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REVISION OF THE GENUS *PHLOEOSINUS* CHAPUIS IN NORTH AMERICA (COLEOPTERA, SCOLYTIDAE)

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INTRODUCTION

THE genus *Phloeosinus* Chapuis is one of the most widely distributed genera of bark beetles, as it occurs in all the large continental land masses and in many islands. Although the genus is not so large, as regards the total number of recognized species, as are several other genera, in North America it appears to be second only to *Pityophthorus* in the number of known species. In the present paper, which deals with all North American forms from Alaska to Mexico inclusive, 45 species, including 16 previously undescribed ones, are recognized as valid. Thorough collecting in Mexico and Alaska would, without doubt, bring to light additional species.

All but three of the known North American species of *Phloeosinus* breed in the inner bark of cupressine and taxodiine trees of the genera *Sequoia*, *Taxodium*, *Libocedrus*, *Thuja*, *Cupressus*, *Chamaecyparis*, and *Juniperus*. Of the three nonconforming species one breeds in *Pinus* and two in *Picea*. Although plainly congeneric, these three species differ from the others not only in host selection but also in certain evident morphological characters that serve as a basis of primary separation.

The breeding habits of the species do not differ greatly from those of many other bark beetles. The brood burrows are constructed in the inner bark, often grooving the surface of the sapwood rather deeply. The burrow usually consists of a simple longitudinal egg

gallery, in each side of which the eggs are placed in closely spaced egg niches. The larval mines extend out at each side, more or less at right angles to the egg gallery. Each egg gallery is the product of a pair of beetles. In some species at least, the male remains on guard in the entrance gallery, often dying in that position.

In all cases where the habits are known, the young adults at the time of emergence from the old host are sexually immature and must feed for some time before attacking a new host. In some cases they clip off and eat the tender leaflets, thus partially defoliating healthy trees. The young adults derive most of their food, however, by boring into the twigs of vigorous trees and gouging out most of the sapwood. This causes the twigs to wilt and die. Sometimes they break off entirely and fall to the ground, but more often the wilted twigs remain attached by a few shreds of bark and wood.

This feeding of the newly emerged adults produces effects which are always very evident and often excessive in areas where the beetles are more than usually numerous. Even under conditions of nature such as in the semidesert areas of the Southwest, where junipers are among the few tree species able to survive, the wilted and broken twigs are very common and conspicuous. In areas where cupressine trees are often used as ornamentals, the feeding injuries may be so numerous as to detract from their beauty. In some cases such feeding activities kill so many twigs as entirely to ruin the appearance of an evergreen hedge or of a specimen tree. This is especially true in many areas in California and Arizona.

While the twig feeding of the adults is responsible for most of the damage inflicted by species of *Phloeosinus*, their breeding activities also cause considerable injury under certain conditions. Most of the species are not at all aggressive in their attacks on trees but by preference enter the bark of dying, weakened, felled, or broken trees or portions of trees. However, when the beetles in flight in an area are particularly numerous, trees which appear healthy may be attacked and killed. Fatal attacks on several species of cypress in California by *P. cupressi* Hopkins and *P. cristatus* (LeConte) and by the latter species also in the Gila Valley of Arizona, have been numerous. It is possible that species of *Cupressus* are more susceptible to attack than are species of other related genera, for in the vicinity of Mexico City *P. baumanni* Hopkins and *P. tacubayae* Hopkins attack the same tree and are known to be serious enemies of the local species of cypress.

It is true, perhaps, that if most cases of killing caused by attacks of *Phloeosinus* upon apparently healthy trees were examined critically it would be found that such trees had been weakened by drought or other causes. The trees' resistance to attack had been lessened

even though they still appeared vigorous. Some such trees would die even though not attacked by insects, but many would probably survive.

The western half of the country, with its numerous species of trees favored by *Phloeosinus*, is especially rich in species of the genus. Of the 40 species known to occur in the United States and Canada, 35 are found in the western half and only 5 in the eastern half. The Pacific Coast States are especially rich in this group, both as to number of species and number of individuals.

I am very grateful for the hearty cooperation of the western field men of the Division of Forest Insect Investigations of the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, in furnishing much of the material on which this study is based. Without the thousands of specimens from the collections of the several field stations, no thorough study of the genus would have been possible. I am, therefore, under great obligations to J. M. Miller, of the Berkeley, Calif., laboratory; F. P. Keen, of the Portland, Oreg., laboratory; J. C. Evenden, of the Coeur d'Alene, Idaho, station; and R. L. Furniss and Donald DeLeon, of the Fort Collins, Colo., station; and to the men working with them for this indispensable assistance.

Sincere thanks are also extended to W. J. Chamberlin, of Oregon State College, Corvallis, Oreg., for the loan of his specimens of *Phloeosinus*, including several paratypes; to J. E. Knull, of Ohio State University, for his collection of the genus, including paratypes of *granulatus* Bruck and *variolatus* Bruck; and to Donald DeLeon, of the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, for his private collection taken in the Southwestern States and in Mexico. I wish also to thank most cordially P. J. Darlington, Jr., of the Museum of Comparative Zoology of Harvard University, Cambridge, Mass., for his kindness and painstaking care in comparing specimens sent for that purpose with the type of *P. serratus* (LeConte).

Genus *PHLOEOSINUS* Chapuis

Phloeosinus CHAPUIS, Synopsis des Scolytides, p. 37, 1869; Extr. Mem. Soc. Roy. Sci. Liège, p. 245, 1873.—LECONTE, Proc. Amer. Philos. Soc. vol. 15, p. 381, 1876.—EICHHOFF, European Borkenkäfer, p. 131, 1881.—LECONTE and HORN, Coleop. North Amer., p. 523, 1883.—BEDEL, Fauna Coleop. Seine, vol. 6, p. 389, 1888.—REITTER, Verh. Naturf. Ver. in Brünn, vol. 33, p. 49, 1894.—BLANDFORD, Trans. Ent. Soc. London, 1894, p. 68; Biol. Centr. Amer., Coleop., vol. 4, pt. 6, p. 160, 1897.—BARREY, Scolytidae l'Europ. Cent., p. 58, 1901.—SWAINE, New York State Mus. Bull. 134, p. 128, 1909.—HOPKINS, Proc. U. S. Nat. Mus., vol. 48, p. 126, 1914.—SWAINE, Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 2, pp. 67-70, 1918.—BLACKMAN, Mississippi Agr. Expt. Sta. Techn. Bull. 11, pp. 59-61, 1922.—W. J. CHAMBERLIN, Bark and timber beetles of North America, pp. 168-182, 1939.

Generic description.—Body stout, oval, strongly convex, ornamented with hairs and scales; frons convex, often weakly impressed in female, concave or strongly impressed in male; eyes strongly emarginate; antenna with funicle 5-segmented, with outer segments wider, club elongate, compressed, with three more or less oblique sutures; pronotum wider than long, posterior outline bisinuate; prosternum moderately short; fore coxae moderately widely separated; elytra with anterior margins arcuate, serrate; striae distinctly, often strongly, impressed, always narrower (often much narrower) than interspaces; declivity with alternate interspaces, especially in male, more strongly asperate or serrate, second interspace often devoid of serrations.

Genotype.—*Hylesinus thujae* Perris from France, designated by Hopkins, 1914.

KEY TO NORTH AMERICAN SPECIES OF PHLOEOSINUS CHAPUIS

1. Frontal rectangle¹ of male nearly or quite as long as wide; that of female 0.8 to 0.9 as long as wide; epistomal lobe narrow, moderately long; mesosternum precipitous and protuberant between coxae; elytral declivity with all interspaces convex and subequally asperate in both sexes; breeding in pines or spruces..... 2
- Frontal rectangle of male from 0.6 to 0.8 as long as wide, that of female wider; epistomal lobe small or nearly absent; mesosternum varying from precipitous to flat between coxae, never protuberant; elytral declivity with second interspaces either flat or much less convex than others, asperities absent in male at least; breeding in taxodiine or cupressine trees..... 4
2. Width of frontal concavity of male less than half distance between eyes; pronotal disk and sides distinctly granulate-punctate; breeding in pines; Manitoba and Michigan— *pini* Swaine (p. 407)
- Width of frontal concavity of male half or more distance between eyes; pronotal disk punctate, sides subgranulate-punctate; breeding in spruce..... 3
3. Pronotum in female slightly longer than wide, wider than long in male; Quebec, in white spruce..... *piceae* Swaine (p. 408)
- Pronotum distinctly wider than long in both sexes; Alaska, in white spruce..... *alaskanus*, new species (p. 409)
4. Second interspace on elytral declivity narrower than (or at most subequal to) first or third, never serrate in either sex; elytral vestiture either abundant or nearly absent..... 5
- Second interspace on elytral declivity as wide as first or third, not serrate in males, often serrate in females, elytral vestiture rather abundant..... 31
5. Usually small species, averaging slightly more or less than 2.0 mm. long (except *keeni*); mesosternum precipitous or steeply oblique between coxae; vestiture of pronotum and elytra usually rather abundant and distinct..... 6

¹ The width of the frontal rectangle is the distance between the inner margins of the eyes. Its length is the distance between a line connecting the upper margins of the eyes and a line parallel to it and touching the lower edge of the epistomal process.

- Usually larger species (2.0 to 4.5 mm. long); mesosternum ranging from flat to moderately oblique between coxae; vestiture of pronotum and elytra usually scanty except sometimes on declivity----- 16
6. Frons deeply concave in male; elytral vestiture rather fine and abundant on disk and sides; declivity with second interspace narrower than first or third, vestiture abundant on all declivital interspaces----- 7
- Frons rather shallowly concave in male; elytral vestiture rather coarse and scanty on disk and sides; declivity with second interspace scarcely narrower than first or third, with obsolescent punctures and without vestiture, first and third interspaces with dense white scales----- 15
7. Elytra of male more than 1.30 times as long as wide, interspaces not twice as wide as striae; first and third interspaces on declivity with coarse, short, stout, closely placed, recurved serrations----- 8
- Elytra of male less than 1.30 times as long as wide (except in *antennatus*), interspaces more than twice as wide as striae; first and third interspaces on declivity sparsely armed with either rather small or with slender, sharp serrations----- 9
8. Frons of male rather narrowly concave, with distinct, elevated carina on lower half; frons of female granulate-punctate throughout; second declivital interspace much narrower than third; California, in *Libocedrus*, *Juniperus*, and *Cupressus*.
hoppingi Swaine (p. 411)
- Frons of male widely concave, carina reduced to tooth on epistoma; frons of female punctate above, feebly granulate at sides only; second declivital interspace only slightly narrower than third; Arizona to Texas and Wyoming, in *Juniperus*----- hoferi, new species (p. 412)
9. Declivital serrations on first and third interspaces rather blunt in male, somewhat smaller in female; declivity in both male and female with dense coat of yellowish scalelike hairs----- 10
- Declivital serrations on first and third interspaces in males sparse, large to moderately large, with apices sharp, much smaller in females; hairs moderately abundant in female at least----- 12
10. Notably larger (2.15 to 2.8 mm. long); frons of male deeply and widely concave, with carina moderately elevated on less than lower half; elytral striae narrow, with small, rather close punctures; Washington, in *Chamaecyparis nootkatensis* (Lamb.) Sudw----- keeni, new species (p. 414)
- Notably smaller (1.6 to 2.0 mm. long); frontal concavity of male moderately deep, rather narrow, with strong, sharply elevated carina on more than lower half; elytral striae moderately narrow, stria punctures larger and not closely spaced; declivital serrations small----- 11
11. Frons of male granulate-punctate at sides and above concavity; pronotum deeply, closely, moderately coarsely punctured, with short, fine hairs; California and Oregon, in *Libocedrus decurrens* Torrey----- antennatus Swaine (p. 415)

- Frons of male finely punctate, broadly depressed; pronotum with fine punctures, covered with yellow hairs; Yucatan, host unknown----- *coronatus*² Chapuis (p. 416)
12. Male more than twice as long as wide, frontal concavity moderately wide, very deep, carina reduced to small epistomal tooth; declivital serrations on first interspace of male sparse, long, slender, spinelike (longer than width of interspace), spines on third interspace slightly smaller; New Mexico, Arizona, *spinosus*, new species (p. 417)
- Males less than twice as long as wide, frontal concavity very deep and moderately to very wide, carina distinct, elevated; declivital serrations on first and third interspaces sparse, acute, not long and spinelike; California----- 13
13. Black throughout; frontal concavity of male moderately broad, granulate-punctate at sides and above; vestiture of elytral declivity entirely hairlike in both sexes----- *swainei* Bruck (p. 418)
- Black with elytra reddish brown; frontal concavity of male very broad, granulate-punctate at sides, punctate above; vestiture of elytral declivity partly scalelike in both sexes----- 14
14. Elytral interspaces punctate, scarcely granulate, with asperities uniseriate from base and larger posteriorly on first and alternate interspaces; declivity with small, acute teeth on first and third interspaces, vestiture moderately abundant. *granulatus* Bruck (p. 419)
- Elytral interspaces densely punctate-granulate, with asperities uniseriate behind middle on first and alternate interspaces; declivity with moderately high, sharp, recurved teeth on first and third interspaces, vestiture more abundant-- *frontalis* Bruck (p. 421)
15. Frons of male granulate-punctate at sides, punctured above concavity; elytral interspaces strongly asperate in both sexes; declivity with small, rather sparse asperities on first and third interspaces; California, in *Cupressus sargentii* and *Libocedrus decurrens*----- *setosus* Bruck (p. 422)
- Frons of male granulate-punctate throughout; elytral interspaces more weakly asperate on disk in male; declivity with minute, obsolescent asperities on first and slightly larger ones in third interspaces; southern Arizona, in *Cupressus arizonica*----- *arizonicus*, new species (p. 424)
16. Brightly shining; elytral striae strongly impressed, and at least moderately wide, with coarse punctures (except in *van-dykei* group); declivity of both sexes with serrations of first and third interspaces subequally developed, sometimes with some of serrations on first interspace of males obsolescent near apex----- 17
- Moderately shining; elytral striae ranging from narrow to wide, and punctures from small to very coarse; declivity of male with first interspace unarmed, or serrate only at top of declivity----- 24
17. Elytral declivity with first and third interspaces in both sexes scarcely serrate, second interspace subequal or slightly narrower than others in width ----- 18

²I have not seen a specimen of this species and cannot be certain it is correctly placed in the key, as the original description is rather general.

- Elytral declivity with first and third interspaces in both sexes distinctly serrate, second interspace plainly narrower than first or third----- 20
18. Smaller (1.8 to 2.25 mm. long); pronotum with small, moderately sparse punctures; elytral striae with very fine punctures, interspaces punctate and with only a few very fine granules; declivity with first and third interspaces weakly convex, each with a few minute, obsolescent granules.
vandykei Swaine (p. 425)
- Larger (2.0 to 2.8 mm. long); pronotum with moderately coarse, close punctures; elytral striae with moderately large punctures; interspaces densely, moderately coarsely granulate-punctate; declivity with interspaces 1 and 3 strongly convex, with a few small granules----- 19
19. Black throughout; frons strongly granulate-punctate throughout, including shallow concavity; pronotum with dense, deep punctures; elytra black, interspaces very densely, rather coarsely granulate; second declivital interspace subequal in width to first or third----- fulgens Swaine (p. 427)
- Black, with elytra reddish brown; frons granulate-punctate at sides, punctate above; pronotum with close, deep punctures; elytra reddish brown, moderately densely, less coarsely granulate; second declivital interspace slightly but distinctly narrower than first or third----- splendens, new species (p. 428)
20. Elytra brilliantly shining, appearing glabrous on disk and sides, but with scanty, minute hairs, striae but little narrower than interspaces, with coarse, shallow punctures; declivity with second interspace impunctate and bare of hairs in male; third interspace strongly elevated and closely, coarsely serrate.
punctatus LeConte (p. 429)
- Elytra a little less brightly shining, with moderately scanty, fine, short (but not minute) hairs on disk and sides, striae distinctly narrower than interspaces, with notably smaller punctures; declivity with second interspace sparsely to very sparsely punctured in male, with few or many hairs; third interspace moderately elevated, with serrations moderately small and sparse----- 21
21. Frontal concavity of male more than half as wide as distance between eyes; pronotum with discal punctures similiar throughout, with much longer, stouter hairs at each side; elytra with interspaces about 1.5 times as wide as striae; declivity of female densely clothed with hairs and scales; first interspace of male with very sparse serrations.
rubicundulus Swaine (p. 431)
- Frontal concavity of male less than half as wide as distance between eyes; pronotum with punctures notably smaller and closer in median line than elsewhere on disk, hairs not much longer or stouter at sides; elytra with interspaces twice as wide as striae; declivity of female rather thinly clothed with hairs or scales----- 22
22. Smaller (1.9 to 2.3 mm. long); elytral declivity of both sexes devoid of scalelike hairs----- buckhorni, new species (p. 432)
- Larger (2.14 to 3.1 mm. long); elytral declivity of female with scalelike hairs----- 23

23. Frons of male rather coarsely granulate-punctate at sides and above, median carina rather short, one-third of diameter of deep concavity; declivity of female with rather wide, scalelike hairs----- kaniksu, new species (p. 434)
- Frons of male finely granulate-punctate at sides, punctate above, median carina long, two-thirds of diameter of rather shallow concavity; declivity of female with rather narrow scalelike hairs----- rusti, new species (p. 435)
24. Elytral striae moderately wide to very wide, with rather coarse to very coarse punctures; female with first and third declivital interspaces subequally, strongly serrate; male with first interspace coarsely serrate only at top of declivity, unarmed below----- 25
- Elytral striae narrow to very narrow, with small, indistinct punctures; female with third declivital interspace much more strongly elevated and serrate than first; male with first declivital interspace devoid of coarse serrations----- 28
25. Elytral interspaces equal or subequal to striae in width, striae punctures very coarse, declivity rather densely clothed with hairs and scales in both sexes, serrations of first and third interspaces very coarse----- 26
- Elytral interspaces distinctly wider than striae, striae punctures moderately large; declivity with few hairs in male at least, serrations moderately coarse on first and third interspaces----- 27
26. Male slightly more than twice as long as wide; frontal carina moderately elevated on epistoma; elytral interspaces rather strongly rugose-granulate-punctate; discal vestiture moderately sparse and short; Mexico, in *Cupressus* sp.
baumanni Hopkins (p. 437)
- Male slightly less than twice as long as wide; frontal carina very strongly elevated on epistoma; elytral interspaces very strongly rugose-granulate-punctate; discal vestiture more abundant and longer; California, in *Cupressus sargentii*.
variatus Bruck (p. 438)
27. Elytra with discal striae and lateral outlines slightly sinuate, broadly impressed across dorsum, lateral interspaces nearly smooth except near declivity; slightly smaller and more slender; Washington and Oregon, *Chamaecyparis nootkatensis*----- nitidus Swaine (p. 440)
- Elytra with discal striae and lateral outlines nearly straight, not impressed across dorsum, moderately rugose-granulate; larger and slightly stouter; California, in *Cupressus* and *Sequoia*----- cupressi Hopkins (p. 441)
28. Male less than twice as long as wide; frons with distinct, elevated carina; elytral interspaces densely and finely granulate-punctate, with small, moderately sparse hairs on disk; declivity closely, deeply, finely punctured in both sexes----- 29
- Male 2.09 or more times as long as wide; frons with indistinct, scarcely elevated carina; elytral interspaces rugose and sparsely granulate-punctate, with minute, sparse hairs on disk; declivity with obsolete or obsolescent punctures in male----- 30
29. Elytral interspaces finely and densely granulate-punctate in male; declivity with first stria strongly impressed, first inter-

space moderately convex and subequal to second; declivital vestiture moderately abundant in male, dense in female.

cristatus (LeConte) (p. 443)

Elytral interspaces strongly rugose, moderately granulate-punctate in male; declivity with first striae weakly impressed, first interspace scarcely convex and narrower than second in both sexes; declivital vestiture rather sparse in male, moderately abundant in female---- *chiricahua*, new species (p. 444)

30. Appearing glabrous but with sparse, minute hairs on head, pronotum, and elytral disk; declivity of female with only a few obsolescent punctures and with only a few short, very fine hairs; California, in *Sequoia sempervirens* and *Cupressus*.

sequoiae Hopkins (p. 446)

Vestiture more abundant but still rather sparse, short and fine but not minute; declivity of female finely, closely, distinctly punctured and with many scalelike hairs; Washington in *Thuja plicata* and *Libocedrus decurrens*-- *squamosus*, new species (p. 448)

31. Elytral declivity of female with second interspace serrate throughout (except in some specimens of *juniperi*); male with one or two small tubercles near apex of second interspace----- 32
Elytral declivity with second interspace entirely devoid of serrations or tubercles in both sexes----- 38

32. Pronotum with moderately small, close punctures; elytral declivity of male with small or moderately small, not compressed serrations on first and third interspaces, those of third only slightly smaller and more numerous----- 33
Pronotum with deep, close, moderately large punctures; elytral declivity of male with large, or very large, black, compressed, recurved serrations on first interspace, those on third more numerous and smaller----- 35

33. Elytral declivity of male with first and third interspaces each with numerous stout, blunt serrations; female declivity with serrations of second interspace notably smaller and less numerous than those of first and third; Southeastern States, in *Taxodium distichum*----- *taxodii* Blackman (p. 450)

Elytral declivity of male with first and third interspaces with less numerous, sharp-pointed serrations; serrations on second interspace of female only slightly smaller than on first and third----- 34

34. Length 2.25 to 2.8 mm.; elytral declivity of male with serrations on first and third interspaces smaller, rather numerous; most of declivital vestiture hairlike; Southeastern States.

dentatus (Say) (p. 452)

Length 2.86 to 3.22 mm.; elytral declivity of male with serrations on first and third interspaces larger, sparse; most of declivital vestiture scalelike; south-central Mexico.

deleoni, new species (p. 454)

35. Larger (more than 3.0 mm. long); elytral striae deep, of moderate width, declivity of male with rather sparse vestiture----- 36
Smaller (usually less than 3.0 mm. long); elytral striae rather narrow; declivity of male with abundant vestiture----- 37
36. Frons of male strongly granulate-punctate, not rugose: disk of pronotum deeply, moderately closely punctured; discal

vestiture of elytra moderately abundant, short, decumbent; first declivital interspace of male with large serrations moderately closely placed; California, Oregon, and Washington, in *Juniperus*----- juniperi Swaine (p. 455)

Frons of male closely, sublongitudinally granulate-rugose; disk of pronotum deeply, very closely punctured; discal vestiture of elytra rather sparse, short, suberect; first declivital interspace of male with large, closely set serrations; habitat and host not certainly known, known only through unique type.

serratus (LeConte) (p. 456)

37. Discal elytral interspaces of male nearly flat, with asperities on posterior half sparse and poorly developed; first interspace of declivity of male with serrations rather sparse; female with serrations of second interspace smaller and sparser than on third; Utah, Arizona, New Mexico, in *Juniperus* spp.

utahensis Swaine (p. 458)

Discal elytral interspaces of male convex, with asperities uniseriate and larger on posterior half; first interspace of male declivity with serrations moderately close, sparser near apex; female with serrations of second interspace but little smaller and sparser than on third; Arizona, New Mexico, Texas, in *Juniperus pachyphloea*, *J. mexicana*, and *Cupressus* sp.

aciculatus Bruck (p. 459)

38. Frons of male transversely impressed, sometimes deep in median area but not truly concave; pronotum with median line not more finely and closely punctured; elytral striae narrow or very narrow, with small, usually indistinct punctures----- 39

Frons of male distinctly concave; pronotum with median line more finely, closely punctured; elytral striae moderately narrow, moderately finely, distinctly punctured----- 43

39. Average size larger (ranging from 2.15 to 3.75 mm. long); pronotum with median line strongly elevated, impunctate, vestiture notably longer at sides----- 40

Average size smaller (ranging from 2.0 to 2.85 mm. long); pronotum with median line rather weakly elevated, vestiture not conspicuously longer at sides----- 41

40. Large (3.0 to 3.75 mm. long, but seldom less than 3.25 mm. long); pronotal punctures rather dense; serrations on first interspace of male equally sparse throughout; New Mexico, Colorado, Utah, in *Juniperus* spp.--- neomexicanus, new species (p. 460)

Smaller (2.15 to 3.14 mm. long, but seldom more than 3.0 mm. long); pronotal punctures rather fine, not so dense; serrations of first interspace of male much sparser on apical half; Texas, in *Juniperus mexicana*----- texanus, new species (p. 462)

41. Antennal club with first two sutures subtransverse; vestiture of elytral declivity only moderately abundant, hair-like in both sexes; Northeastern States and eastern Canada.

canadensis Swaine (p. 463)

Antennal club with all three sutures distinctly oblique; vestiture of elytral declivity, in female at least, very abundant, mostly scalelike----- 42

42. Pronotum with median line distinctly elevated and impunctate on posterior two-thirds, lateral calli large, impunctate; de-

clivital vestiture of male hairlike, that of female mostly scale-like; western Canada and northwestern Washington, in *Juniperus scopulorum*----- scopulorum Swaine (p. 465)

Pronotum with median line weakly elevated and punctured throughout, lateral calli lacking or nearly so; declivital vestiture very abundant, mostly scalelike in both sexes; Mexico, in *Cupressus*----- tachubayae Hopkins (p. 466)

43. Frons of male opaque or subopaque, with shallow concavity subopaque; striae of elytral disk rather narrow, with small, indistinct punctures; first and second interspaces in male widened near base; California, in *Juniperus occidentalis*.

rugosus Swaine (p. 467)

Frons of male shining, with deep concavity brightly polished; striae of elytral disk of moderate width, strongly impressed, with distinct punctures; first interspace of male not widened, second widened near base----- 44

44. Frons in both sexes with a small callus at each side near epistomal margin, more distinct in female, median carina short; discal interspaces of male confusedly granulate except near declivity; male declivity with large, recurved serrations on first and third interspaces; Arizona, New Mexico, Colorado, and Wyoming in *Juniperus pachyphloea*, *J. utahensis*, and *J. monosperma*----- furnissi, new species (p. 469)

Frons devoid of calli in both sexes, median carina long in female, often indistinct in male; discal interspaces of male confusedly granulate only near base; male declivity with small serrations on first and third interspaces; California and Oregon, in *Juniperus occidentalis*— chamberlini, new species (p. 470)

PHLOEOSINUS PINI Swaine

Phlocosinus pini SWAINE, Can. Ent., vol. 47, p. 362, 1915; Canada Dept. Agr., Ent., Branch, Bull. 14, pt. 2, pp. 67, 69, 1918.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 175, 1939.

Male—Piceous-brown to black, with elytra reddish brown to piceous-brown; 2.1–2.5 mm. long, about ³ 1.92 times as long as wide.

Frons moderately wide between eyes, frontal rectangle about equal in length and width; epistomal lobe longer than usual for genus, with free end emarginate; surface black, subopaque, densely granulate-punctate; central area with a moderately deep, subcircular concavity slightly less than half as wide as distance between eyes, with a fine, rather weakly elevated, often distinct, median carina on its lower half; hairs fine and moderately short, inconspicuous. Eye about three times as long as wide, more than half divided by an emargination. Antenna with club about 1.7 times as long as wide, first two sutures slightly oblique, partly septate; third rather strongly oblique.

³ The use of the limiting term "about" in this and all other descriptions does not indicate that the measurements were guessed at or carelessly taken. The measurements and computations were very carefully made and, it is believed, apply with exactness to the specimens measured. However, there is a small amount of individual variation, and for that reason the limiting term "about" was inserted.

Pronotum about 1.22 times as wide as long, widest near middle; posterior angles rounded; sides nearly straight and feebly divergent on posterior third, strongly, arcuately narrowed on middle third, constricted just behind broadly rounded anterior margin; surface piceous to black, rather feebly shining, impressed across dorsum back of anterior margin, finely, closely punctured and finely granulate on disk and sides; median line elevated on posterior half but punctured as on rest of disk; with a small callus at each side; vestiture of fine, moderately short hairs, distinctly coarser and longer at sides.

Elytra wider than pronotum, about 1.3 times as long as wide; sides nearly straight and subparallel, moderately rounded behind; surface rather feebly shining; striae rather narrow, strongly impressed, with stria punctures small and rather inconspicuous; interspaces very wide, second widened at base, all moderately convex, densely granulate-punctate, with rather numerous larger asperities, usually confusedly arranged, but showing some tendency to a uniseriate arrangement near declivity; vestiture rather abundant, of short, slender hairs, becoming stouter posteriorly on disk and sides. Declivity with all interspaces convex and rather sparsely subequally asperate, first and third interspaces slightly more convex than second, but with asperities about equal in number and size on all; vestiture consisting of a few fine, erect hairs arising from bases of asperities, and of more numerous stouter and shorter hairs, many of them scalelike, from surface of interspaces. Mesosternum precipitous and protuberant in front between coxae.

Female.—Similar to male in habitus, but wider between eyes, frontal rectangle about 0.9 as long as wide, densely coarsely granulate-punctate, median carina faint, often lacking except for a small epistomal tubercle; elytral declivity similar to that of male, but with more numerous scalelike hairs.

Type locality.—Riding Mountains, Manitoba, Canada.

Host.—*Pinus banksiana* Lambert.

Location of type.—Canadian National Collection.

I have studied a series of 15 specimens collected and reared from the top of a small white pine by W. F. Fiske, on Grand Island, Mich., and recorded under Hopkins, U. S. Nos. 3775 and 3775a.

PHLOEOSINUS PICEAE Swaine

Phloeosinus piceae SWAINE, Can. Ent., vol. 66, p. 205, 1934.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 179, 1939.

"Length 2.2 mm.; width 1.3 mm. Black with short erect reddish pubescence, antennae and tarsi reddish; closely allied to *pini* Sw.

"Head: In the female the front is subplanate with a feeble arcuate transverse impression, closely rather coarsely granulate, punctation indistinct, pubescence very fine, with a very fine median carina on

epistomal margin and a small, indistinct, post-marginal callosity on each side, the median epistomal process small, but semicircular and emarginate; (in *male* the front is coarsely granulate-punctate, with a large, deep, subcordate impression occupying more than half the space between the eyes, and a strong median carina extending from the depth of the impression to the epistomal margin; the median epistomal process minute, lunar and entire); the antennal club elongate-oval, the 'sutures' bisinuate, subtransverse on the outer half, strongly recurved toward the base on the inner third.

"Pronotum: In the female slightly longer than wide, 2.5:2, rather strongly constricted in front on the sides, the constriction continued across the dorsum as a strong postmarginal impression, the punctuation close, moderate, and subgranular, coarser than *pini*, with a smooth median line very narrow and incomplete; (in *male* decidedly wider than long, 2.2:1.5, strongly constricted in front, with the median line more distinct).

"The *elytra* are stout, longer than wide, 4:3; scutellum depressed, striae narrow and impressed, strial punctures narrow, elongate and deep; interspaces moderately convex, with coarse and fine granules, the coarser nearly uniseriate on the disc, uniseriate, sparser, and acute on the declivity, closer and more numerous near the base, 2nd interspace wider, elevated and densely granulate near base. The *declivity* in the *female* with interspaces convex, 2nd not perceptibly narrower or less elevated than 1st and 3rd, with a single row of acute granules; (in the *male* 1st and 3rd interspaces slightly more strongly convex, the 3rd with distinctly coarse granules).

"The venter is sparsely punctate, the mesosternum precipitous in front, elevated at the anterior angle into a short compressed process between the coxae, perpendicular in the female, narrower and less ridge-like than in *pini*.

"Described from two specimens collected by Mr. E. B. Watson from a tunnel in a white-spruce twig, on Berry Mountain Brook, Cascapedia River, Que.

"*Holotype*: ♀ Gaspé Co., Que., *Picea canadensis*, Aug. 2, 1933 (E. B. Watson); No. 3817 in the Canadian National Collection.

"*Allotype*.—♂, same labels."

Swain's description is quoted verbatim above. I have seen no specimens.

PHLOEOSINUS ALASKANUS, new species

PLATE 38, FIGURE 1

Male.—Black, with elytra piceous, 1.8-2.43 mm. long, holotype 2.23 mm. long, about 1.83 times as long as wide; allied to *pini* Swaine and *piceae* Swaine.

Frons rather wide between eyes, frontal rectangle about 0.92 as long as wide, epistomal lobe longer than usual for the genus, rather narrow, with free end emarginate; surface black, feebly shining to subopaque, finely and densely granulate-punctate at sides and above, central area with a deep, subcircular to cordate concavity involving about half of diameter between eyes, with a fine, elevated median carina on lower half, sometimes extending entire length of concavity; hairs fine and rather short. Eye slightly more than three times as long as wide, more than half divided by a moderately broad emargination. Antenna with club about 1.8 times as long as wide, first two sutures feebly oblique, partly septate; third suture strongly oblique, not septate.

Pronotum about 1.2 times as wide as long, widest near base; sides straight and subparallel on posterior third, strongly, arcuately narrowed, then strongly constricted just behind the broadly rounded anterior margin; surface piceous black, shining, transversely impressed across dorsum opposite anterior constriction; disk with very deep, rather close, moderate-sized punctures, much finer, closer, and subgranulate in front, punctures somewhat roughened and subgranulate on sides; median line scarcely elevated, indefinitely impressed at each side of middle on posterior third; lateral calli small or lacking; vestiture of fine, rather short hairs, definitely longer on sides.

Elytra wider than pronotum, about 1.3 times as long as wide; widest behind middle; sides feebly sinuate on anterior two-thirds, moderately broadly rounded behind; surface rather weakly shining; striae rather narrow, strongly impressed, punctures small and inconspicuous; interspaces wide, convex, second and fourth wider than others, densely granulate-punctate, granules fine and confused, asperities less numerous, confused anteriorly but becoming uniseriate posteriorly on disk and sides; vestiture of short, moderately stout hairs. Declivity (pl. 38, fig. 1) with all interspaces convex and sparsely, finely asperate, first and third interspaces slightly more strongly convex and slightly wider than second, with asperities fewer in number and slightly smaller on second; each interspace with a sparse row of rather fine, erect setae arising from asperities, and more abundant, short, broad, scalelike hairs. Mesosternum precipitous in front, protuberant between coxae.

Female.—Similar to male in habitus; wider between eyes, frontal rectangle about 0.8 as long as wide; densely, coarsely granulate-punctate, median carina almost lacking, usually represented only by a small epistomal tubercle; pronotum slightly shorter than in male, about 1.3 times as wide as long, not so strongly constricted in front; elytra with declivity very similar to that of male but with wider and more numerous scalelike hairs.

Type locality.—Eagle, Alaska.

Host.—*Picea canadensis* (Mill.) B. S. P.

Type material.—Holotype, allotype, and 14 paratypes, U.S.N.M. No. 55396.

The holotype, allotype, and 14 paratypes bear the labels "Hopk. U. S. 1170c; Eagle, Alaska; *Picea canadensis*; W. N. Osgood, Colr."

PHLOEOSINUS HOPPINGI Swaine

Phloeosinus hoppingi SWAINE, Can. Ent., vol. 47, p. 364, 1915; Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 2, p. 67, 1918.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 175, 1939.

Male.—Black, with elytra piceous brown, their declivity reddish brown; 1.68 to 2.15 mm. long, about 2.08 times as long as wide.

Frons wide between eyes, frontal rectangle about 0.77 as long as wide, epistomal lobe very short, surface black, moderately shining, finely, densely granulate-punctate at sides, roughly punctured, subgranulate above; deeply, not broadly concave, with concavity shining, impunctate at center, finely punctured on periphery, with a fine, distinctly elevated median carina on lower half; vestiture of fine, short hairs, inconspicuous except in profile. Eye less than three times as long as wide, less than half divided by a wide emargination. Antenna with club less than twice as long as wide, first and second sutures subtransverse, third suture oblique.

Pronotum about 1.18 times as wide as long; sides strongly arcuate on posterior two-thirds, constricted just behind very broadly rounded front margin; surface black, shining, transversely impressed across anterior dorsum; disk with very deep, rather close, moderate-sized punctures which are much smaller and denser near anterior margin, punctures close, rough, subgranulate at sides; median line weakly elevated on posterior third, lateral calli very small or lacking; vestiture of moderately short, moderately abundant hairs, only slightly longer at sides.

Elytra wider than pronotum, about 1.32 times as long as wide; sides subparallel on anterior two-thirds, very broadly rounded behind; surface shining; striae deep, moderately wide on disk and sides, punctures distinct, moderately small; interspaces wider than striae, convex, confusedly, rather closely granulate-punctate on anterior portion of disk and sides, granules becoming uniseriate posteriorly; vestiture of moderately short, fine, distinct hairs, more abundant on posterior half of disk and sides. Declivity with first and third interspaces strongly convex, with rather close, coarse, acute serrations, mesal half of first interspace very finely and densely punctured, third interspace finely punctured; second interspace narrower than first, slightly narrower than third, nearly flat, shining, finely, moderately closely punctured, devoid of serrations; fifth, seventh, and ninth

interspaces each with a few smaller serrations and fine punctures; vestiture more abundant than on disk, consisting of a few slender setae from bases of serrations and much more numerous flattened scalelike hairs. Mesosternum with anterior face steep.

Female.—Similar to male in habitus; frons wider between eyes than in male, frontal rectangle about 0.71 as long as wide, convex, finely, densely punctate-granulate, arcuately impressed, with a fine, distinct median carina; elytral declivity similar to that of male, but with serrations smaller and scales much more abundant.

This species was described by Swaine from specimens taken from "cedar limbs" in California by R. Hopping.

The specimens that I studied came from various localities in California, as follows: General Grant National Park, Sequoia National Park, Yosemite National Park, Giant Forest, Wawona, Bass Lake, Milford, Millwood, Pinecrest, Fallen Leaf Lake, Ellis Meadow, Miami, Mount St. Helena, and Monterey. The hosts cited include *Libocedrus decurrens* Torr., *Juniperus occidentalis* Hook., and *Cupressus macrocarpa* Gordon.

PHLOEOSINUS HOFERI, new species

PLATE 38, FIGURE 2

Male.—Black, with elytra piceous to reddish brown; 1.75-2.35 mm. long, holotype 2.10 mm. long, about 2.13 times as long as wide; closely allied to *hoppingi* Swaine.

Frons wide between eyes, frontal rectangle about 0.79 as long as wide, epistomal lobe rather short; surface piceous black, moderately shining, finely, closely granulate-punctate at sides, punctured and subgranulate above; deeply and broadly concave, concavity extending from level of top of eye to epistomal margin, finely punctured except at center, median carina lacking except for a small carinal tooth on epistomal margin; vestiture consisting of short, slender hairs. Eye three times as long as wide, about half divided by a moderately wide U-shaped emargination. Antenna with club about 1.8 times as long as wide, first two sutures feebly oblique, third suture more strongly oblique.

Pronotum about 1.20 times as wide as long, widest through posterior third; sides strongly arcuate on posterior two-thirds, constricted just behind broadly rounded front margin; surface shining, black with anterior margin piceous, transversely impressed across dorsum in anterior fourth; disk with very deep, rather close, moderately large punctures (slightly larger and closer than in *hoppingi*), interstices not granulate, closer and slightly finer near anterior margin, sides with punctures larger, close, subgranulate; median line feebly elevated on posterior fourth only; lateral calli

lacking; vestiture of rather short, fine hairs, not notably longer on sides.

Elytra wider than pronotum, about 1.33 times as long as wide; sides nearly straight and subparallel on anterior two-thirds, very broadly rounded behind; surface shining; striae deep, moderately wide (slightly wider than in *hoppingi*) on disk and sides; punctures moderately large, rather close (larger and closer than in *hoppingi*); interspaces convex, from one and a half to nearly two times as wide as striae, rather finely and closely, confusedly granulate-punctate on anterior part of disk and sides, becoming uniseriately asperate on first and alternate segments behind; vestiture of moderately short, slender hairs, more abundant on posterior disk and sides. Declivity (pl. 38, fig. 2) with first and third interspaces strongly convex, with coarse, dark, recurved serrations, punctures very fine and moderately close (finer and sparser than in *hoppingi*); second interspace nearly flat, narrower than third and narrowed toward apex, brilliantly shining, with fine obsolescent punctures, devoid of serrations; fifth, seventh, and ninth interspaces each with a few small serrations; vestiture nearly entirely hairlike with a few scalelike hairs on second interspace and elsewhere. Anterior face of mesosternum moderately steep.

Female.—Similar in general proportions to male, frons wider between eyes, frontal rectangle about 0.72 as long as wide, punctured above, feebly punctate-granulate at sides, transversely impressed, with a definite, elevated median carina on lower half; elytral declivity similar in general to that of male, but with much finer serrations, deeper and more numerous punctures on first three interspaces, and more abundant scalelike vestiture on declivital face.

Type locality.—Ute Pass, Colo.

Additional localities.—Fort Garland and Roosevelt National Forest, Colo.; Vermejo, Meek, Capitan Mountains, Las Vegas, and Capulin, N. Mex.; Davis Mountains, Tex.; Yellowstone National Park, Wyo.; Panguitch, Kamas, and Bryce National Park, Utah; Prescott National Forest, Ariz.

Host.—*Juniperus scopulorum* Sargent.

Additional hosts.—*Juniperus pachyphloea* Torrey, *J. utahensis* (Engelm.) Lemmon.

Type material.—Holotype, allotype, and 233 paratypes, U.S.N.M. No. 55397.

Remarks.—The holotype, allotype, and 5 paratypes were taken from *Juniperus scopulorum* at Ute Pass, Colo., by G. Hofer; 22 paratypes were collected from Capitan Mountains, N. Mex., by J. L. Webb; 14 paratypes were taken from *Juniperus*, Vermejo, N. Mex., by A. D. Hopkins; 69 paratypes from *J. utahensis* at Las Vegas,

N. Mex., by Barber and Schwarz; 1 paratype was taken from *J. pachyphloea* at Meek, N. Mex., by W. F. Fiske; 1 paratype was taken at Buena Vista, Colo., by H. F. Wickham; 58 paratypes from juniper at Fort Garland, Colo., by A. D. Hopkins; 15 paratypes from *J. pachyphloea* in Roosevelt National Forest by M. W. Blackman; 4 paratypes from *J. pachyphloea* at Davis Mountain, Tex., by W. F. Fiske; 11 paratypes from *J. pachyphloea* in Panguitch and Kamas, Utah, by H. E. Burke; and 33 paratypes from *J. pachyphloea* at Prescott, Ariz., by M. W. Blackman. In addition numerous specimens from several localities in Utah, Wyoming, Colorado, New Mexico, and Arizona have recently been taken by R. L. Furness.

PHLOEOSINUS KEENI, new species

Male.—Piceous to black, with posterior elytra reddish to piceous brown; 2.15 to 2.8 mm. long, holotype 2.57 mm., about 2.04 times as long as wide.

Frons wide between eyes, frontal rectangle about 0.70 as long as wide; epistomal margin slightly thickened, epistomal lobe moderately short; central area broadly, deeply concave, finely, closely granulate-punctate at sides and above, concavity shining and impunctate in median fourth, finely granulate-punctate on the slopes at sides and above, with a rather indistinct, not sharply elevated median carina in lower half of concavity; hairs moderately short, cinereous, inconspicuous except in profile. Eye about 2.7 times as long as wide, more than half divided by a broad V-shaped emargination. Antenna with club slightly less than twice as long as wide, first two sutures slightly but distinctly oblique, third suture strongly, sinuately oblique.

Pronotum about 1.14 times as wide as long, widest just behind middle, sides feebly diverging to the widest point, then strongly, arcuately narrowed, constricted just back of the broadly rounded anterior margin; surface shining, transversely impressed behind front margin; disk with close, deep, moderately fine punctures, slightly rougher at sides; elevated median line lacking; lateral calli rather poorly developed, sometimes lacking; pubescence short and fine, inconspicuous except when seen in profile.

Elytra wider than pronotum, nearly 1.30 times as long as wide, slightly wider at about middle; sides subparallel on anterior two-thirds, broadly rounded behind; surface moderately shining on disk; striae narrow, impressed on disk, wider behind and on sides, striae punctures small, rather close; interspaces several times as wide as striae, moderately finely, closely punctate-granulate, the granules confused on disk, with a uniseriate row of larger asperities on first, third, and alternating interspaces, starting near summit of declivity;

hairs small, short, and rather scanty on anterior disk, becoming longer, stouter, and more plentiful posteriorly. Declivity with interspaces closely punctured, clothed for the most part with short, flattened, scalelike, recumbent hairs, with a few semierect setae; first and third interspaces strongly convex, serrations of moderate size; somewhat coarser and sparser on first than on third; fifth and seventh interspaces each with two or three smaller serrations; second interspace narrower than on disk, narrower than first or third, nearly flat, devoid of serrations, with numerous stout, scalelike hairs. Anterior face of mesosternum very steep.

Female.—Similar to male in general habitus; frons wider between eyes, frontal rectangle about 0.67 as long as wide, densely granulate-punctate, with a rather low carina extending from epistomal margin to arcuate transverse impression; elytral declivity with first and third interspaces strongly convex, each with a row of small serrations, smaller than in male.

Type locality.—Mount Rainier National Park, Wash.

Additional locality.—Fairfax, Wash.

Host.—*Chamaecyparis nootkatensis* (Lambert) Sudw.

Type material.—Holotype, allotype, and 76 paratypes, U.S.N.M. No. 55398.

Remarks.—The holotype, allotype, and 60 paratypes were reared from small branches of *Chamaecyparis nootkatensis* taken in Mount Rainier National Park by F. P. Keen and W. J. Buckhorn; 16 paratypes were taken from *C. nootkatensis* at Fairfax, Wash., by J. A. Beal.

PHLOEOSINUS ANTENNATUS Swaine

Phloeosinus antennatus SWAINE, Can. Ent., vol. 56, p. 146, 1924.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 177, 1939.

Male.—Black, with elytra reddish brown to piceous; 1.6 to 2.0 mm. long, about 2.0 times as long as wide.

Frons black, shining, broad between eyes, frontal rectangle about 0.77 as long as wide, epistomal lobe rather short; finely granulate-punctate at sides and above, central area moderately deeply concave (concavity about as narrow but deeper than in *hoppingi*), occupying only about half of space between eyes, with a strong, sharply elevated median carina on lower three-fifths of concavity; vestiture fine, short, and inconspicuous. Eye about three times as long as wide, more than half divided by a deep, moderately wide emargination. Antenna with club twice as long as wide, first suture nearly transverse, second suture slightly oblique, third suture strongly oblique.

Pronotum about 1.17 times as wide as long, widest near middle; sides nearly straight and feebly diverging on posterior half, then

strongly, arcuately narrowed, strongly constricted just behind broadly rounded anterior margin; surface black, shining, transversely impressed just behind front margin, with deep, close, moderate-sized punctures on disk, finer and closer in front, very closely, roughly punctured at sides; median line feebly elevated on posterior third only, lateral calli lacking; vestiture of short, fine, moderately abundant hairs.

Elytra slightly wider than pronotum, about 1.37 times as long as wide; sides nearly straight and subparallel on anterior two-thirds, rather broadly rounded behind; surface shining, striae deep, of moderate width, with moderately large punctures; interspaces slightly wider than striae on disk and sides, convex, finely and closely granulate-punctate, becoming coarser and uniseriate only near declivity; vestiture of short, moderately fine hairs. Declivity with first, third, and alternate interspaces convex, finely, closely punctured, each with a uniseriate row of small, blunt, rather sparse serrations; second interspace nearly flat, narrower than first and third interspaces, finely punctured, entirely devoid of serrations, slightly narrowed toward apex; vestiture consisting of a few slender hairs from bases of serrations and numerous spatulate and scalelike hairs over the entire declivity. Anterior face of mesosternum steep.

Female.—Similar to male in size and proportions, with frons wider between eyes, frontal rectangle about 0.73 as long as wide, finely, densely granulate-punctate throughout, transversely impressed, median carina distinct, acutely elevated, pronotum not so strongly constricted anteriorly, elytral declivity similar to that of male, with serrations only slightly smaller and vestiture slightly more abundant.

Type locality.—Strawberry, Calif.

Host.—*Libocedrus decurrens* Torr.

Location of type.—Canadian National Collection No. 731.

Remarks.—The foregoing descriptions were prepared from 4 paratypes lent by W. J. Chamberlin and 25 specimens bearing identical data and all collected by Chamberlin, August 5, 1919. Additional specimens are from Hackamore and Siskiyou County, Calif., and Pinehurst, Wapinitia, Phoenix, and Wonder, Oreg. All are from *Libocedrus decurrens*.

PHLOEOSINUS CORONATUS Chapuis

Phloeosinus coronatus CHAPUIS, Synopsis des Scolytides, p. 39, 1869; Extr. Mem. Soc. Roy. Sci. Liège, p. 247, 1873.—BLANDFORD, Biol. Centr.-Amer., Coleop., vol. 4, pt. 6, p. 160, 1897.

“Ovatus, subopacus, pallide brunneus; capite nigro, subtiliter punctato, late depresso, depressione pilis flavis, subfasciculatis circumdata; prothorace longitudine plus duplo latiori, summo apice

fortiter constricto, subtiliter punctato, pube lutea oblecto; elytris subtiliter punctato-striatis, interstitiis punctulatis, pilus luteis, squamiformis ornatis, 3° versus apicem subampliato.—Long. $1\frac{3}{4}$ mill. Yucatan."

The writer has not seen a specimen of this species, but from the rather general description he believes that it is a male and is fairly closely related to *antennatus*, as shown by the frontal characters and by the declivity ornamented with scalelike hairs, and by inconspicuous serrations (not mentioned in description).

PHLOEOSINUS SPINOSUS, new species

PLATE 38, FIGURES 5, 6

Male.—Black, with posterior part of elytra reddish brown; 1.94 mm. long, about 2.09 times as long as wide.

Frons black, shining, broad between eyes, frontal rectangle about 0.74 as long as wide; epistomal lobe rather short; central portion deeply, rather broadly concave, surface brightly shining and impunctate in median area, finely punctate at each side, median carina reduced to a small tooth just above epistomal margin; sides of frons finely, closely granulate-punctate, not so closely punctured and without granules in median area above; pubescence semierect, short, inconspicuous except in profile. Eye elongate, nearly half divided by a broad emargination on inner margin. Antenna with club about 1.85 times as long as wide, first suture slightly oblique, second more strongly oblique and sinuate, third very strongly oblique.

Pronotum about 1.20 times as wide as long, sides strongly and nearly regularly arcuate on posterior two-thirds, widest slightly behind middle, strongly constricted in anterior third, broadly rounded in front; surface shining, moderately impressed just behind anterior margin; rather finely, deeply, rather closely punctured, interstices not granulate on disk, very slightly roughened at sides; median line not elevated; vestiture short and fine, visible but not conspicuous.

Elytra slightly wider than pronotum, about 1.26 times as long as wide; sides subparallel on anterior two-thirds, moderately rounded behind, with ends of spines extending beyond outline; surface shining, piceous brown, with posterior third reddish brown and extreme base slightly reddish; striae moderately impressed, much narrower than interspaces, punctures fine, moderately close, shallow; interspaces much wider than striae, moderately convex, granulate-punctate, uniseriately asperate on posterior two-thirds, the asperities on first and alternate interspaces becoming much higher, sharper, and spinelike posteriorly, pubescence short, fine, and inconspicuous anteriorly, stouter behind (pl. 38, fig. 5). Declivity with first and third interspaces strongly convex, with rather close, fine punctures, each

bearing a short, stout, scalelike hair, with a sparse row of large, long, sharp spines, the posterior three or four each with its base broad, occupying from one-half to two-thirds of the diameter of the interspace and from two to three times as long as wide; third interspace with about four slightly smaller but similar spines, fifth and seventh interspaces each with one or two sharp spinelike asperities; second interspace nearly flat, shining, punctured, with short, wide, scalelike hairs. Front face of mesosternum moderately steep.

Female.—Similar to male in general proportions and size; frons broader between eyes, frontal rectangle about 0.66 as long as wide; somewhat flattened below, arcuately impressed, with a distinct, elevated median carina on its lower half; pronotum indefinitely impressed behind at each side of median line; elytral declivity (pl. 38, fig. 6) with first and third interspaces only moderately convex, each with a sparse row of small, inconspicuous, rather sharp asperities; all interspaces clothed with numerous hairs, some of which are slender but most of which are short and somewhat scalelike.

Type locality.—Chiricahua Mountains, N. Mex.

Additional locality.—Pine, Ariz.

Host.—*Cupressus arizonica* Greene.

Type material.—Holotype, allotype, and six paratypes, U.S.N.M. No. 55400.

Remarks.—The holotype, allotype, and one paratype (a fragment) were collected by Donald DeLeon from *Cupressus arizonica*, Chiricahua Mountains, N. Mex., October 2, 1936; and five paratypes were collected from the same host, at Pine, Ariz., by R. L. Furniss.

PHLOEOSINUS SWAINEI Bruck

Phlocosinus minutus SWAINE (not Blandford, 1894), Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 1, p. 9, 1917.

Phlocosinus swainei BRUCK, Can. Ent., vol. 65, p. 56, 1933.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 173, 1939.

Male.—Black, with antennal club and tarsi brown; pubescence moderately abundant, reddish cinereous; 1.75 to 2.1 mm. long, about 1.91 times as long as wide.

Frons black, moderately shining; broad between eyes, frontal rectangle about 0.68 as long as wide; epistomal margin slightly thickened, epistomal lobe short and inconspicuous; broadly, moderately deeply concave, finely punctate and distinctly granulate at sides and above, concavity smooth and brightly shining above in middle fourth, with a fine, moderately elevated, rather short median carina on ventral two-fifths of concavity; vestiture fine and short at sides and above, longer on epistoma. Eye elongate, about 2.8 times as long

as wide, more than half divided by a deep, rather wide emargination. Antenna with club more than twice as long as wide, first and second sutures partially septate, slightly oblique, third suture strongly oblique.

Pronotum about 1.22 times as wide as long, sides feebly arcuate on posterior two-fifths, then strongly, arcuately narrowed, strongly constricted just behind the very broadly rounded anterior margin; surface rather weakly shining, transversely impressed just behind anterior margin; disk with close, deep punctures of moderate size, slightly roughened and subgranulate at sides; median line weakly elevated behind but punctured throughout; vestiture short and fine, less conspicuous than in *hoppingi*, more so than in *antennatus*.

Elytra slightly wider than pronotum, about 1.25 times as long as wide, widest at base; sides nearly straight and subparallel on anterior two-thirds, very broadly rounded behind; surface shining; striae deep, rather narrow on disk, wider on sides, punctures small, rather close; interspaces several times as wide as striae, convex, finely and closely granulate, each with a slightly irregular, uniseriate row of coarser granules or asperities; pubescence consisting of short, fine, moderately abundant, reddish-yellow hairs. Declivity with strial punctures somewhat coarser and rougher; first and third interspaces rather weakly convex, with a few irregularly arranged, rather sharp serrations; second interspace flat, narrowed toward apex, finely, sparsely punctate; vestiture short and fine, reddish yellow, more conspicuous than on disk, entirely hairlike.

Female.—Similar to male in general habitus; frontal rectangle about 0.64 as long as wide; frons wider between eyes than in male, somewhat flattened, impressed between the eyes, finely granulate-punctate, with a fine, elevated median carina on lower half; sides of pronotum not so strongly constricted near anterior margin; elytral declivity with smaller, sharp, irregularly arranged serrations.

Type locality.—Fairfax, Cypress Ridge, Marin County, Calif.

Host.—Not recorded.

Location of type.—Canadian National Collection, Ottawa, Canada.

Remarks.—I have studied one specimen from the type locality; two from Mount Saint Helena, Calif., taken from *Cupressus sargentii* Jepson by Donald DeLeon; and three specimens from Mount Tamalpais, Calif., taken from *C. sargentii* by F. P. Keen.

The species was originally described by Swaine under the name of *Phloeosinus minutus*. Bruck, finding this name preoccupied, renamed it *swainei* in honor of the original describer.

PHLOEOSINUS GRANULATUS Bruck

Phloeosinus granulatus BRUCK, Southern California Acad. Sci. Bull. 35, p. 33, 1936.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 173, 1939.

Male.—Black, with elytra reddish brown; 1.5 to 2.0 mm. long, about 1.86 times as long as wide; allied to *swainei*.

Frons black, moderately shining; broad between eyes, frontal rectangle about 0.71 as long as wide, epistomal lobe short; broadly, deeply concave (deeper than in *swainei*), with concavity shining and glabrous, with a few obsolescent punctures; median carina strongly elevated, extending from epistomal margin to depth of concavity; sides finely, densely granulate-punctate, median area above concavity roughly punctured; vestiture of fine, rather short hair, inconspicuous except in profile, longer on epistoma. Eye more than three times as long as wide, more than half divided by a very wide U-shaped emargination. Antenna with club less than twice as long as wide, first and second sutures nearly transverse, third suture strongly oblique.

Pronotum about 1.25 times as wide as long; sides nearly straight and feebly converging on posterior three-fifths, then strongly arcuately narrowed to lateral constriction just posterior to broadly rounded front margin; surface black, moderately shining, rather strongly, transversely impressed behind anterior margin; disk very deeply, moderately finely, rather roughly punctured, not granulate but with narrow interstices very finely reticulate; punctures finer and closer anterior to impression, with very fine granules; sides with punctures closer than on disk, granulate; median line slightly elevated on posterior third; lateral calli nearly lacking; vestiture of short and fine hairs on entire disk, slightly longer in front and moderately longer on sides.

Elytra wider than pronotum, about 1.22 times as long as wide; sides subparallel on anterior two-thirds, very broadly rounded behind; surface moderately shining; striae moderately strongly impressed, moderately narrow on disk, wider on sides, punctures small, rather close, larger on sides; interspaces wide, convex, distinctly punctate, scarcely granulate, with a sparse, uniseriate row of small sharp asperities on all interspaces, becoming larger posteriorly on first, third, and alternate interspaces on both disk and sides; vestiture consisting of moderately numerous short, fine hairs. Declivity with striae punctures about as on disk, first and third interspaces strongly convex, finely punctured, each with a row of sparse, moderately small, sharp, dark-colored serrations; fifth, seventh, and ninth interspaces finely punctured, each with a few small, sharp asperities; second interspace flat, slightly narrower than on disk; vestiture consisting of short, fine hairs and more numerous, flat, scalelike hairs. Anterior face of mesosternum precipitous.

Female.—Similar to male in habitus, frons wider between eyes, frontal rectangle about 0.61 as long as wide, with a strong, arcuate, transverse impression and a rather short, fine, elevated median carina;

pronotum regularly, arcuately narrowed from base to lateral constriction; elytral declivity similar to that of male but with notably smaller serrations and more abundant scalelike vestiture.

This species is closely related to *swainei*. It is similar in size, proportions, and general habitus. It can, however, be readily separated by differences in the frontal concavity and frontal carina, the shape and sculpture of the pronotum, the width of the elytral striae, the sculpture of the discal interspaces, and the declivital characters. Perhaps the most readily grasped difference is in the declivital vestiture, which in *swainei* is entirely hairlike while in *granulatus* it is largely scalelike in both sexes.

Type locality.—Santa Ana Canyon, Orange County, Calif.

Host.—*Cupressus forbesii* Jepson.

Location of types.—Private collection of C. R. Bruck.

Remarks.—The foregoing description was prepared from a male and a female paratype kindly loaned by J. N. Knull. I have seen no other specimens of this species.

PHLOEOSINUS FRONTALIS Bruck

PLATE 38, FIGURES 3, 3a

Phloeosinus frontalis BRUCK, Can. Ent., vol. 65, p. 55, 1933.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 173, 1939.

Male.—Black, with elytra reddish brown to piceous; holotype 2.08 mm. long, about 1.82 times as long as wide.

Frons piceous black, brightly shining, moderately broad between eyes, frontal rectangle about 0.8 as long as wide, epistomal lobe short; deeply, very broadly concave, with concavity extending from above eyes to epistomal margin, polished and impunctate in median area, finely, closely granulate-punctate at sides, punctured and subgranulate above; median carina on lower half, ending in a small tubercle at epistomal margin; vestiture of fine hairs, rather longer than usual at sides and above concavity. Eye nearly three times as long as wide, more than half divided by a rather wide emargination. Antenna with club slightly less than twice as long as wide, first suture slightly, the others progressively more oblique.

Pronotum about 1.25 times as wide as long, widest through posterior angles; sides nearly straight, feebly arcuate and feebly convergent on posterior half, then much more strongly arcuate and convergent to lateral constrictions just behind very broadly rounded front margin; surface shining, transversely impressed across anterior third of dorsum; disk with deep, close, rather rough, moderate-sized punctures, finer, closer, and subgranulate near anterior margin, moderately coarse, dense, subgranulate at sides; median line not elevated;

lateral calli lacking; hairs cinereous, rather short, inconspicuous on disk, notably longer and more conspicuous on sides.

Elytra slightly wider than pronotum, about 1.19 times as long as wide; sides nearly straight and subparallel on anterior two-thirds, broadly rounded behind; surface shining; striae moderately narrow, deeply impressed, punctures rather small, rather deep, moderately close; interspaces much wider than striae, not uniform in width, first much wider behind, finely granulate-punctate, with larger asperities confused near base, becoming uniseriate farther back on disk and sides; vestiture of moderately abundant, short, fine hairs on anterior part, becoming stouter and more conspicuous behind. Declivity (pl. 38, figs. 3, 3a) with first and third interspaces moderately strongly convex, each with a row of rather sparse, moderately large, sharp, recurved serrations, and with numerous small, close, deep punctures; second interspace nearly flat, shining, narrowed posteriorly, with fine, rather rough punctures; fifth, seventh, and ninth interspaces each with a few small serrations and small punctures; vestiture consisting of a few slender setae from bases of serrations and many stout, flattened or scalelike hairs. Anterior face of mesosternum somewhat obliquely declivitous.

Female.—Similar to male in habitus, frons wider between eyes, frontal rectangle about 0.7 as long as wide; finely granulate-punctate at sides, punctured above, broadly transversely impressed, with a distinct elevated median carina, vestiture of moderately short, slender hairs⁴; elytral declivity similar to that of the male in general features, but with serrations notably smaller, punctures denser, and vestiture much more abundant.

Type locality.—Rialto, Calif.

Host.—*Cupressus arizonica* Greene.

Type material.—Holotype and allotype, U.S.N.M. No. 53820.

Remarks.—The foregoing descriptions were prepared from the holotype and allotype in the United States National Museum. The material was collected by H. E. Burke. Four other specimens collected by Burke at the same location and from the same host were also studied.

PHLOEOSINUS SETOSUS Bruck

Phloeosinus setosus BRUCK, Can. Ent., vol. 65, p. 54, 1933.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 172, 1939.

Male.—Black, with elytra reddish brown to piceous; 1.5–2.5 mm. long, about 1.94 times as long as wide.

⁴ Not "densely clothed with short, scale-like hairs," as described by Bruck. The apparent scalelike structures are fragments of frass adhering to the surface at bases of hairs.

Frons broad between eyes, frontal rectangle about 0.72 as long as wide, epistomal lobe short; moderately broadly, not deeply concave between eyes, with a very strongly elevated median carina on more than the lower half; surface shining, black, finely and closely punctate-granulate at sides, roughly punctured in median area above concavity, granules finer in concavity; vestiture of fine, short, inconspicuous hairs. Eye more than three times as long as wide, more than half divided by a very broad emargination. Antenna with club about 1.6 times as long as wide, first two sutures slightly oblique, third suture strongly oblique.

Pronotum about 1.20 times as wide as long, widest at posterior angles, sides nearly regularly arcuate from base to lateral constriction just behind moderately rounded front margin; surface black, moderately shining, broadly, transversely impressed in anterior third, with very deep, close, moderate-sized punctures on disk, anterior portion more closely punctured and subgranulate, sides roughly, subgranulately punctured; median line not elevated; lateral calli very small or lacking; vestiture rather short and fine, somewhat longer at sides.

Elytra wider than pronotum, about 1.24 times as long as wide; sides nearly straight and subparallel on anterior two-thirds, broadly rounded behind; surface brightly shining, reddish brown to nearly black; striae very deep, more than half as wide as interspaces, punctures of moderate size, rather deep, separated by more than own diameters; interspaces convex, confusedly granulate-punctate on anterior third of disk, strongly rugose and uniseriately asperate behind, asperities transverse, with one, two, or more punctures at posterior base of each, each giving rise to an erect, rather short seta, punctures and setae more numerous on sutural interspaces behind middle of disk. Declivity with first and third interspaces strongly convex, sparsely asperate, densely and finely punctured, with erect setae as on disk and with more numerous, flat, scalelike, nearly white hairs, very numerous on first interspace, forming a white stripe, less numerous on third interspace, second interspace weakly convex, with surface brightly polished and bare, devoid of serrations but with a few minute, obsolescent punctures; more lateral interspaces all finely asperate, with less numerous hairs. Anterior face of mesosternum steep.

Female.—Similar to male in size and general appearance; frons very wide between eyes, frontal rectangle about 0.66 as long as wide, coarsely, densely granulate-punctate, broadly, transversely impressed, median carina less strongly elevated than in male; elytral declivity similar to that of male but with serrations slightly smaller.

Type locality.—Mount Saint Helena, Calif.

Host.—*Cupressus sargentii* Jepson.

Location of type.—Collection of C. R. Bruck.

Remarks.—The above description was prepared from two series of specimens collected by R. L. Furniss from *Cupressus sargentii* and *Libocedrus decurrens* Torrey at the type locality, Mount Saint Helena, Calif.

PHLOEOSINUS ARIZONICUS, new species

PLATE 38, FIGURES 4, 4a

Male.—Black, with elytra reddish brown; 1.8 to 2.37 mm. long, holotype 2.17 mm. long, about 1.95 times as long as wide; closely related to *P. setosus* Bruck but slightly more slender and with the elytral striae wider.

Frons broad between eyes, frontal rectangle about 0.72 as long as wide; epistomal lobe very short; central portion widely, shallowly concave; with a fine, elevated, median carina (smaller than in *setosus*) extending upward to beyond center of concavity; surface shining, finely and closely granulate-punctate throughout, the granules finer in concavity but present everywhere except on carina; pubescence inconspicuous, fine, and short. Eye more than three times as long as wide, more than half divided by a broad emargination. Antenna with club about 1.8 times as long as wide, first two sutures slightly oblique, third suture strongly oblique.

Pronotum about 1.24 times as wide as long; sides strongly and nearly regularly arcuate on posterior three-fourths, then strongly constricted, very broadly rounded in front; surface shining, rather broadly impressed just behind anterior margin, deeply, closely, rather finely punctured on disk, somewhat roughened, subgranulate at sides; median line not elevated, but surface feebly, indefinitely impressed at each side of disk in posterior third; vestiture very short and fine, much less conspicuous than in *setosus*.

Elytra slightly wider than pronotum, about 1.26 times as long as wide; sides straight and subparallel on anterior half, then at first gently then abruptly narrowed, moderately rounded behind; surface brightly shining, reddish brown; striae nearly as wide as interspaces, rather deep, punctures moderately large, shallow, moderately spaced; interspaces narrower than in *setosus*, convex, rugose, asperate, finely punctured, asperities confused near base, somewhat irregular throughout on disk. with fine, short setae (less conspicuous than in *setosus*) becoming stouter posteriorly. Declivity (pl. 38, figs. 4, 4a) with first and third interspaces strongly convex, sparsely and finely asperate (finer than in *setosus*), densely, finely punctured, with a few erect setae and with more numerous, flattened, scalelike, nearly white

hairs, numerous on first interspace, more scalelike and less numerous on third interspace; second interspace slightly narrower than on disk, feebly convex (flatter than in *setosus*), with surface shining and devoid of punctures and pubescence. Mesosternum steep in front.

Female.—Similar to male in size and general appearance; frons very broad between eyes, frontal rectangle 0.66 as long as wide; somewhat flattened below, with a fine, strongly elevated median carina on its lower half; elytral interspaces slightly wider than in male; with pubescence slightly more conspicuous on elytra and pronotum than in male but less evident than in *setosus*.

Type locality.—Santa Catalina Mountains, Ariz.

Additional locality.—Chiricahua Mountains, Ariz.

Host.—*Cupressus arizonica* Greene.

Type material.—Holotype, allotype, and 31 paratypes, U.S.N.M. No. 55401.

Remarks.—The holotype, allotype, and 25 paratypes were collected by M. Chrisman in *Cupressus*, Santa Catalina Mountains, Ariz.; and 6 paratypes were taken from *C. arizonica* by J. L. Webb, Chiricahua Mountains, Ariz. A long series collected by R. L. Furniss from *C. arizonica* at Pine, Ariz., has recently been received.

PHLOEOSINUS VANDYKEI Swaine

Phloeosinus vandykei SWAINE, Can. Ent., vol. 47, pp. 366, 367, 1915; Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 2, p. 68, 1918.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 176, 1939.

Phlocosinus russus SWAINE, Can. Ent., vol. 56, p. 148, 1924.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 178, 1939. (New synonymy.)

Male.—Piceous-brown to black with elytra reddish brown and brightly shining; 1.8 to 2.25 mm. long, about twice as long as wide.

Frons moderately wide between eyes, frontal rectangle about 0.76 as long as wide, epistomal lobe rather short; surface black, shining, finely, moderately closely punctured and finely granulate at sides, more sparsely punctured and subgranulate above; central area widely, deeply concave, median portion glabrous, brightly shining, median carina reduced to a tubercle on lower margin, the concavity continued in median line, above to vertex as a shallow, moderately wide, indefinite impression, hairs at sides and above short and fine. Eye three times as long as wide, nearly half divided by the emargination. Antenna with club nearly exactly twice as long as wide, first two sutures oblique, slightly arcuate, third suture more strongly oblique and sinuate.

Pronotum about 1.2 times as wide as long, widest just behind middle; sides arcuate on posterior half, then strongly, arcuately narrowed, constricted just behind broadly rounded front margin; surface

piceous black, shining, punctures deep, somewhat sparser than usual, of moderate size; lateral calli lacking, the disk indefinitely impressed at each side of median line on posterior fourth; pubescence fine, short, and inconspicuous, only slightly longer at each side just anterior to position of lateral calli.

Elytra wider than pronotum, about 1.35 times as long as wide; sides nearly straight and subparallel on anterior two-thirds, broadly rounded behind; surface brightly shining, striae rather deeply impressed, much narrower than interspaces, stria punctures small, narrow, and elongate, not very close; interspaces wide, convex, surface granulate-punctate, with granules sparse, confusedly asperate near base, rounded and confused on most of disk, becoming uniseriate on alternate interspaces posteriorly, punctures rather fine, with a few very fine, short hairs. Declivity with all of interspaces slightly convex, first and third scarcely more convex than second, surface nearly smooth, with asperities nearly obsolete, those on ninth interspace slightly larger than on others, second interspace subequal to first, narrower than third. Anterior face of mesosternum moderately oblique.

Female.—Similar to male in appearance, with frons convex, closely punctate-granulate below, more sparsely punctured above, with a fine, acute median carina on lower half, with frontal rectangle about 0.70 as long as wide; elytral interspaces slightly more strongly (but still weakly) asperate on declivity than in male.

Type locality.—Fresno County, Calif.

Host.—"Cedar limbs."

Location of type.—Canadian National Collection No. 2173.

Remarks.—Numerous specimens in the United States National Museum were taken at various localities in California and southern Oregon, mostly from *Libocedrus decurrens* Torrey and in one case from *Thuja plicata* D. Don.

Phloeosinus russus was described by Swaine as of about the same size as, and closely allied to, *vandykei* Sw.; more feebly shining, with short, easily seen pubescence; with elytral interspaces more convex, and with uniseriate asperities, large on disk and smaller on declivity. The species was described from a single female specimen labeled "S. B. Mts. (San Bernardino Mountains?), Cal. 7/19/92." The description is very brief, and, if I have interpreted it correctly, it applies very closely to several specimens selected from the rather long series of *vandykei* showing coarser elytral sculpture and more evident vestiture. It is believed that *P. russus* Swaine should be placed as a synonym of *P. vandykei* Swaine.

PHLOEOSINUS FULGENS Swaine

PLATE 38, FIGURE 8

Phloeosinus fulgens SWAINE, 1924, Can. Ent., vol. 56, p. 147, 1924.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 178, 1939.

Male.—Black throughout except antenna and tarsi, brightly shining; 2.0 to 2.71 mm. long, about 2.07 times as long as wide.

Frons moderately wide between eyes, frontal rectangle about 0.72 as long as wide, epistomal lobe short; surface moderately shining, strongly granulate-punctate throughout, broadly, moderately shallowly concave, with little indication of a median carina except for a small tubercle just above epistomal margin; hairs short and fine. Eye about three times as long as wide, more than half divided by a moderately wide U-shaped emargination. Antenna with club about twice as long as wide, all sutures distinctly oblique.

Pronotum about 1.09 times as wide as long, widest on posterior third, sides nearly straight and subparallel on posterior third, then strongly, arcuately narrowed, constricted just behind moderately broadly rounded front margin; surface shining, transversely impressed just behind anterior margin; with dense, deep, moderate-sized punctures, finer and even more dense near front margin, punctate-granulate at sides; median line indistinct, lateral calli usually lacking; hairs very short and fine.

Elytra wider than pronotum, about 1.34 times as long as wide, widest across basal serrations; sides nearly straight and subparallel, broadly rounded behind; surface shining; striae on disk moderately narrow, strongly impressed, punctures of moderate size, shallow, longer than wide, distinct; striae slightly wider and punctures slightly larger on sides; interspaces wider than striae, weakly convex, very densely, confusedly, rather coarsely granulate-punctate, granules not becoming uniseriate on disk; appearing glabrous, but with minute, very inconspicuous hairs, to be seen only in profile. Declivity (pl. 38, fig. 8) brightly shining, striae deeply impressed and striae punctures distinct; first and third interspaces strongly convex, each with a few, rather small, indistinct granules, and fine, indistinct punctures; second interspace more weakly convex, as wide as others, brightly polished, devoid of serrations or granules, with a few, very fine, obsolescent punctures; hairs sparse and minute. Anterior coxae moderately widely separated, anterior face of mesosternum oblique.

Female.—Similar to male, but with frons wider and shorter, frontal rectangle about 0.69 as long as wide, convex; arcuate, transverse impression variable but usually strong, median carina sharply elevated on lower half; elytral declivity similar to that of male, the hairs slightly larger and more numerous but still short and fine.

Type locality.—Norfolk, Calif.

Host.—*Libocedrus decurrens* Torrey.

Location of type.—Canadian National Collection, Ottawa, Canada.

Remarks.—I have studied 57 specimens of *fulgens* collected at Yosemite National Park, Paradise Creek, Wawona, Sequoia National Forest, Placerville, and Eldorado County, Calif., and at Ashland and Wonder, Oreg. The host cited in each case is *Libocedrus decurrens* Torrey.

PHLOEOSINUS SPLENDENS, new species

PLATE 38, FIGURE 7

Male.—Black, with elytra reddish brown to piceous brown; brightly shining; 2.37 to 2.8 mm. long, holotype 2.51 mm. long, about 2.02 times as long as wide; closely allied to *fulgens*.

Frons moderately wide between eyes, frontal rectangle about 0.75 as long as wide, epistomal lobe very short; surface brightly shining, rather closely, deeply punctured, granulate-punctate only at sides (cf. *fulgens*), moderately broadly and deeply concave, median carina nearly obsolete; hairs short and fine. Eye not quite three times as long as wide, about half divided by a wide U-shaped emargination. Antenna with club exactly twice as long as wide, all sutures oblique.

Pronotum about 1.06 times as wide as long, widest at posterior angles; sides nearly straight (feebly arcuate) and very feebly converging on posterior half, then more strongly, arcuately narrowed, constricted just back of broadly rounded anterior margin, with dorsum transversely impressed; surface brilliantly shining, with moderately coarse, deep, closely placed punctures (coarser and less closely placed than in *fulgens*, with larger interstices which are much more brightly polished), punctures much finer and closer near anterior margin, dense and granulate at sides; median line distinct in middle third; lateral calli nearly lacking; hairs minute.

Elytra wider than pronotum, about 1.30 times as long as wide, slightly widest back of middle; sides subparallel on anterior two-thirds, broadly rounded behind; surface brightly shining, discal striae deep, of moderate width (wider than in *fulgens*), punctures rather coarse, moderately spaced, rather shallow, distinct (coarser and less shallow than in *fulgens*), striae on sides wider, nearly equal in width to sixth interspace, punctures slightly larger; interspaces on disk wider than striae, weakly convex, densely, confusedly, moderately coarsely granulate-punctate on anterior disk, granules becoming brightly polished and lower at top of declivity, with only a few very fine granules on the odd-numbered interspaces and none on the even-numbered ones; surface appearing glabrous but with a few minute hairs to be seen only in profile. Declivity (pl. 38, fig. 7) bril-

liantly shining, striae deeply impressed with punctures distinct as on disk; interspaces 1 and 3 strongly convex, each with a few, sparse, fine, obsolescent granules not arranged uniseriately, and a few very fine, indistinct punctures; second interspace nearly as wide as others, less strongly convex, devoid of granules and with very few, minute punctures; vestiture consisting of minute, sparse hairs. Anterior face of mesosternum slightly oblique.

Female.—Similar to male, but with frons wider, frontal rectangle about 0.70 as long as wide, with well-developed arcuate, transverse impression, median carina fine, elevated on lower half; elytral declivity similar to that of male but with hairs slightly larger and more numerous, but still very small and inconspicuous.

This species is very closely allied to *fulgens* but readily distinguished by the pronotal and elytral characters brought out in the descriptions, as well as by the difference in coloration.

Type locality.—Pinehurst, Oreg.

Host.—*Libocedrus decurrens* Torr.

Type material.—Holotype, allotype, and 12 paratypes, U.S.N.M. No. 55402.

Remarks.—The holotype, allotype, and 12 paratypes were taken at Pinehurst, Oreg., by W. J. Buckhorn from the tops of *Libocedrus decurrens*, which they were attacking and killing.

PHLOEOSINUS PUNCTATUS LeConte

PLATE 39, FIGURES 10, 11

Phlocosinus punctatus LECONTE, Proc. Amer. Philos. Soc., vol. 15, p. 381, 1876.—SCHWARZ, Ent. Amer., vol. 2, p. 55, 1886.—HOPKINS, Can. Ent., vol. 35, p. 60, 1903; U. S. Div. Ent. Bull. 48, p. 18, 1904.—CURRIE, U. S. Div. Ent. Bull. 53, p. 73, 1905.—SWAINE, New York State Mus. Bull. 134, p. 130, 1909; Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 2, p. 67, 69, 1918.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 171, 1939.

Male.—Black, shining, with elytra reddish brown; 2.14 to 3.2 mm. long, about 2.07 times as long as wide.

Frons rather wide between eyes, frontal rectangle about 0.71 as long as wide; epistomal lobe short; surface black, shining, rather finely, densely granulate-punctate at sides and above; central area deeply, not very broadly concave, with central portion smooth, impunctate, and brightly shining, with a moderately developed, elevated median carina on lower fourth; hairs at sides and above, short, fine, inconspicuous except in profile. Eye nearly exactly three times as long as wide, about half divided by a U-shaped emargination. Antenna with club nearly twice as long as wide, sutures all strongly oblique, sinuate.

Pronotum about 1.20 times as wide as long, widest posteriorly; sides feebly, arcuately converging on posterior third, then more strongly arcuately narrowed, strongly constricted in anterior third, broadly rounded in front; surface black, shining, rather strongly, transversely impressed opposite anterior constriction; disk with very deep, close, moderately coarse punctures, somewhat roughened but not truly granulate; punctures finer and closer in front, rougher, subgranulate at sides; median line not elevated, slightly indefinitely impressed at each side on posterior fourth; lateral calli nearly entirely lacking; hairs fine and short, distinctly longer at each side just anterior to position of lateral calli.

Elytra slightly wider than pronotum, slightly widest behind middle, about 1.34 times as long as wide; sides subparallel on anterior two-thirds, moderately broadly rounded behind; surface brilliantly shining, reddish brown; striae nearly as wide as interspaces, strongly impressed, with punctures rather large, very shallow, moderately spaced, coarser but still shallow at sides, smaller and deeper on declivity; interspaces slightly wider than striae, convex, rugose, granulate, moderately punctured, confusedly, lunately asperate at base, granules confused, coarse but low and rounded, becoming uniseriate serrations near declivity on first and alternate interspaces; appearing glabrous, but with sparse, minute hairs. Declivity (pl. 39, fig. 11) with first, third, and alternate interspaces rather strongly elevated and strongly serrate; first interspace often with some serrations lacking on apical portion, rather sparsely, very finely punctate median to serrations, with a few minute, fine hairs often entirely abraded and always very inconspicuous; third interspace regularly, strongly serrate to apex, where it meets ninth interspace, which also has a few serrations; fifth and seventh with three to five smaller serrations; second interspace much narrower than on disk, often obsolescent behind, flat, devoid of punctures and serrations. Anterior face of mesosternum oblique.

Female.⁵—Black with elytra dark reddish brown, 2.8 mm. long, about 2.18 times as long as wide. Frons slightly flattened, rather coarsely granulate-punctate, with a distinct, elevated median carina. Pronotum with sides arcuately convergent, moderately constricted anteriorly, surface of disk as in male; caudal half of proepisternum smooth, impunctate except at margin. Elytra with striae and interspaces of disk as in male, hairs slightly more conspicuous; declivity (pl. 39, fig. 10) similar to that of male, but with serrations smaller and hairs more abundant and coarser, some of them scalelike.

Type locality.—Oregon.

Host.—Not recorded.

⁵ Description prepared from the first specimen in LeConte's type series.

Location of type series.—LeConte collection, Museum of Comparative Zoology, Cambridge, Mass.

Remarks.—In the LeConte collection the first four specimens are marked as types (cotypes). Three of these are from Oregon and agree with the short description; the fourth so-called type is from Lake Superior and is a different species. Ten additional specimens from California are in LeConte's composite series. Of this number, four represent a different, slightly smaller species.

The United States National Museum collection contains several hundred specimens of *punctatus* taken in Washington, Oregon, and California. The hosts are *Libocedrus decurrens* Torrey, *Thuja plicata* D. Don, and *Juniperus occidentalis* Hooker.

PHLOEOSINUS RUBICUNDULUS Swaine

PLATE 38, FIGURE 9

Phloeosinus rubicundulus SWAINE, Can. Ent., vol. 56, pp. 144, 145, 1924.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 176, 1939.

Male.—Piceous to black, with elytra reddish brown to piceous brown; 2.5 to 3.42 mm. long, about 2.07 times as long as wide.

Frons very wide between eyes, frontal rectangle about 0.70 as long as wide, epistomal lobe very short; surface piceous, shining, densely, moderately finely granulate-punctate at sides, more sparsely punctured, not granulate, above; broadly, rather deeply concave in central area between eyes, concavity shining, smooth and nearly devoid of punctures and granules, median carina poorly developed, variable, often appearing as an indefinitely elevated area on epistoma; hairs short, fine, and inconspicuous. Eye more than three times as long as wide, more than half divided by a rather narrow emargination. Antenna with club nearly exactly two times as long as wide, first and second sutures oblique, third suture very strongly oblique.

Pronotum about 1.1 times as wide as long, widest at posterior angles; sides nearly straight and feebly converging on posterior half, then strongly, arcuately narrowed to the definite constriction just behind the broadly rounded anterior margin; surface piceous black, brightly shining, with deep punctures of moderate size, notably sparser than usual as in *punctatus*; sides more closely and roughly punctured, subgranulate; lateral calli small, inconspicuous; median line faint, indefinitely impressed at each side near posterior border; hairs fine, short on disk, longer at sides.

Elytra wider than pronotum, about 1.41 times as long as wide; sides nearly straight and subparallel on anterior two-thirds, broadly rounded behind; surface shining; striae deeply impressed, much narrower than interspaces, stria punctures of moderate size, shallow, rather closely spaced, interspaces wide and convex, rugose-granulate-

punctate, becoming uniseriately granulate behind, coarser on first, third, and alternate interspaces, punctures rather sparse, each with a short, rather fine hair; interspaces at sides rugose but less strongly granulate. Declivity (pl. 38, fig. 9) less abrupt than in *cupressi* and *nitidus*, striae impressed, narrower than on disk, with smaller punctures; first interspace weakly elevated, wider than on disk, rather roughly, moderately closely punctured, with only two or three isolated serrations; second interspace narrower than first or third, feebly convex, with few punctures, devoid of serrations; third interspace moderately elevated, moderately strongly serrate; fifth and seventh interspaces each with a few serrations; hairs more abundant than on disk, most of them short, stout, and numerous, with a few longer setae arising from bases of serrations. Mesosternum with anterior portion moderately oblique.

Female.—Similar to male in habitus, frons wider between eyes than in male, frontal rectangle 0.67 as long as wide; epistomal lobe nearly lacking, surface convex, moderately shining, densely granulate-punctate throughout, with a strongly elevated, sharp median carina on lower half; elytral declivity with first and third interspaces subequally elevated, and subequally rather weakly serrate; clothed with numerous, small, short, scalelike, cinereous hairs.

Type locality.—Tulare County, Calif.

Host.—*Sequoia washingtoniana* (Wins.) Sudw.

Location of type.—Canadian National Collection.

Remarks.—I have studied about 150 specimens, collected mostly from the giant sequoia but a few were from *Libocedrus decurrens*, at Yosemite, Wawona, General Grant National Park, Sequoia National Park, Mariposa County, Calif. The range seems to be limited to that of its principal host.

PHLOEOSINUS BUCKHORN, new species

Male.—Black, shining, with elytra bright reddish brown; 1.9 to 2.3 mm. long, holotype 2.21 mm. long, about 2.04 times as long as wide.

Frons rather wide between eyes, frontal rectangle about 0.77 as long as wide; epistomal lobe short; surface black, shining, finely and densely granulate-punctate at sides and above; central area deeply, rather narrowly concave, with its central third smooth, impunctate, brightly shining, with a fine, sharply elevated, short median carina on less than the lower third; hairs at sides and above concavity short, fine, and inconspicuous. Eye slightly less than three times as long as wide, more than half divided by a U-shaped emargination. Antenna with club less than twice as long as wide, first and second sutures distinctly oblique, third suture more strongly oblique and sinuate.

Pronotum about 1.18 times as wide as long, widest posteriorly, sides nearly straight and feebly converging on posterior third, middle third strongly arcuately converging, constricted just behind the broadly rounded front margin; surface shining, transversely impressed opposite anterior constriction; disk deeply, rather closely, moderately finely and roughly punctured, not granulate, punctures finer and closer in front; sides more strongly roughened, subgranulate; slightly, indefinitely impressed at each side of median line on posterior third, median line not definitely elevated, with finer and closer punctures; lateral calli poorly developed; pubescence short, fine, and inconspicuous.

Elytra slightly wider than pronotum, about 1.34 times as long as wide; sides nearly straight and subparallel on anterior two-thirds, moderately broadly rounded behind; surface brightly shining, reddish brown; striae about half as wide as interspaces, impressed, stria punctures moderately small, very shallow and usually indistinct, much larger and plainer, but still shallow at sides and on declivity; interspaces convex, rugose-granulate, with fine punctures and a few very fine, short, inconspicuous hairs, granules confused on most of disk, but becoming uniseriate posteriorly. Declivity with first, third, and alternate interspaces strongly convex, first interspace with moderately small serrations, those on third larger and more numerous, fifth, seventh, and ninth interspaces with a few sharp asperities or granules; second interspace less convex, narrowed and nearly obsolete posteriorly; declivital pubescence consisting of short, very fine hairs, lacking on second interspace, scanty on others. Anterior face of mesosternum slightly sloping.

Female.—Similar to male in general habitus; frons wider and shorter, frontal rectangle about 0.70 as long as wide, densely and roughly granulate-punctate, with a broad, rather low carina on lower half; elytral declivity with first and third interspaces strongly convex, the serrations notably smaller than in male.

Similar to *punctatus* but smaller, with more numerous and larger hairs on both pronotum and elytra and with smaller stria punctures and narrower striae on elytra.

Type locality.—Portland, Oreg.

Additional locality.—Pinehurst, Oreg.

Host.—*Thuja plicata* D. Don.

Additional host.—*Libocedrus decurrens* Torrey.

Type material.—Holotype, allotype, and 47 paratypes, U.S.N.M. No. 55403.

Remarks.—The holotype, allotype, and 21 paratypes were collected from bark of western red cedar (*Thuja plicata*), at Portland, Oreg., by W. J. Buckhorn; and 26 paratypes were reared from *Libocedrus decurrens* taken at Pinehurst, Oreg., by W. J. Buckhorn.

PHLOEOSINUS KANIKSU, new species

Male.—Black, with elytra reddish brown; 2.14 to 3.1 mm. long, holotype 2.71 mm. long, exactly 2.0 times as long as wide; allied to *punctatus*.

Frons moderately wide between eyes, frontal rectangle about 0.80 as long as wide; epistomal lobe very short; surface black, shining, densely, moderately granulate-punctate throughout, deeply, rather narrowly concave between eyes, its central area impunctate and brightly shining, with an elevated median carina on lower third; hairs short, fine, inconspicuous. Eye three times as long as wide, more than half divided by a moderately wide U-shaped emargination. Antenna with club slightly less than twice as long as wide, sutures all oblique.

Pronotum about 1.13 times as wide as long, widest at posterior angles; sides on posterior half nearly straight and feebly converging, then strongly, arcuately narrowed to the constriction just behind the broadly rounded front margin; surface black, moderately shining, strongly, transversely impressed just back of anterior margin; disk with deep punctures of moderate size (slightly smaller and not so close as in either *punctatus* or *rubicundulus*), punctures gradually becoming smaller and closer anteriorly on disk, very dense and small near anterior margin, sides not granulate, with punctures denser than on disk; median line feebly elevated on posterior third; lateral calli very small or lacking; hairs short on posterior disk, slightly longer on anterior disk, considerably longer on sides (but not so long as in *rubicundulus*).

Elytra slightly wider than pronotum, about 1.31 times as long as wide, widest at about middle; sides nearly straight and subparallel on anterior two-thirds, very broadly rounded behind; surface reddish brown, moderately shining; striae narrower and not so deeply impressed as in *punctatus* and *rubicundulus*, with somewhat smaller shallow punctures, striae wider and punctures slightly larger on sides; interspaces considerably wider than striae, feebly convex, densely, confusedly granulate-punctate anteriorly, with granules less numerous on posterior part and with little indication of a uniseriate arrangement on disk; hairs moderately short and stout, more numerous and much more conspicuous than in *punctatus* and *rubicundulus*, though still rather sparse. Declivity with striae not so strongly impressed as in its near allies, with the strial punctures less distinct; first and third interspaces elevated and serrate, with serrations distinctly smaller than in either *punctatus* or *rubicundulus*; first interspace with three serrations nearest apex greatly reduced or lacking, median portion finely, rather closely punctured; second interspace nar-

rower than first and third, nearly flat, finely, very sparsely punctured, devoid of serrations; third interspace elevated, moderately finely, regularly serrate, finely punctured; fifth, seventh, and ninth interspaces convex, each with a few small serrations; entire declivity moderately sparsely clothed with fine, short hairs, with a few slightly longer, erect setae from bases of serrations. Anterior face of mesosternum oblique.

Female.—Similar to male in habitus, with frons wider and shorter, frontal rectangle about 0.73 as long as wide, convex, rather coarsely granulate-punctate, with a broad, strongly elevated median carina on lower half; declivity similar to that of male with serrations no smaller than in male, punctures somewhat more numerous, vestiture consisting of short, moderately stout hairs (more numerous than in male), many of them scalelike, and of the usual small number of longer slender hairs from the serrations.

This species is most readily distinguished from *punctatus* and *rubicundulus* by the more rugged sculpture of the discal interspaces of the elytra, the more abundant and conspicuous discal vestiture, and by the vestiture of the elytral declivity which is notably better developed than in *punctatus* and in the females is less scalelike and much less abundant than in *rubicundulus*.

Type locality.—Metaline Falls, Wash.

Additional localities.—Northport, Wash.; Pierce and Kootenai, Idaho.

Host.—*Thuja plicata* D. Don.

Type material.—Type, allotype, and 29 paratypes, U.S.N.M. No. 55404.

Remarks.—The holotype, allotype, and 5 paratypes were taken from *Thuja plicata* near Metaline Falls, Kaniksu National Forest, Wash., by D. DeLeon; 18 paratypes from the same host at Northport, Wash., by F. P. Keen; and 6 paratypes from the same host at Pierce, Idaho, by J. C. Evenden. Other specimens are from Glacier National Park and other localities in northern Montana.

PHLOEOSINUS RUSTI, new species

Male.—Piceous brown to black, with elytra reddish brown; 2.23 to 3.0 mm. long, holotype 2.45 mm. long, nearly exactly twice as long as wide, allied to *punctatus* LeConte.

Frons very wide between eyes, frontal rectangle about 0.69 as long as wide; epistomal lobe very short; surface piceous black, shining, finely and densely granulate-punctate at sides, somewhat more coarsely, less closely punctate and scarcely granulate above; central half moderately concave, with concavity much shallower than in

buckhorni, with its central portion smooth and impunctate; median carina extending from epistomal margin to center of concavity, but rather indistinct and not sharply elevated; hairs at sides and above concavity, short, fine, inconspicuous. Eye more than three times as long as wide, more than half divided by a U-shaped emargination. Antenna with club less than twice as long as wide, all sutures oblique, the third more strongly than others.

Pronotum about 1.16 times as wide as long, widest posteriorly; sides weakly arcuate and feebly convergent, on posterior half, then more strongly arcuate and convergent, constricted just behind the very broadly rounded front margin; surface shining, transversely impressed behind front margin; disk moderately finely, very deeply, rather closely punctate, not granulate, punctures finer and closer in front, sides with punctures smaller and closer than on disk, subgranulate, indefinitely impressed at each side of median line behind; lateral calli lacking; vestiture moderately short and fine, but visible.

Elytra slightly wider than pronotum, about 1.36 times as long as wide; sides nearly straight and subparallel on anterior two-thirds, broadly rounded behind; surface brightly shining, reddish brown; striae impressed, about one-half (or less) as wide as interspaces, punctures moderately small, close, not deep; punctures larger, shallow, and striae somewhat wider at sides; interspaces convex, rugose-granulate, with a few small punctures bearing short, fine hairs, granules mostly confused, but approaching uniseriate arrangement on posterior half of disk. Declivity with second interspace narrower, nearly flat, smooth and impunctate, first and third strongly convex; first interspace with moderately small serrations, some of those toward apex lacking, finely punctured, with moderately numerous, very fine, short hairs mesad to serrations; third interspace with moderately small serrations, slightly larger toward apex, with a few punctures bearing fine, short hairs; fifth, seventh, and ninth interspaces each with a few small serrations. Anterior face of mesosternum rather steep.

Female.—Similar to male in general habitus but slightly more slender, about 2.11 times as long as wide; frons wider and shorter than in male, frontal rectangle about 0.63 as long as wide, closely, rather roughly granulate-punctate, with a rather fine but distinct median carina on lower half; elytral declivity with first and third interspaces strongly convex, moderately finely serrate throughout, smaller than in male, punctures more numerous, hairs much more numerous and many of those on first interspace short and stout, appearing scalelike.

Type locality.—Metaline Falls, Wash.

Additional localities.—Wind River, Wash.

Host.—*Thuja plicata* D. Don.

Type material.—Holotype, allotype, and 20 paratypes. U.S.N.M. No. 55405.

Remarks.—The holotype, allotype, and 9 paratypes were taken from bark of *Thuja plicata* at Metaline Falls, Wash., by H. J. Rust; and 11 paratypes from *T. plicata*, Wind River, Wash., by J. E. Patterson.

PHLOEOSINUS BAUMANNI Hopkins

Phloeosinus baumannii HOPKINS, Proc. Ent. Soc. Washington, vol. 7, p. 79, 1905.—SCHEDL, Anal. Escuela Nac. Cienc. Biol., vol. 1, p. 337, 1940.

Male.—Piceous to black throughout except antennae and tarsi; 3.0 to 4.1 mm. long (averaging about 3.75 mm.), about 2.11 times as long as wide; allied to *cupressi* Hopkins and *variolatus* Bruck.

Frons very wide between eyes, frontal rectangle about 0.66 as long as wide, epistomal lobe very short, surface piceous, shining, strongly, densely granulate-punctate, with punctures masked by granules except in median line and above, central area between eyes moderately concave, with a moderately strongly elevated median carina on lower half; hairs fine, erect, more numerous and somewhat longer than usual, inconspicuous except in profile. Eye less than three times as long as wide, about half divided by a U-shaped emargination. Antenna with club slightly more than twice as long as wide, sutures arcuate and oblique.

Pronotum about 1.1 times as wide as long, widest near posterior angles; sides distinctly arcuate on posterior two-thirds, constricted just behind broadly rounded front margin; surface piceous, shining, densely, deeply, rather coarsely punctured on disk, more finely in front, and more finely, densely, and roughly punctured at sides; lateral calli small but usually distinct; surface indefinitely impressed at each side of median line on posterior fourth; hairs fine and rather conspicuous, longer on an area in front of lateral calli.

Elytra scarcely wider than pronotum, about 1.39 times as long as wide; sides nearly straight and subparallel on anterior three-fourths, very broadly rounded behind; surface shining; striae, except the first one, rather weakly impressed, with very coarse, rather deep, close punctures; interspaces scarcely wider than striae on disk, scarcely convex, rather coarsely rugose, punctate-granulate, granules becoming somewhat coarser and uniseriate posteriorly on disk and sides; hairs not abundant, rather small, short and inconspicuous. Declivity very abrupt, serrations coarse, blunt, and dark; first interspace with two to four large black serrations at summit of declivity, with apical five-sixths broad, nearly flat, shining, roughly, moderately coarsely punctured; second interspace much narrower than first or third, shining, with a few punctures; third interspace strongly elevated and

closely, very strongly serrate, with serrations near summit notably higher; fifth, seventh, and ninth interspaces each with a few rather coarse, black serrations; each interspace with a median row of erect setae and more numerous short, broad, scalelike hairs. Mesosternum nearly flat, with anterior portion slightly oblique.

Female.—Similar in habitus to male; frons wider between eyes than in male, frontal rectangle 0.64 as long as wide; nearly flat, densely, rugosely granulate-punctate throughout, with a rather faint median carina on lower half, often interrupted by granules; elytral-declivity with first and third interspaces with strong, black, acute serrations, slightly larger midway on declivity; second interspace flat, closely, roughly punctured, only slightly narrower than others, serrate only at summit; all interspaces moderately closely clothed with short, nearly circular, appressed scales, with a few hairlike setae.

The foregoing descriptions were prepared from the female and male types, U.S.N.M. No. 7517, and about 20 specimens bearing the same data, "Hopk. U. S. 1144; Tacubaya, D. F., Mexico; Baumann, Colr." taken from *Cupressus*. Eight other specimens are from *C. benthami* Endl., Mexico, D. F. The writer has also studied two other lots comprising 14 specimens collected from *Cupressus* at San Juan and Chalco, Mexico, by D. DeLeon.

PHLOEOSINUS VARIOLATUS Bruck

PLATE 39, FIGURES 14, 14a, 15, 15a

Phloeosinus variolatus BRUCK, Pan-Pacific Ent., vol. 7, p. 126, 1931.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 174, 1939.

Male.—Piceous to black throughout except antennae and tarsi; 3.0 to 4.0 mm. long, slightly less than twice as long as wide; very closely related to *baumanni* Hopkins.

Frons wide between eyes, frontal rectangle about 0.74 as long as wide, epistoma very short; surface piceous, strongly, densely granulate-punctate; deeply, moderately broadly concave between eyes, concavity less closely granulate-punctate than rest of frons; median carina on lower half very strongly developed, rather broad and low above, but sharply elevated below to form a strong epistomal tooth; hairs fine, erect, somewhat longer than usual, unusually abundant on epistomal margin. Eye considerably more than three times as long as wide, more than half divided by a rather wide emargination. Antenna about twice as long as wide, with sutures oblique and sinuate.

Pronotum about 1.16 times as wide as long, widest at posterior angles; sides evenly, convergently arcuate, constricted just behind

broadly rounded front margin; surface piceous, brightly shining, rather closely, deeply, coarsely punctured on disk (more coarsely than in *baumanni*), very finely and densely near anterior margin; lateral calli better developed than in *baumanni*; hairs moderately short and fine, more conspicuous than in *baumanni*, much longer and more conspicuous on a considerable area at each side anterior to lateral calli.

Elytra only feebly wider than pronotum, about 1.2 times as long as wide, widest at base; sides nearly straight and subparallel on anterior two-thirds, very broadly rounded behind; surface piceous, shining; striae distinctly but weakly impressed, stria punctures very coarse (even coarser than in *baumanni*), very closely placed; interspaces no wider than striae midway on disk, very strongly, rather coarsely rugose and strongly granulate-punctate (sculpture distinctly coarser than in *baumanni*), with granules coarse, confused anteriorly on disk, becoming uniseriate posteriorly; hairs more abundant, longer and more conspicuous than in *baumanni*. Declivity (pl. 39, figs. 15, 15a) very abrupt, serrations coarse, blunt, and black, first interspace with two to five large, black serrations at summit of declivity, with apical five-sixths broad, nearly flat, shining, roughly, rather coarsely punctured, rarely with one or two rather small, vestigial serrations; second interspace much narrower than first or third, widened at apex, shining, punctured; third interspace strongly elevated, with very coarse, closely placed, black serrations; fifth, seventh, and ninth interspaces elevated, each with several rather coarse, black serrations; declivital interspaces all sparsely clothed with small scalelike hairs, with a few slender hairs at bases of serrations. Mesosternum slightly oblique in front.

Female.—Similar in habitus to male; frons wider between eyes than in male, frontal rectangle about 0.64 as long as wide, weakly convex, transversely impressed between eyes, densely granulate-punctate except in median line above; median carina much stronger than in *baumanni*; finely, sharply elevated, toothlike on epistoma; elytral declivity (pl. 39, figs. 14, 14a) with first and third interspaces strongly elevated and with coarse, black serrations (stronger than in *baumanni*), second interspace very narrow but widened near apex; first three interspaces moderately clothed with numerous short scales and with a few hairlike setae.

Type locality.—Mount Saint Helena, Calif.

Host.—*Cupressus sargentii* Jepson.

Location of type.—California Academy of Science.

Remarks.—In addition to a pair of paratypes lent by J. N. Knull, the writer has studied 41 specimens of this species, all taken from

Cupressus sargentii from the following localities in California: Mount Saint Helena (type locality), Livermore, Middleton, and Cedar Ridge, Alameda County. The collectors are H. E. Burke, F. B. Herbert, R. L. Furniss, E. F. Wohletz, and D. Deleon.

PHLOEOSINUS NITIDUS Swaine

Phloeosinus nitidus SWAINE, Can. Ent., vol. 56, p. 145, 1924.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 177, 1939.

Male.—Piceous black, with elytra reddish brown; 2.5 to 3.4 mm. long, about 2.08 times as long as wide. Closely related to *Phloeosinus cupressi* Hopkins.

Frons moderately wide between eyes, slightly narrower than in *cupressi*, frontal rectangle about 0.73 as long as wide, epistomal lobe short; surface piceous, finely, densely granulate-punctate at sides, more sparsely punctured, not granulate above in median fifth, entire median area brightly shining; moderately deeply, not broadly concave between eyes, concavity smooth and impunctate above, very finely subgranulate-punctate on epistoma, with a rather broad, blunt median carina on lower half; hairs short, fine, and inconspicuous. Eye about 3.4 times as long as wide, more than half divided by a rather wide U-shaped emargination. Antenna with club less than twice as long as wide; first two sutures distinctly oblique, third suture more strongly oblique.

Pronotum about 1.1 times as wide as long, widest at posterior angles; sides nearly regularly, convergently arcuate, only slightly constricted just back of the moderately broadly rounded front margin; surface piceous, shining; finely, rather closely, very deeply, somewhat roughly punctured on disk; very finely and densely punctured near anterior margin; sides subgranulately punctured; lateral calli small but distinct; median line scarcely elevated on posterior fifth; surface indefinitely impressed at each side near posterior border; hairs fine and inconspicuous (much shorter than in *cupressi*), hairs just anterior to lateral calli notably longer.

Elytra slightly wider than pronotum, about 1.28 times as long as wide, usually slightly wider at base; sides nearly straight (feebly sinuate) and subparallel on anterior two-thirds, very broadly rounded behind; surface shining, striae deeply impressed, more than half as wide as interspaces, striae punctures large, shallow, close; interspaces on disk rugose-granulate, with fine, sparse punctures, convex granules confused on anterior portion, tending to become uniseriate posteriorly; on sides interspaces little wider than striae, nearly smooth, with granules and rugosities only on posterior portion; hairs short and fine, not abundant. Declivity similar to that of *cupressi* with declivital serrations coarse and dark; first interspace convex and with

two to seven coarse serrations only at summit of declivity, with apical three-fourths to four-fifths flat, shining, finely, rather roughly punctured; second interspace very narrow, flat, shining, with a few punctures; third interspace elevated, with closely placed, dark serrations nearly as coarse as in *cupressi*; fifth, seventh, and ninth moderately convex, each with a few, more widely spaced serrations, smaller than in third interspaces; hairs more numerous than on disk, short, rather fine, more numerous on first and third interspaces. Mesosternum nearly flat with anterior portion slightly oblique.

Female.—Similar to male in habitus; frons wider between eyes than in male, frontal rectangle 0.69 as long as wide, convex, densely granulate-punctate, with an elevated, sharp median carina on lower half; elytra with discal interspaces notably wider and striae punctures smaller than in male; declivity with first and third interspaces elevated and regularly serrate but less so than in *cupressi*, second interspace nearly flat, devoid of serrations, only slightly narrower than third; fifth, sixth, seventh, and ninth with a few serrations; all interspaces from first to fourth on each side with numerous fine punctures and densely clothed with short, broad, cinereous, scalelike hairs and a few slender setae.

Type locality.—Santian National Forest, Oreg.

Host.—Not recorded.

Location of type.—Canadian National Collection.

Remarks.—More than 50 specimens were studied by the writer. All these were derived from *Chamaecyparis nootkatensis* (Lamb.) Sudworth at Mount Rainier National Park, by Keen and Buckhorn, and at Fairfax, Wash., by J. A. Beal.

PHLOEOSINUS CUPRESSI Hopkins

PLATE 39, FIGURES 12, 12a, 13, 13a

Phloesinus cupressi HOPKINS, U. S. Bur. For. Bull. 38, pp. 35-38, 1903; U. S. Div. Ent. Bull. 48, p. 45, 1904.—CURRIE, U. S. Div. Ent. Bull. 53, p. 100, 1905.—SWAINE, Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 2, p. 69, 1918.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 181, 1939.

Male.—Piceous with elytra reddish brown to piceous; 2.06 to 3.6 mm. long, about 2.06 times as long as wide.

Frons very wide between eyes, frontal rectangle about 0.68 as long as wide, epistomal lobe short; surface piceous, densely, moderately finely granulate-punctate at sides, roughly punctate, scarcely granulate above in median fifth; central area between eyes broadly, moderately deeply concave, finely punctate-granulate throughout except in median line; median carina nearly entirely lacking, appearing only as an indefinitely elevated small area on epistoma; hairs short, fine, and inconspicuous, scarcely visible except in profile. Eye about 3.16 times

as long as wide, about half divided by a U-shaped emargination, wider than usual. Antenna with club slightly less than twice as long as wide, first two sutures oblique, third suture very strongly oblique.

Pronotum about 1.13 times as wide as long, widest near posterior angles; sides distinctly arcuate, constricted just behind very broadly rounded anterior margin; surface piceous, shining, moderately finely and closely, very deeply punctured on disk, more finely and closely punctured in front, more roughly punctured but not granulate at sides; lateral calli indistinct or lacking; median line lacking or very faint; feebly, indefinitely impressed at each side near posterior border; hairs fine, notably longer at each side anterior to lateral calli.

Elytra wider than pronotum, about 1.33 times as long as wide; sides subparallel on anterior two-thirds, very broadly rounded behind; surface shining; striae deeply impressed, of moderate width, striae punctures close, moderately coarse; interspaces more than twice as wide as striae, convex, rugulose-granulate, granules confused anteriorly, becoming larger and uniseriate posteriorly; punctures fine, giving origin to short, fine, inconspicuous hairs. Declivity (pl. 39, figs. 13, 13a) more abrupt than usual; declivital serrations very coarse and dark; first interspace with three to five dark, coarse serrations only at top of declivity, the apical four-fifths nearly flat, shining, finely, very roughly punctured; second interspace narrower than first and third, nearly flat, shining, with a few punctures; third interspace elevated, with very coarse, dark, closely placed serrations; fifth, seventh, and ninth interspaces moderately convex, each with three to six smaller, more widely spaced serrations; hairs more abundant than on disk, short, rather stout and numerous on first and second interspaces, more scanty elsewhere. Mesosternum nearly flat, with anterior portion slightly oblique.

Female.—Similar to male in general habitus; frons wider than in male between eyes, frontal rectangle about 0.64 as long as wide, convex, densely granulate-punctate throughout, with a strongly elevated sharp median carina on lower half; elytral declivity (pl. 39, figs. 12, 12a) with first and third interspaces strongly elevated and rather coarsely serrate, second interspace flat, distinctly narrower than first or third, closely, finely punctured; fifth, seventh, and ninth interspaces each with a few serrations, smaller than on third but of moderate size; all interspaces from suture to seventh densely clothed with short, broad, scalelike, cinereous hairs, with a few hairlike setae arising from bases of serrations.

This species has never been adequately described, but the original very brief description was supplemented by a good illustration of each sex, by which the species can be readily recognized. The series of this species contains a number of specimens which were before

Hopkins at the time the description was prepared and one of these is marked "type," although it had apparently never been entered in the type book or assigned a type number. Others of the same lot I have designated paratypes.

Type locality.—Golden Gate Park, Calif.

Additional locality.—Berkeley, Calif.

Host.—*Cupressus macrocarpa* Gordon.

Type material.—Holotype and nine paratypes, U.S.N.M. No. 55406.

Remarks.—In addition to the type series the writer has studied about 90 specimens from Alameda County, Berkeley, Palo Alto, Los Gatos, Monterey, Watsonville, and Salinas, Calif. All but 1 lot are from *Cupressus macrocarpa* Gordon. One single lot was taken from *Sequoia sempervirens* (Lambert) Endl., in Alameda County.

PHLOEOSINUS CRISTATUS (LeConte)

PLATE 40, FIGS. 16, 17

Hylesinus cristatus LeConte, Trans. Amer. Ent. Soc., vol. 2, pp. 169, 170, 1868; Proc. Amer. Phil. Soc., vol. 15, p. 181, 1876.

Phlocosinus cristatus (LeConte) Riley and Howard, Insect Life, vol. 5, p. 262, 1893.—Blandford, Biol. Centr. Amer., Coleop., vol. 4, pt. 6, p. 160, 1897.—Hopkins, U. S. Bur. For. Bull. 38, pp. 39, 40, fig. 4, 1903.—Swaine, Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 2, p. 69, 1918.—W. J. Chamberlin, Bark and timber beetles of North America, p. 180, 1939.

Male.—Piceous black, with elytra reddish brown to piceous brown; 2.8–4.0 mm. long, about 1.99 times as long as wide.

Frons very wide between eyes, frontal rectangle about 0.65 as long as wide, epistomal lobe short; surface piceous, densely, moderately coarsely granulate-punctate, rather deeply, not widely concave between eyes, with median carina extending from above center of concavity to epistomal margin, elevated and moderately acute, continued as low, interrupted elevation on upper part of frons, shining and impunctate above; hairs short, fine, and very inconspicuous. Eye about 3.5 times as long as wide, about two-thirds divided by a deep U-shaped emargination. Antenna with club less than twice as long as wide, all sutures oblique.

Pronotum about 1.08 times as wide as long, widest at posterior angles; sides regularly arcuate and convergent from base to the weak constriction just behind the moderately broadly rounded anterior margin; surface moderately shining, with close, deep punctures of moderate size on disk, much smaller and denser near front margin, coarser and subgranulate on sides; lateral calli small and indistinct, sometimes lacking; median line scarcely elevated, on posterior fourth only; hairs very short, dark in color, inconspicuous.

Elytra scarcely wider than pronotum, about 1.28 times as long as wide; sides subparallel on anterior two-thirds, broadly rounded behind; surface reddish to piceous brown, moderately shining; striae narrow, moderately deeply impressed, stria punctures rather small, longer than wide, not closely spaced; interspaces wide, convex, densely, finely punctate-granulate; hairs numerous, very short and fine, very inconspicuous. Declivity (pl. 40, fig. 17) moderately steep; first interspace slightly convex, finely, deeply, closely punctured, devoid of serrations except a few minute ones at summit of declivity; second interspace scarcely convex, finely and closely punctured, without serrations, only slightly narrower than others; third interspace very strongly elevated, with coarse, closely placed, black, blunt serrations; fifth to ninth interspaces each with a few serrations, rather coarse and four to six in number on fifth and seventh, smaller and less numerous on others; first and second interspaces clothed with moderately abundant scalelike hairs, the others with less abundant scales. Mesosternum nearly flat, with anterior portion slightly oblique.

Female.—Similar to male in general habitus, frons wider between eyes than in male, frontal rectangle about 0.61 as long as wide, convex, densely granulate-punctate at sides and on lower half, more coarsely punctate and scarcely granulate above, with a distinct, arcuate, transverse impression between eyes; median carina fine, sharply elevated, on lower half; elytral declivity (pl. 40, fig. 16) with first interspace slightly convex, with small, sometimes obsolescent serrations, closely punctured and clothed with numerous scales; second interspace nearly flat, closely punctured and clothed with scales; third interspace with a row of moderately coarse, black serrations, with spaces between covered with scales; with smaller serrations on the more lateral interspaces.

The type of *Phloeosinus cristatus* (LeConte) is in the Ulke collection at the Carnegie Museum, Pittsburgh, Pa., and I have not seen it. About a hundred specimens have been studied from *Cupressus* sp. or *C. macrocarpa* Gordon taken at Placerville, Oroville, Reedley, Fresno, Sonora, Walnut Creek, and North Hollywood, Calif., and from *C. glabra* Sudworth, or "arbovitae," and introduced varieties of *Cupressus* in the Gila Valley of Arizona.

PHLOEOSINUS CHIRICAHUA, new species

Male.—Black with elytra dark reddish brown to piceous; 2.77 to 3.5 mm. long, holotype 3.0 mm. long, 1.93 times as long as wide; closely allied to *cristatus* (LeConte).

Frons very wide between eyes, frontal rectangle about 0.61 as long as wide, epistomal lobe very short; surface shining, densely, moderately finely granulate-punctate at sides and below, more coarsely and

sparsely punctured and subgranulate above; moderately deeply and widely concave between eyes, with a median carina on lower half, rather weakly elevated except just above epistomal margin, smooth above in median line; hairs short, fine, inconspicuous. Eyes more than three times as long as wide, about half divided by a U-shaped emargination. Antenna with club nearly twice as long as wide, all sutures oblique and sinuate.

Pronotum about 1.08 times as wide as long, widest near posterior angles; sides feebly arcuate and convergent on posterior two-thirds, then more rapidly narrowed, constricted just behind the broadly rounded front margin; surface shining, with close, deep, moderate-sized punctures on disk, which become smaller and denser near anterior margin, closer, rougher, and subgranulate on sides; lateral calli small; median line broadly, weakly elevated from posterior border to center of disk; hairs rather numerous, but short, inconspicuous except in profile, slightly longer at each side anterior to lateral calli.

Elytra scarcely wider than pronotum, about 1.20 times as long as wide (slightly stouter than in *cristatus*); sides subparallel on anterior two-thirds, very broadly rounded behind; surface brightly shining; striae moderately narrow, moderately strongly impressed, strial punctures moderately small, not longer than wide, separated by considerably more than own diameter; interspaces wide, convex, densely, finely punctate, with granules less numerous than in *cristatus*, confused in arrangement, with little tendency toward becoming uniseriate on disk; hairs numerous, short, and fine on anterior disk, becoming scale-like on posterior disk and declivity, inconspicuous except in profile. Declivity sloping as in *cristatus*; first interspace narrower than on disk, weakly convex, finely, moderately closely punctured, devoid of serrations; second interspace wider than first, shining, finely, deeply, moderately closely punctured, without serrations; third interspace strongly elevated, with coarse, closely placed, dark-colored, blunt serrations, finely punctured; fifth and seventh interspaces each with four to eight smaller, sharper serrations; sixth and eighth interspaces with two to five small granules; declivity rather sparsely clothed (more sparsely than in *cristatus*) with small scalelike hairs. Mesosternum flat, with anterior portion scarcely at all oblique.

Female.—Similar to male in general habitus; frons wider between eyes than in male, frontal rectangle about 0.57 as long as wide; convex, indefinitely impressed between eyes, surface shining, rather finely, densely granulate-punctate except in median area above, median carina scarcely elevated on lower half, more or less broken up by granules but elevated into a small tooth on epistomal margin; elytra with interspaces on disk more strongly granulate than in male,

the granules becoming uniseriate midway on disk, first interspace much narrower than others; declivity with first interspace narrow, convex, with small, rather sparse serrations; second interspace wider than first, flat, closely, finely punctured, without serrations; third interspace elevated and armed with a row of dark-colored, pointed serrations or granules; entire declivity clothed with moderately abundant, flat, scalelike hairs.

Type locality.—Chiricahua National Monument, Ariz.

Additional localities.—Oak Creek Canyon, Santa Catalina Mountains, Gila Valley, Ariz.; and Cuchuta, Sonora, Mexico.

Host.—*Cupressus arizonica* Greene.

Additional hosts.—*Cupressus glabra* Sudworth, *Juniperus pachyphloea* Torrey.

Type material.—Holotype, allotype, and 21 paratypes, U.S.N.M. No. 55407.

Remarks.—The holotype, allotype, and four paratypes were taken from *Cupressus arizonica* at Chiricahua, Ariz., by D. DeLeon; five paratypes from *Cupressus* in Oak Creek Canyon by DeLeon; one paratype from *Juniperus pachyphloea* Torr., Santa Catalina Mountains, by M. Chrisman; six paratypes from *C. arizonica*, Safford, Ariz., by Rex King; and two paratypes from cypress, Gila Valley, Ariz., by H. B. Wales.

The two species *Phloeosinus cristatus* (LeConte) and *P. chiricahua*, new species, are rather closely related, and their distribution overlaps to a certain extent in Arizona. *P. chiricahua* seems to be more numerous in extreme southern Arizona, and the writer has seen no specimens of true *cristatus* from the Chiricahua and Oak Creek Canyon areas, while in the Gila Valley *cristatus* is much more abundant than *chiricahua*; and the two species may occasionally be found in the same material.

PHLOEOSINUS SEQUOIAE Hopkins

PLATE 40, FIGURES 18, 18a, 19, 19a

Phloeosinus sequoiae HOPKINS, U. S. Bur. For. Bull. 38, pp. 33-35, fig. 1, pl. 12, 1903; U. S. Div. Ent. Bull. 48, pp. 18, 45, 1904.—CURRIE, U. S. Div. Ent. Bull. 53, p. 74, 1905.—SWAINE, Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 2, pp. 69, 70, 1918.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 179, 1939.

Male.—Black with elytra reddish brown to piceous; 3.25-4.25 mm. long, about 2.16 times as long as wide.

Frons very wide between eyes, frontal rectangle about 0.66 as long as wide, epistomal lobe nearly lacking; surface piceous black, brightly shining; densely rugose, granulate-punctate below, with rugae often in approximate rows diverging from epistomal margin,

with punctures somewhat larger and sparser, subgranulate above; impressed to shallowly concave between eyes, with an indistinct, feebly elevated median carina on lower half; hairs short, fine, and inconspicuous. Eye more than three times as long as wide, more than half divided by a broad U-shaped emargination. Antenna with club about twice as long as wide, first two sutures slightly oblique, third strongly oblique.

Pronotum about 1.09 times as wide as long, widest at posterior angles; sides nearly straight and very feebly convergent on posterior half, then strongly arcuately convergent, constricted just behind the broadly rounded anterior margin; surface brightly shining, with deep punctures of moderate size and density (slightly finer and sparser than in *cristatus*), closer and finer near anterior margin, rougher and subgranulate on sides; lateral calli small, almost lacking; median line feebly elevated only on posterior eighth; hairs very fine and short, very inconspicuous, surface appearing glabrous.

Elytra scarcely wider than pronotum, about 1.40 times as long as wide; sides subparallel on anterior two-thirds, very broadly rounded behind; surface brightly shining; striae narrow, distinctly impressed, stria punctures fine, not close; interspaces wide, moderately convex, with rugae and low, transverse granules, very fine punctures bearing minute hairs. Declivity (pl. 40, figs. 19, 19a) steep, brightly shining; first interspace feebly convex, devoid of serrations, with only a few, fine, obsolescent punctures; second interspace flat, brightly shining, narrowed posteriorly and becoming obsolete on apical sixth, with no serrations and only a few obsolescent punctures; third interspace very strongly elevated, with very coarse, black serrations; fifth, seventh, and ninth interspaces each with a few moderately coarse, black serrations; sixth and eighth interspaces each with a few granules or small serrations; declivity nearly glabrous with only a few small hairs on the more lateral interspaces. Mesosternum with anterior portion somewhat oblique.

Female.—Similar to male in general habitus; frontal rectangle about 0.65 as long as wide; convex, impressed between eyes, with median carina elevated and distinct on lower half, densely granulate-punctate at sides, more coarsely punctured and subgranulate above; elytral declivity (pl. 40, figs. 18, 18a) shining, first interspace moderately elevated, with a few granulelike serrations and a few very small punctures; second interspace narrowed behind, becoming obsolete on posterior eighth, devoid of serrations and with a few very fine punctures; third interspace strongly elevated, with a row of black, moderately coarse serrations; lateral interspaces with a few moderate serrations on fifth, seventh, and ninth, and with small

granules on sixth and eighth; declivity scantily clothed with small, slender hairs and a few small scales, usually abraded.

Type locality.—Guerneville, Sonoma County, Calif.

Host.—*Sequoia sempervirens* (Lambert) Endlicher.

Type material.—Holotype, allotype, and 7 paratypes, U.S.N.M. No. 55408.

Remarks.—This species has never previously been adequately described, but Hopkins' very brief characterization was accompanied by biological data and by a figure which make it possible to recognize it. Hopkins' description was based on a study of a series of eight specimens taken by him from the bark of recently felled redwood trees, near Guerneville, Sonoma County, Calif. The collection in the National Museum also contains lots taken from redwood at Duncan's Mills, Woodside, Muir Woods, Fieldbrook, Eureka, Los Gatos, and Gasquet, all in California; in *Cupressus*, San Mateo County, Calif.; and in redwood, Brookings, Oreg.

PHLOEOSINUS SQUAMOSUS, new species

PLATE 40, FIGURES 20, 20a, 21

Male.—Black with elytra reddish brown to piceous; 3.4 to 4.1 mm. long, holotype 3.50 mm. long, about 2.09 times as long as wide; closely allied to *sequoiae* Hopkins.

Frons wide between eyes, frontal rectangle about 0.69 as long as wide, epistomal process nearly lacking; surface piceous, brightly shining, densely rugose-granulate-punctate below and at sides, with little tendency toward formation of aciculations, more coarsely, deeply, and roughly punctured above, weakly granulate; very widely, rather deeply concave between eyes, with a poorly developed median carina on lower half, often not reaching the epistomal margin, median line above concavity slightly elevated and devoid of punctures; hairs fine, moderately short, inconspicuous. Eye about 3.5 times as long as wide, more than half divided by a wide U-shaped emargination. Antenna with club slightly more than twice as long as wide, sutures all strongly oblique.

Pronotum about 1.15 times as wide as long, widest at posterior angles; sides nearly straight and slightly convergent on posterior half, then rather abruptly, arcuately narrowed to the constriction just behind the moderately broadly rounded anterior margin; surface black, moderately shining, with very deep, moderately coarse punctures, very closely spaced, with the interstices somewhat roughened, subgranulate (coarser, closer, and rougher than in *sequoiae*); piceous brown near anterior margin with very fine, very dense punctures; sides weakly granulate; lateral calli rather small, median line feebly

elevated on posterior half of disk; hairs short and fine, but notably longer than in *sequoiae*.

Elytra slightly wider than pronotum, about 1.34 times as long as wide; sides subparallel on anterior two-thirds, very broadly rounded behind; surface shining; striae narrow, rather strongly impressed, with stria punctures fine and rather close; interspaces wide, convex, strongly granulate-punctate and rugose, the granules both coarser and more numerous than in *sequoiae*, confused, with little evidence of uniseriate arrangement on disk; hairs on disk small and rather short, but not minute as in *sequoiae*. Declivity (pl. 40, fig. 21) steep, brightly shining, first interspace weakly convex, without serrations, with a few small punctures bearing minute hairs; second interspace nearly flat, brightly shining, narrowed posteriorly and obsolete on apical sixth, without serrations and with a few minute puncture-bearing minute hairs; third interspace strongly elevated, with coarse, black serrations, often as coarse as in *sequoiae* but sometimes considerably smaller; fifth and seventh interspaces each with three to five moderately coarse serrations. Mesosternum somewhat oblique anteriorly.

Female.—Similar to male in habitus; frontal rectangle about 0.69 as long as wide; convex, impressed on a triangular area between eyes, with a rather weak median carina on lower half, slightly stronger than in male, surface shining, strongly granulate-punctate throughout, hairs much stouter and longer than in female of *sequoiae*; elytral declivity (pl. 40, figs. 20, 20a) with first interspace moderately convex, surface shining, densely, finely punctured, with a few granule-like, fine serrations (or often lacking these); second interspace flat, nearly obsolete at apex, finely, densely punctured, without serrations; third interspace strongly elevated, with a row of rather large, black serrations, with its sides finely, rather closely punctured; lateral interspaces with a few small to medium-sized serrations on each, and each with fine punctures, sparser than on the first three interspaces; surface of first three interspaces clothed with numerous flat, scale-like hairs, lateral interspaces with much sparser but similar scales and with a few moderately short, bristlelike hairs.

This species is closely related to *sequoiae* but is easily separated on the basis of a number of characters mentioned in the description. It averages slightly smaller than *sequoiae* and is slightly stouter. The frons shows constant small differences, but perhaps the most readily seen characters have to do with the vestiture of head, pronotum, and elytra, which in *sequoiae* is usually minute, while in *squamosus* it is both longer and stouter. The declivital vestiture in the female is particularly useful, for in *squamosus* this is abundant

and distinctly scalelike while in *sequoiae* it is much scantier and for the most part hairlike. Swaine, in Canadian barkbeetles, page 70, does not distinguish this species from *sequoiae*, for in referring to *sequoiae* he considers it as "probably the common larger *Phloeosinus* of British Columbia cedar." This is really *squamosus*.

Type locality.—Naselle, Wash.

Other localities.—Hoquiam, Kent, Port Angeles, Wash.

Host.—*Thuja plicata* D. Don.

Additional host.—*Libocedrus decurrens* Torrey.

Type material.—Holotype, allotype, and 65 paratypes, U.S.N.M. No. 55409.

Remarks.—The holotype, allotype, and 45 paratypes were collected from *Thuja plicata* by W. J. Buckhorn, at Naselle, Wash.; 2 paratypes from *T. plicata* by H. E. Burke, at Kent, Wash.; 12 paratypes from *T. plicata* by Burke, at Hoquiam, Wash.; and 2 paratypes from *Libocedrus decurrens* by A. D. Hopkins, at Port Angeles, Wash.

PHLOEOSINUS TAXODII Blackman

PLATE 41, FIGURES 22, 23

Phloeosinus taxodii BLACKMAN, Mississippi Agr. Exp. Sta. Techn. Bull. 11, p. 61, 1922.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 174, 1939.

Male.—Piceous to black, with elytra reddish brown; 2.1 to 3.0 mm. long, about 2.0 times as long as wide; allied to *dentatus* (Say).

Frons moderately wide between eyes, frontal rectangle about 0.76 as long as wide, epistomal lobe short; surface piceous, densely, rather finely punctate-granulate at sides, middle third punctate, scarcely granulate above, shining and nearly impunctate below, moderately deeply, widely, transversely impressed in an arcuate area between eyes; median carina bisecting impression, usually moderately developed; hairs short and fine, inconspicuous except in profile. Eye slightly more than three times as long as wide, more than half divided by a V-shaped emargination. Antenna with club 1.9 times as long as wide, sutures sinuate, first two distinctly oblique, third strongly oblique.

Pronotum about 1.13 times as wide as long, widest near base; sides arcuate and converging on posterior two-thirds, strongly constricted in anterior third, broadly rounded in front, weakly impressed across dorsum in front; surface moderately shining, punctures moderately small, close, and very deep on disk (somewhat coarser and closer than in *dentatus* Say), finer and denser in front, roughened, subgranulate at sides; median line evident on posterior third, with surface indefinitely impressed at each side;

lateral calli nearly lacking; hairs fine and short, fairly abundant but inconspicuous.

Elytra wider than pronotum, about 1.32 times as long as wide, widest at about middle; sides subparallel and nearly straight (feebly arcuate) on anterior two-thirds, moderately broadly rounded behind; surface moderately shining; discal striae narrow, strongly impressed (slightly coarser than in *dentatus*), punctures small, distinct, not close, notably larger and striae notably wider on sides, discal striae not so strongly outcurved near base as in *dentatus*; interspaces wide (not so wide as in *dentatus*), nearly flat, densely, rather finely, confusedly granulate, with larger granules becoming uniseriate on posterior disk; hairs rather abundant, short, fine, rather conspicuous. Declivity (pl. 41, fig. 22) with first and third interspaces as wide as on disk, strongly convex, with numerous, crowded, coarse, black, blunt-pointed serrations (more numerous, coarser, and with the ends not so sharp as in *dentatus*); second interspace as wide as third but narrower than on disk, nearly flat, shining, devoid of granules or serrations except for one or two near apex, but with fine punctures; fifth to ninth interspaces each with several rather coarse, blunt serrations; all interspaces with rather numerous short hairs, none of them scalelike. Mesosternum nearly flat, the anterior portion not precipitous, only feebly oblique.

Female (from holotype).—Similar to male in general habitus; frons wider between eyes than in male, about 0.66 as long as wide, convex, weakly impressed between upper angles of eyes, strongly, closely granulate-punctuate, with a rather weak median carina on lower half; elytral declivity (pl. 41, fig. 23) with first and third interspaces more strongly convex than second, weakly serrate (more weakly than in *dentatus*), second interspace with only a few vestigial serrations or granules (sometimes less numerous and smaller than in *dentatus*).

This species is closely allied to *dentatus* Say but differs as follows: The frontal rectangle is narrower in the male. The pronotal punctures are slightly coarser and closer. The elytral striae are slightly wider than in *dentatus* and not so strongly outcurved near the base. The discal interspaces are slightly narrower. The serrations on the second and third interspaces of the male are more numerous, coarser, and blunter. The second declivital interspace of the female has smaller and fewer (vestigial) serrations or granules than in *dentatus*.

Type locality.—Columbus, Miss.

Host.—*Taxodium distichum* (L.) L. C. Rich.

Type material.—Holotype and five paratypes, U.S.N.M. No. 55410.

Remarks.—I have studied more than 60 specimens besides the long type series of 125 specimens. All these specimens are from southern cypress, *Taxodium distichum*, and were taken in numerous localities in Louisiana, Florida, North Carolina, and South Carolina, as well as in Mississippi.

PHLOEOSINUS DENTATUS (Say)

PLATE 41, FIGURE 24

- Hylurgus dentatus* SAY, Journ. Acad. Nat. Sci. Philadelphia, vol. 5, p. 258, 1825.—HARRIS, Treatise on some of the insects of New England which are injurious to vegetation, ed. 2, p. 77, 1852.—FITCH, Trans. New York Agr. Soc., vol. 4, p. 750, 1857.—LECONTE, Complete writings of Thomas Say on the entomology of North America, vol. 2, p. 319, 1859.
- Hylesinus dentatus* (Say) LECONTE, Trans. Amer. Ent. Soc., vol. 2, p. 170, 1868.
- Phloeosinus dentatus* (Say) LECONTE, Proc. Amer. Philos. Soc., vol. 15, p. 381, 1876.—EICHHOFF and SCHWARZ, Proc. U. S. Nat. Mus., vol. 18, p. 608, 1896.—BLANDFORD, Biol. Centr.-Amer., Coleop., vol. 4, pt. 6, p. 160, 1897.—HOPKINS, U. S. Div. Ent. Bull. 48, p. 25, 1904.—CURRIE, U. S. Div. Ent. Bull. 53, p. 81, 1905.—SWAINE, New York State Mus., Bull. 134, p. 129, 1909; Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 2, pp. 68, 70, 1918.—BLACKMAN, Mississippi Agr. Exp. Sta. Techn. Bull. 11, p. 60, 1922.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 169, 1939.
- Dendroctonus* (?) *graniger* EICHHOFF, Berlin. Ent. Zeitschr., vol. 12, p. 147, 1868.
- Phloeosinus graniger* (Eichhoff) CHAPUIS, Mem. Soc. Sci. Liège, ser. 2, vol. 3, p. 248, 1873 (author's extract issued 1869, p. 39).—LECONTE, Proc. Amer. Philos. Soc., vol. 15, pp. 382, 436, 437, 1876.—EICHHOFF and SCHWARZ, Proc. U. S. Nat. Mus., vol. 18, pp. 608, 610, 1896 (= *dentatus* Say).
- Dendroctonus* (?) *haagii* EICHHOFF, Berlin. Ent. Zeitschr., vol. 12, p. 148, 1868.
- Phloeosinus haagii* (Eichhoff) CHAPUIS, Mem. Soc. Sci. Liège, ser. 2, vol. 3, p. 248, 1873 (author's extract issued 1869, p. 38).—EICHHOFF and SCHWARZ, Proc. U. S. Nat. Mus., vol. 18, pp. 608, 610, 1896 (= *dentatus* Say).
- Phloeosinus entrus* BLACKMAN, Mississippi Agr. Exp. Sta. Techn. Bull. 10, p. 56, 1921; Mississippi Agr. Exp. Sta. Techn. Bull. 11, pp. 60, 61, 1922 (new synonymy).

Male.—Piceous-brown to black; 2.25 to 2.8 mm. long, about 1.93 times as long as wide; with rather abundant, short, gray pubescence.

Frons rather wide between eyes, frontal rectangle about 0.67 as long as wide, epistomal lobe very short, nearly lacking; surface piceous, closely, finely, deeply punctate-granulate, less granulate above; moderately deeply and widely, transversely impressed between eyes, with a median carina on lower half, often indistinct; hairs short and fine. Eye slightly less than three times as long as wide, more than half divided by a V-shaped emargination. Antenna with club less than twice as long as wide, sutures nearly straight and slightly oblique.

Pronotum about 1.1 times as wide as long, slightly widest at posterior angles; sides arcuate and gradually convergent, moderately constricted just behind moderately broadly rounded front margin, and slightly impressed across dorsum; surface piceous, shining,

moderately finely, very deeply, closely punctured on disk, punctures finer and closer in front, subgranulate-punctate on sides; median line variably, usually weakly elevated, punctured; lateral calli small or absent; pubescence short, fairly abundant but not conspicuous.

Elytra wider than pronotum, about 1.25 times as long as wide, widest behind middle; sides nearly straight on anterior two-thirds, moderately broadly rounded behind; surface shining; striae on disk very narrow, rather strongly impressed, punctures fine and obscure, striae notably wider on sides; interspaces very wide, flat, densely and strongly granulate (more finely than in *canadensis* Swaine), with a few coarser asperities, irregular on anterior disk, but becoming uniseriate posteriorly. Declivity (pl. 41, fig. 24) with first and third interspaces strongly convex, with moderately large to large (variable) serrations; second interspace weakly convex, about as wide as others, shining; punctate, serrations lacking except for one to three small granules near apex; fifth, sixth, seventh, eighth, and ninth interspaces each with several small serrations or moderately large granules; all interspaces with small, more or less thickened hairs, first and third with erect setae from base of each serration. Anterior face of mesosternum rather steeply oblique.

Female.—Similar to male in habitus; frons wider between eyes than in male, frontal rectangle about 0.66 as long as wide, convex, with median two-thirds flattened, feebly, transversely impressed, closely granulate-punctate throughout, with a fine, elevated median carina on lower half; elytral declivity with all interspaces nearly equally wide and convex and all rather weakly serrate, first and third only slightly more strongly convex and serrations only slightly larger than on second.

Two cotypes of *Phloeosinus graniger* (Eichhoff), received many years ago from Eichhoff and declared by Eichhoff and Schwarz (1896) to be identical with *P. dentatus* (Say), were used, together with other specimens, in the preparation of the description of the male. In like manner, a cotype of *P. haagii* (Eichhoff), a female, was used together with other specimens in preparing the description of the female.

Phloeosinus enixus Blackman, described from Mississippi in 1921, represents a variation of *P. dentatus* (Say) and should also be placed in the synonymy.

Phloeosinus dentatus is more widely distributed than any other American species of the genus. It occurs from New Hampshire to Georgia and westward to Texas and Nebraska. Practically every State within that area is represented in the collection of about 600 specimens. The most common host is *Juniperus virginiana* L., but it is not uncommon in *Chamaecyparis thyoides* (L.) B. S. and P. and *Thuja occidentalis* L.

PHLOEOSINUS DELEONI, new species

Male.—Black with elytra reddish to piceous brown; 2.86 to 3.22 mm. long, holotype 3.2 mm. long, nearly exactly twice as long as wide; allied to *dentatus*, etc.

Frons moderately wide between eyes, frontal rectangle about 0.70 as long as wide, epistomal lobe very short; surface black, rather feebly shining; densely and rather coarsely punctate-granulate; very widely, moderately deeply, transversely concave, with a median carina on lower half, most strongly elevated just above epistomal margin, carina often continued above concavity as an indefinitely elevated area; hairs fine and short, rather more numerous than usual. Eye more than three times as long as wide, more than half divided by a narrow V-shaped emargination. Antenna with club slightly more than twice as long as wide, sutures all oblique.

Pronotum about 1.16 times as wide as long, widest near posterior angles; sides strongly arcuate and converging to lateral constriction just back of broadly rounded front margin, distinctly impressed across dorsum; surface black, moderately shining, very deeply, densely, moderately finely but roughly punctured, punctures often arranged in irregular longitudinal lines of from 3 to 12 or more with cross partitions below level of surface; sides punctate-granulate; median line slightly elevated, impunctate in middle third; lateral calli rather small; hairs short, fine, and inconspicuous.

Elytra slightly wider than pronotum, about 1.27 times as long as wide; sides subparallel on anterior two-thirds, moderately broadly rounded behind; surface shining, striae deeply impressed, about half as wide as interspaces, striae punctures of moderate size and spacing; interspaces moderately wide, convex, densely granulate-punctate, with numerous asperities, which are confused on anterior disk, but become coarsely, rather sparsely uniseriate on posterior third of first, third, and alternate interspaces; sides with striae wider and punctures coarser, interspaces with asperities less numerous on anterior half, uniseriate behind as on disk; hairs on disk and sides moderate in number, short, rather stout, becoming flat and somewhat scalelike behind. Declivity with first and third interspaces moderately convex, each with from four to eight rather widely spaced, sharp, black teeth, surface moderately punctured; second interspace wide, nearly flat, shining, moderately punctured, devoid of teeth or serrations except for one tooth near apex; fifth to ninth interspaces each with a few teeth, only slightly smaller than on first and third; declivity rather sparsely clothed with scalelike hairs and a few slender setae from bases of serrations. Mesosternum rather obliquely declivitous in front.

Female.—Similar in general habitus; frons much wider between eyes, frontal rectangle about 0.65 as long as wide, rather coarsely granulate-punctate, indefinitely, transversely impressed between eyes, with a fine median carina on lower half; elytra with striae wider than in male, interspaces more densely granulate, with posterior uniseriate asperities much smaller; declivity with all of interspaces nearly equally, finely serrate; first and third interspaces moderately strongly convex, second interspace less strongly convex; vestiture similar to that of male, but with scales slightly more numerous.

Type locality.—Jacala, Hidalgo, Mexico.

Host.—*Juniperus flaccida* Schlechtendal.

Type material.—Holotype, allotype, and eight paratypes, U.S.N.M. No. 55411.

Remarks.—The holotype, allotype, and eight paratypes were taken from *Juniperus flaccida* Schlecht. at Jacala, Hidalgo, Mexico, by D. DeLeon, in whose honor the species is named.

PHLOEOSINUS JUNIPERI Swaine

PLATE 41, FIGURE 25

Phlocosinus juniperi SWAINE, Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 1, p. 10, 1917; Canada Dept. Agr. Ent. Branch, Bull. 14, pt. 2, p. 69, 1918.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 172, 1939.

Male.—Piceous black, with elytra reddish brown; 3.0–3.6 mm. long, about 2.08 times as long as wide.

Frons wide between the eyes, frontal rectangle about 0.68 as long as wide, epistomal lobe very short, nearly lacking; surface piceous, somewhat shining, strongly granulate-punctate (more coarsely than in *dentatus*), broadly, arcuately, transversely impressed (sometimes shallowly, subtriangularly concave) between eyes, with a variable median carina (often nearly entirely lacking), strongest midway of impression. Eye more than three times as long as wide, less than half divided by a wide emargination. Antenna with club nearly twice as long as wide, sutures all distinctly oblique.

Pronotum about 1.17 times as wide as long, widest at posterior angles; sides regularly, arcuately convergent on posterior three-fourths, constricted just behind moderately broadly rounded front margin, and distinctly impressed across dorsum; surface piceous, shining, with very deep, moderately closely placed, moderately coarse punctures, finer and closer in front, subgranulate-punctate at sides; median line feebly to moderately elevated on posterior two-thirds, median third more strongly elevated and often impunctate; lateral calli usually rather small but distinct; hair fine, short, inconspicuous.

Elytra distinctly wider than pronotum, about 1.32 times as long as wide, widest behind middle; sides feebly arcuate, subparallel, semicircularly rounded behind; surface reddish brown, shining; striae moderately wide and distinctly impressed on disk, with punctures moderately small and close (striae distinctly wider and punctures coarser than in *dentatus*), striae notably wider and punctures coarser on sides; interspaces about twice as wide as striae, feebly convex on disk, densely granulate-punctate, with many fine and fewer coarse granules, confused on most of disk, but coarser granules becoming uniseriate toward declivity, interspaces narrower on sides, with granules less numerous; hairs short, fine, inconspicuous (much less numerous and smaller than in *dentatus*). Declivity with first and third interspaces elevated; the first with numerous large, dark, sharp serrations, some obsolescent, others obsolete, finely and closely punctured; third interspace with more numerous, somewhat smaller serrations, with fewer punctures; second interspace shining, nearly flat, about as wide as first, wider than third, finely, moderately sparsely punctured, with only one or two small serrations near apex; fifth and seventh interspaces convex, each with four or five small serrations and only a few punctures; all declivital interspaces with moderately sparse, short, yellowish hairs, some of them scalelike. Anterior face of mesosternum short, moderately oblique.

Female.—Similar to male in habitus; frons very wide between eyes, frontal rectangle about 0.63 as long as wide, convex, with wide, shallow postepistomal impression, densely, coarsely granulate-punctate, median carina obsolescent; elytral declivity with serrations similar in arrangement to those of male, but much smaller, second interspace often with several small serrations, sometimes with only one at apex, punctures close and fine throughout; entire declivity rather densely clothed with numerous, yellowish, flattened, scalelike hairs, with a few fine, rather short, erect setae from bases of serrations.

Phloeosinus juniperi was described from specimens taken by Hopping, Scaffold Meadow, Tulare County, Calif. No host was mentioned. The writer has studied more than 90 specimens, including 4 from the type locality collected by Hopping and J. M. Miller. Other specimens were taken at Yosemite National Park and Willow Ranch, Calif.; Prineville, Beatty, Klamath Falls, and Redmond, Oreg.; and Northport, Wash. The hosts cited are *Juniperus occidentalis* Hook. or *Juniperus* sp.

PHLOEOSINUS SERRATUS (LeConte)

Hylesinus serratus LECONTE, Trans. Amer. Ent. Soc., vol. 2, p. 170, 1863.

Phloeosinus serratus LECONTE, Proc. Amer. Philos. Soc., vol. 15, p. 381, 1876.—

SCHWARZ, Ent. Amer., vol. 2, p. 56, 1886; Proc. Ent. Soc. Washington, vol. 1, p. 176, 1889.—BLANDFORD, Biol. Centr.-Amer., Coleop., vol. 4, pt. 6, p. 160,

1897.—SMITH, Catalogue of the insects of New Jersey, p. 365, 1900.—FALL and COCKERELL, Trans. Amer. Ent. Soc., vol. 33, p. 218, 1900.—SWAINE, New York State Mus. Bull. 134, p. 130, 1909; Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 2, p. 70, 1918.—W. J. CHAMBERLIN, Bark and timber beetles of North Amer., pp. 170, 171, 1939.

Male (type).—Black, with elytra dark piceous brown; 3.74 mm. long, about 2.05 times as long as wide (but type specimen distorted from old pinning).

Frons rather wide between eyes; surface piceous, closely, sub-longitudinally rugose-granulate at sides and above; rather weakly, transversely concave (or broadly transversely impressed), with a rather distinct elevated median carina. Eye about three times as long as wide, more than half divided by a V-shaped emargination. Antenna elongate, yellowish brown, sericeous, about twice as long as wide, with all sutures oblique.

Pronotum widest behind middle, sides arcuate, subinflated behind, strongly constricted just behind the broadly rounded anterior margin, and distinctly impressed across dorsum; surface piceous black, moderately shining, deeply, very closely, moderately coarsely punctured, more finely and densely in front; median line indistinct, with punctures as on rest of disk; lateral calli small; vestiture inconspicuous.

Elytra wider than pronotum, about 1.32 times as long as wide; sides subparallel, broadly rounded behind; surface shining, piceous brown, striae of moderate width, deep, with moderate-sized punctures; interspaces moderately wide, rugose-granulate-punctate with moderately short, decumbent, testaceous hairs. Declivity with first interspace convex, with large, black, closely placed serrations on lateral half, surface punctured, rugose; second interspace narrowed posteriorly, shining, nearly flat, closely, rugosely punctate, with a single tubercle near apex; third interspace elevated, with a row of black serrations slightly smaller than in first; fifth, seventh, and ninth interspaces each with a few serrations; vestiture consisting of hairs and rather narrow scales, neither very numerous.

The foregoing description was made from the unique type in the LeConte collection, Museum of Comparative Zoology, Harvard University, partly from my own notes made about 10 years ago and in part from notes recently made by P. J. Darlington, Jr., in comparing specimens sent to him with the type of *Phloeosinus serratus*.

In his original mention of the species LeConte records it from New York. The only locality label on the specimen is a pink disk indicating that it came from the "Middle States." Although much collecting has been done in this area since the time of LeConte, no specimen at all closely related to *serratus* has ever been taken. How-

ever, in the Southwestern and the Pacific States several closely related species such as *utahensis* Swaine, *aciculatus* Bruck, and *juniperi* Swaine are known to occur. None of these, however, agrees with *serratus*, but aside from its smaller size *utahensis* approaches it most closely. It seems likely that *serratus* will be found in the Southwestern States.

PHLOEOSINUS UTAHENSIS Swaine

Phloeosinus utahensis SWAINE, Can. Ent., vol. 47, p. 363, 1915; Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 2, p. 68, 1918.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 175, 1939.

Male.—Black, with elytra reddish brown to piceous brown; 2.3–3.3 mm. long, nearly exactly twice as long as wide.

Frons moderately wide between the eyes, frontal rectangle about 0.68 as long as wide, epistomal lobe nearly lacking; surface black, shining, coarsely rugose-granulate-punctate, densely at sides and below; with a rather wide, moderately deep, arcuate, transverse impression; with a rather faint median carina on lower half, often interrupted by granules below; hairs fine and short. Eye about three times as long as wide, more than half divided by a rather narrow emargination. Antenna with club less than twice as long as wide, all of sutures distinctly oblique.

Pronotum about 1.16 times as wide as long, widest at posterior angles; sides regularly, arcuately convergent from base to lateral constriction just behind broad anterior margin, distinctly impressed across dorsum; surface piceous, brightly shining, moderately coarsely, rather closely and deeply punctured, subgranulately punctured at sides; median line very feebly elevated behind, punctured as rest of disk; lateral calli small; hairs fine and short.

Elytra distinctly wider than pronotum, about 1.33 times as long as wide, slightly widest just behind middle; sides feebly arcuate, subparallel on anterior two-thirds, semicircularly rounded behind; surface moderately shining; striae rather narrow, rather deeply impressed, with small but distinct, rather close punctures; interspaces wide, weakly convex, densely granulate-punctate and asperate on anterior disk, most of asperities and granules lacking on posterior disk, asperities becoming uniseriate on sides behind; disk and sides with rather numerous, fine, short hairs on interspaces. Declivity with first interspace convex, with mesal half finely, closely punctured, lateral half with a row of sparse, coarse, black serrations; second interspace wide, weakly convex, finely punctured, not serrate, but usually with a single tooth near extreme end; third interspace strongly elevated, with rather numerous, black, moderately coarse serrations and fine punctures; fifth, seventh, and ninth interspaces

each with a row of small serrations; entire declivity clothed with numerous, short, moderately stout hairs. Anterior face of mesosternum rather steep.

Female.—Similar to male in habitus; frons very wide between eyes, frontal rectangle about 0.64 as long as wide, convex, with a small subcircular or slightly curved, polished impression in median line, with a very fine, elevated, often indistinct median carina on lower half; elytral interspaces densely granulate-punctate and asperate, with asperities persistent throughout and becoming uniseriate on posterior half of disk; elytral declivity with first and third interspaces subequally, strongly convex, with rather small serrations, second interspace convex, finely and closely punctured, with a row of sparse, small teeth; with small asperities on the more lateral interspaces; entire declivity clothed with numerous, flat, scalelike hairs and a few slender, erect hairs from bases of asperities and serrations.

The species was described from 2 specimens from Stockton, Utah. The writer has studied more than 40 specimens from Utah, Arizona, and New Mexico. The hosts are *Juniperus pachyphloea* Torr. and *J. utahensis* (Engelm.) Lemmon.

PHLOEOSINUS ACICULATUS Bruck

Phocosinus aciculatus BRUCK, Pan-Pacific Ent., vol. 7, p. 127, 1931.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 174, 1939.

Male.—Piceous black, with elytra reddish brown to piceous brown; 2.0–3.0 mm. long, about 1.95 times as long as wide; closely allied to *utahensis* Swaine.

Frons very wide between eyes, frontal rectangle about 0.62 as long as wide, epistomal lobe very short; surface brightly shining, broadly, rather shallowly, transversely impressed, somewhat deeper and impunctate in median line, median carina weakly elevated on lower half, often nearly lacking, strongest in transverse impression, often interrupted by granules on epistoma; surface strongly, densely granulate-punctate; hairs fine and short, with those on epistomal margin longer. Eye three times as long as wide, nearly half divided by a sharp V-shaped emargination. Antenna with club nearly twice as long as wide, all sutures oblique.

Pronotum about 1.20 times as wide as long, widest at posterior angles; sides regularly arcuate and convergent from base to lateral constriction just behind very broad anterior margin, distinctly impressed across dorsum; surface brightly shining, finely, deeply, and moderately closely punctured (not so closely as in *serratus*), more finely and closely in front, sides subgranulately punctured; median line only feebly elevated on posterior third, more distinctly elevated

and impunctate in middle third; lateral calli of moderate size; hairs fine, short, and inconspicuous.

Elytra notably wider than pronotum, about 1.27 times as long as wide; sides subparallel on anterior two-thirds, broadly rounded behind; surface shining; striae narrow and moderately impressed (slightly wider and less deep than in *utahensis*), strial punctures moderately small (coarser than in *utahensis*), separated by their own diameters; interspaces wide, convex, densely granulate-punctate, granules mostly small and confused on anterior disk, posterior disk with a uniseriate row of small, sharp, toothlike asperities in each interspace; lateral interspaces with uniseriate asperities only on and near declivity, finely, confusedly granulate-punctate anteriorly; disk and sides with moderately numerous, short, moderately stout, yellowish hairs. Declivity with first interspace convex, mesal portion closely, finely punctured, with a row of coarse, black serrations on lateral half; second interspace wide, feebly convex, finely punctured, not serrate, with one or two teeth near apex; third interspace strongly elevated, with a row of moderately coarse, black serrations; more lateral interspaces each with a few smaller serrations; entire declivity with fairly numerous, short, rather stout, yellowish hairs. Mesosternum oblique in front.

Female.—Similar to male in habitus; frons very wide between eyes, frontal rectangle about 0.60 as long as wide, convex, densely, strongly granulate-punctate, scarcely impressed, with median carina very indistinct or lacking; elytral interspaces densely, finely granulate-punctate, with more numerous and stronger asperities than in male, becoming uniseriate midway on disk; declivity with all of interspaces serrate, those of second interspace but little smaller than those of first and third; entire declivity moderately clothed with flat, scale-like hairs, with a few slender, erect setae from bases of serrations.

Phloeosinus aciculatus was described from specimens "probably from juniper" collected in the Chiricahua Mountains, Cochise County, Ariz. The writer has studied more than 75 specimens collected at Sycamore Springs and Santa Catalina Mountains, Ariz.; Capitan Mountains, N. Mex.; and Davis Mountains, Tex. The hosts were *Juniperus pachyphloea* Torrey and *J. mexicana* Spreng.

PHLOEOSINUS NEOMEXICANUS, new species

PLATE 41, FIGURE 26

Male.—Black with the elytra reddish brown to piceous brown; 3.0 to 3.75 mm. long, holotype 3.46 mm. long, about 2.03 times as long as wide, allied to *juniperi* Swaine, but without granules in second declivital interspace.

Frons wide between eyes, frontal rectangle about 0.65 as long as wide, epistomal lobe very short, nearly lacking; surface black, feebly shining, moderately coarsely granulate-punctate; shallowly, rather broadly, arcuately impressed between eyes (subconcave in type), with a distinct, elevated median carina on lower half; hairs moderately fine and short. Eye nearly three times as long as wide, more than half divided by a rather narrow emargination. Antenna with club more than twice as long as wide, sutures all rather strongly oblique.

Pronotum about 1.17 times as wide as long, widest near posterior angles; sides distinctly arcuate and slightly convergent on posterior half, then more sharply narrowed, constricted just behind the moderately broadly rounded front margin, impressed across dorsum; surface black, shining, with deep, close punctures, moderately large (slightly coarser than in *juniperi*), finer and closer in front, more shallow and sub-granulate at sides; median line slightly elevated, usually impunctate behind, extending from base to transverse impression, widest in middle third; lateral calli moderately large; hairs longer, coarser, and more conspicuous than in *juniperi*, longer at sides.

Elytra wider than pronotum, about 1.30 times as long as wide, widest just in front of middle; sides subparallel, feebly arcuate on anterior two-thirds, broadly rounded behind; surface piceous brown, shining; striae narrow (distinctly narrower than in *juniperi*), strongly impressed, with punctures small and moderately spaced; interspaces several times as wide as striae, rather weakly convex, densely, confusedly granulate-punctate, with granules showing little tendency to uniseriate arrangement in anterior three-fourths of disk; hairs moderately fine and short (longer and more conspicuous than in *juniperi*). Declivity (pl. 41, fig. 26) with first interspace elevated, with large black serrations, some obsolete, mesal part of interspace finely, closely, roughly punctured; second interspace as wide as others, flat, devoid of serrations, finely, roughly punctured; third interspace elevated, with coarse, black serrations and with fine punctures each side of row of serrations; with a few smaller serrations on the more lateral interspaces; all declivital interspaces with numerous, moderately short, rather stout, yellow hairs (much more abundant, longer, and stouter than in *juniperi*). Anterior face of mesosternum oblique.

Female.—Similar to male in habitus; frons very wide between eyes, frontal rectangle about 0.60 as long as wide, convex, densely granulate-punctate, with rather faint arcuate transverse impression, median carina moderately developed on lower half; elytral declivity with first and third interspaces elevated, bearing smaller serrations than in male, second interspace flat, closely punctured, devoid of ser-

rations, all interspaces clothed with abundant hairs, of which those in first three interspaces are mostly scalelike.

Type locality.—Vermejo, N. Mex.

Additional localities.—Capitan, N. Mex.; Fort Garland, Colo.; and Panguitch, Utah.

Host.—*Juniperus scopulorum* Sargent.

Additional hosts.—*Juniperus monosperma* (Engel.) Sargent and *J. pachyphloea* Torrey.

Type material.—Holotype, allotype, and 35 paratypes, U.S.N.M. No. 55412.

Remarks.—The holotype, allotype, and 15 paratypes were taken from Rocky Mountain red cedar at Vermejo, N. Mex., by Hopkins; 10 paratypes from *J. monosperma* at Capitan, N. Mex., by W. F. Fiske; 7 paratypes from *Juniperus* at Fort Garland, Colo., by Hopkins; 3 paratypes from *Juniperus* at Panguitch, Utah, by H. E. Burke. Additional specimens have recently been collected by R. L. Furniss from *J. scopulorum*, *J. utahensis*, and *J. pachyphloea* in New Mexico, Utah, and Arizona.

PHLOEOSINUS TEXANUS, new species

Male.—Black, with elytra reddish brown to piceous; 2.15–3.14 mm. long, holotype 2.74 mm. long, 1.96 times as long as wide; allied to *neomexicanus*.

Frons very wide between eyes, frontal rectangle about 0.62 as long as wide, epistomal lobe not projecting beyond epistomal lip; surface black, shining, strongly granulate-punctate below and at sides, granules lacking in median area above; arcuately, transversely impressed, deeper in median line; median carina indistinct, often lacking except for small median tubercle on epistoma; hairs moderately short and fine. Eye three times as long as wide, more than half divided by a rather wide U-shaped emargination. Antenna with club nearly twice as long as wide; first suture arcuate, slightly oblique, others strongly oblique.

Pronotum about 1.14 times as wide as long, widest at posterior angles; sides arcuately convergent from base to constriction just behind broadly rounded front margin; surface black, shining, with deep, close, rather fine punctures (finer than in *neomexicanus*), finer and very dense near front margin, subgranulate on sides; median line slightly elevated on posterior two-thirds, impunctate and widest in middle third, lateral calli moderately small (smaller but more distinct than in *neomexicanus*); hairs more numerous than in *neomexicanus*, somewhat longer at sides.

Elytra wider than pronotum, about 1.28 times as wide as long; sides nearly straight and subparallel on anterior two-thirds, broadly

rounded behind; surface piceous brown, shining; striae narrow and strongly impressed (narrower than in *neomexicanus*), punctures very small, rather close, indistinctly seen; interspaces very wide (wider than in *neomexicanus*), moderately convex, confusedly granulate-punctate on disk, lateral interspaces with granules greatly reduced except on anterior third; hairs moderately numerous, rather fine and short. Declivity with first interspace moderately convex (less so than in *neomexicanus*), with moderately large, black serrations, some of them obsolete, finely, roughly punctured; second interspace wide, nearly flat, with serrations entirely lacking, finely, roughly punctured; third interspace elevated, with a rather sparse row of moderately large serrations; fifth, seventh, and ninth interspaces each with a few small serrations; entire declivity clothed with numerous short hairs (more numerous and not so stout as in *neomexicanus*). Anterior face of mesosternum oblique.

Female.—Similar to male in habitus, frons very wide between eyes, frontal rectangle about 0.58 as long as wide, convex, granulate-punctate below and at sides, punctured above, transverse impression faint, median carina very feebly developed on lower half; elytral declivity with first and third interspaces moderately elevated, finely punctured, serrations small and rather sparse; second interspace as wide as others, flat, finely, moderately closely punctured, entirely devoid of serrations; declivity clothed with numerous short, scalelike hairs, and a few fine, erect hairs.

Type locality.—Montell, Uvalde County, Tex.

Additional localities.—Sonora and Gillespie Counties, Tex.

Host.—*Juniperus mexicana* Spreng.

Type material.—Holotype, allotype, and 48 paratypes, U.S.N.M. No. 55413.

Remarks.—The holotype, allotype, and 35 paratypes were bred from *Juniperus mexicana* by W. F. Fiske at Montell, Tex.; 4 paratypes from "arborvitae" by O. G. Babcock at Sonora, Tex.; 4 paratypes marked "Tex., Collection of C. V. Riley"; 5 paratypes taken from "juniper" by J. N. Knull, Gillespie County, Tex.

PHLOEOSINUS CANADENSIS Swaine

Phloeosinus canadensis SWAINE, Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 1, p. 8, 1917; Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 2, pp. 68, 69, 1918.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 171, 1939.

Male.—Piceous, with elytra reddish brown to piceous; 2.14–2.85 mm. long, almost exactly twice as long as wide.

Frons wide between eyes, frontal rectangle about 0.70 as long as wide; epistomal lobe short, but evident; surface piceous black, shin-

ing, finely, closely granulate-punctate below and at sides, less finely, more deeply punctated above in median third, with interstices smooth; broadly, transversely impressed, sometimes subconcave, with a rather broad, elevated median carina bisecting concavity and extending to epistomal margin; hairs short and fine. Eye three times as long as wide, more than half divided by a U-shaped emargination. Antenna with club two-thirds longer than wide, first and second sutures subtransverse, third oblique.

Pronotum about 1.12 times as wide as long, widest behind; sides on posterior two-thirds gradually, arcuately narrowed, rather strongly constricted just behind the very broadly rounded anterior margin; surface piceous black, shining, distinctly impressed anteriorly between lateral constrictions; punctures deep, moderate in size and spacing, interstices smooth on disk, subgranulate at sides; median line behind slightly elevated, impunctate only near middle of disk; lateral calli small, only feebly elevated; vestiture fine and short but visible, slightly longer on sides.

Elytra wider than pronotum, about 1.29 times as long as wide, slightly wider behind middle; sides very feebly arcuate on anterior two-thirds, rather broadly rounded behind; surface shining; striae on disk narrow, deeply impressed, punctures fine and rather indistinct, striae slightly wider on sides; interspaces on disk wide (slightly less so than in *dentatus* (Say)), slightly convex, not so wide and more strongly convex on sides, rather coarsely granulate (more coarsely and sparsely granulate than in *dentatus*), with coarser granules becoming uniseriate near declivity; hairs fairly numerous, fine, moderately short. Declivity with first and third interspaces rather strongly convex, each with a row of strong, sharp serrations, those on first interspace sparser than on third, densely, finely punctured on mesal portion; second interspace shining, unarmed, scarcely narrower than third, flat, sparsely, finely punctured; with a few sharp granules on the interspaces laterad of third; hairs longer and more conspicuous than on disk. Anterior face of mesosternum precipitous.

Female.—Similar to male, but frons wider between eyes, frontal rectangle about 0.63 as long as wide, convex, flattened and impressed between eyes, with a fine, weakly elevated median carina; elytral declivity with first and third interspaces less convex than in male, each with a row of sparse, small, sharp serrations; second interspace flat, unarmed, slightly narrower than third at apex; pubescence of disk and declivity more abundant than in male.

Phloeosinus canadensis was described from specimens taken from *Thuja occidentalis* L. in Quebec. It occurs throughout eastern Canada and the northeastern part of the United States from Maine to

the Lake States. The host trees are *T. occidentalis*, *Juniperus virginiana* L., and *Chamaecyparis thyoides* (L.) B. S. and P.

PHLOEOSINUS SCOPULORUM Swaine

Phloeosinus scopulorum SWAINE, Can. Ent., vol. 56, p. 148, 1924.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 179, 1939.

Male.—Black, with elytra reddish brown to piceous brown; 2.4–2.8 mm. long, about 2.04 times as long as wide; allied to *canadensis*.

Frons wide between eyes, frontal rectangle about 0.66 as long as wide, epistomal lobe short; surface black, shining, moderately finely, closely granulate-punctate at sides and below, punctate above in median area, with interstices smooth; broadly, arcuately, transversely impressed, with medium portion deeper (subconcave), with a distinct, moderately elevated median carina on lower half; hairs short and fine. Eye about three times as long as wide, about half divided by a U-shaped emargination. Antenna about twice as long as wide, all of the sutures oblique.

Pronotum about 1.17 times as wide as long, widest near posterior angles; sides arcuate on posterior two-thirds, rather strongly constricted just behind broadly rounded anterior margin; surface piceous black, shining; punctures of disk deep, moderately close, of medium size, finer and denser in front, close and subgranulate at sides; median line slightly elevated and impunctate from base to transverse impression; lateral calli large; vestiture of fine, short hairs on disk, slightly longer on sides.

Elytra wider than pronotum, about 1.30 times as long as wide, widest through basal serrations; sides subparallel on basal two-thirds, moderately broadly rounded behind; surface shining; striae impressed, narrow, punctures moderately fine, usually distinct; striae wider and punctures larger on sides; interspaces on disk feebly convex, confusedly granulate on anterior half, becoming uniseriate on first and third interspaces behind, obsolescent on second and fourth behind; lateral interspaces scarcely granulate, feebly so behind, hairs rather short and fine, moderately sparse. Declivity with first and third interspaces elevated, each with a row of moderately large black serrations; first interspace finely, closely punctured on mesal half; second interspace flat, not narrowed, with rather fine, moderately close, obsolescent punctures, devoid of serrations; lateral interspaces of declivity with a few small, sharp granules; vestiture with longer slender hairs from serrations and more numerous shorter ones. Anterior face of mesosternum rather precipitous.

Female.—Similar to male, frons wider between eyes, frontal rectangle about 0.64 as long as wide, convex, closely, finely granulate-punctate at sides and below, punctured above, very faintly impressed

between eyes, median carina represented by a small tubercle at epistomal margin; elytral declivity similar to that of male but with smaller serrations on interspaces 1 and 3, second interspace not narrowed at apex, entirely without serrations, but rather closely, strongly punctured; vestiture more abundant than in male, with many hairs flattened and somewhat scalelike.

This species is closely allied to *canadensis* but differs in that all sutures of the antennal club are oblique and the median line and lateral calli of the pronotum are more strongly developed. The female differs from that of *canadensis* in having the second declivital interspace wide to the apex and in having more abundant, scalelike hairs on the declivity.

Phloeosinus scopulorum Swaine was described from specimens taken from *Juniperus scopulorum* Sargent at Williams Lake, British Columbia.

Through the courtesy of W. J. Chamberlin, of Corvallis, Oreg., the writer has studied a female paratype in the preparation of the description. Two additional specimens, a male and a female taken from *J. scopulorum* at Vantage Bridge, Wash., by J. A. Beal and F. P. Keen, were studied carefully and are the only other specimens seen.

PHLOEOSINUS TACUBAYAE Hopkins

Phloeosinus tacubayae HOPKINS, Proc. Ent. Soc. Washington, vol. 7, p. 78, 1905.—
SCHEDL, Anal. Escuela Nac. Cienc. Biol., vol. 1, p. 337, 1940.

Male.—Black, the elytra reddish brown to piceous brown; 2.0 to 2.51 mm. long, about 2.0 times as long as wide; allied to *canadensis*.

Frons moderately wide between eyes, frontal rectangle about 0.78 as long as wide, epistomal lobe short; surface black, shining, finely, closely granulate-punctate below and at sides, roughly punctured above in median area, broadly arcuately, transversely impressed, with an elevated median carina on lower half; hairs moderately short and fine. Eye three times as long as wide, more than half divided by a rather wide emargination. Antenna with club less than half as wide as long, all of sutures oblique.

Pronotum about 1.22 times as wide as long, widest behind; sides straight and subparallel on posterior third, then strongly, arcuately narrowed to the lateral constriction just behind very broadly rounded front margin; surface black, broadly, transversely impressed on anterior third; disk shining, smooth, with deep, close, moderate-sized punctures, finer and denser near anterior margin, closely, roughly, subgranulately punctured at sides; median line feebly elevated behind, punctured throughout; lateral calli lacking or nearly so; vestiture of short, fine hairs on disk, slightly longer in transverse impression, much longer on sides.

Elytra wider than pronotum, about 1.34 times as long as wide; sides subparallel, very feebly sinuate, on anterior two-thirds, broadly rounded behind; surface moderately shining; striae on disk narrow, rather strongly impressed, punctures fine, elongate, rather close; striae on sides, slightly wider, shallower, with somewhat larger punctures; interspaces wide and flat, finely, densely, confusedly granulate-punctate, tending to become uniseriate behind; lateral interspaces narrower, slightly convex; vestiture consisting of short, rather numerous hairs, slender and rather sparse on anterior half, becoming more abundant and stouter behind. Declivity with first and third interspaces moderately convex, each with a row of rather small, granulelike serrations, very finely and closely punctured; second interspace nearly flat, nearly as wide as others, closely, finely punctured, devoid of serrations; interspaces laterad of fourth all finely serrate and punctate; all interspaces with rather abundant, small, more or less scalelike hairs and with a few slender hairs. Anterior face of mesosternum moderately precipitous.

Female.—Similar to male in general habitus, with frons wider between eyes, frontal rectangle about 0.71 as long as wide, convex, feebly impressed in median area, finely, densely granulate-punctate, with a fine, rather indistinct median carina on lower half; elytral declivity similar to that of male but with smaller serrations on first and third interspaces; second interspace punctured and without serrations as in male; vestiture consisting of a few slender hairs and many flattened, widened, scalelike hairs.

Type locality.—Tacubaya, D. F., Mexico.

Host.—*Cupressus*.

Type material.—Female type and five paratypes, U.S.N.M. No. 7516.

Remarks.—The female type and five paratypes (male type apparently lost) were taken from *Cupressus* at Tacubaya, D. F., Mexico, by E. Bowmann, February 1903. In addition nine specimens taken from *Cupressus benthami* Endl. at Chapultepec August 1927, and nine specimens collected from *Cupressus* near pyramids of San Juan, Teotihuacan, Mexico, by D. DeLeon were studied by the writer.

PHLOEOSINUS RUGOSUS Swaine

Phlocosinus rugosus SWAINE, Canada Dept. Agr., Ent. Branch, Bull. 14, pt. 1, pp. 9, 10, 1917; pt. 2, p. 69, 1918.—W. J. CHAMBERLIN, Bark and timber beetles of North America, p. 172, 1939.

Male.—Black, with the elytra dark piceous brown; 2.54 to 3.00 mm. long, about 2.07 times as long as wide.

Frons wide between eyes, frontal rectangle about 0.67 as long as wide, epistomal lobe moderately short; surface black, feebly shining to subopaque, granulate-punctate below and at sides, roughly

punctured above, broadly, arcuately impressed, varying to rather strongly concave between eyes, with a sharp, elevated median carina on lower half (also variable); hairs short and fine. Eye not quite three times as long as wide, about half divided by a moderately narrow, V-shaped emargination. Antenna with club twice as long as wide, all sutures oblique.

Pronotum about 1.2 times as wide as long, widest at posterior angles; sides very feebly, arcuately convergent on posterior half, then strongly, arcuately narrowed to lateral constriction just behind broadly rounded front margin, distinctly impressed across dorsum; surface black, shining, with deep, moderately large, moderately close punctures, much finer and closer in front, sides punctured, not granulate; median line very feebly elevated on posterior fourth, middle half with an approximate double line of smaller, more closely placed punctures; lateral calli very feebly indicated or entirely absent; hairs short and fine, slightly longer at sides.

Elytra slightly wider than pronotum, about 1.37 times as long as wide; sides nearly straight and subparallel on anterior two-thirds, broadly rounded behind; surface piceous brown, moderately shining; striae rather narrow, moderately strongly impressed, with moderately small, shallow, rather closely placed, indistinct punctures; interspaces rather wide on disk, convex, first two widened near base, rather coarsely granulate-punctate, rugose on anterior third, granules tending to become fewer and uniseriate near declivity; vestiture short and scanty, but becoming more abundant near declivity. Declivity finely, closely, and roughly punctured, with rather abundant, short, slender hairs; striae narrow, distinctly impressed; first and third interspaces each with a row of moderate-sized serrations, those of first slightly larger and becoming obsolescent on apical third; second interspace nearly flat, shining, with fine, moderately close punctures, devoid of serrations. Anterior face of mesosternum slightly oblique.

Female.—Similar to male in habitus, frons very wide between eyes, frontal rectangle about 0.65 as long as wide, convex, strongly granulate-punctate, rather indefinitely, transversely impressed, with a very fine, elevated median carina; elytral declivity similar to that of male but with the serrations somewhat smaller, and the vestiture consisting of a few slender hairs from bases of serrations and numerous small, flat, scalelike hairs.

The type series was collected from juniper, Scaffold Meadow, Tulare County, Calif., by Hopping. The specimens before me include two specimens with identical data and probably from the same field lot; specimens taken from *Juniperus occidentalis* Hook., by Miller, Sequoia National Forest; from same host at Willow Ranch, Calif., by J. A. Beal; and from Alturas and Devils Garden, Calif., by E. F. Wohletz.

PHLOEOSINUS FURNISSI, new species

PLATE 41, FIGURES 27, 28

Male.—Black, with elytra piceous brown at base, shading to reddish on declivity; 2.28 to 3.34 mm. long, holotype 2.68 mm. long, about 2.14 times as long as wide.

Frons (pl. 41, fig. 28) very wide between eyes, frontal rectangle about 0.63 as long as wide; epistomal lobe rather short; surface black, moderately shining, finely and densely granulate-punctate at sides, finely, closely punctate above; central area deeply concave, with concavity subtriangular, broad below, narrower above and extending to level of upper border of eyes, shining and impunctate in center, median carina short and obscure on lower fourth, with a small, rather obscure callus at each side on ventrolateral rim of concavity; hairs at sides and above concavity fine, moderately short, inconspicuous. Eye more than three times as long as wide, more than half divided by an emargination. Antenna with club about 2.18 times as long as wide, first and second sutures distinctly oblique, third suture very strongly oblique, sinuate.

Pronotum about 1.14 times as wide as long, widest on posterior half; hind angles rounded, sides nearly straight, weakly arcuate on posterior half, then arcuately narrowed to the constriction just behind the broadly rounded anterior margin; surface shining, black, transversely impressed anteriorly; disk very deeply, closely, moderately finely punctured, not granulate, finer and closer in front, sides slightly roughened but not granulate; median line not elevated, not usually impressed at each side behind, marked by finer, closer punctures; lateral calli absent or only feebly developed; pubescence fine, rather short, visible, but not conspicuous, somewhat longer just anterior to position of lateral calli.

Elytra slightly wider than pronotum, about 1.35 times as long as wide; sides nearly straight and subparallel on anterior two-thirds, broadly rounded behind; surface shining, shading from piceous brown near base to reddish brown on declivity; striae, except the first one, which is wider, less than half as wide as interspaces, deeply impressed, stria punctures shallow, rather small, moderately close on disk, somewhat larger and more distinct on sides, with striae shallower; interspaces convex, granulate-punctate, with granules becoming uniseriate on posterior disk, with hairs moderately short and fine and moderately conspicuous. Declivity with first and third interspaces strongly convex, the first closely, finely punctured, with a row of coarse, closely placed, black, recurved serrations; third interspace more strongly convex, with slightly smaller, very closely placed serrations, often somewhat irregular owing to crowding, and occasionally so crowded as to form a partially double row; fifth, seventh, and ninth

interspaces moderately convex, each with a few small to moderate serrations; second interspace flat, as wide as others, finely, rather closely, somewhat roughly punctured, devoid of granules and serrations; hairs short, stout, more abundant than on disk, not scalelike.

Anterior face of mesosternum moderately sloping.

Female.—Similar in habitus to male; frons (pl. 41, fig. 27) slightly shorter and wider, frontal rectangle about 0.61 as long as wide, granulate-punctate below, with a small, impunctate callus at each side, transversely, triangularly impressed, median carina very indistinct; elytral declivity with first and third interspaces rather strongly convex, the serrations much finer than in male, hairs more numerous and much stouter, many of them scalelike.

Type locality.—Flagstaff, Ariz.

Additional localities.—Nogal, N. Mex., Mesa Verde, Colo., Boulder and Manila, Utah, and Fort Bridger, Wyo.

Host.—*Juniperus pachyphloea* Torrey.

Additional hosts.—*Juniperus utahensis* (Engelm.) Lemmon and *J. monosperma* (Engelm.) Sargent.

Type material.—Holotype, allotype, and 101 paratypes, U.S.N.M. No. 55414.

Remarks.—The holotype, allotype, and 53 paratypes were taken from *Juniperus* at Flagstaff, Ariz., by R. L. Furniss; 7 paratypes from *J. pachyphloea*, Mesa Verde National Park, Colo., by M. W. Blackman; 6 paratypes from *Juniperus* sp., Mesa Verde National Park, Colo., by H. E. Burke, and paratypes were collected by R. L. Furniss as follows: 16 from *J. utahensis* at Boulder and Manila, Utah; 5 from the same host at Fort Bridger, Wyo., and 12 from *J. monosperma* at Nogal, N. Mex.

PHLOEOSINUS CHAMBERLINI, new species

Male.—Black, shining, with elytra ferruginous to piceous near base, reddish brown on declivity; 2.05 to 2.51 mm. long, holotype 2.31 mm. long, about 2.08 times as long as wide.

Frons very wide between eyes, frontal rectangle about 0.66 as long as wide; epistomal lobe short; surface black, shining, finely and densely granulate-punctate at sides, with deep, slightly coarser punctures, not granulate above; central area rather deeply and broadly concave, central two-fifths of concavity brightly shining, impunctate, with a fine, usually indistinct, short median carina on the lower half; hairs at sides and above concavity slightly coarser. Eye about three times as long as wide, more than half divided by a U-shaped emargination. Antenna with club about twice as long as wide, first and second sutures slightly oblique, third suture strongly oblique and sinuate.

Pronotum about 1.17 times as wide as long, widest in posterior third; sides feebly arcuate on posterior third, more strongly, arcuately narrowed on middle third, constricted just behind the broadly rounded anterior margin; surface black, shining, transversely impressed opposite anterior constriction; disk with very deep, rather close, moderate-sized punctures, slightly roughened (subgranulate) at sides; median line not elevated, more finely and closely punctured, indefinitely impressed at each side of middle on posterior third; lateral calli usually small; pubescence short and fine, distinctly longer just anterior to lateral calli.

Elytra slightly wider than pronotum, about 1.41 times as long as wide; sides nearly straight and subparallel on anterior two-thirds, moderately broadly rounded behind; surface shining; striae about half as wide as interspaces, rather strongly impressed, strial punctures close, of moderate size, rather shallow, similar on sides, considerably smaller on declivity; interspaces convex, confusedly granulate-asperate near base, rugose-punctate with occasional rounded granules in middle disk, becoming uniseriately asperate on first and alternate interspaces on posterior disk, pubescence short, fine, and inconspicuous on disk. Declivity with first, third, and alternate interspaces rather strongly convex, first and third closely, finely punctured, each with a uniseriate row of moderately small serrations; fifth and seventh interspaces with two to four similar serrations; ninth interspace joining third, distinctly, rather finely serrate; second interspace nearly flat, only slightly narrower than third, finely and moderately closely punctured, without serrations or granules; elytral pubescence consisting of short, fine hairs, none of them scalelike. Anterior face of mesosternum somewhat sloping.

Female.—Similar to male in size and proportions; frontal rectangle about 0.64 as long as wide, densely granulate-punctate, with a fine, elevated median carina on lower half; elytral declivity with serrations much smaller than in male, pubescence consisting of numerous short, flat, scalelike hairs.

Type locality.—Alturas, Calif.

Additional localities.—Prineville and Redmond, Oreg.

Host.—*Juniperus occidentalis* Hooker.

Type material.—Holotype, allotype, and 133 paratypes, U.S.N.M. No. 55415.

Remarks.—The holotype, allotype, and 40 paratypes were reared from small branches of *Juniperus occidentalis* taken at Alturas, Calif., by F. P. Keen; 40 paratypes were reared from limbs of *J. occidentalis* taken at Prineville, Oreg., by W. J. Buckhorn; and 53 paratypes from *J. occidentalis* at Redmond, Oreg., by W. J. Chamberlin. The species is named in honor of W. J. Chamberlin, Oregon State College, Corvallis, Oreg.

HOSTS AND DISTRIBUTION OF NORTH AMERICAN SPECIES OF PHLOEOSINUS CHAPUIS

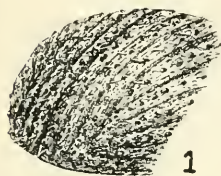
| Species | Known distribution | Known hosts |
|-----------------------------------|---|--|
| <i>aciculatus</i> Bruck----- | Arizona, New Mexico, Texas. | <i>Juniperus pachyphloea</i> , <i>J. mexicana</i> |
| <i>alaskanus</i> , new species-- | Alaska----- | <i>Picea canadensis</i> |
| <i>antennatus</i> Swaine----- | California, Oregon----- | <i>Libocedrus decurrens</i> |
| <i>arizonicus</i> , new species-- | Arizona----- | <i>Cupressus arizonica</i> |
| <i>baumanni</i> Hopkins----- | Mexico, D. F----- | <i>Cupressus benthami</i> |
| <i>buckhorni</i> , new species-- | Oregon----- | <i>Thuja plicata</i> , <i>Libocedrus decurrens</i> |
| <i>canadensis</i> Swaine----- | Northeastern States, eastern Canada | <i>Thuja occidentalis</i> , <i>Juniperus virginiana</i> , <i>Chamaecyparis thyoides</i> |
| <i>chamvertini</i> , new species | California, Oregon----- | <i>Juniperus occidentalis</i> |
| <i>chiricahua</i> , new species-- | Arizona, Mexico----- | <i>Cupressus arizonica</i> , <i>C. glabra</i> , <i>Juniperus pachyphloea</i> |
| <i>coronatus</i> Chapuis----- | Yucatan, Mexico----- | Unknown |
| <i>cristatus</i> (LeConte)----- | California, Arizona----- | <i>Cupressus macrocarpa</i> , <i>C. glabra</i> |
| <i>cupressi</i> Hopkins----- | California----- | <i>Cupressus macrocarpa</i> , <i>Sequoia sempervirens</i> |
| <i>deleoni</i> , new species----- | Mexico----- | <i>Juniperus flaccida</i> |
| <i>dentatus</i> (Say)----- | New Hampshire to Georgia and westward to Texas and Nebraska | <i>Juniperus virginiana</i> , <i>Chamaecyparis thyoides</i> , <i>Thuja occidentalis</i> |
| <i>frontalis</i> Bruck----- | California----- | <i>Cupressus arizonica</i> |
| <i>fulgens</i> Swaine----- | California, Oregon----- | <i>Libocedrus decurrens</i> |
| <i>furnissi</i> , new species--- | Arizona, Colorado, New Mexico, Utah, Wyoming | <i>Juniperus pachyphloea</i> , <i>J. utahensis</i> , <i>J. monosperma</i> |
| <i>granulatus</i> Bruck----- | California----- | <i>Cupressus forbesii</i> |
| <i>hoferi</i> , new species----- | Colorado, New Mexico, Texas, Wyoming, Utah, Arizona | <i>Juniperus scopulorum</i> , <i>J. pachyphloea</i> , <i>J. utahensis</i> |
| <i>hoppingi</i> Swaine----- | California----- | <i>Libocedrus decurrens</i> , <i>Juniperus occidentalis</i> , <i>Cupressus macrocarpa</i> |
| <i>juniperi</i> Swaine----- | California, Oregon, Washington | <i>Juniperus occidentalis</i> |
| <i>kaniksu</i> , new species--- | Washington, Idaho----- | <i>Thuja plicata</i> |
| <i>keeni</i> , new species----- | Washington----- | <i>Chamaecyparis nootkatensis</i> |
| <i>neomexicanus</i> , new species | New Mexico, Colorado, Utah, Arizona | <i>Juniperus pachyphloea</i> , <i>J. utahensis</i> , <i>J. scopulorum</i> , <i>J. monosperma</i> |
| <i>nitidus</i> Swaine----- | Oregon----- | <i>Chamaecyparis nootkatensis</i> |
| <i>piccae</i> Swaine----- | Quebec, Canada----- | <i>Picea canadensis</i> |
| <i>pini</i> Swaine----- | Manitoba, Canada; Michigan | <i>Pinus banksiana</i> , <i>P. strobi</i> |
| <i>punctatus</i> LeConte----- | Oregon, California, Washington | <i>Libocedrus decurrens</i> , <i>Thuja plicata</i> , <i>Juniperus occidentalis</i> |

| Species | Known distribution | Known hosts |
|--------------------------------|---|---|
| <i>rubicundulus</i> Swaine | California | <i>Sequoia washingtoniana</i> , <i>Libocedrus decurrens</i> |
| <i>rugosus</i> Swaine | California | <i>Juniperus occidentalis</i> |
| <i>rusti</i> , new species | Washington | <i>Thuja plicata</i> |
| <i>scopulorum</i> Swaine | British Columbia, Canada; Washington | <i>Juniperus scopulorum</i> |
| <i>sequoiae</i> Hopkins | California, Oregon | <i>Sequoia sempervirens</i> , <i>Cupressus</i> sp. |
| <i>serratus</i> (LeConte) | ? | Unknown |
| <i>setosus</i> Bruck | California | <i>Cupressus sargentii</i> , <i>Libocedrus decurrens</i> |
| <i>spinosus</i> , new species | Arizona, New Mexico | <i>Cupressus arizonica</i> |
| <i>splendens</i> , new species | Oregon, California | <i>Libocedrus decurrens</i> |
| <i>squamosus</i> , new species | Washington | <i>Thuja plicata</i> , <i>Libocedrus decurrens</i> |
| <i>swainei</i> Bruck | California | <i>Cupressus sargentii</i> |
| <i>tacubayae</i> Hopkins | Mexico | <i>Cupressus benthami</i> |
| <i>taxodii</i> Blackman | Mississippi, Louisiana, Florida, North Carolina, South Carolina | <i>Taxodium distichum</i> |
| <i>texanus</i> , new species | Texas | <i>Juniperus mexicana</i> |
| <i>utahensis</i> Swaine | Utah, Arizona, New Mexico | <i>Juniperus pachyphloea</i> , <i>J. utahensis</i> |
| <i>vandykei</i> Swaine | California, Oregon | <i>Libocedrus decurrens</i> , <i>Thuja plicata</i> |
| <i>variolatus</i> Bruck | California | <i>Cupressus sargentii</i> |

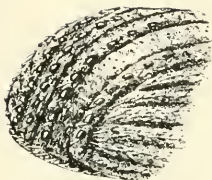
TREES KNOWN TO SERVE AS HOSTS FOR SPECIES OF PHLOEOSINUS CHAPUIS

| Host | Species |
|---|---|
| <i>Chamaecyparis nootkatensis</i> (Lambert) Sudw. | <i>keeni</i> , new species; <i>nitidus</i> Swaine |
| <i>Chamaecyparis thyoides</i> (L.) B. S. P. | <i>canadensis</i> Swaine; <i>dentatus</i> (Say) |
| <i>Cupressus arizonica</i> Greene | <i>arizonicus</i> , new species; <i>chiricahua</i> , new species; <i>frontalis</i> Bruck; <i>spinosus</i> , new species |
| <i>Cupressus benthami</i> Endl. | <i>baumanni</i> Hopkins; <i>tacubayae</i> Hopkins |
| <i>Cupressus forbesii</i> Jepson | <i>granulatus</i> Bruck |
| <i>Cupressus glabra</i> Sudw. | <i>chiricahua</i> , new species; <i>cristatus</i> (LeConte) |
| <i>Cupressus macrocarpa</i> Gordon | <i>cristatus</i> (LeConte); <i>cupressi</i> Hopkins; <i>hoppingi</i> Swaine |
| <i>Cupressus sargentii</i> Jepson | <i>setosus</i> Bruck; <i>swainei</i> Bruck; <i>variolatus</i> Bruck |
| <i>Juniperus flaccida</i> Schlecht. | <i>deleoni</i> , new species |
| <i>Juniperus mexicana</i> Spreng. | <i>aciculatus</i> Bruck; <i>texanus</i> , new species |
| <i>Juniperus monosperma</i> (Engelm.) Sargent | <i>furnissi</i> , new species; <i>neomexicanus</i> , new species |
| <i>Juniperus occidentalis</i> Hook. | <i>chamberlini</i> , new species; <i>hoppingi</i> Swaine; <i>juniperi</i> Swaine; <i>punctatus</i> LeConte; <i>rugosus</i> Swaine |

| <i>Host</i> | <i>Species</i> |
|---|--|
| <i>Juniperus pachyphloea</i> Torrey----- | <i>aciculatus</i> Bruck; <i>chiricahua</i> , new species; <i>furnissi</i> , new species; <i>hoferi</i> , new species; <i>neomexicanus</i> , new species; <i>utahensis</i> Swaine |
| <i>Juniperus scopulorum</i> Sargent---- | <i>hoferi</i> , new species; <i>neomexicanus</i> , new species, <i>scopulorum</i> Swaine |
| <i>Juniperus utahensis</i> (Engelm.) Lem- mon. | <i>furnissi</i> , new species; <i>hoferi</i> , new species; <i>neomexicanus</i> , new species; <i>utahensis</i> Swaine |
| <i>Juniperus virginiana</i> L----- | <i>canadensis</i> Swaine; <i>dentatus</i> (Say) |
| <i>Libocedrus decurrens</i> Torr----- | <i>antennatus</i> Swaine; <i>buckhorni</i> , new species; <i>fulgens</i> Swaine; <i>hoppingi</i> Swaine, <i>puncta-</i> <i>tus</i> LeConte; <i>rubicundulus</i> Swaine; <i>selosus</i> Bruck; <i>splendens</i> new species; <i>squamosus</i> , new species; <i>vandykei</i> Swaine |
| <i>Picea canadensis</i> (Mill.) B. S. P--- | <i>alaskanus</i> , new species; <i>piceae</i> Swaine |
| <i>Pinus banksiana</i> Lambert----- | <i>pini</i> Swaine |
| <i>Pinus strobi</i> L----- | <i>pini</i> Swaine |
| <i>Sequoia sempervirens</i> (Lambert) Endl. | <i>cupressi</i> Hopkins; <i>sequoiae</i> Hopkins |
| <i>Sequoia washingtoniana</i> (Winsl.) Sudw. | <i>rubicundulus</i> Swaine |
| <i>Taxodium distichum</i> (L.) L. C. Rich- | <i>taxodii</i> Blackman |
| <i>Thuja occidentalis</i> L----- | <i>canadensis</i> Swaine; <i>dentatus</i> (Say) |
| <i>Thuja plicata</i> D. Don----- | <i>buckhorni</i> , new species; <i>kaniksu</i> , new species; <i>punctatus</i> LeConte; <i>rusti</i> , new species; <i>squamosus</i> , new species; <i>vandykei</i> Swaine |



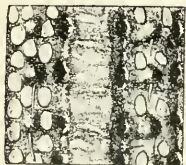
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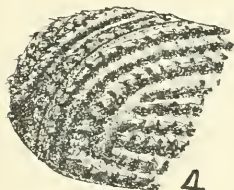
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3a



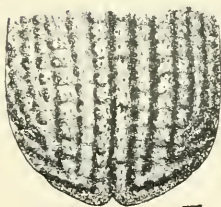
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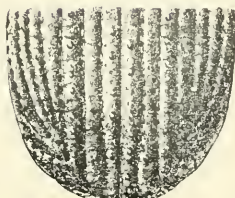
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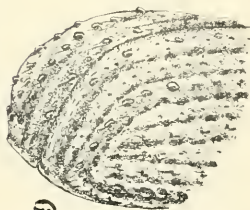
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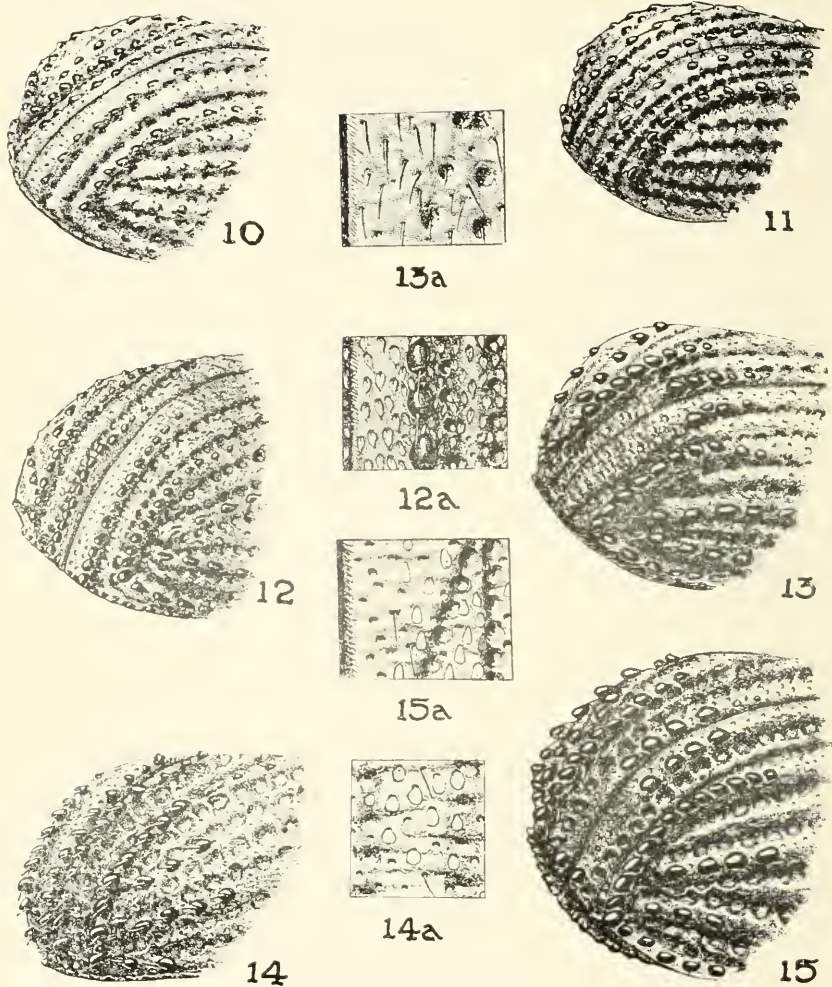
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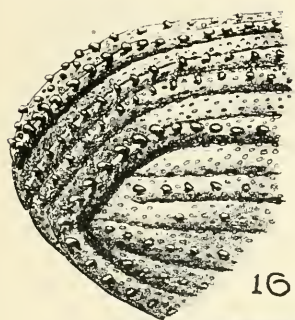
ELYTRAL DECLIVITY IN PHLOEOSINUS

1. *P. alaskanus*, new species, male; 2, *P. hoferi*, new species, male; 3, *P. frontalis* Bruck, male; 3a, same, details of first three interspaces; 4, *P. arizonicus*, new species, male; 4a, same, details of first three interspaces; 5, *P. spinosus*, new species, male; 6, *P. spinosus*, female; 7, *P. splendens*, new species, male; 8, *P. fulgens* Swaine, male; 9, *P. rubicundulus* Swaine, male.

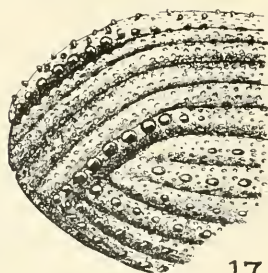


ELYTRAL DECLIVITY IN PHLOEOSINUS

10, *P. punctatus* LeConte, female; 11, *P. punctatus*, male; 12, *P. cupressi* Hopkins, female; 12a, same, details of first and second interspaces; 13, *P. cupressi*, male; 13a, same, details of first two interspaces; 14, *P. variolatus* Bruck, female; 14a, same, details of second interspace; 15, *P. variolatus*, male; 15a, same, details of first two interspaces.



16



17

18a



19a



18



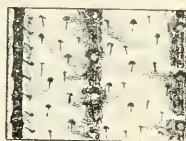
19



20a



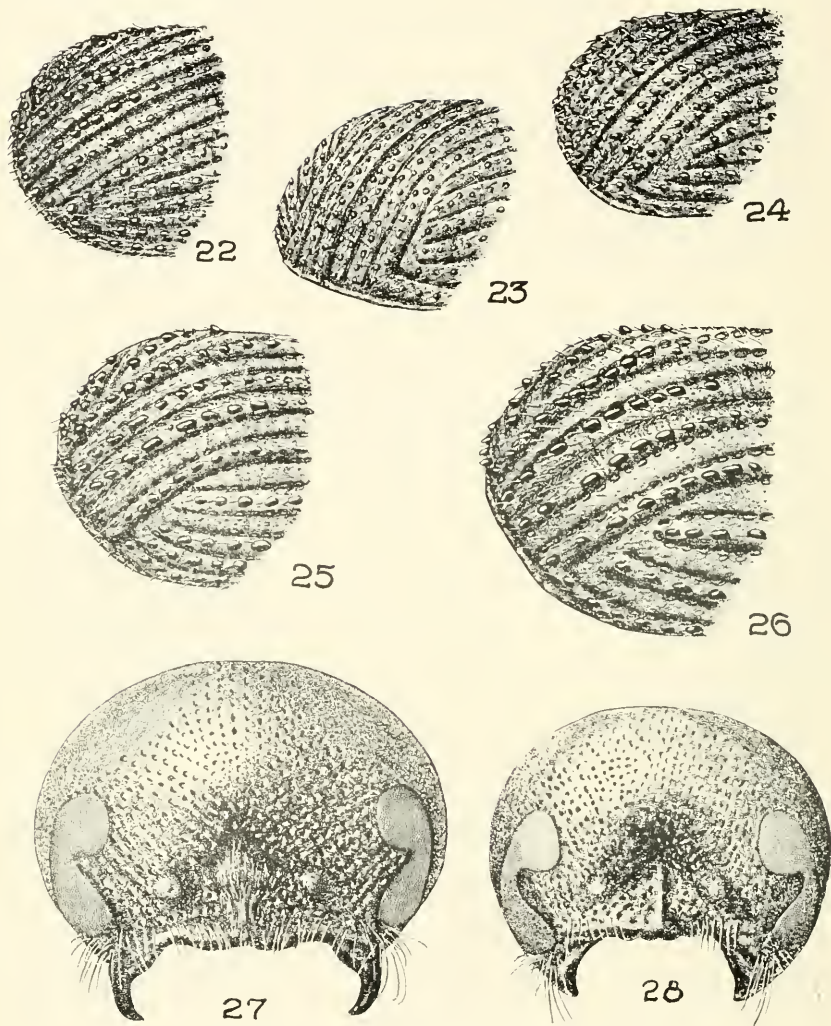
20



21

ELYTRAL DECLIVITY IN PHLOEOSINUS

- 16, *P. cristatus* LeConte, female; 17, *P. cristatus*, male; 18, *P. sequoiae* Hopkins, female; 18a, same, details of first and second interspaces; 19, *P. sequoiae*, male; 19a, same, details of first two interspaces; 20, *P. squamosus*, new species, female; 20a, same, details of first two interspaces; 21, *P. squamosus*, male, details of first two interspaces.

ELYTRAL DECLIVITY AND FACE VIEWS OF *PHLOEOSINUS*

22, *P. taxodii* Blackman, male; 23, *P. taxodii*, female; 24, *P. dentatus* (Say), male; 25, *P. juniperi* Swaine, male; 26, *P. neomexicanus*, new species, male; 27, face view of *P. furnissi*, new species, female, with mandibles omitted; 28, face view of *P. furnissi* male, with mandibles omitted.