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Systematic Notes on Palearctic Birds. No. 34 Picidae: The Genera *Picus* and *Dryocopus*

By Charles Vaurie

The following notes were made during a study of the Palearctic species of *Picus* and *Dryocopus*. The study was based primarily on the collections of the American Museum of Natural History, but I have also used a large amount of material lent to me by several institutions and examined the series in the British Museum. I am much indebted to the following for lending me specimens from the collections under their care: Dr. G. Diesselhorst of the Munich Museum, Dr. H. Friedmann of the United States National Museum, Mr. J. C. Greenway, Jr., of the Museum of Comparative Zoölogy, Mr. J. D. Macdonald of the British Museum (Natural History), Dr. G. Niethammer of the Koenig Museum in Bonn, and Dr. A. L. Rand and Mr. M. Traylor of the Chicago Natural History Museum. Dr. David Snow has corresponded with me concerning the Green Woodpecker of Africa, and Mr. Macdonald and his staff helped me, as usual, with much kindness during my visit to London.

Picus viridis

The Green Woodpecker (*Picus viridis*) varies geographically, and 11 races are recognized by Peters (1948, Check-list of birds of the world, Cambridge, Harvard University Press, vol. 6, pp. 131–132). The material that I have studied shows, however, that the forms sufficiently well differentiated to warrant nomenclatural recognition consist only of four: nominate *viridis* Linnaeus, 1758, type locality, Sweden; *sharpei* Saunders, 1872, type locality, Spain; *innominatus* Zarudny and Loudon, 1905, type locality, Zagros in southwestern Iran; and *vaillantii*

Malherbe, 1847, type locality, Algeria. The last is considered to be a separate species by Peters (*loc. cit.*) and Hartert (1912, Die Vögel der paläarktischen Fauna, p. 893). An additional race (*bampurensis* Zarudny, 1911, type locality, southeastern Iran) is perhaps recognizable. *Bampurensis*, and the relationships of *vaillantii* to *viridis*, are discussed below after the discussion of the first three races.

The synonyms of nominate *viridis* are, in my opinion: *virescens* C. L. Brehm, 1831, type locality, Germany; *karelini* Brandt, 1841, type locality, Gurgan, northern Iran; *saundersi* Taczanowski, 1878, type locality, Caucasus; *pluvius* Hartert, 1911, type locality, England; *pronus* Hartert, 1911, type locality, Italy; *dofleini* Stresemann, 1919, type locality, Macedonia; and *romaniae* Stresemann, 1919, type locality, Romania. Some authors call the German populations by the name *pinetorum*, *frondium*, or *brehmi*. The first two were described by C. L. Brehm from Germany at the same date and in the same work, but *pinetorum* is preoccupied, *frondium* is used by Peters because it has page priority over *virescens*, although earlier revisers, among them Hartert, had chosen *virescens; brehmi* is a new name bestowed on *frondium* by Kleinschmidt in 1919.

Some of the forms synonymized with nominate *viridis* differ from it only in size, and are discussed below. Others differ also in coloration but the variations in coloration are slight or inconstant. The populations from the greater part of Europe are identical in coloration, and specimens were examined by me from western Russia, Sweden, East Prussia, central, eastern, and southern Germany, Austria, Hungary, Romania, Bulgaria, Holland, England, France, Switzerland, Italy, and Serbia. In the specimens seen from Macedonia, Asia Minor, the Caucasus, Transcaucasia, Azerbaijan, and the southern Caspian districts of northern Iran, the cheeks are a little paler, less tinged with greenish, than in the populations enumerated above, the back is slightly duller green, less bright and yellow, in fresh plumage, or is more grayish in worn plumage. The differences in the color of the cheeks or of the back in fresh plumage are very slight, but in some populations the difference in worn plumage is more distinct. This last difference is most distinct and constant in the population (*dofleini*) from Macedonia; all the specimens examined from Macedonia are grayish, some quite distinctly so, but four of the 14 that are comparable to my specimens of nominate *viridis* differ so very slightly from the latter that they are virtually identical with it. In specimens from Asia Minor, the Caucasus, Transcaucasia, Azerbaijan, and Iran the back is grayish in only about one-third of the specimens in worn plumage and, in fresh plumage, is

duller in only about half of the specimens, the other specimens being indistinguishable from nominate *viridis* in worn or fresh plumage. In the two specimens in fresh plumage that I have seen from Macedonia and in two specimens each from Albania and Greece, the color of the back is identical with that of nominate *viridis*. I have not seen specimens in worn plumage from these last two regions, the populations of which are called *dofleini* in the literature. Von Jordans (1940, Izv. Tzar. Prirod. Inst. Sofiya, vol. 13, pp. 123–126), who has seen more material of *dofleini* in fresh plumage than I have, states that specimens collected in September and October are identical with *virescens* (a form identical with nominate *viridis* in coloration) or differ from it only slightly, the cheeks being also tinged with greenish in some specimens. In short, the differences in coloration are not constant in the eastern populations.

Stresemann (1928, Jour. Ornith., vol. 76, p. 395), who has discussed the population of the southern Caspian (*karelini*), states that it does not differ from his own *dofleini* in coloration and has the same wing length, but that *dofleini* has a "somewhat" longer bill. However, as shown below, the overlap in measurements is virtually complete. Stresemann remarks that specimens in juvenal plumage from Iran do not differ "clearly" from specimens from Germany; the five specimens in juvenal plumage that I have from Iran, three of which are topotypes of *karelini*, are indistinguishable from nominate *viridis* in the same plumage.

Gladkov (1951, Birds of the Soviet Union, vol. 1, p. 561) states that *karelini* or, in fact, any population of *viridis* does not differ in coloration. This is clearly incorrect, as shown below, but it seems to me that *karelini*, *saundersi*, or *dofleini* is not sufficiently well differentiated to warrant recognition. Specimens from Romania (*romaniae*) are identical with nominate *viridis*.

The material from the east compared by me to nominate *viridis* consists of 20 specimens of *dofleini* from Macedonia which include the type and 17 paratypes, four specimens from Albania and Greece, one from Bulgaria, two from Romania, including the type of *romaniae*, nine from Turkey, six from the Caucasus, two from Transcaucasia, one from Azerbaijan, and 15 from the southern Caspian, including topotypes of *karelini*, and also five specimens in juvenal plumage from northern Iran. I am particularly grateful to Dr. G. Diesselhorst for including the types of *dofleini* and *romaniae* in the material he lent me from the Munich Museum.

In addition to these specimens, I have examined a series of seven

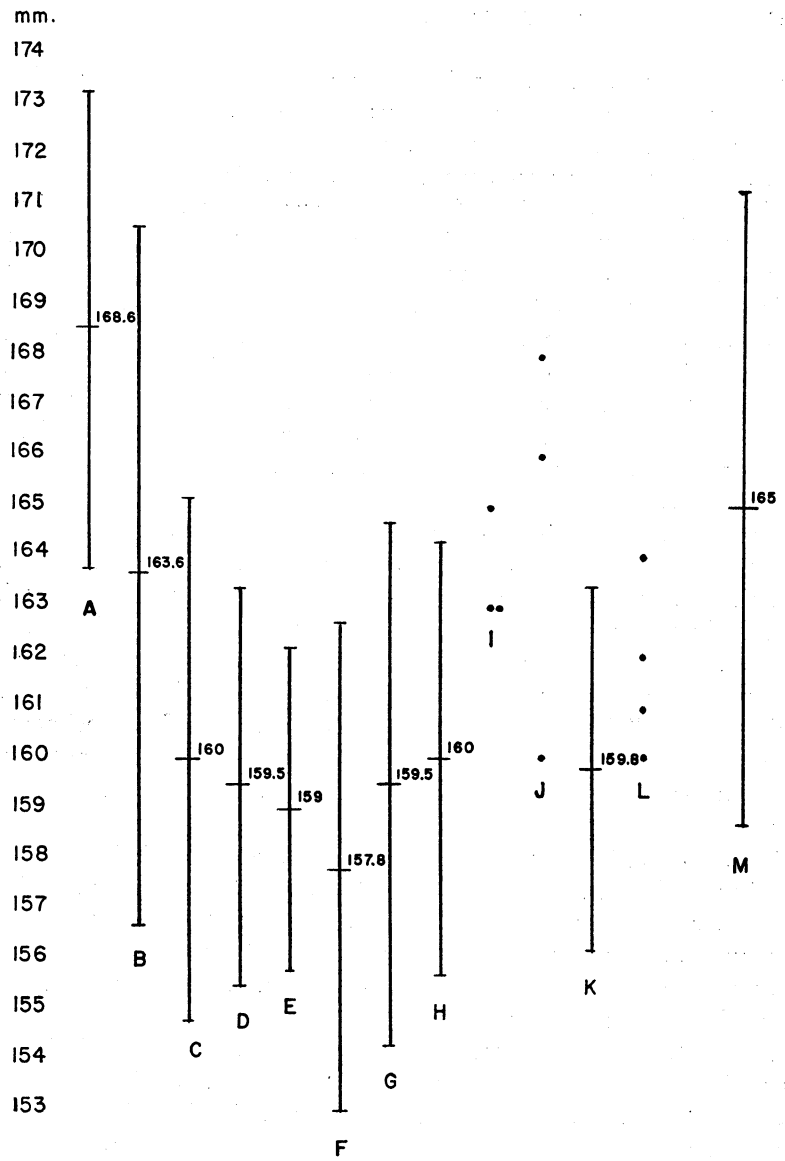

FIG. 1. Geographical variation in the wing length of adult males of *Picus viridis*. The population M from northwest Africa is placed apart on the graph, as it represents *vaillantii* which is considered to be a separate species by many authors (see text). The horizontal bar represents the statistical mean; the vertical bar, two standard deviations above and below; and dots represent individual measurements. *Symbols:* A, Sweden; B, central and south-central Germany (Thuringia and Hesse); C, France and the Jura in Switzerland; D, England; E, Italy; F, Portugal and Spain; G, Yugoslavia (Serbia); H, southern Yugoslavia (Macedonia); I, Turkey; J, Caucasus; K, southern Caspian districts of northern Iran; L, southwestern Iran (Zagros in Luristan and Bakhtiari); and M, northwest Africa.

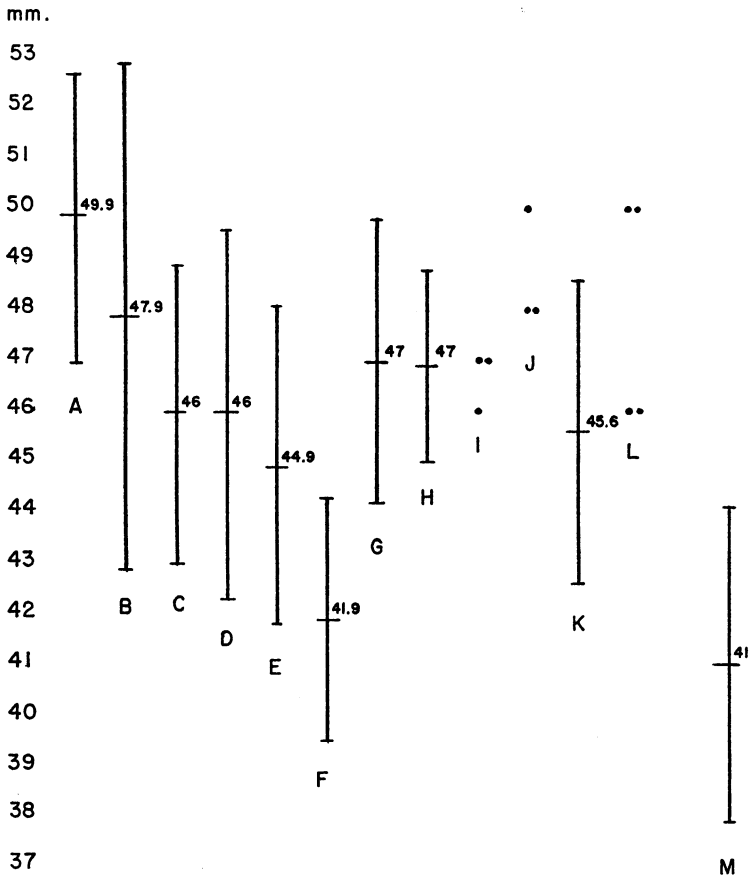

FIG. 2. Geographical variation in the bill length of adult males of *Picus viridis*. For explanation and key see legend of figure 1.

adults and three specimens in juvenal plumage collected by Koelz in the Zagros in Luristan and Bakhtiari. These specimens from southwestern Iran show that *innominatus* is well differentiated in coloration from nominate *viridis* (including *"karelini"*). They are paler throughout in all plumages. The adults are duller green on the back in fresh plumage, more grayish in worn plumage, the cheeks, throat, and upper breast are almost pure white in either plumage, and the barring of the tail feathers averages sharper. The white spots on the edges of the primaries and inner secondaries show also a tendency to be more conspicuous. The specimens in juvenal plumage are more sharply spotted with white above and barred with black below. The markings on the

under parts are darker, more grayish black, less brownish, and contrast more with the ground color which is whitish, considerably paler than in nominate *viridis* in the same plumage. The markings on the under parts are also somewhat reduced in width or abundance in the birds of Iran, especially on the lower abdomen and flanks.

A series of 13 specimens from Spain and five adults and two young birds from Portugal shows that the population of the Iberian Peninsula (*sharpei*) differs very distinctly from nominate *viridis* in coloration. In *sharpei*, the cheeks are very much darker in both sexes, being ashy gray, and the black area on the face is much more reduced. In nominate *viridis*, the pigment on the face is pure black and covers the regions in front and behind the eye to join the moustache, but in *sharpei* the pigment is more sooty than black and is usually restricted to the region in front of the eye. The red moustache of the male is less conspicuously bordered with black in *sharpei*, the red tips of the feathers on the crown of the female are smaller, and, in both sexes, the back averages a little darker and cooler green and the rump more golden than in specimens of nominate *viridis* in comparative plumage. The two specimens in juvenal plumage are distinctly less heavily barred below.

To turn to measurements, the forms *virescens* (Germany) and *pluvius* (England) differ from nominate *viridis* only by being smaller, and measurements have been used also for discriminating *karelini*, *saundersi*, *dofleini*, and *romaniae* from one another, or from nominate *viridis* and *virescens*. However, the measurements analyzed in figures 1 and 2 and listed individually show, I believe, that differences in size should not be used for nomenclatural separation. In *pronus* (Italy) the bill averages slightly more slender than in *pluvius*, but the variations in the shape of the bill are very inconstant.

A cline of decreasing size runs from north to south through western Europe from Sweden to Italy and Spain, and, though the variation does not appear to be clinal, size increases again in southeastern Europe and Asia. The wing measurements of the birds of England, Italy, and Spain do not overlap those of topotypical nominate *viridis* from Sweden, but these populations are connected to *viridis* by populations with intermediate measurements in France and especially Germany.

Niethammer (1936, Ornith. Monatsber., vol. 44, pp. 45–52), who has studied the European populations, states that *virescens* and *pluvius* should be synonymized with nominate *viridis*, but that he would "maintain" *pronus* because it represents the extreme in the cline. The extreme, however, is actually reached in Spain, and *pronus* (see figs. 1

and 2 and individual measurements) is not separable from *pluvius*. Meinertzhagen (1947, Bull. Brit. Ornith. Club, vol. 68, p. 32) believes *pluvius* should be recognized "for the population of the British Islands, Holland, Belgium and central and south-central Germany," but his measurements show a great deal of overlap with those of nominate *viridis*. The measurements given by Meinertzhagen for an unspecified number of specimens are: wing length 165–175 in males, 161–171 in females, and 47–54 for the bill length of both sexes in birds from northern Germany and Sweden, as against, respectively, 157–170, 156–170, and 42–54 for birds from central Germany, Holland, and England that he calls *pluvius*.

The bill averages more slender, more compressed laterally along the distal half, in *pronus* than in *pluvius*, but the difference is slight, and it seems to me that the bill is identical in shape in at least half of the large series I have compared from Italy and England. Furthermore, as Niethammer emphasizes, the shape of the bill is not a good taxonomic character in *Picus viridis*, because it varies too much individually. Individuals with a thin, compressed, and attenuated bill are found throughout the range of the species. It is usually more compressed and attenuated in individuals with the longest bills, and, as a rule, big individuals (as shown by the length of the wing) have longer bills. However, it is distinctly shorter in *sharpei*, in actual measurements and proportions, than in any other population of the species except *vaillantii* from North Africa to which *sharpei* seems to be related.

The form described by Zarudny from Persian Baluchistan, and which he has named *bampurensis*, is known from only two specimens. They were not seen by Hartert or me. According to Zarudny, these two specimens resemble *innominatus* but are more sharply barred on the tail and wing feathers and also on the under parts, the barring extending over the whole of the lower breast. In *innominatus*, the tail and wing feathers are or tend to be sharply barred, but adults are not barred on the abdomen or breast. The barring of the under parts suggests that the two specimens were perhaps not adult, though Zarudny says they were. The validity of *bampurensis* has never been confirmed to my knowledge and will remain doubtful until additional specimens are collected and compared to *innominatus*.

Picus vaillantii and *P. viridis* are very closely related, replace each other geographically, and are connected by *sharpei* of the Iberian Peninsula which is intermediate in several characters. It seems correct, therefore, to consider them conspecific. However, before the publication of two recent systematic lists of the birds of Tunisia, they were

universally considered to be separate species. These lists are by Gouttenoire (1955, Alauda, vol. 23, pp. 1–64) and Blanchet (1955, Mém. Soc. Sci. Nat. Tunisie, no. 3); several collaborators revised Blanchet's list which was published after his death.

The male of *vaillantii* lacks the red moustache of the males of nominate *viridis* and *sharpei*, the moustache being black in both sexes, but this alternate character is the single character that is not bridged to a greater or lesser extent by *sharpei*. In the latter and *vaillantii* the cheeks are gray and identical, and the bill is short. The strong reduction in the intensity and distribution of the black pigment on the face of *sharpei* foreshadows its disappearance in *vaillantii*, in which a faint trace of it persists before the eye in an occasional specimen; the reduction in the size of the red tips of the feathers on the crown of female *sharpei* foreshadows their disappearance on the front and top of the crown in female *vaillantii*. Other tendencies towards *vaillantii* can be noticed in *sharpei* in the hue of the red and yellow pigments and in the reduction of the barring in the juvenal plumage.

Voice is sometimes a clue to relationships, but voice, as well as other characters, may vary geographically, and often does, and it seems to me, as it does to David Snow, quoted below, that the differences in voice exhibited by *vaillantii* are not of specific importance. Hartert (1925, Bull. Soc. Sci. Nat. Maroc, vol. 5, no. 6, p. 294) remarked that "The call [of *vaillantii*] is like that of Central European Green Woodpeckers," but other authors have mentioned a difference, namely, Heim de Balsac (1926, Mém. Soc. Hist. Nat. Afrique du Nord, no. 1, p. 86) and Lynes (1924, Novitates Zool., vol. 31, p. 85). Snow, who has observed *vaillantii*, writes to me, "I never really understood why *vaillantii* was kept separate from *viridis*." He states that he does not recollect the alarm note but that he noticed "a slight difference in the call from European *viridis*. . . . However, N. African Chaffinches, Blue Tits, Coal Tits and others have quite noticeable voice differences from the European forms —every bit as much, I should say, as in the woodpeckers; and I should not have thought that that, even combined with a morphological difference, was of more than subspecific value."

Distribution of *sharpei* in the Pyrenees: I have not seen specimens from the Pyrenees or from the Cantabrian Mountains in northwestern Spain, but pending further study it seems best to refer these populations to *sharpei*. This remark is prompted by the fact that Bernis (1955, Prontuario de la Avifauna Española, Madrid, Cosano, p. 40) states that *pluvius* [= nominate *viridis*] is the race of the western Pyrenees and "probably penetrates the Cantabrian zone," while Mayaud (1936,

Inventaire des oiseaux de France, Paris, Blot, p. 91; 1953, Alauda, vol. 31, p. 37) implies that *sharpei* inhabits only the eastern Pyrenees, the rest of the range being inhabited apparently by a form which Mayaud calls *virescens* (in 1936) and *pluvius* (in 1953). Witherby (1922, Ibis, p. 342), who had compared specimens from the Cantabrian Mountains, stated that they are identical with the type of *sharpei*. It would seem unprecedented to find two such sharply differentiated races as *sharpei* and nominate *viridis* (i.e., *virescens* and *pluvius* of Mayaud and Bernis) inhabiting the Pyrenees, nominate *viridis* intervening to split the range of *sharpei* into two populations, one in the eastern Pyrenees and the other in the Cantabrian Mountains. In the plains of southern France, however, *sharpei* is replaced by nominate *viridis*.

Individual Measurements

The measurements listed are those of adults. Other specimens were examined in addition to those listed but, in the case of large series, I measured only enough adults to give an adequate indication of the variation in size.

Western Russia (Pskov): Male, wing, 173; bill, 53; females, 169, 170; 49, 50.

Sweden: Males, 163, 167, 169, 169, 169, 170, 170, 170; 47, 50, 50, 51, 51, 51, 51, 52; females, 165, 166, 166, 168, 168, 169, 171; 47, 47, 48, 48.5, 49, 50.

East Prussia: Female, 165, 63.

Central and South-central Germany (Thuringia and Hesse): Males, 157, 158, 160, 164, 164, 165, 165, 165, 165, 166, 166, 167, 167, 168, 170; 42, 44, 46, 46, 46, 47, 48, 48, 48, 49, 49, 50, 50, 50, 52; females, 160, 163, 163, 164, 164, 165, 165, 166, 166, 167; 44, 45, 45, 46, 46, 47, 47, 48, 50, 50.

Holland: Female, 165, 46.

Switzerland (Jura): Males, 156, 158, 163; 45, 45, 46.

France: Males, 157, 160, 160, 162, 162, 164; 45, 46, 46, 47, 50; females, 161, 162, 164, 165, 166; 43, 46, 48, 49, 49.

England: Males, 157, 158, 159, 159, 160, 160, 160, 160, 160, 161, 161, 161, 161, 161, 162, 162, 163, 163, 166; 43, 44, 44, 44, 44, 45, 45, 46, 46, 46, 46, 46, 47, 47, 47, 48, 48, 48, 49, 50; females, 157, 158, 159, 160, 160, 160, 160, 160, 161, 161, 161, 161, 161, 162, 162, 164, 164, 165, 166, 167; 43, 43, 43, 43, 44, 44, 45, 45, 45, 45, 45, 45, 46, 46, 47, 47, 48, 48, 48, 49.

Italy: Males, 155, 156, 157, 158, 158, 159, 159, 159, 160, 160, 160, 160, 160, 160, 163; 43, 43, 43, 43, 44, 44, 44, 45, 45, 45, 45, 45, 46, 46, 48, 48; females, 156, 158, 158, 158, 160, 160, 162, 162, 163, 164, 164; 42, 43, 44, 44, 45, 45, 46, 46, 46, 47, 49.

Spain and Portugal: Males, 155, 156, 157, 158, 158, 159, 162, 162; 40, 40, 41, 42, 43, 43, 43, 44; females, 155, 156, 156, 157, 159, 159, 160, 163, 163, 165; 40, 41, 41, 42, 42, 42, 43, 43, 44, 44.

Northwest Africa: Males, 160, 162, 163, 163, 164, 164, 165, 166, 167, 170,

171; 38, 40, 40, 40, 41, 41, 41, 41, 41, 41, 42, 42, 43, 45; females, 160, 161, 163, 163, 165, 165, 166, 167, 170; 38, 39, 39, 39, 42, 42, 42, 42, 44.

HUNGARY: Male, 159, 47; female, 160, 46.

SERBIA: Males, 158, 159, 159, 160, 160, 163, 166; 45, 45, 46, 47, 47, 47, 50; females, 162, 168; 49, 50.

ALBANIA: Males, 158, 161; 45, 50.

MACEDONIA: Males, 156, 157, 158, 160, 160, 160, 160, 160, 161, 161, 161, 165; 46, 46, 47, 47, 47, 47, 47, 47, 47, 48, 49, 49; females, 158, 158, 160, 160, 161, 162, 163; 45, 46, 46, 47, 47, 47, 47.

GREECE: Male, 158, 45; female, 160, 44.

BULGARIA: Female, 161, 47.

ROMANIA: Males, 156, 160; 46, 52.

ASIA MINOR: Males, 163, 163, 165; 46, 47, 47; females, 159, 159, 160, 161, 163, 163; 43, 44, 45, 45, 47, 48.

CAUCASUS: Males, 160, 166, 168; 48, 48, 50; females, 162, 164, 168; 46, 46, 47.

TRANSCAUCASIA: Females, 159, 162; 42, 45.

AZERBAIJAN: Female, 165, 46.

NORTHERN IRAN (SOUTHERN CASPIAN DISTRICTS): Males, 158, 159, 159, 160, 160, 162, 163, 163; 43, 44, 45, 45, 45, 46, 47, 48; females, 157, 158, 160, 161, 161, 163; 45, 45, 45, 47, 48, 48.

SOUTHWESTERN IRAN (LURISTAN AND BAKHTIARI): Males, 160, 161, 162, 164; 46, 46, 50, 50; females, 158, 162, 162, 169; 45, 46, 48, 48.

TYPES: *Pronus*, male, 159, 43; *dofleini*, female, 162, 46; *romaniae*, male, 156, 46.

Picus canus

The Gray-headed Woodpecker is a species of Oriental origin which has spread northward to the forests of Siberia and then westward to Europe. Its geographical variation is slight in the northern and western parts of the range but becomes very marked in Asia from China southward. The variation in the eastern populations has been studied by Greenway (1940, Auk, pp. 550–560), who has recognized 15 subspecies, though he is doubtful of the validity of four of these races. Four of the Oriental races (*sobrinus* in southeastern China and northeastern Tonkin, *tancolo* in Formosa and Hainan, *robinsoni* in Malaya, and *dedemi* in Sumatra) do not come within the scope of my studies and are not discussed here. I have recognized nine races in the following review of the Palearctic populations, making a total of 13 for the species with the inclusion of the four extralimital races. Peters (1948, Check-list of birds of the world, Cambridge, Harvard University Press, vol. 6, pp. 135–138) has recognized a total of 16 races.

Greenway warns that color comparisons should be based only on specimens in fresh plumage, but, though this admonition is generally correct, the subspecific characters in some cases are much more evident in the worn than in the fresh plumage, as in the case of nominate *canus*

and *jessoensis*. I find also that specimens showing signs of wear can be used, provided they are not badly worn or faded. When the state of the plumage is not mentioned, my color comparisons were based on specimens in which the plumage was fresh or not badly worn.

1. *Picus canus canus* Gmelin, 1788, type locality, Norway, with the following as synonyms: *perspicuus* Gengler, 1920, type locality, Bulgaria; and *caesaris* Steinbacher (1938, Ornith. Monatsber., vol. 46, p. 25), type locality, Bulgaria. Some birds from northern Macedonia, Bulgaria, and Romania show a tendency to be more sharply and broadly streaked with black on the crown than birds from the rest of Europe, but the tendency is far from constant, as virtually all the specimens that I have compared are identical. I consider, therefore, that *perspicuus* should be synonymized with nominate *canus*. Steinbacher, unaware of the existence of *perspicuus*, has created a pure synonym in describing the birds of Bulgaria again as *caesaris*.

Nominate *canus* does not breed in the Caucasus, the southern limits of its breeding range in southeastern Russia being the Buzuluk Forest in Bashkiria and the valley of the lower Volga, according to Gladkov (1951, Birds of the Soviet Union, vol. 1, pp. 563–569). Hartert (1912, Die Vögel der paläarktischen Fauna, pp. 894–897) and Peters (*loc. cit.*) included the Caucasus in the breeding range but may have been misled by three specimens in the Rothschild Collection, which were collected at Sarepta below Stalingrad on April 25 and 27, 1890, according to the original labels, but which were subsequently relabeled "Caucasus" by some unknown person. It is possible, however, that nominate *canus* may have occurred in that region, as Gladkov states it "probably" straggles to the Caucasus in winter.

2. *Picus canus biedermanni* Hesse, 1911, type locality, Altai. This race differs from nominate *canus* by being grayer in all plumages, according to Johansen (1955, Jour. Ornith., vol. 96, pp. 387–388). However, if I understand Gladkov (*loc. cit.*) correctly, the difference seems to be apparent chiefly in freshly molted birds, and the individual variation is great, some specimens of *biedermanni* being greener and virtually indistinguishable from nominate *canus*. The individual variation appears to be greatest in western Siberia, and Johansen and Gladkov agree that the birds of this region are best referred to nominate *canus*, and that *biedermanni* should be restricted to the birds of the Altai and Sayans eastward to Transbaicalia. However, it is clear that even typical *biedermanni* represents only a transitional form between nominate *canus* and *jessoensis*, and it seems to me that it would be more constructive not to recognize it but to synonymize it with nominate *canus*, but I

lack material to form an opinion. I have seen only three specimens of *biedermanni:* one collected on the upper Lena which is too badly worn for comparison and two from Yeniseisk which may not be typical. The latter two are only very slightly grayer than nominate *canus.*

Johansen and Gladkov state that the wing length increases slightly in Siberia and the Far East, but the birds I have measured from Ussuriland and Hokkaido are identical in size, or virtually so, with the birds of Europe, the wing length measuring 141–152 (145.8) in 17 males from western and northern Europe, 145–151 (147.5) in 12 from Ussuriland, and 140–150 (145.5) in 24 from Hokkaido.

3. *Picus canus jessoensis* Stejneger, 1886, type locality Hokkaido, with the following as synonyms: *perpallidus* Stejneger, 1886, type locality, southern Ussuriland; and *zimmermanni* Reichenow, 1903, type locality, Shantung. This race differs from nominate *canus* by being considerably grayer in worn plumage. It is paler green on the back and averages paler below in fresh plumage, but the differences between it and nominate *canus* are very slight in this plumage.

The type of *perpallidus,* which I have examined, is a very pale specimen, paler and grayer above than specimens in comparative plumage from Hokkaido, but other specimens from southern Ussuriland do not differ constantly from the birds of Hokkaido. It seems best to synonymize *perpallidus* with *jessoensis,* as all the authors whom I have consulted have done, because only four specimens from southern Ussuriland out of 18 examined, including the type of *perpallidus,* are paler than the birds of Hokkaido.

No specimens in fresh plumage were seen by me from Manchuria, but Meise (1934, Abhandl. Ber. Mus. Dresden, vol. 18, no. 2, p. 51), who has examined some, calls them *jessoensis.* He states that in Manchuria the plumage acquires a grayish cast as early as October. Stegmann (1930, Jour. Ornith., vol. 78, p. 466) states that the population of the Little Khingan in southern Amurland is *jessoensis* and that he did not find the species farther north on the lower Amur. I have, however, examined a specimen collected on February 11, 1930, on the Nelta River, 60 miles north of Khabarovsk on the lower Amur. This specimen is greenish above despite the date, less grayish than specimens from Hokkaido collected in February, and suggests that the population of the lower Amur is perhaps greener than that of Hokkaido, Manchuria, and Ussuriland.

The specimens that I have examined from Hopeh and Shantung are not separable from those of Hokkaido when compared in series,

but the populations from northern China show a slight tendency towards *kogo* of western China and *guerini* of the Yangtze Valley. In about one-quarter of the specimens from northern China the crown is more conspicuously and broadly streaked with black than in the birds of Hokkaido, the streaks coalescing or showing a tendency to coalesce in an occasional specimen to form a more or less ill-defined black patch on the nape. The back is also slightly darker green in about one in five Chinese specimens, and the wing length averages slightly larger, measuring 144–150 (146.5) in eight males from Hopeh, and 143–153 (148) in 12 from Shantung, as against 140–150 (145.5) in 24 from Hokkaido. These differences do not seem sufficient or constant enough to warrant the recognition of *zimmermanni*, and Greenway (*loc. cit.*) had already reached the same conclusion, but his material from Japan was insufficient for him to decide.

4. *Picus canus griseoviridis* Clark, 1907, type locality, Seoul, Korea. Austin has discussed this race on two occasions (1948, Bull. Mus. Comp. Zoöl., vol. 101, p. 159; 1953, *ibid.*, vol. 109, p. 486). In 1948, he stated that *griseoviridis* did not appear to be separable from *jessoensis*, but in 1953 he found it was valid after comparing additional and freshly collected specimens. After examining the new material I agree with Austin that *griseoviridis* is valid, the population of Korea being distinctly darker green, less yellowish on the back, than *jessoensis* and grayer, less yellowish, below. The wing length of *griseoviridis* appears to be similar to that of *jessoensis*, measuring 142–149 (145.5) in eight males from Korea.

5. *Picus canus kogo* Bianchi, 1906, type locality, southern Tsinghai,[1] with *stresemanni* Yen, 1933, type locality, Sining, eastern Tsinghai, as a synonym. This race differs conspicuously from *jessoensis* in coloration and size; it is much larger, very distinctly darker above and below, and heavily streaked with black on the crown, the streaks coalescing to form a large patch on the nape.

The population of the Tsinling Range in southern Shensi shows a very slight tendency towards *jessoensis* of Hopeh and Shantung but is extremely similar to typical *kogo* from Tsinghai and Kansu. In a series of 38 specimens from the Tsinling that I have examined the black

[1] The type locality of *kogo* is in southern Tsinghai near the border of Sikang but is not actually in Sikang as stated by Peters (*loc. cit.*), as *kogo* was based on specimens collected by Kozlov on the Bar Chu River, an affluent of the Nomu Chu, itself a tributary of the upper Mekong. This locality appears to be at about latitude 31° 50′ N., longitude 96° 20′ E., according to Kozlov's map (1907, Mongolia i Kham, St. Pétersbourg, Akademia Nauk, vol. 5).

streaks on the crown and the patch on the nape are fully as well developed in 34 specimens as in typical *kogo*, but the black markings are lacking in four (one male from 19 and three females from 19). The under parts average very slightly paler, and the wing averages somewhat shorter, but many specimens are identical in coloration, and the overlap in measurements is virtually complete, the wing length measuring 151–159 (154.6) in the 19 males from Shensi, as against 152–161 (157) in nine from Kansu and Tsinghai. The birds of the Tsinling were referred to *guerini* by Hartert (*loc. cit.*), but he added that his comparative material of *guerini* was insufficient. Greenway (*loc. cit.*) did not mention the birds of Shensi in his review, and, strange to say, this province and also Shansi were not included in the range of the species by Peters (*loc. cit.*).

The birds of northern Shensi and Shansi are probably more similar to *jessoensis* than are those of southern Shensi, but I have examined only one specimen from northern Shensi, a male from Yenan, and one from Shansi, a female from Taiyuan in central Shansi. These two specimens are too big for *jessoensis*, the male having a wing length of 156 and the female one of 155, as against 144–150 (146.5) and 143–153 (148) in males from Hopeh and Shantung and 139–147 (143) in five females from Hopeh and 140–149 (144.5) in six from Shantung. However, the specimen from Shansi is not streaked with black on the crown and nape, and its general coloration is similar to that of *jessoensis;* the black markings are present in the specimen from Yenan but are less conspicuous than in the specimens from southern Shensi, but the general coloration is similar. It is probable that more specimens from northern Shensi and from Shansi will show that the populations of these regions are intermediate between *kogo* and *jessoensis* but, for the time being, it seems best to refer them to *kogo* because of the large size of the two specimens.

Bangs and Peters (1928, Bull. Mus. Comp. Zoöl., vol. 68, p. 332) state that the specimens collected by Rock in Southern Kansu "can be matched skin for skin by *guerini*," but I have examined these specimens and find this statement is not correct. *Guerini* is darker than these specimens and considerably smaller, its wing length measuring 142–148 (144.8) in 23 males, as against 152, 156, 161 in the three adult males collected by Rock. A male paratype of *kogo* that I have examined has a wing length of 160. Specimens collected by Beick on the border of Tsinghai and Kansu are *kogo*, according to Meise (1938, Jour. Ornith., vol. 68, p. 173) and as shown by two of the specimens of Beick that I have seen. Yen's *stresemanni* was based on the specimens col-

lected by Beick, but Yen had overlooked the existence of *kogo*, and *stresemanni* was synonymized with *kogo* by Hartert and Steinbacher (1935, Die Vögel der paläarktischen Fauna, Ergänzungsband, p. 363), and also by Meise (*loc. cit.*).

To summarize the distribution of *kogo:* It seems to me that this race ranges from northern Shensi and central Shansi (where the populations are probably intermediate between *kogo* and *jessoensis*) westward through Shensi and Kansu to southern Tsinghai, extending, according to Schäfer (1938, Proc. Acad. Nat. Sci. Philadelphia, vol. 90, p. 198) part way into northern Sikang to Beyü and Dawo which are located, respectively, at about latitude 31° 15′ N., longitude 98° 50′ E. and latitude 31° 30′ N., longitude 100° 50′ E. *Kogo* is replaced by *sordidior* farther south in eastern Sikang (Kangting and Yachow now Yaan) and by *guerini* in the Red Basin of Szechwan and the region of the lower Yangtze. It does not reach southwestern Sikang. Ludlow and Kinnear (1944, Ibis, p. 368) identified the birds of "southeastern Tibet" as *kogo*, but I find (see below) that these specimens are *sordidior*. The localities where Ludlow collected his specimens are well east of longitude 93° E., or in southwestern Sikang according to the maps I have consulted.

6. *Picus canus guerini* Malherbe, 1849, type locality, Ningpo (= Ninghsien) and Shanghai, with *jacobsii* La Touche, 1919, type locality, Changyang, western Hupeh, as a synonym. This race inhabits the Red Basin of Szechwan, Hupeh, Anhwei, Kiangsu, and Chekiang and probably grades into all the races that surround it: *jessoensis* in the north, *kogo* in the north and northwest, *sordidior* in the west, and *sobrinus* (the *ricketti* of authors) in the south. It differs from *jessoensis* by being darker and by being well marked with black on the crown and nape, from *kogo* by being smaller and darker, from *sordidior* by being paler and smaller, and from *sobrinus* by being greener, less golden, above.

Specimens from Wanhsien in Szechwan and from Hopeh (*jacobsii*) average slightly darker and greener above, slightly more golden on the wing, and grayer, more tinged with greenish, below than typical *guerini* from the lower Yangtze (Shanghai, Nanking, and Chinkiang). They average also very slightly bigger, but the difference is trivial and measurements overlap, the wing length of four males from Wanhsien measuring 138–152 (146), and of 12 from Hupeh 140–152 (146) as against 142–148 (144.8) in 23 from Kiangsu, Anhwei, and Chekiang. I agree with Greenway (*loc. cit.*) that *jacobsii* represents a poorly differentiated intermediate form between *guerini* and the populations of western Szechwan and Sikang which he calls *setschuanus*, a name that I consider to be a synonym of *sordidior*.

7. *Picus canus sordidior* Rippon, 1906, type locality, northwestern Yunnan, with the following as synonyms: *setschuanus* Hesse, 1911, type locality, Kangting, eastern Sikang; and *yunnanensis* La Touche, 1922, type locality, Milati, southeastern Yunnan. This race differs from *guerini* by being larger and darker, and from *kogo* by being darker, less grayish green, above but grayer below and more tinged with greenish.

Hartert and Steinbacher (*loc. cit.*) have synonymized *setschuanus* with *sordidior*, correctly so in my opinion, stating that they could not detect any difference in coloration and only a very slight one in size, but Greenway (*loc. cit.*) has revived *setschuanus*. Greenway states that the two forms are similar ("close") but that most of his specimens of *sordidior* are "as a rule, slightly paler and more grayish green below. The occiput is, in the large majority of specimens, less heavily streaked and the black nuchal patch is less extensive. The dark barring on the tail is lighter than in *setschuanus* and somewhat narrower, as a rule." However, the series of the two forms that I have compared, which include many topotypes, show only a very slight tendency along the lines indicated by Greenway, the large majority of the specimens being identical. The difference in measurements is also very slight, and I believe *setschuanus* cannot be upheld. The overlap in measurements is great, and the difference in averages is trivial, the wing length of 10 males of *"setschuanus"* from eastern Sikang and the neighboring mountains of western Szechwan measuring 148–157 (152) and 150–160 (154) in 10 male topotypes of *sordidior*.

Three specimens in very fresh plumage collected by Ludlow in "southeastern Tibet" (= southwestern Sikang) average very slightly paler than specimens from eastern Sikang and northwestern Yunnan but can be matched by individuals from these two populations. Two of the specimens are males with a wing length of 155, 155, but the series of six males from southwestern Sikang measures 149–156, according to Ludlow and Kinnear (*loc. cit.*). The population of northeastern Burma is identical with that of northwestern Yunnan, and four males from Burma measure 147–155 (152). I have not seen specimens from southeastern Yunnan, and I follow Greenway, who has examined the two cotypes of *yunnanensis* and considers that this form is not separable from *setschuanus*.

The range of *sordidior* seems to extend from the mountains of western Szechwan and their foothills (Wenchwan, Kwanhsien, and Mt. Omei) westward through Sikang, south of the range of *kogo*, to at least Molo, or at about longitude 93° 55′ E., in southwestern Sikang ("south-

eastern Tibet"), southward to Yunnan and neighboring northeastern Burma. *Sordidior* probably intergrades with *guerini* in western Szechwan, but a specimen collected at Chengtu, about 55 kilometers southeast of Kwanhsien, is *sordidior*. The specimen was collected December 23–25, 1934, and may have wandered from the nearby Sifan Mountains down to Chengtu.

8. *Picus canus hessei* Gyldenstolpe, 1916, type locality, northern Siam, with *gyldenstolpei* Baker, 1918, type locality, Sadiya, Lakhimpur, Assam, as a synonym. This race differs very distinctly from all the preceding by being considerably more golden green above and darker, more golden olive, below, by being much darker on the outer tail feathers, which are all black, not barred in the great majority of the specimens, and is also blacker on the crown and nape, the streaks being broader and the patch on the nape more extensive. The white bars on the inner web of the wing feathers show also a tendency to be broader.

The validity of *gyldenstolpei* has been questioned by Ticehurst (1939, Ibis, p. 2) and Greenway (*loc. cit.*), Greenway stating that "this name is most probably a synonym of *hessei*." The large amount of material that I have seen suggests that the birds of Siam tend to be paler than those of northern Assam, but this tendency is extremely slight, as the great majority of the specimens are identical in coloration. *Gyldenstolpei* has been recognized by some authors because its bill is shorter, but the measurements listed below show a great deal of overlap.

The difference in the length of the bill has caught the attention of authors, but the difference in the length of the wing between the birds of Siam and those of northern Assam is much more constant. The wing measurements show virtually no overlap, but, nevertheless, it seems undesirable to recognize *gyldenstolpei* because the population of Burma which connects that of Siam and that of Assam is intermediate. The wing and bill measurements of the birds of Burma overlap to a great extent those of the birds of Assam on the one hand and those of Siam on the other. About half of the wing measurements from Assam and Burma are similar, and the overlap becomes virtually complete in the birds of Burma and Siam. The bill measurements show an even greater degree of overlap, and, though the birds of Siam are said to have a "much" longer bill, seven of 20 males and 14 of 24 females from Siam have the same bill length as the birds of Assam. It seems best, therefore, not to recognize *gyldenstolpei* and to call *hessei* all the populations ranging from Indochina westward through Siam and Burma to Assam and Sikkim. In northeastern Tonkin, however, *hessei* is replaced by *sobrinus*, and by *sordidior* in northeastern Burma.

WING LENGTH OF MALES

SIAM: 142, 148, 149, 149, 149, 149, 150, 150, 151, 151, 152, 152, 152, 152, 153, 155, 155, 159, 163.

BURMA: 144, 144, 145, 149, 149, 149, 150, 151, 151, 151, 152, 152, 155, 156, 157.

NORTHERN ASSAM: 140, 140, 140, 141, 141, 142, 142, 143, 143, 144, 144, 144, 144, 144, 145, 145, 147, 148.

LENGTH OF BILL, MEASURED FROM THE SKULL, OF ALL SPECIMENS EXAMINED

INDOCHINA, TONKIN: Female, 42.

SOUTHERN ANNAM: Male, 44; females, 42, 43, 46, 46.

COCHINCHINA: Male, 48.

SIAM: Southern, southwestern, and south central: Males, 40, 40, 42, 44, 45, 46, 47; females, 38, 38, 39, 39, 40, 40, 41, 42, 43, 43, 44, 44. Eastern Siam: Males, 43, 45, 46, 46; females, 40, 40, 40, 44, 44. Western Siam: Males, 39, 45, 46; females, 41, 43, 44, 44. Northern Siam: Males, 42, 43, 44, 45, 45, 46; females, 39, 40, 47.

BURMA: Chin Hills: Males, 42, 43, 45. Southern Burma: Males, 41, 43, 43, 43, 44, 44; females, 41, 42, 42, 43, 46, 48. Central Burma: Male, 45. Northern Burma: Males, 38, 41, 41, 42, 43; females, 39, 40, 40, 41.

ASSAM: Northern Cachar: Males, 38, 39, 40, 40, 40, 41, 41, 42, 43, 43; females, 40, 40, 40. Northern Assam (Dibrugarh, Lakhimpur, Sadiya, and Margherita): Males, 39, 39, 40, 40, 41, 41, 41, 41, 41, 41, 41, 41, 42, 42, 42, 42, 42, 43, 43; females, 38, 39, 40, 40, 41, 42.

SIKKIM: Males, 44, 45.

9. *Picus canus sanguiniceps* Baker, 1926, type locality, western Himalayas. This race differs from *hessei* and, of course, *"gyldenstolpei,"* by being purer green, less golden, above and below, by being more heavily marked with black on the crown and nape, and by being larger. It is the largest race of the species, the wing length of 17 males measuring 157–167 (161.2).

The range extends from Kashmir to Kumaon. The specimens that I have examined from Kumaon are typical *sanguiniceps*, but farther east this race apparently grades into *hessei*, as Rand and Fleming (1957, Fieldiana, Zool., vol. 41, no. 1, pp. 91–92) state that their specimens collected from far western to eastern Nepal are intermediate between *sanguiniceps* and *gyldenstolpei* (= *hessei*). The specimens I have seen from Sikkim are *hessei* and show no signs of being intermediate. Rand and Fleming state that their specimens from western Nepal are the largest they have seen, and it is possible that a cline of increasing size runs westward in the Himalayas, but this is not shown by the material of *sanguiniceps* that I have measured. The males measure: Kumaon, 158, 158, 159, 163; Musoorie and Dehra Dun, 157, 157, 161,

162, 167; Rampur, Nagar, and Dharmsala, 158, 160, 164, 164, 165, 166; Kashmir, 160; Murree, 162.

The extralimital races of *Picus canus* were not studied. They consist of: *sobrinus,* southeastern China and northeastern Tonkin; *tancolo,* Formosa and Hainan; *robinsoni,* Malaya; and *dedemi,* mountains of Sumatra.

Dryocopus martius

The geographical variation of the Black Woodpecker is slight, and it seems sufficient to me to recognize only two subspecies: nominate *martius* Linnaeus, 1758, type locality, Sweden; and *khamensis* Buturlin, 1908, type locality, Tibetan Plateau. Dementiev (1939, Alauda, vol. 11, pp. 7–17) would, however, recognize a third, smaller in size than the other two, and the name of which is *pinetorum* C. L. Brehm, 1831, type locality, Germany. According to Dementiev, the range of *pinetorum* is western Europe from Poland, or west of Poland, eastward to Asia Minor, the Caucasus, and northern Iran.

Dementiev had apparently no specimens from Sweden or Germany, but the individual measurements listed below show that topotypical nominate *martius* and *pinetorum* are identical, or virtually so, and that it is impossible to recognize *pinetorum* which I consider to be a synonym of nominate *martius.* I did not measure birds from the Caucasus or northern Iran, but nine males from the Caucasus and Lenkoran have a wing length of 228–245 (236.5) and a bill length (measured from the nostril) of 40.6–50.4 (46.8), according to Dementiev, while four males from northern Iran measure 240, 240, 242, 242, according to Stresemann (1928, Jour. Ornith., vol. 76, p. 397). The birds of the Caucasus thus appear to average smaller, but it is clear that their measurements overlap those of the birds of Sweden and that the birds of Iran appear to be identical with Swedish birds.

The wing length increases from west to east across northern Eurasia, but measurements overlap, and neither Dementiev (*loc. cit.*) nor Gladkov (1951, Birds of the Soviet Union, vol. 1, pp. 550–556) advocates the recognition of an eastern race. I cannot judge the degree of overlap, as Dementiev gave no individual measurements, but it appears to be considerable because Johansen (1955, Jour. Ornith., vol. 96, p. 394) states that only about half of the birds from the east differ from nominate *martius.*

Picus martius khamensis is isolated geographically from nominate *martius* and differs from it in measurements, proportions, and colora-

tion. Dementiev believes that geographical differences in coloration do not exist in this species, but he had seen only four specimens of *kha-*

TABLE 1

MEASUREMENTS OF MALES OF TYPICAL POPULATIONS, BY DEMENTIEV, AND OF A SERIES FROM SCANDINAVIA AND HOKKAIDO

	N	Wing	Bill[a]	
Sweden[b]	11	233–246 (240.5)	45–52	(49)
Western Russia	7	235–248 (241.1)	43–51.5	(47.7)
Central Russia	13	232–255 (246.3)	47–52.5	(49.8)
Eastern Russia	15	240–254 (247.6)	49.5–56	(52.7)
Central Siberia	5	245–251 (247.4)	49–53	(51.5)
Northeastern Siberia	8	235–259 (248.6)	48.2–52.5	(50)
Baikalia	4	242–260 (250)	45.5–51	(48.9)
Amurland	9	239–257 (249.5)	47.3–55	(50.8)
Ussuriland	4	244–252 (249.7)	50–50.8	(50.2)
Sakhalin	5	233–251 (242.4)	46–54.2	(49.3)
Hokkaido[b]	7	242–254 (246.7)	50–54	(52.7)

[a]The bill was measured from the nostril.
[b]Measured by me.

mensis. A series of 15 shows that adult *khamensis* in fresh plumage is darker, purer black, and more glossy on the back than nominate *martius* in the same plumage. Its wing length is longer than that of topotypical nominate *martius*, with no overlap, although some individuals from Siberia are as large as *khamensis*. Its bill (measured from the nostril) is relatively weaker and shorter, the length being about 18.5 per cent of the length of the wing, as against a variation of about 19.5–28 in the populations of nominate *martius* listed above. It should be emphasized that all the characters distinguishing the two races are slight but taken together warrant, I believe, the recognition of *khamensis*. Some authors have mentioned that the tarsus is less feathered in *khamensis*, but this character is not constant. Individuals in which the tarsus is somewhat less feathered can be found throughout the range of the species, as stated by Dementiev.

The easternmost specimens of *khamensis* that I have seen are from the region west of Wenchwan in western Szechwan and represent the most eastern records, though an individual which was not collected was heard drumming, and its nest hole was discovered a little farther east in the region of Sungpan (about longitude 104° E.) according to Rensch (1924, Abhandl. Ber. Mus. Dresden, vol. 16, no. 2, p. 40). The

southernmost record of nominate *martius* in China reported in the literature is from northern Shansi. It thus appears that a very broad gap in distribution separates the two races in China. Elsewhere, they are isolated, of course, by even greater gaps stretching from Iran or northern Mongolia to Kansu and Sikang.

Individual measurements of topotypical adult males of nominate *martius* and *"pinetorum,"* and of *khamensis* from Tibet, Yunnan, and Szechwan, follow:

NOMINATE *martius:* Wing length, 233, 234, 237, 240, 240, 241, 242, 243, 244, 245, 246 (240.5); bill from nostril, 45, 48, 48, 48, 48, 49, 49, 50, 51, 51, 52 (49); bill from the frontal bone, 58, 61, 62, 63, 63, 65, 65, 66, 66, 67, 67 (64).

Pinetorum: 235, 235, 235, 236, 237, 238, 238, 240, 242, 243, 243, 248 (239.2); 46, 46, 46, 46, 47, 48, 49, 50, 50, 50, 52, 53 (48.5); 58, 60, 60, 61, 61, 62, 64, 65, 66, 66, 68, 70 (63.5).

Khamensis: 248, 248, 250, 250, 250, 253, 256, 259 (251.8); 45, 46, 46, 47, 47, 47, 50, 50 (47.2); 58, 62, 62, 62, 62, 63, 63, 65 (62.1).