in September (New Hampshire, White Mountains, September 6).

DISCUSSION: This species differs from all other species of *Nomaretus* in its partly glabrous third antennal segment, in the male genitalia with a slender, pointed tip, in the shape of the pronotum with sinuate, or more conspicuously oblique sides in the posterior half, in the stouter marginal

apical bead of the pronotum, in the more numerous setae on the sides of the pronotum, but no setigerous punctures at the front part of the pronotum, as in *cavicollis*. Also, although less distinct, the elytral striae in *bilobus* are strongly impressed, and the punctures are small, the prosternal process is quite bent toward the body, and the front tarsi of males have a larger brush of papillae (figs. 45, 46).

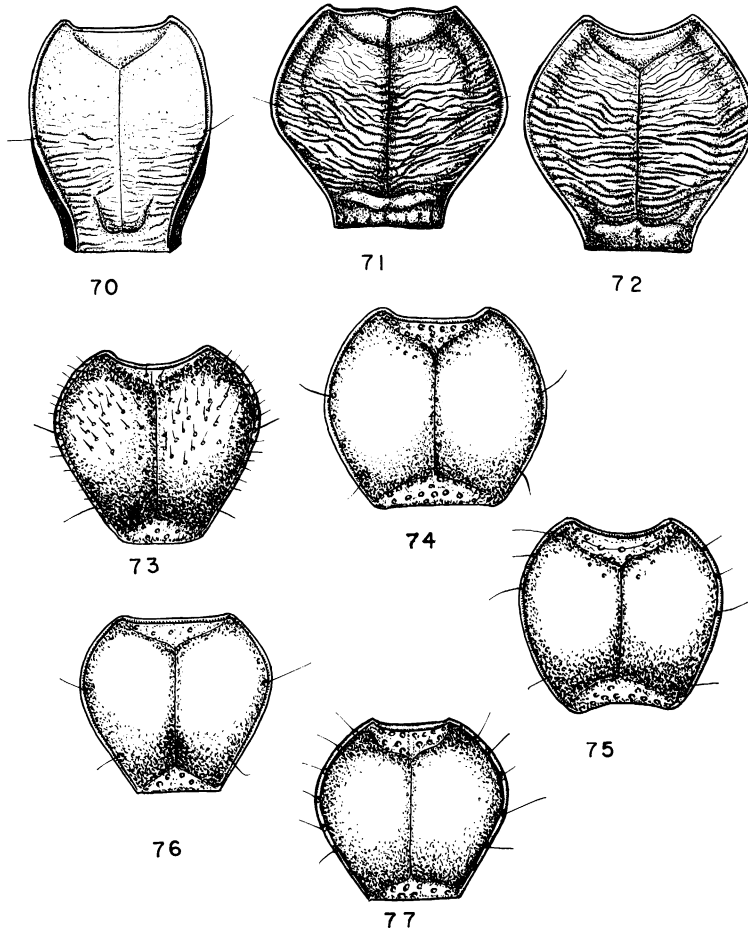
Sphaeroderus palpalis Motschulsky was synonymized by Lindroth (1962) with a question mark. The type of *palpalis* is in Motschulsky's collection, State University in Moscow, and was very



FIGS. 63–69. Pronotum of *Scaphinotus*. 63. *S. (Scaphinotus) elevatus* from New Jersey. 64. *S. (Irichroa) viduus* from Bear Mountains, New York. 65. *S. (Steniridia) guyoti* from Tennessee. 66. *S. (Brennus) ventricosus* from California. 67–69. *S. (Stenocantharus)*. 67. *angusticollis* from Juneau, Alaska, typical individual. 68, 69. *velutinus*. 68. From Dilley, Oregon, rare individual. 69. From Humboldt County, California, common individual.

kindly examined for me by Dr. Zhelokhovtsev. The type does not belong to *Sphaeroderus*, but to *Scaphinotus* (*Nomaretus*). In *palpalis* the second segment of the labial palpi has more than two setae; the episternum and the epimeron of the prothorax are divided by a suture, and both have large punctures; the elytral epipleura do not reach the tip of the elytra; the apex of the third antennal segment and the whole fourth segment are pubescent; the pronotum has more than two lateral setae (actually there are two setae at the front, and conspicuous pore punctures at the margin, but the setae were lost);

and setae orbitalis are present. In *Sphaeroderus* the second segment of the palpi labialis bears two setae; the suture dividing the episternum and the epimeron of the prothorax is absent; and only the base of the prothorax is punctate; the elytral epipleura are enlarged and reach (as a thin line) the tip of the elytra; the third and fourth antennal segments are glabrous; the lateral margin of the pronotum has a middle seta. Thus Lindroth (1962) was right in placing *palpalis* as a synonym of *bilobus*. Roeschke (1907),



FIGS. 70-77. Pronotum of *Scaphinotus*. 70-72. *S. (Stenocantharus) velutinus*. 70. From Humboldt County, California. 71, 72. From Mendocino, California, common individuals. 71. Female. 72. Male. 73-77. *S. (Noma-retus)*. 73. *cavicolis* from Muncie, Kansas. 74, 75. *liebecki* from Texas. 76. *fissicollis* from Imboden, Arkansas. 77. *bilobus* from Mt. Desert Island, Maine.

who considered *palpalis* to be a synonym of *Sphaeroderus canadensis*, apparently did not see the type and did not have a good description of it.

MATERIAL EXAMINED: Eighty specimens, 42 males and 38 females.

GENUS *CYCHRUS* FABRICIUS

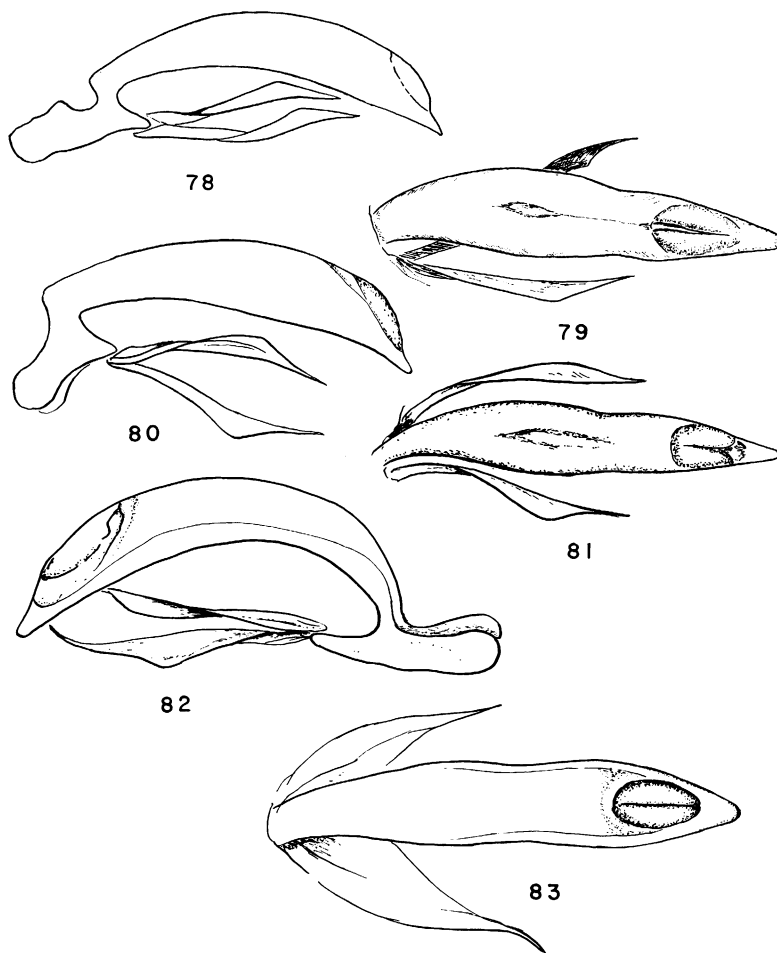
Cychrus FABRICIUS, 1794, p. 440.

TYPE SPECIES: *Cychrus caraboides* Linné of Europe.

This genus is European and partly Asian; only two species occur in America. Roeschke

(1907) described 25 species, and 16 subspecies and varieties that he treated as subspecies. The majority of species belonging to this genus are found in Europe.

DESCRIPTION: Black, head and pronotum densely punctate, elytra with tegulae or tubercles and without distinct striae. Head coarsely punctate up to clypeus; genae simple, labrum stouter than in *Scaphinotus*, with shorter lobes, and two, not four, setae at base (fig. 15); eyes round, moderately convex, not flat as in *Neocychrus*, distinctly emarginate; mandibles stout, with two small teeth; antennae reaching



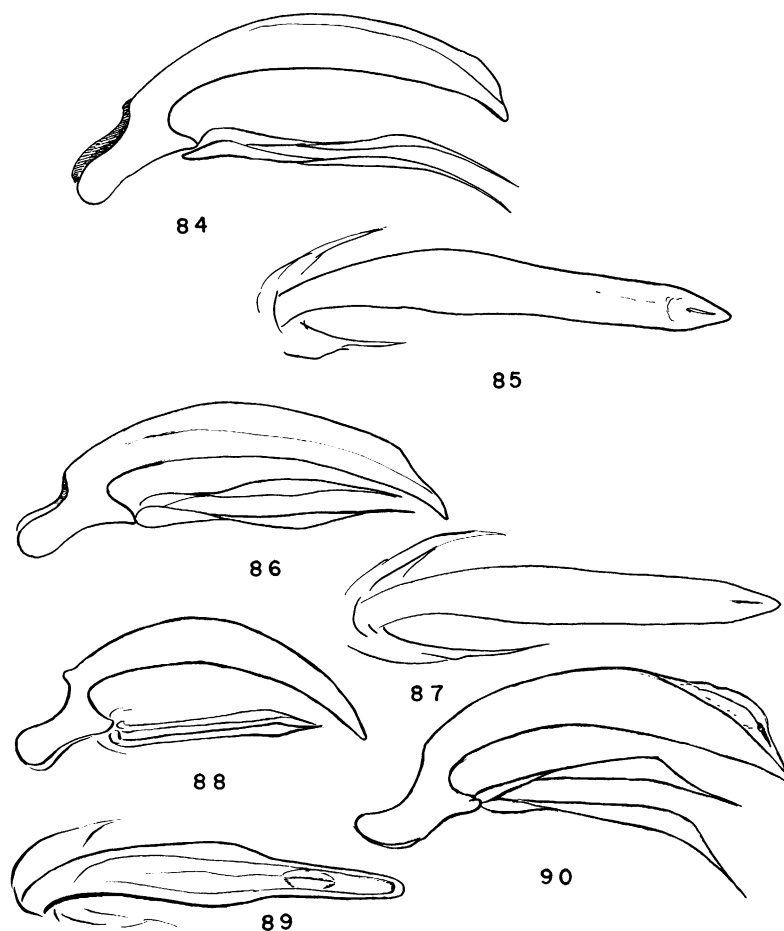
FIGS. 78–83. Male genitalia of *Scaphinotus* (*Neocychrus*). 78, 79. *angulatus* from Steelhead, British Columbia. 80, 81. *behrensi* from California. 82, 83. *longiceps* from California.

slightly beyond humeri; basal antennal segment distinctly stouter than following ones, but shorter than second and third segments together; second antennal segment about one-third shorter than third, but longer than fourth segment, either slightly or conspicuously, rarely as long as fourth segment (in *hemphillii*); beginning from fifth segment antennae pubescent, third and fourth segments bearing a few short setae on tip. Second segment of palpi labialis with four or more setae, last segment distinctly wider in males. This is the only character to distinguish sexes if, of course, the genitalia are not exposed.

Pronotum coarsely punctate or granulated; sides arcuate at front, oblique in posterior half,

convergent or parallel at short distance before base; front angles not, or feebly, projecting forward; hind angles not protruding beyond base; lateral margin narrow from apex to base, with one middle seta on each side; apical marginal bead wider than lateral margin, but in many incomplete and indistinctly outlined; disk usually feebly convex, median line dividing it slightly marked, apical and basal lines inconspicuous because of rough sculpture of pronotum (fig. 15).

Elytra oblong-oval, quite convex, with rough tubercles or tegulae, with rows of larger tubercles distinct in *tuberculatus*, disappearing in *hemphillii* and its subspecies *rickseckeri*. Elytral



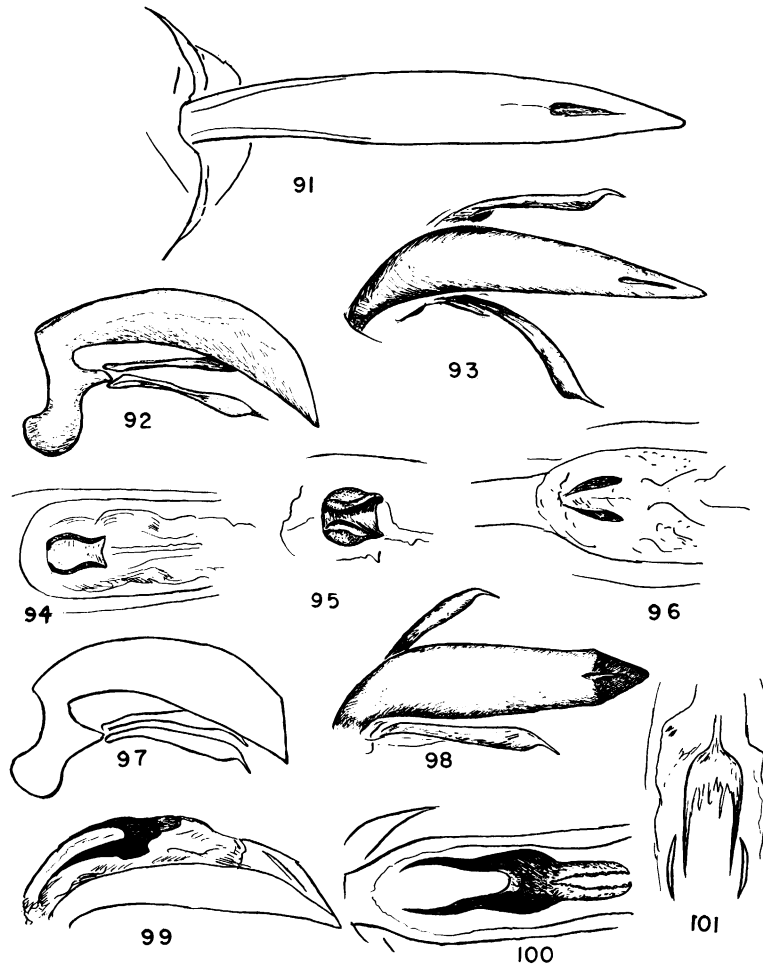
FIGS. 84-90. Male genitalia of *Scaphinotus*. 84-87. *S. (Stenocantharus)*. 84, 85. *angusticollis* from Seattle, Washington. 86, 87. *velutinus* from Crescent, California. 88-90. *S. (Pseudonomaretus)*. 88, 89. *merkei* from Kootenay County, Idaho. 90. *manni* from Wawawai, Washington.

margin narrow, almost obsolete toward apex. Elytral epipleura invariably densely, coarsely punctate, often with confluent punctures forming creases.

Setae orbitalis, gularis, anterior seta on metacoxa and seta on metatrochanter absent, whereas posterior seta on metacoxa present and placed slightly closer to middle than in *Scaphinotus*. Some specimens, regardless of species, bearing two to three posterior setae, close to one another. Males and females with one or two setae on each side of anal segment. Ventral side coarsely punctate on proepisternum, mesasternum, metasternum, and upper part of metacoxa, less coarsely punctate on sides and base of

abdominal segments. Proepisternum and proepimeron not divided by suture line; metasternum small and narrow, longer than wide, although beetles wingless. Prosternal process strongly bent toward body. Legs normally long, front and middle femur with pore punctures; inner spur of hind tibiae about one-third, or twice, longer than outer spur; tarsi glabrous on dorsal side; front tarsi of males like those of females, not dilated and glabrous on ventral side.

Aedeagus in all three forms of *Cychrus* in America not obviously different, slender, apex thin and long, rounded on extreme tip, internal sac without armature, parameres conspicuously

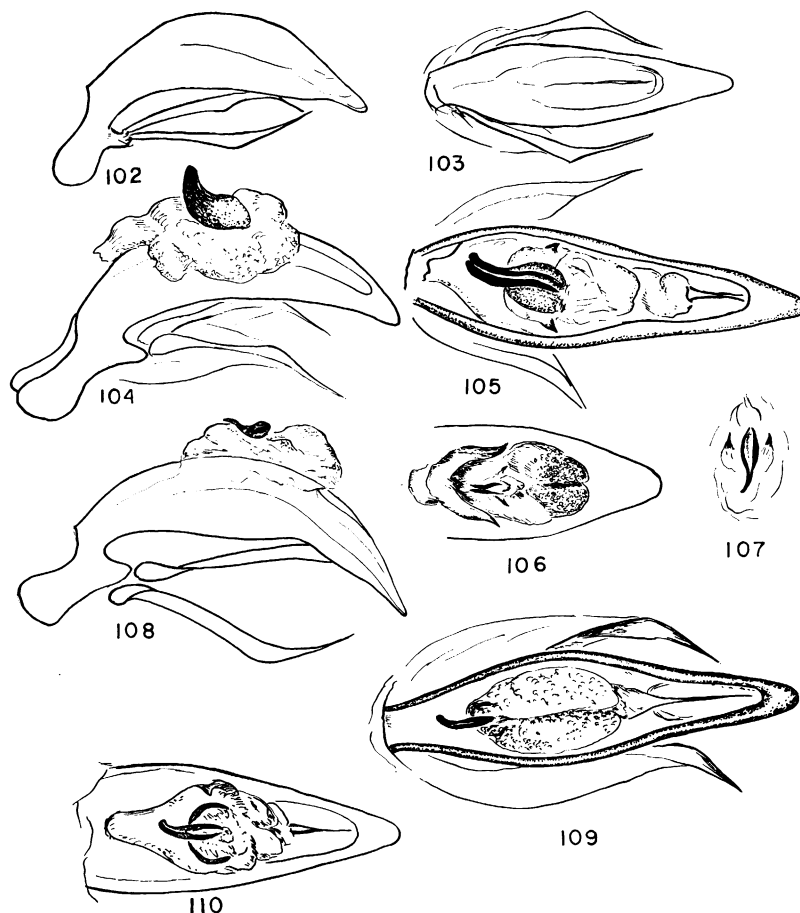


FIGS. 91-101. Male genitalia of *Scaphinotus* (*Pseudonomaretus*). 91. *manni* from Wawawai, Washington. 92-96. *relictus* from Spokane, Washington. 92, 93. Aedeagus. 94-96. Armature of internal sac. 94, 96. Ventral view. 95. Dorsal view. 97-101. *regularis*. 97, 98. Aedeagus of *regularis* from Greer, Idaho. 99. Aedeagus with armature of internal sac exposed (lateral view). 100. Armature of internal sac (ventral view). 101. Armature of internal sac (ventral view) in immature beetle.

broadier toward apex (figs. 119-123). Female genitalia with kind of stubby styli and triangular depression on inner side of basal sclerites, not distinct in every individual (fig. 138). This depression also exists in European *Cychrus attenuatus* and *C. rostratus*, which I examined.

DISCUSSION: In North America *Cychrus* occurs from south of British Columbia down to Utah, but is restricted to the forests of certain mountainous areas. Species of *Cychrus* differ from those

of *Scaphinotus* in having only two, not four, setae at the base of the labrum, in the absence of a suture dividing the proepisternum and the proepimeron, and in the lack of hair on the dorsal side of the tarsi. Also the whole dorsal side of American *Cychrus* is very coarsely punctate and granulated. The setae orbitalis and gularis, the anterior seta on the metacoxa, and the seta on the metatrochanter are absent, whereas most species of *Scaphinotus* have a smoother body, and



FIGS. 102-110. Male genitalia of *Scaphinotus* (*Nomaretus*). 102-107 *cavicollis*. 102, 103. Aedeagus of beetle from Douglas County, Kansas. 104, 105. Aedeagus with armature of internal sac exposed. 106, 107. Armature of internal sac. 108, 109. Aedeagus of *liebecki* from Texas, with armature of internal sac exposed. 110. Armature of internal sac of *liebecki*.

all, or most, of the setae are present. An exception is *Scaphinotus* (*Brennus*) *bullatus*, from which these setae are absent. The tarsi of the males of *Cychrus* are glabrous on the ventral side; in *Scaphinotus* they have brushes of papillae.

From the genus *Sphaeroderus* the American *Cychrus* differs distinctly in the coarse punctuation of the head and pronotum, in having tubercles and granules on the elytra; in having four, not two, setae on the second segment of the palpi labialis. The ventral segments of *Cychrus* have pore punctures; the prosternal process is strongly bent toward the body, not horizontal as in *Sphaeroderus*. The elytral epipleura do not

reach the tip of the elytra in *Cychrus*, and the parameres of the aedeagus have a pointed tip, not round or disklike as are those of *Sphaeroderus*.

KEY TO THE SPECIES AND SUBSPECIES OF THE GENUS *CYCHRUS* FABRICIUS

1. Elytra with three distinct rows of large and convex tubercles, with intermediate, less conspicuous rows of smaller tubercles, separated by area of scattered, small, more or less acute granules (fig. 60) *tuberculatus* Harris
- Elytra without distinct rows of large tubercles, except toward apex, whole elytra with large

- flattened tubercles of different shape and size, all tubercles less acute than in *tuberculatus* (figs. 61, 62) 2
- 2(1). Smaller species, rarely larger than 17–19 mm., usually 14–16 mm.; three rows of elytral tubercles almost or entirely obsolete, interlying space with unevenly shaped, flattened tegulae, or tubercles (fig. 61)
 *hemphillii hemphillii* Horn
- Larger species, seldom less than 18 mm., usually about 20 mm.; elytra with irregular rows of large tubercles, more distinct toward apex, surrounding area between tubercles are unevenly shaped tegulae and smaller granules (fig. 62)
 *hemphillii rickseckeri* LeConte

Cychnus tuberculatus Harris

Figures 7, 15, 23, 60, 119, 120, 138

Cychnus tuberculatus HARRIS, 1839, p. 200 (type locality: Portland, Oregon, designated by Lindroth, 1962. Type lost).

Cychnus pustulosus CASEY, 1905, p. 160 (type locality, Washington State. Type in the National Museum of Natural History, Smithsonian Institution, Washington, D. C. Synonymized by Roeschke [1907]).

DESCRIPTION: Large, black. Head coarsely punctate as far as clypeus, or all over, in many cases with confluent punctures and creases; clypeus moderately or feebly convex, with fewer punctures, smooth or with longitudinal wrinkles, in some specimens divided in front by thin line; between eyes conspicuous depression formed by convex front and swollen occiput (fig. 15).

Pronotum as long as wide, or slightly wider than long, average length 5.1 mm., range from 4.5 to 6.0 mm.; average width 5.5 mm., range from 5.0 to 6.8 mm., with only slight difference between sexes, females being stouter. Whole pronotum very rough with confluent punctures, granules, and creases; sides arcuate at front, straighter in posterior half, becoming parallel or nearly parallel at short distance before base; base not exactly straight, feebly or more distinctly arcuate (fig. 15).

Elytra with rounded or obliterated humeri, with three rows of large tubercles, especially on declivity, and three or four rows of smaller tubercles between large ones; surface around these rows with numerous small granules scattered all over and becoming acute on apex. In general all granules and tubercles of *tuberculatus*

not flattened as in *hemphillii* and *rickseckeri* (fig. 60).

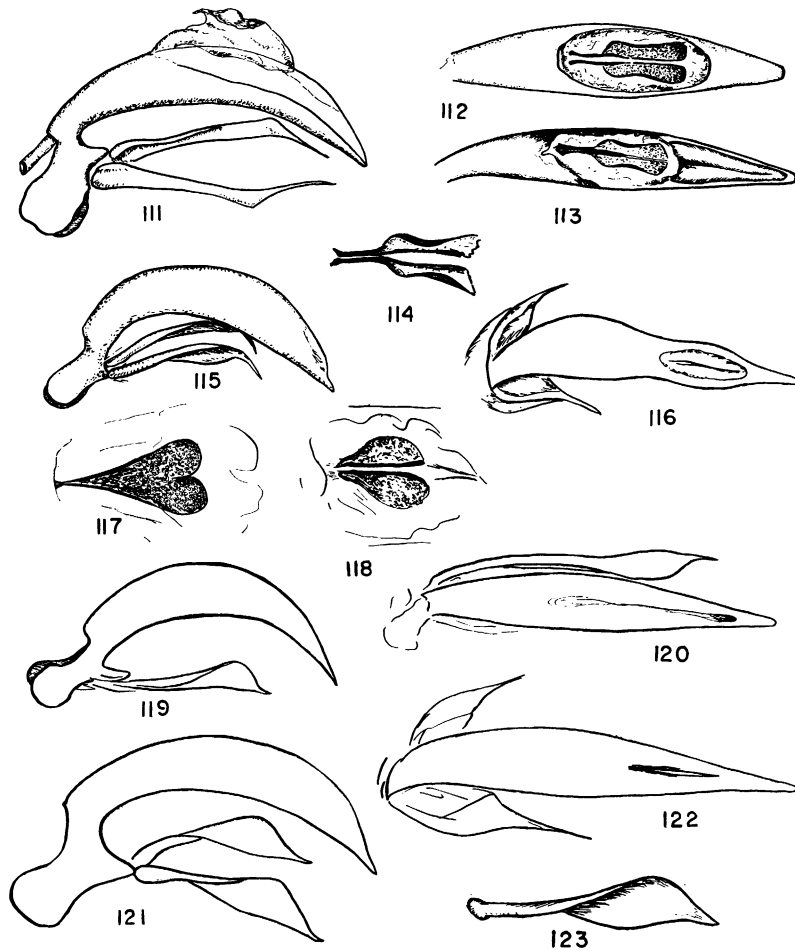
Males mostly with one seta analis on each side of anal segment, but at least 26 percent, of 34 males examined, having two setae, females mostly with two setae analis, yet 31 percent, of 32 females examined, had one seta, rarely females having three or even more setae on each side of anal segment.

Length from 18.5 to 25.0 mm., average 21.8 mm.; average width 9.2 mm., range from 8.0 to 11.0 mm. Females, as a rule, stouter than males; average length of male 20.6 mm., average width 8.2 mm.; females 23.0 mm. long, and 10.2 mm. wide (average). Some males, however, are as large as 25 mm.

DISTRIBUTION: Western area of northern Pacific, from southwestern British Columbia to southern Oregon. I have seen specimens from the following localities: *Canada: British Columbia:* Vancouver Island, in Victoria, Duncan, Nanaimo, Yellow Point. John Deane Province. Charlotte Island: Massett Queen. Pender Harbour Hotel Lake, Gordon Harbour. Fraser River and Agassiz in Fraser Valley District. *Washington:* Whatcom County: Friday Harbor on San Juan Island. Snohomish County: Glacier, Chase Lake, Monroe. King County: Seattle (Golden Garden), Snowqualmie. Mason County: Shelton. Clallam County: Forks. Pierce County: Puyallup, Electron at altitude of 3000 feet. Thurston County: Olympic National Forest Reservation. Pacific County: South Bend. *Oregon:* Washington County: Dilley, Hillsboro. Multnomah County: Portland. Polk County: Dallas (Black Rock). Marion County: Detroit (North Santiam River). Lincoln County: Toledo. Benton County: Corvallis. Lane County: Vida, McKenzie Bridge, Oakridge, Glenada, McCredie Springs. Klamath County: Creston Lake.

The range to Alaska, as given by Roeschke (1907), seems to be doubtful, as already stated by Lindroth (1962). Roeschke also gave as a locality Mendocino, California, which is possible, but I have not seen beetles from there. Lindroth (1962) reported that *tuberculatus* extends as far north as Comox (close to the middle of Vancouver Island).

Specimens of *tuberculatus* that I examined were collected through the summer, from May 6 (Nanaimo and Seattle) to August 30 (Vancouver Island).



FIGS. 111-123. Male genitalia. 111-118. *Scaphinotus* (*Nomaretus*). 111-114. *fissicollis* from Iowa. 111-113. Aedeagus with armature of internal sac exposed. 114. Armature of internal sac (beetle from Arkansas). 115-118. *bilobus* from Lawrence, Kansas. 115, 116. Aedeagus. 117, 118. Armature of internal sac. 119-123. *Cychrus*. 119, 120. *tuberculatus* from Vancouver Island. 121-123. *hemphillii hemphillii* from Utah. 121, 122. Aedeagus. 123. Parameres of aedeagus.

DISCUSSION: Although there is not much difference, if any, in the genitalia of the three forms of North American *Cychrus*, the species *tuberculatus* is easily identified by the sculpture of the elytra, which has three distinct rows of tubercles, by the coarser punctures and granules on the head and the pronotum, and by a deeper impression between the eyes. I leave it, as Lindroth did, as a separate species.

Casey's *pustulosus*, as stated by Roeschke (1907), Hatch (1953), and Lindroth (1962), is a synonym of *tuberculatus*. According to Casey

(1905), it differs in being smaller, having more conspicuous elytral tubercles, and oblique sides of the pronotum. I have examined this type and saw no difference between it and the typical *tuberculatus*.

MATERIAL EXAMINED: Ninety-two specimens, 45 males and 47 females.

Cychrus hemphillii

DESCRIPTION: Head densely, but not so coarsely, punctate as that of *tuberculatus*, clypeus

and occiput smoother, front feebly convex and depression between eyes shallower, less conspicuous; second antennal segment about one-third longer than fourth segment, but in some specimens as long as fourth. Pronotum wider than long, sides slightly arcuate at front, oblique or almost so in their posterior part, convergent at base; base straight; whole surface of pronotum densely, coarsely punctate with confluent punctures and creases, in some beetles slightly granulated, yet less coarsely so than in *tuberculatus*. Elytra with or without rows of larger tubercles, these rows, if present, not arranged so neatly as in *tuberculatus*, and more conspicuous on declivity; surface between rows with tegulae or tubercles, larger than in *tuberculatus*, but less convex, often quite flattened.

This is a polytypic species with two subspecies (*hemphillii* and *rickseckeri*). They differ in size and in the elytral sculpture.

Cychrus hemphillii hemphillii Horn

Figures 7, 24, 61, 121-123

Cychrus hemphillii HORN, 1878, p. 184 (type locality, Wasatch Mountains near Ogden, Utah. Type in the Academy of Natural Sciences of Philadelphia, Pennsylvania).

DESCRIPTION: Smaller than *rickseckeri*, average length 16.0 mm., range from 13.0 to 19.0 mm.; width from 6.0 to 8.0 mm., average 6.5 mm. Pronotum from 3.5 to 4.3 mm. long, average length 4.0 mm.; width from 4.0 to 5.0 mm., average 4.5 mm. Females slightly stouter than males.

Three rows of large tubercles on elytra, so distinct in *tuberculatus*, virtually absent in *hemphillii* (fig. 61), except on declivity; surface of elytra irregularly sculptured, with scattered punctures and unevenly shaped tegulae (or tubercles). Often, however, three rows of tegulae quite conspicuous, although tegulae in rows not larger than surrounding tegulae, and as flat as other ones; toward apex all tegulae more acute and smaller.

Males mostly with two setae analis on each side of anal segment, rarely with one seta, and quite seldom with three setae (six setae altogether). Females mostly with two setae.

DISTRIBUTION: This species is found in the mountains of southwestern Idaho, western Wyoming, and northern Utah, north and south of Ogden. I have seen specimens from the

following localities: *Idaho*: Oneida County: southwest of Downey (altitude 6000 feet). *Wyoming*: Sheep Mountain (altitude 9500 feet) in Teton County. *Utah*: Cashe County: Logan Canyon (altitude 6000 feet). Wasatch Mountain (altitude 11,000 feet), Timpanogos Mountain, Provo Canyon, Aspen Grove in Provo Canyon, North Fork in Provo Canyon. Beetles were collected from May to September.

DISCUSSION: Roeschke (1907) and Lindroth (1962) considered *hemphillii* and *rickseckeri* as subspecies. Hatch (1953) treated them as different species, but he wrote that it may be that all three American species of *Cychrus* are a single polytypical species. Van Dyke (1902) wrote that *hemphillii* and *rickseckeri* are more closely related than being separate species. I think that these two forms are subspecies. They differ in size and elytral sculpture; *hemphillii* is not longer than 19 mm., and most specimens range from 16 to 17 mm. Of 68 beetles measured, only six, or not more than 9 percent, were from 18.5 to 19.0 mm., whereas *rickseckeri* is not smaller than 17.5 mm., and most specimens measure about 20 mm. The elytra in *hemphillii* have no conspicuous rows of larger tubercles, except on the declivity; in *rickseckeri* these larger tubercles are present, although not arranged in neat rows as in *tuberculatus*. Also *hemphillii* does not extend so far north as *rickseckeri*, and does not occur in Washington State and British Columbia.

MATERIAL EXAMINED: Sixty-eight specimens, 34 males and 34 females.

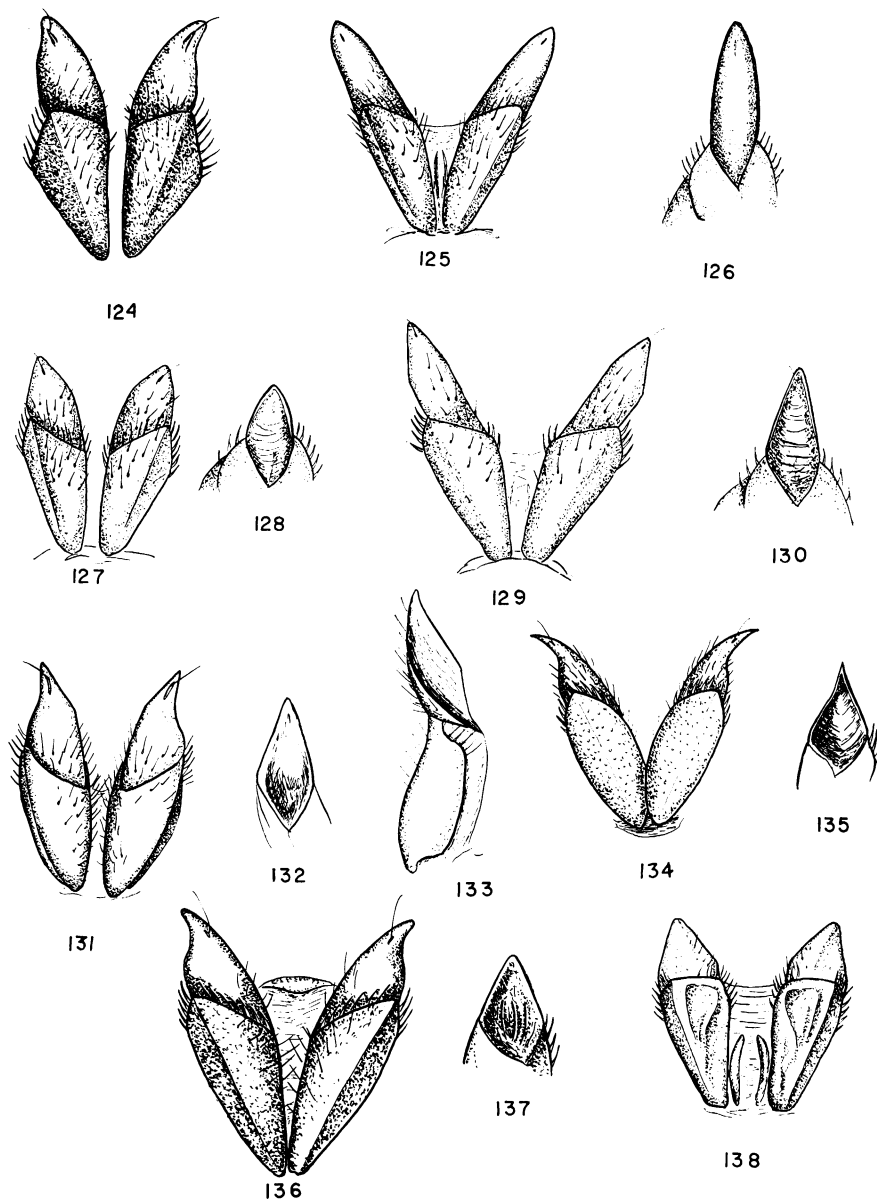
Cychrus hemphillii rickseckeri LeConte

Figures 7, 62

Cychrus Rickseckeri LECONTE, 1884, p.2 (type locality, Montana. Type in the Museum of Comparative Zoology, Cambridge, Massachusetts).

DESCRIPTION: As stated by LeConte (1884) *rickseckeri* seems to be between *tuberculatus* and *hemphillii*. Larger than *hemphillii hemphillii*, average length 20.4 mm., range from 17.5 to 24.0 mm.; average width 8.9 mm., range from 7.5 to 10.0 mm.; females larger and stouter than males, average length of male 18.8 mm., average width 8.0 mm., in females average length is 21.6 mm., and average width 9.5 mm.

Pronotum slightly or conspicuously wider than long, average length 5.0 mm., range from 4.5 to



FIGS. 124-138. Female genitalia. 124-137. *Scaphinotus*. 124. *S. (Neocychrus) angulatus*. 125-130. *S. (Pseudonomareetus)*. 125, 126. *manni* from Asotin, Washington. 126. Styli (dorsal view). 127, 128. *relictus* from Coeur d'Alene, Idaho. 128. Styli (dorsal view). 129, 130. *regularis* from Mt. Moscow, Idaho. 130. Styli (dorsal view). 131-137. *S. (Nomareetus)*. 131-133. *liebecki*, paratype, from Texas. 132, 133. Styli. 132. Dorsal view. 133. Lateral view. 134, 135. *fissicollis* from Imboden, Arkansas. 135. Styli (dorsal view). 136, 137. *bilobus* from White Mountains, New Hampshire. 137. Styli (dorsal view). 138. *Cychrus tuberculatus* from Vancouver Island.

5.5 mm.; average width 5.8 mm., range from 5.0 to 7.0 mm. Elytra with three rows of tubercles, not arranged in distinct rows as in

tuberculatus, and not invariably conspicuous among other unevenly shaped tegulae, or tubercles (fig. 62).

DISTRIBUTION: Southern British Columbia, but not on the coast, eastern Washington, and northern Idaho. Type from Montana. I have seen specimens from the following localities: *Canada: British Columbia*: Kootenay West District: Creston, Wynndel. *Washington*: Spokane County: Spokane. *Montana*: Fergus County: Clark's Peak. *Idaho*: Kootenay County: Coeur d'Alene, Howdell (this last locality not found on the map). I also saw one specimen from Logan

Canyon, Utah, which exactly resembled the form *rickseckeri*, although Utah is the area of subspecies *hemphillii*. Most specimens were found in July and August.

DISCUSSION: As stated under *hemphillii hemphillii*, these two subspecies differ in size and in the elytral sculpture; also *rickseckeri* is a northern form and is not so common as *hemphillii hemphillii*.

MATERIAL EXAMINED: Twenty-one specimens, nine males and 12 females.

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