

normality seems rather long when one considers the cold climate and requisite energy intake in the form of seeds that must be extracted by a specialized bill from the cones of coniferous trees.

The skeleton of the individual has been preserved in the Biological Collections, University of Alaska.—GEORGE C. WEST, *Institute of Arctic Biology, University of Alaska, Fairbanks, Alaska 99701*. Accepted 25 Jun. 73.

Breeding of the Green-bellied Hummingbird.—On 21 February 1970 near Moco Moco creek in the Kanuka Mountains of southern Guyana at approximately 85 m elevation we found a nest of the Green-bellied Hummingbird (*Amazilia viridigaster*), which has not previously been described. The nest contained two half-fledged young, and we had good views of the parent returning to feed the nestlings. The nest was in a small tree growing from a rocky cleft beside a waterfall, and was fixed by cobwebs to two fine twigs near the end of a side branch, 3 m above the ground.

After the young had left we collected the nest. It is a typical hummingbird cup nest with an outer layer of moss encased by cobwebs, some lichen decorations, and a lining of a thick layer of tawny-colored vegetable down. Its dimensions are: internal diameter of cup 30 mm, depth of cup 14 mm, total depth of nest 28 mm.

During our 3 months' residence at Moco Moco creek (January–April 1970), we saw Green-bellied Hummingbirds often. Two were trapped, weighed (4.1 g and 3.9 g), and color-photographed. Identification was confirmed by comparison of the photographs with museum specimens. One bird caught at the end of January was not molting; the other, trapped on 21 March, was nearing the completion of its wing molt. Previous records of this species from Guyana are from the Merume Mountains and Quonga (Snyder 1966, *The birds of Guyana*, Salem, Massachusetts, Peabody Mus.). The present record extends the known range in Guyana about 80 miles to the south.—BARBARA K. SNOW and D. W. SNOW, *Old Forge, Wingrave, Aylesbury, Buckinghamshire, England*. Accepted 26 Jun. 73.

Puna bird species on the coast of Peru.—Observers on the coast of Peru have documented the presence of at least 10 bird species that nest only in the puna zone of the high Andes. Of these species only two can be called regular altitudinal migrants. This paper summarizes the known records of puna species on the Peruvian coast and offers some possible interpretations for the patterns that appear.

The puna zone of the Peruvian Andes (3,500 m to snowline) is an extensive expanse of grassy pampas (plains) and valleys, rocky slopes, lagunas (lakes), and boggy steppes. This zone extends from the Department of Cajamarca in northern Peru south through the Department of Puno on into Bolivia, Argentina, and Chile. In Peru the puna zone exhibits moderate seasonal fluctuations in temperature (Table 1). Precipitation is markedly seasonal, with 80–90% of the annual precipitation falling from the end of November to mid-April. Annual precipitation varies considerably from year to year. Over a 20-year period (1953–72), the weather station at Puno (Granja Salcedo), Department of Puno, had an annual mean rainfall of 618.2 mm and extremes of 481.7 mm and 996.7 mm for the driest and wettest years. The mean annual rainfall decreases on a north-south gradient (Table 2).

TABLE 1
AVERAGE TEMPERATURES FOR TWO PERUVIAN PUNA WEATHER STATIONS FOR
1960-65 ($^{\circ}\text{C}$)

	Cerro de Pasco, Dept. of Pasco El. = 4,400 m Lat. = $10^{\circ} 55' \text{ S}$		Imata, Dept. of Arequipa El. = 4,405 m Lat. = $15^{\circ} 49' \text{ S}$	
	\bar{x} max	\bar{x} min	\bar{x} max	\bar{x} min
January	11.8	0.9	12.0	-1.8
February	10.9	0.8	11.7	-1.3
March	11.3	0.6	12.1	-2.6
April	11.6	-0.3	12.1	-4.2
May	12.4	-1.8	12.3	-7.8
June	12.8	-4.1	11.7	-12.6
July	12.7	-4.1	12.0	-13.8
August	12.8	-3.7	12.4	-12.4
September	12.0	-1.3	13.0	-8.3
October	12.5	-1.2	14.4	-9.3
November	12.2	-0.6	14.4	-7.2
December	12.6	-0.3	12.1	-3.3
Annual	12.1	-1.3	12.5	-7.1
Annual extreme	17.3	-10.0	19.4	-20.6

The Peruvian coastal plain consists of a narrow strip of desert that, except for occasional river valleys and associated freshwater and brackish ponds, lagoons, and marshes, is remarkably arid (mean annual precipitation for Lima = 19 mm). Immediately inland from the coastal desert strip the maritime range of foothills rise. During the cool, foggy months of May to November some fog vegetation grows on these foothills, but in the warm, sunny months of the rest of the year, much of this vegetation dies off (M. Koepcke 1963). The Andes themselves rise abruptly beyond the maritime range, and an average of only 115 km separates the coast from the puna zone.

Three categories of puna species are not included in this discussion as they are not limited to nesting in the puna. (1) The first category includes such species as the Bare-faced Ground-Dove (*Metriopelia ceciliae*) and the Rufous-collared

TABLE 2
MEAN ANNUAL RAINFALL FOR A NORTH-SOUTH GRADIENT OF
PERUVIAN PUNA WEATHER STATIONS

Locality	Latitude (S)	Elevation (m)	Mean annual rainfall (mm)
Parón	$9^{\circ} 00'$	4,185	920
Cerro de Pasco	$10^{\circ} 55'$	4,400	965
Laguna de Huarón	$11^{\circ} 00'$	4,560	888
Pachachaca	$11^{\circ} 40'$	3,971	742
Yauricocha	$12^{\circ} 18'$	4,522	951
Accnococho	$13^{\circ} 03'$	4,520	804
Pañe	$15^{\circ} 25'$	4,524	778
Imata	$15^{\circ} 49'$	4,405	573
Granja Salcedo	$15^{\circ} 53'$	3,852	618
Juli	$16^{\circ} 12'$	3,862	689
Desaguadero	$16^{\circ} 39'$	3,850	637
Mazo Cruz	$16^{\circ} 45'$	4,590	477

Sparrow (*Zonotrichia capensis*) that nest commonly from coast to puna. (2) Another group of species, White-tufted Grebe (*Podiceps rolland*), Yellow-billed Pintail (*Anas georgica*), American Coot (*Fulica americana*), and Slate-colored Coot (*Fulica ardesiaca*), although mainly puna nesters, also nest on the southern coast of Peru. (3) The last category consists of three raptors. The Andean Condor (*Vultur gryphus*) has nested on the coast at Cerro Illescas, Department of Piura (Koepcke and Koepcke 1963-71) and may nest on other parts of the coast as well. The Mountain Caracara (*Phalco boenus megalopterus*) and the Aplomado Falcon (*Falco femoralis*) are mainly puna residents but occasionally nest at elevations down to 760 m.

PUNA IBIS (*Plegadis ridgwayi*). This species is an irregular visitor to the coastal marshes of central and southern Peru. Hughes (pers. comm.) saw 6 individuals on 27 August 1955, 1 on 29 July 1962, 6 on 27 June 1965, 3 on 3 July 1965, and 1 on 25 September 1966 all near Mollendo, Department of Arequipa. We saw a single individual on 17 May 1972 at Lurin, Department of Lima, and another on 24 June 1972 at Playa Ventanilla, Department of Lima. Koepcke and Koepcke (1963-71) consider *P. ridgwayi* very rare on the coast.

CHILEAN FLAMINGO (*Phoenicopterus chilensis*). This species is a rare visitor to the northern Peruvian coast, Rio Tumbes, Department of Tumbes (Taczanowski 1877), but it occurs regularly in small numbers in the Salinas near Huacho, Department of Lima (M. Koepcke 1970), and in large numbers at Paracas and Bahía de La Independencia, Department of Ica. Hughes (1970) considers *P. chilensis* a regular visitor to the Mollendo region. Although present in all months on the central and southern coast, the greatest numbers occur from April to October. On 9 November 1968 Plenge found four immatures at Paracas, and on 20 January 1968 one individual was present. On 11 May 1972 we counted 150 at Paracas, 70% of which were immatures.

ANDEAN GOOSE (*Chloephaga melanoptera*). On 27 May 1972 we found an adult at Playa Ventanilla, Department of Lima, the first coastal record for the species. We studied the individual for 20 minutes at close range while it swam in a shallow coastal marsh pond. When we returned 4 hours later to photograph the bird, it had left.

SPECKLED TEAL (*Anas flavirostris*). Only one coastal record is known for this species. Ortiz de la Puente (1952) reported an individual at Laguna de Villa, Department of Lima, on 11 January 1942.

PUNA TEAL (*Anas puna*). Ortiz de la Puente (1952) reported an individual at Laguna de Villa, Department of Lima, 5 October 1947. Hughes (pers. comm.) found single individuals near Mollendo at Mejía Lagoons, Department of Arequipa, in October 1970 and April 1972. Plenge saw two individuals in the lagoons at Playa Mamacona, Department of Lima, January 1970. *A. puna* should be considered a casual visitor to the coast.

ANDEAN LAPWING (*Vanellus resplendens*). This species is an irregular visitor to the coast. Hughes (1970 and pers. comm.) saw a flock of 6 at Mejía Lagoons, Department of Arequipa, in August 1954, 1 near Mollendo, Department of Arequipa, in May 1956, 1 near Mollendo in July 1965, and a flock of 7 at Mejía in June 1970. Lüthi (pers. comm.) saw two individuals together on a small pond between San Juan de Miraflores and Laguna de Villa, department of Lima, on 17 August 1969. Plenge recorded one at Playa Ventanilla, Department of Lima, on 24 June 1972.

PUNA PLOVER (*Charadrius alticola*). This species has not previously been re-

corded for the coast. Ashmore and Tovar (pers. comm.) saw two birds and collected one at Paracas, Department of Ica, on 31 July 1967. Tovar found one bird at Cañete, Department of Lima, on 8 August 1967 and three birds at Paracas on 12 January 1968. On 27 May 1972 we identified two individuals among a flock of Snowy Plovers (*Charadrius alexandrinus*) at Playa Ventanilla, Department of Lima. We returned on 28 May 1972 and collected one of the *C. alticola*, an adult female in nonbreeding plumage and with considerable subcutaneous fat. Perhaps this species has gone largely unnoticed on the Peruvian coast because of its association and resemblance to *C. alexandrinus*. We found the best way to distinguish these two species in nonbreeding plumage is the slightly larger size of *C. alticola*, its black legs instead of the gray of *C. alexandrinus*, and the uniform gray back of *C. alticola*, which is in contrast to the light brown and gray mottled back of *C. alexandrinus*.

ANDEAN GULL (*Larus serranus*). This species is definitely the most abundant puna zone bird that visits the coastal region. Recorded in all months of the year, it is most common and regular between April and October (Hughes 1970). It has been recorded as far north as Punta Pariñas, Department of Piura (Murphy 1936), on the Peruvian coast.

RUFous-BACKED NEGRITO (*Lessonia rufa*). Short and Morony (1969) reported a male from Bujama Baja, Department of Lima, on 31 August 1968, but it was not collected. We collected the first coastal specimen of this species on 27 May 1972 at Playa Ventanilla, Department of Lima. The bird was feeding on tiger beetles (*Cicindela trifasciata*) along the edge of brackish ponds in a small coastal marsh. It was an immature female of the highland race, *L. r. oreas*, and had little subcutaneous fat. We consider *L. rufa* casual on the coast.

PLAIN-CAPPED GROUND-TYRANT (*Muscisaxicola alpina*). On 25 August 1968 Lüthi (pers. comm.) carefully studied an individual of this species in the Lurin Valley between Pachacamac and Cieneguilla (el. = 100 m), Department of Lima, along the edge of the Rio Lurin.

SILVERY GREBE (*Podiceps occipualis*). The specimen of this species reported by Bond (1955) from Pisco, Department of Ica, has since been determined to be a White-tufted Grebe (*Podiceps rolland*) (Bond, pers. comm.). No records are known for *P. occipualis* from the coast.

Although puna species have been recorded on the Peruvian coast in every month of the year, the majority are present from April to October. A combination of four major possibilities best explains the general pattern of occurrence.

The main nesting season for most puna species ends in March and April, and it is possible that wandering immatures find their way to the coast. Except for *Phoenicopterus chilensis*, however, immature birds do not make up a significant proportion of the coastal records.

During the dry season in the puna, many of the smaller ponds dry up (H.-W. Koepcke 1963), and the water level of the larger lakes falls. Lake Titicaca has an annual fluctuation in its water level of 1–7.5 m (Mario Barrera, pers. comm.). In addition, many of the smaller ponds, especially in the colder south (Table 1), are regularly frozen during the nights and early mornings of June, July, and August (Peñaherrera 1969). That all of the puna species recorded on the coast are aquatic or closely associated with aquatic habitats (except for the single record of *Muscisaxicola alpina*) suggests that a reduction of habitat forces some individuals to the coast in this season. When more extensive observations are available from the coast, this theory can be tested by comparing the amount and

duration of rainfall in the puna each year to the number of puna species on the coast. We would expect that in extreme dry years the less regular coastal visitants would occur. The puna species that are affected by small changes in the habitat would appear on the coast more regularly.

Another possibility is the effect of migrants to the Peruvian puna. The arrival of southern migrants from Argentine and Chilian puna corresponds closely to the increased occurrence of most puna species on the coast. If resources are limited, the increased competition with the newly arrived migrants could create sufficient pressure to stimulate some individuals, most likely the new arrivals, to wander from the puna. This competition is likely magnified by the corresponding arrival of the dry season. During the period September to April, many North American migrants are present in the puna, but evidently because of the rainy season and increase in aquatic habitat during their presence, competition from northern migrants is reduced, and the resident puna species are able not only to maintain themselves but to nest and feed young.

A final possibility to be considered is that some of the coastal birds mentioned may not come from the Peruvian puna but may be southern migrants moving up the coast from Chile. Of the species we have included in this paper, Johnson (1965, 1967) reports that only *Phoenicopterus chilensis* and *Larus serranus* have occurred more than five times on the Chilean coast.

In summary then, the patterns in which puna species occur on the coast can best be explained by a combination of the following: (1) wandering immatures finding their way to the coast, (2) seasonal reduction in aquatic puna habitat by lower water levels and freezing, (3) competition from migrants to the puna, and (4) southern migrants moving up the coast.

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SUMMARY

En la costa del Perú se han registrado diez especies de aves que anidan solamente en la puna. Se resumen las observaciones conocidas y se presentan posibles interpretaciones sobre el origen de estos desplazamientos. En la puna la temperatura tiene una fluctuación estacional moderada. La precipitación es más marcada, siendo de mayor intensidad desde Noviembre a mediados de Abril. La mayoría de las aves se presentan en la costa entre Abril y Octubre, después de su reproducción. Posiblemente algunos juveniles errantes encuentran el camino a la costa. La estación seca de la puna baja el nivel de las aguas de los lagos y seca las lagunas. La mayoría de las especies son acuáticas o relacionadas con habitats acuáticos, y la reducción de habitats puede obligar a algunos individuos a migrar a la costa. La competencia de aves migratorias de Argentina y Chile puede ejercer suficiente presión como para forzar a algunos individuos a dejar la puna. Esta presión aumentaría con el arribo de la estación seca. Aves migratorias del hemisferio norte están presentes en la puna entre Setiembre

y Abril, ofreciendo una mínima competencia a las especies residentes, las que en combinación con la estación de lluvias y aumento del habitat acuático, se mantienen, reproducen, y alimentan sus crías. Algunas aves de la puna pudieran migrar por la costa, desde Chile.

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Relationship of *Veniliornis "cassini" chocoensis* and *V. "cassini" caquetanus* with *V. affinis*.—In reviewing species of the genus *Veniliornis* for a forthcoming book on the world's woodpeckers I was able to reevaluate the status of *Veniliornis chocoensis* Todd (1919, Proc. Biol. Soc. Washington 32: 116; *chocoensis* is treated universally as a race of *V. cassini*) and of *V. cassini caquetanus* Meyer de Schauensee (1949, *Caldasia* 5: 640). Available for examination were: three specimens of *chocoensis*, including a male paratype (Carnegie Mus. 66522) from Potedo, Choco, Colombia; a male (Acad. Nat. Sci. Philadelphia 157856) from Bella Vista, Cauca, Colombia; and a male (see Norton et al. 1972, *Auk* 89: 891) from Esmeraldas, northwestern Ecuador (Mus. Comp. Zool. 298406); and two specimens of *caquetanus*, the male type (ANSP 152658) from Morelia, Caqueta, Colombia; and a topotypical male (AMNH 116145) very closely resembling the type. Comparisons were made using material in the American Museum of Natural History representing *V. c. cassini* (35 specimens), *V. affinis* (all races, more than 20 specimens of each),