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Systematic Notes on Palearctic Birds. No. 53¹ Charadriidae: The Genera *Charadrius* and *Pluvialis*

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The following notes were made during a study of the Palearctic plovers that is based on the collections of the American Museum of Natural History and on those in a number of European museums. The material that I saw abroad was very abundant, and I wish to express my gratitude to the authorities of the natural history museums of Bonn, Copenhagen, Leningrad, London, Moscow, Paris, and Stockholm for their cooperation and hospitality. Mme. E. V. Kozlova of Leningrad and the staff of her museum were especially helpful, and my thanks are due also to Drs. K. Curry-Lindahl, G. Rudebeck, and F. Salomonsen for advice; Mr. C. J. O. Harrison of the British Museum (Natural History) for calling my attention to an unpublished record of *Charadrius leschenaultii*; and Dr. G. E. Watson of the United States National Museum of the Smithsonian Institution for lending me material and searching the collections and records of his institution for material of critical importance from northeastern Siberia which turned out to be nonexistent.

¹ The present paper is the last in the subseries "Systematic Notes on Palearctic Birds." Thirty-three numbers (1-33), which deal with the passerine birds only, were published from 1953 to 1958, and an index to the species and subjects discussed was provided in 1959. Numbers 34 to 53, which concern the non-passerines, carry dates from 1959 to 1964, and an index to these numbers will also be provided.

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Drs. H. Johansen, N. Mayaud, and E. Stresemann also gave me the benefit of their comments on the study that I had made in New York. At the American Museum of Natural History, I am indebted to my colleagues, Dr. J. P. Chapin, for advice on some African forms; Dr. D. Amadon and Mr. E. Eisenmann, for commenting on the manuscript of this paper; and Mme. T. Gidaspow, for help with Russian texts.

The taxonomic relationships in the subfamily Charadriinae were discussed by Bock (1958) in an important paper entitled "A generic review of the plovers." Bock is interested chiefly in the genera, as the title of his paper indicates, and I agree with him as far as the Palearctic genera are concerned, but he discussed the species also and, in my opinion, combined too many forms. Among the Palearctic plovers (the only ones discussed in the present paper) he "lumped" *semipalmatus* with *hiaticula*, *sanctae-helenae* with *pecuarius*, *marginatus* with *alexandrinus*, and *veredus* with *asiaticus*. "Lumping" had been done in varying degrees by earlier authors, but it seems to me that Bock did not investigate this problem sufficiently when he followed these authors. This question is discussed first, before I comment on some individual species.

Charadrius semipalmatus and *hiaticula*

The Ringed Plover (*hiaticula*) breeds on the beaches, coastal or inland flats, and tundras of the Old World from Iceland and the British Isles to the tip of northeastern Siberia, and also in Greenland and eastern North America on Ellesmere and Baffin Islands. The Semipalmated Plover (*semipalmatus*) occupies a similar habitat from Alaska east to Baffin Island, Newfoundland, and Nova Scotia. The two birds appear to be closely related and probably were derived from the same ancestral stock which became separated into two clusters by the advance of the glaciers. In post-glacial times, *semipalmatus* remained in North America, but *hiaticula* expanded westward from Europe via Iceland and Greenland to eastern Baffin Island where it is now sympatric with *semipalmatus*, the two birds showing no sign whatever of interbreeding, according to Wynne-Edwards (1952).

We should have no hesitation, therefore, in granting that they have reached species level, but Bock, in a subsequent paper (1959), interpreted the situation as an instance of circular overlap. He granted that this postulates the existence of "a series of intergrading populations," and emphasized quite correctly that the critical region is Bering Strait.

My study shows, however, that the two birds do not meet and interbreed in Bering Strait and does not confirm the statement made by Bock

that "a general cline [runs] from the large *hiaticula* in Europe to the small *semipalmatus* in North America."

We should note, first of all, that the outer and middle toes are not webbed in any population of *hiaticula*, whereas these toes are webbed in all the populations of *semipalmatus* (hence the name) down to the level of the first joint, or farther, a difference well illustrated by Kozlova (1961, p. 112). I grant that this difference is not always easy to see in dried skins, but those persons who have collected these birds or handled them alive state that it is immediately apparent in all individuals of all ages.

The populations of *hiaticula* exhibit several clines in color and size (see below). This variation can be very briefly summarized as follows. The birds of Europe are pale, grayish, and large. The coloration becomes darker and more brownish and the size decreases through the range north through Scandinavia and east through northern Russia to the tundras of central Siberia, where a distinct race (*tundrae*) is usually recognized. This trend, however, stops at about the Lena River, where, on an average, the birds are somewhat paler and more grayish and very slightly larger east of the Lena. The general coloration of a few individuals in the series that I have seen from northeastern Siberia resembles to a certain extent that of the darker birds which breed in the British Isles, but, taken as a whole, the birds of northeastern Siberia are more similar to *tundrae* and do not warrant recognition as a distinct subspecies in that region, which was named *kolymensis* by Buturlin (1934, p. 52). The 25 males that I have measured from northeastern Siberia east of the Lena have a wing length of 125–133 (129.1), as against 124.5–134 (128) in 51 collected from the Lena west to the Pechora. A similar trend toward increasing size in the northeast is shown by the specimens measured by Portenko (1939, p. 159).

The differences are slight, but it is of interest to note that the cline has been reversed and that the birds of northeastern Siberia do not become intermediate between *hiaticula* and *semipalmatus*. This is emphasized by characters other than size or general coloration: the birds of northeastern Siberia differ from *tundrae* and nominate *hiaticula* by having a larger and more conspicuous white streak above and behind the eye, by being whiter on the outer tail feathers, and by having, as a rule, a broader band of black across the breast. In other words, the characters of *hiaticula* have been "reënförmed" in northeastern Siberia, whereas we would expect the reverse to be true if the population of this region was intermediate between *hiaticula* and *semipalmatus*.

Most standard works, such as Hartert (1920), Gladkov (1951), or Kozlova (1961), state that *semipalmatus* ranges to northeastern Siberia, or state that it is "casual" in that region (see the check list of North American

birds published by the American Ornithologists' Union, 1957). That it does so has been questioned increasingly by recent authors, and I have not been able to confirm that the species occurs in Siberia. The record of *semipalmatus* in Siberia dates back to Nelson (1883) who stated that, during the cruise of the United States revenue steamer "Corwin" to the Bering Sea and Arctic Ocean, he found *semipalmatus* "from the peninsula of Alaska north to Point Barrow and along the entire northeastern Asiatic coast." This report is ambiguous, because Nelson does not say whether he actually collected birds or merely saw them. All subsequent expeditions to northeastern Siberia have failed to find *semipalmatus*.

Nelson's report is probably erroneous, as suggested by a letter that I received from Dr. G. E. Watson of the United States National Museum. I had asked him to search for me the collections, catalogues, or reports of his institution. He replied that ". . . as far as I can make out the only Siberian specimens collected on the trip were a single '*Motacilla ocularis*' skin and a *Cepphus columba* skeleton at Plover Bay and two Steller Eider and one *Gavia alba* skeletons at Cape Wankarem. Do you think he [Nelson] was at all aware that there were two forms of Ringed Plover, if not, perhaps '*semipalmatus*' refers to *hiaticula*. I have checked again with Fish and Wildlife but there are no further notes or catalogues."¹

The status of the birds that have been reported from St. Lawrence Island is not clear. Gabrielson and Lincoln (1959, p. 323) state that Nelson saw *semipalmatus* on St. Lawrence Island, but this record is open to doubt as it was made by Nelson in the same report mentioned above. Dr. Watson, on the other hand, tells me that a breeding bird that was collected with its chicks on St. Lawrence Island was sent to him for identification and turned out to be *hiaticula*. The collector said that he also saw *semipalmatus* on the island but was not sure whether it bred. He added that, at any rate, the birds were rare, as, during a period of 11 years, he saw but one *semipalmatus* and one pair of *hiaticula*. The collector's report will eventually be published and the situation will bear further watching, because both species may expand to St. Lawrence Island, as they have done to Baffin Island.

To turn back to Baffin Island, Kumlien (1879, p. 83) seems to have been the first to mention that *semipalmatus* and *hiaticula* were sympatric during the breeding season, a report confirmed about 70 years later by Wynne-Edwards (1952). Kumlien's report was very explicit, and it seems

¹ This report brings up the question of the validity of the records of other species reported by Nelson from Siberia. He may have identified the birds he saw correctly, but, with the exception of those mentioned by Watson, we cannot take the validity of Nelson's records for granted.

strange that it was ignored or discounted by some authors. He found both birds breeding at Cumberland Sound. Of *semipalmatus*, he further stated: "[It is] by no means rare. Breeds on the mossy banks of fresh-water ponds along both the Kingwah Fjords, as well as other localities in Cumberland. It seems remarkable that the Cumberland Eskimo should discriminate between this and the following species [*hiaticula*], when they confound all the larger gulls under one name. They told me that *Ae. hiaticula* was larger, flew faster, and had a stronger voice than *semipalmatus*!! All of which is true." Of *hiaticula*, he wrote: "It is apparently more common than the preceding in Cumberland. Arrives about the same time, and breeds in similar localities . . . this bird is readily distinguishable from *Ae. semipalmata* by its greater size and more robust form, in having a white patch above and behind the eye, and much wider pectoral band."

Wynne-Edwards' observations were made at the head of Clyde Inlet. He said that only the chicks of *semipalmatus* were found, but the behavior of *hiaticula* (decoy displays and courtship chase of long duration) suggested that it also was on its breeding grounds. He stated, as Kumlien did, that *semipalmatus* "is a considerably smaller bird, with a narrower black breast-band and generally less white on the head, secondaries, and tail." He could detect no difference in vocalizations. He believed that the two birds are conspecific but added that they show "no sign of hybridization or intergradation . . . [that] individuals of all ages can immediately be identified in the hand by the clear-cut difference in the amount of webbing between the toes . . . [and that] it appears that the birds can recognize members of their own race; each race avoids the other on the breeding grounds, a situation which might quickly arise through selection if mixed matings are infertile. They behave in fact as distinct species, and return of course to winter quarters separated by the Atlantic Ocean."

The observations of Kumlien and Wynne-Edwards, taken together with the situation in northeastern Siberia discussed above, suggest very strongly that the birds are not conspecific.

Charadrius pecuarius and *sanctae-helenae*

Kittlitz's Plover (*pecuarius* Temminck, 1823) is very broadly distributed in Africa, including Madagascar, from Cape Province north to the Sahara and the delta of the Nile, thus penetrating into the Palearctic Region. It seems to show no evidence of geographical variation throughout this great range, although some authors, such as Sclater (1924, p. 120), have confused matters by combining with it the very distinct

plover that is restricted to St. Helena Island (*sanctae-helenae* Harting, 1873). Other authors, such as Peters (1934), and Chapin (1939; Chapin says that he still holds the same view), have expressed the opinion that *sanctae-helenae* is best kept as a separate species. Bock (1958) stated, however, that "there is no reason to consider them as distinct species," because the two birds are "very similar." He wrote that "the major differences" consist in the fact that *sanctae-helenae* is larger and not buffy on the breast as *pecuarius*, the two birds being "similar in all other respects."

It is quite easy, however, to detect many differences besides those of size and the color of the breast. In *sanctae-helenae*, the buffy margins of the feathers of the upper parts are less well developed than are those in *pecuarius*, and the feathers at the base of the upper bill are black as against white. The differences in the structure, shape, and color of the primaries are conspicuous. The two birds are not migratory, but the wing is much rounder in *sanctae-helenae*, and the web of its primaries is almost twice as broad. The latter are blacker, less brown, than those of *pecuarius*, and their shafts are black or very dark brown (with the exception of the outermost primary in which it is white), whereas the shafts of all the primaries are white or very much paler in *pecuarius*.

The difference in size is very considerable, and the measurements reveal also differences in proportions. For instance the tail and tarsus are proportionally, as well as actually, longer in *sanctae-helenae*. In 20 adults of the latter the wing, tail, bill, and tarsus measure, respectively, 112–118 (115.2), 51–57 (53), 27.5–30 (28.6), and 35–39.5 (37), as against 96–107 (102.2), 35–44 (40.3), 19–22.5 (21.3), and 25.5–30 (27.9) in 20 adults of *pecuarius*.

The fact that the two birds are allopatric should not be the only factor to be taken into consideration. When we consider all the many differences mentioned, and the fact that *pecuarius* shows no evidence of geographical variation, not even on Madagascar, it becomes improbable that the two birds are conspecific.

Charadrius alexandrinus and *marginatus*

The Kentish Plover (*alexandrinus*), or Snowy Plover as the American population is called, has an enormous range, its various subspecies inhabiting western and southern North America, the west coast of South America, the Antilles, and Eurasia from southern Sweden east to Transbaicalia, and south to north Africa, the Cape Verde Islands, the Red Sea region and Arabia to Somaliland, northwestern India, Ceylon, southeastern China, and Java. It is replaced in eastern, tropical, and

southern Africa, including Madagascar, by the White-fronted Plover (*marginatus* and subspecies), and in New Guinea and Australia by the Red-capped Plover (*ruficapillus*). These three plovers were combined in a single species (*alexandrinus*) by Peters (1934), and such combination was followed by Bock (1958).

The breeding range of these plovers is not well known in northeastern Africa, and Mackworth-Praed and Grant (1952, pp. 340–342) may be correct when they claim that the breeding ranges of *alexandrinus* and *marginatus* overlap in Somaliland. Such overlap was questioned by Bock (*loc. cit.*) who cited in his support Meinertzhagen (1954) and Chapin (1939, pp. 65–67), stating that these two authors “agree with Peters and state that there is no overlap.” Meinertzhagen agrees with Peters, and the ranges outlined by Chapin show no overlap, but the reference to Chapin made by Bock is isolated from its background and misleading, because Chapin (who gave a reference to Peters) did not “agree” with him. In fact, Chapin (*loc. cit.*) considered that *alexandrinus* and *marginatus* are separate species, and he told me, when we discussed the two birds, that he has not changed the opinion he expressed in 1939.

I have tried to investigate the alleged overlap and failed to confirm or deny it, but even if this overlap should prove to be non-existent, the importance of the morphological differences that distinguish the two plovers suggests that they are not conspecific.

Charadrius marginatus is considerably smaller than *alexandrinus*, at least in the regions where their breeding ranges approach, its tail is proportionately longer, its feet are weaker, its legs are yellowish (as against black or lead gray in *alexandrinus*), and it also lacks the conspicuous black or dark brown patches of the latter at the sides of the upper breast. The lack of these patches and the difference in the color of the legs suggest that these two birds can or could recognize each other by sight.

In 10 males of *marginatus* that I have measured from northeastern Africa, the wing, tail, and tarsus measure, respectively, 98.5–109 (102), 43–49 (45.1), 22.5–27 (24), as against 106–113 (110), 40–48 (43.9), 25–29 (26.5) in 10 of *alexandrinus* from Europe and the Mediterranean. In South Africa, or at the other extremity of its range, the wing and tail of *marginatus* measure 97–115 (106.6) and 43–52 (47.3) in 20 males.

Charadrius marginatus and *C. alexandrinus* differ also to some extent in their breeding behavior. *Alexandrinus* incubates by day and does not cover its eggs when it leaves the nest, but Curry-Lindahl (1960, 1961), as well as other authors, stated that *marginatus* incubates at night and covers its eggs with sand when leaving the nest. Curry-Lindahl's observations were made in eastern Africa, but in southwestern Cape Province,

Hall (1960) stated that *marginatus* does incubate by day and does not always cover its eggs. He found them uncovered in 23 per cent of his observations and believed that the covering of the eggs is correlated, not with weather factors, but with the amount of disturbance by predators. Curry-Lindahl (1961) commented on the findings of Hall and stated that his own observations did not correspond at all with those of Hall. It would appear from these papers that this behavior varies geographically, and, while its significance is still not clear, it has not been reported in *alexandrinus*.

I wish to express my appreciation to Curry-Lindahl for calling this behavior to my attention. He tells me that he does not believe that *marginatus* and *alexandrinus* are conspecific. I am grateful also to Professor Stresemann for his comments on these and other plovers; I did not study *ruficapillus* which, he says, "is certainly *not* conspecific with *alexandrinus*."

Charadrius asiaticus and *veredus*

The plovers in each pair that I have discussed so far appear to be more or less closely related, but the relationship of *asiaticus* (Caspian Plover) with *veredus* (Oriental Plover) seems more remote. Bock (1958) stated, however, that they are so "extremely similar to one another in size and plumage color" that he saw "no basis for maintaining them as distinct species." The statement that they are "extremely similar" leaves one nonplussed, because *veredus* appears to be almost twice as large as *asiaticus* in skins of comparative make, and the two birds, though similar in general appearance, show some important differences in coloration. For instance, the axillaries are brown in *veredus* as against white in *asiaticus*, a difference which is certainly evident at a glance. Kozlova (1961, pp. 170–171), who objects most strongly to the opinions of those authors who consider that the two birds are conspecific, mentioned several other differences in coloration, notably that the crown, nape, and back are concolorous in *asiaticus* but not in *veredus*. In *veredus*, the legs are yellowish; in *asiaticus*, they are greenish gray.

Kozlova (*loc. cit.*) emphasized other differences which are perhaps more fundamental. She has studied *veredus* on its breeding grounds and says that its plumage sequence is distinct from that of *asiaticus*. It takes three years for *veredus* to assume its full breeding plumage, but *asiaticus* assumes it in the second spring. In this respect, *veredus* differs from all the other Palearctic plovers. She said also that *veredus* molts on its winter grounds, whereas most of the molt is completed in *asiaticus* before it leaves its breeding grounds.

I suspect that Bock was more interested in the structure of the skull. In *asiaticus*, the supraorbital rim is less ossified than that in *veredus*, a difference that is well illustrated by Lowe (1933, pl. 5, figs. 7, 8). The plate, incidentally, shows a marked difference in the general size of the skull of the two birds. *Asiaticus* breeds usually on arid salt steppes or along saline lakes, whereas *veredus* breeds along bodies of fresh water as well as saline ones, and Stegmann (1937) believed this difference in ecology is probably correlated with one in the size of the nasal glands and, hence, in the degree of ossification of the supraorbital rim.

Bock (1958) referred approvingly to Stegmann's paper but, unfortunately, misquoted him by stating that Stegmann, in discussing the two birds, "points out [they] are conspecific, as concluded earlier by Hartert." But Stegmann did not say that they are conspecific. He merely called attention to the fact that the difference in the ossification is not a generic one, and, in his subsequent and important paper (1938) on the zoogeography of the Palearctic region, he singled out *C. veredus* as a species characteristic of the Mongolian subregion, *C. asiaticus* being, in Stegmann's opinion, a Mediterranean species that has penetrated to Russian Turkestan. Hartert (1920) seemed to have been influenced chiefly by the fact that the two birds are allopatric, but our knowledge of both has increased considerably since his day.

The measurements of the wing, tail, bill, and tarsus of 15 males of *asiaticus* and 15 males of *veredus* are, respectively, 140–153 (146.5), 48–56 (51.3), 23–28 (26.4), and 33–41 (37) in *asiaticus*, as against 161–176 (167), 57–68 (61.4), 29–34 (31.5), and 43–47 (45.6) in *veredus*.

Charadrius hiaticula

The geographical variation of *C. hiaticula* has been discussed by Salomonsen (1930, 1949, and 1950), and by Bateson and Barth (1957); this last paper concerns chiefly the populations of Scandinavia. My observations are in general accord with those of these authors but are briefly discussed below, because the great majority of the material that I studied, including a large amount from the Soviet Union, was not seen by the authors mentioned. My measurements are summarized in table 1 and are those of breeding birds only or of specimens collected during the breeding season. I regret now that I did not measure the females during my visit to Russia, but, as my time was limited, I concentrated on the males which were more abundantly represented in the collections. I have included the measurements of two series of *C. semipalmatus* to provide a comparison with *C. hiaticula*.

TABLE 1
MEASUREMENTS OF THE LENGTHS OF THE WING AND BILL IN
Charadrius hiaticula AND *Charadrius semipalmatus*

Species and Region	N	Wing	Bill ^a
<i>C. hiaticula</i>			
North Greenland ^b	9 ♂	126-133 (129.6)	17.5-19 (18.1)
	2 ♀	132, 132	19, 19
Southwest Greenland	9 ♂	129-136 (132.4)	19-20 (19.1)
	5 ♀	128.5-134 (130.5)	19-20 (19.3)
Northeast Greenland	24 ♂	127-138 (131)	19-20.5 (20.4)
	12 ♀	127-139 (131.3)	19-21 (19.7)
Spitsbergen	5 ♂	131.5-136.5 (133.1)	16.2-18 (17.9)
	3 ♀	128-133 (130.4)	18-21 (19)
Iceland	23 ♂	126-135 (131.2)	17.2-20.5 (18.9)
	17 ♀	126.5-139.5 (132.8)	18-21 (19.2)
British Isles	30 ♂	126-140 (132.5)	18-23 (20.9)
	30 ♀	127-141 (134.2)	18-24 (20.6)
South Sweden	21 ♂	124-135 (130.5)	17-21 (19.1)
	16 ♀	123-136 (130.6)	18-21 (19)
Lapland ^c	19 ♂	126-134 (128.6)	17.5-20.5 (18.9)
	10 ♀	124-131.5 (128.2)	17.5-19.5 (18.3)
Murmansk coast	14 ♂	123-133 (128.5)	15.5-20 (18.4)
Novaya Zemlya	7 ♂	125-134.5 (128.9)	18.5-21 (19.5)
Pechora to Lena	51 ♂	124.5-134 (128) ^d	17.5-21 (18.7)
Northeast Siberia ^e	25 ♂	125-133 (129.1)	17.5-21 (19.1)
<i>C. semipalmatus</i>			
Alaska	27 ♂	114-127 (119.9)	15-18 (16.3)
	11 ♀	115-125 (118.9)	14.5-17 (16)
Hudson Bay	7 ♂	115.5-125 (120.5)	16-18 (16.8)

^a Measured from the skull.

^b From Peary Land; one female, collected on August 4, and labeled "breeding," from Grinell Land, northern Ellesmere Island, measures 138 and 19.

^c Northernmost Norway and Swedish Lapland.

^d The type of *tundrae*, collected on June 12, 1877, measures 134 and 19.

^e From the New Siberia Archipelago, Chukotski Peninsula, and Anadyrland.

The geographical variation is somewhat complicated but appears to be clinal. The palest, most grayish, and largest birds breed in the British Isles, and from this center run two clines of increasing color saturation and decreasing size in opposite directions, one northwestward to northern Greenland and the other northeastward to northern Scandinavia and the Kola Peninsula. The second cline continues eastward through northern Russia and Siberia to about the Lena River, becoming reversed farther east, as stated above in the discussion of *C. hiaticula* and *C. semipalmatus*.

The western cline is quite slight, but the eastern cline is better indicated, at least as far as northern Scandinavia and the Kola Peninsula. In both clines, the color of the upper parts becomes more brownish, less grayish, as it becomes darker, but the variation in color is more apparent in birds in breeding or summer plumage, tending to disappear in the autumn or winter plumage.

These clines complicate a division of the species for nomenclatural purposes (a very common problem in Palearctic birds), but two subspecies are recognized by many authors: nominate *hiaticula* Linnaeus, 1758, type locality, Sweden, for all the populations with the exception of those of Russia and Siberia; and *tundrae* Lowe, 1915, type locality, Yenisei Valley, for the latter. It should be mentioned, however, that the validity of *tundrae* is not acknowledged by some leading Russian authors, such as Gladkov (1951, 1960) and Kozlova (1961), probably because *tundrae* is not really well differentiated. Its measurements overlap to a very considerable extent those of the other populations, and the difference in its coloration (darker and more brownish) is relatively slight and not always evident. Many specimens in autumn or winter plumage cannot be identified with certainty as was mentioned by Witherby (1943, p. 353). Nevertheless, most European ornithologists, including Witherby, agree that it is convenient to recognize *tundrae*, to distinguish the usually smaller and browner birds which migrate in large numbers through western Europe and winter farther south in Africa than the larger and paler birds that breed in western Europe.

The birds that I have seen from northern Norway, Swedish Lapland, the north coast of the Kola Peninsula, and Novaya Zemlya, where they breed north to about 75° of latitude, and presumably those that breed on Kolguev and Vaigach Islands, which I have not seen, are about intermediate in coloration between nominate *hiaticula* (in the broad sense) and *tundrae*, but are more similar to the latter in average size. From the Pechora River east to the Lena, the birds are relatively homogeneous and represent "typical" *tundrae*.

The small series that I saw from Spitsbergen is much more similar to the birds of eastern Greenland than it is to the populations of northern Scandinavia and the Kola Peninsula, thus confirming the observation of Bateson and Barth (1957). Four birds from Bear Island are identical in coloration with those of Spitsbergen but have a shorter wing, measuring 129 in one male, and 127, 127, 131.5 in three females.

A number of subspecies have been based on the small differences in color or size, or both, that are mentioned, but their characters are much too slight to warrant their recognition. They are *septentrionalis* C. L.

Brehm, 1831, type locality unknown, but based on material collected from Iceland to Kiel in Germany; *major* Seebohm, 1885, type locality, British Isles: *psammodroma* Salomonsen, 1930, based on material from the Faroes, Iceland, Greenland, and perhaps Baffin Island; and *harrisoni* Clancey, 1949, type locality, Outer Hebrides, but actually a new name for *major* Seebohm, 1885, which is preoccupied. These names should be synonymized with nominate *hiaticula* Linnaeus, 1758, and, indeed, Salomonsen (1950) has already done so with his *psammodroma*. The following name, namely, *kolymensis* Buturlin, 1934, type locality, delta of the Kolyma, should be synonymized with *tundrae* Lowe, 1915.

Charadrius leschenaultii

Geoffrey's Plover (or Greater Sand Plover, as it is also called) breeds locally from Armenia and eastern Azerbaijan eastward through Transcaспia and Russian Turkestan to the basin of the middle Ili River, and, again, farther east, from the Chuya Steppe in southeastern Russian Altai to about longitude 111° E. in Mongolia. It is highly migratory, leaving the breeding grounds in July and early August to winter from the Persian Gulf, southern Iraq, and Egypt south through eastern Africa to the islands in the western Indian Ocean and Cape Province, wintering also from Formosa, the Philippines, Micronesia, Indo-Chinese Peninsula, and India eastward through the Sunda Archipelago to the Solomons and Australia.

Many authors believe that this plover does not return to its breeding grounds until June, but it returns much earlier. I have seen two birds that were collected on April 13 on the shores of the Caspian Sea, and Dolgushin (1962, p. 78) states that some individuals return to Kazakhstan toward the end of March. It arrives in Mongolia in the first days of May, according to Kozlova (1930, p. 120), and I have seen a bird that had been taken on May 4 in the Gobi. It also arrives in Armenia in May, according to Liaister and Sosnin (1942, p. 154). The earliest date on which eggs have been found that I know of is April 27, and for chicks, May 1 (both records from Dolgushin, 1962).

Zarudny (1911, p. 201) stated that it breeds also in several regions of northern, eastern, and southern Iran, but his records have not been confirmed. Ticehurst (1929) and Meinertzhagen (1930, p. 541) have suggested also that it probably breeds in Egypt and the Red Sea region. Archer (1937, p. 384) is more positive, as he believes that "a young bird only a few days out of the shell" that he saw in British Somaliland on July 15 was a chick of *leschenaultii*, because he says that it was associated

with adults of that species. But Archer makes many assumptions and grants that he is not certain after all of the identity of the chick. Archer's record was, nevertheless, accepted by Mackworth-Praed and Grant (1952, p. 348) who added that a young bird was found in Italian Somaliland. This last record was apparently based on Moltoni and Ruscone (1944, p. 106), but their record was most ambiguous and does not prove at all that *leschenaultii* breeds in Somaliland.

Ticehurst and Meinertzhagen believed that *leschenaultii* probably breeds in Egypt and the Red Sea region, because they had seen two specimens from these regions, one taken on July 7 at Aden, and the other on July 19 in Egypt. These birds were not adult, and Ticehurst remarked that "it would be impossible . . . for a bird of the year to reach Egypt by July 19th from . . . [its] breeding-quarters in N.E. Asia." Meinertzhagen made a similar remark. But Ticehurst was under the impression that *leschenaultii* does not breed before "the middle of June," and he, and Meinertzhagen, did not know that it starts to breed much earlier and that the breeding range extends west to Armenia, which is surely not too far from Egypt or Arabia for such a great migrant.

I may add that the authors mentioned, as well as others, such as Heuglin, mention that *leschenaultii* is present all year in the regions discussed, some individuals even assuming the full breeding plumage, but there is no evidence that these birds breed. Many shorebirds remain far south of their breeding range without breeding during the spring and summer, a common phenomenon that has been commented upon frequently.

Mr. C. J. O. Harrison of the British Museum showed me in London a clutch of three eggs which had been collected near Berbera, Somaliland, saying that they corresponded to the description of the eggs of *leschenaultii* published by Grote (1925). But when I read Grote, I found that Grote was merely translating a report by Zarudny, the authenticity of which has since been criticized by Dolgushin (1962).

In short, it has not been confirmed so far that *leschenaultii* breeds in Iran, Egypt, Arabia, and along the Red Sea to Somaliland, and it seems very rash, therefore, to recognize the existence of a distinct race in these regions, as Ticehurst (*loc. cit.*) would have us do. Ticehurst said that "I certainly think that a western race must be recognized" (for which the name *columbinus* Wagler, 1829, type locality, Arabia, is available), because the specimens that he had measured from Palestine, Egypt, and Arabia had a somewhat shorter wing and bill, on an average, than the winter visitors that he had from India. Archer (*loc. cit.*) goes further, saying that a study made by Neumann [apparently unpublished] has

shown that there are three races: nominate *leschenaultii* Lesson, 1826, based on winter visitors to India; *columbinus* Wagler, 1829; and *crassirostris* Severtzov, 1873, type locality, Transcaspiia. I could not find a publication by Neumann on this subject and suspect that he merely wrote to Archer, because Peters (1934, p. 254) mentioned the fact that Neumann had written to him about this alleged variation.

The question of the alleged western race has been reopened recently by Watson (1961, p. 304) who believes that this race is valid. He discussed one specimen, a male, which he collected in Greece on September 16, 1954, which he believed had "not bred at a great distance from the Aegean," because its outer primary was still growing. This belief seems to be an unwarranted assumption, because I have seen specimens collected in September all the way from the Philippines and Palawan to Timor and Australia in which this feather was still growing, and these birds had certainly traveled a great distance from their breeding grounds.

Watson stated that the bill length of his bird measures 27 mm., a measurement which, he said, is "near the smallest" of those given by Ticehurst. The bill differs in shape from that of two females that he saw from the Palau Islands by being "much finer, less robust with the horny tip markedly shorter." He concluded that, since the females were "migrants from the eastern population," the western population differs from the eastern by having a smaller bill. But Watson, unfortunately, had not seen any birds from the breeding range and had no concept of their range in individual variation.

I cannot know if Neumann had examined specimens of *leschenaultii* from its breeding range, but it is certain that no such specimens were seen by Meinertzhagen, Ticehurst, and Watson. I have, on the other hand, examined a series of breeding birds and failed to detect any evidence of geographical variation in any character. In breeding birds from the western end of the range (Armenia and the Caspian Sea), center (eastern Russian Turkestan), and eastern end (Mongolia), the lengths of the wing and bill measure, respectively: In the west, 139, 26.5; 140, 29, in males; 143, 30; 145, 26; 146, 30; and 147, 29.5, in females; and 140, 28.5; 141, 30.5, in birds not sexed. In the center, 140, 28.2; 145, 29.5; and 148, 30.5, in males; 138, 29; 144, 32; 146, 32; and 152, 29.5, in females; and 140, 28.5; 146, 32, in birds not sexed. In the east, 137, 25.5; 137.5, 25.5; 138, 29; 140, 29.5; 140, 30; 140, 31; 141, 27.5; 143, 28; 144, 27.5; and 144, 28, in males; and 138, 28; 141, 28.5; 141, 30; and 147, 29, in females.

The range of individual variation is, therefore, about the same in the three populations. Birds that may have been migrating but were col-

TABLE 2
MEASUREMENTS OF *Charadrius leschenaultii*

Region and Age of Specimens	N	Wing	Bill ^a
Breeding range			
Adults	20 ♂	136–148 (140.3)	25.5–31 (28.4)
	13 ♀	135–152 (143.3)	26–32 (29.6)
	4 ^b	140–146 (141.7)	28.5–32 (29.8)
Immatures	2 ♂	137, 139	26, 29
	3 ♀	132, 133, 142	27.5, 29, 30
Other regions ^c			
Adults	18 ♂	138.5–149 (142.3)	28–33.5 (30.1) ^d
	23 ♀	133–152.5 (141.5)	28–34 (30.8)
	14 ^e	135–152 (142.9)	26–35 (30.5)
Immatures	6 ♂	133–140 (137)	27–30 (29)
	7 ♀	129–143 (135)	28–30 (29.5)

^a Measured from the skull.

^b Not sexed.

^c See text.

^d Seventeen measurements.

^e Not sexed.

lected within the breeding range measure: 136, 30.5; 137.5, 27; 138, 29; 139.5, 29; and 141, 27, in males; and 135, 29, in one female.

These birds are all adults, and their measurements, as well as those that are immature, are summarized in table 2, in which are also given the measurements of the specimens that I have examined from Iraq, the coasts of the Persian Gulf, Palestine, Egypt, western and southern Arabia, Eritrea, and Somaliland. In the last region alone, where *leschenaultii* has been reported to breed by Archer and by Mackworth-Praed and Grant, males measure 138.5, 31; 139, 30; 139, 31; 140, 31; 143, 33.5; and 146, 30; and females, 136, 31; 141, 33.5; 146, 31; and 152.5, 32.

Table 2 shows quite clearly that small as well as large individuals occur in both the breeding range and the other regions mentioned where *leschenaultii* is alleged to breed. I believe that the authors who advocated the recognition of subspecies were misled by very inadequate material.

Pluvialis dominica

The populations of this species belong to two forms. One (*fulva* Gmelin, 1789, the Asiatic Golden Plover) breeds on the tundras of Siberia from the Yamal Peninsula eastward to the coast of western Alaska where it

TABLE 3
MEASUREMENTS OF *Pluvialis dominica*

Subspecies and Region	N	Wing	Tail	Tarsus	Bill ^a
<i>fulva</i>					
Northeastern Siberia	17 ♂	156–174 (165.3)	55–62 (58.1)	37–43 (39.7)	27–31 (29.5)
	15 ♀	160–173 (165.8)	52–64 (57)	37–44 (39.8)	26–31 (28.8)
Alaska	30 ♂	164–177 (169.5)	55–64 (60)	34–44 (40.9)	27–32 (29.3)
	16 ♀	164–180 (171.6)	55–62 (58.3)	37–43 (40.9)	27–32 (29.3)
<i>dominica</i>					
Alaska	16 ♂	176–191 (182.8)	63–71 (65.5)	37–45 (40)	28–34 (30.6)
	16 ♀	176–193 (185)	62–76 (66)	38–42 (40)	28–33 (30.8)
Canada	8 ♂	180–193 (184.2)	63–70 (67.7)	37–42 (39)	28–34 (31.6)
	5 ♀	180–196 (186.2)	63–66 (64)	35–40 (38)	27–32 (30.8)

^a Measured from the skull.

breeds from Cape Lisburne south to the Kuskokwim River, and also on St. Lawrence, Nunivak, and Nelson Islands. The other (*dominica* Müller, 1776, the American Golden Plover) breeds from southern Baffin Island, Southampton Island, and the west coast of Hudson Bay west to the arctic coast of Alaska to at least Wainwright, and also apparently inland in northern Alaska to about the Arctic Circle. Their breeding ranges are not, however, very well known in northern Alaska, and it is possible, as Bailey remarked (1948, p. 201), that they actually overlap, a question that awaits further field work.

The American bird (*dominica*) has been taken also within the range of *fulva* in Siberia, namely, in Anadyrland during the last century and at the beginning of the present one, and Portenko (1939, pp. 153–155) believes the two birds are separate species. In support of Portenko's opinion, one can mention that "typical" *fulva* is certainly very distinctly smaller than "typical" *dominica* (table 3) and more spangled with gold above in the adult and juvenal plumage and that its downy chick is much yellower. It migrates westward to winter in the Pacific from Formosa, the Philippines, and southeastern China south to India, and Micronesia and Polynesia to Australia and New Zealand, whereas

dominica migrates eastward and then southward over the Atlantic to South America.

Table 3 shows also another interesting difference which was mentioned by Ridgway (1919, p. 88) but seems to have been overlooked, namely, that the length of the tarsus averages shorter in *dominica* (and I may add is also slightly thicker). The difference in length is actually very slight, but as *dominica* has a longer wing than *fulva* its tarsus is proportionately shorter, the ratio being about 100/21 in *dominica*, as against about 100/24 in *fulva*. Morphological differences of the sort mentioned serve often to separate two related species, but, in this case, it seems very doubtful that the two forms are distinct species. If they were, we would expect that their characters would diverge more sharply in Alaska, where they come into contact during the breeding season, than in Siberia or Canada, but the reverse is true, as is shown in table 3. The measurements of a few individuals from Alaska actually overlap, and, in view of the fact that the amount of spotting and its color is only one of degree, these specimens cannot be identified with assurance. Bailey (*loc. cit.*) found that "where the two breeding areas come together in extreme northern Alaska, there are many specimens which can not be satisfactorily identified subspecifically."

In other words, the two birds may well interbreed, and the situation in Alaska probably represents a case of secondary expansion from both east and west that occurred before reproductive isolation had been achieved. *Dominica* may also have expanded farther east to Anadyrland but dropped back again, as it has not been reported from that region since 1901, where, furthermore, there is no proof that it ever bred.

The measurements of the birds from Alaska given in table 3 are, with few exceptions, of specimens collected on the Seward Peninsula in the case of *fulva*, and the region of Point Barrow in the case of *dominica*. I did not include a few specimens that were too intermediate to identify.

Pluvialis apricaria

The Golden Plover (*P. apricaria*) breeds in Iceland, the Faroes, British Isles, and Scandinavia east through northern Russia and Siberia to the Taimyr Peninsula, and two subspecies are usually recognized: nominate *apricaria* Linnaeus, 1758, type locality, Öland Island, southern Sweden; and *altifrons* C. L. Brehm, 1831, type locality, the Faroes.

The two subspecies are similar in size and indistinguishable in the non-breeding plumage, but the birds (*altifrons*) that breed in Iceland, the Faroes, northern Scandinavia, Russia, and Siberia assume, as a rule, a

more regular and contrasting color pattern in the breeding plumage than those (nominate *apricaria*) that breed from the British Isles east to southern Scandinavia. This difference is best shown in males, *altifrons* differing from nominate *apricaria* by being more uniform, blacker, less mottled with white on the face and under parts, and purer white on the band that extends from the forehead and the region above the eye down to the sides of the neck, breast, and flanks.

This contrasting plumage is not always assumed, however, and Kozlova (1961, p. 101), discussing the birds of the Soviet Union, believed it is not proper to recognize subspecies. Williamson (1948), who discussed the birds of the Faroes (the type locality of *altifrons*), stated: "A number of Faeroese breeding birds appear never to attain the full black front . . . of typical *altifrons*, nor do they show the characteristic white band bordering this black. Some are, in fact, quite indistinguishable in the field from birds of the southern race [nominate *apricaria*], whilst others could perhaps best be described as intermediates. It can be said, however, that most Faeroe breeding birds have affinities with typical *altifrons*, so far as the characters can be assessed in the field."

The birds that breed in Scotland (a region normally included in the range of nominate *apricaria*) are, on the other hand, often in the contrasting (*altifrons*) plumage, as shown by Smith (1957) and Wynne-Edwards (1957). The fact led Wynne-Edwards to question the validity of *altifrons*; he wrote, "not less than half" of the birds that breed in some parts of Scotland are of the "northern" type, i.e., *altifrons*.

Probably Scotland represents a zone of intergradation between *altifrons* and nominate *apricaria*, and Dr. Salomonsen tells me that all of the many specimens that he collected in the Faroes were *altifrons*. Those that I saw from these islands were not, however, so constant.

In the adults that I have examined from the breeding range of *altifrons*, the ratios (with allowances made for intermediates and sexual differences) between specimens that were or were not in the contrasting plumage are as follows:

Iceland: contrasting, 60; not contrasting, 10
Faroes: contrasting, 18; not contrasting, 5
Lapland: contrasting, 28; not contrasting, 7
Russia and Siberia: contrasting, 49; not contrasting, 12

These ratios suggest that the nomenclatural recognition of *altifrons* is probably warranted.

The breeding ranges of the two species of golden plovers (*dominica* and *apricaria*) overlap very broadly in western and central Siberia, from the west coast of the Yamal Peninsula east to the mouth of the Khatanga

River, or over a distance of about 1500 kilometers. The extent of the overlap is well illustrated by the map published by Johansen (1960, p. 478).

Pluvialis squatarola

The Grey Plover (or Black-bellied Plover, as it is called on the American list) breeds on the tundras of North America from Alaska east to southwestern Baffin Island, and on those of the Soviet Union from the Kanin Peninsula east to the Chukotski Peninsula and Anadyrland. No races have been recognized since the study of Low (1938), but it is of interest to mention that this plover varies geographically to a slight extent. The variation involves size only and is clinal, the average wing length decreasing from west to east. In breeding males that I have seen, the wing length measures 190–208 (200.4) in 35 from northeastern Siberia, 193–207 (198) in eight from Alaska, and 182–198 (191.7) in 14 from Canada. In migrants taken in Sweden, which probably bred in Russia and western Siberia, the wing measures 186–203 (195.4) in 25 males.

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