



Responses of Birds to a Snowstorm in the Andes of Southern Peru

Author(s): John P. O'Neill and Theodore A. Parker, III

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209–211, 1964) considers the Slate-colored Coot to be a color morph of the American Coot.

Conirostrum tamarugensis.—Johnson and Millie (*in* Johnson, Supplement to The Birds of Chile, Platt Establecimientos Gráficos, Buenos Aires, 1972) reported the typical habitat of the recently described Tamarugo Conebill as mesquite groves, or “tamarugales,” (*Prosopis tamarugo*) in lowland northern Chile, but they mentioned possible sightings at higher elevations. On 15 June 1974, Tallman, Parker, and Lester found *C. tamarugensis* in a zone of low (1.5–3.0 m) scattered trees (*Polylepis* sp.) and shrubs (*Gynoxys* sp.) between 3450 and 3850 m above sea level on the slopes of Cerro Picchupicchu, approximately 50 km northeast of the city of Arequipa.

The cone-bills foraged in groups of 4 to 10 individuals, feeding mainly at the higher elevations where *Polylepis* is dominant. The 4 specimens obtained (LSUMZ 79121–124), 3 males and 1 female, all had ossified skulls, showed little to moderate fat, and were molting on the heads and necks. None was in breeding condition. Unlike Johnson and Millie, we found no difference in plumage between males and females. This similarity in plumage is expected because the adults of both sexes of the closest relatives of *C. tamarugensis*, *C. cinereum* (Cinereous Conebill), *C. rufum* (Rufous-browed Conebill), and *C. ferrugineiventris* (White-browed Conebill) are indistinguishable. Hughes later observed *C. tamarugensis* in the same area on 13 July and 14 September 1974 and on 7 June 1975. On these occasions, the birds were more in evidence among *Gynoxys* (3400–3500 m) with only a few in *Polylepis* (up to 3900 m). This conebill is not known in Peru below 3400 m.

Behaviorally, *C. tamarugensis* closely resembles *C. cinereum*, especially in its foraging manner, gleaning leaf surfaces and twigs of trees and shrubs, and in its call, a “seep” and a quarrelsome “chichericheriche.” On Cerro Picchupicchu, the ranges of the 2 cone-bills overlap from 3400 to 3650 m, but only *C. tamarugensis* inhabits the upper limit of *Polylepis* at 3700 to 3900 m. *C. tamarugensis* probably breeds at high elevations and descends to low elevations at certain times of the year. It may replace *C. cinereum* as a breeding species in the *Polylepis*–*Gynoxys* habitat on the arid Pacific slope of the Western Cordillera of the Andes from southern Peru to northern Chile. In the lowlands of northern Chile, where *C. cinereum* breeds, *C. tamarugensis* may be a visitant.—DAN A. TALLMAN, THEODORE A. PARKER, III, GARY D. LESTER, *Louisiana State Univ. Museum of Zoology, Baton Rouge, 70893*, and R. A. HUGHES, *Casilla 62, Mollendo, Peru*. Accepted 5 July 1977.

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Responses of birds to a snowstorm in the Andes of southern Peru.—Although there are a number of birds that regularly migrate north from Chile and Argentina to spend the nonbreeding season in Peru, relatively little is known about the elevational movements of these and other high-Andean species. Most birds that inhabit the high puna grasslands and *Polylepis* woodlands above timberline in southern Peru are thought to be resident and sedentary, but we have made observations demonstrating that some of them apparently do occasionally perform short-term elevational migrations in response to extreme climatic conditions and that behavior of both the resident and “migrant” species changes correspondingly when this movement occurs. These movements are comparable to those of certain alpine species of mid-latitude mountains such as the western North American rosy finches of the genus *Leucosticte*. The latter apparently undertake such downslope migrations only as part of their annual cycle, but during the

autumn months (Sept.–Nov.) they may move up and down the slopes depending on the amount of snow that falls at higher elevations (Bent and collaborators, U.S. Natl. Mus. Bull. 237 (1):382–383, 1968). Zimmer (Auk 55:405–410, 1938) reports altitudinal migrations for *Cinclodes oustaleti* in Chile, but Johnson and Goodall (The Birds of Chile and Adjacent Regions of Argentina, Bolivia, and Peru, Vol. 2, Platt Establecimientos Gráficos S.A., Buenos Aires, 1967) claim that the movement of this species also is performed only as an annual event and not in response to short-term extremes in climatic conditions.

From 7 to 11 August 1974 we were camped at the ruins of Peñas, on the western slope of the eastern Andes, about 25 road km above the Inca ruins and town of Ollantaitambo on the road to Quillabamba, Department of Cuzco, at an elevation of approximately 3262 m. The Peñas area is situated about 300 m below absolute timberline in a steep-sloped valley with a rushing mountain stream in its floor. The slopes are covered with bushes and small trees, some up to 6 m in height, and large boulders. In well-protected gullies and small canyons, alders (*Alnus* sp.) can be found.

On 8–9 August 1974 a massive cold front pushed northward into southern and central Peru. On the 9th, snow fell in the city of Cuzco for the first time in many years. At our camp rain fell most of the day, and by early evening it had changed to sleet, which continued until about 22:00. What we did not realize until the next morning was that the sleet had given way to falling snow. The temperature on 10 August remained near 0°C until about noon and snow continued to accumulate until that time, when approximately 15 cm was on the ground.

In the Peruvian Andes the temperature at 3262 m is rarely low enough to permit the formation of snow and even less frequently is it low enough to permit accumulation. At this low elevation the effect of the snow on the birdlife was evident in both the major influx of species and individuals from above timberline and the “confused” behavior of these and some resident species. Insectivorous, nectarivorous, and seedeating species were affected.

The first evidence of the influx occurred as we stood by our tent early in the morning. We noticed individuals of the insectivorous furnariid, *Cinclodes fuscus*, flying down the valley past us. After seeing about 6 in 3 min, O'Neill began to count them. In a period of approximately 15 min he counted 27 birds. We then became distracted by many other events and so throughout the rest of the morning only occasionally took note of the movement of that species. However, whenever either one of us looked up the valley he could see a *Cinclodes* making its way down out of the heavy snowfall that was occurring above.

We had specimens to prepare from the previous day and so were forced to spend time inside the tent. On each occasion that one of us went out, something new was encountered. Another furnariid, *Asthenes wyatti*, a grassland species, was atop a snow-covered bush. Parker walked along the highway, which was warm enough to remain relatively free of snow, and observed great numbers of displaced puna birds. Scattered aggregations foraged over the slush-covered gravel. These groups consisted of *Asthenes humilis*, *A. flammulata virgata* (not previously reported from the Department of Cuzco), and the finches *Phrygilus unicolor*, *P. plebejus*, and *P. gayi*. Before the snowfall only the last-mentioned of these had been present in the area, and from our experiences in other areas in Peru we would not have expected the other species to occur there under normal conditions.

Despite the weather conditions hummingbirds seemed to be as active as usual, but some had difficulty finding snow-free flowers (primarily *Salvia* spp. and *Passiflora*

spp.) and intra- and inter-specific aggression appeared to be more frequent than they had been before the snowfall, despite the added energy expenditures of such behavior. As soon as an *Aglaeactis castelnaudii* (wt. ca. 7 g), the most common resident species, attempted to feed at a flower that was not covered with snow, it was usually attacked by another individual of the same species or by an *A. cupripennis* (wt. ca. 7 g). The interactions between the two species of *Aglaeactis* occurred to such an extent that almost every time we began to watch an individual of either species, another bird would be after it. *Pterophanes cyanopterus* (wt. ca. 11 g) and *Metallura tyrianthina* (wt. ca. 3 g) were both active and were both regularly supplanted by the *Aglaeactis* species. Individuals of both *A. castelnaudii* and *M. tyrianthina* were sometimes hit by large, wet snowflakes and once the entire pile of snow covering a hanging flower fell on an *Aglaeactis* as it fed. The latter bird perched, shook, and preened, and then went on its way. Below the camp Parker collected a specimen of *Chalcostigma stanleyi* (wt. ca. 7 g), a species that we had previously encountered only in *Polylepis* woodlands above the main timberline.

In the afternoon, after the snow ceased to fall and the sky began to clear, Parker went to a small plowed field close to camp. The field contained many members of the tyrannid genus *Muscisaxicola*. He collected 4 birds representing 4 species: *M. alpina grisea*, *M. cinerea*, *M. rufivertix*, and *M. albilora*, none of which had been present the previous day. None of the *Muscisaxicola* had enlarged gonads.

Resident birds noted that day included *Asthenes ottonis*, *Cranioleuca albicapilla*, *Myiotheretes erythropygius*, *Xenodacnis parina*, *Conirostrum cinereum*, *Diglossa carbonaria*, *Saltator aurantiirostris*, and *Zonotrichia capensis*. These birds seemed to be foraging normally, but more than the usual number of *Zonotrichia capensis* were seen searching for food along the slush-covered gravel road.

No Gray-breasted Seedsnipes (*Thinocorus orbignyianus*) were noted, but 4 days later, after another big snowfall, O'Neill went over the pass above Peñas and flushed many flocks of them from the gravel roadbed. Since seedsnipes are probably not dependent upon insects, they are not likely to be greatly affected unless the snow stays on the ground for a long period of time. Even if the snow had remained, the seedsnipes, unlike the displaced finches and insectivorous furnariids and tyrannids, would probably have been able to uncover their needed food.

The night of 10 August was clear and a hard freeze ensued. The majority of the snow, however, had melted during the previous afternoon, when the temperature rose above 0°C. On the morning of 11 August, cloud cover was high and all snow was gone. We were scheduled to leave the area, were busy breaking camp, and thus did not pay as much attention to the birds as we should have. We did, however, notice several *Cinclodes fuscus* flying up the valley, but not in the numbers in which we had seen them come down. On the same morning another puna-inhabiting finch, *Diuca specularifera*, was collected in the pasture below camp.

On 15 August O'Neill had the opportunity to talk to local people who lived on the other side of the pass from Peñas, and they informed him that the birds of the puna also come down to their area when there is a snowstorm. The sight of puna birds in the lush temperate forest of the eastern slopes is difficult to imagine!

Our observations show that, given the opportunity, some puna-inhabiting birds will move to lower elevations to escape heavy accumulations of snow. We wonder, however, what individuals of some of these same species do in parts of the vast south-Peruvian or north-Bolivian *altiplano* where there are no nearby lowlands to which to descend.

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and support of the Peruvian fieldwork of the Louisiana State University Museum of Zoology, the institution that sponsored our studies. We also express our gratitude to Marc Dourojeanni R., Carlos Ponce P., and Antonio Brack E. of the Dirección General Forestal y de Fauna, Ministerio de Agricultura, and Hernando de Macedo R. of the Museo de Historia Natural "Javier Prado," all of Lima.—JOHN P. O'NEILL AND THEODORE A. PARKER, III, *Museum of Zoology, Louisiana State Univ., Baton Rouge 70893. Accepted 28 July 1977.*

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Cannibalism by an Adult Great Horned Owl.—Reports of cannibalism in birds of prey are not uncommon, although in most cases the cannibalism has involved nestlings and has been deduced from post facto circumstantial evidence. Pilz (Auk 93:838, 1976), Heintzelman (Auk 83:307, 1966), and Ingram (Auk 76:218, 1959) have all documented cannibalism directed towards juvenile raptorial birds. Cannibalism among birds of prey, however, has seldom been reported in the literature. Clevenger and Roest (Auk 91:639, 1974) observed possible cannibalism when they reported seeing an adult Red-tailed Hawk (*Buteo jamaicensis*) carrying the partially eaten remains of another hawk of the same species. Robinson (Wilson Bull. 66:72, 1954) saw a Burrowing Owl (*Athene cunicularia*) feeding on another Burrowing Owl, while Steffen (Auk 94:593, 1977) found skeletal remains and rectrices from an adult Red-tailed Hawk in a nest with a live immature chick.

The observation described below took place within a fenced test reactor area on the Idaho National Engineering Laboratory Site. This area is characterized as a cool desert shrub biome and is situated along the western edge of the upper Snake River Plain in southeastern Idaho. At 09:00 on 3 December 1974, we saw a Great Horned Owl (*Bubo virginianus*) feeding on another Great Horned Owl on snow covered ground. The feeding owl showed little alarm on our approach to within 3 m and continued to remove breast feathers. It then fed on exposed pectoral muscle tissue. Since the dead owl was limp and not frozen despite a minimum temperature of -12°C the previous night, we concluded that the owl had died recently.

On 2 subsequent visits within a span of 3 hours, the owl was still seen feeding on the carcass, however no further observations were made that day. The following morning at 08:30, a Great Horned Owl was again feeding on the remains, but flew when approached. The owl returned within a few minutes and continued to feed until 13:00 when it left; it was not seen again. Most of the flesh had been removed from the owl carcass and the head was severed from the body. The remaining skeletal mass and gastrointestinal tract were intact. Two castings were collected and one contained owl remains. A comparison of the remains, including the feet, with Great Horned Owl study skins at Idaho State University suggested that the dead owl was a male. Although the sequence of observed events led us to hypothesize the actual killing of an adult owl by another, no causal evidence was found to directly support such a contention.

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