world (Eastwood and Rider 1965; Nisbet 1963b; Able 1970; Bellrose 1971; Bruderer and Steidinger 1972), situations may be encountered in which birds migrate at considerably higher average altitude (e.g., during long water crossings). Different species groups may also behave differently with respect to altitude. Workers employing this technique in unfamiliar areas should be alert for these problems.

In sum, various factors may influence the reliability with which nocturnal migration may be sampled with the portable ceilometer. Use of the ceilometer to quantify nocturnal migration requires that these variables be held as constant as possible. For this reason, we have been able to work out a quantification technique based only on samples collected at the beginning of nocturnal migration. This precludes use of the technique to study temporal changes in the quantity of migration during single nights. However, the method can be used to study several aspects of nocturnal migration that are in need of further work: night-to-night variations in migration magnitude; seasonal and geographic patterns; and the relationships between migration and weather.

SUMMARY

Portable ceilometers may be used to study the orientation and magnitude of migration. We have used two independent methods to compute a migration traffic rate in units of birds per mile of front per hour from ceilometer counts made during the first 2 hr of nocturnal migration. One method is based on the physical dimensions of the space sampled by the ceilometer; the other, on a correlation between ceilometer counts and simultaneous radar traffic rates. Both methods yield similar results. The quantification method gives reliable results only when applied to data collected during the first 2 hr after dark and under clear skies. The technique provides a simple, inexpensive, highly portable means of obtaining measures of migration magnitude that can be used in studies of night-to-night, seasonal, geographic, or weather-dependent variations in nocturnal migration.

We gratefully acknowledge the assistance and hospitality of the personnel of the National Weather Service stations at Athens, Georgia, and Lake Charles, Louisiana. Without the virtually unlimited access to the radar facilities we enjoyed, this work would have been impossible. During part of these studies, we were supported by grants from the Air Force Office of Scientific Research to S.A.G. Ryland Loos prepared figure 1.

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RANGE EXTENSIONS AND NEW RECORDS FOR BIRD SPECIES IN ECUADOR, PERÚ, AND BOLIVIA

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From July 1971 to November 1972, I conducted a field study to investigate aspects of bird community structure in Amazonian Ecuador, Perú, and Bolivia. In the process of gathering data for this study and traveling between sites, I encountered several species of birds that represented significant extensions of the known ranges or were previously unrecorded from one or more of these three countries. The purpose of this paper is to report these new records and range extensions.

The majority of the records are from the following localities (fig. 1) and indicated periods:

1. Limoncocha, Province of Napo, Ecuador (0° 24′ S; 76° 38′ W), located in the northeastern part of the country near the Napo River (el. = 300 m) about 15 km S of the town of Coca (1 July 1971–19 April 1972).

2. Yarinacocha, Department of Loreto, Perú (8° 17′ S; 74° 37′ W), located in the east central part of the country near the Ucayali River (el. = 150 m) 15 km NW of Pucallpa (2 June–5 September 1972).

3. Tumi Chucua, Department of Beni, Bolivia (11° 8′ S; 66° 10′ W), located in the extreme northeastern part of the country near the Beni River (el. = 176 m)

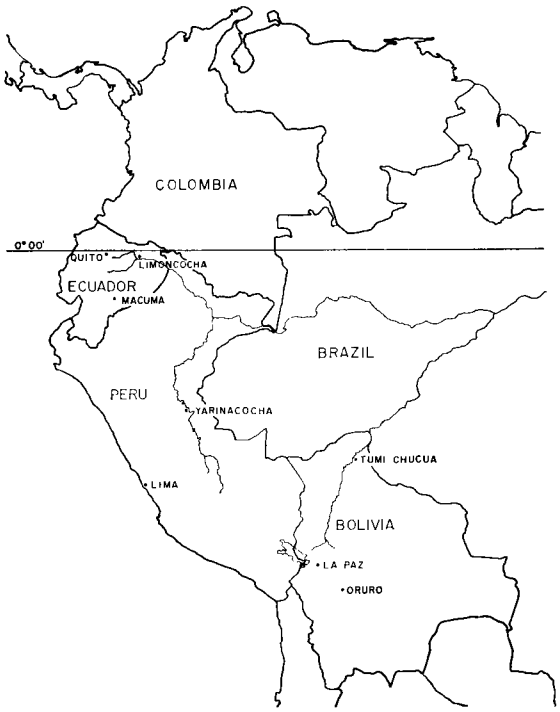

FIGURE 1. Map of northwestern South America indicating localities referred to in the text.

FIGURE 2. Photograph of Hudsonian Godwit (*Limosa haemastica*) taken on 12 September 1972 at Lake Uru-uru, Department of Oruro, Bolivia.

about 20 km S of Riberalta (14 September–15 November 1972).

More detailed information about the bird species composition, abundance, and habitat preference as well as climatic and physical factors for these three localities is available elsewhere (Pearson 1972, 1975; O'Neill and Pearson 1974).

Meyer de Schauensee (1966, 1970) is the main source from which I have determined range extensions and new country records, but Chapman (1926) for Ecuador, Zimmer (1931–1955) for Perú, Bond and Meyer de Schauensee (1942, 1943) and Gyldenstolpe (1945) for Bolivia were also used. I include several records that have been published previously by other authors but not included in Meyer de Schauensee's works (1966, 1970), the standard references on distribution of South American birds. All specimens collected are deposited in the Louisiana State University Museum of Zoology, Baton Rouge, Louisiana.

Crypturellus bartletti. Bartlett's Tinamou. This species was uncommon in primary forest at Tumi Chucua, where I collected one specimen. It is previously recorded by Meyer de Schauensee (1966, 1970) from south of the Amazon River to central Perú and western Brazil east to the Madeira River. Gyldenstolpe (1945) reported specimens from two localities in Bolivia: Victoria, Department of Pando; and Puerto Salinas, Department of La Paz.

Zebrilus undulatus. Zigzag Heron. In 2 months of concentrated field work at Tumi Chucua, I saw only one individual. I collected this specimen, a female, as it fed in moist soil and leaf litter on the floor of primary forest. This is the first record for Bolivia.

Chauna torquata. Southern Screamer. Typically associated with the Pampas and open areas, this species is reported by Gyldenstolpe (1945) to occur only as far north as central Bolivia near Lorenzo, about 350 km S of Tumi Chucua. In the open marshes at the south end of Lake Tumi Chucua, I could often count as many as eight individuals sitting in trees and calling.

Dendrocygna autumnalis. Black-bellied Tree-Duck. On 19 January 1972 Dr. and Mrs. William Andberg and I watched an individual fly from a tree at the north end of Lake Limoncocha. Although *D. autumnalis* has an extensive South American range and has been recorded from western Ecuador (Chapman 1926; Lévêque 1964), no previous records are known for eastern Ecuador.

Helicolestes hamatus. Slender-billed Kite. At least five pairs were residents along the edge of Lake Limoncocha, where I collected one specimen, and about three pairs occurred along 10 km of the nearby Rio Jivino, Ecuador. At Tumi Chucua, however, I observed it only three times as it sat in or flew over trees along the edge of the lake. This species is previously unrecorded from both Ecuador and Bolivia.

Laterallus exilis. Gray-breasted Crake. This crake was common at Limoncocha in the sedge along the edge of the lake as well as in the grassy pastures and airfield. Indian boys captured several individuals alive by surrounding a calling bird in the tall grass and then treading the grass down into a smaller and smaller circle until the crake was forced to run or fly. One of these birds was preserved as a specimen. The lack of previous records for eastern Ecuador is undoubtedly due to the difficulty in observing or collecting this elusive species. Chapman (1926) reported one specimen from Esmeraldas in western Ecuador.

Limosa haemastica. Hudsonian Godwit. On 12 September 1972, while photographing flamingos at Lake Uru-uru (el. = 3700 m), 2 km S of Oruro, Department of Oruro, Bolivia (fig. 1), I saw an individual in fall plumage land in a nearby pond and was able to take several photographs of it (fig. 2). This species is casual on the Pacific Coast of South America, migrating mainly through the eastern part of the continent. The presence of *L. haemastica* at this altitude represents not only the first record for Bolivia but for the puna zone in any country. Dark axillary

feathers precluded the possibility of this individual being a Black-tailed Godwit (*L. limosa*). Several North American migrant shorebirds such as Wilson's Phalarope (*Steganopus tricolor*), Baird's Sandpiper (*Calidris bairdii*), and Lesser Yellowlegs (*Tringa flavipes*) were common at Lake Uru-uru at this time. A few individuals each of Greater Yellowlegs (*Tringa melanoleuca*), Least Sandpiper (*Calidris minutilla*), Pectoral Sandpiper (*Calidris melanotos*), and Stilt Sandpiper (*Micropalama himantopus*) were also present.

Columbina picui. Picui Ground-Dove. Only two previous records of this small dove are known from Perú: a female from Quitún, Department of Puno (Bond 1955), and a male from Balta, Department of Loreto (O'Neill 1969). I collected a female on 19 June 1972 at the Yarinacocha farm and observed four individuals on the Yarinacocha airstrip on 4 July 1972 and single individuals in an open pasture near the farm on 20 August and 2 September 1972. With the extensive clearing of forest in the Pucallpa area, it appears that either this southern migrant is finding more and more suitable habitat in which to winter or that it is expanding its range and has established itself as a resident in this area.

Ara severa. Chestnut-fronted Macaw. This species was very common throughout the Limoncocha area. Records from both eastern and western Ecuador (Chapman 1926) appear to have been omitted in Meyer de Schauensee (1966, 1970).

Ara manilata. Red-bellied Macaw. One could easily see 200 individuals every morning and evening flying in small flocks from or to an island in Lake Tumi Chucua that was used as a roosting area. The distinctive call notes and coloration of this species facilitated its identification. The absence of previous Bolivian records of *A. manilata* can probably be attributed to lack of observers.

Pyrrhura picta. Painted Parakeet. On 1 February 1972 I observed several flocks of 10–15 individuals along the Macuma River (2° 30′ S; 77° 5′ W), Province of Santiago-Zamora, Ecuador (fig. 1). The presence of this species in southeastern Ecuador was to be expected as it is known from northern Perú (Sclater and Salvin 1873).

Brotogeris sanctithomae. Tui Parakeet. The range of *B. sanctithomae* is presently given by Meyer de Schauensee (1966, 1970) as extending no farther south than northeastern Perú. I found large flocks commonly feeding in high trees both along the edge of the lake and in the primary forest at Tumi Chucua, where I collected one specimen. Gyldenstolpe (1945) also reported it from Bolivia at Victoria and Riberalta.

Glaucidium minutissimum. Least Pygmy-Owl. I observed this species several times between June and September 1972 in the upland forest west of Lake Yarinacocha. One individual escaped from my grasp as I removed it from a mist net, but not before I noted the spotting on the back of the head that distinguishes it from the more common Ferruginous Pygmy-Owl (*G. brasilianum*). Between 15 July and 30 August, I heard its distinctive whistle from high in the trees throughout the day on a 15-ha area of my study plot. The song is a short series of low, staccato whistles descending in pitch as opposed to the song of *G. brasilianum*, which is normally a single low whistle given on the same pitch. O'Neill (1969), who reported the only previous record for *G. minutissimum* in Perú (Balta, Department of Loreto), visited my study plot in August and corroborated my identification of the owl by its song.

Chaetura brachyura. Short-tailed Swift. This species has not been previously recorded for Bolivia. A colony of eight pairs nested in the chimney of a house on the Tumi Chucua base from September to November 1972. On several occasions nests and young fell into the fireplace and were recovered by the residents of the house. I collected one female to verify the identification.

Reinarda squamata. Fork-tailed Palm-Swift. This very distinctive species was common at Limoncocha from July 1971 to April 1972. At Tumi Chucua, however, I observed only four individuals, all on 3 November 1972. *R. squamata* is previously unrecorded from both Ecuador and Bolivia.

Galbula leucogastra. Bronzy Jacamar. I found individuals and pairs regularly in open areas of the primary forest and occasionally high in the canopy at Limoncocha. It was recorded from several locations in eastern Ecuador by Chapman (1926) under the name *G. chalcothorax*, which is now considered the subspecies of *G. leucogastra* present in northeastern Ecuador (Meyer de Schauensee 1964). Evidently because of some confusion in this revision of the nomenclature, Meyer de Schauensee (1966, 1970) does not include *G. leucogastra* for Ecuador.

Xiphorhynchus obsoletus. Striped Woodcreeper. *X. obsoletus* was uncommon at Tumi Chucua and occurred generally in the lower strata of primary forest, where I collected two specimens. I regularly observed it tending raiding swarms of army ants. Meyer de Schauensee (1966, 1970) does not list this species as occurring in Bolivia, but Gyldenstolpe (1945) recorded it from Victoria and Puerto Salinas, Bolivia.

Philydor pyrrhodes. Cinnamon-rumped Foliage-gleaner. Meyer de Schauensee (1966, 1970) indicates that *P. pyrrhodes* was not known south of northeastern Perú. I found it to be uncommon in the mid-story of primary forest at Tumi Chucua and collected two specimens. It fed most frequently in palm leaves. Gyldenstolpe (1945) reported one specimen from Victoria, Bolivia.

Myrmeciza hyperythra. Plumbeous Antbird. This species occurred uncommonly in moist secondary forest at Limoncocha, where I collected two specimens. Its presence in both southeastern Colombia and northeastern Perú (Zimmer 1932) makes this first record for Ecuador expected.

Hylophylax punctulata. Dot-backed Antbird. On 8 November 1972 I collected a female at Tumi Chucua. It was foraging near the ground in open primary forest. Meyer de Schauensee (1966, 1970) lists this species only as far south as northeastern Perú and central Amazonian Brazil. Gyldenstolpe (1945), however, reported one specimen collected at Victoria, Bolivia.

Platyrinchus coronatus. Golden-crowned Spadebill. Once I learned the high-pitched song of this species, I found it common in the low undergrowth of primary forest at Tumi Chucua, where I collected one specimen. Its occurrence in Bolivia is not mentioned in Meyer de Schauensee (1966, 1970), but both Zimmer (1939) and Gyldenstolpe (1945) recorded specimens collected in northern Bolivia.

Lamprospiza melanoleuca. Red-billed Pied-Tanager. Only two previous specimens are known from Perú. One was collected at Astillero and one at Yahuarmayo, both in the Department of Puno in extreme southeastern Perú (Zimmer 1947). I observed a pair foraging high in the canopy of primary forest at Yarinacocha from 5 to 12 June 1972. They were usually in a large, mixed-species flock of tanagers and cotingas and fed on both fruits and insects. The specimen I collected was a male with enlarged testes.

Gyldenstolpe (1945) reported specimens of an additional four species from northern Bolivia that I did not record and that Meyer de Schauensee (1966, 1970) does not include for Bolivia. The species and the localities from which they were collected are:

Deconychura longicauda. Long-tailed Woodcreeper. Cachuela Esperanza, Department of Beni; Victoria, Department of Pando.

Thamnomanes caesius. Cinereous Antshrike. Victoria, Department of Pando.

Serpophaga hypoleuca. River Tyrannulet. Victoria, Department of Pando.

Elaenia pelzelni. Brownish Elaenia. Victoria, Department of Pando.

The members of the Instituto Lingüístico de Verano not only on their bases at Limoncocha, Yarinacocha, and Tumi Chucua but also in Quito, Lima, and Cochabamba graciously provided transportation, housing, and other help without which this study would have been impossible. Eugene Eisenmann, Michael Gochfeld, Dennis R. Paulson, and Manuel A. Plenge critically reviewed early drafts of this paper; George H. Lowery, Jr. and John P. O'Neill verified identification of all bird specimens collected during the study; my wife Nancy served as both field assistant and secretary in often arduous situations throughout our year and a half in South America. This work was supported in part by NSF grant GB-20978.

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INTRASPECIFIC AGONISTIC BEHAVIOR OF OSPREYS (*PANDION HALIAETUS*)

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During the 1971 nesting season, the senior author kept three active Osprey nests under periodic surveillance to gain information on the behavior and food habits of Ospreys. Behavior at or near each nest was recorded from dawn to dusk. Nest 24, located on a piling in southern Lake Coeur d'Alene, Kootenai County, Idaho, was observed on 1 and 16 July. Nest 301, located on a piling near Sandpoint in Bonner County, was watched on 15 July, 4 and 11 August. Nest 512, located in a live conifer about 7 km up the Selway River from Lowell in Idaho County, was observed on 7 and 27 July.

Several instances of intraspecific agonistic behavior involving the nesting pairs, their nestlings, and intruding Ospreys were observed. On 1 July 1971 at 08:45, the male of nest 24, which contained 3-month-old young, returned with a kokanee (*Onchorhynchus nerka*), closely followed by a strange Osprey. The intruder hovered just above the nest before departing. At 09:07, the male landed on the nest and was followed closely by a strange Osprey that appeared to be preparing to land also but veered away at the last moment. The sex of the intruding birds could not be determined. At 09:52, the male again returned to the nest, followed by an intruder. This intruder appeared to be the male from an active nest (no. 57) located 0.6 km southwest of nest 24.

At 05:31 on 16 July 1971, a strange Osprey of unknown sex ventured near nest 24 and was pursued by the nesting male. At 14:22, a strange Osprey of unknown sex circled close above nest 24 and the male from nest 24 called, but did not leave his perch