Salaman, P.G.W. & Stiles, F.G. (1996) A distinctive new species of vireo (Passeriformes: Vireonidae) from the Western Andes of Colombia. *Ibis* 138: 610-619.

A distinctive new species of vireo (Passeriformes: Vireonidae) from the Western Andes of Colombia.

P. G. W. Salaman[1] & F. Gary Stiles[2]

[1] Department of Applied Science, Anglia Polytechnic University, Cambridge, CB1 1PT, U.K.
[2] Instituto de Ciencias Naturales, Univ. Nacional de Colombia, Apartado 7495, Bogotá D.C., Colombia.

On the basis of field observations and two specimens from two localities in the Chocó biogeographical region of west Colombia, we here describe *Vireo masteri*, sp. nov. This species appears to be most closely related to *Vireo carmioli* of Costa Rica and west Panama, but is much smaller and has a distinctive long superciliary, a feature otherwise unknown in the subgenus *Vireo*, of which it is the southernmost known taxon. *Vireo masteri* appears to be restricted to a narrow belt of premontane pluvial forests from 1,300-1,600 m on the Pacific slope of the Western Andes. We present notes on the behaviour, ecology, and conservation of this new species.

Con base en observaciones en el campo y dos especímenes de dos localidades en la región biogeográfica del Chocó colombiano, describimos una nueva y distintiva especie de vireo o chiví, *Vireo masteri*, sp. nov. Esta especie parece mas afín a *V. carmioli* de Costa Rica y Panamá que a cualquier otra especie, pero es de menor tamaño y tiene una lista superciliar larga y llamativa, caracteristica única en la subgébero *Vireo*, del cual es la forma más sureña. *Vireo masteri* aparentemente se restringe a una faja altitudinal angosta (1,300-1,600 msnm) de bosque pluvial premontano en la vertiente del Pacífico de la Cordillera Occental de los Andes colombianos. Presentamos anotaciones sobre la ecología, el comportamiento, y la conservación de esta nueva especie.

The Chocó biogeographical region of extreme north-western South America has one of the world's highest concentrations of endemism for birds (Terborgh and Winter 1983, ICBP 1992), plants (Gentry 1986), reptiles and amphibians (Lynch 1979) and butterflies (Brown 1982). Over half of the species endemic or quasi-endemic to Colombia are restricted to this region (Stiles 1993). Ornithological explorations in the region began in the 1870s and have continued sporadically ever since (see Chapman 1917, Meyer de Schauensee 1966, and Hilty and Brown 1986 for summaries), but due to difficulties imposed by the extremely wet, unhealthy climate and difficult terrain, its avifauna remains incompletely known. This is especially true of the lower and middle slopes of the Pacific slope of the Western Andes, where rain, fog, and mist over most of the year make observation and collection of small canopy birds especially difficult. Thus, the discovery of a new species of small, canopy-dwelling vireo in this area is not altogether unexpected. More surprising, however, is the fact that the bird was independently discovered and collected twice within a year, at localities some 500 km apart.

Between July and September 1991, ornithological fieldwork was conducted in western Nariño, in the south-west corner of Colombia, by a team of British and Colombian students from Anglia Polytechnic University and Universidad del Vallé. In the course of locating and exploring sites requiring conservation measures, it was determined that a narrow belt of intact, very wet forest was directly threatened by the project to renovate the Pasto to Tumaco highway. An ornithological survey of the area around the Río Ñambí (1°18'N 78°5'W) at ca.1,400 m elevation, found high concentrations of Chocó endemic and threatened species. In this area on August 25 1991, PGWS briefly observed a small passerine that he could not identify low at a forest gap, but fortunately, the bird flew obligingly into a mist-net. The bird was held in captivity overnight for further examination but died during the night; it was prepared as a study skin, which was unfortunately party destroyed by ants, and it was thereafter temporarily misplaced in Bogotá.

Photographs and notes of this bird, identified as a probable undescribed form of vireo (Salaman 1991), were circulated at the Neotropical Ornithological Congress at Quito in December 1991.

During an ornithological survey of the Alto de Pisones (5°25'N 76°2'W), an extremely wet, cloud-forested ridge on the west slope of the Western Andes in Risaralda during late May-early June 1992, FGS was repeatedly puzzled by a small, foliage-gleaning canopy passerine that he could not identify. He at length obtained a specimen, which unequivocally represented an undescribed species of *Vireo*. The collecting site was at 1,550 m, but a number of visual observations were made between ca.1,450 and 1,600 m. Study of the specimen and correspondence with PGWS established that the Río Ñambi and Pisones birds were the same species; this was confirmed when FGS finally located the former specimen in the collection of the Unidad de Investigación "Federico Medem" (UNIFEM) of the Instituto Nacional de los Recursos Naturales Renovables y del Ambiente (INDERENA) in Bogotá.

We have since revisited both localities (PGWS at Río Ñambí in July 1992 and August 1993, FGS at Alto de Pisones in March 1993), obtaining further observations of the new species but no additional specimens. However, the two specimens and our numerous (c.25) observations leave no doubt that the bird is indeed a new species of vireo, which we here name;

Vireo masteri sp. nov., Chocó Vireo

HOLOTYPE

Adult male, no. 31206 of the ornithological collection at Instituto de Ciencias Naturales, Museo de Historia Natural, Universidad Nacional de Colombia; collected 5 June 1992 by FGS (original number FGS 2890) at Alto de Pisones (5°25'N 76°2'W), ca. 7 km NW Gegnadas, Municipio de Mistrató, Departmento de Risaralda, Colombia at 1,550 m asl. Adult male with skull fully ossified, left testis 4.5 x 3.5 mm, no subcutaneous fat.

PARATYPE

Juvenile male, no. 6425 of the ornithological collection of UNIFEM-INDERENA, Bogotá. Netted 25 August 1991 by PGWS during the "Colombia '91: Cambridge Rainforest Expedition" at Río Ñambí (1°18'N 78°5'W), ca. 5 km NW Altaquer, Municipio de Barbacoas, Departmento de Nariño, Colombia; elevation 1,400 m. Skin prepared by Guillermo Cantillo. Color slides of the live mist-netted bird are available on request from PGWS.

DIAGNOSIS

In pattern (especially the conspicuous wingbars), proportions, general shape and impression, and well-developed tenth primary (nearly half the length of the ninth), this bird is a member of the genus *Vireo*, and subgenus *Vireo*. *V. masteri* most closely resembles *V. carmioli* but is much smaller (wing cord ca.50-55 mm vs. 65 mm or more), slightly duller in general coloration, and with a different and highly distinctive facial pattern: a dark orbital line, pale superciliary stripe, both of which extend posteriorly to above the posterior portion of the auriculars, rather than terminating just behind the eyes; also lacks the pale subortibal spot of *V. carmioli*. Similar in size and overall coloration to some forms of *V. pallens* but differs from these even more in facial pattern (supraloral stripe prolonged into a long superciliary rather than ending above the anterior part of the orbit), iris colour (dark, not pale), and habitat (montane, not coastal). The combination of conspicuous wingbars and a well-developed pale superciliary distinguishes *V. masteri* from all other species of the genus *Vireo*.

ETYMOLOGY

The species epithet reflects the fact that, because this species is the first to be named through the Species Sponsorship Programme, we have no idea what to expect!

DISTRIBUTION

Presently, known from only two localities on the Pacific slope of the Western Andes of Colombia, 520 km apart (see Introduction). However, it is probably more or less continuously distributed, in appropriate forest habitat from Alto de Pisones (holotype-locality), at elevations 1,300-1,600 m, southwards to the Río Ñambí (paratype-locality), at 1,300-1,400 m (Figure 1).

Figure 1. Map of Andes and Chocó biogeographic region of Colombia, showing the two type-localities of *V. masteri* on the Pacific slope of the Western Andes of Colombia: (1) Río Ñambí; (2) Alto de Pisones. Bold black contour lines (indicating altitudes 1,300-1,600 m), highlight the suspected range of this species.

DESCRIPTION OF HOLOTYPE

Capitalised color nomenclature and numbers follows Smithe 1975, 1981.

Upperparts
Olivaceous, shading from Olive (30) on pileum to progressively brighter and greener hues posteriorly (back near 48, Auxiliary Olive Green; rump and upper tail-coverts 46, Basic Olive Green). Central pair of rectrices mostly Olive Green (48), the remaining rectrices coloured like the secondaries, except that the outer three pairs have very narrow pale brownish fringes.

Wings
Remiges dull dark brown (near 121, Vandyke Brown), the secondaries narrowly edged with Olive Green (46), the primaries edged basally with paler, more yellowish-olive (duller than 52, Olive Yellow). Median and greater secondary coverts dull brown like remiges, but broadly tipped with white slightly tinged with dull yellow (near 56, Straw Yellow) forming two prominent bars. Wing-linings yellow (56, Straw Yellow).

Face and underparts
Supraloral area ochraceous (between 123c, Yellow Olive, and 53, Buff-Yellow); the pale area extending posteriorly as a broad supercilium (near 53, Buff-Yellow) to beyond the posterior margin of the auriculars. Lores and orbital stripe (extending back over the auriculars) dark (near 30, Olive, but darker). Upper and lower eyelids pale yellowish (near 56, Straw Yellow), forming a narrow eyering interrupted before and behind the eye by the dark orbital stripe. Cheeks and auriculars ochraceous yellow (same color as supraloral area), mottled with Olive (30). Chin and throat dull whitish, tinged with Straw Yellow (56); sides of throat and entire chest rather bright ochraceous yellow (between 53, Buff-Yellow and 56, Straw Yellow) shading to Olive Green (48) on sides and flanks. Lower breast, sides of abdomen, and crissum paler, clearer yellow (56, Straw Yellow), shading to dull white on centre of abdomen. \

Soft Parts
Iris dark brown; maxilla blackish, shading to dark horn color at tip; mandible pale horn colour, shading to whitish at base; legs and feet bluish (lead) grey.

PLUMAGE VARIATION

The paratype is a young male (skull ca. 30% ossified) moulting from juvenile to first year plumage. Its superciliary and facial area are paler, more cream-coloured than those of the adult, but emerging adult-type feathers with darker, richer colours give these areas a slightly spotty appearance. The wingbars are broader and less sharply defined, especially proximally (the inner edges of the white tips of the wing-coverts are blurred rather than sharp), and with a much stronger yellow tinge; the legs were paler and more bluish in life. Both wing and tail are shorter than in the adult; the remiges and wing-coverts have soft pale fringes, while the rectrices are pointed rather than rounded at the tips; the tenth primary is decidedly shorter (ca. one-third the length of the ninth) than in the adult. Below, the anterior underparts are slightly paler and less ochraceous, the flanks paler and less strongly olive. Measurements of the paratype are given in table 1.

No obvious variation in plumage was noted amongst birds seen in the field, which undoubtly included both sexes and ages. In the Vireonidae in general, the sexes are identical in color but males average slightly larger in size (cf. Ridgway 1904).

MEASUREMENTS

Measurements of the type series of *Vireo masteri* and a comparison with *V. carmioli* are presented in Table 1.

Table 1. Measurements of *Vireo masteri* and 10 specimens of *V. carmioli.*

	V. masteri		*V. carmioli*	
	ICN (holotype)	INDERENA (paratype)	*X*	N
Exposed culmen (mm)	11.5	11.2		
Total culmen (mm)	13.6			
Commissure width (mm)	7.0			
Bill depth at nostril (mm)	3.4	3.4		
Wing chord (mm)	54.9	54.0	68.47 +/- 0.81	
Tail length (mm)	35.1	34.9		
Tarsus length (mm)	17.3	17.3		
Mass (g)	11.4	11.0	13.13 +/- 0.27	
Ratio wing/tail	1.56	1.55		

Ratio tarsus/tail	0.49	0.49

TAXONOMIC AFFINITIES

From its size, coloration, and general aspect, the new species could belong to any of several families; particularly Formicariidae, Parulidae, and Vireonidae. Its ten primaries eliminate Parulidae (indeed, the entire nine-primaried assemblage), and characters of the foot and tarsal scalation exclude the species from Formicariidae (cf. Ridgway 1904). The most detailed diagnosis of the external characters of the Vireonidae available to us is that of Ridgway (1904), and the new species agrees with this diagnosis in every particular, including tarsal envelope, relative lengths of the digits, adherence of basal phalanges, subterminal tooth and hooked tip of maxilla, tip of mandible produced into an ascending point, two inconspicuous rictal bristles on each side, nostril partly overhung by operculum, feathers of frontal antiae with well-developed bristle-like tips that extend antenorly, and coloration without barring (except wingbars), spots, or streaks. We are completely confident that our bird is a vireonid.

Within the family, the best generic keys are those of Ridgway (1904) and Phillips (1991: *Hylophilus* excluded). In both of these keys, the new species keys out to the genus *Vireo*, subgenus *Vireo*; in both, it keys out under *V. carmioli* (Yellow-winged Vireo) of Costa Rica and west Panama by virtue of its long superciliary and small size, and its tenth primary nearly half the length of the ninth. Until the discovery of the new form, *carmioli* was the southernmost breeding form of the subgenus *Vireo*, and thus on geographical grounds as well as morphological grounds, might be expected to be its closest relative.

On a recent visit to Costa Rica, FGS was able to compare directly the type specimen of *masteri* with several specimens of *carmioli* he had personally collected and prepared, in the collection of the Museo de Zoología, Universidad de Costa Rica. Compared to the latter, *masteri* is a duller greenish in general, with a much more ochraceous wash across the breast, and is also significantly smaller (cf. Table 1), but the most conspicuous difference is in facial pattern. Although *carmioli* is said to possess a long, *Vireosylva*-like superciliary by Phillips (1991), in reality its superciliary is quite short, terminating immediately behind the eye; in life the effect is more that of broad, pale yellowish spectacles, interrupted behind the eye, since *carmioli* also has a pale suborbital spot of similar width and colour to the superciliary. The new species differs strikingly in its much longer superciliary (which is indeed comparable in length to those of *Vireosylva* species), its similarly long and contrastingly dark orbital stripe and its lack of a pale suborbital spot. In *carmioli*, the lores are dark, but the postocular area, where the spectacles are interrupted, is not darker than the sides of the head and neck in general. In both species the eyelid feathers are pale, but in *carmioli* these feathers are at most slightly paler than the spectacles and do not contrast; in *masteri* the contrast of these feathers with adjacent areas is much greater. We therefore discount the possibility that *masteri* is merely a race of *carmioli*, and given the magnitude of these differences, we hesitate to propose even a superspecies relationship between the two.

In size and general coloration, *masteri* is fairly similar to some of the northern Central American forms of *V. pallens* (Mangrove Vireo) (cf. Parkes 1990). However, it differs from these even more strongly than from *carmioli* in facial pattern (in all of these, the supraloral stripe terminates at the anterior end of the orbit). Also, all forms of *pallens* have more or less pale irides; in *masteri* (and *carmioli*), the irides are dark. Populations of *V. pallens* from Caribbean Central America, as well as *V. carmioli*, present two color phases, called "grey" and "yellow" by Parkes (1990). Apparently both colour phases are common in northern populations of *pallens*; but in the southernmost, Pacific population (closest to *masteri* geographically), all individuals are "grey"; in *carmioli*, "grey" (axanthic) individuals are quite rare (FGS pers. obs.). The new species is coloured like the "yellow" forms of some races of *pallens*, but we have noted no variation in plumage among birds seen in the field; if a "grey" form exists, it must be quite rare. Caribbean populations of *pallens* are evidently not restricted to mangroves, occurring as well in mixed woodland and pine savanna as well; but apparently always in coastal lowlands. Thus, in morphology, ecology and patterns of variation,

masteri appears to differ even more from *pallens* than from *carmioli*.

The genetic analysis of the Vireonidae by Johnson *et al.* (1988) reaffirms the identity of the subgenus *Vireo* (*Lanivireo* is not separable) except for *V. bellii*, and gives some support to a relationship between *carmioli* and *V. huttoni*. The fact that *carmioli* is more 'spectacled' than 'eye-ringed', whereas *huttoni* is distinctly 'eye-ringed', cautions against relying too much on details of facial pattern as a guide to relationships within this group. Johnson *et al*. (1988) also did not include any member of the *pallens* group in their analysis. Thus until a more comprehensive genetic analysis of the vireos is performed, including *masteri* and all possible relatives, we consider it premature to propose sister-group (or super-species) relationships of *masteri* with any other form.

ECOLOGY AND BEHAVIOUR

At both Río Ñambí and Alto de Pisones, we found *V. masteri* only in primary cloud forest, usually on steeply sloping terrain. At both localities the forest was characterised by a rather broken canopy 20-25 m tall, with occasional emergents to 30 m or more. Natural treefall gaps, reflecting the steepness of the terrain and high rainfall, were numerous at both sites. Dominant canopy trees included Lauraceae, Burseraceae, Clusiaceae, Hippocastanaceae, Moraceae, Araliceae, and Euphorbiaceae. Palms were numerous in all strata, and several species of Melastomataceae and Rubiaceae were common amongst subcanopy and understorey trees and shrubs. Also numerous in the understorey were shrubs of Rubiaceae, Gesneriaceae, Urticaceae, and Monimiaceae, and large herbs of Araceae, Heliconiaceae, and Marantaceae. Epiphytes were extremely abundant, especially Bromeliaceae, Araceae, Ericaceae, Gesneriaceae, Cyclanthaceae, Orchidaceae, and ferns, with trunks and branches festooned in moss. In treefall gaps, dense thickets were frequent, dominated by Urticaceae, Rubiaceae, Solanaceae, Melastomataceae, and large monocots. Treeferns were numerous at Pisones, less so at Río Ñambí; dense thickets of bamboo were infrequent at both sites.

We have accumulated ca.25 observations of *V. masteri* in the field, about equally divided between the Río Ñambí and Alto de Pisones. At both sites, the bird is inconspicuous and uncommon, as we recorded on average less than one sighting per day in its preferred habitat. We saw the birds singly or in twos (presumably pairs) during all seasons, and in threes (presumably family groups), in July and August at Río Ñambí. The birds usually occurred at medium levels or higher in the canopy, but occasionally descended to open undergrowth around the edges of treefall gaps, but we never recorded them in young second growth. *V. masteri* was almost invariably in the outer foliage of trees, actively gleaning at the tips of twigs or among leaves. They sometimes stretched below leaves, occasionally hanging upside-down, but did not sally or flutter to reach prey. They confined their activities to foliage, usually of rather open-leafed trees, and we never saw them probe or investigate tufts of moss or epiphytes, nor to take fruit. On one occasion at the Río Ñambí a bird was seen to catch a large caterpillar (ca.2 cm) then promptly smash it against a twig several times before eating it; similar to behaviour observed in *V. caribaeus* (Barlow and Nash 1985). The stomach of the Pisones specimen contained only insects, including 2-3 small beetles (Chrysomelidae, Curculionidae) and a hemipteran. *V. masteri* was associated with mixed-species foraging flocks of tanagers, antwrens, warblers, flycatchers, and furnariids in about half of our observations, but they often lagged behind flocks, spending several minutes foraging in apparently productive trees.

V. masteri is a very active foliage-gleaner, more reminiscent of a wood warbler (Parulinae), although appears most similar in foraging activity to *V. carmioli* (cf. Stiles and Skutch 1989) and *V. caribaeus* (St. Andrew Vireo) (Barlow and Nash 1985), which are considered the most energetic vireo species. On 15 April 1993, FGS observed a pair of *V. masteri* foraging near migrant individuals of *V. olivaceus* (Red-eyed Vireo) and *Dendroica fusca* (Blackburnian Warbler). In comparison, the activity of *V. masteri* was between the "sluggish" *V. olivaceus* and nervous and "flitting"*Dendroica fusca*. The foraging behaviour of *V. masteri* was most similar to *Herpsilochmus axillaris* (Yellow-breasted Antwren) and *Basileuterus tristriatus* (Three-

striped Warbler). Both are active foliage-gleaners, sometimes occurring in the same flocks as *V. masteri*. The antwren tends to hang upside-down and peer beneath leaves and twigs more than *V. masteri*, whilst the warbler less so. The vireo and antwren often occur together high in the canopy, whereas the warbler prefers dense foliage from the understorey to mid-levels. No antagonistic interactions between the vireo and any other species was noted.

The only other vireonid resident at Alto de Pisones was the much larger and heavier-billed Black-billed Peppershrike, *Cyclarhis nigrirostris*; at Río Ñambi *V. masteri* was sympatric with *C. nigrirostris* and *C. gujanensis* (Rufous-browed Peppershrike) in their narrow zone of overlap. Differences in size and activity would seem to preclude competition between *V. masteri* and either of these species. *Vireo* (*Vireosylva*) *leucophrys* (Brown-capped Vireo) was found by FGS to be common in the slightly drier forests at similar elevations on the Cauca valley side of the Western Andes above Mistrató, ca. 20 km east of Alto de Pisones. *V. masteri* was not seen at this site, nor was *V. leucophrys* found at Alto de Pisones. The resident *cancensis* race of the*Vireo* (*Vireosylva*) *olivaceus* species (or superspecies) breeds, close by to both Alto de Pisones and Río Ñambí, in secondary woods and coffee plantations, but does not seem to enter closed forest; thus *V. masteri* might be the only resident member of its genus (as well as subgenus) on the wet Pacific slope of the Andes. However, the migratory nominate race of Red-eyed Vireo passes through its habitat in both fall and spring.

During most of our observations of *V. masteri*, the birds were silent. Occasionally a weak, undistinctive "*chip*" was heard from foraging birds; on one occasion a bird responded to a pygmy-owl imitation, by FGS, giving a brief chatter. PGWS heard a bird, presumably a male, sing a brief snatch of song on August 18 1993, delivered from a bare branch in the upper canopy of the forest at Río Ñambí. The song was reminiscent of recordings of *V. carmioli* that had recently been heard (Barlow and Hardy 1981), but unfortunately the bird only sang once and no recordings could be made.

CONSERVATION

Evidence suggests that *V. masteri* is restricted to a narrow belt of premontane pluvial forest, between 1,300 to 1,600 m, on the Pacific slope of the Western Andes, where it is known from only two localities and threatened by forest destruction. After intensive searches, *V. masteri* was found to be entirely dependent on primary forest, and uncommon even within its preferred habitat. *V. masteri* is the only endemic member of the genus *Vireo* to South America.

Threats

The forests of the Chocó have long been utilised. However, the region is now being unsustainably exploited and destroyed under the auspices of the "*Plan Pacífico*" development programme, instigated by the Colombian government. The future survival of the Chocó's rich forest resources are in the balance, as road construction and development projects throughout the region threatened what wilderness areas remain. Already the Pasto-Tumaco and Cali-Buenaventura highways have carved the Chocó into segments, creating disjunct forest blocks for species such as *V. masteri*. These problems were exemplified at the two type-localities. Although Alto de Pisones and Río Ñambí are part of two relatively large blocks of primary forest, both locations are directly threatened by road construction projects, with associated colonisation and deforestation.

Alto de Pisones is menaced by a proposed highway project through Geguadas to the Chocó lowlands via Santa Cecilia. Although the road will come no closer than 5-7 km from Pisones, it will open up access to the remaining intact forest of the region to loggers and mining activities. Furthermore, if the project goes ahead, an extension of the highway straight through Pisones, from Geguadas to the gold-mining centre of Puerto de Oro, seems highly likely in the future. The Pasto-Tumaco road is only 4 km from the Río Ñambí forest, and is presently being renovated to a paved, three-lane highway. Logging contractors are following the road construction to buy newly accessible areas, such as the Río Ñambí. The problems are further compounded by a large influx of gold-miners and immigrant *campasinos* which are presently moving into the region (PGWS pers. obs. 1993). The very real threats to the very forests that *V. masteri* is dependent on,

justifies conservation measures to be instigated immediately.

Measures taken

Following the discovery of the vireo and other globally threatened birds at both sites, conservation proposals were prepared. At the Río Ñambí, South America's first Community Nature Reserve (whereby the local community own, administer and manage a protected area) was successfully set up following the Colombia '91 expedition, by local people from the town of Altaquer, with advice and financial support from the U.K., U.S.A., and Colombia (Salaman 1992). The Río Ñambí Community Nature Reserve protects ca.3,000 ha of largely pristine pluvial forest for the benefit of nature and local environmental awareness, with three full-time staff based in reserve headquarters (capacity for 15 visitors) centred in primary forest.

CARDER (Corporación Autónoma Regional de Risaralda) is elaborating a conservation and research plan for the area of Pisones, but lacks funds to implement it. Preservation was recommended in the report by FGS (Stiles 1992) in which the presence of 24 species of Chocó endemics was documented for the area, 20 of which represent northward range extensions. Funds donated from the sale of Chocó Vireo's scientific name will hopefully allow the Alto de Pisones conservation strategy to be implemented. Furthermore, funds from the sale have created an endowment fund for the Río Ñambí Community Nature Reserve, which will support annual recurrent costs (staff, maintenance, etc.), thus securing the long-term future of the reserve. The proposed creation of an international biosphere reserve joining the Río Ñambí area to the Awá reserve in north-western Ecuador is close to being implemented (C. Samper verbally 1993). This would afford a degree of protection to the virtually unknown and relatively intact forests of south-western Nariño, encompassing the Río Ñambí and therefore populations of this and many other rare species.

Based on the largely anecdotal evidence, *V. masteri* should be considered within the Red Data Book as "indeterminate". It is important that further research be undertaken to ascertain the true distribution, population density and ecological requirements of *V. masteri*, thus enabling it's conservation needs to be assessed and acted upon. Nevertheless it is of concern that the vireo appears to only survive in primary forest in a restricted range. At both sites the vireo is sympatric with a large proportion of the Chocó's endemic and threatened species. At Alto de Pisones, Black-and-gold Tanager *Bangsia melanochlamys* and Gold-ringed Tanager *B. aureocincta* were discovered in 1992 (Collar *et al.* 1992). Gold-ringed Tanager is only known from one mountain ridge at Alto de Pisones, having previously been known 40 km south at Cerro Tatama, from just four specimens collected before 1946 (Collar *et al.* 1992). The Río Ñambí holds populations of three threatened species, notably Plumbeous Forest-falcon *Micrastur plumbeus*, together with twenty-six Chocó endemics (according to ICBP 1992). For conservation initiatives to be effective the requirements of all threatened species must be considered.

We are very grateful for advice and assistance from the following: Gonzulo Andrade, William Beltrán, Birdlife International, Javier Bustos, Guillermo Cantillo, CARDER, Jon Fjeldså, Foundación para la Educación Superior, David W. Gandy, Robert Giles, Neil J. Johnson, Martin Kelsey, La Planada Nature Reserve, Eduardo Londoño, Adrian Long, Diana Mora, Milton Muñoz, Jorge Orejuela, the late Theodore A. Parker III, the late Juan Manuel Paez, Robert S. Ridgely, Mark Robbins, Pablo Rodriguez, Cristian Samper, Victor Hugo Serrano, Dr David Snow, David Wege, Universidad Nacional de Colombia, and Carlos Alberto Vanegas. We are grateful to Hernando Chiriví and José V. Rueda (INDERENA - UNIFEM), Gilbert Barvantes (Universidad de Costa Rica), Arturo Rodriguey (Instituto de Ciencias Naturales), and Peter R. Colston (British Museum [Natural History]), for permission to examine specimens.

The "Colombia '91" and "Colombia '92" expeditions to the Río Ñambí were only made possible by generous financial support by many organisations, companies and individuals: Anglia Trust, ICBP/FFPS BP Conservation Expedition Award, The Biological Council, British Birds, British Ecological Society, British Ornithologists' Union, The Cotton Trust, Gilchrist Educational Trust, People's Trust for Endangered Species, Rayne Foundation, Royal Geographic Society c/o ESSO and S. R. Resin, and Severn Trent. Ornithological studies at Alto de Pisones were part of the "Flora and Fauna of Western

Risaralda" investigation, executed by the Instituto de Ciencias Naturales, Unviersidad Nacional de Colombia, and contracted by CARDER. The Vireo name sale was channelled through the Species Sponsorship Programme, implemented by the Foundation for Community Conservation and BirdLife International, with thanks to H.R.H. Prince Bernhard of the Netherlands, Jane Fenton, Robert Giles, Martin Kelsey, Mike Parr, Mike Rands, and Leslie Stanton. Special thanks go to Adrian Long for producing the map and to David Quinn for his excellent painting.

LITERATURE CITED.-

BARLOW, J. C. AND J. W. HARDY. 1981. Songs of the vireos and their allies; family Vireonidae: vireos, peppershrikes, shrike-vireos, and greenlets. ARA-7, 2 monoaural LP records.

---------- and Nash, S. V. (1985) Behaviour and nesting biology of the St. Andrew Vireo. Wilson Bull. 97: 265-272.

BROWN JR., K. S. 1982. Paleoecology and regional patterns of evolution in Neotropical forest butterflies. Pp 255-308 in G. T. Prance, ed. Biological diversification in the tropics, Colombia University Press, New York.

COLLAR, N. J., L. P. GONZAGA, N. KRABBE, A. MADROÑO-NEITO, L. G. NARANGO, T. A. PARKER III, AND D. C. WEGE. 1992. Threatened birds of the Americas: The ICBP/IUCN Red Data Book. Third edition (part 2). International Council for Bird Preservation, Cambridge, U.K.:

CHAPMAN, F. M. 1917. The distribution of bird life in Colombian birds, II. Bull. Amer. Mus. Nat. Hist. 36:.1-169.

EISENMANN, E. 1962. Notes on some Neotropic Vireos in Panamá. Condor. 64: 505-508.

GENTRY, A. H. 1986. Species richness and floristic composition of Chocó regional plant community. Caldasia 15: 71-91.

HILTY, S. L. AND W. L. BROWN. 1986. A Guide to the Birds of Colombia Princeton Univ. Press, Princeton, New Jersey.

ICBP (1992) Putting biodiversity on the map: priority areas for global conservation. International Council for Bird Preservation, Cambridge, U.K.

JOHNSON, N. K., R. M. ZINK, AND J. A. MARTEN. 1988. Genetic evidence for relationships in the avian family Vireonidae. Condor 90: 428-445.

LYNCH, J. D. 1979. The amphibians of the lowland tropical forest. In: W.E. Duellman, ed. The South American herpetofauna: Its origin, evolution, and dispersal. Mus. of Nat. Hist., Univ. Kansas (Monogr. 7).

MEYER DE SCHAUENSEE, R. 1966. The birds of Colombia and adjacent areas of South and Central America. Narberth, Penn.:Livingston Publishing Company for the Academy of Natural Sciences Philadelphia.

PARKES, K. C. 1990. A revision of the Mangrove Vireo (*Vireo pallens*) (Aves: Vireonidae). Ann. Carregie Mus 5: 49-60.

PHILLIPS, A. R. 1991. The known birds of North and Middle America, part 2. Allan R. Phillips, Denver, Colorado.

RIDGWAY, R. 1904. The birds of North and Middle America. U.S. Natn. Mus. 50 (3).

----------. 1911. The birds of North and Middle America. U.S. Natn. Mus. 50 (4).

SALAMAN, P. G. W. 1991. Notes on an unidentified *Vireosylva* species caught in Departmento de Nariño, Colombia. Unpublished.

----------. 1992. Project Río Ñambi. Unpublished conservation proposal.

SMITHE, F. 1979. 1981. Naturalists' color guide. Amer. Mus. Nat. Hist. Press, New York.

STILES, F. G. 1992. An inventario parcial de la avifauna del noroiadente del Departamento de Risaralda. Report to CARDER. Instituto de Ciencias Naturales. 74 pp.

STILES, F. G. and SKUTCH 1989. **The birds of Costa Rica**

TERBORGH, J. AND B. WINTER. 1983. A method for siting parks and reserves with special reference to Colombia and Ecuador. Biological Conservation. 27: 45-58.

COLOR PLATE

The frontispiece plate of an adult male (top left) and immature male (bottom right) Chocó Vireo (*Vireo masteri*) in premontane pluvial forest. The painting is by D. Quinn.

Submitted 17 July 1995; revisions accepted 1 February 1996