Voices of Stripe-backed Bittern Ixobrychus involucris, Least Bittern I. exilis, and Zigzag Heron Zebrilus undulatus, with notes on distribution

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Introduction

Despite its large range, vocalisations of the locally common but cryptic Stripe-backed Bittern Ixobrychus involucris have not been described. Hancock & Kushlan¹² refer to it as "the most enigmatic and least-known representative of the little bitterns". Straneck has published its voice on audiocasette²⁵, but it remains unknown to most North American and European ornithologists. I present a preliminary description of calls recorded in Paraguay and Argentina. The range of Stripe-backed Bittern is discussed and its Paraguayan distribution is summarized. Additionally, I call attention to some South American forms of Least Bittern I. exilis, whose voices differ significantly from published descriptions of the northern Least Bittern I. e. exilis, and are confusingly similar to both Stripe-backed Bittern and the often sympatric Zigzag Heron Zebrilus undulatus.

Stripe-backed Bittern Ixobrychus involucris

On 18 August 1990, I was part of a group observing birds in Departmento Presidente Hayes, Paraguay, along an extensive marsh at km79 on Route 9, the Carlos A. Lopez or Trans-Chaco Highway. This area is north-west of Asunción. in a habitat generally referred to as "wet chaco". At approximately 14h30, we (Davis W. Finch and Wings, Inc. tour participants) heard, from a concealed bird 10-15 m distant, a short series of soft gulping or croaking noises sounding like auk or ook. Tape-recordings were obtained of four call series, two of which are illustrated (Fig. 1A). Thirty, 56, and 75 seconds after the last gulping call was delivered, the bird, a Stripe-backed Bittern, uttered multiple syllable phrases which sounded like a rapid stuttering or gargling (Fig. 1B). Adjacent to each major pulse of the gargling phrase's sonagram is a minor pulse, narrower in frequency and slightly longer in duration (members of each pulse pair are probably produced independently by the right and left syringes). Several minutes after giving the gargling phrase, the bird delivered four or five more gulping notes.



Stripe-backed Bittern Ixobrychus involucris (Lyn Wells)

During and after playback of its calls, the Stripe-backed Bittern approached us over an 8-10 m arc defined by the edge of an open pool bordered by marsh, occasionally to within 3-4 m. Most of the time it remained within 1 m of the surface (mud or water), and we saw it only as it skulked past gaps in the vegetation. Occasionally, it ascended a stem to a height of c.1.5 m, always remaining partially hidden. Consequently, our views of the bird tended to be a composite of quick looks at various parts of its body. We observed the bird intermittently for c.20 minutes, noting its buff-and-black streaked back, yellow iris, and the yellow-horn bill which was dusky at the tip and along the upper surface of the culmen, and pinker at the base of the lower mandible. Other species seen within 20 m of the bittern included: Limpkin Aramus guarauna, Spotted Rail Rallus maculatus, Rufous-sided Crake Laterallus melanophais, Yellow-chinned Spinetail Certhiaxis cinnamomea, Great Kiskadee Pitangus sulphuratus, Warbling Doradito Pseudocolopteryx flaviventris, Unicoloured Blackbird Agelaius cyanopus, and Scarlet-headed Blackbird Amblyramphus holosericeus.

The bird I recorded was vocalising spontaneously; no others were audible. It was not known whether the initial gulping vocalisation constituted a mating call, a territorial call broadcast to other males, or a scold. Because, prior to its delivering the gargling phrase, I had played the gulping call back to the bird (in an attempt to draw it into the open), I assumed the gargling phrase represented a territorial challenge which I solicited. Being longer and perhaps providing more acoustic information than the gulping call, it might serve to aid an approaching female (or male) with more precise territorial cues.

Vocalisations of Stripe-backed Bittern recorded in Buenos Aires Prov., Argentina during December of the austral summer²⁵, shed some light on this question. Its similar gulping calls (Fig. 1C) are shorter than those taped in Paraguay, lacking the soft introductory syllable, possibly a function of distance from the microphone, or level of excitement. Twelve and 17 seconds after the short gulping series, the bird delivered gargling calls (Fig. 1D). Straneck states that the bird's guttural vocalisations may be heard from Scirpus rush beds both day and night²⁵. Apparently then, both the gulping and gargling calls taped by Straneck and myself are part of the territorial presentation of Stripebacked Bittern; their order and rate of delivery are presumably of some significance to other individuals.

Stripe-backed Bittern exhibits a broadly disjunct distribution, with northern and southern populations on both sides of the Andes. Northern birds are found in central and extreme northern Colombia¹⁴ (in brackish and fresh water marshes including Typha swamps, and rice fields), northern Venezuela¹⁷, Trinidad¹⁰, and the Guyanas where (in Surinam) they favour freshwater swamps thickly vegetated with rushes^{11,13}. Based on their smaller size, some authors have considered these northern birds to represent a different population, but Blake³ cites birds with intermediate measurements. The southern populations inhabit regions south of the Amazon in Brazil, Argentina south to the Río Negro, Uruguay, Paraguay, southern Bolivia, eastern Peru (where it was first documented at Manu National Park during October 1976²⁶ and seen subsequently at Tambopata, generally along the margins of oxbow lakes [fide R. S. Ridgely]), and central Chile. A mid-March 1988 record at La Selva Lodge, northern Napo, Ecuador, has been published as the first record for the country⁶ but apparently lacks documentation. There, at

Garzacocha and Mandicocha, oxbow lakes formed by the Napo River, a few Least Bitterns, of the poorly known subspecies *I. e. limoncochae*, inhabit emergent vegetation (pers. obs.), and the Zigzag Heron is locally common⁷. A northward movement of southern Stripe-backed Bittern has been suggested; indeed, they vacate some nesting areas in Argentina. It remains undetermined whether this represents a formal migration, or dispersal in response to changing water levels¹².

In Paraguay, the first record was a bird reported by Azara, upon which the original description was based⁵. Later, during the early 1900s Félix Posner collected one near Benjamin Aceval in the extreme south-east Dept. Presedente Hayes. There, according to Posner, or to Bertoni who published his collection, the bird was fairly common along the Paraguay River¹ and found at Asunción² (F. E. Hayes in. *litt.* warns that Bertoni may not have uniformly distinguished Stripe-backed from Least Bitterns). During 1937-1938, Alberto Schulze collected seven individuals 170-195 km west of Puerto Casado, near the juncture of the departments of Boquerón and Alto Paraguay (specimens at Museum of Zoology, Univ. of Michigan). Steinbacher²⁴ mentions a male taken on 24 March 1956 c.50 miles south of Filadelfia. near the borders of Presidente Hayes and Boquerón. Until recently, nearly all sightings were from the chaco west of the Río Paraguay. Recent records from the east include individuals seen 6 July 1977 at Luque, Central (R. S. Ridgely), 8 January 1990 south of San Patricio, Misiones (P. A. Scharf), and 24 August 1992 at Estancia La Golondrina, Caaguazú⁷. Like many secretive marsh birds, the Stripe-backed Bittern probably occurs more frequently in Paraguay than the still relatively few records suggest. Like other bitterns, it escapes detection by "freezing" in the typical bill-up bittern posture. ffrench¹⁰ and Narosky¹² found the species difficult to flush and then a weak clumsy flier, quick to seek cover. Vieillot's comment⁵ (based on Azara's observations), "cet oiseau...n'a pas la faculté de voler" (this bird...does not have the ability to fly) is negated by Meyer de Schauensee's "seen only when flushed, always close at hand"17. Haverschmidt, too, comments on the difficulty of encountering the bird, calling it "more skulking than the Least Bittern"13. However, Ridgely, who, on numerous occasions, has observed flying birds in Argentina and Chile, considers it no more difficult to see than Least Bittern. During several years observing birds in Paraguay, often

with other ornithologists, Hayes never encountered the species.

Least Bittern Ixobrychus exilis

The North American subspecies *exilis* breeds in fresh and brackish marshes in south-eastern Canada, the eastern and (locally) western U.S., the Greater Antilles and northern Bahama Islands, central and southern Mexico, and south at least as far as northern Costa Rica^{4,12,16,23}. Its southern breeding limits are not well defined where it approaches another subspecies in central Panama^{12,21}. During winter, it is more widespread in Mexico, the Caribbean and Central America^{4,12,16,23}. Palmer¹⁹ describes its song as guttural and dove-like. He depicts it as "uhuh-uh-oo-oo-oo-oo-ooah". Armistead⁹ says it usually delivers "3-5 coos repeated at fairly frequent intervals during breeding season, especially at dawn, sometimes at night" and notes its similarity to the call of Black-billed Cuckoo Coccyzus erythropthalmus. Howell and Webb¹⁶ describe it as "an accelerating then slowing series of 6-8 low, moaning clucks, cowh-cowh... or pukh-pukh ...". A territorial vocalisation of this subspecies recorded by G. B. Reynard in New Jersey, U.S.A., is depicted (Fig. 1E). The songs are delivered at a rate of 7/min. and contain less than half as many notes/sec. as the gargle of involucris. The notes are more widely spaced and heard as a series of individual syllables. A longer song of this same subspecies was recorded in Cuba by Reynard²⁰ (Fig 1F). This individual's call, slightly lower-pitched than the New Jersey bird's, begins with several rapid soft notes, then increases in both volume and frequency. If intervals were not edited during phonodisc preparation, the calls were delivered at a faster rate of 16/min. A fast series of c.3-5 explosive cackling notes, described as *tut-tut-tut*¹² or a series of kak-kak or ka-ka notes reminiscent of a Clapper Rail Rallus longirostris, may be given when the bird is disturbed. Such a series taped by J. Kingery 22 December 1992, just west of Kingston, Jamaica, is presented (Fig 1G). It is composed of five rapid pulses and sounds to me like yak'yak'yak'yak'yak. This call was so deeply imbedded in the matrix of marsh noises that I was unable to separate it electronically or mechanically; nonetheless, its general form may be perceived.

In Middle and South America, at least five other subspecies of Least Bittern occur; the vocalisations of several remain unrecorded. Two, possibly three, overlap the range of Stripe-



Least Bittern Ixobrychus exilis (Lyn Wells)

backed Bittern. The dark subspecies I. e. pullus is a rivermouth associate along a 500 km strip of coastal Sonora and Sinaloa, Mexico¹², Apparently, its voice remains undescribed (S. Russell pers. comm.). The long-billed, dull, and largest subspecies I. e. peruvianus is known from wetlands along much of the Peruvian coast, although its exact range has yet to be determined. Although occasionally encountered in areas visited by tour groups, its vocalisations, too, appear not to have been tape-recorded (T. S. Schulenberg pers. comm.). Neither of these forms is likely to occur with Stripe-backed Bittern. Potentially sympatric is the subspecies I. e. bogotensis characterised by ochraceous sides to its head and deep buff underparts. It is found in marshes and savannas in southern Boyacá and Cundinamarca in central Colombia^{12,15}, adjacent to western Meta where Stripe-backed Bittern occurs. Its voice has not been described. As yet unidentified to subspecies are birds observed in the lowlands of western Ecuador. In coastal El Oro, H. Bloch et al. first observed the species 30 March 1989, in the marshes outside Santa Rosa (fide R. S. Ridgely in litt.). Further north in Manabí, G. Rosenberg and I saw several individuals on 25 January 1993, at freshwater marshes near Chone where other observers have since encountered them between January and April. These birds may represent boreal migrants, or even a satellite population of peruvianus (R. S. Ridgely in litt.). The remaining two subspecies overlap Stripe-backed Bittern. Their voices are very different from nominate Least Bittern I. e. exilis, and could be confused with both Stripe-backed Bittern and the Zigzag Heron.

The most widespread subspecies of Least



Figure I. Songs and calls of *I. involucris*, *I. exilis*, and *Zebrilus undulatus* Vertical axis equals frequency (kHz), horizontal axis equals time (s)¹

- A Gulping vocalisation of *l. involucris*, km 79, Trans-Chaco Highway, Dept. Presidente Hayes, Paraguay, 18 August 1990 (Behrstock), Voucher on file at the Center for Bioacoustics, Texas A&M Univ.²
- B Gargling vocalisation of I. involucris, same data as above.³
- Gulping vocalisation of *l. involucris*, San Miguel del Monte, Buenos Aires Prov., Argentina, December. From Canto de las aves pampeanas *ll*, reproduced with the recordist's permission.⁴
 Gargling vocalisation of *l. involucris*, same data as above.⁵
- E Two vocalisation of *l. e. exilis*, New Jersey, 10 May 1958, by G.
 B. Reynard, Catalog No.002265, Library of Natural Sounds, Cornell Laboratory of Ornithology, Ithaca, New York.⁶
- F Vocalisation of I. e. exilis, Soplillar, southern Matanzas, Cuba, 10 April 1983. From Bird songs in Cuba, reproduced with the recordist's permission.⁷

- G Scold of I. e. exilis, 10h50, 22 Dec. 1992, Caymanas Estate, just west of Kingston, Jamaica (Jeff Kingery).⁸
- H Vocalisation of *I. e. erythromelos*, km 79 marsh, Trans-Chaco Highway, Dept. Presidente Hayes, Paraguay, 31 May 1991 (R. S. Ridgely).⁹
- I Vocalisation of I. e. limoncochae, Lago Limoncocha, Napo, Ecuador, Aug. 1986 (R. S. Ridgely).¹⁰
- J Vocalisation of I. exilis (presumably subspecies limoncochae), Isla Roncoso, Loreto, Peru, I June 1982 (T. A. Parker), Catalog No. 29361, Library of Natural Sounds, Cornell Laboratory of Ornithology, Ithaca, New York.¹¹
- K Same information as above, two birds calling.
- L Dawn territorial vocalisation of adult Zebrilus undulatus, La Selva Lodge, Napo, Ecuador, 11 August 1989, single note of long series (Behrstock). Voucher on file at the Center for Bioacoustics, Texas A&M Univ.¹²

Bittern, I. e. ervthromelas, is distinctly rufous on the sides of the head and neck¹². It ranges from central Panama and northern Colombia east through the Guianas to Trinidad, and south to Paraguay and Brazil; yet surprisingly few authors mention its voice. In Trinidad¹⁰, it commonly utters "a churring woh, also in alarm a loud kock". In Brazil²², its song is "given continuously in morning and late afternoons, a deep rro-rro-rro" as well as a "croaking raaahb" and "gheh-eh". On 31 May 1991, Ridgely taped its soft woh notes in Paraguay (Fig. 1H), at the km 79 marsh where I earlier recorded Stripe-backed Bittern. His recording contains two calls that appear as inverted bowls. Although c.50% longer than the gulping notes of Stripe-backed Bittern, at any distance, the two could readily be confused.

During August 1986, Ridgely taped the little-known and apparently local subspecies *I. e. limoncochae*¹⁸ at Lago Limoncocha, Napo, Ecuador, as it delivered a long series of mellow dove-like *haww* or *aww* notes (Fig. 11). The recording suggests a group of 4-5 notes spaced 2.6-4.3 sec. apart, followed by a gap of c.8 sec. then another series.

Birds recorded 1 June 1982 by the late Ted Parker on Isla Ronsoco, Napo River, Loreto, Peru, presumably represent *I. e. limoncochae* as well, the Napo providing a fine corridor for dispersing waterbirds. The clipped dove-like notes sound like *waa*' or *aaw*' and are separated by gaps of c.3 sec. (Fig. 1J). To the ear and the eye, they are similar to the notes of *I. e. erythromelas*. Calls were delivered at a rate of c.17/min. As Parker taped a long series (including some of lower frequencies), a second individual (mate, rival?) called several times in the background. Although encompassing the same upper range, its voice sounds much higher because it lacks the lowerpitched frequencies of the closer bird's call (Fig. 1K, left voice).

Zigzag Heron Zebrilus undulatus

English et al.⁸ discuss some vocalisations of Zigzag Heron at La Selva Lodge, Napo, Ecuador. They describe a "hollow hooting, sometimes given alone, and sometimes given in a series of seven or eight calls at a rate of 1/s" and a "nasal, higher-pitched *ahnnn* that is delivered singly". During several trips at La Selva, I have recorded a hollow and slightly grating call, which I perceive as *áow* or *aww* (Fig. 1L). I have heard it in Napo, Ecuador (January, July, and August), and in the Federal Territory of Amazonas. Venezuela (May), often commencing about 05h10 when the sky is still quite black. A string of calls may continue unabated for many minutes; one minute contained 14 evenly spaced calls. As I have observed only adults delivering this persistent vocalisation, occasionally in the vicinity of known nest-sites, I presume it to be the territorial "song". As English et al.⁸ suggest, these same, or very similar, notes may also be delivered as a series or sporadically in the later afternoon, and at or after dusk. An isolated note, or a short series from Zigzag Heron could be confused with that of Stripe-backed Bittern, a long series (not known for Stripe-backed Bittern) would not. However, if their sympatry depends on a post-

Figure I superscripts:

- The author's recordings were made with an SME modified Sony TCM 5000 C, an SME-BA microphone preamp (both from Saul Mineroff Electronics), and a Sennheiser ME-88 microphone. In the laboratory, tapes were played on a Denon DN-770R tape deck, and analysed with a DSP Sona-Graph model 5500 (Kay Elemetrics Corp) set at Frequency Range 0-2 kHz (0-8 kHz for Figure 1G), Input Shaping Hi-Shape, Transform Size 128 pts., Filter 59 Hz, and Analysis Window-Hamming. Noises from traffic, other birds, and some possibly artificial harmonics produced by amplification were mechanically removed from all but one sonagram.
- ² Three gulping vocalisations averaged 0.26 s duration, and were delivered at intervals of 1.7 s. Four series contained: 6/25, 5/ 10, 7/15, and 4/9 calls/duration of seconds. Five calls averaged c. .230-.760 kHz.
- ³ Three averaged 0.91 s duration, and are composed of 13 pulses spanning c. .380-.850 kHz, with peak power (dominant frequency) at .580 kHz.
- ⁴ Gulping calls average c. 0.12 s duration, and are delivered at an average interval of 1.8 s. Four have a frequency range of .400-.860 kHz

- ⁵ Gargling call of 13-14 pulses, c. 0.89 s in duration, range of c. .230-.860 kHz, dominant frequency at .500 kHz (Fig. 1D).
- Two songs contain six-seven syllables and are 0.86-1.00 s long, and range from c. .450-.940 kHz, with peak power at .640 kHz.
- ⁷ Three calls averaged 1.63 s duration, and spanned a range of .460-.775 kHz, with peak power at .605 kHz.
- ⁸ The call delivered over a period of c. 1 s is composed of five rapid pulses spanning a large range of c. .680-7.360 kHz, with power peaks at 2.960 and 5.520 kHz. Each pulse lasts 0.14 s.
- power peaks at 2.960 and 5.520 kHz., Each pulse lasts 0.14 s. ⁷ Two calls of 0.38 s duration, separated by a gap of 8.18 s. They span a range of .430-.970 kHz with a power peak at .610 kHz.
- ¹⁰ Four averaged 0.44 s each, and are composed of a pair of harmonics spanning a range of .210-.750 kHz, with the power peaks at 320 and 590 kHz.
- ¹¹ Notes average 0.35 s duration, and are separated by gaps averaging 2.92 s. Four spanned an average range of .265-.795 kHz with a dominant frequency of .720 kHz.
- ¹² Five calls averaged 0.55 s duration, with an average range of c. .510-.860 kHz.



Zigzag Heron Zebrilus undulatus (Lyn Wells)

breeding dispersal of Stripe-backed Bittern, it is unlikely that the two would be calling side by side. More likely to be confused are the vocalisations of some form of Least Bittern, either I. e. erythromelas, which broadly overlaps Zigzag Heron in northern South America, or I. e. *limoncochae*, whose range may be wholly submerged within that of Zigzag Heron. Both bear a disturbing resemblance to those of Zigzag Heron, and, although less coarse, a short series could *easily* be misidentified. Because the range of Least Bittern is poorly documented in the Amazon Basin, heard birds should not be assumed to be either Least Bittern or Zigzag Heron, and whenever possible, a visual identification should be obtained.

Acknowledgements

Andrea Priori, Library of Natural Sounds, Cornell Univ., supplied Least Bittern recordings by G. B. Reynard and T. A. Parker. Reynard granted permission to reproduce a Cuban vocalisation from his phonographic disc. John W. Hardy, Florida State Museum, provided a copy of Roberto Straneck's Argentinian recording, and Straneck kindly allowed me to publish a sonagram made from it. Jeff Kingery provided a copy of his Jamaican recording. Robert Benson offered the resources of the Center for Bioacoustics at Texas A&M University and helped prepare the sonagrams utilised in this paper. For providing literature, specimen notes, or data, I thank: James Kushlan, Univ. of Mississippi; Diane Maurer (ret.) and Thomas S. Schulenberg, Field Museum of Natural History;

Janet Hinshaw, Museum of Zoology, Univ. of Michigan; John P. O'Neill, Louisiana State University; and Stephen Russell, Univ. of Arizona. Prior to the publication of his monograph¹⁴, Floyd E. Hayes, Dept. of Biology, Caribbean Union College, freely shared his encyclopedic knowledge of Paraguayan bird distribution and ornithological literature. Fellow bird recordists Davis W. Finch, Jeff Kingery, and Gary Rosenberg (all of Wings, Inc.) were enthusiastic travelling companions during trips when Ixobrychus observations were made. Robert S. Ridgely, Academy of Natural Sciences of Philadelphia, furnished several literature citations and much encouragement, as well as commenting on various aspects of this paper. To all, my thanks.

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