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Prodromus of American Bees of the Genus *Andrena* (*Hymenoptera, Apoidea*)

Wallace E. LaBerge

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Prodromus of American Bees
of the Genus Andrena
(Hymenoptera, Apoidea)
The University of Nebraska

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Keys to the females and males and diagnoses of the American subgenera of the genus Andrena are presented in this paper. Previously described subgenera recognized in this work are as follows: Callandrena Cockerell, Scaphandrena Lanham, Plastandrena Hedike, Parandrena Robertson, Dactylandrena Viereck, Andrena Fabricius, Iomelissa Robertson, Oligandrena Lanham, Hesperandrena Timberlake, Micrandrena Ashmead, Gonandrena Viereck, Oamprena Robertson, Cnemidandrena Hedike, Simandrena Pérez, Thysandrena Lanham, Taeniandrena Hedike, Ptilandrena Robertson, Trachandrena Robertson, Xanthandrena Lanham, Diandrena Cockerell, Leucandrena Hedike, Melandrena Pérez, Gymnandrena Hedike, Scociandrena Lanham, Onagrandrena Linsley and MacSwain. The following five new subgenera are described: Eremandrena, Laralldrena, Tylandrena, Geandrena, Chaulandrena.
ACKNOWLEDGEMENTS

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The National Science Foundation, Washington, D.C., has supported these studies of the North American species of the genus *Andrena* with two three-year research grants (1959–62 and 1962–65). The author is deeply appreciative of this continued support.
Prodromus of American Bees of the
Genus Andrena (Hymenoptera, Apoidea)

INTRODUCTION

The thirty-two currently recognized subgenera of *Andrena* occurring in North and Central America have been treated comprehensively in only one published paper (Lanham, 1949). In his paper on the subgenera Lanham provides an excellent discussion of the history of the subgeneric classification of *Andrena* and a good discussion of the characters used in classification. Lanham’s work also provides a usable key to the females of the subgenera of *Andrena* of the New World and a list of the known New World species together with the proper subgeneric placement of a majority of these species. Lanham’s paper provides an excellent starting point for a monographic study of the New World species of the genus *Andrena*.

The only other comprehensive treatment of the subgenera of *Andrena* is a paper published by Hedicke (1933) on the subgenera occurring in Europe. In Hedicke’s paper, type species are designated for named subgenera and new subgenera are described. Hedicke did not provide keys to the subgenera and his descriptions are inadequate.

There are two primary purposes to be served by the present paper. First, keys are provided for the determination to subgenus for both females and males of *Andrena*. Several new characters are employed in recognizing the subgeneric limits which make a key to the males possible. Previous authors have relied too heavily upon characters involved in the pollen collecting apparatus of the females for delimiting subgenera in this group. These are not

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1 Associate Professor of Entomology, Research and Field Associate in Entomology of the, University of Nebraska State Museum.
necessarily conservative characters as Lanham assumed, indeed, many are highly specialized.

Some characters involving the pollen-collecting apparatus appear to be highly labile. For instance, the plumosity of the tibial scopal hairs can vary even within a single species. Grünwaldt (in litt., 1961) has communicated to the author that *Andrena (Simandrena) mucida* Kriechbaumer in Europe has typical short, simple scopal hairs on the hind tibiae in the spring generation, but has plumose hairs in the summer generation. For this reason Grünwaldt believes that the subgenus *Stenandrena* Timberlake ought to be synonymized with *Simandrena* Pérez. The present author concurs with this opinion but on other morphological grounds. In short, if the newly discovered characters are given proper consideration (characters such as the form of the pronotum, the length of the maxillary palpae and the form and shape of the propodeum) a key to the subgenera in the male sex becomes possible, although some readjustment of the classification becomes necessary.

The second purpose of this paper is to make known and to describe certain new subgenera. Several new subgenera have come to the attention of the author during the past three or four years. Of these, only a few are described here. The new subgenera described will either make the keys to the subgenera more useful or are needed to more clearly delimit certain of the subgenera which are currently being monographed by the author or by his students.

Subgeneric descriptions are presented for the new subgenera or for subgenera whose limits have been changed. The other subgenera are not described herein as the descriptions are available in Lanham’s (1949) work or elsewhere in the literature. More complete descriptions will be published as each of the subgenera is monographed in subsequent papers by the author or his students. However, all subgenera are listed, together with the type species of each and synonymical notes where necessary. The order in which the subgenera appear in this list is not meant to indicate phylogenetic relationships, although closely related subgenera do occasionally appear near one another in the list. The subgenera are numbered and appear in the same order as in Lanham’s paper (1949), except where changes in status or in names make a change in the number or order necessary.

Discussion of Characteristics

In certain subgenera (*Andrena s. str., Gonandrena, Cnemidandrena*, etc.) the pronotum has a more or less distinct angle on the posterior margin just mesad and above each of the posterior pro-
Prodromus of American Bees of the Genus *Andrena*

notal lobes. A dorsoventral ridge, usually more sharply produced in the male than in the female, extends downwards from this angle along the midlateral surface of the pronotum. The author calls these angles the "humeral" angles of the pronotum. Although this character is constant within several of the subgenera and, therefore, is of diagnostic value, two things should be kept in mind concerning the humeral angles. First, these angles probably arose independently more than once in the genus *Andrena*. The character is associated with the thickness of the head and consequent width of the genal areas (in turn correlated with the length of the mandibles); those forms having a broad genal area usually also have well-developed humeral angles. The *Tylandrena* has humeral angles, but the dorsoventral ridges extending down from the angles are interrupted by a deeply impressed suture, unlike the situation in *Andrena s. str.* and its allies. In some cases (such as *Opandrena* or *Ptilandrena*) the ridge is well developed and uninterrupted but is much nearer to the posterior margin of the pronotum than in *Andrena s. str.* and its allies. Second, in a few groups (such as the *Hesperandrena*) this character appears to be either in the process of developing or of being lost, as the angles are poorly developed or are not evident in some species. One should remember that the character when it occurs is almost universally more evident in the male than in the female. In spite of these shortcomings which apply equally well to most characteristics, the author has found the humeral angle character to be useful in distinguishing several of the subgenera.

A single character, the shortness of the maxillary palps, holds the subgenus *Callandrena* together. A constellation of several other characters, such as plumose tibial scopal hairs, narrow pterostigma, yellow clypeus in the male, lack of humeral pronotal angles, etc., can be applied to at least a large majority of the species. The subgenus seems to be heterogeneous at first glance, but the author believes it is a monophyletic group. In fact, if the genus *Andrena* were to be split up into several genera, the *Callandrena* would constitute one of these and could then readily be divided into several distinct subgenera.

The proportions of the facial quadrangle are of importance, especially in the male sex. The length of the facial quadrangle is measured from the lower margin of the median ocellus to the tip of the clypeus. The width of the facial quadrangle is meant to be the widest part of the face between the compound eyes.

By the malar space, the author means the space between the mandible and the lower end of the compound eye. The relative length and breadth of the malar space is important. Its length is
measured medially and its breadth is understood to be equivalent
to the width of the base of the mandible.

The propodeum is divided into five principal areas in *Andrena.*
The dorsal triangular area is known as the enclosure of the propo-
deeum. The enclosure of the propodeum is bounded by sutures
which meet on the posterior surface to form a sulcus which leads
down to the metasomal articulation. This sulcus divides the pos-
terior surface into right and left halves. The two lateral surfaces of
the propodeum form the bottoms of the propodeal corbiculae. The
lateral surfaces are occasionally separated from the posterior and
dorsal surfaces by carinae. Occasionally the dorsal surface is not
distinct from the posterior surface, the propodeum being entirely
declivous from the metascutum to the metasomal articulation.

Subgeneric Key to the Females of the
Genus *Andrena* of North America

1. Posterior spur of hind tibia basally strongly bent and
   broadened near base; enclosure of propodeum usually
   coarsely sculptured .......................................................... 2.
   Posterior spur of hind tibia not usually strongly bent
   and not widened at base; enclosure of propodeum
   finely or coarsely sculptured ............................................ 3.

2(1). Enclosure of propodeum finely sculptured .......... *Aporandrena*
   Enclosure of propodeum coarsely sculptured .......... *Plastandrena*

3(1). Pronotum with humeral angle along posterior margin just
   above posterior pronotal lobe, usually with a ridge
   or elevation extending down side of pronotum from
   humeral angle, often with depressed or flattened area
   posterior to this ridge .................................................... 6.
   Pronotum without humeral angle, smoothly rounded
   posteriorly from one posterior pronotal lobe to the
   other, without ridge running down side of pronotum 4.

4(3). Enclosure of propodeum coarsely sculptured, often
   bounded posteriorly by a strong transverse carina,
   if finely sculptured, with longitudinal rugae at least
   basally ................................................................. 5.
   Enclosure of propodeum usually finely sculptured, usually
tessellate, never with strong transverse posterior
   carina, if coarsely sculptured, without longitudinal
   rugae ................................................................. 25

5(4). Terga 2-4 with depressed apical areas equal to less than
   half length of tergum medially ............... *Mimandrena*
   Terga 2-4 with depressed apical areas equal to half or
   more of each tergum medially ............... *Trachandrena*
6(3). Pronotum laterally with deeply impressed suture cutting diagonally up and forward from pronotal spiracle to near midline anteriorly, suture strongly depresses ridge extending down from humeral angle. *Tylandrena*

Pronotum without lateral diagonal suture, or this suture a mere line, not deeply impressed and not depressing the strong ridge extending down from humeral angle. 7.

7(6). Fore wings with two submarginal cells. 8.
Fore wings with three submarginal cells. 9.

8(7). Enclosure of propodeum usually rather coarsely sculptured; propodeal corbicula incomplete anteriorly, usually with internal hairs. *Diandrena*

Enclosure of propodeum finely sculptured; propodeal corbicula complete anteriorly, with few or no internal hairs. *Parandrena*

9(7). Fore wing with first recurrent vein meeting second submarginal cell before or near middle of cell (not two-thirds of distance from base of cell) . 10.
Fore wing with first recurrent vein meeting second submarginal cell at about two-thirds of distance from base of cell or beyond . 11.

10(9). Clypeus very short, protruding beyond lower ends of eyes by less than one-fourth median length of clypeus; propodeum with dorsal surface poorly defined, sloping evenly from apex to base, with complete lateral carinae delimiting lateral from posterodorsal surfaces. 12.

Clypeus normal, protruding beyond lower ends of eyes by more than one-fourth median clypeal length and/or propodeum with well-defined dorsal surface and without complete lateral carinae. 13.

11(10). Tibial scopal hairs highly plumose throughout. 12.
Tibial scopal hairs simple or largely so, occasionally weakly plumose throughout. 13.

12(11). Enclosure of propodeum moderately coarsely sculptured; hind tibiae with scopal hairs with crowded, short, stiff branches in outer third or less, hairs short. *Eremandrena*

Enclosure of propodeum finely sculptured; scopal hairs with abundant, short, curved branches in outer half or more, hairs long and rather weak. *Ptilandrena*

13(11). Galeae with abundant, short, hooked hairs. *Scoliandrena*
Galeae without hooked hairs. 14.

14(13). Galeae elongate, as long as clypeus or slightly longer;
maxillary and labial palpi greatly elongated, second maxillary palpal segment at least one and one-half times as long as first segment; enclosure of propodeum finely sculptured.........................Iomeliussa

Galeae not elongate, or if so, then labial and maxillary palpi not greatly elongate, second maxillary palpal segment about as long as first segment or slightly longer; enclosure of propodeum often moderately coarsely sculptured.........................................................15.

15(14). Vestiture entirely black, or with pale hairs only on thorax; terga without pale apical hair bands; pronotum with lateral ridge indistinct, not sharp

..............................................................................................................Onagrandrena (in part)

Vestiture largely pale; terga with pale apical hair bands; pronotum with lateral ridge sharp, almost carinate, close to posterior margin and posterior pronotal lobe

..............................................................................................................Opandrena

16(9). Facial quadrangle considerably longer than broad (almost or quite three-fourths as broad as long)..................... 17.

Facial quadrangle as broad as long or almost so............. 18.

17(16). Malar area almost as long as broad; pleural hairs black or dark brown........................................ Chaulandrena

Malar area about half as long as broad; pleural hairs pale ochraceous to fulvous............................... Conandrena

18(16). Facial quadrangle slightly broader (at its greatest width between eyes) than long medially; propodeal corbicula incomplete anteriorly, poorly developed above, with short internal hairs; malar space linear ..... Oligandrena

Facial quadrangle at least as long as broad and usually slightly longer; propodeal corbicula usually complete anteriorly, with long, curled, plumose hairs above, often without internal hairs or with few long simple or branched internal hairs; if propodeal corbicula poorly developed above, then malar space about ¼ as long as broad.........................................................19.

19(18). Middle basitarsus expanded medially; terga 2–4 and usually tergum 1 with complete apical fascia of pale hairs (hairs with short, close-set barbs giving them an opaque appearance); labral process strongly bidentate and reflexed...........................................Chnemidandrena

Middle basitarsus not expanded medially, parallel-sided; terga 2–4 with or without apical pale fasciae, tergum 1 without pale fascia; labral process variously formed. 20.
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20(19). Clypeus with median third impunctate, shiny; tibial scopal hairs weakly plumose throughout ... \textit{Larandrena}

Clypeus with median third punctate, dulled by fine shagreening or both, \textit{if} impunctate and shiny, \textit{then} this area much less than one-third of clypeus; tibial scopal hairs usually simple at least medially........21.

21(20). Clypeus with median third punctate, dulled by fine shagreening or both, \textit{if} impunctate and shiny, \textit{then} this area much less than one-third of clypeus; tibial scopal hairs usually simple at least medially........21.

21(20). Genal areas often with strong posterior carina; scutellum shiny, unshagreened; enclosure of propodeum with rather coarse, irregular sculpturing; clypeus with apical margin usually broad, usually distinctly reflexed or turned upwards ......................... \textit{Gonandrena}

Genal area without posterior carina; scutellum usually not shiny, shagreened, or \textit{if} shiny, \textit{then} enclosure of propodeum finely granular or tessellate; clypeus with apical margin narrow and/or not turned up............22.

22(21). Malar space extremely short, linear; humeral angle of propodeum weak, lateral ridge weakly developed...23.

Malar space distinct, one-fifth to one-fourth as long medially as broad; humeral angle of pronotum usually distinct, lateral ridge well-developed.........................24.

23(22). Terga 2-4 with pale apical hair bands; vestiture largely pale in color........................................ \textit{Leucandrena}

Terga 2-4 without pale apical hair bands; vestiture entirely or mostly black in color ... \textit{Onagrandrena} (in part)

24(22). Vestiture entirely black; propodeal corbica incomplete anteriorly, interior hairy throughout ..... \textit{Dactylandrena}

Vestiture usually at least partially pale; propodeal corbica complete anteriorly, with few or no internal hairs ................................................................. \textit{Andrena s. str.}

25(24). Maxillary palpus short, usually not exceeding galea, occasionally exceeding galea by length of terminal segment; pterostigma narrow, narrower than distance from inner margin of prestigma to wing margin........

........................................................................ \textit{Calystrena}

Maxillary palpus not short, exceeding galea by at least two terminal segments; pterostigma usually not narrow, usually as broad as from inner margin of prestigma to anterior wing margin or broader........26.

26(25). Tibial scopal hairs highly plumose........................................27.

Tibial scopal hairs entirely or largely simple........28.

27(26). Propodeal corbica complete; propodeum narrow at base; integument black or mostly so, not metallic........... \textit{Simandrena} (in part)
Propodeal corbicula with internal hairs; propodeum normal, not narrow at base; integument usually metallic

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| 28(26)   | Pterostigma especially broad, first transverse cubital vein ending within two or three vein widths or less of pterostigma; propodeal corbicula incomplete anteriorly or with at least a few simple internal hairs; bees usually 8 mm. or less in length. 

*Geandrena* (in part)

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| 29(28)   | Hind tibia especially broad, near apex about one-third as broad as long; tibial scopal hairs short, along posterior margin less than half as long as greatest tibial width. 

*Micrandaena*

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| 30(29)   | Hind tibia normal, one-fourth as broad as long or narrower; tibial scopal hairs normal, along posterior margin at least half as long as greatest tibial width. 

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| 31(30)   | Propodeal corbicula complete, bare internally. 

*Simandraena* (in part)

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| 32(29)   | Tergum 1–4 with apical pale fasciae; terga 2–4 with abundant erect hairs arising from small distinct punctures; wing membranes and vestiture usually yellowish. 

*Xanthandraena*

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| 33(32)   | Tergum 1 without pale fascia; terga 2–4 with or without apical pale fasciae, if with fasciae, *then* basal areas without erect hairs arising from small punctures; wing membranes and vestiture variously colored. 

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| 34(33)   | Terga 2–4 without pale apical fasciae. 

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| 35(33)   | Terga distinctly punctate, surface dulled by dense reticular shagreening; clypeus flattened posteromedially. 

*Taeniandraena*
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Terga usually impunctate, if distinctly punctate, then shiny and/or clypeus not flattened. Thysandrena

35(33). Enclosure of propodeum usually coarsely sculptured, propodeum outside of enclosure with large contiguous punctures; terga conspicuously punctate. Thysandrena

Enclosure of propodeum usually finely sculptured, granular or tessellate, outside of enclosure finely sculptured, punctures when present not contiguous; terga usually not punctate. Thysandrena

36(35). Tibial scopal hairs extremely long and sparse, scarcely hiding surfaces of tibiae. Onagrandrena (in part)

Tibial scopal hairs normal, thick, not especially long, hiding surfaces of tibiae. Melandrena

Subgeneric Key to the Males of the Genus Andrena of North America

1. Forewing with two submarginal cells. Diandrena (in part)

2. Forewing with three submarginal cells. Diandrena (in part)

2(1). Clypeus metallic blue, often with violaceous reflections. Diandrena (in part)

Clypeus yellow, white, or black. 3.

3(2). Maxillary palpus short, when extended forward exceeds tip of galea by no more than length of terminal segment and often less; propodeum outside of enclosure punctate. Callandrena

Maxillary palpus exceeding tip of galea when extended forward by at least length of last two segments; propodeum outside of enclosure usually impunctate. 4.

4(3). First flagellar segment excavated above (excavation may extend onto basal part of second segment). Thysandrena (in part)

First flagellar segment normal, terete. 5.

5(4). Clypeus with few scattered punctures; labral process entire. Thysandrena (in part)

Clypeus with abundant regular punctures; labral process bidentate. Diandrena (in part)
6(4). Clypeus and parocular areas black. *Onagrandrena* (in part)
Clypeus and usually parocular areas white to yellow

7(1). Malar space half as long as wide or longer; clypeus yellow,
protruding beyond eye in facial view by about half
length of eye ........................................... *Parandrena* (in part)
Malar space one-third as long as wide or shorter, usually
linear; clypeus yellow or black, protruding beyond eye
in facial view usually by less than half length of eye ... 8.

8(7). Palpi elongate, segment two of labial palpus about as long
as segment one; clypeus black or at most with two
yellow spots .................................................. *Iomelissa*
Palpi normal, segment two of labial palpus much shorter
than segment one; clypeus yellow or black .......... 9.

9(8). Anterior trochanter with spinelike process; malar space
about 1/3 as long as wide; clypeus yellow. *Dactylanclrena*
Anterior trochanter without spinelike process; malar
space often less than 1/3 as long as wide; clypeus yellow
or black ...................................................... 10.

10(9). Maximum width of face between compound eyes equals
about two-thirds length of face from bottom of median
ocellus to tip of clypeus; clypeus yellow or partially so;
malar space about one-third as long as wide. *Conandrena*
Maximum width of face about equals length or broader,
at least broader than two-thirds length; clypeus yellow
or black; malar space less than one-third as long as
wide, usually linear ........................................... 11.

11(10). Gular area bordered posteriorly by a flange or keel, occi­
cuput when viewed in facial aspect or from above exca­
vated on either side above compound eyes; clypeus
black, enclosure of propodeum areolate ....... *Gonandrena*
Gular area not bordered posteriorly by a flange or keel,
occiput when viewed from facial aspect or from above
not excavated above compound eyes, or, if gular area
with keel or flange and occiput excavated, then enclo­
sure of propodeum finely sculptured, not areolate;
clypeus yellow or black ...................................... 12.

12(11). Posterior spur of hind tibia slightly widened basally by
a membranous flange, often strongly curved, broader
than anterior spur near base .......................... 13.
Posterior spur of hind tibia not widened basally, spur not
usually strongly curved, usually as narrow or narrower
than anterior spur ........................................... 14.
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13(12). Enclosure of propodeum coarsely sculptured  *Plastandrena*  
Enclosure of propodeum finely sculptured  *Aporandrena*

14(12). Pronotum with distinct humeral angle along posterior margin, with distinct ridge extending down from humeral angle to anterior coxa, area between ridge and posterior pronotal lobe often shiny and impunctate, occasionally deep and narrow ................................. 15.
Pronotum without humeral angle along posterior margin, without ridge extending down to anterior coxa .......... 25.

15(14). Maxillary palpus short, not exceeding galea when extended forward; pterostigma narrower than inner margin of prestigma to anterior margin of wing  ...... Callandrena (in part)
Maxillary palpus exceeding galea by at least last two palpal segments when extended forward and often longer; pterostigma various, often as broad or broader than inner margin of prestigma to anterior margin of wing ........................................ 16.

16(15). Propodeum with dorsal area shorter than metasternum, enclosure of propodeum with fine but distinct longitudinal rugae, gena below posterior mandibular articulation with a short blunt shiny process .  *Eremandrena*  
Propodeum with dorsal area usually longer than metasternum, enclosure without longitudinal rugae, or gena without short blunt process below posterior mandibular articulation......................................................... 17.

17(16). Clypeus yellow, impunctate and shiny at least in median one-third; pterostigma broader than inner margin of prestigma to anterior wing margin ........ Larandrena  
Clypeus usually black, if yellow in part or entirely, then punctate medially; pterostigma scarcely broader than inner margin of prestigma to anterior wing margin or narrower ........................................ 18.

18(17). Clypeus and sides of face (parocular areas) yellow (or with at least some yellow); face very broad; terga distinctly punctate; enclosure of propodeum granular ........................................  *Opandrena*  
Clypeus and parocular areas usually black; terga indistinctly punctate, if at all; face usually not broad; enclosure of propodeum finely sculptured, not coarsely granular ........................................ 19.

19(18). Clypeus often yellow, if black, then facial quadrangle very broad, maximum width greater than length; labral
process entire, triangular, and first flagellar segment subequal to second in length. Oligandrena

Clypeus usually black; facial quadrangle not so broad, usually slightly longer than wide, or labral process bidentate, or first flagellar segment distinctly longer than second. 20.

20(19). Terga (including first) with apical pale hair bands, if first tergum without apical pale band, then labral process strongly bidentate and genal area often angulate behind; mandible without basal tooth. Cnemidandrena

Terga without apical pale bands or pale bands restricted to terga 2 to 4 or 5, if present, then labral process entire or only slightly emarginate and genal area not subcarinate behind, or mandible with basal tooth. 21.

21(20). Ridge extending down from humeral angle of pronotum usually not sharp, interrupted by a deep suture; terga usually without apical pale bands and first two terga usually without long erect hairs (occasionally present on first tergum). Tylandrena

Ridge extending down from humeral angle of pronotum usually sharp, not at all interrupted by a suture (or, if suture present, a mere line and not indenting ridge); terga either with apical pale hair bands or terga 1 and 2 with abundant long erect hairs or both. 22.

22(21). Terga 2-4 with pale apical hair bands; labral process entire or, at most, weakly emarginate medially, not much, if any reflected; wing vein 1st m-cu usually meets second submarginal cell near middle of cell. Ptilandrena

Terga 2-4 without pale apical hair bands, or labral process bidentate and strongly reflected, or both; vein 1st m-cu usually meets second submarginal cell two-thirds or more of distance from base of cell. 23.

23(22). Terga 2-5 with more or less distinct pale apical bands; mandible never with basal tooth. Leucandrena

Terga 2-5 without pale apical hair bands; mandible often with basal tooth. 24.

24(23). Pronotum with lateral ridge extending down from humeral angle sharp, almost carinate; mandible usually with basal tooth; malar space usually distinct, usually about one-fifth as long as broad. Andrena s. str.

Pronotum with lateral ridge blunt and indistinct; mandible without basal tooth; malar space linear. Onagrandrena (in part)
25(14). Maxillary palpus short, rarely exceeding galea when extended forward or exceeding galea by less than length of last two palpal segments ........................................... 26.
Maxillary palpus long, exceeding galea when extended forward by at least length of last two palpal segments ................................................................. 27.

26(25). Labral process large, entire, subtriangular, about as long as broad; first flagellar segment twice as long as second; integument dark metallic blue or blue-black ..................................... Scoliandrena
Labral process smaller, usually bidentate or emarginate, broader than long; first flagellar segment often less than twice as long as second; integument rarely metallic usually black or rufescent in part ....................................................... Callandrena (in part)

27(25). First transverse cubital vein ending one to three vein widths from pterostigma; second flagellar segment as long as broad or shorter ........................................... Micrandrena
First transverse cubital vein ending more than three vein widths from pterostigma; second flagellar segment usually longer than broad ......................................................... 28.

28(27). Pleura and enclosure of propodeum moderately coarsely sculptured and/or terga distinctly punctate; genal area narrow, about as wide as eye ........................................... 29.
Pleura and enclosure of propodeum usually finely sculptured, often merely granular or tessellate, if moderately coarsely sculptured, then terga indistinctly punctate, or genal area much broader than eye in lateral view .......................................................... 34.

29(28). Posterior spur of hind tibia slightly widened basally by a membranous flange, often strongly curved, broader than anterior spur; sixth sternum bent downwards and forwards posterolaterally to form two reflexed blunt teeth; vein 1st m-cu meets second submarginal cell near middle or only slightly beyond middle .................................. Plastandrena (in part)
Posterior spur of hind tibia not widened basally nor unusually curved, as narrow as anterior spur; sixth sternum relatively flat, if recurved apically, then not forming posterolateral reflexed teeth; vein 1st m-cu often meets second submarginal cell at a distance of two-thirds or more from base of cell ........................................... 30.
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30(29). Enclosure of propodeum coarsely areolate or irregularly rugose, with posterior carina separating dorsal from posterior surface

Enclosure of propodeum coarsely punctate, not areolate or rugose, without posterior carina separating dorsal from posterior surface

31(30). Apical area of tergum 2 equals one-third or more of median length of tergum; flagellar segment 3 usually two-thirds as wide as long or longer, antenna in repose usually reaches beyond scutellum; vein 1st m-cu usually meets second submarginal cell near middle of cell; hind basitarsus and tibia usually piceous

.................................................................................................. *Trachandrena*

Apical area of tergum 2 equals less than one-third of length of tergum; flagellar segment 3 distinctly more than two-thirds as wide as long, antenna in repose usually not reaching beyond middle of scutellum; vein 1st m-cu meets second submarginal cell at two-thirds or more of distance from base of cell; hind tibia and basitarsus yellow to red

.................................................................................................. *Mimidrena*

32(30). Terga 2–5 with apical pale hair bands but these often interrupted medially; clypeus much flattened mediobasally; terga distinctly punctate, surface dulled by dense reticular shagreening

Terga 2–5 without pale hair bands; clypeus not unusually flattened mediobasally, often bowed outwards; terga punctate, surface usually shiny or moderately so, shagreening fine if present

.................................................................................................. *Taenianidrena*

33(32). First flagellar segment much shorter than second segment, second segment subequal to third; labial palpus short, second and third segments almost as broad as long

.................................................................................................. *Melandrena*

First flagellar segment usually at least as long as second segment, rarely slightly shorter, second segment often shorter than third; labial palpus normal, second and third segments slender, not nearly as broad as long

.................................................................................................. *Onagrandrena* (in part)

34(28). Clypeus at least in part yellow or white

Clypeus black or metallic blue or green

35(24). Clypeus scarcely, if at all, protruding beyond lower margins of compound eyes; propodeum with dorsal area almost eliminated, declivous from anterior margin to base of metasoma, with short lateral carinae extending
from metasomal articulation separating lower lateral from posterior surfaces. \textit{Hesperandrena}

Clypeus protruding distinctly beyond lower margins of compound eyes; propodeum with dorsal area usually distinct and usually without trace of lateral carinae. 36.

36(35). Terga without pale apical hair bands, usually dark metallic blue-black in color. \textit{Elandrena}

Terga with pale apical hair bands, usually dull black in color. \textit{Xanthandrena}

37(36). Clypeus cream-colored or white; lateral ocellus often separated from posterior margin of vertex by less than one ocellar diameter. \textit{Scaphandrena}

Clypeus yellow; lateral ocellus separated from posterior margin of vertex by at least one ocellar diameter. \textit{Thysandrena} (in part)

38(34). Genal areas narrow, slightly wider than eye or narrower. 39.

Genal areas broad, conspicuously broader than eye. 42.

39(38). Enclosure of propodeum outlined by a faint but distinct raised ridge; clypeus impunctate or punctures obscured by dense, fine tessellation or coarse shagreening; integument black, never metallic. \textit{Simandrena}

Enclosure of propodeum usually not outlined by a fine raised ridge, \textit{if so, then} integument at least slightly metallic; clypeus usually distinctly punctate, often shiny, but occasionally impunctate and dull (\textit{if so, usually metallic}). 40.

40(39). Terga 1–5 with pale apical hair bands, basally with abundant long erect hairs; vestiture often yellow. \textit{Xanthandrena}

Terga 1–5 usually without pale apical hair bands, or pale apical band absent at least on tergum 1, basally terga with or without erect hairs; vestiture variously colored. \textit{Geandrena}

41(40). Clypeus usually metallic blue with distinct violaceous reflections, punctures usually obscured by dense shagreening; terga usually without pale hair bands, but occasionally weak bands present. \textit{Thysandrena} (in part)

Clypeus usually black, if metallic, rarely with violaceous reflections, punctures almost always distinct; terga usually with pale apical hair bands. \textit{Geandrena}

42(38). Terga 2–4 and often 5 with more or less distinct pale apical hair bands; bees usually less than 9 mm. in size. 43.
The Subgenera of *Andrena* of North and Central America

1. *Callandrena* Cockerell


The subgenus *Pterandrena* Robertson is merged with the subgenus *Callandrena*. The author cannot discover a reason for keeping these groups separate. The only characteristic which separates them constantly in Lanham's work (1949, p. 200) is the number of submarginal cells present. According to Lanham, *Callandrena* has two submarginal cells and *Pterandrena* has three submarginal cells. Mitchell (1960, p. 140) has described as a *Pterandrena* the species, *A.* *asteroides*, which has a high proportion of the known specimens (including several of the paratypes) with only two submarginal cells in one or both wings. The author has seen a small undescribed species from Texas which has two submarginal cells; this species closely resembles certain species of *Pterandrena* with three submarginal cells. *A.* *(Callandrena) verbesinae* Viereck and Cockerell and *A.* *(Pterandrena) accepta* Viereck are so similar that one must conclude that *A.* *(C.) verbesinae* is more closely related to *A.* *(P.) accepta* than to any other species of *Andrena*. Indeed, these two resemble each other more closely than *A.* *accepta* does any other of the *Pterandrena* with which it is grouped.

The subgenus *Callandrena* as here constituted can be readily separated from most other species of *Andrena* by the short maxillary palpae in both sexes. The palpae are usually shorter than the galeae when these are both extended forward. In a few species the maxillary palpae exceed the galeae by no more than the length of the last palpal segment when extended forward. *Scotiandrena*, the only other subgenus in which maxillary palpae are short, can
be distinguished from the *Callandrena* by the presence of hooked galeal hairs in the females and the large triangular labral process in the males. Females of most species of *Callandrena* have highly plumose tibial scopal hairs, a flat, emarginate labral process, and narrow pterostigma (narrower than from inner margin of the prestigma to the anterior wing margin). Males of most species of *Callandrena* are marked by the narrow pterostigma, a yellow clypeus (and often yellow parocular areas) and a flat emarginate labral process. Both sexes of *Callandrena* lack the pronotal humeral angle and ridge (except one undescribed species). Except for the short maxillary palptae, the constellation of characters which distinguish the subgenus *Callandrena* each have exceptions. The author is presently monographing this group and the subgenus will be more completely described in a later publication.

2. *Eremandrena*, new subgenus

Type species: *Pterandrena pallidiscopa* Viereck, 1904.

This subgenus is being erected to include a single, but rather distinctive species, *Andrena pallidiscopa* (Viereck). This species is marked by highly plumose tibial scopal hairs in the females and by a well-developed pronotal humeral angle and ridge and rather distinctively formed clypeus and genal areas in both sexes, as described below. Lanham (1949, p. 216) recognized the distinctiveness of this species by placing it provisionally in the subgenus *Ptilandrena*.

Medium-sized bees with black integument and white vestiture. Facial quadrangle slightly broader than long (about 9.4:8.0 in the female and 8.2:7.5 in the male); lateral ocellus separated from vertex by slightly more than one ocellar diameter; labial palpus short, second and third segments only slightly longer than broad; maxillary palpus normal, exceeding galeae when extended forward by length of last two segments; clypeus relatively flat, evenly rounded from side to side, protruding beyond ends of eyes in facial view by less than half median clypeal length (less in male than in female); malar space linear anteriorly but posterior mandibular articulation separated from eye margin by more than three times distance of anterior articulation from eye margin; genal areas in lateral view distinctly broader than eye. Pronotum with distinct humeral angle, ridge extending down from humeral angle sharp and distinct in upper half or more but scarcely carinate, space between ridge and posterior pronotal lobe extremely narrow; propodeum with dorsal area distinct, slightly longer than metasternum; enclosure of propodeum with at least one and usually several longitudinal rugulae, otherwise tessellate, sutures at sides of enclosure straight, not curving outward or inward. Tergal integument distinctly punc-
tate. Hind tibial spurs normal. Pterostigma about as broad as inner margin of prestigma to anterior wing margin; vein 1st m-cu meets second submarginal cell at or just before middle of cell (rarely slightly beyond middle). Vestiture generally pale; terga 2–4 (and 5 in the male) with distinct pale apical hair bands.

**Female.** Facial lovea broad, shallow, upper end occupying more than half space between eye and lateral ocellus; labral process flat, entire, slightly thickened apically. Pygidial plate V-shaped. Middle basitarsus not expanded medially, normal. Subgenal coronet well developed; tibial scopal hairs usually dark, highly plumose in outer third; trochanteral floculus nearly complete; propodeal corbicula incomplete anteriorly, with abundant simple internal hairs.

**Male.** Clypeus and parocular areas black; first flagellar segment equals about one and one-half to two times second segment; genal area just below posterior mandibular articulation with a short, shiny process; mandibles somewhat decussate; labral process obscurely emarginate apically, slightly thickened apically. Middle tibia with sharp apicoposterior spinelike process.

### 3. Scaphandrena Lanham


This subgenus can be recognized in the female sex by the broad, cuneate hind tibia bearing extremely short simple scopal hairs, and the propodeal corbicula being incomplete anteriorly and bearing abundant long simple internal hairs. The males are difficult to distinguish from certain other subgenera. They are marked by a pale clypeus (usually white or cream-colored rather than yellow) and frequently pale maculae on the parocular areas together with lateral ocelli placed very near the posterior margin of the vertex. Both sexes have a pronotum without the humeral angle and ridge, terga with distinct apical hair bands, maxillary palpi of normal length, and labral processes usually bidentate.

### 4. Aporandrena Lanham


This subgenus includes a single species, *A. coactipostica* Viereck, which is related to members of the subgenus *Plastandrena* Hedilcke. Both sexes can be distinguished from all other subgenera except the *Plastandrena* by having the posterior spur of the hind tibia being rather strongly curved and broadened near the base by a
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membranous flange. Aporandrena can be separated from the Plastandrena by its much finer sculpturing, especially by the finely tessellate enclosure of the propodeum (in Plastandrena the enclosure of the propodeum is rugose or rather coarsely areolate). Females of Aporandrena have a normal tibial scopa, an incomplete propodeal corbicula with simple hairs throughout, and conspicuous pale apical tergal bands. The males of Aporandrena have a yellow or partially yellow clypeus, narrow genal areas, and relatively short mandibles.

There is a possibility that this subgenus may be merged with one of the European subgenera proposed by Hedicke (1933). Additional study of the Eurasian forms related to Plastandrena and Aporandrena is needed before this decision can be made.

5. Plastandrena Hedicke


This subgenus contains several North American species and is widespread at least in the western states. The author agrees with Popov (1949) in synonymizing Hedicke's Schizandrena with Plastandrena. Furthermore, other Eurasian subgenera, such as Hedicke's Poecilandrena, may be merged with the Plastandrena after the Eurasian fauna has been more thoroughly studied.

Both sexes of Plastandrena can be readily distinguished from all of the New World subgenera of Andrena (except the Aporandrena) by the posterior spur of the hind tibia being unusually curved and broadened near the base by a membranous flange. The Plastandrena can be distinguished from the Aporandrena in both sexes by having the enclosure of the propodeum coarsely sculptured (rugose or areolate in Plastandrena, tessellate in Aporandrena). Females of Plastandrena have maxillary palpi of normal length, broad facial foveae, simple tibial scopa hairs, the propodeal corbicula incomplete anteriorly and provided with abundant simple internal hairs, and more or less complete pale apical hair bands on terga 2 to 4. The males of Plastandrena are marked by normal maxillary palpi, narrow genal areas, short mandible, usually a yellow clypeus, and
clypeus in the male), and a rather coarsely sculptured propodeal enclosure. The wing venation is of the *Andrena, s. str.* type, that is, with vein 1st m-cu meeting the second submarginal cell at a distance of two-thirds or more from the base of the cell. The females of *Gonandrena* have propodeal corbicula incomplete anteriorly and with branched internal hairs and the tibial scopal hairs usually weakly plumose.

16. *Opandrena* Robertson


The subgenus *Opandrena* contains only three species, one of which is undescribed. The species are characterized by the shortness of the labrum (especially in the female), the moderately coarsely sculptured enclosure of the propodeum, the punctate and banded metasomal terga, and the well-developed pronotal humeral angle and ridges. The females have normal tibial scopal hairs without branches, a propodeal corbicula which is incomplete anteriorly and provided with internal hairs, and broad facial foveae. The males have a yellow clypeus and parocular areas (occasionally partially infuscated or almost entirely black) and decussate mandibles.

17. *Cnemidandrena* Hedicke


This is a large subgenus occurring throughout North America during the summer and fall months. Both sexes are characterized by the well-developed humeral angles and ridges (almost carinate in males and not interrupted by a suture, the short malar space, the first tergum usually having a pale apical hair band as well as succeeding terga, the fore wings with vein 1st m-cu meeting the second submarginal cell at two-thirds of distance from base of cell or more, and the strongly bidentate and reflexed labral process. The females are marked by the middle basitarsus being much broadened medially (broader than hind basitarsus), the hind tibial scopal hairs being simple and short, and the propodeal corbicula being complete anteriorly and without internal hairs. The males have a black
clypeus in the male), and a rather coarsely sculptured propodeal enclosure. The wing venation is of the *Andrena, s. str.* type, that is, with vein 1st m-cu meeting the second submarginal cell at a distance of two-thirds or more from the base of the cell. The females of *Gonandrena* have propodeal corbicula incomplete anteriorly and with branched internal hairs and the tibial scopal hairs usually weakly plumose.

16. **Opandrena Robertson**


The subgenus *Opandrena* contains only three species, one of which is undescribed. The species are characterized by the shortness of the labrum (especially in the female), the moderately coarsely sculptured enclosure of the propodeum, the punctate and banded metasomal terga, and the well-developed pronotal humeral angle and ridges. The females have normal tibial scopal hairs without branches, a propodeal corbicula which is incomplete anteriorly and provided with internal hairs, and broad facial foveae. The males have a yellow clypeus and parocular areas (occasionally partially infuscated or almost entirely black) and decussate mandibles.

17. **Cnemidandrena Hediche**


This is a large subgenus occurring throughout North America during the summer and fall months. Both sexes are characterized by the well-developed humeral angles and ridges (almost carinate in males and not interrupted by a suture, the short malar space, the first tergum usually having a pale apical hair band as well as succeeding terga, the fore wings with vein 1st m-cu meeting the second submarginal cell at two-thirds of distance from base of cell or more, and the strongly bidentate and reflexed labral process. The females are marked by the middle basitarsus being much broadened medi ally (broader than hind basitarsus), the hind tibial scopal hairs being simple and short, and the propodeal corbicula being complete anteriorly and without internal hairs. The males have a black
clypeus in the male), and a rather coarsely sculptured propodeal enclosure. The wing venation is of the Andrena, s. str. type, that is, with vein 1st m-cu meeting the second submarginal cell at a distance of two-thirds or more from the base of the cell. The females of Gonandrena have propodeal corbicula incomplete anteriorly and with branched internal hairs and the tibial scopal hairs usually weakly plumose.

16. Opandrena Robertson


The subgenus Opandrena contains only three species, one of which is undescribed. The species are characterized by the shortness of the labrum (especially in the female), the moderately coarsely sculptured enclosure of the propodeum, the punctate and banded metasomal terga, and the well-developed pronotal humeral angle and ridges. The females have normal tibial scopal hairs without branches, a propodeal corbicula which is incomplete anteriorly and provided with internal hairs, and broad facial foveae. The males have a yellow clypeus and parocular areas (occasionally partially infuscated or almost entirely black) and decussate mandibles.

17. Cnemidandrena Hedicke


This is a large subgenus occurring throughout North America during the summer and fall months. Both sexes are characterized by the well-developed humeral angles and ridges (almost carinate in males and not interrupted by a suture, the short malar space, the first tergum usually having a pale apical hair band as well as succeeding terga, the fore wings with vein 1st m-cu meeting the second submarginal cell at two-thirds of distance from base of cell or more, and the strongly bidentate and reflexed labral process. The females are marked by the middle basitarsus being much broadened medially (broader than hind basitarsus), the hind tibial scopal hairs being simple and short, and the propodeal corbicula being complete anteriorly and without internal hairs. The males have a black
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in the United States. Both sexes can be readily recognized by the elongate facial quadrangle, the elongate galeae, the elongate labial and maxillary palpi, and the distinct pronotal humeral angles and dorsoventral ridges. The records indicate that the single known species of the subgenus, *A. violae*, collects pollen only from flowers of the genus *Viola*.

12. Oligandrena Lanham


This subgenus of western bees contains a few rather heterogeneous species. Both sexes are marked by a broad facial quadrangle (especially in the male), a finely sculptured propodeum, an unbandied terga, and pronotal angles and ridges (weakly developed in the female). The females of *Oligandrena* are characterized by having a rudimentary propodeal corbicula, although it is reasonably well developed in one species, *A. diognatha* Timberlake, which Lanham provisionally assigns to this subgenus. The males have a black or yellow clypeus.

13. Hesperandrena Timberlake


A small group of Pacific Coast species of *Andrena* in which the species are well characterized in the female sex by having the propodeum without a well-marked dorsal surface, that is, declivous from apex to base, and with a distinct carina separating each lateral surface from the posterodorsal surface. The males are not so readily distinguished, but are also marked by a completely declivous propodeum with short basal carinæ between each lateral surface and the posterior surface. Both sexes have short clypei which only slightly exceed the lower margins of the eyes (the clypeus is usually yellow in the male) and pronotal angles and ridges, but the ridges are set very near to the hind margin (or the posterior lobe) of the pronotum and both angle and ridge may be poorly developed in the female. Both sexes are also characterized by the finely sculptured pronotum and terga and by the pale tergal bands.

14. Micrandrena Ashmead


This is a medium-sized group of small species of *Andrena* widespread throughout North America. Both sexes are usually characterized by having the first transverse cubital vein ending very close (within 2 to 3 vein widths or closer) to the pterostigma. The pterostigma is usually exceptionally broad, being considerably broader than from the inner margin of the prestigma to the anterior wing margin. In addition, both sexes are marked by an entire labral process, usually with distinct tergal banding, and black or slightly metallic integument. The females have propodeal corbicula incomplete anteriorly and with abundant internal hairs. The males usually have yellow clypei and parocular areas and relatively short antennae. Lanham (1949) provisionally included in this subgenus a series of species (*Andrena miserabilis* Cresson and related forms) which the present author believes should comprise a separate and new subgenus related not to *Micrandrena* but to the *Andrena*, *s. str.* This new subgenus (No. 19) is described in a later section of this paper.

15. *Gonandrena* Viereck


*Tropanclrena* Viereck, 1924, Canadian Ent., vol. 56, p. 21; Cockerell, 1932, Canadian Ent., vol. 64, p. 157 (synonymy). Type species: *Andrena fragilis* Smith, 1853, monobasic and by original description.

The subgenus *Gonandrena* includes several species from the eastern United States. They are characterized by Lanham (1949) chiefly by the genal areas being carinate posteriorly in both sexes. However, the present author has found that in certain species the females may have this carina poorly developed or absent. Both sexes of *Gonandrena* have broad genal areas (usually carinate posteriorly), well-developed pronotal humeral angles and ridges (the ridges are sharp, almost carinate in some species), banded metasomal terga, a shiny, impunctate scutellum, black integument (occasionally yellow
clypeus in the male), and a rather coarsely sculptured propodeal enclosure. The wing venation is of the *Andrena, s. str.* type, that is, with vein 1st m-cu meeting the second submarginal cell at a distance of two-thirds or more from the base of the cell. The females of *Gonandrena* have propodeal corbicula incomplete anteriorly and with branched internal hairs and the tibial scopal hairs usually weakly plumose.

16. *Opandrena* Robertson


The subgenus *Opandrena* contains only three species, one of which is undescribed. The species are characterized by the shortness of the labrum (especially in the female), the moderately coarsely sculptured enclosure of the propodeum, the punctate and banded metasomal terga, and the well-developed pronotal humeral angle and ridges. The females have normal tibial scopal hairs without branches, a propodeal corbicula which is incomplete anteriorly and provided with internal hairs, and broad facial foveae. The males have a yellow clypeus and parocular areas (occasionally partially infuscated or almost entirely black) and decussate mandibles.

17. *Cnemidandrena* Hedicke


This is a large subgenus occurring throughout North America during the summer and fall months. Both sexes are characterized by the well-developed humeral angles and ridges (almost carinate in males and not interrupted by a suture, the short malar space, the first tergum usually having a pale apical hair band as well as succeeding terga, the fore wings with vein 1st m-cu meeting the second submarginal cell at two-thirds of distance from base of cell or more, and the strongly bidentate and reflexed labral process. The females are marked by the middle basi tarsus being much broadened medially (broader than hind basitarsus), the hind tibial scopal hairs being simple and short, and the propodeal corbicula being complete anteriorly and without internal hairs. The males have a black
clypeus, lack the basal mandibular tooth, and usually have the genal areas angulate posteriorly.

18. Simandrena Pérez


The subgenus Stenandrena Timberlake is being synonymized with the subgenus Simandrena Pérez for the reasons discussed in the introduction. Timberlake (1949) states that, except in regard to the tibial scopal hair character, the Stenandrena are remarkably similar to the Simandrena, the males being indistinguishable even in phallic characteristics. Since the tibial scopal hair character no longer separates the two groups (see introduction), maintaining Stenandrena as a separate group is not tenable.

The subgenus Simandrena is characterized in both sexes by the weakly punctate clypeus (especially in the male), the weakly punctate and dull metasomal terga, the normal pronotum, the finely sculptured propodeal enclosure which is bounded by a distinctly raised but fine suture, and the base of the propodeum especially narrow (the lateral surfaces of the propodeum are enlarged at the expense of the posterior surface, thus forming a narrow base). The females are distinguished by the propodeal corbicula being complete anteriorly and bare internally. The female tibial scopal hairs are either extremely short and simple (shorter than the width of the tibia near the apex) or long and plumose. The males are marked by a black clypeus.

19. Larandrena, new subgenus

Type species: *Andrena miserabilis* Cresson, 1872

This subgenus includes a group of species which Lanham (1949, p. 209) included provisionally in the subgenus Micrandrena. The
are rather large bees for *Micrandrena*, and do not have the first transverse cubital vein of the front wing ending near the pterostigma. Both sexes are characterized by the well-developed humeral angles and ridges on the pronotum, the clypeus being impunctate and polished medially, and usually the front wing having vein 1st m-cu ending about two-thirds of the distance from the base of the second submarginal cell. Females have the tibial scopa with weakly plumose hairs throughout and a propodeal corbicula which is incomplete anteriorly and with long weakly branched internal hairs. The males have a yellow clypeus (and usually the parocular area with a small yellow macula) and decussate mandibles.

Medium-sized to small bees with white or pale ochraceous vestiture. Facial quadrangle about as long as broad or longer; lateral ocellus separated from vertex by about one ocellar diameter; labial palpus normal; maxillary palpus normal, exceeds galeae when stretched forward by about last two palpal segments; clypeus relatively flat, evenly rounded from side to side, protruding beyond eyes in facial view by slightly more than half median clypeal length, impunctate and shiny in median one-third or more (rarely less); malar space linear; genal areas in lateral view distinctly broader than eye. Pronotum with distinct humeral angle, ridge extending down from humeral angle sharp, interrupted by diagonal suture, more distinct in male than in female; propodeum with dorsal area distinct, slightly longer than metascutum medially; enclosure of propodeum finely sculptured, shagreened or tessellate, not rugulose. Tergal integument weakly but distinctly punctate, shiny. Hind tibial spur normal. Pterostigma as broad or slightly broader than from inner margin of prestigma to anterior wing margin; first transverse cubital vein separated from pterostigma by more than three vein widths; vein 1st m-cu meeting second submarginal cell at about two-thirds distance from base of cell. Vestiture generally pale; terga 2–4 (and 5 in the male) with more or less distinct pale apical hair bands.

**Female.** Facial fovea broad, shallow, upper end occupying more than half space between eye and lateral ocellus; labral process bidentate, reflexed. Middle basitarsus not expanded medially, normal. Subgenal corona well developed; tibial scopal hairs pale, weakly plumose throughout but especially posteriorly; trochanteral floculus weak but complete; propodeal corbicula incomplete anteriorly, with abundant internal hairs some of which are weakly plumose.

**Male.** Clypeus yellow, parocular areas usually with small yellow maculae; mandibles somewhat decussate.
20. *Thysandrena* Lanham


*Thysandrena* is a large and rather heterogeneous assemblage of species occurring throughout North America. When the species are better known, one or more groups now included in this subgenus may be found to belong to subgenera now known only in Eurasia. For instance, Hedicke's *Euandrena* seems to be closely related to the *Thysandrena*. The type species of *Euandrena* is *Andrena gwynana* (Kirby). This species seems to be a typical *Thysandrena* except that it lacks distinct tergal pale hair bands at least in the females. There are North American species of *Thysandrena* in which the tergal hair bands are weak. The author has not had the opportunity to examine males of *A. gwynana*, therefore a decision cannot be reached as to the status of these forms at this time. At present the *Thysandrena* are characterized rather negatively as the species lack the specializations which characterize the other subgenera.

Both sexes of *Thysandrena* are marked by having distinct tergal hair bands, lacking the humeral angle and ridge on the pronotum, having generally black integument frequently slightly metallic, having the propodeal enclosure finely sculptured, and having a normal hind tibial spur. The females of *Thysandrena* have the tibial scopal hairs of normal length and almost entirely simple and have the propodeal corbicula incomplete anteriorly and provided with abundant internal hairs. The males of *Thysandrena* usually have a black clypeus (yellow in a few species), have short, apposite mandibles, and narrow genal areas.

21. *Taeniandrena* Hedicke


A single, presumably introduced, species, *Andrena wilkella* (Kirby) occurs in eastern North America. The other known species of *Taeniandrena* are found in Eurasia. The subgenus is very similar to the *Gymnandrena* and may eventually be synonymized with that taxon. However, the Eurasian species must be studied more thoroughly before this can be done.

The *Taeniandrena* are characterized in both sexes by the lack of the pronotal humeral angle and ridge, by the more or less distinct
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apical tergal hair bands, by the finely sculptured propodeal enclo-
sure, by the coarsely punctate metasomal terga, and by the oval
clypeal punctures (in A. wilkella, the clypeal punctures are not
conspicuously oval in shape). The females have broad facial foveae,
normal tibial scopal hairs, and a propodeal corbicula which is
incomplete anteriorly and provided with abundant long simple
internal hairs. The males have a black clypeus and short mandibles.
Both sexes have rather peculiarly flattened clypeus. The clypeus
is normally protuberant beyond the tips of the compound eyes, but
the posteromedian area is much flattened; this is especially con-
spicious in the male. Neither Hedicke (1933) nor Lanham (1949)
mention the form of the clypeus, and, although this character may
be distinct for A. wilkella, it may not hold for the other Eurasian
species.

22. Ptilandrena Robertson

Ptilandrena Robertson, 1902, Trans. American Ent. Soc., vol. 28,
pp. 187, 192; Timberlake, 1938, Pan-Pacific Ent., vol. 14, p. 24;
Viereck, 1924, Canadian Ent., vol. 56, p. 21; Lanham, 1949,
Type species: Andrena erigeniae Robertson, 1891, by original
designation.

According to Lanham (1949) the Ptilandrena includes a group of
small vernal bees in which the female has highly plumose scopal
hairs. This arrangement includes two rather distinct groups accord-
ing to the present author. The first group, the true Ptilandrena, is
a group of small eastern, vernal species with a distinct pronotal
humeral angle and ridge and plumose scopal hairs in the female
(described below). The second group, the western species which
Lanham includes with the Ptilandrena, form a new subgenus which
is described later (No. 32) in this paper. The western forms lack
the pronotal humeral angle and ridge and some of the species lack
the plumosity of the tibial scopal hairs in the female. Furthermore,
Lanham (1949, p. 216) provisionally included Andrena pallidiscopa
(Viereck) in the Ptilandrena. This species is now the type of a mono-
basic subgenus, Eremandrena (No. 2), described earlier in this paper.

The Ptilandrena, as restricted in this paper, are characterized
in both sexes by the presence of a distinct pronotal angle and
ridge, the ridge being very sharp and set very near to the hind
margin (or the posterior lobe) of the pronotum. In addition, both
sexes are characterized by having pale apical tergal hair bands,
broad genal areas, narrow malar spaces, flat, short clypeus, and black
integument. The females are distinguished by the highly plumose
tibial scopal hairs and the propodeal corbicula being incomplete
anteriorly and hairy internally. The males usually have black clypei (rarely yellow) and decussate, although rather short, mandibles.

23. *Trachandrena* Robertson


The *Trachandrena* is a very large subgenus of rather distinctive bees. Both sexes are characterized by a coarsely sculptured enclosure of the propodeum which usually has longitudinal rugae and a transverse carina at the posterior margin. Females have normal, simple hind tibial scopal hairs, an incomplete propodeal corbicula with abundant simple internal hairs, a deep facial fovea which is usually strongly narrowed in the lower half or less and is well separated from the inner margin of the compound eye, and the apical depressed part of each tergum equals half or more of the median length of the tergum. The males have black clypei, short mandibles, and the apical depressed part of each tergum equals one-third or more of the median length of the tergum. Neither sex shows pronotal humeral angles or ridges.

This subgenus can be easily confused with the subgenus *Mimandrena* Lanham (especially the males) from which it differs only by tergal characteristics mentioned in the keys and in the discussion of *Mimandrena* given below. Males of *Trachandrena* can be confused with those males of the *Plastandrena* which have black clypei. *Plastandrena* males with black clypei have the sixth sternum with strong reflexed lateral teeth which are lacking in *Trachandrena*. The *Trachandrena* is being monographed at present. When the species are better known these two subgenera may be merged.

24. *Mimandrena* Lanham


This is a small subgenus closely related to the *Trachandrena*. Both sexes are characterized in the same way as the *Trachandrena* except that the metasomal terga have narrower depressed apical
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areas. In Mimandrena females the depressed apical areas of the terga are each shorter than half the length of each tergum medially. In the males of Mimandrena the depressed apical areas equal one-third or less of the median length of each tergum. In addition, the females of Mimandrena do not have the facial foveae narrowed below and the foveae are shallower. This subgenus might be merged with the Trachandrena, but this is not being done until the species of the two subgenera have been studied in detail.

25. Xanthandrena Lanham


The Xanthandrena includes a few species of Andrena closely related to the Thysandrena found in western North America. The Xanthandrena are characterized in both sexes by having apical tergal hair bands on tergum 1 as well as the succeeding terga, by the simple pronotum, the finely sculptured propodeal enclosure, the punctate terga, the erect hairs in the basal areas of the terga, and the generally yellow vestiture and black integument. The females have simple long hind tibial scopal hairs and a propodeal corbicula which is incomplete anteriorly and provided with abundant simple internal hairs. The males have black clypei and short mandibles.

26. Diandrena Cockerell


The subgenus Diandrena is one of the few subgenera of Andrena marked by two submarginal cells. Both sexes of Diandrena are further characterized by the metallic blue or green integument, the impunctate propodeum (although the enclosure is often relatively coarsely sculptured), the strongly reflexed bidentate labral process, and the pronotum with humeral angle and ridge usually well developed. The females of Diandrena have simple hind tibial scopal hairs which are occasionally rather short, the propodeal corbicula incomplete anteriorly and with abundant internal hairs, and the terga without conspicuous pale apical hair bands. The males have black clypei (with one exception and that species is doubtfully placed in Diandrena). The species of this subgenus are at present
being monographed by Mr. R. W. Thorp, the University of California at Berkeley.

27. Leucandrena Hedieke


Type species: *Apis sericea* Christ, 1791, by original designation.

This is a medium sized, rather poorly characterized subgenus related to the *Andrena*, s. str. Both sexes of *Leucandrena* are distinguished by having distinct apical hair bands on metasomal terga 2 to 4 (and 5 in the males), a pronotum with humeral angle and ridge (although the dorsoventral ridge is weakly developed and the humeral angles are rather weakly developed in the females), a short, linear malar space, a finely sculptured propodeal enclosure, and front wings with vein 1st m-cu meeting the submarginal cell beyond the middle of the cell and usually at least two-thirds of distance from the base of the cell. The females of *Leucandrena* have simple hind tibial scopal hairs of normal length and a propodeal corbicula which is complete anteriorly but usually with at least a few internal hairs. The males of *Leucandrena* have somewhat decussate mandibles and black clypeo. The labral process is usually bidentate in the female, although occasionally entire, and is almost always bidentate and often reflexed in the male.

28. Melandrena Pérez


Most of the American species of *Andrena* assigned to the subgenus *Melandrena* by Lanham (1949) have since been removed to form a new subgenus (No. 84), the *Onagrandrena* Linsley and MacSwain (1956). Only a few species, those provisionally considered to be *Melandrena* by Lanham, remain in the subgenus *Melandrena*. There is some doubt in the author's mind whether these should remain as American representatives of *Melandrena* or if a new subgenus should be erected to include them. At present they are being left in *Melandrena*. Further study of the species of *Onagrandrena*, of the Eurasian *Melandrena*, and of the few American forms remaining in *Melandrena* will solve this problem.
The American _Melandrena_ are characterized in both sexes by the black or dark metallic-blue integument, the lack of pronotal humeral angles and ridges, the rather coarsely sculptured propodeal enclosure (areolate), and the coarsely punctate metasomal terga and propodeum. The females of _Melandrena_ have the tibial scopal hairs of normal length and a propodeal corbicula which is incomplete anteriorly and provided with abundant simple internal hairs. The male of _Melandrena_ have black or metallic blue clypei and short mandibles.

29. _Gymnandrena_ Hedicke


The _Bythandrena_ of Lanham (1949) differ from the _Gymnandrena_ chiefly by the females having complete trochanteral flocculi, whereas these are incomplete in _Gymnandrena_. The author has found this characteristic to be somewhat variable and not diagnostic. The males of the two groups cannot be separated except on the basis of a genitallic character of dubious diagnostic value. On the other hand, several species included by Lanham in the _Bythandrena_ (but not _Andrena carlini_, the type species) do form a rather distinct grouping on the basis of the shape of the pronotum and the female pollen collecting apparatus. This group is given a new name later in this paper (No. 30).

The _Gymnandrena_, including several species formerly in _Bythandrena_, are characterized as follows: the pronotum lacks humeral angles or ridges, the genal area is broad, the terga usually lack pale apical hair bands, the propodeal enclosure is usually finely sculptured (occasionally moderately roughened), the malar space is short, linear, and the front wing has the pterostigma narrow and vein 1st m-cu meets second submarginal cell near middle of cell (occasionally well beyond middle). The females of _Gymnandrena_ have the trochanteral flocculus complete or incomplete, the tibial scopal hairs simple, short or long, and the propodeal corbicula incomplete anteriorly and with abundant simple internal hairs. The males
usually have black clypei (rarely yellow) and mandibles of moderate length, rarely decussate.

30. Tylandrena, new subgenus

Type species: Cilissa erythrogaster Ashmead, 1890.

The subgenus Tylandrena is proposed to include those species related to Gymnandrena in which both sexes have pronotal humeral angles and ridges and the females have the propodeal corbicula complete anteriorly but provided with simple internal hairs. The new subgenus includes a number of species formerly included in Bythandrena Lanham, but does not include Andrena carlini, the type species of Bythandrena.

Medium to large bees with integument black or red. Facial quadrangle as long as broad or slightly shorter; lateral ocellus separated from vertex by at least one ocellar diameter and usually more; labial palpus normal; maxillary palpus longer than galeae, exceeding galeae when extended forward by at least last two palpal segments; clypeus rounded, protruding beyond ends of eyes by at least half median length of clypeus; malar space linear; genal areas in lateral view much broader than eye (especially in male). Pronotum with distinct humeral angles, each angle slightly concave posteriorly and somewhat ear-shaped (especially in male), with ridge extending down from humeral angle, ridge interrupted medially by deeply impressed suture (especially in males); propodeum with dorsal area distinct, usually longer than metascutum; enclosure of propodeum finely sculptured, tessellate or slightly roughened, sutures at sides straight or bowed slightly outwards. Tergal integument usually impunctate, occasionally moderately punctate. Hind tibial spurs normal. Pterostigma about as broad as from inner margin of prestigma to anterior wing margin; vein 1st m-cu meets second submarginal cell at or beyond middle of cell. Vestiture variously colored, terga rarely with distinct pale apical hair bands.

Female. Facial fovea broad, shallow, upper end occupying more than half space between eye and lateral ocellus; labral process flat, usually entire, occasionally slightly emarginate medially. Pygidial plate large, V-shaped. Middle basitarsus not expanded medially. Subgenal corinet present; tibial scopal hairs short to long, simple; trochanteral flocculus usually complete; propodeal corbicula complete anteriorly, with abundant long simple internal hairs.

Male. Clypeus and parocular areas black; mandibles usually somewhat decussate; labral process usually entire, occasionally emarginate or bidentate.
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31. Scoliandrena Lanham


This is a small subgenus of robust species which occur in California and are related to the Gymnandrena. Females of Scoliandrena can be distinguished by the large flat labral process and the small galeae covered with short hooked hairs. The males of Scoliandrena can be recognized by the extremely large, triangular labral process. Both sexes of Scoliandrena have metallic blue or bluish-green integument and short maxillary palpal buse (as in Callandrena). In characters other than those mentioned, the Scoliandrena are similar to the Gymnandrena.

32. Geandrena, new subgenus

Type species: Andrena coerulea Smith, 1879.

The subgenus Geandrena includes the Ptilandrena-like species occurring in western North America. Both sexes are characterized by having the pronotum without humeral angles or ridges, usually lacking pale tergal hair bands, and having the integument dull metallic blue or black (the clypeus showing violaceous reflections). Occasionally, the females have highly plumose tibial scopal hairs. The females without the plumose scopal hairs resemble small species of Gymnandrena, whereas the males are difficult to separate from certain species of Thysandrena.

Small bees with integument metallic black or metallic blue or bluish-green, clypeus with violaceous reflections. Facial quadrangle longer than broad; lateral ocellus separated from apex of vertex by about one ocellar diameter; labial palpus normal; maxillary palpus exceeds galeae when extended forward by at least last two palpal segments; clypeus rounded, protruding beyond ends of eyes by more than half median clypeal length, punctures usually indistinct, obscured by dense shagreening or tessellation; malar space linear; genal area narrow, not much wider than eye. Pronotum normal, without humeral angle or ridge; propodeum with dorsal area distinct, slightly longer than metascutum, enclosure of propodeum finely sculptured, sutures at sides usually curving slightly outward. Tergal integument indistinctly punctate or not at all punctate, surface usually dulled by dense coarse shagreening. Hind tibial spurs normal. Pterostigma about as broad as prestigma to anterior wing margin; vein 1st m-cu meets second submarginal cell at or near middle of cell. Vestiture usually white, occasionally largely brown; terga 2–4 usually without distinct pale apical hair bands.
Female. Facial fovea narrow, shallow, upper end often occupying no more than half space between eye and lateral ocellus (occasionally more); labral process flat, entire. Pygidial plate V-shaped. Middle basitarsus normal, not expanded medially. Subgenal coronet present; tibial scopal hairs largely simple or highly plumose; hind femora with hairs along anterodorsal margin usually plumose; propodeal corbicula complete or incomplete anteriorly, interior with abundant hairs which are often branched.

Male. Clypeus and parocular areas dark in color; genal area narrow; mandibles short, apposite or slightly crossed, not decussate.

33. Chaulandrena, new subgenus

Type species: *Andrena porterae* Cockerell, 1900.

This subgenus includes a few species formerly placed in the subgenus *Dactylandrena* by previous authors (Lanham, 1949). They can be distinguished in both sexes by the unusually long facial quadrangle and malar space and by the black vestiture. The males can be distinguished from those of *Dactylandrena* by the lack of the front coxal spines.

Medium-sized species with black integument and lacking tergal pale bands. Facial quadrangle much longer than broad; lateral ocellus separated from apex of vertex by more than one ocellar diameter; labial palpus normal; maxillary palpus normal, exceeds galea when extended forward by at least last two palpal segments; clypeus bowed outwards rather strongly, protruding beyond ends of eyes by much more than half median clypeal length (more nearly by two-thirds median clypeal length); malar space long; genal areas in lateral view distinctly broader than eye. Pronotum with humeral angle and ridges, ridge not interrupted by distinctly impressed suture; propodeum with dorsal area distinct, enclosure finely sculptured. Tergal integument obscurely punctate or impunctate. Hind tibial spurs normal. Pterostigma narrow, no broader than prestigma to anterior wing margin and often narrower; veins 1st m-cu meets second submarginal cell at two-thirds or more of distance from base of cell. Vestiture entirely black in female, thorax and head usually pale in male.

Female. Facial fovea broad, short, upper end occupying more than half space between eye and lateral ocellus, lower margin not extending below lower margin of antennal fossa; labral process emarginate medially, somewhat reflexed. Subgenal coronet present; tibial scopal hairs simple, rather long; propodeal corbicula poorly developed, incomplete anteriorly, dorsal fringe of sparse (although long) hairs, internally hairy throughout; trochanteral flocculus complete but hairs rather sparse.
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Male. Clypeus usually yellow; first flagellar segment subequal to second plus third; mandibles very long, decussate; front coxae without spines.

34. *Onagrandrena* Linsley and MacSwain


The subgenus *Onagrandrena* includes a group of black species which collect pollen exclusively from plants of the family Onagraceae. Lanham (1949) included several of these species in the *Melandrena*. The group is difficult to characterize and, perhaps, is of polyphyletic origin. A thorough study of the *Melandrena* (both Eurasian and American species) and *Onagrandrena* is needed to clarify the affinities of the species and species groups.

The *Onagrandrena* are characterized in both sexes by usually having pronotal angles and ridges (usually weakly developed), the terga lacking pale apical hair bands, the propodeal enclosure being moderately coarsely sculptured, the terga usually being distinctly punctate, the front wings having vein 1st m-cu meeting the second submarginal cell well beyond the middle of the cell and usually two-thirds or more of distance from base of cell, and having the clypeus strongly protuberant (extending beyond ends of eyes by considerably more than half the median length of the clypeus). The females are characterized by usually having short facial foveae (not extending down below lower margin of antennal fossae), having the vestiture entirely black, and having long sparse tibial scopal hairs. The males usually have at least the thoracic hairs pale-colored, slightly decussate mandibles, and black clypei.

Female. Facial fovea narrow, shallow, upper end often occupying no more than half space between eye and lateral ocellus (occasionally more); labral process flat, entire. Pygidial plate V-shaped. Middle basitarsus normal, not expanded medially. Subgenal coronet present; tibial scopal hairs largely simple or highly plumose; hind femora with hairs along anterodorsal margin usually plumose; propodeal corbicula complete or incomplete anteriorly, interior with abundant hairs which are often branched.

Male. Clypeus and parocular areas dark in color; genal area narrow; mandibles short, apposite or slightly crossed, not decussate.

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