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XII

RECORDS AND DESCRIPTIONS OF WESTERN BUMBLEBEES (BREMIDÆ)

BY

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This paper is the result of an extensive study of the native western bumblebees contained in the collection of the California Academy of Sciences. Two forms, previously recognized but standing unnamed in my private collection, are herewith recorded and described because of the presence of similar specimens in the collection of the Academy. For the sake of convenience, this paper has been divided into three parts, the first dealing with synonymy, the second with distributional records, and the third with new descriptions.

For the loan of the material upon which this paper is based I am indebted to Mr. E. P. Van Duzee and Dr. E. C. Van Dyke. Individual collectors of the various specimens have not been specifically mentioned in each case. It will suffice, I think, to record that most of the material belonging to the Academy was collected by Dr. E. C. Van Dyke and Mr. E. P. Van Duzee, and that others who aided with the collecting or donated material were: A. J. Basinger, V. W. Owen, G. R. Pilate, J. R. Slevin, A. C. Pickett, O. C. Poling, J. A. Kusche, and C. L. Fox.

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A. NOTES ON SYNONYMY

Bremus sylvicola var. gelidus (Cresson)

Bombus gelidus Cresson, Proc. Acad. Nat. Sci. Phila., 1878, p. 184, ♀.

In 1921, after a careful study of the queen type from the Aleutian Islands now in the collection of the American Entomological Society at Philadelphia, I came to the conclusion that this form was not a distinct species but a color variety and an unusually large specimen of *Bremus sylvicola* (Kirby). The examination of considerable material since that time, particularly specimens in the collection of the California Academy of Sciences, confirms my earlier but unpublished opinion. Franklin, in 1913, although considering them as separate species, expressed an opinion that "I think it probable that they will some day be considered as mere color variants of the same species." Like many other bumblebees, found in temperate and boreal climates, *Bremus sylvicola* (Kirby) displays considerable variation in color throughout its range. In fact, it is difficult to find many specimens exactly alike. All of these color varieties, however, that I have thus far seen, can be conveniently grouped under the following names: *Bremus sylvicola* (Kirby), *Bremus sylvicola* var. *lutzi* Frison, *Bremus sylvicola* var. *johanseni* (Sladen), and *Bremus sylvicola* var. *gelidus* (Cresson). I believe that further division would serve no useful purpose.

B. DISTRIBUTIONAL RECORDS

1. **Bremus nevadensis (Cresson)**

Yukon Territory: Whitehorse, 2 queens, June 5. A new record for Yukon Territory, Canada.

2. **Bremus separatus var. mormonorum (Franklin)**

Idaho: Preston, 1 worker, July 17. The first record of this variety from Idaho.

3. **Bremus morrisoni (Cresson)**

Oregon: Steen Mountains, 1 queen, June 23. *Arizona*: Cochise County, 1 queen, March 9; Ramsey Canyon, Huachuca Mountains, 2 workers, July 10. *California*: Silver Canyon, 1 queen, May 11. *Utah*: Zion National Park, 1 worker.

4. *Bremus crotchii* (Cresson)

California: Santa Monica, 3 queens; Bear Valley, San Bernardino Mountains, 1 queen, July; Claremont, 1 queen; Huntington Lake, 7000 feet, 1 queen, one worker, July 28; Little Panoche Canyon, Kern County, 1 worker, May 22; Panoche Hills, Merced County, 1 worker, May 20; Ensenada Lake, 1 male, June, and Fresno, 4 males.

5. *Bremus rufocinctus* (Cresson)

New Mexico: Cloudcroft, 1 queen, August 5. *Vermont*: Huntsville, 1 worker, July 21.

6. *Bremus occidentalis* (Greene)

A large series of specimens of all castes from various western states. *California*: Meadow Valley, Plumas County, 3 queens, June 1 and 9; Fallen Leaf Lake, 1 queen, July 23; Carrville, Trinity County, 1 queen, June 10, 9 workers, June 10-29; Arcata, 2 workers, June 11; Sisson, 1 worker, 1 male, July 25. *Washington*: Longmire, Rainier National Park, 1 queen, 1 male, July 27; Paradise Valley, Mt. Rainier, 2 queens, 3 workers, July 15-25; Mt. Adams, 1 queen, 1 worker, July 3 and June 30; Lake Quiniault, 1 queen, May 31, and North Bend, King County, 1 worker, July 10. *Oregon*: Olney, 1 queen, 1 worker, June 14-15; Mt. Hood, 5 queens, June 22-24; Steen Mt., Harney County, 3 queens, June 24-26; Corvallis, 1 worker, 2 males, June 11-15; Newport, 1 worker, June 8; Sparta, 2 workers, July 2; Coleston, Jackson County, 5 workers, July 30-31; Alsea Grade, Benton County, 7 workers, June 12-17. *Idaho*: Preston, 1 queen, 1 worker, July 15-19. *Utah*: Pine View, 1 worker, July 21. *Alberta*: Banff, 1 male, June 16. *British Columbia*: Victoria, 1 queen, June 28; Nanaimo, Biological Station, 3 queens, June 27-28.

7. *Bremus occidentalis* var. *proximus* (Cresson)

Alaska: Rampart, 2 queens, 3 workers, July; Savonoski, Naknek Lake, 1 queen, 2 workers, July 2, 1 queen, 4 workers, July 13; Seward, Kenai Peninsula, 1 male, May, 6 males, 1 worker, June; Skagway, 1 queen, May 22. *Washington*: Longmire, Rainier National Park, 1 worker, July 27.

8. *Bremus occidentalis* var. *nigroscutatus* (Franklin)

California: Contra Costa Co., 1 queen; San Francisco, 2 queens, October 9 and 28, 1 worker, August 27, 1 male, October 9; San Francisco, 4 workers, 3 males, August 27; Oakland, 5 workers, 1 male, July 11; Millbrae, 1 worker, August 25, 1 male, July 21, 7 males, September 1; Sobre Vista, 11 workers, October 2-6, 5 males, May 9, 32 males, October 2-6; Berkeley, 2 workers, September 9; San Mateo County, 1 male, September 29; Carmel, 1 male, October 8.

9. *Bremus edwardsii* (Cresson)

A large series of all castes. *California*: Sobre Vista, Sonoma County, 13 queens, January 21, June 22, November 21 and 24, 2 males, April 30 and May 8, 12 workers, February 17, March 19, April 6-30 and May; Carmel, 6 queens, January 27, February 9-23, May 1, June 10, October 25, 1 queen, February, 4 workers, May 18, 20; Meadow Valley, Plumas County, 6 queens, June 1-8, July 2, 3 males, June 7-14, 2 workers, June 5; Porterville, 1 queen, November 9; Claremont, 1 queen; San Francisco, 1 queen, January 26, 2 males, April 20, May 10, 2 workers, April 28, April 20; Carrville, 16 males, May 31, June 7-29, July 1, 3 workers, June 13-25, July 1; Santa Cruz Island, 10 males, May 16-18, June 1; Silver Lake, Plumas County, 4 males, June 19; Sacramento, 1 male, May 28; Marin County, 1 male, April 23; Yosemite Valley, 7 males, May 17, 22, June 7-21; Kean Camp, 5 males, 1 worker, June 6-12; Muir Woods, 2 males, May 4, 21; Pismo, 2 males, April 25; Crystal Lake, San Mateo Co., 1 male, May 7; Nellie Lake, Fresno Co., 1 male, July 25; Yorkville, 1 worker, May 1; Lake Tahoe, 1 worker, June 22; Huntington Lake, 1 worker, July 6, 1 queen, July 9; Nash Mine, Trinity Co., 1 worker, June 13; Ukiah, 1 male, May 10.

10. *Bremus vosnesenskii* (Radoszkowskii)

Oregon: Hood River, 2 queens, June 12; Olney, 2 queens, June 15-16; Waldport, 1 queen, 6 workers, June 5; Jacksonville, 1 worker, 1 male, July 14; Ashland, 1 male, August 2; Crater Lake, 2 queens, July 17. *Washington*: Hoquiam, 1 worker, May 26. *California*: Norval Flats, Lassen Co., 1 queen, May 30; Santa Cruz, 1 queen, October 23, 3 workers, June 1; Yosemite Valley, 1 queen, May 16, 1 worker, June 10; Berkeley, 1 queen, May, 1 queen, October 9, 2 workers, May, 1 worker, September 9, 1 worker, May 12, 1 worker, June 6; San Francisco, 1 queen, July 2, 2 queens, March 30, 2 queens, April 20, 1 worker, October 9, 1 worker, April 28, 2 workers, April 20, 1 worker, May 10, 1 worker, August 2, 1 male, August 27, 1 male, August 27, 1 male, July 2; Inverness, 1 queen, June 11; Soboba Springs, 1 queen, June 3; Carmel, 1 queen, November 17, 11 workers, June 9-25, 1 worker, August 21, 1 worker, June 23, 2 workers, August 6, 1 worker, May 29, 4 workers, July 4-17, 1 worker, July 6; Fallen Leaf Lake, 1 queen, July 14, 1 queen, June 20, 1 worker, July, 2 workers, July 18-23; Carrville, 1 queen, 4 workers, June 3-29, 1 worker, May 31, 1 worker, July 1, 1 male, July 1, 1 male, June 10; Martinez, 3 queens, 2 workers, May 2, 1 queen, June; Muir Woods, 2 queens, May 4; San Mateo, 1 queen, June 15; Bubbs Creek, 1 queen, July 9; South Fork of King's River, 1 queen, July 4; Sobre Vista, 2 queens, September 23-25, 2 workers, 3 males, May 8-9, 28 males, October 2-6, 2 males, September 1-20; McCloud, 1 queen, June 19; Meadow Valley, 1 worker, June 21, 2 males, July 1; Gilroy Hot Springs, 1 worker, May 30; Mesa Grande, 1 worker, July 10, 1 worker, July 17; Fairfax, 1 worker, May 11; Huntington Lake, 1 worker, June 21, 8 workers, July 5-12; Scotia, 1

worker, June 12; Arcata, 1 worker, June 11; Mount Tamalpais, 1 worker, April 6, 1 worker, August 27; Strawberry Valley, 1 worker, 1 male, August 5; Seaside, 6 workers, July 12; Bear Valley, San Bernardino Mountains, 1 worker, July; Oakland, 1 worker, June 7, 4 males, June 30; Kean Camp, 1 worker, June 6-12; Santa Monica, 1 worker, 1 male, July; Cayton, 1 worker, July 12; Preston, 2 workers, 2 males, July 19, 1 male, August 27; Lagunitas, 1 worker, June 25; Nash Mine, Trinity Co., 1 worker, June 13; Mount St. Helena, 1 worker, June 9; Reading, 1 worker, July 6; Laurel Dell, 1 male, August 3; Cisco, 1 male, July.

11. *Bremus bifarius* (Cresson)

California: Mt. Kaiser, 9000 feet, 1 male, July 19.

12. *Bremus bifarius* var. *vancouverensis* (Cresson)

British Columbia: Nanaimo, 16 queens, 3 workers, June 23-25. *Oregon*: Steen Mountains, 2 queens, June 24. *Alaska*: Skagway, 1 worker, July 1.

13. *Bremus bifarius* var. *kenoyeri* (Cockerell)

Oregon: Steen Mountains, 4 queens, June 24-25. *Utah*: Park City, 2 queens, July 2-3; Mount Timpanogos, 1 queen, July 8; American Fork Cañon, 1 queen, July 25.

14. *Bremus bifarius* var. *nearcticus* (Handlirsch)

California: San Francisco, 3 queens, April 20; Paradise Valley, Fresno Co., 1 queen, July 16; Pyramid Peak, Eldorado Co., 1 queen, August 8; Truckee, 1 queen, July 20; Fallen Leaf Lake, 1 queen, 7 workers, July 13-25, 1 queen, June 20, 1 queen, June 17; Huntington Lake, 9 workers, July 5-17; Eldorado County, 4 workers, 1 male, August 8, 9; Bullfrog Lake, Fresno Co., 3 queens, 1 worker, July 10; South Sonoma Co., 1 worker, May 1; Lake Tahoe, 1 worker, June 22; San Mateo County, 1 worker, July 7, 1 male, June 15; Silver Lake, Plumas County, 2 males, June 19; Cisco, 2 males, July; Shasta County, 1 male, June 26. *Oregon*: Crater Lake, 3 queens, July 17-18; Fremont National Forest, 1 queen, June 18; Warner Mountains, Lake County, 1 queen, June 19; Mount Hood, 5 queens, June 11-26; Sparta, 1 queen, 2 workers, 1 male, July 2; Steen Mountains, 1 queen, July 5; Wallowa Mountains, 1 queen, 1 male, July 5. *Washington*: Paradise Valley, Mount Rainier, 1 queen, 2 workers, July 18-25; Mount Adams, 1 worker, July 3. *Alberta*: Banff, 1 worker, June 16. The first definite records of this variety from California, Washington and Alberta.

15. *Bremus sylvicola* (Kirby)

Alberta: Banff, 1 queen, June 16. *Alaska*: Nome, 7 queens, July; Savonoski, Naknek Lake, 1 worker, July 2-19, 2 males, July 4; Makushin Bay, Unalaska Island, 2 workers, July 15; St. Paul Island, Pribilof Islands, 1 queen, June.

The presence of one queen of this species in the Academy collection from St. Paul Island, Pribilof Islands, is surprising. Previous to this record only one species of bumblebee had been recorded from the Pribilof Islands. Furthermore, according to Dr. G. Dallas Hanna "bumblebees are confined solely to St. Paul Island of the Pribilof Group. During seven summers spent up there I have never seen one elsewhere, and the natives, who are quite familiar with the bees, are positive in their assertions that the facts are as stated" (Proc. Calif. Academy of Sciences, 4th Ser. Vol. XI, 1921, p. 186). Mr. George Haley, who presented this specimen to the Academy, states that it was taken by him personally from flowers of lupine at the "wells" a mile from the settlement on St. Paul Island and, as he took no more bees on that trip, there can be no possible error as to locality. However, it must not be overlooked that *Bremus sylvicola* occurs on the mainland of Alaska and in the Aleutian Islands.

16. *Bremus sylvicola* var. *gelidus* (Cresson)

Alaska: Makushin Bay, Unalaska Island, 2 queens, July 14; Dutch Harbor, Unalaska Island, 3 workers, August 13, July 7; Mount Dewey, 8 males, August 19; Skagway, 4 workers, July 14-August 7.

17. *Bremus melanopygus* (Nylander)

Oregon: Olney, 2 queens, 2 workers, 13 males, June 8-15; Newport, 1 queen, 1 male, June 8; Mount Hood, 1 queen, June 22; Alsea Grade, Benton Co., 2 males, June 12; Marshfield, 1 male, June 12; Waldport, 4 males, June 5. *Washington*: Paradise Valley, Mt. Rainier, 18 queens, 25 workers, July 15-25; Forks, 2 workers, 1 male, July 5; Lake Quinault, 7 workers, 1 male, May 30, 31; Port Angeles, 1 worker, May 26. *Alaska*: Seward, 1 queen, 7 workers, June 1; Savonoski, Naknek Lake, 6 workers, July 5; Skagway, 2 queens, May 15-22, 1 queen, 1 worker, July. *California*: Meadow Valley, 1 male, June 19. *Alberta*: Banff, 2 workers, June 16. *British Columbia*: Nanaimo, 5 queens, 4 workers, June 22-28. A new record for California.

18. *Bremus frigidus* (F. Smith)

California: Meadow Valley, Plumas County, 1 queen, June 5; Yosemite Valley, 1 queen, July 7. *Alaska*: Savonoski, Naknek Lake, 5 workers, 1 male, July 2-11. *Alberta*: Banff, 3 workers, 2 males, June 16. A new record for California.

19. *Bremus mixtus* (Cresson)

Alaska: Skagway, 5 queens, May 14-22. *British Columbia*: Nanaimo, 1 queen, June 24. *Washington*: Paradise Valley, Mt. Rainier, 2 queens, July 15, 25; Seattle, 1 queen, 4 workers, 1 male, June 16, 19; North Bend, King County, 6 workers, 6 males, July 8-10; Hoquiam, 8 workers, May 29; Quiniault, 2 workers, May 30; Forks, 1 male, July 2. *Oregon*: Newport, 3 queens, 6 workers, 1 male, June 8; Olney, 10 workers, 4 males, June 14-16; Corvallis, 1 worker, June 12; Waldport, 3 workers, 5 males, June 5; Alsea Grade, Benton County, 3 males, June 12; Coleson, 1 male, June 30. *California*: Crescent City, 2 workers, 2 males, July 24, 25; Huntington Lake, 1 worker, 1 male, July 6, 27; Meadow Valley, Plumas County, 1 male, June 19, 2 males, July 2-8; Strawberry Valley, Eldorado County, 1 male, July 7, 1 male, August 13; Carrville, Trinity County, 1 male, June 28.

20. *Bremus flavifrons* (Cresson)

British Columbia: Nanaimo, 3 queens, 1 worker, June 23-26. *Alaska*: Rampart, 1 queen, 1 worker, 1 male, July; Skagway, 1 queen, July 1. *California*: Fallen Leaf Lake, 1 queen, July 13. *Utah*: Mount Timpanogos, 1 worker, July 8. A new state record for California.

21. *Bremus flavifrons* var. *dimidiatus* (Ashmead)

Washington: Forks, Callam County, 1 queen, July 1; Humptulips, 1 worker, 1 male, May 28, 29; North Bend, King County, 5 males, July 10; Monroe, 1 male, July 4-15; Fork Hoh River, 1 male. *California*: Sisson, 1 male, July 24; Norval Flats, Lassen County, 1 male, July 18; Soquel Creek, Santa Cruz Co., 1 male, May 30. New distributional records for Washington and California.

22. *Bremus flavifrons* var. *ambiguus* (Franklin)

California: Nash Mine, Trinity County, 5 queens, June 13; Pyramid Peak, Eldorado County, 1 queen, August 8; Bubbs Creek, King River, 2 queens, July 9; Carrville, Trinity County, 1 queen, June 29; Fallen Leaf Lake, 1 queen, July 21; Strawberry Valley, Eldorado County, 1 queen, August 10. *Washington*: Lake Quiniault, 1 queen, May 30.

23. *Bremus pleuralis* (Nylander)

Alaska Seward, Kenai Pen., 1 queen, June.

24. *Bremus centralis* (Cresson)

Oregon: Fremont National Forest, 7 queens, June 18; Steen Mountains, Harney County, 2 queens, June 23-26; Warner Mountains, Lake County, 2 queens, 1 worker, June 20; Crater Lake, 1 worker, July 19; Sparta, 2 workers, July 2; Wallowa Mountains, Baker County, 1 worker, July 5.

25. *Bremus centralis* var. *monardæ* (Cockerell)

California: Sobre Vista, Sonoma County, 8 males, June 22-23, 4 males, July 10, 1 male, July; Carrville, Trinity County, 4 males, July 1; Huntington Lake, 2 males, July 27. The first definite record of this variety from California.

26. *Bremus sitkensis* (Nylander)

Alaska: Skagway, 4 queens, May 12-22, 1 queen, July 29, 2 workers, May 22, July 23, 1 male, August 7; Mt. Dewey, 2 males, August 19; Seward, Kenai Peninsula, 2 males, June. *Oregon*: Waldport, 2 queens, 9 workers, 5 males, June 5-6; Olney, 8 workers, 2 males, June 14-15. *British Columbia*: Nanaimo, 1 queen, 11 workers, June 22, 28; Victoria, 1 male, June 28. *Washington*: Paradise Valley, Mount Rainier, 1 queen; Forks, Callam County, 12 workers, 9 males, July 2, 5; Seattle, 2 workers, June 16-19; Hoquiam, 3 workers, May 27; Paradise Valley, Mount Rainier, 1 worker, 1 male, July 20; Quiniault, 10 workers, 2 males, May 30, 1 worker, June 1; North Bend, King County, 2 workers, 1 male, July 9, 10. *California*: Santa Cruz, 1 worker, May 21; Scotia, 2 workers, June 12; Oakland, 1 worker, February 19; Pescadero, 1 male, June 4; Queenville, Sonoma County, 1 male, May 30; Inverness, 1 male, June 11, 2 males, May 22; Muir Woods, Marin County, 1 male, May 2.

27. *Bremus polaris* (Curtis)

Alaska: Nome, 2 queens, 2 workers, July.

28. *Bremus hyperboreus* (Schönherr)

Alaska: Makushia Bay, Unalaska Island, 2 queens, July 14-15; Beach Bay, 1 worker, 1 male, September.

29. *Bremus appositus* (Cresson)

California: Nash Mine, Trinity County, 9 queens, June 13, 15, 2 queens, June 7-29, 11 workers, June 25 and 29; Sisson, 6 workers, July 24, 25; Castella, 1 male, July. *Utah*: Pine View, 1 queen, July 21; Park City, 1 queen, July 2. *Oregon*: Crater Lake, 1 queen, 1 worker, 7000 feet elevation, July 18; Mount Hood, 1 queen, June 23; Wallowa Mountains, Baker County, 1 worker, July 5. *Washington*: Mount Adams, 1 worker, June 20. *Idaho*: Glencoe, Bear Lake County, 1 worker, August 13. A new record for Idaho.

30. *Bremus fervidus* (Fabricius)

Utah: Salt Lake City, 1 queen, June 24; Kings Station, Davis County, 1 worker, July 24.

31. *Bremus fervidus* var. *dorsalis* (Cresson)

Oregon: Sparta, Baker County, 1 queen, July 2; Steen Mountains, Harney County, 1 queen, June 24. The first definite record of this variety from Oregon.

32. *Bremus californicus* (F. Smith)

British Columbia: Victoria, 1 worker, June 28; Nanaimo, 2 queens, June 22. *Oregon*: Sparta, 1 worker, July 2; Olney, 3 queens, June 14, 15; Newport, 1 queen, 1 worker, June 8; Coolestin, 1 worker, July 31; Corvallis, Mary's Peak, 1 queen, June 4. *Washington*: Seattle, 2 queens, June 16-19; North Bend, 1 queen, July 10. *California*: Panoche Hills, 1 queen, April 30; Meadow Valley, 4 queens, June 14-30; San Luis Obispo, 1 queen, April 26; Fremont National Forest, 3 queens, June 18; Carmel, 1 queen, October 11; Oak Glen Lodge, San Bernardino Mountains, 1 queen; Contra Costa County, 1 queen, April 16; St. Monica, 1 queen, 1 worker, July; Claremont, 1 queen, May 22; Berkeley, 1 queen, May; Sobre Vista, 1 queen, 1 worker, 4 males, July 10-17, 3 workers, September 1; Martinez, 2 workers, June 12; Cazadero, 5 males, September 2; Inverness, 1 male, June 11; Keen Camp, 1 male, June 6-12; Preston, 1 male, July 19; Soboba Springs, 2 males, June 2-5; Mesa Grande, 1 male, July 10, 1 July 17.

33. *Bremus californicus* var. *dubius* (Cresson)

British Columbia: Victoria, 1 queen, June 27. *Washington*: Seattle, 1 queen, June 16. *California*: Oakland, 1 male, June 7; Sobre Vista, 1 male, July 10. The first definite record of this variety from British Columbia.

34. *Bremus sonorus* (Say)

Arizona: Baboquivari Mountains, 2 queens, October and September 15, 2 queens, 3 workers, August 18-20, September and October, 5 males, October 3 and November 20, 1 male, October 16; Ramsey Canyon, Huachuca Mountains, 1 queen, July 10, 1 worker, June 13; Santa Rita Mountains, 1 worker, June 4, 2 workers, July 10, 11 workers, August 7; Patagonia Mountains, 2 workers, August 1 and 2; Cochise County, 1 worker, June 26; Oracle, 2 workers, July 27. *California*: Playa del Rey, 1 queen, October 16, 1 worker, October 3, 5 queens, May 31 and June 5; Claremont, 1 queen; St. Monica, 1 queen, 3 workers, July; Riverside, 1 worker, September and 1 worker, June.

35. *Psithyrus suckleyi* (Greene)

Washington: Forks, Clallam County, 1 queen, July 5. *Utah*: Vivian Park, 1 queen, July 7. *Oregon*: Wallowa Mountains, Baker County, 1 queen, July 5; Warner Mountains, Lake County, 1 queen, June 20; Mount Hood, 3 queens, June 22 and 23.

36. *Psithyrus insularis* (F. Smith)

British Columbia: Nanaimo, 5 queens, June 23-27; Victoria, 1 male, June 28. *Alaska*: Savonoski, Naknek Lake, 2 queens, 2 males, July 4-21; Mount Dewey, 2 males, August 19; Skagway, 1 queen, May 11. *Oregon*: Newport, 1 queen, June 8; Wallowa Mountains, Baker County, 3 males, July 5. *Washington*: Port Angeles, 1 queen, May 26; Monroe, 1 male, July 4-14. *Utah*: Aspen Grove, 1 male, August 20; Boy's Camp, Logan County, 1 male, September 7.

37. *Psithyrus crawfordi* Franklin

California: Yosemite, 1 queen, June 19; Fallen Leaf Lake, 1 queen, June 29, 3 males, May 22; Shasta, 1 male, July 23; Meadow Valley, Plumas County, 8 males, June 5-21 and July 1, 2; Martinez, 2 males, May 2; Huntington Lake, 2 males, July 6 and 17; Silver Lake, Plumas County, 1 male, June 19; Strawberry Valley, Eldorado Co., 1 male, August 9; South Fork, King's River, 1 male, 5000 feet elevation, July 5. *Oregon*: Newport, 1 male, June 8.

38. *Psithyrus fernaldæ* Franklin

Washington: Paradise Valley, Mount Rainier, 4 queens, 1 male, July 7, 15, 25; Longmire, 5 males, August 12; Forks, 8 males; July 2, 5; Lake Quiniault, 1 male, May 30. *Oregon*: Walport, 9 males, June 5, 6; Newport, 2 males, June 8; Marshfield, 8 males, June 11, 12, 14, 19. *California*: Eureka, 1 male, July 25.

39. *Psithyrus fernaldæ* var. *wheeleri* Bequaert and Plath

California: Yosemite Valley, 1 queen, May 25; Meadow Valley, Plumas County, 2 males, June 7; Strawberry Valley, Eldorado Co., 1 male, July 7. *Oregon*: Mount Hood, 2 queens, June 22, 24; Waldport, 6 males, June 5; Marshfield, 3 males, June 12, 13.

C. DESCRIPTIONS

Bremus edwardsii russulus Frison, new variety

Worker. Structurally identical with the worker of *edwardsii* (Cresson) [= *fernaldi* Franklin]. Differs from typical specimens of *edwardsii* (Cresson) in having the pubescence upon the dorsum of the fourth segment mostly ferruginous in color and that on the fifth and sixth dorsal segments with a golden color.

Holotype: worker, taken in **Yosemite Valley**, June 24, 1902, in collection of the author. One paratype in collection of the author, three in that of the California Academy of Sciences.

Paratypes, workers: 1, Meadow Valley, Plumas County, California, 3500-4000 feet altitude, June 4, 1924 (E. C. Van Dyke); 1, Yosemite Valley, California, June 9, 1921 (E. C. Van Dyke); 1, Lake Tahoe, California, June 22, 1925 (E. H. Nast); 1, Huntington Lake, Fresno County, California, 7000 feet altitude, July 6, 1919 (Mrs. E. P. Van Duzee).

***Bremus crotchii nigricaudus* Frison, new variety**

Queen. Structurally identical with the queen of *crotchii* (Cresson). Differs from typical specimens of *crotchii* (Cresson) in having the pubescence on the apical dorsal abdominal segments entirely black, or at least with only a faint suggestion of a ferruginous tinge.

Holotype: queen, No. 2436, Mus. Calif. Acad. Sci., collected by C. H. Muzzall, at **Claremont, California**. Paratype, queen, collected by J. A. Kusche at Sobre Vista, Sonoma Co., California, in the collection of the author.

The paratype is smaller than the holotype and it is possible that it may be a large worker instead of a queen. Less specialization has evidently taken place between workers and queens in this subgroup of the genus than in others. This variety is recorded as "Color Variant 1" by Franklin (1913), but not given a varietal name.

***Bremus flavifrons vandykei* Frison, new variety**

Worker. Structurally identical with the worker of *flavifrons* (Cresson) as redescribed by Franklin, 1913, except that the malar space is slightly shorter. Differs in color characters from typical specimens of *flavifrons* (Cresson) and its varieties *flavifrons dimidiatus* (Ashmead) and *flavifrons ambiguus* (Franklin) as follows: Pure yellow pubescence above and below bases of antennæ and on occiput. Dorsum of thorax with a clearly defined wide black band between wings, anterior dorsal portion of thorax with pure yellow pubescence,

and scutellum mostly yellow. Pubescence on second dorsal abdominal segment, except yellowish hairs on its posterior margin and lateral posterior corners, almost entirely black; third segment entirely covered with yellow pubescence; lateral margins of fourth segment fringed with some yellowish pubescence. Hairs fringing corbiculæ entirely black.

Holotype: worker, No. 2437, Mus. Calif. Acad. Sci., collected by Dr. E. C. Van Dyke, June 30, 1925, on **Mt. Adams, Yakima Indian Forest Reservation, Washington**, 3000 ft. elevation. Paratype, one worker, same data, in collection of the author.

The proper status of this form has proved a puzzle to me. Superficially it resembles *Bremus edwardsii* (Cresson). It may be easily separated from that species, however, by the fact that the first and fourth dorsal abdominal segments are mostly covered with black pubescence. The form we are now considering as *Bremus bifarius* var. *nearcticus* (Handlirsh) somewhat resembles *vandykei*, but the comparatively shorter malar space of the former offers a good character for their separation. The length of the malar space of the variety *vandykei* is somewhat suggestive that this form may be entitled to specific recognition. My decision to consider *vandykei* a variety rather than a new species is based upon the fact that the two specimens just described are the only ones of a similar character that I have ever seen. Furthermore, *Bremus flavifrons* (Cresson) is exceedingly variable in color characters. *Bremus flavifrons* var. *ambiguus* (Franklin) somewhat approaches *vandykei* in color characters and is frequently found in collections from Washington. Biological studies of *Bremus flavifrons* (Cresson) are needed to throw light upon the limits of color variation in this species.

I take pleasure in naming this variety for its collector, Dr. E. C. Van Dyke, to whom the Academy is mainly indebted for the development of its collection of bumblebees.

***Bremus caliginosus* Frison, new species**

Male. Identical in coloration with the male of *Bremus vosnesenskii* (Radoszkowskii) as redescribed by Franklin (1913). Differs structurally from that species as follows:

Malar space almost twice as long as its width at articulation of mandible, at least two-thirds as long as greatest width of, and slightly over one-fourth length of, the eye. Third and fifth antennal segments of almost equal length, fourth much shorter than either.

ILLUSTRATIONS

(Camera lucida drawings by Mrs. K. H. Paul)

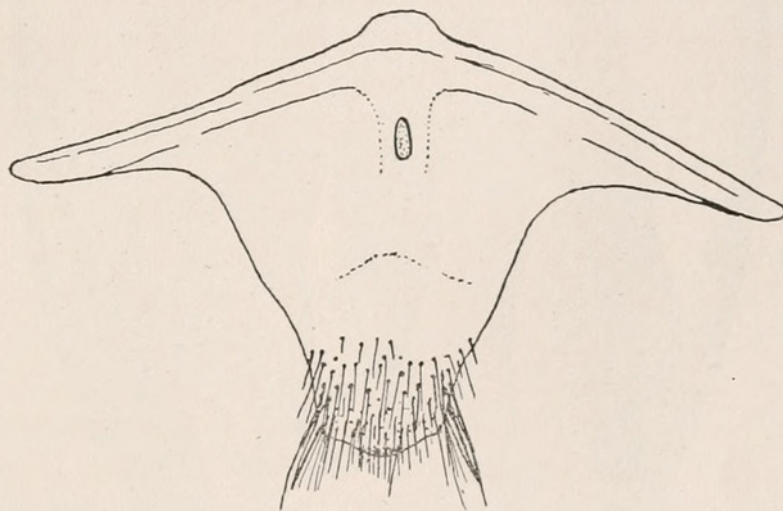


Fig. 1. *Bremus caliginosus* new species, outer spatha.

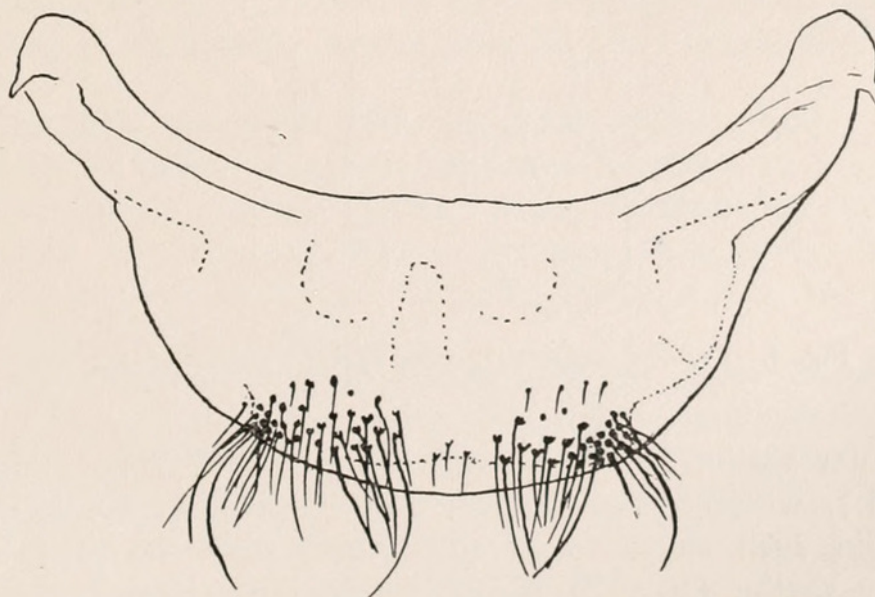


Fig. 2. *Bremus caliginosus* new species, inner spatha.

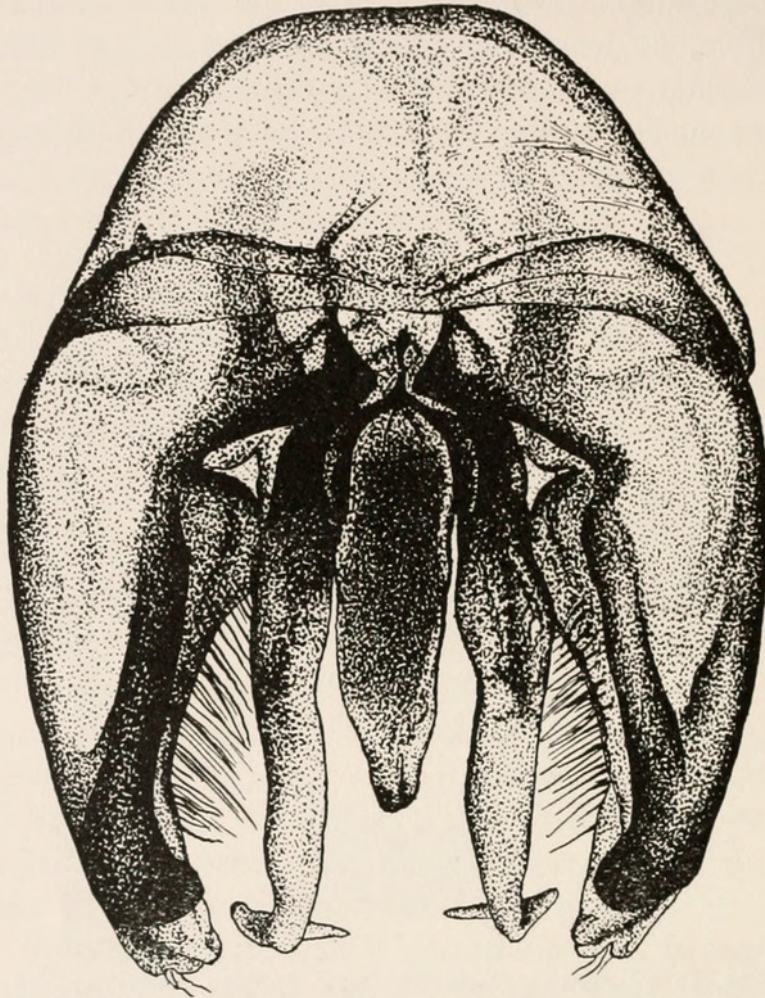


Fig. 3. *Bremus caliginosus* new species, genitalia, dorsal aspect.

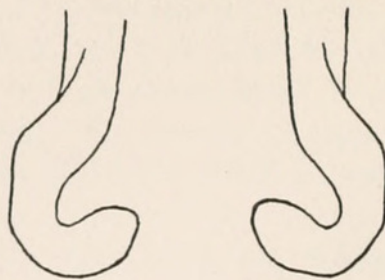


Fig. 4. *Bremus caliginosus* new species, heads of sagittæ.

Outer spatha (Fig. 1) about like that of *Bremus sitkensis* (Nyl.), without prominent median indentation on posterior margin such as is found in *Bremus vosnesenskii* (Rad.) Inner spatha (Fig. 2) about like that of *Bremus sitkensis* (Nyl.), without prominent median indentation on posterior

margin of caudal projection such as is found in *Bremus vosnesenskii*.

Inner apical point of volsella (Fig. 3) more conspicuous than outer apical point, a condition reversed in the case of *B. vosnesenskii*. Inner apical angle of squama (Fig. 3) broadly rounded, this being more pointed in *B. vosnesenskii*. Shafts of sagittæ (Fig. 3) straighter than in *B. vosnesenskii*, and with sickle-shaped heads (Fig. 4) dilated instead of narrow as in *B. vosnesenskii*.

Holotype: male, taken by C. D. Duncan, September 16, 1920, at **Arcata, California**, in collection of the author. Paratypes, males, 1, Monterey, California, June 21, 1921 (L. S. Slevin); 1, Lagunitas, Marin County, California, June 25, 1924 (E. H. Nast); 2, Carmel, California, May 16 and June 19, 1921 (L. S. Slevin), 2 May 24 and July 11, 1925 (L. S. Slevin); 1, Mt. St. Helena, Napa County, California, June 9, 1918 (E. P. Van Duzee); 2, Sobre Vista, Sonoma County, California, June 22, 1910 (J. A. Kusche); 2, Requa, California, August and September 13, 1920 (C. D. Duncan); 1, Brookings, Oregon, July 9, 1923 (G. A. McGinnis); 1, Corvallis, Oregon; 1, "W. T." (= Washington); 1, Mt. Sideo, twelve miles northwest, Carson, Washington, October 21, 1918 (A. C. Burrill); 1, Kings Valley, Oregon, July 18, 1905 (Vincent); 1, Vancouver, Washington, August 14, 1907 (Nettie Currin); 1, Alsea, Oregon, August 2, 1921 (H. A. Scullen); Gold Beach, Oregon, July 10, 1925 (H. A. Scullen).

Nine paratypes in the collection of the author. Seven paratypes in the collection of the California Academy of Sciences. Four paratypes in the collection of the Oregon Agricultural College. The antennæ of one paratype from Sobre Vista, California, are abnormal in that the seventh, eighth and ninth segments are much enlarged.

This species is undoubtedly standing in many collections under the name of *Bremus vosnesenskii* (Radoszkowskii). I first became aware of the existence of this form in 1921, while making a comparative study of the genitalia of the North American species of this genus. A description of the species was not published at that time because of the poor condition of the two specimens then in my possession and the

desire to see additional material. The series of eighteen specimens just recorded is sufficient to indicate that the characters of this form are constant and easily serve to distinguish it from the form we are now calling *vosnesenskii* (Radoszkowskii). I have examined hundreds of the males of this latter species and have found no evidence of a transition between it and *Bremus caliginosus* Frison.

Undoubtedly the workers and queens of this species mimic in color those of *Bremus vosnesenskii* (Radoszkowskii). I have tried to definitely locate and separate the workers and queens of *vosnesenskii* and *caliginosus*, without satisfying results. At least, I have not been able to point out any tangible characters for their separation by others. The solution of this problem must probably await the examination of additional material or specimens from a single nest in which all castes are represented.

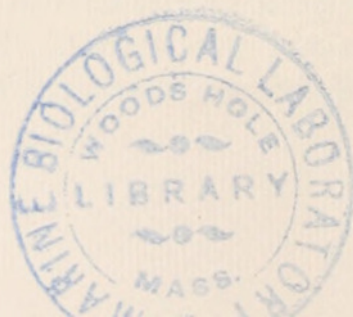
The male of this new species is easily recognized from *Bremus vosnesenskii* (Radoszkowskii) by its longer malar space, differences in comparative lengths of third, fourth and fifth antennal segments, and the greatly dilated sickle-shaped heads of the sagittæ. All these characters indicate that *Bremus caliginosus* Frison is a member of the *sitkensis-flavifrons* complex rather than of the *huntii-vosnesenskii* complex of the subgenus *Pratobombus* Vogt.

***Bremus caliginosus tardus* Frison, new variety**

Male. Structurally identical with the male of *Bremus caliginosus* Frison as described in this paper. Differs in coloration from *Bremus caliginosus* Frison by having the dorsal abdominal segments entirely covered with black pubescence.

Holotype: male, No. 2438, Mus. Calif. Acad. Sci., collected by L. S. Slevin, July 20, 1921, at **Carmel, California.**

This variety of *Bremus caliginosus* Frison is readily separable from *Bremus vosnesenskii* (Radoszkowskii) by the lack of yellow pubescence upon the dorsum of the fourth abdominal segment.





Frison, Theodore Henry, 1895-1945. 1927. "Records and descriptions of Western bumblebees (Bremidae)." *Proceedings of the California Academy of Sciences, 4th series* 16, 365–380.

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