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A REVISION OF THE GENUS PLEOCOMA

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Continued from Vol. XXXIII, No. 3, p. 130

CHARACTERS, METHODS, AND TERMS

The characters upon which the species of *Pleocoma* are separated are fairly numerous. Among the most important are the number of joints in the antennal club, the hairiness of the pronotum and the scutellum, and the sculpture of various parts of the body. A few species, such as *P. staff* and *P. hoppingi*, have characters that set them apart from the others immediately, but the worker in the group must depend chiefly upon an aggregate of minor characters, rather than upon one or two diagnostic ones. With the exception of the number of joints in the antennal club and the hairiness of the pronotum and scutellum, there are few characters that are not subject to great variation.

The parts of the head used in classification are illustrated in Figure 1, A and B.

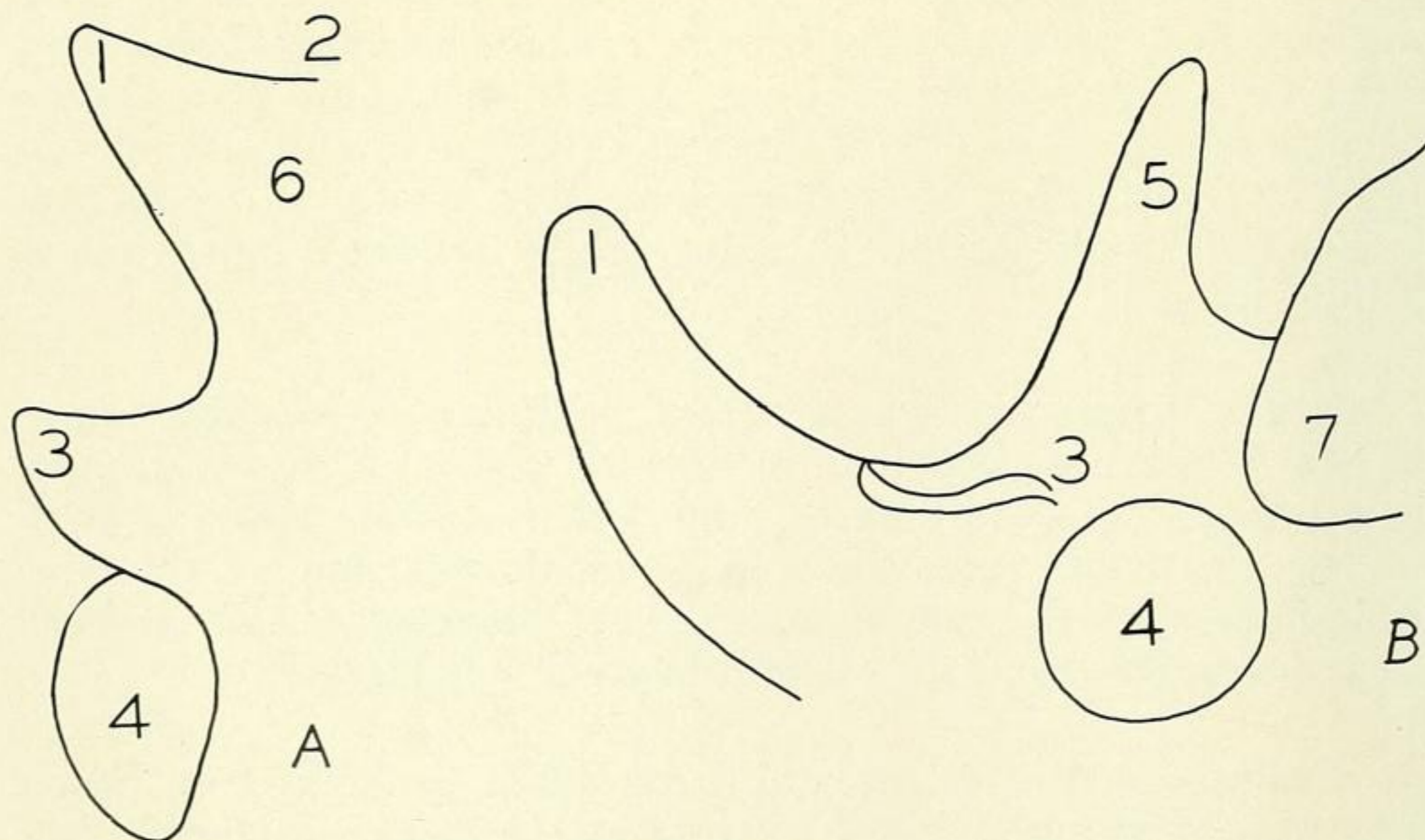


FIGURE 1

Pleocoma badia fall: A—One-half of dorsal view of head. B—Outline of profile of head: 1, apex of clypeus; 2, emargination of clypeus; 3, ocular canthus; 4, eye; 5, horn of vertex; 6, clypeus.

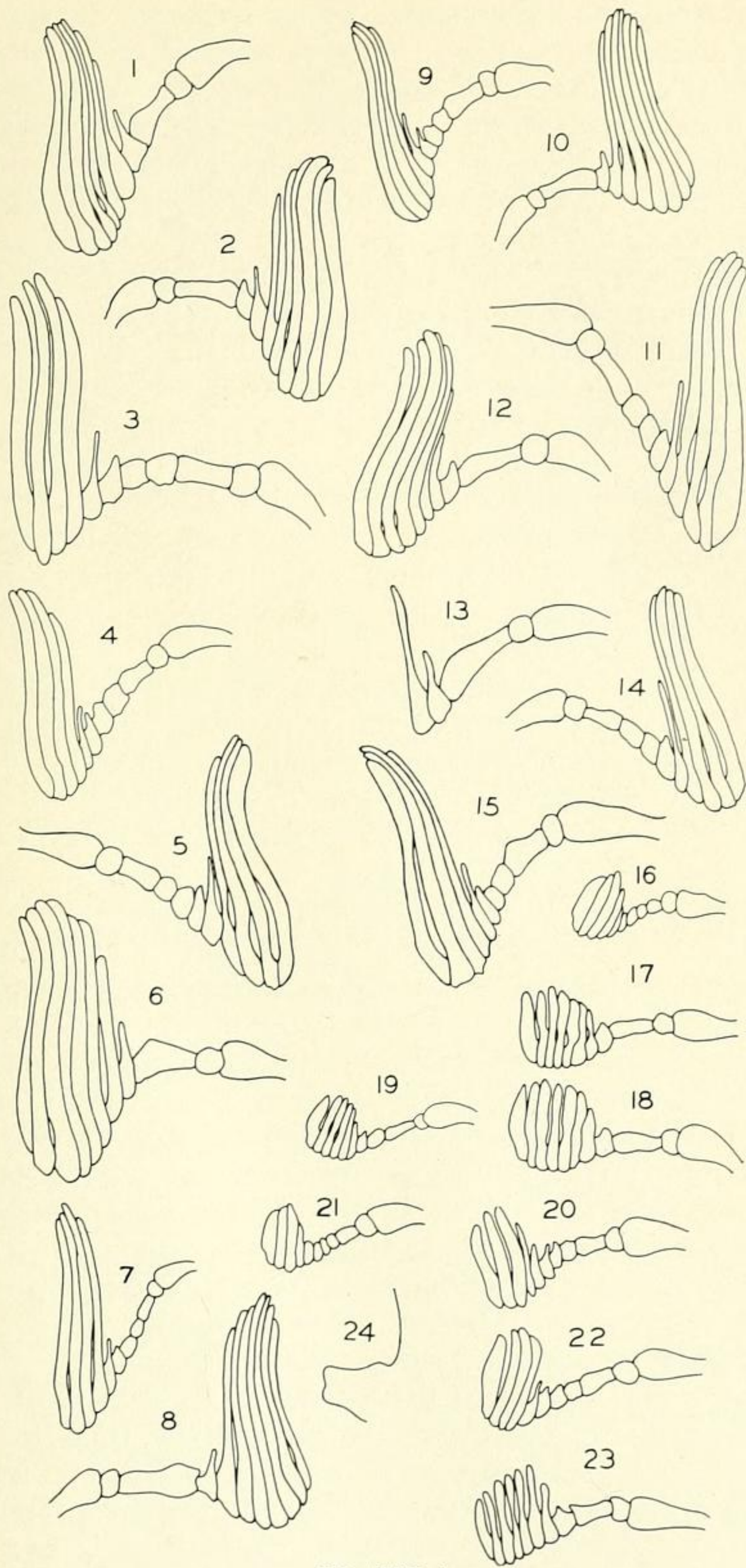


PLATE 1

Pleocoma: Antennae of males—1, *badia* Fall; 2, *staff* Schaufuss var. *dubitabilis* Davis; 3, *puncticollis* Rivers; 4, *australis* Fall; 5, *simi* Davis; 6, *hoppingi* Fall; 7, *rickseckeri* Horn; 8, *ulkei* Horn; 9, *remota* Davis; 10, *conjungens* Horn; 11, *fimbriata* Le Conte; 12, *hirticollis* Schaufuss; 13, *edwardsii* Le Conte; 14, *behrensii* Le Conte; 15, *shastensis* Van Dyke. Antennae of females—16, *rickseckeri* Horn; 17, *badia* Fall; 18, *hoppingi* Fall; 19, *staff* Schaufuss var. *dubitabilis* Davis; 20, *fimbriata* Le Conte; 21, *behrensii* Le Conte; 22, *australis* Fall; 23, *hirticollis* Schaufuss (redrawn from Horn); 24, ocular canthus of *P. hoppingi* Fall, male.

The sketches of the antennae (Pl. 1) are not drawn to scale, but are in correct proportion, most of them having been drawn with the camera lucida. Of necessity they are diagrammatic, as the antennae are so bent and the lamellae so overlap one another that a drawing of them as they actually are would mean very little. For this reason, in the accompanying sketches, the joints are brought as nearly into one plane as possible and drawn from the dorsal aspect, so that comparison may be made. Measurements of the antennae were made, either directly from the specimen with a pair of very fine calipers and a finely divided millimeter scale, or with a micrometer eyepiece in a binocular microscope. Measurements of parts other than the antennae were made directly, with the calipers. The proportions of the pronota and elytra were made with the specimen so tipped that the margins of the parts to be measured were as nearly as possible on a horizontal plane all around. The length of the elytron was measured from the anterior margin at the point where it extends beneath the scutellum to the apex.

In speaking of the antennae the terms "length" and "width" are reversed when referring to the joints forming the club, i. e., joints produced into projections or lamellae the relative lengths of which it is necessary to compare. In these cases "length" means the length of the joint and projection or lamella together, across the long axis of the antennae.

It might be well to state here that in the past some writers, in speaking of the antennal club in this genus, have considered the extent of projection of the lamellae anteriorly as the index of length, overlooking the fact that the joints are not even at their bases. Thus, for example, the ninth joint may project beyond the tenth at the apex, and is noted as "longer than the tenth," whereas actually the base of the tenth joint may project farther posteriorly than that of the ninth, the joint and lamella being distinctly longer than the ninth. In the present paper the measurements of these joints from base to apex are compared.

Total length was measured from the tip of one of the clypeal horns to the apex of the elytron on the same side.

The following key is made as brief as possible consistent with accuracy, and will serve to separate fairly typical male specimens. I have attempted to make it absolute, so that the identification of a single specimen may be made without referring to others. This has not been possible in all cases, especially in *P. behrensii* and *P. fimbriata*, where exact locality is not known. Since separation of a given species from others of the genus sometimes depends, as in those just mentioned, upon a number of minor characters, it was considered advisable, even at the risk of apparent repetition, to give descriptions following the table in detail, with notes upon the variations encountered.

Of the females, some are not known at all; others are represented by two or three specimens only; and there are so few important characters in the female specimens that a workable key could not be produced for them.

KEY TO THE SPECIES OF PLEOCOMA

1. Club of antenna 4-jointed 2
 Club of antenna 7-jointed 13
2. 3rd joint of antenna $\frac{3}{4}$ or less than $\frac{3}{4}$ long as 1st..... 3
 3rd joint of antenna more than $\frac{3}{4}$ as long as 1st;
 scutellum covered with hair *remota* Davis
3. Hairs of underside dark brown or black 4
 Hairs of underside yellow or rufous 6
4. Scutellum not hairy 5
 Scutellum hairy and coarsely punctate; middle and hind
 tarsi distinctly shorter than the tibiae
 *shastensis* Van Dyke
5. Larger (26-31 mm.); length of pronotum at mid-line
 less than $\frac{1}{2}$ the greatest width; hind angles distinct;
 elytral intervals not rugose *puncticollis* Rivers
 Smaller (20-23 mm.); length of pronotum at mid-line
 about $\frac{2}{3}$ the greatest width, hind angles rounded;
 elytral intervals rugose *rickseckeri* Horn
6. 11th joint of antenna subequal to the 10th 7
 11th joint of antenna distinctly shorter than the 10th 8
7. Unicolorous, shining black, less robust *australis* Fall
 Bicolorous, pronotum piceous, elytra reddish brown,
 more robust *bicolor* Linsley*
8. Scutellum hairy; color brown 9
 Scutellum not hairy; color deep brown or black 10
9. Unicolorous; anterior median impression of pronotum
 longitudinal, narrow, deep, and coarsely and closely
 punctate and hairy *simi* Davis
 Bicolorous, the pronotum darker than the elytra; an-
 terior median impression of pronotum shallow, wide,
 involving $\frac{1}{2}$ the width of pronotum *oregonensis* Leach
10. Pronotum finely, rather sparsely punctate 11
 Pronotum more coarsely punctate 12
11. Basal angles of pronotum less prominent .. *fimbriata* LeConte
 Basal angles of pronotum prominent *tularensis* Leach

* *Pleocoma bicolor* Linsley and *P. sonomae* Linsley were described (Pan-Pac. Ent. 11: 11-15, January 1935) after the present paper was in process of publication. The writer has not seen specimens of either species, but has placed them in the key as well as possible by the descriptions.

12. Lamella of 7th antennal joint $\frac{1}{2}$ to $\frac{2}{3}$ as long as that of 8th *behrensi* LeConte
 Seventh joint hardly more than transverse, without lamella *sonomae* Linsley*
13. Pronotum convex in front, or with a slight depression .. 14
 Pronotum retuse in front, i. e., suddenly declivous in front of and broadly impressed behind a transverse elevation 17
14. Pronotum hairy 15
 Pronotum not hairy, or at most with a few hairs near the anterior edge 16
15. Robust, convex; color deep chestnut brown, pronotum gray or black *hirticollis* Schauffus
 Less robust, dorsum flattened, sides more nearly parallel; color light brown *hoppingi* Fall
16. Larger (23.5-28.5 mm.); color brown *badia* Fall
 Smaller (23.5 mm.); color black; anterior median impression of pronotum not or sparsely hairy, punctation light *conjungens* Horn
 Very hairy; anterior median impression of pronotum closely punctate and hairy *hirsutus* n. var.
17. Scutellum not hairy; color brown 15
 Scutellum covered with hair:
 Bicolorous; elytra bright red-brown, pronotum darker *staff* Schaufuss
 Unicolorous; black or very dark brown *dubitabilis* n. var.
18. 4th joint of antenna produced in a process about $\frac{1}{2}$ as long as that of the 5th; basal angles of pronotum broadly rounded *edwardsi* LeConte
 4th joint of antenna merely transverse, not produced; basal angles of pronotum distinct *ulkei* Horn

* *Pleocoma bicolor* Linsley and *P. sonomae* Linsley, *idem*.

Pleocoma remota Davis (2)

Broadly oval, robust, dorsum slightly flattened, fimbriate and clothed beneath with yellow hair. Head very dark brown or blackish, closely punctate above, ocular canthi impunctate; eyes moderately prominent, much flattened, slightly cut into in front by the ocular canthi, and rather deeply behind by lobes of the genae, so that about two-thirds of the total area is ventral, set into the head obliquely with the anterior margins each about 0.3 mm. nearer the mid line than the posterior margins, where they disappear under the pronotum; clypeus small, heavy, reflexed,

sharply obtusely emarginate at apex, the anterior margins sinuate, apices bluntly rounded and nearly truncate, lateral margins rounded; anterior margins of ocular canthi sinuate, inclined posteriorly from a right angle to the mid line, apical angles and posterior margins broadly rounded; horn of vertex fairly long, heavy, rounded at apex, quadrate in cross section, the anterior angles of the horn continued as oblique ridges on the frons, terminating on each side at the junction of the ocular canthus with the clypeus.

Pronotum black, glabrous, less than twice as wide as long, widest at basal two-fifths; anterior angles, sides, and basal angles all included in one sweeping curved margin; disc evenly, moderately coarsely, and rather closely punctate, posterior median impression distinct, anterior median impression broad and deep, giving a retuse appearance to the profile of the pronotum.

Scutellum subtriangular, almost covered with tawny hair.

Elytra chestnut brown, wider at the humeri than the base of the pronotum, conjointly nearly as wide as long, widest at about the apical third; costae hardly elevated, smooth, impunctate; geminate striae distinct but not deep, not attaining the apices of the elytra, delimited by large, shallow punctures; sutural striae moderately deep; elytral intervals coarsely, sparsely punctate and slightly rugose.

Body beneath castaneous, femora darker, and tibiae nearly black.

Length 22.5 mm., maximum width 14 mm.

Antennae (Pl. 1, fig. 9) brown. First joint conical; second subglobular, transverse, four-fifths as wide as first; third subcylindrical, pentagonal as viewed from above, seven-tenths as long as the first joint, widest at apical fifth; joints 2 and 3 together almost or quite equal in length to the first; fourth joint shorter than the third and about equal in width, pentagonal in outline; fifth joint wider than the fourth and about as long, joints 4 and 5 together shorter than the third; sixth joint transverse, angulate, with a short process; seventh joint with a short lamella a little more than one-third as long as the joint and lamella of the eighth; joints 8 to 11 forming the club, the ninth joint longest, the tenth nearly as long, the eleventh shorter than the tenth, and the eighth shorter than the eleventh.

Type locality, Utah.

The female of this species is not known.

The thorax in profile is distinctly retuse, although not so pronouncedly so as in *P. staff* and *P. edwardsii*. The geminate striae do not reach the apex of the elytra, a peculiarity found also in *staff*. The first geminate stria is interrupted behind the mid-

dle by an offset laterally of about its own width, the inner stria resuming on a line with the outer one, and terminating abruptly a short distance posterior to this point.

P. remota differs from *P. behrensii* and *P. fimbriata* in color, in the hairy scutellum (which was probably completely covered with hair when the specimen was first taken), in the different proportions of the antennal joints, the blunt apical horn, and the elytral characters. The species resembles *P. staff* very closely in all except the number of joints in the antennal club, and might easily be mistaken for an off-color specimen of that species. Since the unique type is labeled "Utah" and is from the collection of J. B. Smith, there is little doubt that this is the specimen concerning which the note (25) upon Utah as a new territory for *Pleocoma behrensii* was written.

Pleocoma shastensis Van Dyke (27)

Broadly oval, robust, dorsum flattened, black, fimbriate and clothed beneath with very dark brown hair. Head above rather coarsely and closely punctate; eyes round, very prominent; clypeus reflexed, obtusely emarginate at apex, apices acutely rounded; ocular canthi with anterior margins sinuate, directed slightly forward of a right angle to the midline, apical angle lacking, posterolateral angle broadly rounded, smooth and shining above, with an oblique carina; horn of vertex short, subconical, pointed at apex.

Pronotum distinctly less than twice as wide as long (7 by 11.6 mm.), widest at about the basal third, smoothly and evenly convex in profile, rather sparsely punctate; apical angles rounded, basal angles rounded but distinct; both anterior and posterior median impressions very vague.

Scutellum subtriangular, apex and sides broadly rounded, surface nearly covered with hair.

Elytra conjointly about one-fourth longer than wide, sides nearly parallel from the humeri but widening slightly to the apical third; sutural striae faint in front, rather deep apically; costae not or barely elevated, minutely punctate, rugose; geminate striae moderately well defined basally, disappearing at about the apical third; intervals very sparsely punctate and rugose.

Body beneath and legs clothed with dark brown hair. Legs robust, middle and hind tarsi distinctly shorter than the tibiae.

Length 25 mm., width 13 mm.

Antennae (Pl. 1, fig. 15) brown. First joint subconical; second transverse; third elongate, pentagonal in outline, widest at apical third, less than half as long as first, joints 2 and 3 together slightly over half as long as the first; fourth joint sub-

globular; fifth transverse; sixth transverse with a short projection, joints 4, 5, and 6 together equal in length to the third; seventh joint with a projection almost half as long as that of the eighth. Joints 8 to 11 form the club, the tenth joint longest, the ninth almost as long, the eleventh shorter than the ninth, and the eighth about six-sevenths as long as the eleventh.

The female of this species is unknown.

The type locality of this species is near Pondosa, Siskiyou County, California, where specimens were collected by K. A. Salman on October 22, 1932.

Pleocoma puncticollis Rivers (20)

Shining black, fimbriate with black or rusty-black hair. Head above sparsely punctate; clypeus deeply emarginate, the apices blunt, rounded, or truncate; anterior margins of the ocular canthi nearly straight, almost at right angles to the mid line or slightly inclined forward, apices rounded and moderately sharp, posterior margins rounded; horn of vertex with sides almost parallel and with a very slight emargination at apex.

Pronotum twice as wide as long, basal angles rounded but distinct, disc coarsely and closely punctured, more closely toward the sides, median anterior and basal impressions shallow to moderately deep.

Elytra equal to or slightly narrower at base than the base of the pronotum, from two-twelfths to three-fifths longer than wide; costae barely elevated, smooth, impunctate; geminate striae indicated by rows of shallow punctures at wide intervals; elytral intervals smooth, shining, very finely and sparsely punctate.

Body beneath and legs clothed with black, slate-black, or brownish-black hair.

Length 26-31 mm.

Antennae (Pl. 1, fig. 3) piceous with a tendency for the apices of the joints to be brownish, club rusty gray. First joint conical, elongate; second globular, tending to quadrate in outline, two-thirds as wide as the first; third joint narrower than the second, slightly more than two-thirds as long as the first, constricted at the basal third and widest near the apex, joints 2 and 3 together nearly equal to the first in length; fourth joint quadrate, very slightly if at all wider than the third, and one-half as long; fifth joint subequal in length to the fourth and wider, joints 4 and 5 together almost exactly equal to the third in length, or slightly longer; sixth joint transverse, angulate, pentagonal in outline, nearly as long and twice as wide as the fifth; seventh joint subequal to the sixth in length and about twice as wide, with a short projection. Joints 8 to 11 form the club, the tenth longest,

the ninth slightly shorter, and the eleventh distinctly shorter. The lamella of the ninth joint projects farthest forward, the tenth slightly less.

I have never seen a female of this species, and it may be unknown.

In the key this species falls closest to *P. rickseckeri*. The characters of the shape and relative proportions of the pronotum may not be reliable, and not enough specimens have been available to make an accurate determination of the amount of variation. According to Rivers (20) "*puncticollis* differs from *rickseckeri* by the former being heavily punctured all over the disc of the thorax, while in the latter the same part is sparsely and lightly punctured." Allowing for the difference in size between the two species, the males of *rickseckeri* seem to be about as heavily punctate as those of *puncticollis*. The posterior margin of the pronotum is less divergent from the center in *puncticollis* which, with the sharper basal angles, makes these appear to project beyond the humeri. The elytra of *puncticollis* are smooth and shining, the sutural striae shallow, the geminate striae feebly indicated, and the intervals very finely and sparsely punctate, while the elytra of *rickseckeri* have the sutural striae deeper, the geminate striae more clearly indicated although not deep, and the intervals are distinctly rugose. The tenth joint of the antenna is almost equal to the ninth in *puncticollis*, distinctly shorter in *rickseckeri*. *P. rickseckeri* is found in Sonoma County, Calif. (Sylvania), and has never been taken elsewhere to my knowledge while *puncticollis* is found in the southern part of the state. The locality and size alone almost suffice to distinguish the two species.

I have the following records of capture for this species, all in California:⁴

Type locality "8 miles from Julian, Calif." (San Diego County); Alamo, Lower California (F); Del Mar, San Diego County (F, D); Cuyamaca (CAS); Beverly Hills, Los Angeles County (LAM).

Pleocoma rickseckeri Horn (8 and 9)

Male: Shining black, margins fimbriate with black hair. Head above coarsely and closely punctate; apical emargination of clypeus usually deep and rounded, apices acutely rounded; ocular canthi with anterior margins rounded, the middle in advance of either end, apical angles broadly rounded, posterior margins nearly straight; horn of vertex with sides nearly parallel, obtusely triangularly emarginate at apex.

⁴ The collections from which records were obtained are designated as follows: (F), H. C. Fall; (D), A. C. Davis; (LAM), Los Angeles Museum; (CAS), California Academy of Sciences; (Frost), C. A. Frost; (U. S.), United States National Museum.

Pronotum slightly less than twice as wide as long (Horn says more than twice as wide as long), widest at basal angles, which are distinct in most specimens but very obtuse; disc heavily and closely punctured, the punctation slightly less dense toward the sides; basal median impression lacking or very faint, anterior median impression faint.

Elytra conjointly somewhat less than one-sixth longer than wide, wider at the humeri than the base of the pronotum, widest slightly behind the middle; sutural striae moderately deep; costae slightly elevated, rugose; geminate striae outlined by rows of confluent wrinkles (not punctures); elytral intervals rugose.

Body beneath black, clothed with black hair.

Length 20-23 mm.

Antennae (Pl. 1, fig. 7) piceous to ferruginous. First joint elongate, conical, curved; second subglobular, slightly narrower than the first; third joint cylindrical, slightly curved, three-fifths as long and wide as the first; the second and third joints together somewhat over two-thirds the length of the first; fourth joint two-thirds as long as the third and somewhat wider; fifth joint angulate, equal in length to and somewhat wider than the fourth, joints 4 and 5 together one-fourth longer than the third; sixth joint transverse, angulate, pentagonal in outline. Joints 7 to 11 form the club, the seventh with its lamella about half as long as the eighth, the ninth joint longest.

Female: Castaneous, head and elytra darker than the pronotum. Head above coarsely and closely punctate; clypeus slightly reflexed, anterior margin rounded or squarely truncate, not or very slightly emarginate; ocular canthi about the same as in the male, but with the anterior margin straighter and not advanced so far; horn of vertex short, stout, emarginate at apex.

Pronotum about twice as wide as long, basal angles distinct but rounded; disc coarsely and moderately closely punctate; basal and anterior median impressions shallow.

Elytra with sutural striae moderately deep, shallower than in the male; geminate striae very faint; elytral intervals rather coarsely but very shallowly rugose.

Length, 28-34 mm.

Antennae (Pl. 1, fig. 16) brown. First joint conical and somewhat more than one-half as wide as long; second subglobular, two-thirds as wide as first; third cylindrical, one-fourth as long as the first; joints 4 and 5 subequal in length, wider than the third and together somewhat longer; sixth joint transverse, equal in length to the fifth but wider; seventh shorter and wider than the sixth. Joints 8 to 11 form the club, the ninth distinctly longest, joint 10 shorter, and joint 11 shorter than the tenth. In one specimen seen the ninth and tenth joints were subequal in length.

Pleocoma rickseckeri seems to be peculiar to Sonoma County. The type locality is Sylvania, Calif.

Pleocoma australis Fall (5)

Male: Ovate, less robust than *P. fimbriata*, dorsum flattened, black, shining, fimbriate with reddish-yellow hair. Head above finely and closely punctured; eyes round, prominent; clypeus reflexed, deeply emarginate, the apices sharply rounded, not truncate; ocular canthi with the anterior margins nearly straight, inclined slightly forward, apical angles rounded, posterior margins broadly rounded; horn of vertex with sides converging toward the apex, apex with a small emargination.

Pronotum less than twice as wide as long, basal angles distinct but rounded; disc coarsely and closely punctured, a little more closely so toward the sides; basal and anterior median impressions vaguely indicated, the former nearly or quite impunctate.

Elytra conjointly from one-seventh to one-fifth longer than wide, wider at the humeri than the base of the pronotum, sides nearly parallel; sutural striae well defined; costae very little if at all elevated; elytral intervals finely, sparsely punctate, with a secondary rugose sculpture more or less evident.

Body beneath castaneous, clothed with reddish-yellow hair.

Length 24-28 mm.

Antennae (Pl. 1, fig. 4) dark brown, club gray-brown. First joint conical, elongate; second subglobular, somewhat wider than long, two-thirds as wide as the first; third more than one-half as long as the first, widest at apical third, joints 2 and 3 together five-sixths as long as the first; fourth joint shorter, wider than the third, quadrate; fifth wider than the fourth, joints 4 and 5 together equal to or slightly longer than the third; sixth joint transverse, angulate, wider than the fifth; seventh joint with a short lamella, a little more than one-third as long as the joint and lamella of the eighth. Joints 8 to 11 form the club, the tenth longest, the eleventh very nearly or quite as long, the ninth shorter. Joints 9 to 11 have their apices very nearly even in front.

Female: Robust, ovate, castaneous, head and pronotum darker, fimbriate with yellow hair. Head moderately closely and coarsely punctate; eyes hardly visible from above; clypeus reflexed and broadly, obtusely emarginate, the apices rounded; ocular canthi as in the male, but broader and heavier; horn of vertex heavy, conical, truncate, deeply grooved on the median line before and behind, but not emarginate at apex.

Pronotum slightly less than twice as wide as long, basal angles distinct but rounded; disc with very heavy, coarse, close punctation, the punctures confluent over much of the surface; basal and anterior median impressions vague, and on each side of the midline a small impunctate area.

Elytra thin, semi-transparent, widest at apical third; sutural striae merely rows of punctures; costae not elevated; geminate striae hardly visible; elytral intervals very finely and sparsely punctate.

Body beneath and legs clothed with yellow hair.

Length 40 mm.

Antennae (Pl. 1, fig. 22) brown, the club darker. First joint conical, elongate, one-half as wide as long; second subglobular, one-half as wide as first; third subconical, at base one-half as wide as the second, at apex two-thirds to three-fourths as wide as the second, one-half as long as the first, joints 2 and 3 together two-thirds as long as the first; fourth joint shorter, wider than the third; fifth joint shorter, wider than the second, joints 4 and 5 together equal to the third in length; sixth joint transverse, almost equal to the fifth in length, but one-third wider; seventh joint shorter and wider than the sixth. Joints 8 to 11 form the club, the ninth longest, the tenth almost or quite as long, the eighth and eleventh successively shorter.

This species seems to be related to *rickseckeri*, *puncticollis*, and *fimbriata*, resembling the last-named species most closely. From the first two it may be distinguished at once by its yellow vestiture. From *P. fimbriata* it differs relatively less. The antennae are nearly the same except that in *fimbriata* they are less robust, the joints being more cylindrical and longer in proportion. In *australis* the eleventh joint of the antenna is subequal to the tenth, while in *fimbriata* it is distinctly shorter. In addition, *fimbriata* is more robust, the thorax has usually a brownish tinge, and the punctation of the pronotum is finer and sparser than in *australis*.

The type locality is Bailey Canyon, near Sierra Madre, Calif., and the species is also found in the Santa Anita Canyon, some three miles east.

Pleocoma bicolor Linsley

Distinguished from other species with 4-jointed antennal clubs by the color and the more sparsely and finely punctate pronotum.

Pleocoma simi Davis (2)

Broadly oval, robust, dorsum flattened, fimbriate and clothed beneath with yellow hair. Head dark brown, closely but rather lightly punctate, densely clothed with long yellow hair; clypeus reflexed, not or very slightly emarginate at apex, angles sharply rounded, lateral margins rounded, upper surface densely clothed with yellow hair; anterior margins of ocular canthi at right angles to the midline of the body, anterior and posterior angles lacking, the outer half being very nearly semicircular in outline as viewed

from above, upper surface smooth, impunctate; eyes prominent, round; horn of vertex moderately long, subconical, pointed at apex.

Pronotum chestnut brown, less than twice as wide as long (6.5 by 11.8 mm.), of even maximum width from about the middle to the posterior fifth, anterior and posterior angles broadly rounded; disc finely and sparsely punctate at the median base, coarsely and closely punctate toward the sides, where the punctures tend to confluence; posterior median impression distinct, anterior median impression long, groove-like, involving the anterior three-fifths of the length of the pronotum, fairly wide and deep, coarsely and extremely closely punctured, and with sparse, long yellow hairs. At each side of the disc, equally distant from the midline and the lateral margin and at about the basal third, is a large, shallow circular pit. The pronotum has a retuse appearance in profile.

Scutellum transverse, posterior margin rounded, punctate and clothed with yellow hair, which, with that of the base of the pronotum, nearly conceals the surface.

Elytra chestnut brown, wider at the humeri than the base of the pronotum, one-sixth longer than wide conjointly, widest at apical third; sutural striae moderately deep; costae slightly elevated, smooth, impunctate, not attaining the apices of the elytra; geminate striae faint, consisting of small, shallow, widely spaced punctures; elytral intervals finely and sparsely punctate.

Body beneath and legs castaneous, densely clothed with long yellow hair.

Length 24 mm., maximum width 13.5 mm.

Antennae (Pl. 1, fig. 5) brown. First joint subconical; second transverse; third almost twice as long as wide, subconical, joints 2 and 3 together exactly four-fifths as long as the first in the type; fourth joint transverse; fifth joint of about the same length, but wider, angulate; sixth joint transverse, longer than the fifth, twice as wide as long; seventh joint as long as the sixth, with a short process. Joints 8 to 11 form the club, the ninth and tenth equal and longest, the eleventh shorter, and the ninth shorter than the eleventh.

Type locality, Cleveland, Oregon.

This species may be distinguished from *P. behrensii* and *P. fimbriata* by the color, the hairy scutellum, and by the groove-like, densely punctate and hairy anterior median impression. From *P. oregonensis*, as far as I can tell without actually seeing the type, it differs in being unicolorous, in the characters of the anterior median impression, the very shallowly emarginate clypeus, and the less abrupt declivity of the pronotum.

Two male specimens of *Pleocoma* from Shasta County, Calif., given me some years ago by E. O. Essig of the University of California, probably represent an undescribed species very close

to *simi* and *oregonensis*, being brown, and having the scutella hairy. Unfortunately the antennae of both are lacking and they cannot be described at this time.

Pleocoma oregonensis Leach (10)

The following description is taken from that of Leach:

Form robust, rounded, bicolorous and shining above, clothed underneath with long dense golden brown hair; densely fimbriate on prothorax, lightly on elytra.

Head piceous, coarsely and densely punctured except on ocular canthi which are smooth, shining, wide and broadly rounded at apex; clypeus deeply emarginate, angles acute; horn of vertex moderate in size, round, and acute at apex.

Pronotum dark brown above, widest slightly behind the middle, broadly rounded at sides and basal angles; disc finely and closely punctured, the punctures coarser and confluent at sides and front; posterior median impression narrow, shallow, impunctate, with a smaller depression on each side, laterally; anterior median impression involving one-half of the width of the pronotum, forming a declivity in front.

Scutellum with the surface hidden by dense long golden-brown hair.

Elytra light red brown; at humeri very slightly wider than the base of the pronotum, widest at middle; sutural striae deeply impressed their entire length, the costae not widened at apex; geminate striae distinct but not deep, not attaining the apex of the elytra.

Legs stout, posterior tarsi much shorter than the tibiae (4.8 mm. to 6:2 mm.).

Length 23 mm., width 13 mm.

Antennae with first joint heavy and subconical; second transverse; third almost three times as long as the second and three-fourths as long as the first; sixth with a slight lobe; seventh with a lamina almost one-half as long as those on the joints 8 to 11, which form the club.

Type locality, Wasco, Oregon.

Pleocoma fimbriata Le Conte (11, pp. 24-25).

Male: Dorsum depressed, shiny black, sometimes with a castaneous tinge, fimbriate with yellow hair. Head above very finely and sparsely punctate, almost impunctate; clypeus deep and heavy as viewed from the side, sharply reflexed, rather deeply emarginate, the apices acutely rounded; anterior margins of ocular canthi nearly straight, inclined slightly forward of a right angle to the midline of the body in most cases, apices and posterior margins rounded; horn of vertex with sides parallel or slightly converging near the apex, which is obtusely emarginate.

Pronotum about or slightly more than twice as wide as long, basal angles distinct but rounded; disc finely and sparsely punctate.

Elytra with the sutural striae shallow; geminate striae feebly indicated by fine punctures at wide intervals; costae slightly elevated, smooth; elytral intervals very finely and sparsely punctate.

Body beneath and legs castaneous, clothed with long yellow hair.

Antennae (Pl. 1, fig. 11) deep chestnut brown, club gray-brown. First joint conical, elongate; second subglobular, three-fourths as wide as the first; third cylindrical, slightly constricted at the basal fourth, about two-thirds as long as the first joint, joints 2 and 3 together averaging slightly more than four-fifths the length of the first, but varying from two-thirds to twelve-thirteenths as long; joints 4 and 5 subequal in length, slightly wider than the third and together about equal to it in length; sixth joint with a short projection or lamella; seventh with a lamella one-half to two-thirds as long as that of the eighth, in reality forming part of the club. Joints 8 to 11 form the club, the ninth usually longest, the tenth nearly as long.

Female: Light yellow brown in color, pronotum and head slightly darker. Head in front moderately coarsely and closely punctate; eyes hardly visible from above; clypeus very slightly reflexed, very broadly, shallowly emarginate at apex; ocular canthi much as in the male, but shorter, broader, and with the anterior margins at right angles to the midline of the body and the posterior margins nearly straight; horn of vertex short, stout, subconical, deeply triangularly emarginate at apex.

Pronotum less than twice as wide as long, basal angles rounded but distinct; disc coarsely and closely punctured, more closely toward the sides, basal and anterior median impressions feebly indicated, and a narrow impressed impunctate median line in the center of the disc.

Elytra of the usual form, widest at middle; sutural striae distinct but shallow; geminate striae very feebly indicated; costae not, or hardly, elevated, smooth; elytral intervals finely, sparsely punctate.

Body beneath clothed with short yellow hair.

Length 27-34 mm.

Antennae (Pl. 1, fig. 20) brown. First joint conical; second globular, two-thirds as wide as the first; third conical, one-half as wide as the second at the base and almost or quite three-fourths as wide at the apex, one-third as long as the first, joints 2 and 3 together two-thirds as long as the first; fourth joint one-half as long as the third and slightly wider; fifth joint shorter than the fourth, joints 4 and 5 together equal to the third in length; sixth joint shorter, transverse, one-fourth wider than the fifth, almond-shaped; seventh about equal to the sixth in length, one-third wider.

Joints 8 to 11 form the club, the ninth longest, the eighth three-fourths as long, the tenth shorter than the ninth, and the eleventh shorter than the tenth.

The characters of this species are subject to such great variation that it is necessary to take all of them into account in determination rather than to rely greatly upon one or two characters.

P. fimbriata seems to be the most common and widely distributed species of the genus. I have records of capture from the following localities, all in California:

Camp Greely, Fresno County (D, F); "Above Dunlop," Fresno County (D); Fresno County (D, F, CAS); Tulare County (D, F); Kaweah, Tulare County (F); Badger, Tulare County (Frost); Placer County (F); Eldorado County (CAS).

Horn (9) reported the species from Fresno and Eldorado Counties. The type locality is given as merely "California." Le Conte (12, p. 71) records the finding of fragments of this beetle "in the stomach of a woodpecker" at Fort Tejon, Kern County, Calif., just across the Los Angeles County line. The specimen to which the latter record refers was possibly *P. conjungens* var. *hirsutus*.

Pleocoma fimbriata Le Conte, var. *tularensis* Leach (10)

The following is taken from Leach's description:

Form robust, oval, black, shining above, fimbriate at sides of prothorax and elytra, clothed underneath with long dark brown hair.

Head piceous, moderately punctured; clypeus deeply emarginate, angles slightly divergent; horn of vertex long, flattened, and emarginate at tip.

Pronotum twice as wide as long (13 by 6.3 mm. in type), angled at the sides and convergent in front, widest at base; basal angles prominent; surface finely punctate as in *fimbriata*; median anterior and posterior impressions vague.

Elytra at humeri as wide as the base of the pronotum, widest slightly behind the middle; sutural striae more deeply impressed apically, where the intervals, or costae, are slightly widened; geminate striae feeble.

Legs moderately short, the hind tarsi longer than the tibiae (7.6 to 7 mm.).

Length of type 26.5 mm., width 14.6 mm. Varies from 23.5 to 28.5 mm. in length.

Antennae with the third joint almost three times as long as the second, and three-fourths as long as the first; sixth joint with a lobe shorter than its length; seventh with a lobe slightly longer than its length; joints 8 to 11 with long lamellae of increasing

length, the last being slightly the longest and equal in length to the first nine segments.

Recorded from Sequoia National Park and from Badger, both in Tulare County, Calif.

As I have stated, the characters upon which the species of *Pleocoma* may be separated are, with a few exceptions, extremely variable, and *P. fimbriata* seems to vary more than the others, perhaps because of its wider distribution. I have attempted to separate *tularensis* from *fimbriata* with little success in most cases. The shape and relative proportions of the pronotum vary too much within *fimbriata* to be of much assistance. Careful measurements of the lengths of the antennal joints of the series of both species at hand gave the following results:

JOINT No. - - -	1	2	3	7	8	9	10	11
FIMBRIATA	1.3	0.3	0.7	2.25	3.95	4.45	4.4	4.2
	1.3	0.3	0.9	1.5	3.4	4.0	3.9	3.8
	1.3	0.3	0.8	1.8	3.4	4.0	3.9	3.8
	1.3	0.3	0.8	1.3	3.8	4.2	4.3*	4.0
	1.7	0.4	0.6	1.0	3.1	3.6	3.6	3.4
	1.6	0.35	0.65	2.4	4.4*	4.3	4.15	4.1
TULARENSIS	1.3	0.3	0.65	1.4	3.7	4.25	4.3	4.15
	1.2	0.3	0.75	1.15	3.2	4.0	4.0	3.95
	1.3	0.25	0.7	1.1	3.1	4.15	4.2	4.1

Examination of the table shows that the tenth joint is longer than the eleventh, and subequal to or longer than the ninth in *tularensis*. In *fimbriata* the ninth joint is usually the longest, but unfortunately this is not always the case, as shown by the figures marked with an asterisk in the table for *fimbriata*.

The specimen of *fimbriata* with the 9 mm. third antennal joint agrees rather closely with *tularensis* in all respects except color, but was taken in the same flight with *fimbriata* at Camp Greely, Fresno County, Calif. This specimen was compared with the type of *P. fimbriata* by P. J. Darlington, Jr., who states that the third joint is relatively a little shorter in the type, joints 2 and 3 together being shorter than the first; antennal club about a sixth smaller. The pronotum in this specimen is almost exactly twice as wide as long, basal angles rounded but rather distinct, pronotum widest at base. Mr. Darlington says that in the type of *fimbriata* the proportions of the pronotum are about the same, and that the basal angles are *slightly* less well defined.

The proportions of the first three antennal joints seem to me to be too nearly the same in both species to be relied upon for separation.

The sculpture of *tularensis* is in some cases nearly or quite lacking but in some specimens the elytra are more rugose than in some *fimbriata*.

P. fimbriata var. *tularensis* will have to be separated from *fimbriata*, if at all, by locality, general appearance, and the relative lengths of antennal joints 9 and 10. I do not believe that it represents more than a variety of *fimbriata*.

Pleocoma behrensii Le Conte (13)

Male: Robust, oval, convex, dorsum flattened, black in color, pronotum with a brownish tinge, fimbriate and clothed beneath with yellow hair. Head above rather finely punctured; eyes large, prominent; clypeus rather small in proportion, reflexed, rather broadly emarginate, apices acute; ocular canthi small, anterior margin a little rounded and inclined forward, angles and posterior margins rounded; horn of vertex with sides parallel and apex broadly triangularly emarginate.

Pronotum very variable in its proportions, basal angles rounded and not distinct in some specimens; disc finely and rather sparsely punctate, the punctations finer and sparser toward the sides; median impressions feeble.

Elytra conjointly varying from one-ninth to one-seventh longer than wide, wider at the humeri than the base of the pronotum; sutural striae well defined; geminate striae distinct; costae slightly elevated, smooth; elytral intervals rugose.

Body beneath and legs castaneous, clothed with long yellow or brownish-yellow hair.

Length 21-27 mm.

Antennae (Pl. 1, fig. 14) brown, club lighter in color. First joint conical, elongate; second subglobular with a tendency to be pentagonal in outline as viewed from above, almost as wide as the first; third joint elongate, at base one-half as wide as the second, widest at apical third, one-half as long as the first joint, joints 2 and 3 together about two-thirds as long as the first; fourth joint wider and shorter than the third, distinctly pentagonal in outline as viewed from above; fifth joint shorter and wider than the fourth, the anterior base angulated, joints 4 and 5 together longer than the third; sixth joint transverse, longer than the fifth, the anterior base produced in a sharp spur; seventh joint shorter, with its projection from one-half to two-thirds as long as the eighth. Joints 8 to 11 form the club, the ninth and tenth longest and subequal, the eleventh shorter, and the eighth shorter than the eleventh.

Female: Robust, convex, castaneous, fimbriate with yellow hair. Head above rather finely, very closely punctate; eyes visible from above; clypeus short, broad, slightly reflexed at anterior

margin, which is rounded, sometimes with a small notch at the midline, but usually without; ocular canthi with the anterior and posterior margins about equally rounded, the anterior angle rounded but distinct; horn of vertex short, stout, deeply emarginate at apex.

Pronotum with the hind angles rounded, disc moderately coarsely and closely punctate, the punctures showing a tendency to confluence as in *P. australis*; basal median impression vague or absent, anterior median impression not indicated.

Elytra thin; widest at apical third; sutural striae distinct; geminate striae moderately well defined in most specimens; costae elevated; elytral intervals with sparse punctation.

Body beneath and legs clothed with short yellow hair.

Length 26-34 mm.

Antennae (Pl. 1, fig. 21) brown, the club darker. First joint conical, elongate; second subconical, two-thirds as wide as first; third conical, at base one-third, at apex two-thirds to three-fourths as wide as second, joints 2 and 3 together two-thirds as long as the first; fourth joint shorter, wider than the third; fifth joint shorter, wider than the fourth, joints 4 and 5 together as long as the third; sixth joint transverse; seventh very short, transverse, slightly produced, the joint and projection together one-half as long as the eighth. Joints 8 to 11 forming the club, the ninth longest, eighth five-sixths as long as the ninth; tenth slightly shorter than the ninth, and the eleventh shorter than the tenth. In some specimens the antennae are more robust, and the differences in the width of the joints are less.

In most of the specimens of *P. behrensii* that I have seen the pronotum is widest at base, but in a few it is widest at the middle. One of my specimens has the seventh antennal joint three-fourths as long as the eighth. On other specimens the rugosity of the elytral intervals is not marked, and the color may be very deep brown rather than black.

This species may be separated at once from *P. puncticollis* and *P. rickseckeri* by the yellow vestiture. From *australis* it differs in the more convex dorsum and in the fact that the eleventh joint of the antenna is distinctly shorter than the tenth. In *australis* the sutural striae are not deep, the geminate striae are feebly indicated, and the elytral intervals are finely and sparsely punctate. In *behrensii* the sutural striae are deeper, the geminate striae plainer, and the intervals in typical specimens are rugose, approaching *rickseckeri* in this respect. From *fimbriata*, to which it seems most closely related, typical *behrensii* differs in the characters given in the key, as well as in the less prominent basal angles of the pronotum. In some cases it is almost impossible to be sure with which species one is dealing. In the collection of the Academy of Natural Sciences of Philadelphia there is a

short series of what I am almost certain is *P. fimbriata* from Eldorado County, Calif. These specimens resemble typical *behrensii* more closely than do some examples of the latter species, being small and convex, with the elytral intervals rugose. *P. fimbriata* seems to be confined to the Sierra Nevada range, and *P. behrensii* to the coastal mountains, but they probably represent races of the same original species.

I have the following records of capture for *P. behrensii*:

Type locality "near San Francisco," Calif.; Alameda County, Calif. (F, D); Berkeley, Calif. (D, CAS); Oakland, Calif. (F, D); Fort McDowell, Angel Island, Calif. (in San Francisco Bay) (CAS); San Mateo County, Calif. (F, D); Cypress Ridge, Marin County, Calif. (CAS); Sausalito, Calif. (recorded by Horn, ♀); Mt. St. Helena, Calif. (CAS); Sonoma County, Calif. (F, D, CAS).

Pleocoma sonomae Linsley

Distinguished from *P. behrensi* Lec., to which it seems most closely related, by the lack of processes upon the 6th and 7th antennal joints, "broadly oval (rather than oblong-oval), robust form, the broad, subparallel frontal horn, more deeply impressed sutural striae of the elytra"

Pleocoma hirticollis Schaufuss (23)

Male: Robust, convex, dorsum slightly flattened, fimbriate with yellow-brown hair. Head above coarsely and rather closely punctate, with impunctate areas about the base of the vertical horn; eyes prominent, round; clypeus small, reflexed, the sides nearly parallel, obtusely emarginate, the depth of the notch very variable, apices broadly rounded; ocular canthi short, front margins slightly sinuate and inclined posteriorly, apices sharply rounded, posterior margins rounded or sinuate; horn of vertex stout, subconical, truncate or very slightly notched at apex.

Pronotum very slightly less than twice as wide as long, widest at base, hind angles distinct but obtusely rounded, sides nearly parallel to the middle, thence strongly narrowed to the apex; disc coarsely punctate and sparsely clothed with long, semierect yellow hairs.

Scutellum more transverse than in other species, being almost semicircular.

Elytra conjointly very slightly longer than wide, wider at the humeri than the base of the pronotum, widest at apical third; sutural striae moderately deep, the sutural costae very broad; geminate striae well defined; costae distinct, elevated, rather wide, smooth; elytral intervals finely and sparsely punctate, sometimes rugose.

Body beneath castaneous, clothed with yellow hair.

Length 20-21 mm. One very small specimen in the collection of the Academy of Natural Sciences of Philadelphia measures only 17.3 mm. in length.

Antennae (Pl. 1, fig. 12) brown, club grayish. First joint conical, elongate, one-half as wide as long; second globular, three-fourths as wide as first; third at base one-half, at apex three-fifths as wide as second, curved, nearly or quite as long as the first, joints 2 and 3 together longer than the first; fourth joint about two-fifths as long as the third and slightly wider, transverse, with a short projection anteriorly. Joints 5 to 11 form the club, the fifth with its lamella equal to three-fifths of the sixth, eighth joint longest, the joints progressively shorter in the following order: Ninth, tenth, eleventh, seventh, sixth, and fifth. The whole club is very strongly curved outward toward the apex.

The following description of the female is taken from Horn's revision, no specimen being available to me at this time:

"Ovate, robust, convex, reddish brown. Clypeal horn short, broad and feebly emarginate, vertical horn short, rather deeply emarginate. Thorax similar in outline to the male, but not more than twice as wide as long, not impressed in front, moderately strongly and closely punctate, nearly equally over the entire surface, median line smooth, without erect hairs. Elytra broadest behind the middle, sutural striae not deeply impressed, the interval not wider behind, geminate striae very faintly indicated, surface more sparsely punctate than the thorax. Legs very robust. Length 1.32 inch; 33 mm.

"The antennae of the female (Pl. 1, fig. 23) are of the same type as the male, but much shorter and with the lamellae short. First joint conical, second globular as well (wide?) as first, third more slender, half as long as first, fourth short, transverse, angulate on the inner side, fifth prolonged in a lamella, three-fourths as long as sixth, joints six to ten nearly equal in length, the eleventh shorter.

"When the leaves of the lamella are closed the apices are contiguous, but the joints at the middle are separated."

The notch between the ocular canthi and the base of the clypeus of the male, pointed out by Horn, is nearly as often lacking as present. The dimensions of the pronota as given in most of the earlier descriptions are not reliable. As Fall (4) points out, the measurements were apparently taken with the specimen upright, giving a greatly foreshortened measurement for the length, as Schaufuss (23, p. 58) says that the thorax is almost three times as wide as long, and Horn (9) describes it as more than twice as wide as long, where as a matter of fact, it is about or less than twice as wide as long. In my single male specimen and in one other that I have seen the ninth antennal joints have been the longest, not the eighth, as is usually the case.

This species falls into the group with the hairy pronota. From *P. hoppingi* it may be separated at once by the color, the greater convexity and robustness, and the shape of the ocular canthi.

I have the following records of capture for *hirticollis*, all in California: San Joaquin (F, US); Bennett Valley, Santa Rosa (County?) (F, LAM); Nevada City, Horn (♀); Alameda County (CAS); Alameda (US); Sonoma County (US, CAS); Marysville (CAS); Eldridge (CAS). The type locality was given merely as "Calif."

Pleocoma hoppingi Fall (4)

Male: Ovate, elongate, dorsum much flattened, almost gibbous, light brown in color, shining, fimbriate with yellow hair. Head small, frons very sparsely and moderately finely punctate; eyes prominent, round; clypeus reflexed, triangularly emarginate, very broadly rounded at apices; ocular canthi (Pl. 1, fig. 24) with the anterior margins strongly bisinuate, slightly inclined posteriorly, apical angle distinct, rounded, posterior margins angulated, the apical portion parallel to the long axis of the body and notched at center, the posterior portion inclined slightly forward; horn of vertex stout, sides nearly parallel, apex with a rounded emargination.

Pronotum exactly twice as wide as long, basal angles rounded but distinct, sides converging very strongly from middle to apex; disc shining, densely punctate, the punctures fine at the sides, coarser near the posterior margin, and still coarser at the middle in front, a small impunctate area near the middle of each half; basal median impression distinct but small, anterior median impression rather deep, transverse.

Elytra conjointly more than one-third longer than wide, wider at the humeri than the base of the pronotum, sides nearly parallel; sutural striae moderately deep; geminate striae well defined; costae slightly elevated; elytral intervals finely and sparsely punctate, more strongly toward the sides.

Length 23-26 mm.

Antennae (Pl. 1, fig. 6) brown, club gray-brown. First joint conical, elongate; second subglobular, three-fourths as wide as first; third a little shorter than the first, and as wide, the anterior edge being raised into a thick angulate keel involving the whole length of the joint and causing it to appear pentagonal in outline as viewed from above; fourth joint short, with a short lamella. Joints 5 to 11 form the club, 8 and 9 subequal and longest, the remaining joints decreasing in length in the following order: Tenth, eleventh, sixth, fifth.

Female: Robust, convex, castaneous, prothorax and head darker, fimbriate with rather short yellow hair. Head above mod-

erately finely punctate; eyes flat, not prominent; clypeus with a shallow triangular emargination, apices broadly rounded; ocular canthi of the same form as those of the male, but stouter; horn of vertex very short, with a deep notch at apex.

Pronotum less than twice as wide as long, of about the same form as that of the male, punctation about the same; basal median impression round, well defined; anterior impression lacking.

Elytra wider at the humeri than the base of the pronotum, a little less than a third longer than wide; sutural striae feeble; geminate striae defined by rows of shallow punctures; costae elevated, smooth, and of a somewhat darker shade than the rest of the elytra; elytra intervals finely, moderately closely punctate.

Body beneath and legs clothed with short yellow hairs.

Length 30-35 mm.

Antennae (Pl. 1, fig. 18) brown, club gray-brown. First joint conical, elongate; second globular, two-thirds as wide as the first; third about, or slightly less than, one-half as long as the first, at base one-half, at apex two-thirds as wide, widest at apical third, slightly curved; fourth joint quadrate, transverse, about one-third wider than the third. Joints 5 to 11 form the club, the ninth longest, joints 7 and 8 subequal and shorter, then 10, 6, 11, and 5 in order of decreasing length.

Pleocoma hoppingi is the most easily distinguished of the genus. The hairy pronotum distinguishes it as once from all but *hirticollis*, from which it differs in color, the broad, rounding apices of the clypeus, the quadrate ocular canthi, and the peculiar shape of the third antennal joint.

The type locality is the South Fork of the Kaweah River, Tulare County, Calif. I have records also from Colony Road, Tulare County, Calif. (F); and Millwood, Fresno County, Calif. (CAS).

Pleocoma badia Fall (6)

Male: Robust, ovate, dorsum depressed, brown in color, fimbriate with yellow-brown hair. Head above rather closely and coarsely punctate; eyes large, prominent; clypeus reflexed, with a deep, rounded emargination, apices acutely rounded; ocular canthi with the anterior margins arcuate, inclined forward of a right angle to the long axis of the body, apices rounded, posterior angle and margin broadly rounded.

Pronotum about, or a little less than, twice as wide as long, variable in shape; disc finely and sparsely punctured, except for the area included in the anterior median impression, which is heavily and coarsely punctured; anterior median impression usually distinct, with long yellow hairs from the anterior edge; basal median impression small or lacking.

Elytra conjointly about one-fifth longer than wide, brown, transparent, showing the folded wings beneath them; sutural striae shallow; geminate striae feebly defined; costae not appreciably elevated, smooth; elytral intervals finely and sparsely punctate.

Body beneath and legs clothed with yellow hair.

Length 23:5-28-5 mm.

Antennae (Pl. 1, fig. 1) brown, club grayish. First joint conical, elongate, curved; second globular, about two-thirds as wide as the first; third elongate, nearly cylindrical, dilated at apical third, at base one-half as wide as the first joint, joints 2 and 3 together nearly as long as the first; fourth joint wider than the third, transverse or with a short projection anteriorly. Joints 5 to 11 form the club, the ninth and tenth longest and subequal, the eighth and seventh successively shorter, the other joints decreasing in the order 11, 6, and 5, the fifth being two-thirds to three-fourths as long as the sixth.

Female: Robust, dorsum very slightly flattened, castaneous, head and pronotum darker, fimbriate with short yellow hair. Head in front coarsely and closely punctate; clypeus slightly reflexed, with a broadly rounded emargination; ocular canthi of the same form as those of the male, but stouter; horn of vertex short, stout, deeply triangularly emarginate at apex.

Pronotum less than twice as wide as long, the hind angles broadly and obtusely rounded but usually distinguishable; disc coarsely and closely punctate, the punctures tending to coalesce into transverse impressed lines, giving a rugose appearance; anterior and basal median impressions usually present, but small.

Elytra at the humeri wider than the base of the pronotum, transparent, the abortive wings and dorsal abdominal segments visible through them; sutural striae distinct but not deep; geminate striae feebly indicated by rows of fine, widely spaced punctures; costae hardly elevated.

Body beneath and legs castaneous, clothed with short yellow-brown hair.

Length 32-43 mm.

Antennae (Pl. 1, fig. 17) brown. First joint conical, elongate; second globular, three-fourths as wide as the first; third elongate, as base one-half as wide as the second, a little dilated at apex; joints 2 and 3 together subequal in length to the first; fourth joint transverse, angulate. Joints 5 to 11 form the club, the ninth longest, eighth and tenth shorter and subequal, then, in order of decreasing length, 7, 11, and 6.

The brown color and the form of the ocular canthi, which seem to be fairly constant, set *badia* apart at once from *conjungens*, nearest to which it runs in the key. The transparent elytra, through which the folded wings may be seen, are peculiar

to this species, at least in the case of the male. After several years in the cabinet the elytra may become opaque, but several in my own series remain clear after sixteen years. The pronotum is very variable, and no dependence is to be placed upon characters of the relative proportions or the prominence of the basal angles.

Pleocoma badia has been taken only upon the south slope of Mt. Wilson, near Pasadena, Calif., at an altitude of from 3,500 to 4,000 feet. It may occur also at Pine Flats, about fifteen miles farther north. The nearest capture of *badia* to the territory of *australis* is about five miles by trail, and it would not be surprising if the territories of the two were found to overlap somewhat.

Pleocoma conjungens Horn (8, 9)

Male: Robust, oval, dark brown to black in color, dorsum slightly flattened, fimbriate with yellow hair. Head above finely and closely punctate, sparsely clothed with yellow hairs; clypeus reflexed, obtusely emarginate, the emargination broadly rounded at the bottom, apices acutely rounded, anterior margins rounded; ocular canthi with anterior margins sinuate, almost at right angles to the long axis of the body or slightly inclined posteriorly from this, apices rounded, posterior margins rounded; horn of vertex long, the sides nearly parallel for most of their length, approaching apically, apex deeply and rather broadly emarginate.

Pronotum very slightly more than twice as wide as long, widest at basal angles, black, chestnut brown along the lateral margins; disc moderately finely and not very closely punctate (slightly more coarsely than *rickseckeri*, and about as sparsely), the punctures tending toward confluence, especially in the center of the disc; apical angles rounded, basal angles rounded but distinct; basal median impression lacking, being represented by an evenly convex median impunctate line; anterior median impression moderate; profile of pronotum about as in *hirticollis*.

Elytra conjointly one-eighth longer than wide, widest at apical third; very deep brown or black; sutural striae shallow; geminate striae consisting of little more than rows of shallow punctures; costae hardly elevated, nearly impunctate; elytral intervals finely, sparsely punctate, with a very slight rugosity.

Body beneath and legs castaneous, covered with yellow hair.

Length 22.5-23.5 mm.

Antennae (Pl. 1, fig. 10) dark brown. First joint conical, elongate; second subglobular, almost as wide as the first, wider than long; third elongate, somewhat curved, at base one-half, at apex slightly more than one-half, as wide as the maximum width of the first, widest at apical fifth or fourth, longer than the first, joints 2 and 3 together one-third longer than the first; fourth joint transverse, with a slight projection. Joints 5 to 11 form the

club, the eighth and ninth equal in length and longest, tenth shorter, seventh shorter than the tenth, sixth and eleventh subequal in length and shorter than the seventh, fifth shortest, about five-eighths as long as the sixth.

So far as I can discover there are no females of this species available, and I can find no description, although Rivers (22) states that the female is known.

The type locality is given by Horn (9) as Santa Cruz City, Calif. E. C. Van Dyke once told me that he had on one occasion picked up, in the streets of Carmel, 100 miles or so south of Santa Cruz, elytra that he was almost certain belonged to this species. E. R. Leach (10) notes that specimens of *P. conjungens* in the collection of the California Academy of Sciences are from Moke-lumne Hill, Calaveras County, Calif.

Pleocoma conjungens Horn var. *hirsutus* Davis (3)

Male: Broadly oval, convex, dorsum flattened, shining black, margins heavily fimbriate, clothed beneath with long yellow-brown hair. Head above, including ocular canthi, closely covered with long yellow-brown hair; ocular canthi with the anterior margins curving forward of a right angle with the midline of the body, apices acute, rounded, lateral margins nearly straight, posterior angles obtuse but distinct; horn of vertex with the sides nearly or quite parallel.

Pronotum slightly less than twice as wide as long (6 by 11.8 mm.), black, brown at sides, with an occasional hair upon its surface; punctation as in *conjungens*; posterior median impression nearly lacking; lateral pits lacking; transverse ridge lacking, the basal part of the pronotum being smoothly and evenly convex to the declivity; anterior median impression distinct and moderately deep, very heavily and coarsely punctate and rather densely clothed with long yellow hairs.

Scutellum brown, sparsely and finely punctate and sparsely clothed with short hair. Long yellow-brown hair growing thickly from the base of the pronotum nearly conceals the basal half.

Elytra as in *conjungens*, costae attaining the apices.

Legs and body beneath brown, very densely clothed with long yellow-brown hair.

Antennae almost exactly as in the specimen of *P. conjungens* labeled as the type in the collection of the Academy of Natural Sciences of Philadelphia, except in the proportions of the antennal joints 1 to 3, which are 1.2, 0.3, and 1.0 mm. in length respectively, compared with 0.7, 0.25, and 0.8 in the type.

Type locality: Between Lebec and Saugus, in Los Angeles County, Calif., in the Sierra Madre Mountains.

This variety, while close to *P. conjungens*, may be distinguished from it by the extreme hairiness, the different shape of the ocular canthi, the more parallel sides of the horn of the vertex, the hairiness of the head and anterior part of the pronotum, the heavily punctate anterior median impression, and the different relative proportions of the first three antennal joints.

Pleocoma staff Schaufuss var. *dubitabilis* n. var.

I have not seen the type of *P. staff*, and, since the description of that species must be largely by comparison, the variety is placed first for convenience.

Male: Dorsum depressed, dark brown or black above, castaneous beneath, fimbriate and densely clothed beneath with yellow-brown hair. Head above moderately closely and coarsely punctate; clypeus varying from deeply triangularly emarginate to broadly rounded, apices rather acutely rounded; ocular canthi variable, but tending toward quadrate, the anterior margin curved and usually inclined a little forward; angles broadly rounded, posterior margin at first rounded and nearly parallel to the long axis of the body, thence rounding in to the head; horn of vertex short, conical, pointed at apex, not emarginate.

Pronotum less than twice as wide as long, widest at from slightly behind the middle to the basal fifth; retuse in front, hind angles broadly rounded and not distinguishable in many specimens; disc finely and sparsely punctate, basal and apical median impressions distinct before and behind a broad, rounded, transverse ridge a little behind the center of the disc.

Scutellum completely covered with tawny hair.

Elytra conjointly one-fifth longer than wide, wider at the humeri than the base of the pronotum, widest behind the middle; sutural striae deep, the sutural costae rather wide; geminate striae distinct; costae elevated, rugose; elytral interspaces finely and rather closely punctate, the punctures tending to confluence, giving a rugose effect in many cases.

Length 23-29 mm.

Antennae (Pl. 1, fig. 2) brown. First joint conical, one-half as wide as long; second globular, slightly transverse; third elongate, at base two-thirds as wide as, at apex as wide as, the second, joints 2 and 3 together about one-fourth longer than the first; fourth joint short, transverse, angulated or with a short projection. Joints 5 to 11 form the club, the ninth longest, the eighth and tenth subequal and very slightly shorter, and, in order of decreasing length, joints 11, 7, 6, and 5. The sixth joint is about five-sixths as long as the seventh, and the fifth two-fifths as long as the sixth.

Female: Convex, dorsum slightly but distinctly flattened in most cases, castaneous, fimbriate and clothed beneath with yel-

lowish hair. Head above coarsely and moderately closely punctate; eyes not prominent; clypeus reflexed, rounded, with a broad, rounded emargination, apices retracted and sharply rounded; horn of vertex represented by two tubercles with deep obtuse longitudinal groove between them.

Pronotum less than twice as wide as long, widest at or slightly before the middle, hind angles broadly rounded, evenly convex to slightly retuse in front; disc moderately finely, closely punctate, especially toward the sides and front; basal median impression distinct, anterior median impression represented by a short, impunctate, longitudinal groove.

Elytra wider at the humeri than the base of the pronotum, about or slightly less than one-fifth longer than wide, widest behind the middle; sutural striae rather deep; geminate striae distinct; costae elevated; elytral intervals varying from finely, sparsely, confluent punctate to rugose.

Length 25-32 mm.

Antennae (Pl. 1, fig. 19) brown. First point conical, three-fifths longer than wide; second globular; third elongate, at base one-third, at apex two-thirds or three-fourths, as wide as the second, joints 2 and 3 together almost equal to the first in length; fourth joint short, wider than the third; fifth transverse, angulate. Joints 5 to 11 form the club, the ninth and tenth subequal and longest, the eighth and eleventh subequal and shorter, slightly longer than the seventh, sixth about three-fourths as long as the seventh, and fifth merely transverse.

The ordinary characters of this variety are more variable than those of any other of the genus, but the scutellum invariably seems to be covered with hair, and this character, with the 7-jointed antennal club, the black or very dark color, and the retuse pronotum, will serve to distinguish it from the other species.

I have the following records of capture for this variety: Clakamas County, Oreg. (CAS); Dilley, Oreg. (F, D, US); Forest Grove, Oreg. (CAS, D).

This is the form that passes in collections in the United States and elsewhere as *Pleocoma staff*. As will be seen by reference to the following description, it differs rather markedly from *staff* in several particulars, and, since the status of *staff* in the genus has been a source of trouble for some years, I have thought it well to give the variety a name. A representative pair of cotypes will be deposited in the collection of the United States National Museum.

Pleocoma staff Schaufuss (23)

Male: Robust, convex, dorsum slightly depressed, bicolorous, the pronotum dark brown, somewhat lighter at the base, the elytra bright reddish-brown. Head above very coarsely, moderately

closely punctate; clypeus with a deep oval emargination, apices obtusely rounded, blackish-brown in color; ocular canthi subquadrate, anterior margin inclined slightly forward, anterior angles projecting somewhat beyond the posterior ones.

Pronotum less than twice as wide as long (7 by 13 mm.), retuse in front, the transverse ridge prominent at about the center, occupying about three-fifths of the total length of the pronotum, disc very finely and sparsely punctate; anterior and posterior median impressions distinct; hind angles of pronotum rather sharply rounded.

Scutellum very sparsely hairy. (This hair has undoubtedly been rubbed off, since Schaufuss specifically mentions that the scutellum is hairy.)

Elytra bright reddish-brown, striae deep; costae prominent, elevated; punctuation extremely fine and sparse, rugosity very indistinct.

Length 26 mm., width 14 mm.

Antennae as in var. *dubitabilis*.

The above description was drawn up from data sent me by Dr. Hans Sachtleben and Mr. R. Korschefsky. Two specimens for my series of "*staff*" were very kindly compared with the type of that species by Mr. Korschefsky, who says:

"The Schaufuss type of *Pleocoma staff* is labeled 'Californ. mer.' Perhaps the color of the type is not fully developed. The type was preserved in liquor; therefore the hairs were much pasted so that it is very difficult to state how the hairiness was distributed originally on head and thorax. The type differs so much from your specimen 1 that this might be probably another form. The type is larger, the sculpture on the elytra is much less marked, the striae are more distinct. Besides the type differs from specimen 1 in having the transverse ridge of the thorax much developed."

Specimen 1 above referred to is about representative of all specimens that I have seen as far as concerns the development of the transverse ridge. From this I take it that the profile of the pronotum in *staff* resembles that in *ulkei* and *edwardsii*. From what is known of the life history of *Pleocoma* it seems very unlikely that the type is an immature specimen, not fully colored.

The history of this species in our literature is rather interesting. In 1870 Schaufuss named it for the General Staff of the German army, "rubbing in" a rather silly error that he said had appeared in one of the Paris newspapers. Le Conte disapproved of the name on the grounds of its source and the motive for giving it, and suppressed it (13), substituting "*edwardsii*," and redescribing the species. Sharp (24) made some comments upon Le Conte's action, and gave it as his opinion that the name *staff*

should stand, regardless of the motives that led to its giving. Horn (8, 9) then redescribed the species and reestablished the name *staff*. Both Le Conte and Horn undoubtedly had the same specimen before them at the time these descriptions were written, as each notes that the specimen had only five antennal joints. It is quite surprising at this late date to discover, after the controversy is over, that *edwardsii* seems to be different from *staff*.

Pleocoma edwardsii Le Conte (13)

Male: Broadly oval, robust, convex, dorsum slightly flattened, fimbriate and clothed beneath with yellow hair. Head above moderately coarsely and closely punctate, nearly black in color; eyes round, prominent; clypeus reflexed, the apical emargination deep and broadly rounded, apices not acute, sides broadly rounded, base a little narrower than apex; horn of vertex short, conical, not emarginate at apex; ocular canthi quadrate, margins rounded.

Pronotum nearly black, slightly less than twice as wide as long, widest at middle; anterior angles, sides, and basal angles all included in one broadly sweeping curved margin; disc finely and rather sparsely punctate; basal median impression deep; anterior median impression shallow in front of an extremely prominent transverse ridge, giving a very retuse profile.

Scutellum transverse, shining, not hairy.

Elytra chestnut brown in color, conjointly about one-fifth longer than wide, not wider at the humeri than the base of the pronotum, widest at or slightly behind the middle; sutural striae deep; geminate striae distinct, entire; costae wide, elevated, finely, sparsely punctate, and sinuate, diverging from the midline at about the apical third, and again becoming nearly parallel to it near the humeri, where they are also much wider; elytral intervals sparsely, rather coarsely punctate.

Length 27.2 mm.

Antennae (Pl. 1, fig. 13) brown. First joint conical, about one-half as wide as long; second globular, slightly transverse; third elongate, at base one-half, at apex twice, as wide as the second, pentagonal in outline; fourth joint bearing a process, the joint and process together about two-fifth as long as the joint and process of the fifth; fifth joint lamellate. Joints 6 to 11 are missing from the type, the only known specimen of this species.

A peculiarity of this species that may prove to be constant when more specimens come to hand is the situation of the second costa. At about the basal third the costa diverges from the midline rather abruptly, becoming much wider as it approaches the humerus, just before reaching which it again becomes nearly parallel to the mid line. The first costa follows the second, but not to the same degree, being much straighter. I have seen this

peculiarity indicated to a very slight extent in some specimens of *P. behrensii* and *P. hirticollis*, but it is never prominent, and the first costa is straight in all that I have seen.

In spite of the fact that the antennal clubs are missing, *P. edwardsii* may be placed in the key quite easily. From *P. staff* it differs in the glabrous scutellum, the less convex shape, and in the development of the transverse ridge of the pronotum. The geminate striae are not so deep as those of *staff*, but are complete, not having the same tendency to disappear apically. The elytral intervals of *staff* are extremely finely and sparsely punctate, while the punctuations of the intervals of *edwardsii* are coarse and less sparse. From *staff* var. *dubitabilis*, *edwardsii* is distinguished by the color and the glabrous scutellum.

The type and only known locality for this species is "Calif."

I am of the opinion that *Pleocoma edwardsii* Lec. is a valid species, represented by the single type in the Le Conte collection at Cambridge, Mass. Notwithstanding its being mistaken for *staff* by Le Conte (13) and accepted as such by Horn (9) (there is little doubt, from the description given, that Horn had this identical specimen before him when he wrote that description), the fact remains that Le Conte gave a recognizable description of the species, and, furthermore, referred it to a definite individual specimen which still exists and is available for reference. In other words, he described a species under the impression that he was redescribing one. In view of the facts just stated, it is necessary to restore *edwardsii* to full specific standing, from the position it now occupies as a synonym for *P. staff*.

Pleocoma ulkei Horn (8, 9)

Broadly oval, depressed, fimbriate and clothed beneath with yellow hair. Head above very dark brown, nearly black, coarsely and closely punctate, covered sparsely with yellow hair; eyes prominent, round; clypeus sharply reflexed, the apical emargination deep, rounded at bottom, apices sharply pointed, lateral margins as viewed from above parallel to the long axis of the body for about half their length, thence approaching the midline rather abruptly, making the base distinctly narrower than the apex; ocular canthi with the sides about equally rounded before and behind, the apical angle rather acute; horn of vertex conical, acute, not emarginate.

Pronotum glabrous, shining, deep blackish brown in color with lighter areas at the sides; very slightly less than twice as wide as long, widest at about the apical two-fifths or one-third; moderately coarsely and rather sparsely punctate, the punctures coarser and closer toward the sides; anterior angles rounded, basal angles distinct but not acute; basal median impression very deep, with a smaller impression at each side; anterior median impression practically lacking; transverse ridge across fully two-

thirds of the width of the pronotum, very prominent, giving the profile a retuse appearance.

Scutellum glabrous, transverse.

Elytra chestnut brown, conjointly a little less than five-sixths as wide at the widest point as long, not wider at the humeri than the base of the pronotum, widest at apical two-fifths; sutural striae deep; geminate striae deep; costae wide, elevated, finely and sparsely punctate, sinuate, diverging from the midline at about the apical third and again becoming parallel to it at about the basal third, and becoming much wider basally; elytral intervals finely, sparsely punctate and slightly rugose.

Length 24 mm.

Antennae (Pl. 1, fig. 8) brown. First joint subconical, elongate, widest at apical third; second subglobular, slightly transverse, as wide as the apex of the first; third elongate, narrower than the second at base and about the same width at apex, widest at apical three-fourths, where it almost equals the maximum width of the first joint, longer than the first, joints 2 and 3 together almost twice as long as the first; fourth joint transverse, with a short process. Joints 5 to 11 form the club, the eighth longest, the ninth subequal to it, the seventh and tenth subequal in length and shorter, the sixth very nearly as long as the seventh, the eleventh shorter than the sixth, and the fifth shorter than the eleventh.

No female of this species has ever been taken.

Type locality: Utah.

Those who know this genus have been very skeptical of the published type locality. That this doubt was well founded is shown by E. R. Leach (10), who records the capture of four males in Nevada County, Calif., in 1933.

Pleocoma ulkei and *P. edwardsii* are very closely related species, the principal points of difference being in the shape of the pronotum, and the relative lengths of the fourth antennal joint in the two species, that of *ulkei* being hardly more than transverse, and that of *edwardsii* being prolonged into a process about half the length of the fifth. If the latter character is not an abnormality it is sufficient to distinguish between the two species. In addition to these points, *edwardsii* is larger and more convex, and the elytra at the sides are not so parallel as in *ulkei*. Except for the fourth antennal joint (which is subject to some variation) these points of difference are subject to great variation throughout the genus, and in all others the two types resemble each other very closely indeed. I am inclined to regard them as identical, but in view of the fact that the type of *edwardsii* lacks the terminal joints of the antennae a positive statement to that effect would be inadvisable.

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