

## FROM FIELD AND STUDY

**Notes on Some Neotropical Vireos in Panamá.**—T. H. Hamilton's stimulating paper (Condor, 64, 1962:40-68), discussing phylogenetic and ecological relationships in the genus *Vireo*, points out the need for data on the neotropical species. As I have had field experience in Panamá with several breeding forms, it may be useful to put certain observations on record and to offer some comparison with their better-known allies in the United States.

*Vireo carmioli*. Yellow-winged Vireo. So little has been published regarding the Yellow-winged Vireo, a distinctive high mountain endemic of Costa Rica and western Panamá, that Hamilton understandably expresses doubt as to its habitat niche. My own experience, limited to a few observations in the mountains (6400 to 7300 ft.) above Cerro Punta, Chiriquí Province, Panamá, is in agreement with that of Wetmore that it forages in the high tree crowns in very humid montane forest. The nearest to the ground that I have observed it was once about 40 feet up; on other occasions it was about 80 feet up, possibly higher. The song has not been described in the literature. Twice in late February, 1960, I saw birds singing and once in early April, 1961, in the same locality, I briefly heard what I believe was the same song. The observed song perches were high up in branches just below the leafy canopy of gigantic trees, along a broad forest trail. The song consisted of short, leisurely phrases, with long pauses between each phrase, of the same basic pattern as that of most northeastern vireos (*V. solitarius*, *V. flavifrons*, *V. olivaceus* and *V. philadelphicus*). It had some of the huskiness of the Yellow-throated Vireo (*V. flavifrons*) and something suggestive of the Solitary Vireo (*V. solitarius*), but with a distinctive, accented terminal phrase. I syllabized the song as *cheéyah . . . cheéyou . . . chipcheewéé*, repeated a few times, with a long pause between repetitions. Another vocalization, presumably a call or single song phrase, I noted as *peeacheewit*. Carriker's (Ann. Carnegie Mus., 6, 1910: 780) statement that in the Costa Rican mountain forest it is "found rather low down among the undergrowth and low limbs of the trees, as is usual with vireos," may represent postbreeding behavior or perhaps the special condition at the higher elevations on the Volcán de Irazú (between 8000 and 9500 ft.) where he collected his three specimens, for he states that at these altitudes the forest gradually becomes stunted (*op. cit.*, 320, 321, 344). The great differences in habitat and song and in other characters from the White-eyed Vireo (*V. griseus*) convinces me that *V. carmioli* is more closely allied to the montane *solitarius* group. Hamilton's tables of wing-bill and wing-tail ratios in his earlier paper (Wilson Bull., 70, 1958:317-318) indicate that in proportions the relatively long-winged *V. carmioli* is quite unlike the other species placed in the *V. griseus* group and is much more similar to *V. solitarius*. The long wing cannot be attributed either to migratory habits or to "aridity effect," for *carmioli* is a resident of the most humid cloud forest zone. A preference for large trees in distinctly rich, humid (even swampy) woodland is a characteristic, in my experience, of another member of the *V. solitarius* group, *V. flavifrons* (see also Stewart and Robbins, North Amer. Fauna No. 62, 1958:262-269). The songs of the undoubted members of the *V. griseus* group in the West Indies and Central America are all reported to be either of the short emphatic White-eyed Vireo type or of a chattering character (Bond, Birds of the West Indies, 1960:183-186). If song is phylogenetically significant in vireos, this raises a question as to the allocation of the long-tailed Gray Vireo (*V. vicinior*), customarily placed in the *griseus* group, although it is reported to sing much like *V. solitarius* (Peterson, A Field Guide to Western Birds, 2d ed., 1961:243). The value of song in showing relationships within this genus is somewhat weakened by the fact that *V. philadelphicus*, apparently most closely allied to *V. gilvus*, sings almost exactly like the sympatric *V. olivaceus*.

*Vireo leucophrys*. Brown-capped Vireo. This is a common bird in the mountains of western Chiriquí between 5000 and 6600 feet, but it also occurs somewhat lower and higher. About Cerro Punta, where I have chiefly observed it, the Brown-capped Vireo favors borders of streams, edges of clearings, and cut-over open woods, rather than heavy forest. In early April, 1961, many were singing about Cerro Punta (5400 to 6600 ft.), usually in the foliage of medium-sized (40 to 60 ft.) trees, but sometimes as low as 15 to 25 feet in second growth of roadsides or of montane pastures. The song is of the continuous warbled type used by its ally, the Warbling Vireo (*V. gilvus*), although shorter and less varied. The longest songs I transliterated were: *cheéroorooweéchee-cheéweerooweéchee-cheereéchee* and *twéécheewééchee-twéécheewééchee-twéécheewééchee*; these lasted about 3 to 3½ seconds and were reiterated with pauses of 3 to 5 seconds between repetitions. A shorter variant I wrote as

*tweereereéwee-tweeooeé*. In the previous year, during a week spent in the same area from February 21 to 29, 1960, this species was not heard. From September 17 to 21, 1958, however, Brown-capped Vireos, while not singing were conspicuous, usually in twos, and often in mixed bird bands, of which the Common Bush-Tanagers (*Chlorospingus ophthalmicus*) and Wilson Warblers (*Wilsonia pusilla*) were regular members. These vireos were then frequently seen between 10 and 30 feet from the ground. Occasionally the Brown-capped Vireos hung upside down as they gleaned among the terminal twigs, and they uttered a sharp *zweéyou, zweéyou, zweéyou*. Other foraging vocalizations noted were *titi*, and *tsip*.

*Vireo flavoviridis*. Yellow-green Vireo. In Panamá the species, unlike its northern ally, the Red-eyed Vireo (*V. olivaceus*), is not a forest species, at least on the mainland. While it breeds at forest borders and in clearings and may occur on migration within the forest in the tree canopy, it is most numerous in cut-over areas, in coastal scrub and mangroves, in suburban gardens, and in open woods and light second growth. It is abundant on the drier, less heavily wooded, Pacific slope (except eastern Darién), but it is found in the humid, forested Caribbean slope only where cleared. Essentially a lowland bird, it also follows extensive clearings up into the humid highlands to about 5500 feet. A similar situation prevails in Costa Rica (Skutch, Pac. Coast Avif. No. 34, 1960:11). As has often been noted (Skutch, *op. cit.*:12), the song of the Yellow-green Vireo is extremely similar to that of the Red-eyed Vireo, but it seems to me to be more monotonous because the individual phrases are shorter—generally of two notes, sometimes with a slurred third note.

*Vireo flavoviridis* appears to be migratory in Panamá, as it is farther north in Middle America. I am unaware of any Panamanian record between October and mid-January. The birds are present, singing abundantly, by late January and early February. In 1960 I arrived in Panamá on January 21; the next morning, January 22, I observed one singing in a suburban garden, where it regularly breeds. Wetmore reported that in 1956 they first appeared on Isla Coiba, off the Pacific coast, on January 19 (Smiths. Misc. Coll. 134(9), 1957:83), and that they "were mating" by the first week in March in the Pearl Islands, Gulf of Panamá (Smiths. Misc. Coll. 106(1), 1946:51) and seemed to be on territory in the gallery forest by the middle of the month, although migrants still were passing through.

On the mainland, nests are known in March through June 1, and I have seen stub-tailed fledglings being fed as late as mid-July and adults singing as late as early August. On March 8, 1960, I saw a concentration of about twenty birds, presumably migrants, although many were singing and chasing, in a small patch of mangroves on the Pacific coast of the Canal Zone. If the local population leaves Panamá in late August and September to return in late January and early February, a problem is raised as to the function of this migration. Yellow-green Vireos live in habitats where most trees lose their foliage during the dry season (usually mid-December through April) and insect life is reduced. But the driest period, when defoliation is most complete, comes in February and March, when the vireos have returned. Perhaps the answer lies in the fact that during this latter part of the dry season many leafless trees flower and fruit, so that there is a recrudescence of arboreal insects. By the time the young hatch there is an abundance of larval forms. This vireo also eats small fruit (Skutch, *loc. cit.*); I have seen it pecking at the red berries of a banyan, *Ficus*.

In his latest paper Hamilton (*op. cit.*, 1962) treats *V. flavoviridis* as specifically distinct from *V. olivaceus*, but as a member of the same superspecies. In a genus where even sympatric species may be very similar, this conservative treatment seems justified, considering the differences in wing-formula and color and the absence of proved intergradation. However, if more than one species is recognized, the inclusion of the South American *V. chivi* complex as subspecies of *V. flavoviridis* becomes questionable. The differences in color and wing formula between the *chivi* and *flavoviridis* complexes are about as great as those between *flavoviridis* and *olivaceus*. In head markings and color of underparts *chivi* is almost identical with *olivaceus*. It is harder to separate these two than to separate *flavoviridis* from the *V. chivi* complex. One of these, *V. chivi cauae* of central and western Colombia, is found almost on the Panamanian boundary at Río Juradó—a locality at which *V. flavoviridis* also has been taken as late as April 4; all other Colombian specimens of *flavoviridis* were collected in August to December (de Schauensee, *Caldasia*, 5, 1951:929, 931-932). Far from showing any intergradation with *flavoviridis*, *cauae* is extremely like the nominate *chivi* of Argentina (Zimmer, *Amer. Mus. Novit.*, no. 1127, 1941:10). The breeding ranges of *flavoviridis* and *cauae* were separated by the heavy humid forest of eastern Darién and northwestern Colombia; with increasing clearing these ranges should

soon meet, if they have not already done so. Until intergradation is shown, it seems to me that either *V. chivi* should be given specific status, or all members of the *olivaceus* superspecies must be considered one species, as in Hamilton's earlier (1958) treatment. In any event *V. chivi* (Vieillot, 1817) has priority over *V. flavoviridis* (Cassin, 1851) as the specific name if they are lumped.

The genus *Hylophilus*. In Panamá the Gray-headed Greenlet, *Hylophilus decurtatus*, a smaller, much more active and gregarious vireo, replaces *V. flavoviridis* in lowland forest, although overlap occurs at the borders. The song of this greenlet strongly suggests a single phrase of *V. olivaceus* or *V. flavoviridis*, repeated many times before there is any variation, usually with a two-to-five-second pause between each repetition; at times the phrase will be given twice before the pause. Variants of this phrase were: *itsacheét*, *tsitseeewéét*, *chwee-chweét*, and *teewéét*. The Golden-fronted Greenlet, *H. aurantiifrons*, found on the Pacific slope of central and eastern Panamá and southward into South America, favors rather dry scrubby areas and keeps to the lower trees and shrubs, generally below 30 feet. Its song is also distinctly vireonine, resembling that of *H. decurtatus*, but it is even less varied, most often with a four-syllabled whistled phrase, sliding down at the end—*cheetsacheéyou* or *itsacheéyou*—and with two-to-five-second pauses between each repetition. On the Pacific coast of central Panamá it is ecologically, as well as geographically, sympatric with *V. flavoviridis*, but it tends to keep lower and avoids the more humid second growth areas to which *V. flavoviridis* extends.

Regarding the Tawny-crowned Greenlet, *H. ochraceiceps*, I can add little to what Skutch (*op. cit.*:35-38) has written. In Panamá it seems most common in foothill woodland and forest, although also occurring rather sparingly in the more humid wooded lowlands. I found a beautiful vireo-type nest, externally of green moss, only three feet from the ground in a sapling in humid second-growth woodland near El Hato, western Chiriquí, at about 4000 feet elevation, on July 13, 1949. The only notes I have heard are a constantly uttered *nya-nya*, and a more nasal vireonine *weng*. Edwards and Tashian (*Condor*, 61, 1959:334) report in México an ascending trill, followed by a single lower-pitched note.

The Scrub Greenlet, *H. flavipes viridiflavus*, is a very common species in Panamá in low bushy growth of the drier savanna and scrubby areas of the Pacific slope and now extends into cleared areas of the humid Caribbean slope in the Canal Zone region. The pale iris and bill and bright color of the local race give it a very different aspect from the other Panamanian members of the genus—almost suggestive of a diminutive parrot. Its voice also is very distinct, a whistle, usually of two notes, repeated interminably, which varies somewhat individually or seasonally. Usually to my ear the call is *towhéé*, *towhéé*, *towhéé*, *towhéé*, repeated unchangingly from five to twenty or more times, without pause. Sometimes it sounds more like *twee* or even *weéyee* and one individual seen in September seemed to call *weary*, *weary*, *weary*. On the Pacific coast of central Panamá this species is ecologically and geographically sympatric with both *Hylophilus aurantiifrons* and *Vireo flavoviridis*. It seems more tolerant of humid conditions than *aurantiifrons* and less so than *flavoviridis*, as it occurs in scrubby cleared areas of the rainy Caribbean slope, but in my experience on the mainland, it avoids forest borders. Generally it does not forage as high as *flavoviridis*.

*Sympatry and ecological preferences in vireos.*—In wide-ranging vireos and other species published records often tend to show such a variety of occupied habitats that comparative field studies in areas of sympatry must be made to determine details of ecological preferences (see Stewart and Robbins, *North Amer. Fauna* No. 62, 1958:262-269). Peripherally an abundant species will use habitats outside its primary niche; this also occurs where there are no better-adapted competitors. Thus in Panamá on the avifaunally depauperate Coiba Island off the Pacific coast, where the forest-dwelling *Hylophilus decurtatus* and most mainland forest birds are absent, Wetmore reports that both *Vireo flavoviridis* and *Hylophilus flavipes* extend their habitat to the crowns of the forest trees (Smiths. Misc. Coll., 134(9), 1957:83-85)—as was the case of other species which on the mainland are confined to open or scrubby growth. The abundance of *V. flavoviridis* on the coastal Pacific scrub of Panamá may be correlated with the absence of any member of the *V. griseus* complex. In the Boquete region, western Chiriquí, at Finca Lerida (5300 to 5400 ft.), Mönniche collected three breeding species of *Vireo*: *V. flavoviridis*, *V. leucophrys chiriquensis*, and *V. carmioli*, all with gonads enlarged in May. In addition the migrants *V. olivaceus*, *V. philadelphicus*, and *V. flavifrons* occurred, and nearby the resident *Hylophilus decurtatus* and the vireo ally, the Rufous-browed Peppershrike (*Cyclarhis gujanensis*) were taken (Blake, *Fieldiana: Zoology*, 36, 1958:553-555). Despite the overlap, there is a sig-

nificant difference in the recorded altitudinal range in Panamá: *V. carmioli* from 5300 to 9500 feet, *V. leucophrys* from 3000 to 7000 feet, *V. flavoviridis* from sea level to 5500 feet. In comparing the superspecies *V. olivaceus-flavoviridis* with *V. gilvus-leucophrys* Hamilton (*op. cit.*, 1962:45, 53) states they are distinguished by the montane preference of the latter. This certainly is correct as to the tropical forms, but does not generally hold for the north temperate representatives. In eastern North America *V. gilvus*, although ecologically and geographically more restricted than *V. olivaceus*, is fully as much a lowland species; in fact *V. olivaceus* ranges higher as a breeder. This, I think, reflects not an altitudinal preference, but rather the fact that *V. olivaceus*, while tolerating park-like conditions, favors broadleaf forest and woodland, which in the humid east occur widely from sea level to a considerable elevation. *Vireo gilvus*, on the other hand, requires more open broadleaf habitats, favoring stream borders and tree plantings along roads and in cultivated and suburban areas. In the arid west *V. gilvus* undoubtedly occurs chiefly in the mountains but also along stream borders in the lowlands, because only these places provide the required open deciduous, broadleaf tree habitat (see Grinnell and Miller, *Pac. Coast Avif.* No. 27, 1944:389-390). It is my impression that *V. leucophrys*, although definitely montane, has increased in Panamá with the clearing of forest. That *V. flavoviridis* differs from *V. olivaceus* in avoiding forest may indicate only that in what is important to a vireo the open deciduous growth of the tropics is more like the northern deciduous forest than is the heavy humid evergreen tropical forest.—EUGENE EISENMANN, *American Museum of Natural History, New York, New York, March 11, 1962.*

**A Record of a Tree-nesting Gyrfalcon.**—Snyder (*Arctic Birds of Canada*, 1957:108), acknowledging insufficient data, states that the nest of the Gyrfalcon (*Falco rusticolus*) is "probably situated on a ledge or in a pocket of a vertical rock or soil cliff" and that it incorporates a small amount of vegetation if constructed by the falcons or constitutes a bulky structure if the nest is taken over from a Raven or Rough-legged Hawk. Most of the nests of Gyrfalcons discussed in the literature have been in situations similar to those given by Snyder. Cade (*Univ. Calif. Publ. Zool.*, 63, 1960:168), in discussing the nesting habit of Gyrfalcons in Alaska, states that these large falcons require sea cliffs, river bluffs, or escarpments away from rivers, and he also mentions that no records exist of Gyrfal-



Fig. 1. Nesting site of Gyrfalcon in a tree in the Thelon Valley, MacKenzie District, Northwest Territories.