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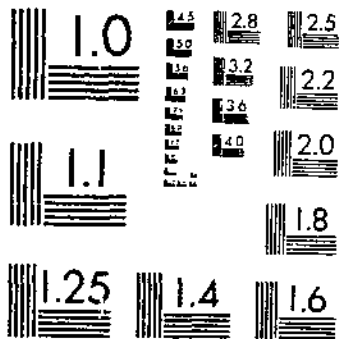
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A REVISION OF THE GENUS PETALIUM LECONTE IN THE UNITED STATES

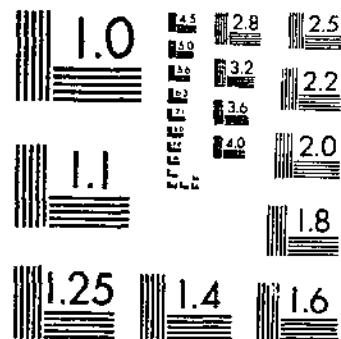
FORD, E. J., JR.

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A Revision of the Genus *Petalium* LeConte  
in the United States, Greater Antilles,  
and the Bahamas  
(Coleoptera: Anobiidae)

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# A Revision of the Genus *Petalium* LeConte in the United States, Greater Antilles, and the Bahamas (Coleoptera: Anobiidae)

By E. J. FORD, JR., collaborator, Systematic Entomology Laboratory,  
Northeastern Region, Agricultural Research Service<sup>1</sup>

While attempting to identify a series of *Petalium* bred from poison-ivy (*Rhus toxicodendron*) in Baltimore, Md., I found that the specimens did not agree with the two species known to occur in the vicinity of Maryland (Leng, 1920).<sup>2</sup> Dissections of male genitalia from other specimens collected in light traps indicated additional *Petalium* species in the same area. These discoveries, the lack of a systematic account of *Petalium* during the 67-year span since the last revision (Fall, 1905), and the scarcity of published biological data or illustrations (only Boving's (1954, pl. 42) larval study and White (1962, pl. 6, fig. 23)) indicated the desirability of preparing this bulletin.

*Petalium* is primarily Neotropic, with 21 species known from Central and South America, four from the Lesser Antilles, and two from Mexico. Also, several species are awaiting description. Outside of the New World, species have been described from tropical Africa, Madagascar, and the Seychelles. Collection records from the United States indicate that speciation of *Petalium* is greatest in the Southwestern States and along the east coast, with the number of species diminishing northward. Only a single specimen has been seen from Canada. It is surprising that only one species (*P. californicum* Fall) is known from California where there must surely be more species. At least four species are known to me from Baja California, namely *P. brunnerum* Horn and three undescribed.

## HISTORICAL REVIEW

The genus *Petalium* was described by LeConte (1861). This description was restated by LeConte (1865) and was based on the first

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<sup>1</sup> Now with Agricultural Quarantine Program, Animal and Plant Health Inspection Service, U.S. Department of Agriculture, Baltimore, Md.

<sup>2</sup> The year in italic after the author's name indicates the reference in Literature Cited, p. 35.

known New World species described by Say (1825) as *Anobium bistratum*. *P. bistratum* (Say) is the type-species of *Petalium* by LeConte's original designation and monotypy. Pic (1903) placed *Rhadinia* Baudi, 1873, in synonymy with *Petalium*, and he (1912) synonymized *Synanobium* Schilsky, 1898, with *Petalium*. The most significant contribution was by Fall (1905), who described four species and three subspecies. A single species was described by Fisher (1936) from Puerto Rico totaling six species and three subspecies in the area covered by this bulletin. Until now the classification of *Petalium* in the United States has remained as it was presented by Fall (1905).

## HOSTS

Populations of the various species are apparently limited by availability of suitable host material. Specimens reared from poison-ivy were found in old, dry, pithy stems clinging to the sheltered side of a tree trunk. Examination of numerous stems in the same area that were wet, fungus ridden, or infested with other insects yielded no *Petalium*. Another species reared from bark of a living scrub oak (*Quercus ilicifolia* Wang) was collected from the outer layers of dry, corky material on the protected side of the trunk. It is thus evident that the dry, pithy condition of woody tissues is important in serving the food requirements of *Petalium*. The only authentic host records now known for *Petalium*, i.e., reared specimens, follow.

*incisum*, new species:

*Celastrus scandens* L., A. B. Champlain, October 2, 1914, Pennsylvania.

Locust, F. H. Chittenden, date ?, District of Columbia.

*Rhus toxicodendron* L., E. J. Ford, Jr., June 6, 1966, Maryland.

*Robinia pseudoacacia* L., W. F. Fiske, July 30, 1906, North Carolina.

*seriatum* Fall:

Dead walnut, F. H. Chittenden, June 17, year ?, Virginia.

*Juglans nigra* L., Wm. Haliburton and J. A. Beal, March 15, 1943, North Carolina.

*Juglans* sp., F. C. Craighead and H. B. Kirk, April 21, 1917, Virginia.

*Pinus* sp., F. C. Craighead, June 15, 1914, Virginia.

*alaseriatum*, new species:

*Forestiera acuminata* (Michx.) Poir., J. D. Mitchell, April 18, 1907, Texas.

*bistratum* (Say):

*Quercus ilicifolia* Wang., E. J. Ford, Jr., July 2, 1966, New Jersey.



*Quercus velutina* Lam., F. C. Craighead and H. B. Kirk, April 21, 1914, Virginia.

In addition to these hosts it is possible that the host of *P. californicum* is *Juglans regia* L. since several specimens were taken "on" or "beaten from" that tree. The host of *P. yuccae* Fall may be *Yucca* spp. although there are no records of *yuccae* being bred from yucca plants.

### SPECIES VARIATION

Exact body proportions are too critical to be useful in determining the species of *Petalium*, because all species are rather elongate, ranging from 1.5 to 4 mm. in length, they vary in size, and males are generally smaller than females. In addition to the size factor, difficulty in identifying species of *Petalium* in the past was partly because Fall's type series of *seriatum* Fall was a mixture of *seriatum*, *whitei*, new species, and *incisum*, new species. His description of three varieties of *bistriatum* (Say), i.e., *debile*, *bicolor*, and *arizonense*, further established that species of *Petalium* were very variable morphologically as well as in size. Subsequent workers therefore identified numerous specimens as *seriatum*, *bistriatum*, or a variety. Considering that Fall probably had less than 100 specimens to study and that *Petalium* must have been a rather obscure genus in 1905, his systematic treatment must be regarded as a valuable basic contribution. Some variation does occur among individual species of *Petalium* but not to the extent proposed by Fall.

Large series of a species bred from the same host plant show very little variation, or large series of a species collected at light on the same night display hardly any differences. However, series of one species collected from widely separate localities, different altitudes, and at different times may show subtle changes in pronotal form, color, size, sculpture, or vestiture. For example, specimens of *seriatum*, *bistriatum*, and *whitei* are usually darker and smaller in the south than those collected farther north.

### CHECKLIST OF SPECIES

The following species are arranged in groups reflecting similarities; the sequence is not necessarily phylogenetic.

#### *incisum* group:

1. *incisum*, new species..... Eastern United States south of latitude 45° N. and east of longitude 100° W.

*demicarinatum* group:

- |  |                            |
|--|----------------------------|
| 2. <i>demicarinatum</i> , new species -----  | Texas.                     |
| 3. <i>mediocarinatum</i> , new species ----- | Booby Cay, Bahama Islands. |

*schwarzi* group:

- |                                      |   |
|--------------------------------------|---|
| 4. <i>incarinatum</i> , new species_ | Higley, Ariz.                                   |
| 5. <i>schwarzi</i> Fall-----         | Texas.  |
| 6. <i>yuccae</i> Fall-----           | Southern Florida, Bahama Islands.               |
| 7. <i>wernerii</i> , new species_    | Arizona.  |
| 8. <i>brevisetum</i> , new species_  | Eastern United States from Maryland to Florida. |
| 9. <i>globulum</i> , new species_    | Texas.  |

*debilitatum* group:

- |  |                    |
|--|--------------------|
| 10. <i>debilitatum</i> , new species_        | Arizona mountains. |
| 11. <i>uniperforatum</i> , new species ----- | Southern Florida.  |
| 12. <i>puertoricense</i> Fisher_             | Puerto Rico.       |
| 13. <i>bahamense</i> , new species_          | Bahama Islands.    |

*seriatum* group:

- |                                       |  |
|---------------------------------------|--|
| 14. <i>seriatum</i> Fall-----         | Eastern North America from Canada to Florida.        |
| 15. <i>californicum</i> Fall-----     | California.  |
| 16. <i>knilli</i> , new species_      | Texas, Arizona, Mexico.                              |
| 17. <i>alaseriatum</i> , new species_ | Eastern United States from Massachusetts to Florida. |
| 18. <i>alternatum</i> , new species_  | Mississippi, Texas, Indiana.                         |

*arizonense* group:

- |  |                             |
|--|-----------------------------|
| 19. <i>arizonense</i> Fall, new status ----- | Texas, Arizona.             |
| 20. <i>bistriatum</i> (Say)-----             | Eastern United States.      |
| 21. <i>evolutum</i> , new species_           | Arizona, Texas.             |
| 22. <i>grossum</i> , new species_            | Arizona.                    |
| 23. <i>longulum</i> , new species_           | Texas, Arizona, Colorado.   |
| 24. <i>whitei</i> , new species_             | Eastern United States.      |
| 25. <i>debile</i> Fall, new status_          | Southeastern United States. |
| 26. <i>bicolor</i> Fall, new status_         | Southern Florida.           |

Genus *PETALIUM* LeConte

*Petalium* LeConte, 1861: 204; 1865: 224.

*Rhadine* Baudi, 1873: 331.

*Synanobium* Schilsky, 1898: 22.

Elongate, black or brown, with yellowish recumbent pubescence; head, antenna, and legs strongly retractile. Antenna 11-segmented with apical three segments forming distinct club longer than segments 2-8 combined. Maxillary and labial palpi yellow, three-segmented, apical segment deeply emarginate distally. Pronotum hoodlike, expanded, with one or two perforations near front angles. Prosternum minute, hidden between front coxae where it is hollowed for reception of antennal funicle. Elytron excavated on side margin below humerus for reception of apices of front and middle femora, and at middle of side margin for reception of hind femoral apex. Mesosternum small, deeply, longitudinally hollowed between mesocoxae for reception of antennal club. Metasternum very prominent, strongly produced in front into petallike lobe that covers mandibles in repose, laterally grooved for reception of mesotarsi.

The generic name *Petalium* refers to the leaf or petallike expansion of the anterior area of the metasternum (figs. 34-35). Members of *Petalium* can be distinguished from all other Anobiidae by the following characters: Bearing a metasternal lobe, not over 4 mm. long, and with one or two perforations set in depressed side of pronotum. The species of *Petalium* are not so readily identified and have many characteristics in common as shown in the following detailed description:

Body brown or black, less than 4 mm., more or less elongate, strongly retractile, pubescent, with yellowish or reddish antennae, palpi, and tarsi. Antenna 11-segmented, clavate, with segments 3, 5, and occasionally 7 inwardly produced or swollen; segments 4, 6, and 8 smaller than all other segments. Head with front evenly convex between eyes, bent downward near clypeal suture, which may be deeply impressed entirely or only at sides. Labrum very small, set with fine silky pubescence. Eyes small to large, frequently emarginate at antennal insertions, usually larger in ♂, surrounded by ocular grooves. Maxillary palpi (fig. 36) and labial palpi three-segmented, deeply emarginate apically (not "fusiforme and acute" as stated by LeConte (1865), who apparently described it from lateral view). Labial palpus one-third smaller than maxillary palpus. Galea prominent, nearly as large as apical segment of maxillary palpus, distally rounded and tufted with sensory setae. Lacinia with tufted apex one-half as large as apex of

galea. Mandibles bidentate with outer tooth larger than inner tooth, outer face set with six to eight long, curvate hairs about as long as outer tooth. Mentum subquadrate, small, little rounded in front. Submentum large, strongly transverse, twice as long as mentum at middle. Gula triangular, minute. Gular sutures convergent behind, almost confluent at margin of occipital foramen.

Prothorax greatly expanded dorsally and much reduced ventrally. Pronotum usually more or less gibbous on disk, hollowed in front for reception of head, anterior margin produced at sides forming postocular lobes, most species with an anterior recurved carina proximad and parallel with anterior margin extending across middle to postocular lobes each side (absent in *schwarzi* Fall and *incarinatum*, new species). Front angles of pronotum depressed or indented and set with two deep perforations usually connected by a sulcus. Perforations and connecting sulcus partly vestigial in few species. Prosternum small, integument thin, semitransparent, posterior margin set with row of fine setae as long as entire length of prosternum. Mesosternum laterally, obliquely grooved for reception of front legs. Metasternum large, produced in front into petallike lobe under which lie retracted front tarsi, obliquely grooved each side for reception of retracted mesotarsi. Metepisternum with anterior one-fourth smooth, concealed by front and middle legs when retracted, posterior three-fourths exposed, sculptured, one-half as wide as anterior one-fourth, hind margin transversely excavate for reception of hind legs in repose, deeply emarginate at middle of hind margin for reception of intercoxal process of abdominal segment 1. Elytron more than two times longer than broad with two prominent marginal striae (striae 9 and 10).

Abdomen with five visible ventrites, ventrite 1 not as long as 2, 1 obliquely, transversely excavate for reception of hind legs, and medially produced on anterior margin into intercoxal process. Intercoxal process sharply, arcuately channeled at sides for reception of hind tarsi. Ventrite 2 longer than any other ventrite, subquadrate, more or less as long as ventrites 3-5 combined. Ventrites 3-5 with front margins slightly curved backward at sides. Legs with all coxae widely separated. Procoxae more or less cone shaped, perpendicular. Trochanters little longer than wide. Femora externally carinate, internally sulcate for reception of tibiae, widest near middle. Tibiae externally carinate, slightly longer than femora. Tarsi small, pubescent, five-segmented, basal segment little longer than segments 2-4, apical segment longer and wider than segments 1-4 and set with two small, simple, widely spaced claws.

♂ genitalia trilobed, symmetrical, lateral lobes chitinous, rigid, inwardly produced, deeply emarginate, appearing as two lobes each side.

Lateral lobe on outer side with large, palplike structure with membranous cuticle set with eight to nine long setae. Palplike structure exceeding length of true lateral lobes, apically rounded or acuminate. Median lobe two to three times wider than palplike structure, sides parallel, sinuate, or converging apically, membranous apical area divergent and with pattern of sensory papillae, middle of ventral side with heavily sclerotized hooklike process variously formed according to species.

The perforations of the side of the pronotum of *Petalium* are unique; I know of no other beetles with this peculiarity. One hypothesis is that the perforations are an adaptation in which the cuticle has inverted to provide more efficient muscle attachments involved with movement of the head.

### Key to *PETALIUM* Species

1. Pronotum with anterior recurved carina strongly incised at middle  
     1. *P. incisum*, new species  
     Pronotum with anterior recurved carina not incised at middle, but may be weakly emarginate..... 2
2. Pronotum with anterior recurved carina strongly produced only on middle one-third or one-half..... 3  
     Pronotum with anterior recurved carina strongly or weakly produced from side to side or absent..... 4
3. Anterior recurved carina of pronotum produced on middle one-half; elytra without evident discal striae, or striae punctures at obscured by dense uniform tomentum..... 2. *P. demicarinatum*, new species  
     Anterior recurved carina of pronotum produced only on middle one-third; elytra with distinct striae punctures longitudinally separated by three to four times diameter of a puncture, not obscured by dense tomentum..... 3. *P. mediocarinatum*, new species
4. Mostly shining, less elongate species set with sparse, minute setae; anterior recurved carina of pronotum weakly produced or absent; elytral disk with striae and striae punctures confused, subobsolete, or absent..... 5  
     Mostly dull, more elongate species with denser, longer setae; anterior recurved carina of pronotum always present; elytral disk usually with prominent striae punctures at least on anterior one-third..... 9
5. Anterior recurved carina of pronotum absent; reddish-brown species..... 6  
     Anterior recurved carina of pronotum present; piceous species..... 7
6. Anterior angles of pronotum with two large perforations connected by a shallow sulcus..... 4. *P. incarinatum*, new species  
     Anterior angles of pronotum with one small perforation near middle of side margin..... 5. *P. schwarzi* Fall
7. Dull black; dorsum with large punctures; pronotum strongly transverse and explanate at sides..... 6. *P. yuccae* Fall  
     Shining piceous; dorsum with smaller, shallower punctures; pronotum about as long as wide..... 8
8. Pronotum with coarse rugosity in contrast with much smoother elytra; anterior recurved carina of pronotum prominent and feebly emarginate at middle..... 7. *P. werneri*, new species  
     Pronotum with rugosity not deeply impressed, similar to that of elytra; anterior recurved carina of pronotum weakly raised and without medial emargination..... 8. *P. brevisetum*, new species
9. Anterior angles of pronotum with one small perforation near middle of side margin..... 10  
     Anterior angles of pronotum with two distinct perforations usually connected by a sulcus..... 11

10. Eyes very small in both sexes, separated by a distance at least equal to two times their vertical diameter; pronotal perforation contiguous with side margin..... 10. *P. debilitatum*, new species  
 Eyes large in both sexes, separated by distance less than vertical diameter of an eye; perforation dorsad of middle of side margin..... 11. *P. uniperforatum*, new species
11. Pronotal disk swollen, subglobose, shallowly sculptured, shining; elytral stria punctures vague; eyes small in both sexes, separated by distance more than two times vertical diameter of an eye..... 9. *P. globulum*, new species  
 Pronotal disk not globose, weakly or strongly gibbous, when gibbous, flanked by oblique posterolateral depressions; eyes never separated by a distance more than  $1\frac{1}{2}$  times vertical diameter of an eye..... 12
12. Strial punctures of elytra large, deep from base to apex, longitudinally separated on anterior one-third by distance less than or equal to diameter of a puncture..... 13  
 Strial punctures of elytra prominent on anterior one-third or one-half, longitudinally separated by distance equal to or greater than diameter of a puncture..... 17
13. Perforations of anterior angles of pronotum connected by shallow sulcus, or sulcus lacking; reddish brown; pronotal disk with prominent medial hump..... 14. *P. seriatum* Fall  
 Perforations of anterior angles of pronotum connected by deep sulcus; dark brown or piceous; medial hump on pronotal disk variable..... 14
14. Elytral intervals alternately broad and narrow in width..... 18. *P. alternatum*, new species  
 Elytral intervals subequal in width..... 15
15. Anterior half of elytral disk with stria punctures one-third as wide as intervals; dark brown..... 15. *P. californicum* Fall  
 Anterior half of elytral disk with stria punctures subquadrate and more or less equal to width of intervals; dull, piceous..... 16
16. Scutellar stria punctures obscure; 2 mm..... 16. *P. knulli*, new species  
 Scutellar stria punctures prominent; 3 mm..... 17. *P. alaseriatum*, new species
17. Pronotum reddish or black, coarsely rugose, contrasting with smooth elytra, medial hump moderately or strongly raised; elytra shining, black, with short sparse setae, stria punctures diminishing in size apically and longitudinally separated by distance nearly two times diameter of a puncture..... 20. *P. bistriatum* (Say)  
 Pronotum reddish brown or dark brown, usually not so coarsely rugose, medial hump usually less conspicuous; elytra less shining, setae longer and denser, stria punctures variable..... 18
18. Small species, usually 1.5-2 mm..... 19  
 Larger species, usually 2-3 mm..... 20
19. Pronotum piceous, moderately gibbous, coarsely rugose, anterior recurved carina prominent at middle, front angles reddish; marginal striae of elytra at middle set with small uniform punctures longitudinally separated by two times diameter of a puncture..... 26. *P. bicolor* Fall, new status  
 Pronotum reddish brown, feebly gibbous, moderately rugose, anterior recurved carina not more prominent at middle than at sides; marginal striae of elytra set with large punctures unequally spaced longitudinally..... 25. *P. debile* Fall, new status
20. Pronotum with broad medial hump flanked by short oblique depressions; dorsal setae long, coarse, curvate; elytra with sutural striae not deeply impressed on declivity and represented only by series of small punctures..... 21  
 Pronotum with narrower medial hump or lacking; dorsal setae variable; sutural striae of elytra on declivity usually deep and set with series of large, deep punctures..... 22
21. Pronotum brown, coarsely reticulate-rugose, side margins extending three-fourths distance to anterior margin; eyes large, moderately convex..... 13. *P. bahamense*, new species  
 Pronotum black, moderately rugose, side margins nearly touching anterior margin; eyes large, bulging..... 12. *P. puertoricense* Fisher

22. Nearly black, densely covered with long, thick, aegrescent hair; elytra with large, deep stria punctures on basal one-third; anterior recurved carina of pronotum flanged at sides; perforations of anterior angles of pronotum large and deep; perforation near middle of side margin two times as large as inner perforation. 22. *P. grossum*, new species  
 Dark brown or castaneous; dorsal setae short, finer; elytral striae with punctures moderately or weakly evident on basal one-third; anterior recurved carina of pronotum not obviously flanged at sides; perforations of anterior angles of pronotum proportionately smaller. 23
23. Dark brown, with pronotum longer than wide; elytra comparatively short and wide, with punctures obscure on apical one-third  
 21. *P. evolutum*, new species  
 Castaneous, with pronotum as long as wide; elytra more elongate, with punctures obscure or not on apical one-third. 24
24. Pronotum with prominent medial hump, anterior recurved carina strongly arched and produced at middle. 19. *P. arizonense* Fall, new status  
 Pronotum with medial hump vague or absent, anterior recurved carina not as strongly arched nor produced more at middle than at sides. 25
25. Very elongate, typically 3 mm., front angles of pronotum with connecting sulcus usually not extending beyond perforations  
 23. *P. longulum*, new species  
 Less elongate, usually less than 3 mm.; front angles of pronotum with connecting sulcus usually extending beyond perforations  
 24. *P. whitei*, new species

## SPECIES DESCRIPTIONS

### I. *Petalium incisum*, new species

Body moderately elongate, subcylindrical, castaneous, covered with sparse, nearly white, yellowish setae. Head rugose-granulate, clypeal suture straight and deeply indented at middle, feebly tuberculate above antennal insertions; eye with vertical diameter one-third again as long as interocular distance. Antenna (fig. 20). Pronotum strongly gibbous, medial hump large, flanked by smaller hump each side posterolaterally; front angles deeply impressed, set with two large perforations connected by short, rather shallow sulcus extending dorsad little beyond inner perforation; anterior recurved carina strongly raised, piceous, shining at middle where it is incised; postocular lobes weakly produced; side margins broadly arcuate, extending about three-fifths distance to anterior margin. Elytron not at all flattened, convex, somewhat raised at suture, stria punctures large, shallow, and longitudinally separated by distance more or less equal to diameter of a puncture on anterior one-third; stria punctures progressively smaller on posterior two-thirds; marginal stria punctures larger than discal stria punctures; sutural stria obvious on declivity, set with seven to eight equally spaced punctures; vestiture moderately long, sparse, evenly distributed hairs. ♂ genitalia (fig. 6). Length 2.4 mm., width 1 mm.

**Holotype.**—♂ (USNM 71256), Leakin Park, Baltimore, Md., 6 June 1966, reared from *Rhus toxicodendron*, E. J. Ford, Jr.<sup>3</sup>

**Allotype.**—Differs in having vertical diameter of eye equal to interocular distance.

**Paratypes.**—Six, same data, and 10, Tryon, N.C., 16 June 1906, reared from *Robinia pseudacacia*, W. F. Fiske (USNM).

**Additional Specimens.**—One hundred thirty-four from the following localities: ALABAMA: Birmingham, 20 June, H. Soltau (USNM); Oak Grove, 17 June, Soltau. DISTRICT OF COLUMBIA: 17 June 1903, Shoemaker Collection; "reared from locust," Chittenden; 4 July 1920, Buchanan (USNM). FLORIDA: Oleno State Park, Lake County, 27 May 1970, Ford (EJF). GEORGIA: Dunwoody, 1955, E. F. Menhinick (REW). INDIANA: Atoka, June 1933, H. F. Wickham (USNM); Tippecanoe County, July 1955–1965, N. M. Downie (NMD). MARYLAND: Anne Arundel County, 16 July 1969, J. and R. E. White (REW); Beltsville, 24 June 1922, Buchanan; Beltsville, 14 June 1914, W. L. McAtee (USNM); Bethesda, 6 June 1965, T. J. Spilman (TJS); Cabin John, 29 July 1914, Barber; 2.2 miles east of Capitol Heights, Prince Georges County, H. L. Dozier (EJF); Friendship Airport, 10–20 June 1967, Ford; Great Falls, 2 July 1919, Barber; Hebbville, Baltimore County, 25 July 1970, Ford; Largo, 25 June 1922, Buchanan; Odenton, 11 June 1922, Buchanan; Plummers Island, 24 June 1922, L. L. Buchanan, and 8 June 1902, H. S. Barber and E. A. Schwarz; Smithsonian Farm, R. E. Alex; Sparrows Point, 3–5 July, 1931–1932, J. W. Green (CAS). MISSISSIPPI: Bay St. Louis, 14 May 1945; Gulf Park College, Harrison County, 26 May 1969, L. H. Williams (LHW); Vicksburg, 1955, D. H. Habeck (REW). MISSOURI: Berkeley, 1 July 1963, Kennen (EJF). NEW JERSEY: Phillipsburg, 1 July 1917, Green (CAS); Ramsey, 5 July 1968, G. G. Kennen (EJF). NEW YORK: New York, C. W. Leng; New York, 1 July 1887, F. H. Chittenden (USNM). OHIO: Cincinnati, 14 June, Soltau; 1962, White (REW). PENNSYLVANIA: Rockville, 10 February 1914, A. B. Champlain (USNM). TENNESSEE: Reelfoot Lake, 2 June 1954, D. J. and J. N. Knull (OSU). TEXAS: Dallas, 7 June 1907, Schwarz and F. C. Pratt; Victoria, 24 September, Barber (USNM). VIRGINIA: Dulles Airport, 15 July 1970, Ford (EJF); Falls Church, 27 July, Buchanan; Hampton, 12 June 1944, N. M. Downie; Mt. Vernon, 27 June 1915, McAtee; Roslyn, 10–12 June, Chittenden (USNM).

**Discussion.**—These data show that *incisum* has been collected from 1887 to 1970. It is remarkable that it has remained in obscurity for

<sup>3</sup> Throughout this bulletin all information pertaining to distribution records is given essentially as it appeared on the insect labels.



83 years in that part of the United States that has been most intensively studied. This is partly explained by the fact that three specimens of *incisum* were included in Fall's type series of *seriatum*. Therefore subsequent workers have also regarded *incisum* as a variation of *seriatum*. *P. incisum* is the only species I know with the following combination of characters: Pronotum with anterior recurved carina strongly raised and obviously incised at middle and the elytra with large, shallow strial punctures longitudinally separated by at least the diameter of a puncture.

## 2. *Petalium demicarinatum*, new species

Dark brown, rather densely covered with recumbent, brassy tomentum. Head coarsely rugose, sparsely covered with short setae; clypeal suture deeply impressed; vertical diameter of eye equal to interocular distance. Pronotum with flattened disk, medial hump vague, hind margin broadly bisinuate; hind angles slightly obtuse, darker than disk; side margins carinate, sinuate, ending four-fifths distance to anterior margin; feebly expanded at sides; postocular lobes small; anterior recurved carina strongly produced medially and about as long as distance between eyes, becoming obsolete at sides; perforation nearest side margin deep and large; inner perforation and connecting sulcus represented by deep depression only. Elytron finely rugose-punctate; strial punctures subobsolete on anterior one-third, absent posteriorly; marginal striae prominent, but shallowly impressed with large punctures; declivity evenly rounded except for series of deep punctures near suture. Length 2 mm., width 0.8 mm.

**Holotype.**—Sex undetermined, Hidalgo County, Tex., 20 March 1952, D. J. and J. N. Knull (OSU).

**Discussion.**—The unique example is described as new because of its unusual form, which makes it easily separable from any other species now known from the United States. The specific name is derived from the form of the anterior recurved carina developed only on the medial half. This character and the nearly smooth pronotal disk, vague elytral strial punctures, and uniform clothing relate *demicarinatum* only to *mediocarinatum* from the Bahamas. The latter species differs as shown in the key and in having the elytral strial punctures present.

## 3. *Petalium medicarinatum*, new species

Dorsum near black, venter reddish brown, moderately clothed with short, appressed hairs. Head reticulate-rugose, set with short, sparse, suberect setae; clypeal suture moderately deep, feebly arcuate; labrum small, set with fine silky pubescence about as long as combined diam-

eters of three eye facets; front with small tubercles above antennal insertions; eyes moderately bulging; vertical diameter of eye equal to interocular distance. Pronotum little transverse, finely rugose; disk feebly gibbous; anterior recurved carina strongly produced medially, arcuate, slightly shorter than interocular distance, absent laterally; front angles deeply indented, set with two perforations connected by short, deep sulcus; side margins nearly straight, extending four-fifths distance to anterior margin; postocular lobes moderately produced. Elytron opaque; discal striae obsolete, represented only by small, deep serial punctures from base to apex longitudinally separated by three to four times diameter of a puncture; punctures of anterior one-third less widely separated than apical ones; marginal striae with punctures two times as large as discal punctures and separated longitudinally by  $1\frac{1}{2}$  times diameter of a puncture. Metasternum with medial groove deep, one-third as long as entire length. Length 1.7 mm., width 0.7 mm.

**Holotype.**—♂, Conception Island, Booby Cay, Bahama Islands, 8 April 1965, B. D. Valentine and R. W. Hamilton (OSU).

**Discussion.**—The unique example is worthy of description as it is distinct from any other found in this study. The specific name is derived from the abbreviate, anterior, recurved carina, which is produced only on the middle one-third. *P. mediocarinatum* is reminiscent only of *demicarinatum*, but differs in the presence of elytral striae punctures, which are lacking in *demicarinatum*.

#### 4. *Petalium incarinatum*, new species

Body castaneous, moderately shining, feebly sculptured, vestiture sparse, rather short hairs. Head shallowly reticulate in front, evenly convex, hardly at all tuberculate above antennal insertions; clypeus on slightly lower plane than front, with suture near obsolete medially, and represented by deep pit each side; labrum minute; vertical diameter of eye two times as long as interocular distance. Antenna with segments 8 and 9 equally produced inward. 8 minute, 9 and 10 triangular. Pronotum evenly rounded, not at all gibbous, with feeble depressions posterolaterally, punctures confused, shallow, unequal; sides with larger shallow punctures reticulately arranged; anterior recurved carina feebly raised at middle; side margins carinate, piceous, glabrous, joining anterior margin at apex of postocular lobes; perforations of anterior angles equal in size, connected by shallow sulcus. Elytron with vague striae punctures on anterior one-third, nearly absent on posterior two-thirds; sutural stria shallowly impressed on declivity and represented only by six large, shallow punctures; marginal striae moderately impressed, set with large, shallow,

unequally spaced punctures mostly at middle. Metasternum subglabrous, anterior lobe strongly transverse. Length 2 mm., width 0.7 mm.

**Holotype.**—(USNM 71258), Higley, Ariz., 18 June 1917, E. G. Holt.

**Discussion.**—The proportionately wider form and the smooth pronotum with the anterior recurved carina nearly lacking place the unique specimen of *incarinatum* in the *schwarzi* group near *weneri*. *P. weneri*, however, is black, and the anterior recurved carina obvious from side to side. Also, the pronotal disk of *weneri* is coarsely sculptured and slightly gibbous in contrast to smooth and not at all gibbous in *incarinatum*.

### 5. *Petalium schwarzi* Fall

*Petalium schwarzi* Fall, 1905: 214; Leng, 1920: 243.

Body castaneous, flattened, shining, dorsum shallowly punctate, set with minute setae. Head shallowly rugose-punctate; clypeal suture incomplete, interrupted at middle, leaving short, transverse sulcus each side. Pronotum without anterior recurved carina, more or less evenly rounded, not at all gibbous; postocular lobes feebly produced; side margin confluent with anterior margin; perforations and connecting sulcus of anterior angles vestigial, represented by single small perforation near middle of side margin; front angles not depressed. Elytron mostly smooth, stria punctures vague, covered with uniform, widely spaced, minute setae; marginal striae evident but shallowly impressed; sutural stria represented by five or six shallow punctures. Abdomen with second segment little longer than combined length segments of 3+4. Length 1.9 mm., width 0.7 mm.

**Lectotype.**—(USNM 9092), Victoria, Tex., 15 July, E. A. Schwarz.

**Discussion.**—*P. schwarzi* is the most atypical of all species of *Petalium* included in this study. The complete absence of an anterior recurved carina on the pronotum, evenly convex pronotal disk, and single small perforations near the middle of the side margins are a combination of characters not found in any other known species. The body form, elytral sculpture, and vestiture are similar in *brevisetum*, but *brevisetum* has an anterior recurved carina slightly produced and the front angles are indented and set with two obvious perforations. Apparently *schwarzi* is quite rare or locally restricted as no additional specimens were found in the numerous examples of *Petalium* examined in this study.

### 6. *Petalium yuccae* Fall

*Petalium yuccae* Fall, 1905: 215; Leng, 1920: 243.

Body dull black, pubescence scanty, pronotum with large, deep punctures strongly contrasting with relatively finer elytral sculpture. Head punctate; vertical diameter of eye about two-thirds as long as

interocular distance. Antenna yellow, segments 3 and 5 inwardly produced. Pronotum strongly transverse, front angles expanded, side margin confluent with anterior margin; perforations near front angles widely spaced, deep, connected by deep sulcus. Elytron with striae punctures and smaller punctures of interspaces each set with minute, recumbent seta. ♂ genitalia (fig. 9). Length 2 mm., width 0.9 mm.

**Lectotype.**—(USNM 9093), Key West, Fla., 2 April 1903, E. A. Schwarz.

**Additional Specimens.**—Sixty-five from the following localities: BAHAMA ISLANDS: Eleuthera, 1933, Wickham Collection (USNM). FLORIDA: Dry Tortugas, 7 June 1913, H. F. Wickham; Dunedin, 9 February 1918, Blatchley (PU); Garden Key, Lodgehead Key, and Dry Tortugas, B. K. Dozier (REW); Jupiter, 24 April (USNM); Key Largo, 9 April 1951, H. F. Howden (HFH); Key West, 19 March 1919, W. S. Blatchley (PU); Lower Metacombie Key, 20 July 1939, on *Tournefortia gnaphalodes* (L.) R. Br., P. W. Oman; Plantation Key, 1 March 1964, R. E. White; Punta Gorda, 12 July (USNM); St. Nicolas.

**Discussion.**—The pronotum of *yuccae* as described here is distinctive for this species. It may be confused only with *weneri* or *brevisetum*, as they too are black with scanty pubescence. The pronotum of the last two species, however, is not transverse, the front angles are less expanded, and the sculpture is rugose-reticulate instead of strongly punctate.

### 7. *Petalium weneri*, new species

Body piceous, subglabrous, reddish ventrally, vestiture short and sparse. Head moderately reticulate-punctate, tubercles above antennal insertions feebly produced, interocular distance equal to vertical diameter of eye; clypeal suture complete, deep, nearly straight. Antenna (fig. 22). Pronotum with disk feebly gibbous, reticulate-rugose, slightly crenate near anterior margin; hind margin broadly bisinuate; side margin slightly curved downward at middle, extending nine-tenths distance to anterior margin; anterior recurved carina moderately raised, extending to feebly produced postocular lobes each side, slightly emarginate at middle; perforation near side margin large, deep, connected to smaller inner perforation by deep sulcus, which surpasses inner perforation. Elytron with few large, shallow, diffuse punctures on anterior one-third; sutural striae represented by eight large punctures on declivity; marginal striae most prominent at middle with irregularly spaced punctures; discal surface somewhat wrinkled, covered with sparse, minute, appressed setae. Metasternum mostly glabrous at middle, strongly depressed behind metatarsal grooves, medial

groove short extending one-fourth distance to front margin. ♂ genitalia (fig. 13). Length 2 mm., width 0.8 mm.

**Holotype.**—♂ (UA). Pena Blanca, Santa Cruz County, Ariz., 10 July 1961, blacklight trap, F. G. Werner and W. H. Nutting.

**Allotype.**—Differs from ♂ in having the interocular space greater than the vertical diameter of an eye.

**Paratypes.**—Five, same data as type (UA).

**Additional Specimens.**—One, Matamoros, MEXICO, May, A. Fenyés collection (CAS).

**Discussion.**—Allied to *brevisetum* and *wernerii*: differs in having a more prominent anterior recurved carina, which is slightly emarginate at the middle, a pronotal disk more gibbous and coarsely sculptured, and other less obvious details. Named after Floyd G. Werner in recognition of his contributions to beetle classification and as one of the collectors of this species.

### 8. *Petalium brevisetum*, new species

Body piceous, shining, feebly sculptured, clothed with minute, sparse setae. Head shallowly reticulate-rugose with obscure, minute setae in front: clypeal suture abbreviate, not reaching antennal insertions: labrum yellow, set with fine silky pubescence as long as diameter of two eye facets combined: vertical diameter of eye as long as interocular distance. Antenna (fig. 33). Pronotum faintly gibbous: shallowly irregularly rugose, clothed with short, sparse tangential setae: side margins little explanate: anterior recurved carina subobsolete, feebly raised, without sharp margin: perforations of depressed front angles closely set, connected by short, deep sulcus. Elytron subglabrous behind, rather undulate on basal one-half, punctures vaguely, serially arranged and each set with minute seta: marginal striae prominent with large, uneven punctures. Legs yellowish red. Venter reddish piceous, without coarse sculpture: metasternal groove wide and short. ♂ genitalia (fig. 17). Length 2 mm., width 0.8 mm.

**Holotype.**—♂ (USNM 71253), Elvaton, Anne Arundel County, Md., 15 July 1968, blacklight trap, E. J. Ford, Jr.

**Allotype.**—Fort Monroe, Va., 17 June, H. G. Hubbard and E. A. Schwarz.

**Paratypes.**—One, Gainesville, Fla., 25 May 1964, R. E. White (REW); one, Tippecanoe County, Ind., 24 July 1959, N. M. Downie (NMD); one, Lake Drummond, Va., 8 June 1905, H. S. Barber (USNM).

**Additional Specimens.**—Three from MISSISSIPPI, Gulf Park College, Harrison County, May 1969, L. H. Williams.

**Discussion.**—A distinct and rather uncommon species, *brevisetum* may be separated from *wernerii*, its nearest relative, as shown in the discussion of *wernerii*.

### 9. *Petalium globulum*, new species

Body castaneous, shining, with shallow sculpture and sparse, short, uniform clothing. Head in front convex, shallowly reticulate-rugose, protuberant above antennal insertions; vertical diameter of an eye one-half as long as interocular distance; eyes small; clypeus strongly depressed below level of front; clypeal suture foveate each side. Antenna (fig. 28). Pronotum with disk subglobose, swollen, feebly rugose; anterior recurved carina sharply raised and shining; side margin with fine edge, explanate, nearly confluent with anterior margin; postocular lobes weakly produced; front angles deeply indented, with two perforations connected by crescent-shaped sulcus extending beyond inner perforation. Elytron with vague strial punctures on anterior one-third near humerus, hind two-thirds simply punctulate, sparsely clothed with near white, recumbent setae directed behind; sutural stria shallow on declivity, set with few deep punctures; marginal striae not deeply impressed, set with uneven, elongate punctures. ♂ genitalia (fig. 3). Length 1.8 mm., width 0.7 mm.

**Holotype.**—♂ (USNM 71257). Devils River, Tex., 2 May 1907, Bishopp and R. Y. Pratt.

**Allotype and Paratypes.**—Five, same data. Eyes of ♀ slightly smaller than ♂ and the abdomen more swollen.

**Discussion.**—In the *schwarzi* group *globulum* is the only species with the pronotal disk shining and subglobose combined with the anterior recurved carina being sharply raised. Especially distinctive of *globulum* are the small eyes in both sexes.

### 10. *Petalium debilitatum*, new species

Body elongate, reddish brown, feebly sculptured, moderately covered with light aenescant hairs. Head in front with shallow reticulations each set with a small seta, tuberculate above antennal insertions; clypeus nearly on same plane as front; clypeal suture in shallow depression; interocular distance  $1\frac{1}{2}$  times vertical diameter of an eye; eyes broadly emarginate at antennal insertions. Antenna (fig. 23). Pronotum almost evenly convex, feebly gibbous, rather shallowly reticulate-rugose, noticeably swollen at hind angles; anterior recurved carina strongly produced, shining; side margins complete, confluent with anterior margin; front angles broadly depressed, with single minute perforation contiguous with side margin. Scutellum rather

large, quadrate. Elytron punctulate on disk; strial punctures on anterior one-third vague, large, shallow; marginal striae weakly impressed, set with unequal, irregularly spaced punctures; sutural stria on declivity shallow, set with four or five small, but deep, punctures; apex not strongly declivous. Metacoxal plates subtriangular, three times longer internally than externally. ♂ genitalia (fig. 4). Length 2 mm., width 0.8 mm.

**Holotype.**—♂ (OSU). Chiricahua Mountains, Ariz., 14 July 1936, J. N. Knull.

**Allotype and Paratypes.**—Nine, same data except dates July, 1952–1959, D. J. and J. N. Knull.

**Additional Specimens.**—Seventeen from the following localities: ARIZONA: Huach Mountains, C. F. A. Schaeffer (USNM); Montezuma Pass, Huachuca Mountains, 6 July 1956, H. and A. Howden (HFH); Oracle, 11 July, H. G. Hubbard and E. A. Schwarz (USNM); Santa Catalina Mountains, 11 September 1961, 4200 ft., F. G. Werner and W. H. Nutting. NEW MEXICO: Mesilla, on alfalfa (USNM).

**Discussion.**—Both sexes of *debilitatum* have very small eyes. This character and the comparatively smooth sculpture of the dorsal surface, complete pronotal side margins, and single small perforation near the middle of the side margin make this species distinct from any others in this study. One other species, *globulum*, also has small eyes in both sexes, but the pronotum is more transverse and both perforations are prominent in the depressed front angles. The general form of *debilitatum* closely resembles *uniperforatum*, but the latter is smaller and the eyes are large in both sexes.

### 11. *Petalium uniperforatum*, new species

Body light brown, moderately covered with uniform, recumbent, yellowish tomentum. Head coarsely reticulate in front, strongly descending toward clypeal suture; clypeus depressed below level of front; eyes large, entire; interocular distance three-fourths as long as vertical diameter of an eye; rather strongly protuberant over antennal insertions. Antenna with segments 3, 5, and 7 internally produced. Pronotum slightly gibbous, reticulate-rugose more at sides than at middle; anterior recurved carina sharply defined and produced at middle, with edge roughened and receding laterally; side margin straight, extending about three-fourths distance to anterior margin; postocular lobes moderately produced; front angles convex, swollen, without perforations; one minute perforation near and slightly behind middle of side margin. Elytron elongate with vague, very shallow strial punctures longitudinally separated on anterior one-third more or less by diameter

of a puncture; sutural stria weakly impressed on declivity; marginal striae obvious, but shallowly impressed, set with uneven punctures unequally spaced longitudinally; notch at middle of side margin weakly indented. Metasternum with broad, deep excavation at middle behind anterior lobe; medial groove wide, deep, extending one-third distance to anterior margin. Metacoxal plates more or less rectangular, as long internally as externally. Length 1.8 mm., width 0.6 mm.

**Holotype.**—♂ (PT), Royal Palm Park, Fla., 16 March 1924, W. S. Blatchley.

**Allotype.**—Same data, differs from ♂ in having eyes slightly smaller.

**Paratypes.**—One, same data, and one, Paradise Key, Fla., 21 February (USNM).

**Discussion.**—*P. uniperforatum* is remarkably distinct in having the front angles of the pronotum swollen instead of indented and the presence of only one minute perforation near the middle of the side margin. The only other species with one perforation that resembles this species is *debilitatum*, but the latter has the front angles depressed, it is larger, and the eyes are comparatively much smaller in both sexes. The specimens of *uniperforatum* were found mixed with others labeled "*seriatum* Fall."

## 12. *Petalium puertoricense* Fisher

*Petalium puertoricensis* Fisher, 1936: 238-242.

*Petalium puertoricense* Fisher, Blackwelder, 1957: 404.

**Holotype.**—(USNM 57594), dead wood, Noyes Finca, Ponce, Puerto Rico, 16 February 1936, R. G. Oakley, San Juan 5499.

**Discussion.**—The type series of this species has been examined and found to be closely allied to *bahamense*. There is some doubt that the two species are distinct without adequate specimens for dissection. *P. puertoricense* differs in having the eyes more bulging and the pronotal side margins extending four-fifths the distance to the anterior margin. In *bahamense* the eyes are less bulging, and the pronotal side margins extend about three-fourths the distance to the anterior margin.

## 13. *Petalium bahamense*, new species

Body small, brown, feebly sculptured, vestiture hirsute. Head with front evenly rounded above antennal insertions; clypeal suture set below level of front, interrupted at middle leaving deep pits each side; vertical diameter of an eye slightly greater than interocular distance; eyes somewhat broadly emarginate. Antenna with segments 9-10 elongate, not strongly triangular (fig. 19). Pronotum with disk feebly



gibbous; anterior recurved carina subobsolete, scarcely visible medially; side margins extending about three-fourths distance to anterior margin; perforations of front angles about equal in size, connected by moderately deep sulcus; disk shallowly reticulate-rugose, moderately covered with long, rather coarse, recumbent hairs mostly directed toward center. Elytron with humerus prominent, strial punctures small and uniformly separated longitudinally by two to three times diameter of a puncture; strial grooves absent on disk; sutural stria feebly impressed on declivity; marginal striae prominent but shallow, set with large, widely spaced punctures diminishing in size apically; clothing similar to that of pronotum, but mostly directed behind. ♂ genitalia (fig. 7). Length 1.9 mm., width 0.7 mm.

**Holotype.**—♂ (USNM 71255), Eleuthera, Bahama Islands, 1933, H. F. Wickham collection.

**Paratypes.**—Three as follows: One, same data as type; one, Bahama Islands, South Victoria, San Salvador Island, 26 January 1956, H. L. Dozier (OSU); one, West Indies, Desecho Island, 18–20 February 1914 (AMNH).

**Discussion.**—The nearest ally to *bahamense*, new species, is discussed under *puertoricense*. None of the species now known in the United States are likely to be confused with *bahamense*.

#### 14. *Petalium seriatum* Fall

*Petalium seriatum* Fall, 1905: 215; Blatchley, 1910: 877; Leng, 1920: 243; White, 1962: 20.

Body castaneous, coarsely sculptured, moderately covered with somewhat thick, short, appressed, aeneous hairs. Head coarsely reticulate-rugose, front moderately raised above and between antennal insertions; clypeal suture sulcate, deep, complete side to side; eyes surrounded by deep groove; vertical diameter of an eye three-fourths as long as interocular distance. Antenna (fig. 21). Pronotum prominently reticulate-rugose, strongly gibbous, medial hump large and flanked each side by oblique depressions; anterior recurved carina strongly raised with minute setae overlapping edge; side margins strongly expanded, arching upward in front, nearly confluent with anterior recurved carina; front angles with outer edge expanded, inwardly depressed, depressions set with two deep perforations connected by shallow groove. Elytron with rather prominent humerus; strial punctures large, deep, close set from base to apex, but diminishing in size behind; discal strial punctures on anterior one-third separated longitudinally by one-half diameter of a puncture; interspaces on anterior one-third at least two times as wide as a puncture; marginal striae more prominent than dis-

cal striae, set with large, close punctures. ♂ genitalia (fig. 8). Length 2.8 mm., width 1.1 mm.

**Lectotype.**—(USNM 9094), Staten Island, N. Y., before 1905, M. L. Linell.

**Additional Specimens.**—One hundred thirty-eight from the following localities: CANADA: Leamington, Ontario, 2 July 1931, W. J. Brown (CNC). DISTRICT OF COLUMBIA: Heideman, H. S. Barber collection; H. G. Hubbard and E. A. Schwarz (USNM). FLORIDA: Bryant collection (CAS); one, no data (UAC); Bellair and Biscayne Bay, Mrs. A. T. Slosson (AMNH); Dunedin, January to March 1916 ?, Blatchley (PU); Dunedin, 4 April 1917, W. S. Blatchley; Enterprise, 1906; Hernando County, 25 February 1930, O. C. Tigner (USNM); Monroe County, 29 April 1953, E. L. Sleeper; Oleno State Park, 27 May 1970, Ford (EJF); Ormond, 11 April 1913, Blatchley; Royal Palm Park (AMNH); St. Lucie; Tampa, 27 March; Torreya State Park, Liberty County, 16 May 1964, White (REW). GEORGIA: One, no data (ANSP). INDIANA: Tippecanoe County, June to July 1959 to 1966, N. M. Downie (NMD). KANSAS: Topeka, Popenoe, and Atchison, Soltan (USNM). LOUISIANA: Baton Rouge, 26 May, Soltan (USNM). MARYLAND: Baltimore, 2 June, F. E. Blaisdell (CAS); Friendship Airport, 9 July 1967, E. J. Ford (EJF); Jessup, 12 June 1965, R. E. White (REW); Piney Point, Hubbard and Schwarz; Plummers Island, June 1902–1907, Heideman, Schwarz, Barber (USNM). MASSACHUSETTS: Marion, in Wickham collection (USNM); Tyngsboro, C. W. Leng, in Hopping collection (CAS). MISSISSIPPI: Gulf Park College, Harrison County, 26 May 1969, L. H. Williams (LHW). MISSOURI: Big Spring State Park, 18 June 1954, J. W. Green (CAS); Kansas City, 25 May, H. Soltan (USNM). NEBRASKA: Seward County, 2 July 1963, White (REW). NEW JERSEY: One, no data (AMNH); Palisades, Leng, in Hopping collection (CAS). NEW YORK: Brooklyn, 12 July 1903 (USNM); New York, Leng (CAS). NORTH CAROLINA: Black Mountains, June 1914 ? (AMNH); Chittenden (USNM); Durham, 15 March 1943, Wm. Haliburton and J. A. Beal, in Shoemaker collection. OHIO: Franklin and Summit Counties, June to July 1962, White (REW); Green and Delaware Counties, July 1955, D. J. and J. N. Knull (OSU). PENNSYLVANIA: 3 July 1907, H. W. Wenzel (OSU); Easton, 8 July 1917 and 26 June 1910, J. W. Green (CAS). TENNESSEE: Reelfoot Lake, 2 June 1954, D. J. and J. N. Knull (OSU). TEXAS: Brownsville, 19 March 1907, on *Mimosa borealis* Gray, Jones and Pratt (USNM); College Station, 27 May 1906, F. C. Pratt; Dallas, 7 June 1907, Pratt and E. A. Schwarz. VIRGINIA: Falls Church, 15 June 1917, F. C. Craighead; Fred-

ricksburg, 18 June 1892 (USNM); Roslyn, 16 June, F. H. Chittenden.  
 WEST VIRGINIA: Delislow, Tibbs Run, "Hercules club," A. D.  
 Hopkins; W. Sulphur, 15 July 1914, W. Robinson (USNM).

*Discussion.*—When Fall described *seriatum*, he had at least three species in the type series that he regarded as variations of *seriatum*. The description here of *seriatum* is based on a large series from Pennsylvania, including both sexes, which shows no notable variation and all specimens agree with Fall's description and with some specimens from his type series. All specimens from the Fall collection in the U.S. National Museum have been labeled according to the classification here. In addition to the diagnostic characters shown in the key to species, *seriatum* has the seventh antennal segment swollen about three times larger than segment 6 or *S. P. seriatum* is related to *ichitai* and *glaserioides*, but the last two do not have the pronotal side margins curved upward nor a swollen seventh antennal segment.

### 15. *Petalium californicum* Fall

*Petalium californicum* Fall, 1905: 216; Leng, 1920: 243.

Body very elongate, slightly flattened, dark brown, moderately covered with brassy pubescence arranged in rows on elytra. Head reticulate-rugose in front becoming finer orad; eyes moderately large, surrounded by deep grooves, emarginate above antennal insertions; clypeus with long hairs similar to hairs on external face of mandible. Antenna (fig. 31). Pronotum finely rugose dorsally, somewhat granulate laterally; anterior recurved carina prominently raised; side margin arcuate, nearly joining anterior margin; front angles indented, set with two deep perforations connected by short sulcus that continues little beyond inner perforation. Elytron about three times as long as pronotum, widest on posterior one-third, feebly striate, with deep strial punctures diminishing little in size apically; anterior one-third with interspaces two times as wide as diameter of a strial puncture; interspaces minutely rugose, covered with appressed hairs two times as long as setae set in strial punctures; marginal striae but little more prominent than discal striae; humeral and medial emarginations feebly indented for reception of legs. ♂ genitalia (fig. 1). Length 2-2.9 mm., width 0.7-1 mm.

*Lectotype.*—USNM 24890, Los Angeles County, Calif., A. Koebel.

*Additional Specimens.*—Fifty-nine from the following localities: CALIFORNIA: Britlit, Springs, 14 June 1912, A. Fenyes (CAS); Carrville, Trinity County, 1 July 1913, Van Dyke collection; Castle Crag, 5 July 1904, Fenyes collection (CAS); Colusa, Colusa County, 14 June 1966, beating *Juglans regia* L., W. W. Wiard and J. Bandy

(CDAS); Davis Meadow, 8 July 1907, 2800 ft., R. R. Flatt (CAS); Nondhoff, 31 May 1904, mistletoe, A. D. Hopkins (USNM); Oro Grande and Jacumba, 8-16 June 1948-1954, D. J. and J. N. Knull (OSU); Shasta Retreat, Siskiyou County, alt. 2416 ft., July 1905, F. E. Blaisdell.

**Discussion.**—The prominent strial punctures of the elytra, elongate form, and strongly gibbous pronotum place *californicum* in the *seriatum* group. It may be separated from other species of the group by having the strial punctures on the anterior one-third of the elytra one-half as wide as the interspaces and the interspaces rugulose with a dense covering of yellowish appressed hairs. *P. seriatum* has a similar arrangement, but the integument is reddish brown rather than dark brown and the interspaces are not rugulose. Also, the pronotal side margins curve upward in *seriatum*, but in *californicum* the side margins nearly join the anterior margin.

### 16. *Petalium knulli*, new species

Body dull piceous, opaque, coarsely sculptured, covered with aenescant hairs more or less in rows on elytral interspaces. Head coarsely rugose-reticulate, rather strongly protuberant above antennal insertions; mouth parts and clypeus strongly bent downward; clypeal suture straight, moderately deep; vertical diameter of an eye  $1\frac{1}{2}$  times as long as interocular distance; eyes very large, feebly emarginate near antennal insertions, surrounded by deep grooves. Antenna (fig. 24). Pronotum transverse, moderately gibbous, front angles expanded; vestiture and sculpture similar to those of head, but more coarsely so at sides; postocular lobes short, swollen for reception of large eyes; side margin straight, carinate three-fourths distance to anterior margin; anterior recurved carina strongly arched, prominent equally from side to side; front angles deeply indented, set with two deep perforations connected by deep, slightly arcuate sulcus. Elytron with serial punctures diminishing in size posteriorly, most prominent on basal one-third, subobsolete on apical one-third; strial punctures on basal one-third separated longitudinally one-half to one times the diameter of a puncture; interspaces on basal one-third about two times as wide as diameter of a strial puncture, rugulose, and covered with short, thick, appressed hairs; sutural stria on declivity deeply impressed; marginal striae more prominent than discal striae, especially so at middle. ♂ genitalia (fig. 12). Length 2.2 mm., width 0.9 mm.

**Holotype.**—♂ (OSU), Hidalgo County, Tex., 7 April 1950, D. J. and J. N. Knull.

**Allotype and Paratypes.**—Eleven, same data except dates March to

April, 1950 to 1960. ♀ differs from ♂ in having interocular space subequal to vertical diameter of an eye.

**Additional Specimens.**—One hundred forty varying in length from 2 to 2.5 mm. from the following localities: MEXICO: Chipinque Mesa, 5400 ft., near Monterrey, Nueva Leone, 22 July 1963, H. F. Howden; Monterrey, Nueva Leone, 24 July 1960. Howden (CNC). TEXAS: Brownsville, June. H. F. Wickham, in Horn collection (ANSP); Brownsville, 30 April 1904, H. S. Barber (USNM); Brownsville, 25 May 1935, J. N. Knull; Devils River, 3 May 1907, Schwarz (USNM); Hidalgo County, March to April, 1950 to 1963, D. J. and J. N. Knull (OSU); Round Mountain, H. W. Wenzel collection (OSU); San Antonio, 10 May 1907, E. A. Schwarz (USNM); Victoria, 23 March, Schwarz; Wickham collection (USNM).

**Discussion.**—Similar to *alaseriatum* in general form and color, *knulli* may be mistaken for smaller examples of *alaseriatum*. Besides being on the average smaller than *alaseriatum*, *knulli* has the anterior submarginal carina more strongly arched, front angles more expanded, and the side margins nearly straight instead of feebly arcuate. In addition, the ♂ genitalia are grossly different. It is named in honor of Dr. and Mrs. J. N. Knull for their many contributions to entomology and for collecting about one-third of all the specimens used in this study.

### 17. *Petalium alaseriatum*, new species

Body piceous, dull, with prominent, deep sculpture and vestiture of rather coarse, recumbent, aenescant hairs. Head strongly reticulate in front, finer orad; tuberculate above antennal insertions; clypeal suture deep, complete side to side; labrum depressed below level of clypeus; eyes emarginate at antennal insertions; vertical diameter of eye one-third again as long as interocular distance. Antenna (fig. 30). Pronotum with front angles expanded, coarsely rugose, feebly granulate; anterior recurved carina strongly raised and shining, ending at postocular lobes each side; moderately gibbous; side margins extending three-fourths distance to anterior margin; perforations in depressed front angles more or less confluent, appearing as deep, arcuate sulcus. Elytron striate with deep strial punctures from base to apex diminishing in size posteriorly; interspaces feebly costate; discal striae 2-6 on basal one-third with punctures subquadrate, as wide as or wider than interspaces; eighth stria confluent with sutural stria on declivity; marginal striae not more prominent than discal striae on basal two-thirds. Metasternum moderately rugose, deep groove at middle extending nearly one-third distance from base to anterior margin. ♂ genitalia (fig. 5). Length 2.3 mm., width 1 mm.

**Holotype.**—♂ (USNM 71254), Milner, Ga., 9 June 1933, tanglefoot trap, T. L. Bissell.

**Allotype.**—Same data. Differs from ♂ in having interocular distance equal to vertical diameter of an eye, and length 2.9 mm.

**Paratypes.**—Five, same data; four, Barnsville, Ga., 5–26 June 1933, Tanglefoot trap, T. L. Bissell. Length 2.2 to 3 mm.

**Additional Specimens.**—Twenty-five from the following localities: ALABAMA: Huntsville, 17 June, P. N. Musgrave, in Hopping collection (CAS). ARKANSAS: Southwest, C. Palm (AMNH). DELAWARE: Little Creek, 4 June 1969, E. J. Ford, Jr. FLORIDA: Dunedin, 12 April 1917 (AMNH); Gainesville, 23 July 1964, White (REW); Vero Beach, 12 July 1964, White (REW). GEORGIA: Dunwoody, 1955, E. F. Menhinick (REW); 10 miles S. of Savannah, 20 May 1970, E. J. Ford (EJF). KANSAS: Salina, Jones (USNM). MARYLAND: Baltimore, 13–21 June 1909, F. E. Blaisdell (CAS); Friendship Airport, 11–19 July 1970, Ford (EJF); Plum Point, 28 May 1922, L. L. Buchanan (USNM); Sparrows Point, 5–9 July 1931, J. W. Green (CAS). MASSACHUSETTS: Tyngsboro, C. W. Leng (USNM). NORTH CAROLINA: Durham, 15 March 1943, W. Haliburton and J. A. Beal (USNM). SOUTH CAROLINA: Ware Shoals, 2 June 1943, A. Nicolay. TEXAS: Karnac, 17 May 1948, D. J. and J. N. Knull (OSU). VIRGINIA: Fairfax County, 6 April 1968, White (REW); Fredricksburg (USNM).

**Discussion.**—Closely related to *knulli*, but differs as shown in the key and in the discussion of *knulli*. *P. alternatum* is also piceous and dull, but the elytral interspaces are alternately wide and narrow, whereas those of *alaseriatum* are more or less equally spaced.

### 18. *Petalium alternatum*, new species

Body subcylindrical, dark reddish brown, generously covered with golden pubescence alternately arranged in wide and narrow rows on elytra. Head piceous, dull, coarsely rugose, little protuberant above antennal insertions; vertical diameter of eye equal to interocular distance; ocular grooves deep; clypeal suture straight and deep. Antenna segments 3, 5, and 7 strongly produced inward, 5 with fingerlike projection exceeding width of 3 or 7, 7 longer than 3. Pronotum coarsely rugose, moderately gibbous, expanded at front angles; anterior recurved carina strongly, equally raised side to side; side margin feebly arcuate, extending three-fourths distance to anterior margin; postocular lobes swollen, but little produced forward; moderately depressed behind front angles and set with two deep perforations connected by deep sulcus. Elytron strongly convex, rather abruptly declivous apically; stria punctures large, deep, longitudinally separated by distance

less than diameter of a puncture basally, and diminishing in size posteriorly; intervals 1, 3, 5, 7, and 9 wider than even numbered intervals and densely tomentose; marginal striae more prominent than discal striae; suture slightly raised at middle; sutural stria deeply impressed on declivity; declivity perpendicular, not at all explanate at apex. Length 3 mm., width 1 mm.

**Holotype.**—♂ (USNM 71373), Gulf Park College, Harrison County, Miss., 26 May 1969, light trap, L. H. Williams.

**Allotype and Paratypes.**—Eleven, same data (USNM). Varying in size from 2.8 mm. to 3.2 mm. ♀ with eyes somewhat smaller than in ♂.

**Additional Specimens.**—Fifteen from the following localities: INDIANA: Tippecanoe County, June–August, 1955–1970, N. M. Downie (NMD). MISSISSIPPI: Same data as type (EJF). TEXAS: Victoria, 18 April 1911, *Forestiera acuminata*, J. D. Mitchell (USNM).

**Discussion.**—The alternately wide and narrow elytral intervals combined with the unusual form of the antenna are diagnostic for *alternatum*. The only other species approaching this combination of characters is *seriatum*, but in *seriatum* antennal segments 3, 5, and 7 are not as strongly produced inward and the elytral intervals are more or less equal in width.

### 19. *Petalium arizonense* Fall, new status

*Petalium bistriatum arizonense* Fall, 1905: 217; Leng, 1920: 243.

Body uniformly reddish brown, moderately sculptured, sides parallel, covered with sparse, light-yellowish tomentum. Head reticulate-rugose; clypeal suture straight, not deeply indented or impressed; external face of mandible and labrum with fine cinereous pubescence; interocular distance about three-fourths as long as vertical diameter of an eye; ocular grooves moderately deep and narrow. Antenna (fig. 25). Pronotum moderately to strongly gibbous, reticulate-rugose; side margin nearly straight, almost joining anterior margin; anterior recurved carina strongly arched and produced side to side; depressions behind front angles set with two deep perforations connected by deep sulcus extending upward and surpassing inner perforation. Elytron elongate, strongly convex, feebly shining; strial punctures prominent on anterior one-third, longitudinally separated by distance about equal to diameter of a puncture, diminishing in size posteriorly, subobsolete apical one-third; marginal striae more prominent than discal striae. ♂ genitalia (fig. 10). Length 2–2.5 mm.

**Holotype.**—(USNM 21081), Oracle, Ariz., 7 May, H. G. Hubbard and E. A. Schwarz.

**Additional Specimens.**—One hundred forty-three from the following localities: ARIZONA: 15 miles S. of Ajo, 24 August 1949, F. G. Werner and W. H. Nutting; Chiracahua Mountains, July–August, 1936–1961, D. J. and J. N. Knull (OSU); Cochise Stronghold, Dragoon Mountains, 16 July 1958, C. O'Brien; Huachuca Mountains, Ramsey County, 12 July 1956, Werner and G. D. Butler (UA); Palmerlee, 7–27 July, H. A. Wenzel; Peppersauce Cn., Santa Catalina Mountains, 8 July 1961, F. H. Johnson; Portal, 24 June 1956, H. and A. Howden (HFH); Ruby, 7 July 1952, Knull (OSU); Tumacacori Mountains, July–August, 1949–1950, Knull (OSU); Yuma, 17 July 1961, D. Tuttle (UA). TEXAS: Davis Mountains, 6 July, H. A. Wenzel (OSU); Uvalde County, 13 June 1949, Knull.

**Discussion.**—The specimens assigned to *arizonense* show considerable variation in size and other less obvious characters. It is possible that more than one species is involved, or perhaps *arizonense* is simply a variable species because of a wide range of ecological conditions with the area it inhabits. Since all the specimens apparently were collected at light, there are no supporting biological data to suggest further division. The localities listed previously are mostly in west Texas or Arizona and none from New Mexico, which separates them. Further dissections of male genitalia and also host and altitude records would provide excellent material for a more detailed study of the *arizonense* complex.

Specimens of *arizonense* with a strongly gibbous pronotum resemble *seriatum*, but the side margins do not curve upward as in *seriatum*. Those with a slightly gibbous pronotum resemble small specimens of *longulum* or *whitei*, but *longulum* is darker brown and the striae punctures of the elytra are more prominent. *P. whitei* differs from *arizonense* in having the pronotum hardly at all gibbous and the pronotal side margins very remote from joining the anterior margin. Some specimens of *arizonense* also have a slight emargination on the middle of the anterior recurved carina. Male genitalia are distinctive in each of these named species.

## 20. *Petalium bistriatum* (Say)

- Anobium bistriatum* Say, 1825: 235; Say's Ent. 1859: 281 (in LeConte (1861)).  
*Petalium bistriatum* LeConte, 1865: 222.  
*Petalium bistriatum* (Say), Fall, 1905: 216; Blatchley, 1910: 878.  
*Petalium bistriatum bistriatum* (Say), White, 1962: 21.

Body elongate, piceous, shining; pronotum red, reddish black, or black; legs, palpi, antenna yellow or reddish yellow. Head feebly convex in front, moderately reticulate-rugose, protuberant above antennal insertions; feebly declivous orad; clypeal suture straight and deep



side to side: clypeus on same plane as front: eyes rather small, weakly convex, surrounded by deep groove, emarginate near antennal insertions. Antenna (fig. 27). Pronotum moderately to strongly gibbous, sculpture as on front of head: anterior margin broadly arched: anterior recurved carina prominently, evenly raised side to side: side margin feebly S-shaped, extending three-fourths distance to anterior margin: front angles deeply indented, set with two deep perforations connected by deep, crescent-shaped sulcus. Elytron black, subglabrous, with short, sparse, yellowish, recumbent setae: stria punctures prominent on basal one-third, diminishing in size apically, subobsolete on posterior one-half: discal stria punctures rather small, longitudinally separated by distance greater than diameter of a stria puncture: marginal striae shallow apically, set with irregular punctures: discal stria nearest marginal striae rather prominent at middle: declivity somewhat raised on suture, sutural stria punctures prominent. ♂ genitalia (fig. 14). Length 1.5 mm. to 3 mm.

*Neotype*.—(USNM 71375). Anne Arundel County, Md., 16 July 1968. R. E. and Jan White.

*Additional Specimens*.—Two hundred fifty-four from the following localities: ALABAMA: Birmingham, Soltau; Thomasville, W. D. Pierce (USNM). ARKANSAS: Highlands, H. Soltau; Hope, L. Knobel, Hopping collection (CAS); Hot Springs, J. N. Knoll (OSU); S. W., C. Palm (AMNH). CONNECTICUT: New Haven, Parsons, MacKenzie collection (UCR). DISTRICT OF COLUMBIA: Horn collection (ANSP); C. V. Riley collection (USNM). FLORIDA: Leng, Hopping collection (CAS); Monticello, W. A. Hoffman; St. Nicolas (USNM). GEORGIA: Experiment, T. L. Bissell (USNM); Rabun County, C. W. Leng, Hopping collection (CAS); in Horn collection (ANSP). INDIANA: Atoka, Wickham collection (USNM); Knox County, W. S. Blatchley (PU); Parke County, Downie (NMD); Tippecanoe County, N. M. Downie (NMD). KENTUCKY: Fort Knox, A. B. Gurney (USNM). LOUISIANA: Covington, Soltau (USNM). MARYLAND: Baltimore, F. E. Blaisdell, MacKenzie collection (UCR) (CAS); Beltsville, L. L. Buchanan; Bladensburg, Buchanan; College Park, H. L. Dozier; Elvaton, J. Mills (EJF); High Island, H. S. Barber (USNM); Largo, Buchanan; Pasadena, J. Mills; Piney Point, Hubbard and Schwarz; Plummers Island, Buchanan; Sparrows Point, J. W. Green (CAS). MASSACHUSETTS: Tyngsboro, Leng (CAS). MISSISSIPPI: Gulfport, R. E. Blackwelder; Meridian, Soltau; Natchez, E. S. Tucker (USNM). MISSOURI: Webster Groves, Satterthwait. NEW JERSEY: (AMNH): Anglesea, Hubbard and Schwarz; Anglesea and Seven Mile Beach, H. W. Wenzel (OSU); Atison, Green (CAS);

Cedar Grove, Shoemaker collection (USNM); Montclair, A. Nicolay; Ramsey, G. G. Kennen; Wharton Tract, E. J. Ford, Jr. (EJF). NEW YORK: Hastings and New York City, Leng (CAS); Long Island, Schaeffer collection (USNM); New York, M. L. Linell; Rockaway Beach, Long Island, L. B. Woodruff (AMNH); Staten Island, Chittenden (USNM). NORTH CAROLINA: Black Mountains (AMNH); Black Mountains, Green (CAS); Cherokee, Soco Valley; Southern Pines, A. H. Manee, Van Dyke collection (CAS). OHIO: Ashland, Delaware, Fairfield, and Hocking Counties, D. J. and J. N. Knull; Ashland County, R. E. White (REW); Kerrville, F. C. Pratt (USNM). PENNSYLVANIA: Easton, F. S. Carr collection (UAC); Easton, J. W. Green (CAS); Glenolden, G. M. Greene (USNM); Wind Gap, J. W. Green (CAS). SOUTH CAROLINA: Aiken, J. R. Vockeroth (CNC); Hamburg, Schwarz per C. V. Riley; Ware Shoals, A. Nicolay (USNM). TENNESSEE: Johnson City, Bryant (CNC); Knoxville, H. F. Howden; Oak Ridge, AEC Area, Howden (HFH). VIRGINIA: Fredricksburg (USNM); Falls Church, L.L. Buchanan and H. B. Kirk; Great Falls, Haldeman; Mount Vernon, Shoemaker collection; Mountain Vernon, Haldeman, in Barber collection (USNM); Penington Gap, Hubbard and Schwarz (USNM). WEST VIRGINIA: White Sulphur, A. Fenyés collection (CAS).

**Discussion.**—*P. bistratum* may be separated from all other species in the *arizonense* group by the shining black elytra with widely spaced stria punctures, which become subobsolete on the apical half. The pronotum may be red, black, or reddish black, and at least two specimens have been seen that have only the scutellum red. Teneral specimens of *bistratum* may easily be confused with *whitei* or *arizonense*. In *whitei* the vertical diameter of a ♂ eye is as long as the interocular distance instead of shorter as in *bistratum*. Also, *bistratum* has the pronotum moderately to strongly gibbous compared to hardly at all gibbous in *whitei*. *P. arizonense* has a moderately gibbous pronotum, but the anterior margin is more strongly arched than in *bistratum*. The broad median lobe of the male genitalia of *arizonense* too is obviously distinct from that of *bistratum* (figs. 10, 14).

## 21. *Petalium evolutum*, new species

Body dark reddish brown, slightly flattened, feebly sculptured, with vestiture of short, near white setae. Head shallowly reticulate; clypeal suture slightly arcuate, complete, deeply sulcate side to side; clypeus small, strongly transverse, somewhat depressed below level of front; front mildly protuberant above antennal insertions; eyes large, bulging, surrounded by deep grooves; vertical diameter of an eye one-third again longer than interocular distance. Antenna (fig. 32). Prono-

tum shallowly, rather firmly rugose. feebly gibbous: anterior recurved carina moderately produced with sharp, black edge becoming confluent with anterior margin at sides; side margins piceous, joining anterior margin; front angles moderately indented, set with two prominent perforations connected by short, wide, rather shallow sulcus: perforation nearest side margin larger than inner perforation. Elytron with stria punctures separated longitudinally by distance about equal to diameter of a puncture on basal one-half, subobsolete posterior one-half: disk uniformly covered with numerous short setae; marginal striae more deeply impressed at middle than on declivity: punctures of inner marginal stria subquadrate at middle and uniformly separated by distance one-half diameter of a puncture: sutural stria represented on declivity by five deep punctures. ♂ genitalia (fig. 16). Length 2 mm., width 0.7 mm.

**Holotype.**—♂ (USNM 71374). Sabino Canyon, Ariz., 9 August 1953, G. D. Butler.

**Allotype.**—Same data, differs from ♂ in somewhat larger size (2.3 mm.), and vertical diameter of an eye about equal to interocular distance instead of greater.

**Paratypes.**—Three, same data, and one, Sonoran Desert Museum, Pima County, Ariz., 1 August 1962, W. L. Nutting and S. Oman; one, Pena Blanca, Santa Cruz County, Ariz., 10 July 1961, F. G. Werner and W. L. Nutting (UA).

**Additional Specimens.**—Sixty-two from the following localities: ARIZONA: Fish Creek, 19 August 1913, W. D. Pierce; Tucson, 5 August 1935, O. Bryant. TEXAS: Brownsville, Los Borregos, 24 May 1904, H. S. Barber (USNM); Chisos Mountains, 8 July 1955, Knull (OSU); Columbus, 1 June, E. A. Schwarz; Devils River, 4 May 1907, F. C. Pratt; Fort Brown, Brownsville, 22 July, Schaeffer collection (USNM); Starr County, 3 April 1960, D. J. and J. N. Knull; Uvalde County, 13 June 1949, Knull.

**Discussion.**—See comment under *P. grossum*, new species.

## 22. *Petalium grossum*, new species

Body robust, nearly black, flattened, moderately sculptured, covered with long, dense, coarse, brassy pubescence. Head shallowly reticulate-rugose: clypeal suture broad, straight, deep; clypeus small, below level of front; vertical diameter of eye slightly less than interocular distance; eye feebly emarginate near antennal insertion, surrounded by deep groove. Pronotum transverse, broader than base of elytra, rather finely rugose-punctate, with expanded front angles; anterior recurved carina flanged backward at sides, more remote from anterior margin at sides than at middle; side margin nearly straight,

almost touching anterior margin at apex of postocular lobes; front angles moderately indented, set with two perforations connected by short, rather shallow sulcus; perforation near side margin about two times as large as inner perforation. Elytron finely rugose, stria punctures prominent basal one-third, increasingly obscure on apical two-thirds; stria punctures basal one-third longitudinally separated more or less by diameter of a stria puncture; sutural stria on declivity set with seven to eight large, confluent punctures; marginal striae deep at middle with nearly uniform series of deep punctures; interspaces with long, thick, aenescent tomentum directed behind. Length 2.6 mm., width 0.8 mm.

**Holotype.**—Sex undetermined, Patagonia, Ariz., 27 June 1961, P. H. Johnson (UA).

**Discussion.**—The transverse pronotum, thick, dense, tomentum, and other less pronounced features of *grossum* justify the description based on the unique example. The laterally flattened body is reminiscent of *evolutum*, but the latter is smaller and less hairy and the front angles of the pronotum are less expanded.

### 23. *Petalium longulum*, new species

Body very elongate, castaneous, moderately sculptured, covered with short, sparse, fine, recumbent, aenescent hairs. Head moderately tuberculate above antennal insertions; clypeal suture nearly straight and complete side to side; ocular groove shallowly impressed; eyes broadly, shallowly emarginate at antennal insertions; vertical diameter of eye slightly greater than interocular distance. Antenna (fig. 26). Pronotum rather rugose with fine granules, feebly gibbous; anterior recurved carina strongly, evenly produced, with vague medial emargination; side margin straight, extending four-fifths distance to anterior margin; perforation near middle of side margin large, deep, two times as large as inner perforation; sulcus between perforations shallow. Elytron elongate with small, shallow, close set stria punctures from base to apex; each puncture set with short seta smaller than setae of interspaces, creating vague striped appearance; sutural stria with series of large, deep, widely spaced punctures on declivity; marginal striae much larger and deeper than discal striae. ♂ genitalia (fig. 11). Length 2.8 mm., width 1 mm.

**Holotype.**—♂ (OSU), Davis Mountains, Tex., 15 July 1955, D. J. and J. N. Knull.

**Allotype.**—Same data as type. ♀ differs from ♂ in slightly larger size and the vertical diameter of an eye is about equal to interocular distance.

**Paratypes.**—Seven, same data as type except dates June–July, 1946–1957; two—Chiricahua Mountains, Ariz., 14–19 July 1936–1952. Knull.

**Additional Specimens.**—Twenty-eight from the following localities: ARIZONA: Oak Creek Canyon, 7 August 1956. Knull; Patagonia Mountains, August 1950–1952. Knull; Tumacacori Mountains, 7 August 1950. Knull. COLORADO: Montezuma County, 26 July 1938. Knull (OSU). TEXAS: Chisos Mountains, 17 July 1946. Knull; Davis Mountains, June–July, 1949–1955. Knull.

**Discussion.**—*P. longulum* is closely related to *arizonense* and *whitei*. It is separable from *arizonense* by the more elongate form, darker color, larger size, and more broadly arcuate anterior margin of the pronotum. From *whitei*, *longulum* differs in having the front pronotal angles more prominent rather than suppressed as in *whitei*. Doubtful identifications of *longulum*, *whitei*, or *arizonense* should be referred to comparisons of ♂ genitalia which are more precisely diagnostic for each.

#### 24. *Petalium whitei*, new species

Reddish brown, weakly sculptured, sparsely covered with aenescant hairs. Head moderately rugose in front, feebly tuberculate above antennal insertions; clypeal suture deep, arcuate; clypeus set below level of front; labrum small, yellow, half as wide as clypeus; vertical diameter of eye equal to interocular distance. Antenna (fig. 29). Pronotum rather coarsely rugose-reticulate, with granules on anterior one-third; disk feebly gibbous; front angles not at all expanded; anterior recurved carina prominent, slightly emarginate medially; side margin black, extending three-fourths distance to anterior margin; front angles with two perforations connected by deep, crescent-shaped sulcus extending beyond perforations. Elytra with strial punctures from base to apex diminishing in size behind; strial punctures on basal one-third longitudinally separated by one-half to one times diameter of a strial puncture; interspaces  $1\frac{1}{2}$  times as wide as a puncture on basal one-third. ♂ genitalia (fig. 15). Length 2.3 mm., width 0.9 mm.

**Holotype.**—♂ (USNM 71252), Friendship Airport, Anne Arundel County, Md., blacklight trap, E. J. Ford, Jr., 20 July 1967.

**Allotype.**—Same data as type. Differs from ♂ in having vertical diameter of eye slightly less than interocular distance.

**Paratypes.**—Ten, same data as type except dates 7–27 July 1967.

**Additional Specimens.**—Fifty from the following localities: FLORIDA: Dunedin, 1913. W. S. Blatchley (PU); Interlachen, 20 March 1958. H. F. Howden (HFH); Naples, 26 March 1947. J. W. Green (CAS); Punta Gorda, 8 February 1940. E. C. Van Dyke; Tor-

reya State Park, Liberty County, 1962, R. E. White (REW). GEORGIA: Beachton, 13 May 1925, C. O. Handley (USNM); Dunwoody, 1955, E. F. Menhinick (REW); Okefenokee State Park, 24 May 1970, Ford (EJF). INDIANA: Kosciusko, Posey, and Vermillion Counties, 4-7 June 1904, W. S. Blatchley (PU); Tippecanoe County and Columbus, 4-7 May 1970, N. M. Downie (NMD). MARYLAND: Bladensburg, 14 June 1919, L. L. Buchanan; Dorchester County near Lloyds, 10 July 1907, H. S. Barber. MASSACHUSETTS: Hopping collection (no data). MISSISSIPPI: Natchez, 25 May 1909, E. S. Tucker (USNM). NEW YORK: Southold, Long Island, Schaeffer; Wyandanch, Long Island, 21 June 1914, F. M. Schott. NORTH CAROLINA: Black Mountains, 4 July 1940, Green (CAS); Kill Devil Hills, Dare County, 1 June 1938, K. V. Krombein; Raleigh, 16 May 1949, A. E. Thompson (HFH); Tryon, June, W. F. Fiske. OHIO: Scioto County, 10 June 1944, Knull (OSU). PENNSYLVANIA: Cowans Gap, 30 June 1968, Ford (EJF). SOUTH CAROLINA: Aiken, 31 May 1957, H. F. Howden (HFH). TEXAS: Bastrop State Park, 26 March 1950, D. J. and J. N. Knull. VIRGINIA: Fairfax County, 11 June 1944, A. Nicolay; Mount Vernon, Fairfax County, 17 June 1923, Shoemaker collection (USNM); Nelson County, 5 July 1925, W. Robinson; Revells Island, 18 June 1924, C. C. Sperry; Veitch, 21 July 1923, L. L. Buchanan (USNM).

**Discussion.**—In the *arizonense* group, *whitei* may be confused with *longulum* or *arizonense*. To separate *whitei*, see key characters and discussion of *longulum*. In addition to diagnostic characters, it may be helpful when determining the identity of these three species to remember that *whitei* is an eastern United States species, *arizonense* is of general distribution in the Southwestern States, and *longulum* is apparently a mountain inhabitant from west Texas to Arizona.

*P. whitei* is named in honor of R. E. White in recognition of his outstanding contributions to the study of beetles.

### 25. *Petalium debile* Fall, new status

*Petalium bistriatum debile* Fall, 1905: 217.

Body small, reddish brown, weakly sculptured, moderately covered with near white, recumbent setae. Head shallowly reticulate-rugose, feebly protuberant above antennal insertions, clypeus below level of front; vertical diameter of eye in ♂ one-third wider than in ♀, and one-third again longer than interocular distance. Antenna (fig. 18). Pronotum rugose, feebly gibbous, anterior margin broadly arched, front angles weakly expanded; side margin straight, extending four-

fifths distance to anterior margin; front angles with two close set, subequal perforations connected by short, deep sulcus. Elytron weakly shining, vestiture sparse; stria punctures small and shallow on anterior one-third, diminishing in size behind, longitudinally separated more or less by diameter of a puncture; marginal striae with large, uneven punctures at middle; discal stria punctures subobsolete on posterior one-third; sutural stria weakly impressed, represented by six to seven large punctures on declivity. ♂ genitalia (fig. 2). Length 2 mm., width 0.8 mm.

**Holotype.**—(USNM 21083). Goliad, Tex., 19 April, E. A. Schwarz.

**Additional Specimens.**—Forty from the following localities: FLORIDA: Cedar Keys. 8 June, Schwarz; Dunedin, March–April, 1913–1925, W. S. Blatchley (PU); two, no data (UAC). GEORGIA: One, no data, Horn collection (ANSP); Tybee Island, June–July, H. W. Wenzel collection (OSU). NEW JERSEY: 7 mile Beach, 1 July, Wenzel collection (OSU). TEXAS: Brownsville, 19 March 1908, on *Mimosa borealis*, Jones and Pratt (USNM); College Station, 27 May 1907, F. C. Pratt; Dallas, 7 July 1907, Pratt (USNM).

**Discussion.**—Distinctive characteristics are shown in the key to *Petalium* species.

## 26. *Petalium bicolor* Fall, new status

*Petalium bistriatum bicolor* Fall, 1905: 217.

Body small, dull black, venter reddish, pronotum coarsely sculptured, elytra rather smooth with gray-violaceous sheen. Head with clypeus little depressed below level of front, clypeal suture more deeply impressed at sides than at middle, slightly arcuate; vertical diameter of eye in ♂ subequal to interocular distance. Antenna light yellow, pubescent, segment 2 globose and as wide as 1; segments 3 and 5 inwardly produced, 4 and 8 smallest. Pronotum mildly gibbous, reddish piceous, strongly arched in front; postocular lobes feebly produced; side margin extending four-fifths distance to anterior margin; anterior recurved carina dull, moderately produced at middle; front angles deeply indented, set with two perforations subequal in size, connected by deep sulcus. Elytron rugulose, interspaces covered with moderately long, recumbent hairs; striae and stria punctures evident only on basal one-third; sutural stria confluent with discal stria 9 on declivity and represented by short series of deep punctures. Length 1.8 mm., width 0.7 mm.

**Holotype.**—(USNM 21082), Key West, Fla., 2 April 1903, E. A. Schwarz and H. G. Hubbard.

**Additional Specimens.**—FLORIDA: Thirteen, same data as holotype; one, Biscayne, 10 May (USNM).

**Discussion.**—The smallest species of *Petalium* now known in the United States, *bicolor*, is probably restricted to southern Florida and the Keys. All but one of the known specimens were collected on Key West, which is now devoid of natural vegetation.

Specimens of *bicolor* might easily be confused with *bistriatum*, which in Florida is usually all black and smaller than specimens from northern States. *P. bicolor* may be distinguished from *bistriatum* by its dull luster, more strongly arched front margin of the pronotum, and almost complete lack of discal striae punctures on the elytra.



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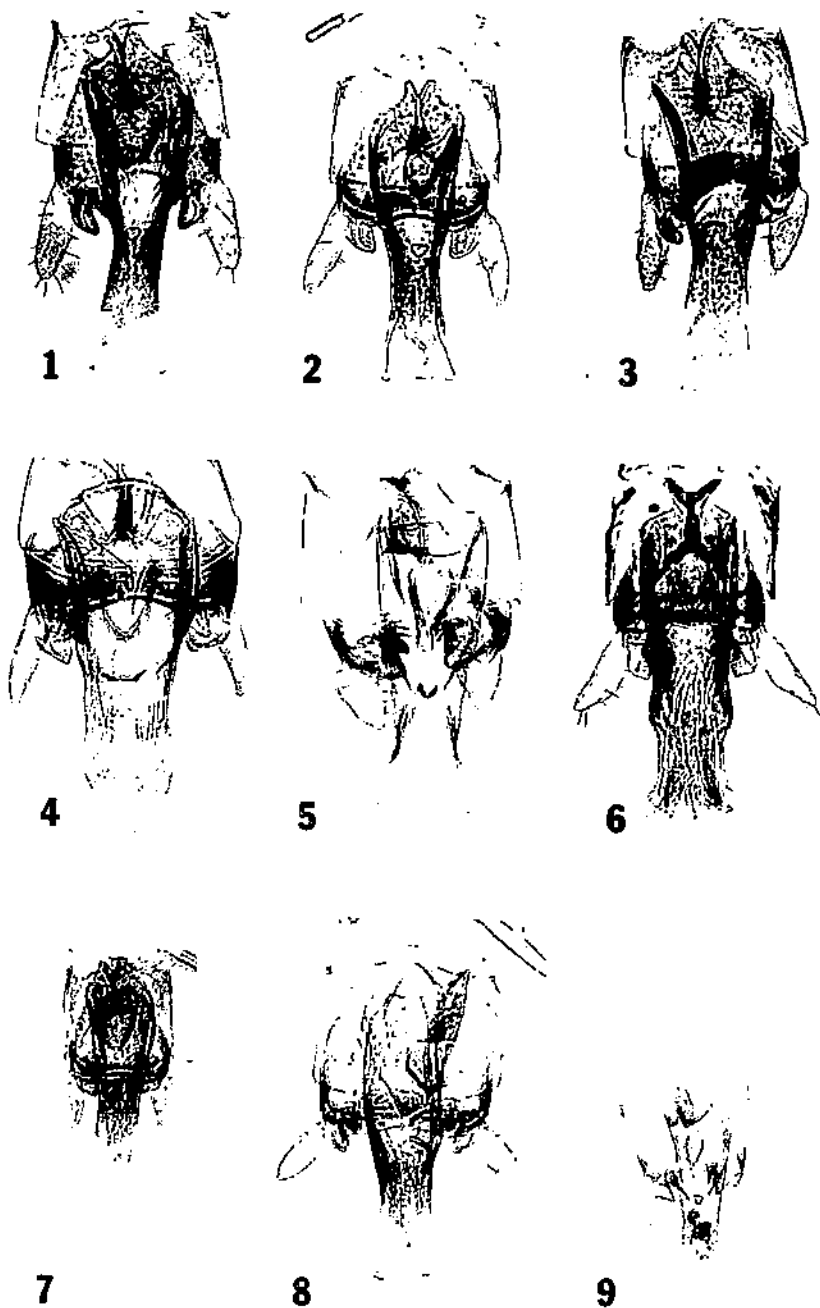
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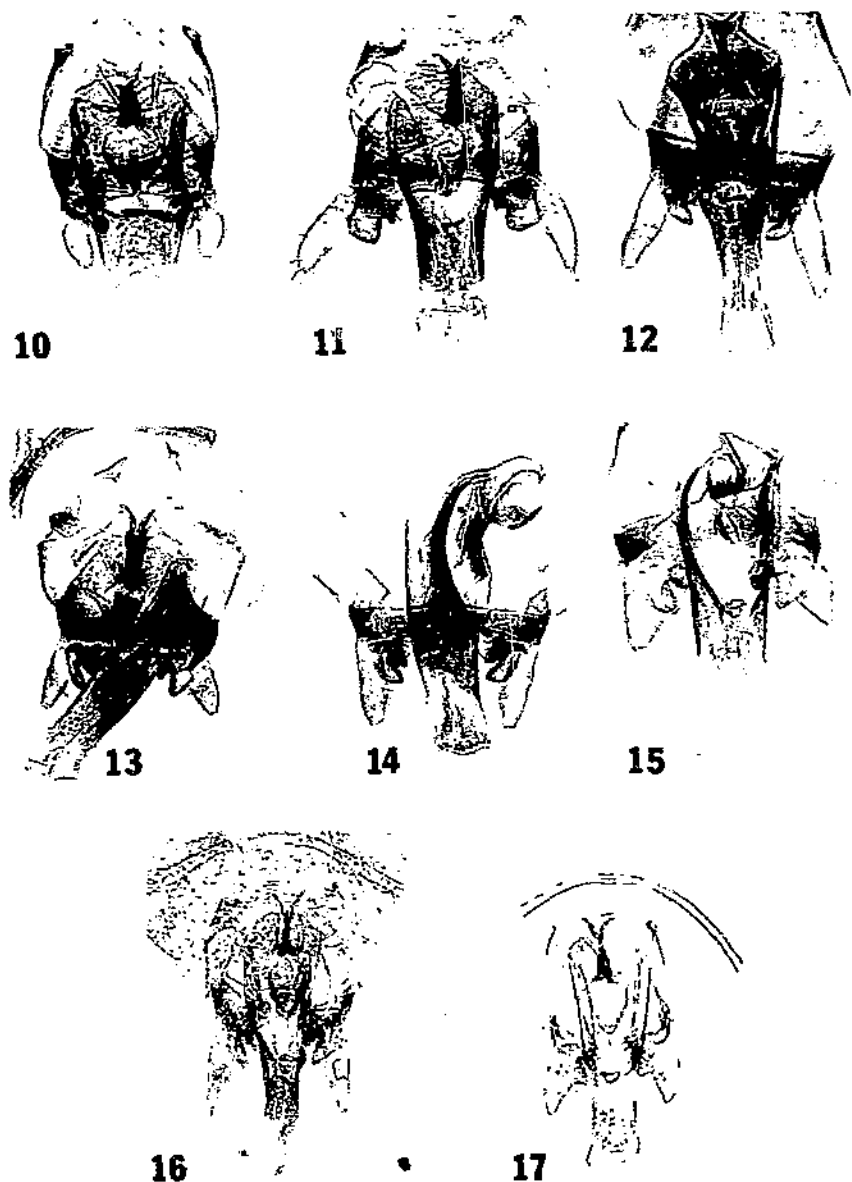
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FIGURES 1-9.—♂ genitalia of *Petalium*: 1, *californicum* Fall; 2, *debile* Fall, new status; 3, *globulum*, new species; 4, *debilitatum*, new species; 5, *alaseriatum*, new species; 6, *incisum*, new species; 7, *bakamense*, new species; 8, *seriatum* Fall; 9, *yuccae* Fall.



FIGURES 10-17.—♂ genitalia of *Petalium*: 10, *arizonense* Fall, new status; 11, *longulum*, new species; 12, *knulli*, new species; 13, *icneri*, new species, median lobe in profile; 14, *bistriatum* (Say), median lobe in profile; 15, *whitei*, new species; 16, *evolutum*, new species; 17, *brevisetum*, new species.



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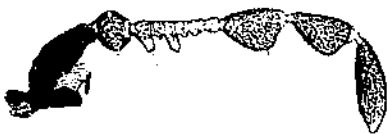
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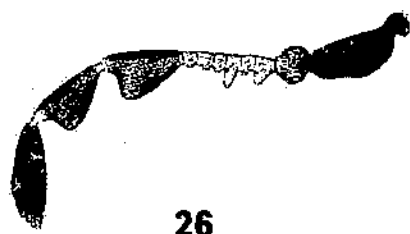


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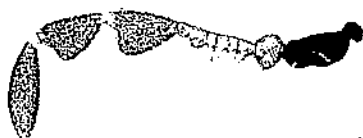


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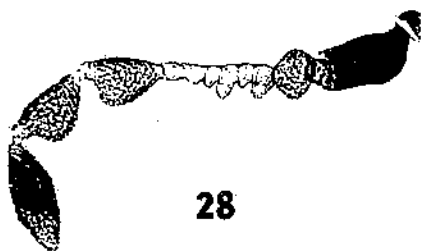
FIGURES 18-25.—♂ antennae of *Petalium*: 18, *debile* Fall, new status, with broken apical segment; 19, *bahamense*, new species; 20, *incisum*, new species; 21, *seriatum* Fall; 22, *werneri*, new species; 23, *debilitatum*, new species, segments 1-8 twisted; 24, *knulli*, new species, segments 1-8 twisted; 25, *arizonense* Fall, new status, segments 1-8 twisted.



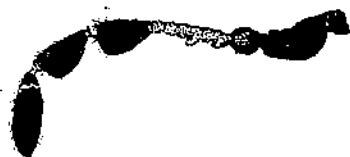
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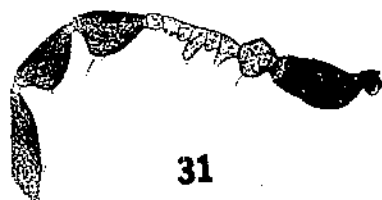
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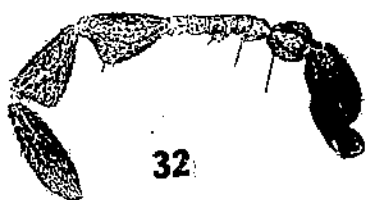
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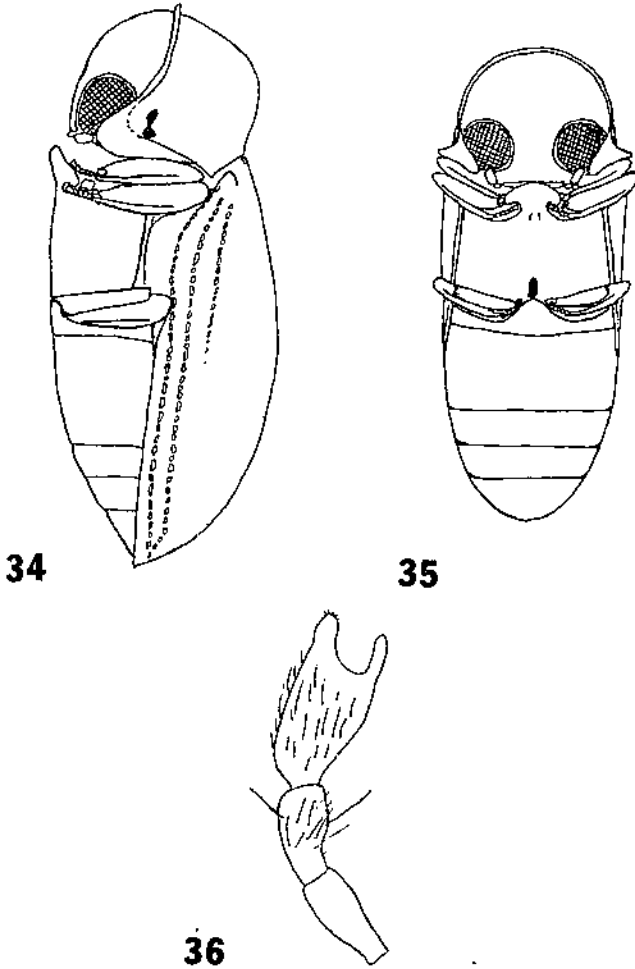


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FIGURES 26-33.—♂ antennae of *Petalium*: 26, *longulum*, new species; 27, *bistriatum* (Say); 28, *globulum*, new species; 29, *whitei*, new species; 30, *alaseriatum*, new species; 31, *californicum* Fall; 32, *evolutum*, new species; 33, *brevisetum*, new species, segments 1-2 missing.



FIGURES 34-36.—Adult *Petalium*: 34, Profile; 35, ventral view; 36, maxillary palpus.

**END**