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A NEW SUBSPECIES OF PINE GROSBEAK FROM ARIZONA WITH CRITICAL NOTES ON OTHER RACES

WITH FIVE ILLUSTRATIONS

By RANDOLPH JENKS

The White Mountains of central-eastern Arizona, from which the new race comes, represent a boreal "island" set apart from the high Rocky Mountains in northern New Mexico by about 200 miles of Upper Sonoran Zone. They are similarly separated from other continuous chains of mountains and high plateaus in all directions except the west. Here the Mogollon Plateau, a high southerly continuation of the Colorado Plateau, connects them by a narrow belt of Transition Zone to the boreal region of San Francisco Mountain in north-central Arizona, nearly 200 miles away. Looking from an aeroplane, one would say that the area called the White Mountains resembles a large bulge at the southeast end of a narrow, forested island. This region has previously been described more fully (Jenks, Condor, vol. 38, 1936, pp. 242-243).

Pine Grosbeaks collected in the White Mountains appeared to be different from *Pinicola enucleator montana*. This circumstance stimulated a review of the species. The writer has personally examined more than 500 skins of pine grosbeaks representing all known races of the species, except those of eastern Asia.

In reviewing the status of the Pine Grosbeak in Arizona, I find that the first specimen, an adult female (U. S. Nat. Mus. no. 241988), was collected on July 30, 1915, by Dr. H. H. T. Jackson of the United States Biological Survey, at 9500 feet altitude on Baldy Peak, White Mountains, Arizona. The specimen was not reported upon.

The first published record of pine grosbeak for Arizona is that of Vorhies (Condor, vol. 32, 1930, pp. 262-263), who saw six at Jacob Lake Ranger Station, Transition Zone, Kaibab Plateau, June 24, 1929. He was unable to collect specimens. The only other Arizona record is that of Jenks and Stevenson (Condor, vol. 39, 1937, pp. 89-90), who recorded Pine Grosbeaks from the White Mountains under the name of *montana*.

Other records have all been from the Rocky Mountain-Great Basin region north and east of Arizona, the closest being Cedar Breaks, Iron County, Utah, and Kingston, Sierra County, New Mexico. I have been unable to examine the two specimens collected November 12, 1904, by O. B. Metcalfe of Kingston, in the Mimbres Mountains of New Mexico (Bailey, Birds of New Mexico, 1928, p. 694), but from the geographical and faunal affinities between the Mimbres and Mogollon mountains of southwestern New Mexico and the White Mountains of central-eastern Arizona, I should expect to find them closer to *jacoti* than to *montana* unless they are migrants from northern New Mexico. Specimens from northern New Mexico are *montana*.

***Pinicola enucleator jacoti*, new subspecies. Arizona Pine Grosbeak.**

Type.—Randolph Jenks collection no. 1; red adult male; collected at Phelps Ranger Station, 9500 feet, Canadian Zone, northeast base of Baldy Peak, White Mountains, 6 miles south of Greer, Apache County, Arizona, by A. R. Phillips, October 21, 1936; prepared by J. G. Correia, field no. 4G. Named in honor of Edouard C. Jacot, whose admirable work on Arizona birds is well known.

Subspecific characters: The average red adult male, autumn and winter plumage.—Similar to *P. e. montana*, but bill decidedly stubbier; tip of culmen more abruptly decurved and not projecting so far beyond end of lower mandible; tip of lower mandible more rounded in outline and appearing

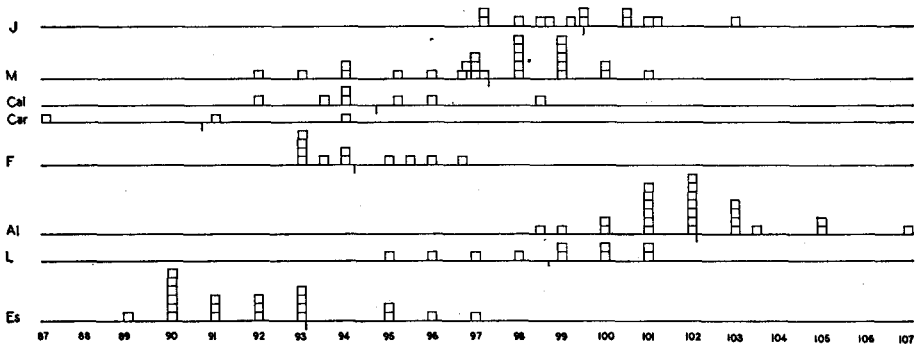


Fig. 13. Tail lengths (in millimeters) of adult male Pine Grosbeaks. Each square represents a single bird; averages are indicated by short perpendicular lines. Abbreviations are as follows: Es, *eschatosus*; L, *leucura*; Al, *alascensis*; F, *flammula*; Car, *carlottae*; Cal, *californica*; M, *montana*; J, *jacoti*. See table, page 32.

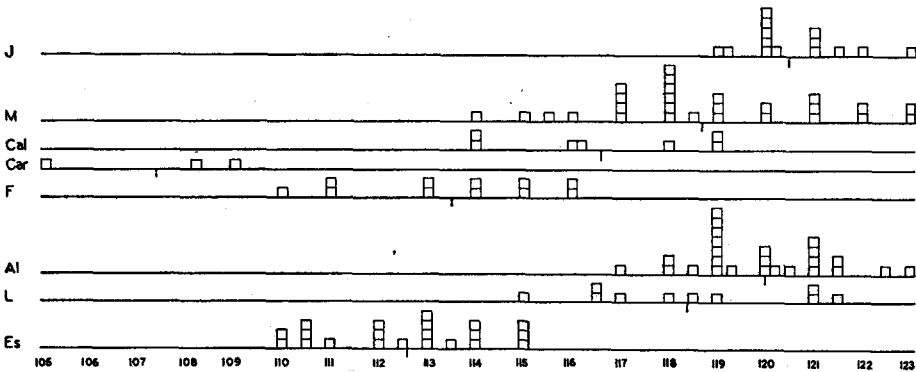


Fig. 14. Wing lengths of adult male Pine Grosbeaks. See figure 13 for explanations.

stubbier; bill as a whole averages shorter, higher and wider at base. (Method of preparation and tying of bill were taken into consideration in all specimens examined.) Wings and tail average longer. In coloration, upper surface darker, appearing dark mouse gray rather than fuscous as in *montana* (names of colors based on Ridgway, Color Standards and Color Nomenclature, 1912); head, nape, hind neck and rump, darker and less vivid red, appearing nopal red rather than scarlet red or jasper red as in *montana*, the red usually not extending so far down on belly; breast slightly lighter red than head; dark patches or spotting in feathers on back more distinct than in *montana*, appearing dark mouse gray surrounded by feather edgings of pale neutral gray; outer primaries edged narrowly with light orange yellow grading into similarly narrow edgings of thulite pink on inner primaries, in this respect similar to, but more distinct than, *montana*; two white wing bars distinct and only rarely tinged with pink; under side of tail feathers mouse gray; lower belly pale neutral gray; iris brown; upper mandible black, lower mandible blackish brown; feet and tarsi brownish black. (Colors taken from fresh specimens.)

Red adult male, worn summer plumage.—Similar to fresh plumage of red adult male, but red more unevenly distributed, more mottled, and slightly brighter due to wear.

Molt takes place during August, sometimes beginning in late July, and the fresh postnuptial plumage is generally fully acquired by the middle of September.

Other adult males.—There is an undetermined proportion of breeding males which do not appear to obtain the full red plumage. Whether or not they ever attain the red plumage is not known. They resemble the average immature male described below, but their measurements coincide with those of the average red adult male. Brooks (Condor, vol. 24, 1922, pp. 87-88) says, "The proportion of

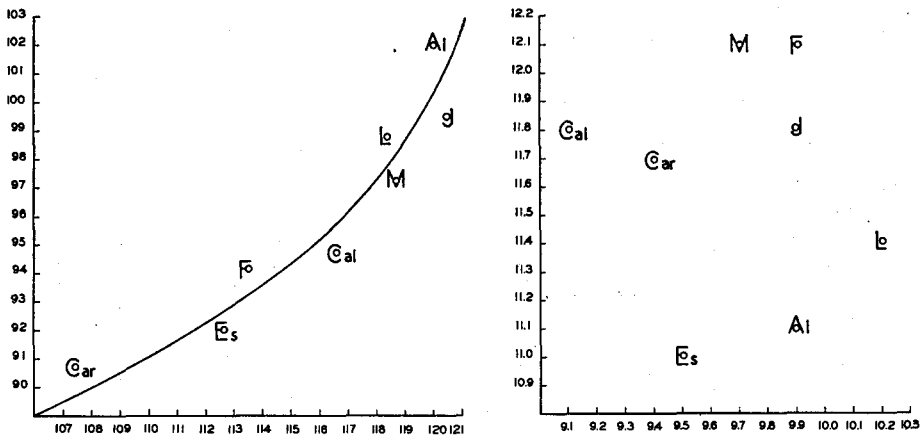


Fig. 15. At left: Average correlations between wing and tail lengths for races of adult male Pine Grosbeaks. Horizontal axis, wing; vertical axis, tail; line, curve of relative wing and tail length. At right: Correlation between width of bill (horizontal axis) and length of bill from nostril (vertical axis) for races of Pine Grosbeaks. The average for each subspecies is indicated by position of its abbreviation. Numbers of individuals for each race may be found in tables on pages 31, 32, the averages being the same as given therein.

red males in *Pinicola* is much smaller than in *Loxia* or *Carpodacus* and is probably not more than one in three of breeding birds. The proportion of red males in collections may be higher, but this is obviously due to the fact that collectors will take a red male in preference to a gray bird in nearly all cases . . . Of five breeding pairs seen in the season of 1920, only one was a red male." The case for *jacoti* may be somewhat different for geographical reasons. Red males were not taken in preference to gray birds and in the series of adult males from the White Mountains of Arizona there are more red than gray birds. Whatever the racial significance of red adult male *Pinicola* may be, it is yet to be worked out satisfactorily by means of a correlation of life history with morphological study based upon more specimens.

Adult female, autumn and winter plumage.—Head and nape mars orange to mars yellow, in most cases darker than head and nape of *montana*; rump often tinged with mars yellow or mars orange but sometimes lacking this; upper back with lighter, less distinct spotting than in adult male;

wing edgings of outer primaries paler yellow, inner primaries edged with gray or white; throat light buff; wings, tail and gray of upperparts and underparts same as adult male; bill same as adult male. Measurements nearly the same as in adult males, but averaging slightly less.

Immature male, first winter plumage.—Similar to adult female, but with amount and tone of color on head, neck, rump and wing edgings varying from condition same as in adult female to redder color resembling that of red adult male but not so extensive; breast usually remains more or less gray, but sometimes tinged with mars orange or reddish; distribution of color generally restricted as in adult female; bill same as adult male. Most immature males similar to adult female but with slightly darker head and neck. Wing and tail of 14 immature males of first winter plumage average 1.6 and 1.1 mm., respectively, shorter than the average for red adult males.

Immature female.—Similar to adult female, but with head and neck usually lighter and with more greenish yellow, usually appearing raw sienna or old gold rather than mars yellow; bill same as in adult male.

Range.—Boreal Zone of the White Mountains in central-eastern Arizona, Apache County. Breeds above 8,500 feet altitude, chiefly in the Hudsonian division of the Boreal Zone.

COMPARISON OF *P. E. JACOTI* WITH OTHER RACES

White Mountains birds differ from *montana* and from all other North American races especially in the character of their beaks. Since these birds are closest to the range of *montana*, I have made primary comparisons with this form, in spite of the fact that the Arizona series resembles selected specimens of *alascensis*.

The type of *montana*, adult female, U. S. Nat. Mus. no. 159689, came from Bear Creek, Gallatin County, Montana (Ridgway, Auk, vol. 15, 1898, p. 319) and has long been recognized as a distinct race. The principal characters setting it apart from the Sierra Nevada form, *californica*, are its larger size, longer wing and tail, longer, thicker and wider bill, and brighter, deeper red coloration of red adult males. It inhabits the Boreal Zone of the Rocky Mountains and southern Boreal "islands" from western Alberta and eastern British Columbia southward through Idaho, Montana, Wyoming, Utah and Colorado to the mountains of central-northern New Mexico. It is relatively non-migratory, as is the case with all western races of pine grosbeak, but often descends to lower elevations in the winter. There are winter records of this subspecies as far east as northwestern Nebraska. I have examined specimens which are intermediate between *montana* and *flammula* and between *montana* and *alascensis*. *Montana* intergrades with *alascensis* in northern British Columbia and southern Yukon, and with *flammula* in eastern British Columbia, just as *leucura* intergrades with *alascensis* in the Northwest Territory (Griscom, Proc. New Eng. Zool. Club, vol. 14, 1934, p. 12). *Montana* of New Mexico and Colorado probably does not interbreed with birds from eastern Arizona because of the isolation of the latter group.

Average and extreme measurements in millimeters of adult males of *Pinicola enucleator*

Subspecies	No.	Exposed culmen	Bill from nostril	Gonys	Lower mandible
<i>eschatosus</i>	21	13.9 (12.6-15.2)	11.0 (9.8-12.2)	8.9 (8.4-9.6)	11.7 (11.2-12.5)
<i>leucura</i>	10	14.6 (14.0-15.1)	11.4 (10.7-12.1)	9.2 (8.5-9.8)	12.3 (11.9-13.0)
<i>alascensis</i>	26	13.9 (13.0-15.1)	11.1 (9.8-11.7)	8.9 (8.4-9.6)	12.1 (11.3-13.1)
<i>flammula</i>	12	15.7 (15.0-16.3)	12.1 (11.3-12.8)	10.1 (9.6-10.4)	13.4 (13.0-13.9)
<i>carlottae</i>	3	15.1 (14.5-15.8)	11.7 (11.4-12.1)	9.1 (8.8-9.5)	12.2 (12.0-12.5)
<i>californica</i>	8	14.8 (13.4-15.8)	11.8 (10.9-12.3)	9.7 (9.1-10.2)	12.7 (11.9-13.7)
<i>montana</i>	29	15.5 (14.3-16.6)	12.1 (11.1-13.1)	9.8 (9.1-10.7)	13.1 (12.4-13.9)
<i>jacoti</i>	13	14.8 (14.0-15.4)	11.8 (11.0-12.6)	9.7 (9.1-10.3)	13.0 (12.2-13.6)
<i>jacoti</i>	type	15.0	11.6	9.8	12.9

Subspecies	No.	Width of culmen	Height of bill	Wing	Tail
<i>eschatosus</i>	21	9.5 (9.3-9.7)	11.4 (10.7-12.4)	112.6 (110.0-115.0)	92.1 (89.0-97.0)
<i>leucura</i>	10	10.2 (10.2-10.6)	12.0 (11.5-13.0)	118.4 (115.0-121.5)	98.7 (95.2-101.0)
<i>alascensis</i>	26	9.9 (9.1-10.7)	11.8 (11.0-12.6)	120.0 (117.0-123.0)	102.1 (98.5-107.0)
<i>flammula</i>	12	9.9 (9.5-10.6)	11.6 (10.9-12.7)	113.5 (110.0-116.0)	94.2 (93.0-96.7)
<i>carlottae</i>	3	9.4 (9.1-9.8)	11.2 (11.1-11.5)	107.4 (105.0-109.0)	90.7 (87.0-94.0)
<i>californica</i>	8	9.1 (8.5-9.5)	10.4 (9.5-11.2)	116.6 (114.0-119.0)	94.7 (92.0-98.5)
<i>montana</i>	29	9.7 (9.3-10.3)	11.3 (10.4-11.8)	118.7 (114.0-123.0)	97.3 (92.0-101.0)
<i>jacoti</i>	13	9.9 (9.4-10.4)	11.4 (10.5-12.1)	120.5 (119.0-123.0)	99.5 (97.2-103.0)
<i>jacoti</i>	type	9.8	12.0	121.0	97.2

The exposed culmen was measured from the point where the bases of the feathers of the forehead meet the culmen to its tip. Length of bill from anterior margin of the nostril gives a more accurate index of bill length than the exposed culmen. The width of the bill at the posterior base of the nostrils is significant in differentiating races. Middle toe and tarsus do not show racial difference well. Tail and wing are the most significant measurements for non-molting birds.

COMPARISON OF RED ADULT MALES OF *PINICOLA ENUCLEATOR* OF WESTERN NORTH AMERICA

	<i>alascensis</i>	<i>flammula</i>	<i>carlottae</i>	<i>californica</i>	<i>montana</i>	<i>jacoti</i>
Red	lightest (coral red)	dark (scarlet)	darkest (nopal red)	medium (jasper red)	medium (jasper red)	medium dark (scarlet red)
Gray	lightest	dark, with olive	darkest, with most olive	medium	medium	medium light
Wing and tail	lightest	medium dark	medium dark	medium	medium	darkest (dark mouse gray)
Upper wing bar	widest	narrow	narrow	medium	medium	next to widest
Wing	next to longest	short	shortest	medium	long	longest
Tail	longest	short	shortest	medium	long	next to longest
Bill: length	shortest	longest	long	long	long	next to shortest
width	widest	fairly wide	medium	narrowest	wide	wide
hook	hook next most decurved; short	hook least decurved; long	hook medium long	hook next least decurved	hook medium	hook most decurved; short, sharp

In most specimens the actual color of the breast was the same as that of the back but in some it appeared lighter because of the presence of more gray feathers. Red is given for the head and nape. Hook, refers to the end of the upper mandible.

The arrangement of subspecies in the accompanying tables and figures is primarily geographical. It may be seen that *jacoti* lies closest to *alascensis* in most characters. Wing and tail of *jacoti* are especially close to *alascensis*, the large extreme. *Jacoti* has the longest wing and *alascensis* the longest tail. In bill proportions these races also are similar.

GEOGRAPHICAL DISTRIBUTION OF BREEDING PINE GROSBEAKS

Montana.—Within the 1,500 miles of north-south range of *montana* transitions can readily be traced northward from the larger, lighter colored birds of Colorado, New Mexico and Utah to the smaller, darker birds of eastern British Columbia. Specimens from northern Idaho are midway between those of Utah and eastern British Columbia. On the other hand, specimens of *montana* from Wyoming, Montana and western Alberta do not diminish appreciably in size but exhibit a gradual transition toward *alascensis* and *leucura*, sharing characters with each of these races. They have stubbier bills and lighter colored plumage than the breeding specimens of northern Idaho and southern British Columbia, but the bills are not so stubby and the plumage not quite so pale as in typical

alascensis. It may be that at the northern limits of the range of *montana*, the crest of the Rocky Mountains is the dividing line between areas of intergradation, the more humid western-slope birds tending toward *flammula* and the more arid eastern-slope birds toward *alascensis* and *leucura*. Specimens from southeastern Yukon appear to share characters with *montana*, *alascensis* and *leucura*, but they are closer to *alascensis* than to the other two races.

Strangely enough, as Brooks (*loc. cit.*) suggested, *carlottae* resembles *enucleator* of northwestern Europe more closely than does any other North American race.

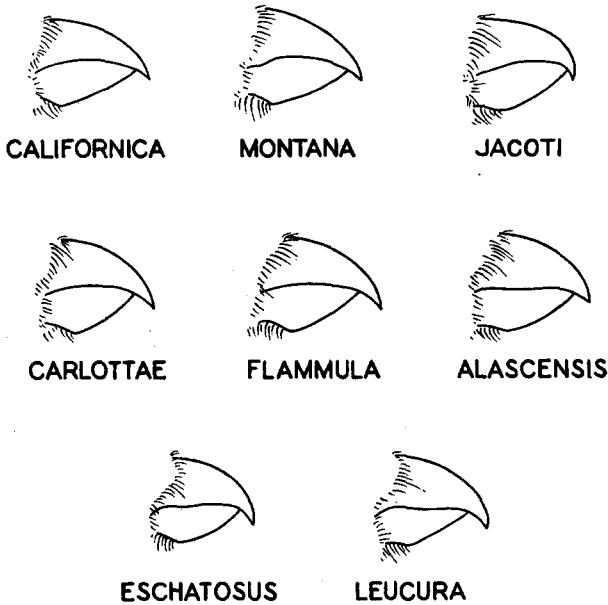


Fig. 16. Comparison of bills of adult male *Pinicola enucleator*.
Life-size drawings by P. Artemieff.

Californica.—Restricted to the Boreal Zone of the Sierra Nevada of California. As far as is known at present *californica* breeds from approximately 39° 45' latitude in Plumas County to 37° 30' in Mono County. Specimens of this race are scarce in collections, but in the 30 breeding birds examined, I find evidence for the constant and distinct race which Price (*Auk*, vol. 14, 1897, p. 182) so thoroughly described. Due to isolation in a very limited area there is no intergrading toward *flammula* or *montana*.

Subspecies?—I have been unable to examine specimens of breeding pine grosbeaks from the coast district or Cascade Mountains of Washington and Oregon, but Kitchin (*Northwest Fauna Series*, no. 1, 1934, p. 19) reports that *montana* has been recorded from the Cascade Mountains at the north boundary of Washington. No specimens are listed as collected. Breeding material from Washington and Oregon needs to be carefully examined and compared with *flammula*, *montana* and *californica* before it is definitely assigned to any particular subspecies, new or otherwise.

Jacoti.—Restricted to a Boreal "island" on the White Mountains of Arizona; a well isolated race.

Leucura.—The forested Hudsonian Zone of Canada is occupied by *leucura* (Griscom, *op. cit.*, pp. 5-12). During the breeding season this race inhabits most of northern Canada, at least where conifers grow profusely, from the Atlantic coast of northern Labrador to Yukon, where it intergrades with *alascensis*. Specimens from eastern Yukon share characters with both races. From northeastern Labrador to the south end of Hudson Bay *leucura* intergrades with *eschatosus* of southeastern Canada. Breeding specimens from these regions show characters common to both races.

Eschatosus.—Breeds locally in the Canadian Zone of most of southeastern Canada. This subspecies is nearly as small as *carlottae* and occurs at nearly the same latitude, but it has a more extensive range. It inhabits southeastern Canada from central-eastern Labrador west to the south end

of Hudson Bay and south to the region of the Gulf of St. Lawrence, including Newfoundland and the mountains of northern Maine and northern New Hampshire. It intergrades with *leucura* in the northern part of its range. Breeding specimens from central Labrador are larger than *eschatosus* and smaller than *leucura*, with intermediate bills.

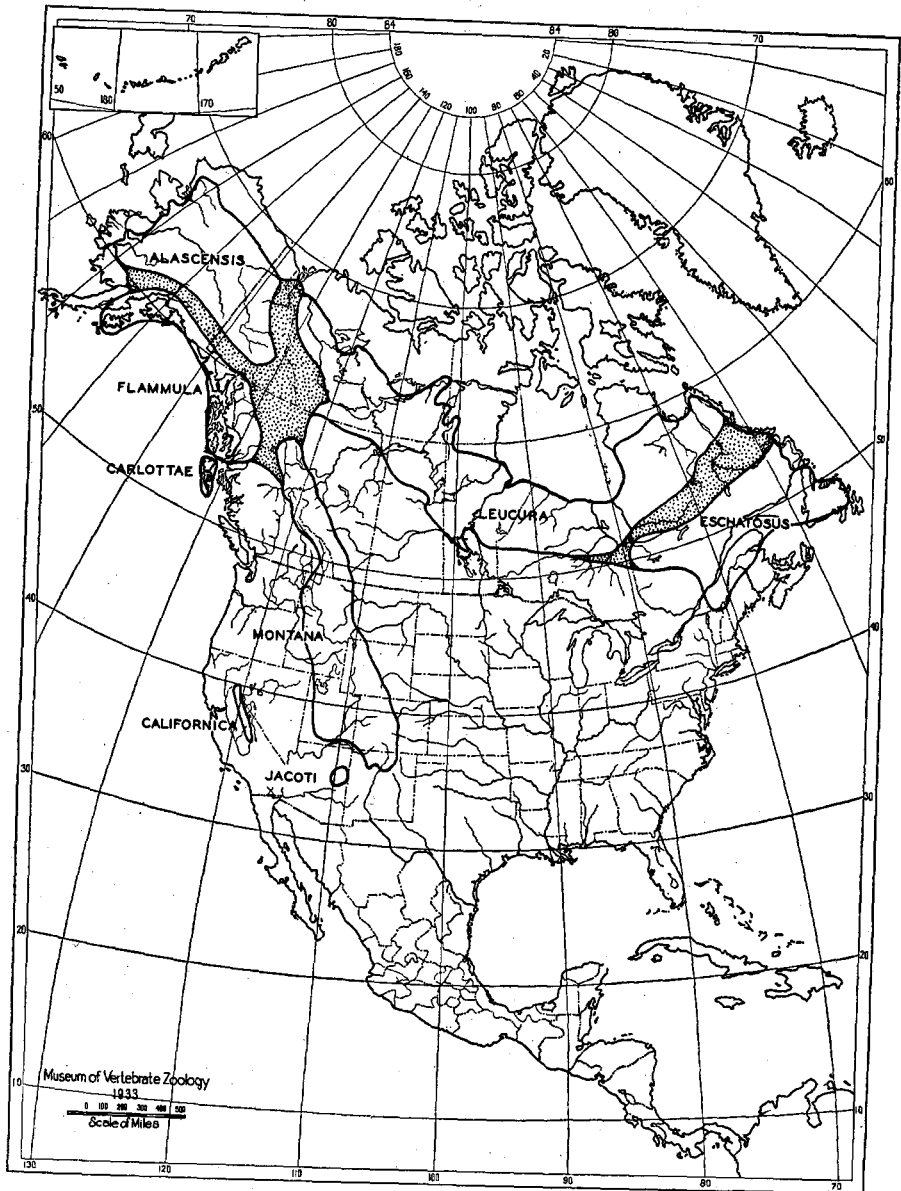


Fig. 17. Breeding ranges of North American *Picicola enucleator*. Heavy lines indicate approximate boundaries of breeding range for each race, with the understanding that the northernmost forms do not occupy treeless areas and the southernmost forms only occupy Boreal Zone, including Boreal "islands." Stippled areas indicate regions of intergradation.

KEY TO THE RACES OF PINE GROSBEAKS OF WESTERN NORTH AMERICA

RED ADULT MALES ONLY

- A. Plumage very dark; head and nape nopal red to scarlet.
- B. Wing under 110 mm.; tail under 93 mm.; bill shorter; darkest and smallest of western races. Queen Charlotte Islands, British Columbia.....*carlottae*
- BB. Wing over 110 mm.; tail over 93 mm.; bill longer
Coast of southern and southeastern Alaska.....*flammula*
- AA. Plumage light; red usually coral red to jasper red or scarlet red.
- C. Bill longer, not stubby, tip of upper mandible not abruptly decurved.
- D. Wing and tail shorter; bill narrow (8.5-9.5 mm.), shorter, smaller.
Sierra Nevada of California.....*californica*
- DD. Wing and tail longer; bill wide (9.3-10.3 mm.), longer, larger.
Rocky Mountains from Canada to New Mexico.....*montana*
- CC. Bill short, stubby, tip of upper mandible abruptly decurved.
- E. Coral red; bill not so strongly hooked; wings and tail lighter (fuscous).
Yukon and Alaska except the south coast.....*alascensis*
- EE. Scarlet red to jasper red; bill strongly hooked; wings and tail darker (dark mouse gray).
White Mountains of Arizona.....*jacoti*

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I am further indebted to the following persons for enabling me to compare representative examples of Pine Grosbeaks: Mr. J. L. Peters, Museum of Comparative Zoology; Mr. E. T. Gilliard and Mr. J. T. Zimmer, American Museum of Natural History; Dr. H. C. Oberholser, U. S. Biological Survey; Dr. A. Wetmore, U. S. National Museum; Dr. R. T. Orr and Mr. J. Mailliard, California Academy of Sciences; Dr. W. H. Rich, Stanford Museum of Natural History; Mr. A. M. Bailey, Colorado Museum of Natural History; Mr. E. R. Warren, Colorado College Museum; Dr. R. V. Chamberlin, University of Utah; Dr. A. S. Hyde, Conner Museum, State College of Washington; Major Allan Brooks, Okanagan Landing, British Columbia.

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University of Arizona, Tucson, Arizona, August 15, 1937.