

SPECIFIC STATUS AND BEHAVIOR OF *CYMBILAIMUS SANCTAEMARIAE*, THE BAMBOO ANTSHRIKE, FROM SOUTHWESTERN AMAZONIA

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ABSTRACT.—*Cymbilaimus sanctaemariae* (Formicariidae), previously regarded as a poorly known subspecies of *C. lineatus*, is a distinct species. The two forms overlap broadly in geographical range and are distinct in morphology, plumage, voice, and habitat. We propose the vernacular name Bamboo Antshrike. The species apparently links *Cymbilaimus* and *Thamnophilus*. It is a member of the growing list of bamboo-associated birds endemic to southwestern Amazonia. Received 2 August 1982, accepted 4 January 1983.

IN 1941 the Swedish taxonomist Gyldenstolpe described a new subspecies of the Fasciated Antshrike, *Cymbilaimus lineatus sanctaemariae* (Formicariidae), from five specimens collected at a single locality in northern Bolivia. The recent discovery of the form at six sites in southeastern Peru and one in extreme western Brazil reveals that the range of *sanctaemariae* lies almost completely within that of *C. l. intermedius*, the widespread Amazonian race of the Fasciated Antshrike. At three sites in the lowlands of the department of Madre de Dios, Peru, we now know that the two forms occur together. They are easily distinguished by size, plumage, and voice and differ as well in habitat preference. For these reasons it is clear that *sanctaemariae* must be elevated to the rank of full species. We propose for it the vernacular name Bamboo Antshrike, reflecting its unusually restricted habitat preferences.

DESCRIPTION

Distribution.—The holotype and four paratypes of *sanctaemariae* (4 ♂ and 1 ♀, Royal Museum of Natural History, Stockholm) were collected by A. M. Olalla in October 1937 at Victoria, at the confluence of the Ríos Madre de Dios and Beni, department of Pando, Bolivia (elev. 170 m, 10°59'S, 66°10'W; Fig. 1, site 1) (Gyldenstolpe 1941, 1945b). The species was otherwise unknown until 1958, when E. R. Blake collected three individuals (2 ♂ and 1 ♀, Field Museum of Natural History) from three sites in the drainage of the Río Madre de Dios,

departments of Madre de Dios and Cuzco, Peru (Fig. 1, sites 2, 3, and 4). At the mouth of the Río Inambari (elev. approximately 280 m, 12°41'S, 69°44'W; site 2), Blake collected both *C. sanctaemariae* (♀, FMNH #251823) and *C. lineatus intermedius* (♀, FMNH #251825). This remains the only locality for which co-occurrence is documented by specimens.

In November 1981, while we were camped at 1,200 m on the bamboo- and forest-covered slopes of the Cosñipata Valley, Dept. Cuzco, Peru ("Consuelo," ca. 13°07'S, 71°15'W; site 5), a loud, ringing, unfamiliar call repeatedly drew our attention to tall bamboo thickets. Taped playback attracted an agitated, singing, black-and-white barred antshrike with a long black crest held vertically erect. We immediately recognized this as a species we had seen and tape-recorded, but failed to identify, in August 1980, also in dense bamboo, about 3 km east of Shintuya on the left bank of the Río Alto Madre de Dios, Dept. Madre de Dios (elev. 420 m, ca. 12°40'S, 71°15'W; site 6). *C. lineatus* occurred as well at this locality but only in nearby tall, moist tropical forest. This latter site represents the second at which the two species live side by side. At Consuelo we collected five specimens of *sanctaemariae* (4 ♂ and 1 ♀, FMNH) but did not locate any *lineatus*.

The two species occur together at the Explorer's Inn, Río Tambopata, Dept. Madre de Dios (elev. 190 m, 12°36'S, 69°11'W; site 8). T. Parker (pers. comm.) has tape-recorded both *Cymbilaimus* voice types at this site (recordings

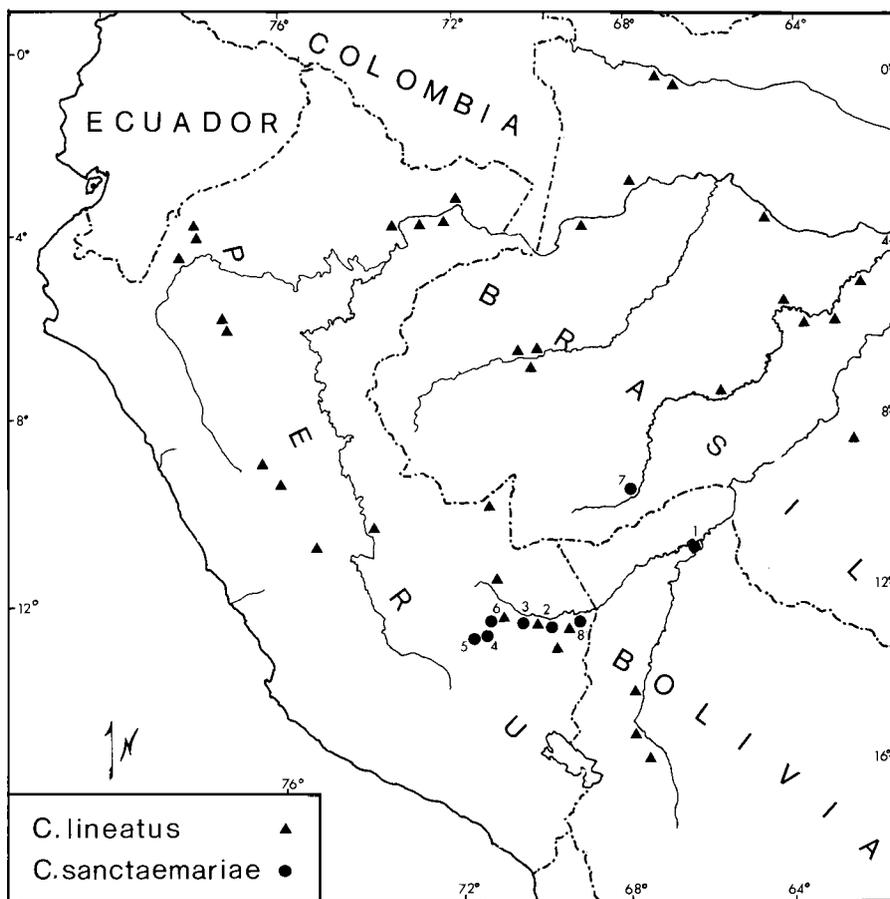


Fig. 1. Some localities in Peru, Bolivia, and western Brazil where *C. sanctaemariae* (circles) and *C. lineatus* (triangles) have been collected or observed. *C. lineatus* also occurs from Nicaragua to Ecuador and Amazonian Brazil. Sources: specimens in AMNH, FMNH, LSUMZ, and Carnegie Museum of Natural History (Zimmer 1932; Gyldenstolpe 1941, 1945a, b, 1951; Peters 1951; O'Neill 1974; pers. comm. from J. V. Remsen and T. Parker; pers. obs. by the authors).

on file at Cornell Laboratory of Ornithology). He reports that *sanctaemariae* calls are heard only from dense bamboo stands near the Río Tambopata, whereas *lineatus* is generally found only in higher-ground forest openings.

Only one record takes *sanctaemariae* out of the drainage basin of the Río Madre de Dios. A single female (Louisiana State University Museum of Zoology, courtesy of J. V. Remsen) was collected by J. Hidasí in 1968 on the Río Acre in the state of Acre, Brazil (exact location unknown; near site 7).

The range of *C. sanctaemariae*, as presently known, lies almost entirely within that of *C. lineatus* (Fig. 1). Only along a thin elevational

zone in the Andean foothills does *sanctaemariae* apparently occur without its more widespread congener. *C. lineatus* reaches its upper elevational limit at or below approximately 1,000 m (specimens in FMNH and LSUMZ; pers. obs.). We found *sanctaemariae* up to 1,200 m at Consuelo, but it was absent at 1,300–1,400 m, despite the presence of ample bamboo habitat.

Morphology.—*Cymbilaimus sanctaemariae* is smaller than *lineatus* and has a noticeably shorter, more slender bill (Table 1, Fig. 2). The mean weight of 5 *lineatus* mist-netted at the Cocha Cashu Biological Station in the Manu National Park, Dept. Madre de Dios, Peru (elev. 380 m, 11°55'S, 71°18'W) was 38.5 g, while that of the

TABLE 1. Measurements (mm) of *Cymbilaimus sanctaemariae* and three races of *C. lineatus*.^a

Character	<i>C. sanctaemariae</i> (9) ^b			<i>C. l. intermedius</i> (46)			<i>C. l. fasciatus</i> (20)			<i>C. l. lineatus</i> (20)		
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
Bill length	13.4***	0.4	12.9-14.0	14.6	0.5	13.6-15.9	15.3	0.8	13.9-16.8	14.9	0.5	13.6-16.1
Bill depth	7.6***	0.2	7.4-7.8	8.9	0.4	8.1-9.6	9.1	0.2	8.5-9.4	9.0	0.4	8.4-9.8
Bill width	7.2***	0.1	7.1-7.8	8.6	0.4	7.6-9.3	8.7	0.4	7.9-9.4	8.8	0.4	8.2-10.2
Wing length	71.4**	2.5	69.6-75.6	74.6	2.8	70.8-83.0	74.2	2.8	70.3-80.1	74.0	2.4	70.0-78.5
Tail length	65.0**	3.8	59.5-67.9	68.0	2.6	61.4-73.4	69.1	3.2	64.5-75.6	69.4	3.3	63.7-75.6
Tarsus length	25.2 ^{ns}	0.7	23.8-25.8	24.8	0.9	23.0-26.5	25.0	1.0	22.3-26.3	25.3	1.0	23.2-26.9

^a Sexes pooled; bill length from tip to anterior edge of nasal opening; bill depth and width measured at anterior edge of nasal opening; sample sizes in parentheses.

^b *Sanctaemariae* differing from sympatric *intermedius*: *** $P < 0.0005$; ** $P < 0.01$; ns, not significant.

5 *sanctaemariae* collected at Consuelo was 30.9 g, a highly significant difference (Table 2). In addition, nine *sanctaemariae* specimens were significantly smaller on average than a representative series of Amazonian *lineatus intermedius* in 5 out of 6 measurements (Table 1; tarsus lengths do not differ). Differences between the two species in bill dimensions are highly significant ($P < 0.0005$ for each dimension) and for wing and tail only slightly less so ($P < 0.01$). Differences between mensural characters in the three subspecies of *lineatus* rarely are significant at any level. In short, *sanctaemariae* is far more different from *lineatus* than the three races of *lineatus* are from each other. In most mensural characters *sanctaemariae* lies outside of the range of variation in *lineatus*.

Plumage.—The plumages of the two species of *Cymbilaimus* are unusually similar, but several diagnostic characters do exist in both males and females. Gyldenstolpe (1941, 1945b) pointed out distinguishing features in the male plumage, and he described the female *sanctaemariae* in detail. Here, we shall briefly reiterate these differences and describe one character, the long crest, that Gyldenstolpe apparently overlooked.

Males of both species are finely barred black and white above and below, except for the crown. On the face and undersides the bars are

nearly equal in width, while on the back the white bars are narrower or reduced to fine lines on a black background. Both ventrally and dorsally the bars are broader and more sharply defined in *sanctaemariae* than in *lineatus* (Fig. 2; Gyldenstolpe 1941, 1945b).

A more distinctive character is the barring on the tail (Fig. 2). In males of all races of *lineatus* the white bars are thin arching lines that almost meet the central shaft on each rectrix. In *sanctaemariae* these bars are short, broad notches in both feather margins, never meeting the central shaft.

As shown in Table 2, both males and females of *sanctaemariae* have extremely long crests, much longer than in *lineatus*. In addition, the crests of *sanctaemariae* males are completely black, with no white barring further back than the lores. *C. lineatus* males always have fine barring on the forehead, often extending back across the crown to the nape. This is particularly true of *C. lineatus fasciatus* but occurs as well in other subspecies.

Plumages of female *lineatus* and *sanctaemariae* differ more substantially than those of males. In both species the back and face are broadly barred with black and reddish-buff (color #24; color nomenclature from Smithe 1975). Below, from chin to undertail coverts, *lineatus* females are uniformly barred black and buff, the latter

TABLE 2. Weights and central crown-feather lengths of *Cymbilaimus sanctaemariae* and *C. lineatus* (sexes pooled).

Species	n	Weight (g)			Crown-feather length (mm)			
		Mean ± SD	Range		n	Mean ± SD	Range	
<i>C. sanctaemariae</i>	5	30.9 ^a	2.0	28.5-34.0	7	21.8 ^b	1.9	19.2-25.5
<i>C. lineatus intermedius</i>	5	38.5	1.5	36.5-39.9	20	15.4	0.8	14.0-17.0

^a Weights significantly different; $t = 6.8$, $P < 0.0005$, one-tailed test.

^b Crown feathers significantly different; $t = 12.5$, $P < 0.0005$, one-tailed test.

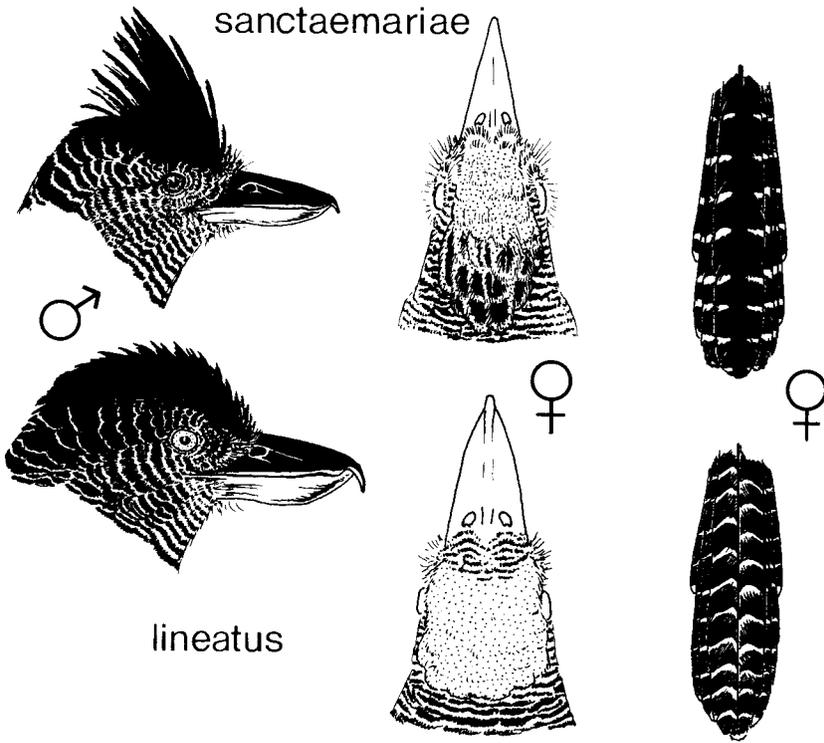


Fig. 2. Distinctive features of plumage and bill morphology in the two *Cymbilaimus* species. In *sanctaemariae*, note more slender bill, conspicuous crest, black hind-crown feathers in females. Both sexes show the respective tail patterns illustrated here.

blending from Pale Horn Color on the throat to light Buff on the lower abdomen. Female *sanctaemariae*, in contrast, are bright, orange-tinged Buff from chin to undertail coverts, barred very lightly with black only on the sides of the breast, flanks, thighs, and undertail coverts. The throat is not barred and the center of the breast and abdomen only lightly so.

On the remiges and rectrices the barring differs in both extent and color between the two species. Female *lineatus* have broad, arching reddish-Buff bars that meet the central shaft on both wing and tail feathers. In *sanctaemariae*, the bars are white, or very pale buff, marginal notches not meeting the shaft.

Females' crowns differ in hue as well as in feather length: female *lineatus* crowns are bright, orange-tinged Brick Red, while *sanctaemariae*'s forecrown is a browner, darker shade of Amber. Even more diagnostic are the posterior crest feathers of *sanctaemariae* females, which are pure black or black outlined with brown. This condition is never present in *lineatus* (Fig. 2).

We encourage museum curators to check their collections for hidden *sanctaemariae*, particularly among the males. Despite their superficial similarity, the two species are easily distinguished by the plumage characters described above and by bill dimensions. The two species have nonoverlapping ranges of values for bill depth at the anterior edge of the nostril (*sanctaemariae* range = 7.4–7.8 mm; *lineatus* range = 8.1–9.8 mm), and almost nonoverlapping ranges for bill width (*sanctaemariae* range = 7.1–7.8 mm; *lineatus* range = 7.6–10.2 mm; Table 1).

Eye color.—Adult *sanctaemariae* have brown irides and adult *lineatus* generally have red. Out of 70 adult *lineatus* of three subspecies for which eye color was reported (specimens in AMNH and FMNH), 67 (96%) were red, the descriptions including "scarlet," "crimson," and "ruby red." Out of 7 juveniles, 6 (86%) were brown and none was red. Five adult *sanctaemariae* collected in 1981 had brown irides with no hint of red.

Voice.—The distinctive songs of *C. lineatus* and

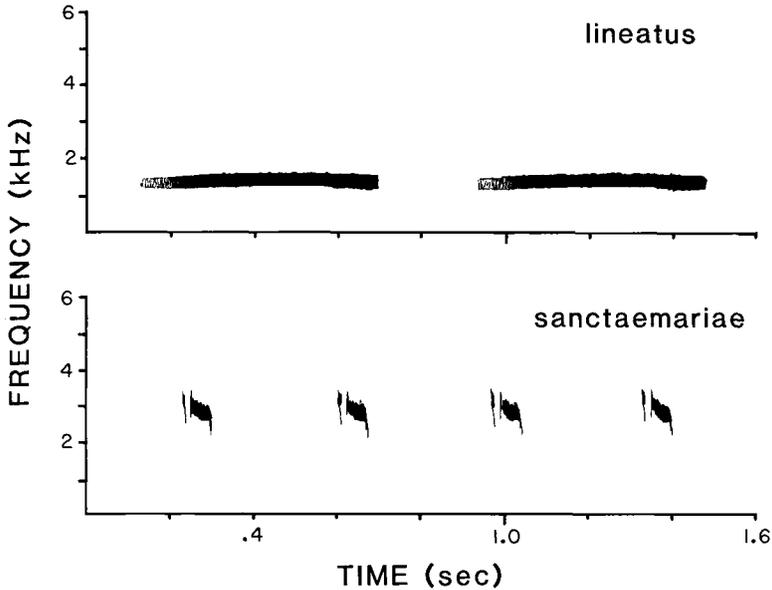


Fig. 3. Sections of the songs of *C. lineatus* and *sanctaemariae*, traced from the originals. Each song is composed of a longer series of notes than is demonstrated here (see text). The frequency resolution is approximately 200 Hz. Philip Gaddis prepared the sonograms on a Kay Elemetrics Co. Sona-Graph, Model 6061-B at the American Museum of Natural History. Recordings by J. W. Fitzpatrick.

sanctaemariae provide further evidence that the two forms are separate species. The song of *C. lineatus* is a series of four or five long, slurred whistles, each beginning on the same note and sliding up and then down again to the beginning pitch (Fig. 3). Each whistle's onset is gradual. Both sexes sing the same song. *C. sanctaemariae* males and females sing a rapid series of 8–17 clear, staccato notes, each with an abrupt, barely audible introductory note lasting only 0.009 s. The main portion of each note descends sharply in pitch. The result is a monotonic series of rapidly repeated "pyurt" notes. Males give a harsh harmonic call note, as well as the regular song, in response to playback.

At Consuelo, males responded to playback of their own calls by approaching the source of the sound, singing, calling, and flying rapidly about between perches. Females responded by singing sporadically but were not attracted to the sound of their own species' song, male or female.

Ecology.—*Cymbilaimus sanctaemariae* appears to be a strict bamboo specialist. We have found it only in stands of *Bambusa* spp., at 1,200 m elevation and at 420 m. Like all members of its

family the bird is insectivorous. Stomachs of four individuals collected in 1981 contained, among many unidentified bits of chitin, the remains of several beetles (Coleoptera), a 15-mm short-horned grasshopper (Acrididae), a small roach, a 30-mm caterpillar (*Lepidoptera*), and a 6-mm ant (Hymenoptera). The birds usually forage in extremely dense masses of fine bamboo branches and leaves in the tops of the plants, at 8–12 m above the ground. One sighting was in dense vines and foliage around a 25-cm diameter trunk at 12–15 m, above low (6 m) bamboo. These foraging sites render the birds unusually difficult to see from the ground and may explain the species being overlooked for so long.

At our Consuelo site, 1,000–1,200 m on the sides of the Cosñipata Valley, extensive stands of bamboo covered many of the sunny, open slopes. Trees, including *Cecropia* (Moraceae), *Irriartia* (Palmae), and Araliaceae, grew up through the bamboo to heights of 16–18 m but formed a closed canopy over the bamboo only in a few places. Ridgetops and steep-sided ravines in this area were generally forested, the trees rising to heights of 15–25 m and clothed in thick mats

TABLE 3. Measurements (mm) of three barred *Thamnophilus* races apparently closely related to *Cymbilaimus sanctaemariae*.^a

	Bill			Wing length	Tail length	Tarsus length
	Length	Depth	Width			
<i>Thamnophilus doliatus subradiatus</i> (n = 20)						
Mean	12.4	6.3	5.4	72.2	59.9	25.7
SD	0.7	0.3	0.3	1.9	2.7	0.9
Range	10.6-13.9	5.5-6.8	4.9-5.9	67.5-77.4	54.7-64.5	23.4-27.5
<i>T. palliatus berlepschi</i> (n = 15)						
Mean	12.0	6.1	5.8	71.7	63.0	24.1
SD	0.8	0.4	0.3	2.3	3.7	0.7
Range	10.2-13.3	5.3-6.4	5.3-6.2	68.2-76.8	56.0-70.6	23.2-25.4
<i>T. multistriatus multistriatus</i> (n = 14)						
Mean	11.3	6.0	5.5	70.6	64.8	23.8
SD	0.8	0.4	0.2	3.3	4.3	0.9
Range	10.1-12.1	5.6-6.8	5.2-5.9	63.2-75.8	57.1-69.9	22.6-24.8

^a Sexes pooled; compare with measurements of *Cymbilaimus sanctaemariae* in Table 1.

of moss, ferns, and bromeliads. Tree ferns and small palms were common in the thick understory of the moist ravines. We did not find *sanctaemariae* in the forested areas.

Cymbilaimus sanctaemariae apparently live in pairs on exclusive territories. Three of the four "groups" we found were pairs; the fourth was a single male. The four males were spaced well apart in an area of about 3 km². The birds sometimes foraged alone or in pairs and sometimes in loose association with mixed-species flocks of antbirds, flycatchers, vireos, and tanagers. One female that we followed for 3 h through about 1 km of thick, 5-12-m-high bamboo joined and separated from a flock several times.

Cymbilaimus lineatus, which we observe regularly at the Cocha Cashu Biological Station, usually forages for insects in dense vine tangles at heights of 6-20 m in the understory and subcanopy of tall (40-50 m) tropical forest, often in old, overgrown treefall openings. It, too, appears to be monogamous and frequently associates with understory and subcanopy flocks composed of antbirds, furnariids, woodcreepers, vireos, and tanagers (see Munn and Terborgh 1979).

REMARKS

Taxonomic affinities.—Characters of plumage and external morphology indicate that *C. lineatus* is the closest relative of *sanctaemariae* and therefore that the latter does belong in the

present genus *Cymbilaimus*. *C. sanctaemariae* may establish a morphological link, however, between *Cymbilaimus* and a much larger genus of antshrikes, *Thamnophilus*. These genera are extremely closely related. In size, bill size, and several plumage characters, *sanctaemariae* is intermediate between *C. lineatus* and the complex of three finely barred *Thamnophilus* species—*T. doliatus*, *multistriatus*, and *palliatus*—that is currently placed at the beginning of that genus. *C. sanctaemariae* especially resembles *T. doliatus subradiatus* (eastern Peru from Loreto to Madre de Dios, western Brazil to the lower Río Negro and Río Purus; Peters 1951) and *T. palliatus tenuifasciatus* (Ecuador, Río Napo; Peters 1951). Male *sanctaemariae* resemble both of these in the form and extent of barring, particularly on the tail, and in the length and pure black color of the crest (Table 3). Female *sanctaemariae* resemble female *T. doliatus* in the orange-buff color and reduction or loss of barring on the throat, breast, and abdomen. In body size and bill size, *sanctaemariae* is intermediate between *C. lineatus* and the three barred *Thamnophilus*.

The unbarred *Thamnophilus* are generally smaller, and smaller-billed, than the barred species. Thus, a fairly distinct division exists between the first three members of the genus (large, relatively large-billed, and barred) and the remaining species (smaller and more plainly colored). Many of the latter species more closely resemble succeeding genera such as *Dy-*

sithamnus and *Thamnomanes* (even smaller and more slender-billed).

The above patterns suggest to us that *C. sanctaemariae* may be more closely related to the three barred *Thamnophilus* than these species are to the rest of their genus. If this is the case, the two genera must either be united or redrawn to include *Cymbilaimus* and these three species (and perhaps others) in a genus distinct from the small, plain-colored *Thamnophilus*. Such a revision, however, should await a more careful look at details of internal anatomy, lest we place too much emphasis on potentially plastic plumage patterns. Furthermore, the necessary revision and character analyses must also treat the closely related genera *Batara*, *Mackenziaena*, and *Frederickena*, which are currently interposed between *Cymbilaimus* and *Thamnophilus* (Peters 1951).

Bamboo endemics.—*Cymbilaimus sanctaemariae* joins a growing list of southwestern Amazonian endemics that are now known to be bamboo specialists, hence our choice of common name. Other members of this unusual assortment include a recently discovered, as yet undescribed antbird (*Cercomacra* sp. nov.; Fitzpatrick in prep.), a recently rediscovered flycatcher, *Poecilatriccus albifacies* (formerly in *Todirostrum*; unpubl.), three additional flycatchers (*Hemitriccus flammulatus*, *Lophotriccus eulophotes*, *Ramphotriccus megacephala boliviiana*), and a peculiar furnariid (*Simoxenops ucayalae*). All seven of these forms were, until recently, either rare or absent in collections; yet all but *Lophotriccus* are now known to be rather common locally along the Río Madre de Dios and its major tributaries, in southeastern Peru. All these species are nearly or absolutely restricted to dense and extensive stands of bamboo. A large number of additional, more widespread species in this region appear to be partial to bamboo stands, even though they are not entirely restricted to them (notably *Monasa flavirostris*, *Nonnula ruficapilla*, *Celeus spectabilis*, *Automolus dorsalis*, *A. melanopezus*, *Thamnophilus murinus*, *Drymophila devillei*, *Myrmotherula ornata*, *Empidonax euleri*, *Thryothorus genibarbis*).

Various researchers have reported to us that, in comparison with other regions of lowland Amazonia, southeastern Peru appears to be especially rich in bamboo. In addition to several species of *Bambusa* that are extremely common along the banks of major rivers in southern

Peru, we have encountered vast stands of as yet unidentified bamboo species blanketing the tops of low hills in between small streams within the Manu National Park. This high-ground habitat occurs at least as far north as Balta, Dept. Ucayali (O'Neill 1969, pers. comm.) but apparently is not typical of such areas in central or northern Amazonia. We suggest that the existence of this extensive bamboo habitat in the southwestern Amazon basin has resulted in the persistence, and possibly the local differentiation, of a community of relative habitat specialists that now are, and perhaps always have been, unique to this unusually diverse faunal zone.

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