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AN ORNITHOLOGICAL COMEDY OF ERRORS: *CATHARUS OCCIDENTALIS* AND *C. FRANTZII*

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ANYONE who has critically identified thousands of birds in museums has surely found a number of misidentifications and added his share, but these are mainly at the subspecific level. Errors at the specific level are less common, and the case presented here is unique in my experience—the only one where a bird's supposed geographic variation is actually based, to a significant degree, on specimens of another species!

For years contradictory and irreconcilable statements about *Catharus* have plagued us. Controversy has raged about the birds of Omiltemi, Guerrero, Mexico, whence Ridgway long ago (1907) recognized two sympatric species; one of the forms involved he had named *C. frantzii omiltemensis*. Soon after Hellmayr (1934) had questioned Ridgway's judgment, Griscom (1937) reaffirmed and strengthened it, pointing out that "the real, fundamental specific characters . . . are (1) the wholly yellow mandible in *frantzii*, whereas the terminal half of the mandible is blackish in *occidentalis*; (2) the inner webs of the bases of the remiges in *occidentalis* are abruptly buffy, forming a distinct buffy patch at the base of the spread wing, which is otherwise grayish on the under surface. These differences are much less pronounced in immature specimens." Later I (Phillips, 1962a: 362–364) added minor characters useful in Jalisco, where I had discovered *C. frantzii* and collected both species together. Finally, Rowley discovered important differences in their biology (Rowley and Orr, 1964).

Meanwhile unfortunate errors by Ridgway himself had started the idea that only one variable species is involved. A mixed series identified (in some cases erroneously) as *C. occidentalis* in the U. S. National Museum led Hellmayr (1934: 468) to synonymize *omiltemensis* because he had "before me three topotypes from Omilteme collected by Nelson and Goldman in May, 1903—one of them, an adult female, shot on the same day (May 19) as the type—which differ nowise from Jalisco specimens. The buffy basis [sic] to the inner web of the remiges, upon whose absence

Mr. Ridgway obviously laid much stress, is an exceedingly variable character in this thrush; it being lacking in one, but just as well developed as in birds from other localities in the two remaining examples from Omilteme. The same variation, furthermore, is observable in a series of typical *occidentalis* from Mount Zempoaltepec, Oaxaca." This concept of extreme individual variation (plus the use of specimens from both Costa Rica and Panama to represent true *frantzii*) led Hellmayr (1934: 469) to state that *C. occidentalis alticola* "an exceedingly poor form, is hardly distinguishable from *C. o. frantzii* by on average more olivaceous (less rufescent) color of the back. . . . There is absolutely no difference in the coloration of the under parts, ... They may even turn out to be inseparable . . . . I do not see any possibility of there being another race in Honduras intermediate between *frantzii* and *alticola,* which we are just able to maintain on slight average characters."

Later, even after Griscom pointed out the importance of bill color, similar doubts continued. Miller et al. (1957: 193) seemed to deal the coup de grace to the concept of two species, writing: "Large series (K–d, O–d) [i.e. in the Moore Collection and the Museum of Vertebrate Zoology] from high elevations in Guerrero show complete gradation and lack of correlation within single populations of characters of bill color and secondary patterning—characters once supposed to differentiate *fulvescens* and *omiltemensis* as sympatric representatives of two species; accordingly *Catharus frantzii omiltemensis* is regarded as a synonym." This sounded so definite and final that, in the recent and supposedly authoritative "Check-list of birds of the world," Ripley (1964: 168) makes no mention at all of *omiltemensis* even after my paper (Phillips, 1962a). Others also had doubts. Blake alternated between following Griscom (Blake, 1958: 551) and Hellmayr (Blake, 1953: 430–431). Lowery and Newman (1951: 320) followed Hellmayr with obvious reluctance, noting that "the whole problem of geographic variation in the species should be reinvestigated on a broad basis." This has now been done, thanks to the cooperation of the curators of the museums whose aid is acknowledged below, and especially of J. W. Hardy.

Rather than discuss all the various minor errors in the above confusing literature, I present the results of my examination of the "Large series (K–d, . . .)" in Table 1. Thus readers may judge for themselves whether there is "complete," or any, "gradation and lack of correlation within single populations." As to this last point, not a single specimen in the Moore Collection is marked as mated to, or in any way related to, any other specimen. It is now clear that there are two sympatric species in a much greater area of southern and central Mexico than was previously believed (Figure 1). My taxonomic conclusions may be summarized in

TABLE 1

ANALYSIS OF THE 40 GUERRERAN SPECIMENS OF THIS GROUP IN THE MOORE LABORATORY OF ZOOLOGY

Moore collection number	Buff patch on wing	Color of mandible
	C. occidentalis	
29503–510	Prominent	Dull; tip dusky
29950–51	Prominent	Dull; tip dusky
30068–070	Prominent	Dull; tip dusky (slightly faded in 30069)
30089	Prominent	Dull; tip dusky
30190	Prominent	Dull; tip dusky
46249	Prominent	Dull; tip dusky
46258	Prominent	Dull; tip dusky
46260	Prominent	Dull; tip much faded
46262, 64, 66	Prominent	Dull; tip dusky
46269	Prominent	(Shot off)
46274, 79	Prominent	Dull; tip dusky
46281	Prominent	Dull; tip dusky
56092	Prominent	Dull; tip faded
56094, 96	Prominent	Dull; tip dusky
56100–101	Prominent	Dull; tip dusky
56137	Prominent	Dull; tip dusky
56194	Prominent	Dull; tip dusky
	C. frantzii	
45824	Absent	Entirely bright
45915	Absent	Entirely bright
46257, 59	Absent	Entirely bright
46265	Absent	Entirely bright
46271	Absent	Entirely bright
46283	Absent	Entirely bright
46292	Absent	Entirely bright

the following key, based on unworn specimens killed 10 to 25 years earlier:

Key to the species and subspecies

A. Mandible flesh-color at base, drab to dusky on distal 4.5–7 mm (only the gape and mouth bright, i.e. orange yellow). Longer under secondary coverts and bases of secondaries and of inner primaries pale buffy, in contrast to the darker remainder of the under side of the wing. Tarsus (maximum measurement) usually less than 33 mm (always in ♀ ♀ ?), though reaching 34.0 occasionally in northwestern Mexico, about 35–43% of length of tail. "Tail clear" (length of tail beyond longest upper tail coverts) usually 37.5 or more, very rarely (never in ♂ ♂ ?) below 36.0 mm. Tail usually over 73 in ♂ (68 in ♀), and usually graduated for less than 4.5 mm. In *juvenal* plumage, almost entire body spotted (or squamately barred) except throat, belly, and crissum (Figure 2). Eggs (where known) plain pale bluish (*C. occidentalis*) ..... B.

B. Back redder, deep Sudan Brown[1] to dull Amber Brown; crown near Argus Brown (northeastern Oaxaca) ..... *C. o. occidentalis*

[1] Capitalized colors from Ridgway (1912).

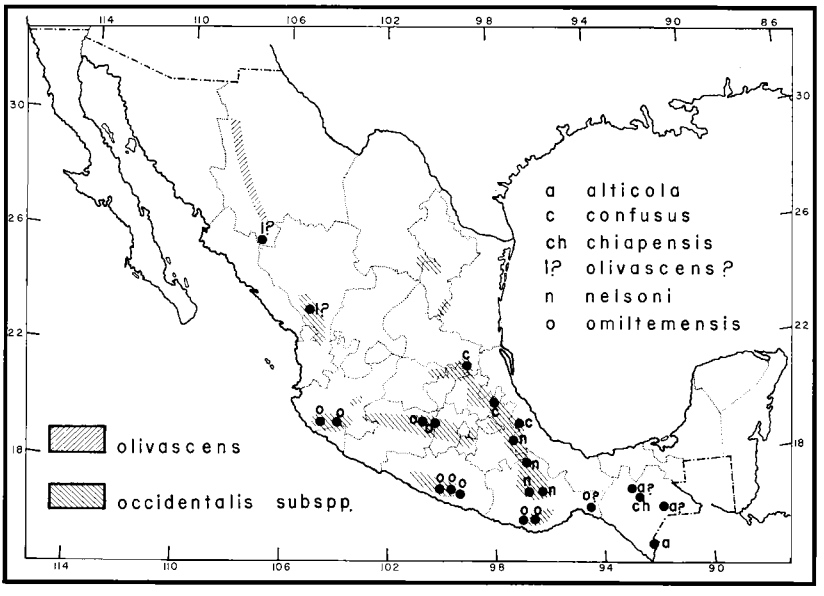

Figure 1. Distribution of *Catharus occidentalis* (lined) and of Mexican races of *C. frantzii* (letters, except "l?").

B'. Back paler or duller, Sudan Brown to Antique Brown or duller; crown (except sometimes in Guerrero) paler or duller than Argus Brown, sometimes near Sudan Brown ..... C.

C. Crown not much paler or duller than Argus Brown; back near Sudan Brown or deep Antique Brown (rest of southern Mexico) ..... *fulvescens*

C'. Paler and duller (northern and central Mexico) ..... D.

D. Crown deeper rusty, more contrasted to the back; back slightly olive-tinged, approaching Dresden Brown but somewhat darker and more rufescent; chest usually sharply but narrowly spotted with dusky (Sierra Madre Occidental) ..... *durangensis*

D'. Crown paler, less different in hue from back; breast spots blurry, less dusky (i.e. paler) ..... E.

E. Duller and more uniform above; crown near Dresden Brown or a deep, dull Ochraceous-Tawny, *not* strongly contrasted to back, which is between Dresden Brown and Saccardo's Umber; breast with big, blurry spots. Larger (Chihuahua and nearby) ..... *olivascens*

E'. Crown warmer, more orangeish, near Antique Brown; back approaches Dresden Brown. Slightly smaller, wing (chord) and tail often less than 89 and 80 in ♂ (84.5 and 72 in ♀), which are usual minima for *olivascens* (eastern Mexico) ..... *lambi*

A'. Mouth, gape, and whole mandible (except distally in very young birds) bright orange (mandible sometimes yellower, near Light Cadmium). Longer under secondary coverts and bases of secondaries and of inner primaries grayish, not conspicuously paler than nor contrasting with the

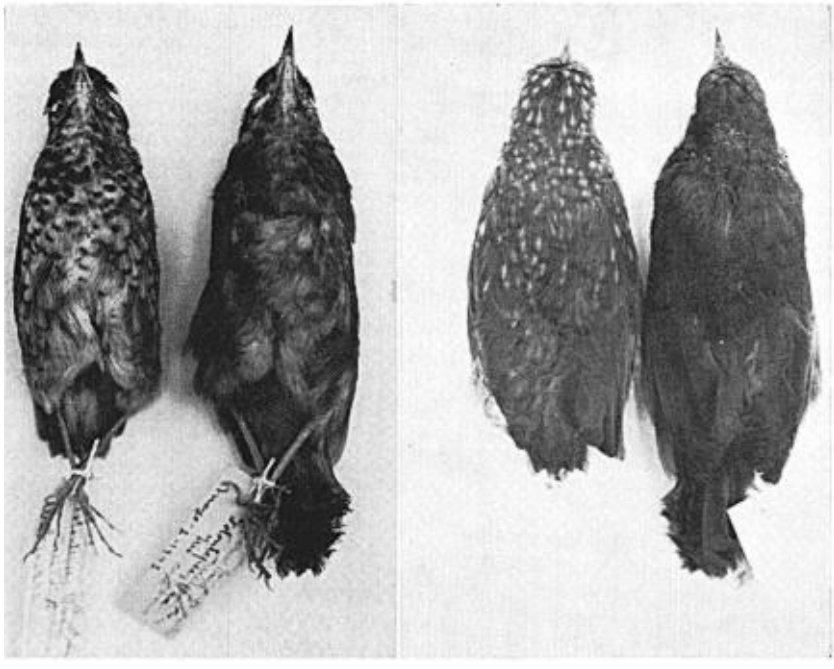

Figure 2. Ventral and dorsal views of juvenal *Catharus occidentalis* (left) and *C. frantzii* (right). Both specimens are labeled as from Totontepec, Oaxaca. Photographs courtesy of J. W. Hardy.

remainder of the under side of the wing. Tarsus usually 33 mm or more, about 45–50% of the length of the tail. "Tail clear" usually 37 mm or less (but occasionally up to 43 mm in ♂). Tail rarely exceeds 77.5 (71 mm in ♀) except in Chiapas, and usually graduated (when unworn) for 4.5 mm or more. ***Juvenal plumage solidly dark*** above and on the sides and flanks, and with broad blurry spots giving an essentially solid dark appearance to throat and chest (Figure 2). Eggs spotted (*C. frantzii*) ..... F.

F. Deeper. Back Argus Brown to Brussels Brown, near Raw Umber, or darker. Crown, and often tail and longer upper tail coverts, near Auburn, or Argus Brown ..... G.

G. Duller and darker below; throat and breast pale grayish. Back more olivaceous, Brussels Brown to Raw Umber or darker. Chest washed with Light Brownish Olive or Drab to Hair Brown. Flanks Mouse Gray or darker, washed with Hair Brown or a deep Olive-Brown (Guatemala and Sierra Madre of Chiapas) ..... *alticola*

G′ Paler below; throat and breast whitish. Back redder, Argus Brown to Brussels Brown. Flanks Mouse Gray or paler, washed with Drab or Olive-Brown ..... H.

H. Chest brighter, paler, washed with Isabella Color or Buffy Brown to Light Brownish Olive (northern and central Oaxaca) ..... *nelsoni*

H′. Chest duller, usually deeper grayish, washed with Olive-Brown (usually lightly) or Saccardo's Umber (Central America) ..... I.

I. Chest washed with Saccardo's Umber (more rufescent). Back less contrasted to the (duller) crown. Flanks brownish, unless worn (Costa Rica) ..... *frantzii*

I′. Chest grayish or washed with Olive-Brown (usually lightly), duller. Crown redder, in greater contrast to back ..... J.

J. Chest brown-washed; chest and flanks not much duller than crissum. Slightly larger: wing (chord) usually 84–92 mm, tail 68–72, in male (♀ 80.5–84.5, 66 or 68–71) (Honduras) ..... *juancitonis*

J′. Flanks less brownish, and chest with almost no brown tinge, much duller than crissum, which is more or less strongly rufescent (washed with pale Tawny-Olive). Slightly smaller: wing 80–83 mm, tail 62–66 (♀ 78.5–80, 61.5–65.4) (northern Nicaragua) ..... *waldroni*

F′. Paler or duller. Back approaching Raw Umber or Russet (or even paler). Crown Argus Brown, or approaching Sudan or Amber Brown. Tail and upper tail coverts Amber Brown, or still paler and more olivaceous (less reddish) ..... K.

K. Deeper, ruddier above: crown nearest Argus Brown; upper tail coverts near Argus or Amber Brown, or approaching Russet; back Brussels Brown to Mars Brown (Chest strongly washed with Buffy Brown; crissum usually a pale brown, approaching Honey Yellow) (eastern Mexico) *confusus*

K′. Paler and sometimes more olivaceous above; at brightest, or reddest, crown nearest Amber Brown or approaching Sudan Brown; upper tail coverts near Russet, approaching either Cinnamon-Brown or (more or less strongly) Dresden Brown. Back near Russet or Prout's Brown. (Chest sometimes duller and crissum paler than most *confusus*) ..... L.

L. Below (chest, crissum) close to *confusus* (western Panama) ..... *wetmorei*

L′. Below duller; crissum usually near Cream-Buff or still whiter; chest grayish, or washed with a color near Drab or approaching Wood Brown; flanks and sides duller, less brown (Mexico) ..... M.

M. Slightly duller and paler below; sides of chest and flanks more purely grayish or washed with a paler, more buffy, hue. Crown duller, usually slightly to distinctly more grayish than Sudan Brown (western and central Mexico) ..... *omiltemensis*

M′. Sides of chest and flanks washed with more definite, darker (rustier) brown. Crown redder, near Sudan Brown (central Chiapas) ..... *chiapensis*

DISCUSSION

Anyone who has attempted a revision of this sort, with due regard to the several variables (particularly the possibility of migration), will realize that the results are never definitive. In *Catharus* we find wide individual variation in some populations, serious postmortem color changes ("foxing"), and seasonal variations. Fresh fall-plumaged *C. frantzii,* though lacking obvious pale tips to the feathers, nonetheless seem paler and duller, less reddish, than spring birds. No molt intervenes, to my knowledge. Add to these difficulties the fact that many local populations are represented, in

the material examined, by one or a very few specimens—often in the worst plumage imaginable, or by a juvenile only. Thus, without field experience in northern Mexico, I am quite unable to specify the winter ranges of those populations of *occidentalis,* or even to say whether or not they migrate any considerable distance. I have previously remarked (Phillips, 1960, 1962b) that the widespread, complacent assumption that *Catharus* and other birds are strictly sedentary in northern Mexico, simply because we know nothing about their movements, is unwarranted. Thus I can only hope that the present attempt to define the races and their ranges will prove helpful to future workers blessed with better series.

As I took *C. frantzii* at its northern limits, in Jalisco, in February 1959 and January 1960, I believe it is probably nonmigratory. But I have seen no winter-taken *C. occidentalis* from north of southeastern Sinaloa (and Babizos, one specimen) and the region around the Distrito Federal. Thus I cannot say where the northern populations winter.

The specific characters distinguishing *frantzii* and *occidentalis* are considered "much less pronounced" (Griscom, 1937) or "unreliable" (Blake, 1958) in "immature" birds. The difference in wing pattern, however, is obvious as soon as the bird is nearly full-grown, while the juvenal plumages are still more different. The color of the mandible and minor characters are thus unnecessary for specific identification. Blake also reports two "clearly adult" *frantzii* with "a suggestion of blackening" on the mandible distally; I suspect that these are actually young birds. In any case, the two species are easily distinguishable in any plumage, even if the mandible is missing.

In the following account collections consulted are referred to by the following abbreviations: American Museum of Natural History, AMNH; Louisiana State University Museum of Zoology, LSU; Moore Laboratory of Zoology at Occidental College, RTM; United States National Museum, USNM; and Western Foundation of Vertebrate Zoology, WF.

The principal synonymies, characters, and distributions of the various forms are as follows:

Catharus occidentalis occidentalis P. L. Sclater

Catharus occidentalis P. L. Sclater, Proc. Zool. Soc. London, 1859: 323, 370 (Totontepec, Oaxaca); Rowley and Orr, 1964: 310, part (two of the four adults, Cerro San Felipe, are actually of this species).

Catharus occidentalis occidentalis, Ridgway, 1907: 26, part (excluding Mt. Zempoaltepec, part, and Veracruz and Puebla); Hellmayr, 1934: 468, part (same); Miller et al., 1957: 193, in small part only; Ripley, 1964: 168, in small part only.

DIAGNOSIS: The deepest, reddest brown race dorsally (wherefore universally confused with the Caribbean slope races of *C. frantzii*); also the

brownest below, with darkest flanks and most constantly buffy lower throat.

RANGE: Breeds, and presumably resident, in Mt. Zempoaltepec area; birds of central (Cerro San Felipe) and southwestern Oaxaca are tentatively referred here pending study of comparable series.

REMARKS: In this race and the next, at least, females average distinctly paler and somewhat less reddish brown than males. Hellmayr's "dark raw umber" was, I suspect, actually drawn from a northern Veracruz specimen of *C. frantzii*; *occidentalis* is paler.

Catharus occidentalis fulvescens Nelson

Catharus occidentalis fulvescens Nelson, Auk, 14, 1897: 75 ("heavy oak forests" of Amecameca, Mexico [= lower slopes of Ixtaccihuatl-Popocatepetl massif]; ranging east to Mt. Orizaba, and in Guerrero); Ridgway, 1907: 27 (excluding "Omilteme," part); Hellmayr, 1934: 467–468, part (same, and excluding supposed synonym *C. frantzii omiltemensis*); Miller et al., 1957: 193, part only (excluding same, and also Sinaloa, Durango, Guanajuato, and Tamaulipas); Ripley, 1964: 168, part only (same).

Catharus occidentalis occidentalis (not of P. L. Sclater), Ridgway, 1907: 26, part (Veracruz; Puebla); Hellmayr, 1934: 468, part (same; includes *C. frantzii*?); Miller et al., 1957: 193, part (same); Ripley, 1964: 168, part (same).

DIAGNOSIS: Duller, particularly the back, than *C. o. occidentalis,* but brighter than all the more northern races.

RANGE: Resident in mountains of Guerrero, and north and west to southern Hidalgo and southern Jalisco.

REMARKS: Geographic variation in *occidentalis,* contrary to the east-west pattern given by authors generally, is actually north-south in its main outlines (as hinted by Nelson). Thus Guerrero birds are often near Argus Brown on the crown, averaging deeper there than northern *fulvescens,* which in turn are deeper and richer throughout the upperparts than more northern races. In agreement with Nelson, I find birds from near Mt. Orizaba (head of Acultzingo grade, RTM) to be *fulvescens,* which ranges north along the Caribbean side to near Teziutlán, Puebla (one specimen). This will explain Ridgway's footnote that *fulvescens* is "a rather unsatisfactory subspecies"; it is indeed, if compared to Mt. Orizaba birds, which Ridgway included in *occidentalis.*

Catharus occidentalis lambi new subspecies

(?) *Catharus occidentalis olivascens* (not of Nelson?), J. Phillips, Auk, 28, 1911: 80 (Galindo, Tamaulipas); Griscom, Amer. Mus. Novitates, 293, 1928: 6 ("Miquihuana," Tamaulipas; apparently this race, but badly worn).

(?) *Catharus occidentalis fulvescens* (not of Nelson), Hellmayr, 1934: 467–468, part (Tamaulipas); Miller et al., 1957: 193 and Ripley, 1964: 168, part (same).

Catharus occidentalis occidentalis (not of P. L. Sclater), Lowery and Newman, 1951: 320, part (southeastern San Luis Potosí, composite series "tentatively . . . placed

here"); Miller et al., 1957: 193, part (San Luis Potosí and Huauchinango, Puebla, part); Ripley, 1964: 168, part (same).

TYPES: RTM 49777 and 49788 ♂♂; 5 km west of Huauchinango, northern Puebla, 1,700 m alt, 4 and 10 April 1949. Collected by Chester C. Lamb, original numbers 49574 and 49624. Wing (chord) 85.7 and 86.3; tail 76, 73.8; tarsus 30.7, 32 mm respectively, *fide* J. W. Hardy.

DIAGNOSIS: A very pale race, nearly or quite as pale above as *olivascens* but warmer, less neutral or olivaceous, brown; crown more reddish brown, and thus in greater contrast to back.

RANGE: Breeds in eastern and perhaps northeastern Mexico, from the type locality north; west to northeasternmost Guanajuato (11 km "NW" [= southwest?] of Xichú). Winter range unknown.

REMARKS: I take special pleasure in dedicating this race to the late Chester C. Lamb, collector of the entire series in the Moore Laboratory, whose many years of work laid the foundation for so many of the recent studies of Mexican birds, including the present one. His Huauchinango series, though collectively called *C. o. occidentalis* by A. H. Miller, is obviously paler than even *fulvescens* when the five *C. frantzii* are eliminated. It is interesting to find the two species so different in coloration here, whereas in western and central Mexico they are virtually inseparable dorsally, as Griscom (1937) pointed out.

From northeastern Mexico I have seen only the worn "Miquihuana" bird (a bone of contention between Griscom and Hellmayr, *supra*) and a juvenile from Cerro Potosí, Nuevo León (RTM). My ascription of *lambi* to these states, and to Coahuila (Ely, 1962), is thus purely tentative. Similarly lack of fresh plumages from this region makes it impossible to identify certain suspected migrants taken in central Mexico.

Catharus occidentalis durangensis new subspecies

Catharus occidentalis fulvescens (not of Nelson), Miller et al., 1957: 193, part (Sinaloa; Durango); Ripley, 1964: 168, part (same).

TYPE: RTM 51249, [first year?] ♂; San Juan, 8 km west of El Salto, Durango, 15 June 1951; collected by John Davis (original number 2052). Testes 8 mm; wing (chord) 90; tail 74.6; tarsus (maximum) 31.8.

DIAGNOSIS: Close to *fulvescens,* but paler; intermediate in depth of dorsal coloration toward the northern races (*olivascens, lambi*). Back more olivaceous and crown deeper and rustier than *lambi,* producing more contrast. Ventrally the most definitely (though narrowly) spotted of the races, and in fact of all the forms of *Catharus* breeding in Mexico, save the races of *dryas*.

RANGE: Breeds in the Sierra Madre Occidental of Durango, north at least to 40 km NNW of El Salto (female in Sutton Collection); probably

west sparingly into eastern Sinaloa. (North-south extent uncertain; see below.) I have identified winter specimens from southeastern Sinaloa only.

REMARKS: Two specimens from Mascota, western Jalisco (La Cumbre de los Arrastrados, AMNH), appear near *durangensis* but are old and worn. February birds from central Michoacán (near Ario de Rosales, RTM) also approach this pale race. Intergradation probably occurs over a broad zone of central western Mexico, and possibly *durangensis* also occurs here as a migrant. The puzzling question of its northward limits is discussed under *olivascens,* below.

Catharus (occidentalis?) olivascens Nelson

Catharus olivascens Nelson, Proc. Biol. Soc. Washington, 13, 1899: 31 (Sierra Madre, ca. 105 km east of Batopilas, Chihuahua).

Catharus occidentalis olivascens, Ridgway, 1907: 27; *et auct.*

DIAGNOSIS: The largest, palest, dullest race of the group. Chest with whitish background, against which the vague, large spots stand out though they are not dusky, being distinctly paler than those of typical *durangensis.* Crown least rufescent, and therefore most similar to the back.

RANGE: Breeds in northern part of Sierra Madre Occidental, in western Chihuahua and adjacent northwestern Durango. Winter range uncertain, probably mainly in eastern Sinaloa.

REMARKS: I refer here a winter specimen from Babizos, northeastern Sinaloa (RTM); a male from Rancho Batel, southeastern Sinaloa, 22 April 1962 (R. S. Crossin collection) is possibly also *olivascens.*

The status of *olivascens* is still not altogether clear; it may yet prove to be a distinct species, as Nelson believed. Its characters are well-marked, yet strangely inconstant at a given locality. Thus, in a series from Mt. Mohinora, Chihuahua, one male (RTM 18740, testes "full size," 25 May 1937) is even darker above than Moore's series of *durangensis,* has less blurred chest spots than most *olivascens,* and is small; wing (chord) 87.4, tail 76 (±; central rectrices missing), tarsus 31.7 mm. Another northern male (RTM 18746, Muertocito, northwesternmost Durango, 15 June 1937) is also inseparable dorsally from *durangensis,* but is large. A Muertocito female (RTM 18742) and possibly also two worn females from Laguna Juanota, Chihuahua (RTM 18925 and 18927) are likewise dubiously separable from *durangensis.*

On the other hand, the one breeding bird examined from Rancho Batel, southeastern Sinaloa (RTM 20628 ♂) has the chest spots like *olivascens* and a long tarsus (33.5 mm); while one of six males from 6 km west of La Ciudad, Durango (RTM 52142, 22 June 1951) is not only large (wing chord 94.8, tail 83, tarsus 32 mm) but agrees in color with the more rufescent specimens of *olivascens* such as RTM 18744 (♂, westernmost

part of Durango–Chihuahua border, 27 June 1937). It does not seem to be badly worn or faded.

Obviously we need better material from Durango and Chihuahua, carefully annotated as to colors of soft parts, weights, and amount of fat, and preferably with trunk skeletons. This should include mated pairs taken before the plumage becomes too hopelessly worn, pairs with nests and eggs, and if possible birds of recorded vocalizations; also birds (preferably from family groups) in and just finishing the prebasic or postnuptial molt. Lacking all this, we must suppose that individual variation in both size and color is more extreme, over extensive areas, here than elsewhere in the species' range. The status of *olivascens* (as species or subspecies) is the most puzzling aspect of this study.

Catharus frantzii frantzii Cabanis

Catharus frantzii Cabanis, J. Ornithol., 8, 1860: 323 (Volcán de Irazú, Costa Rica).
Catharus frantzii frantzii, Ridgway, 1907: 28 (part; excluding Panama); *et auct.*
Catharus occidentalis frantzii, Hellmayr, 1934: 469–470 (same); Ripley, 1964: 168 (same).

DIAGNOSIS: A deep, richly colored race, the back ruddy in only slight contrast to the crown; chest and flanks washed with brown, the former on a dark gray background giving a distinct contrast to the remaining, whitish, anterior underparts.

RANGE: Costa Rican mountains, north of San José.

REMARKS: As stated by Ridgway and Stone (but denied by Hellmayr), the brown flanks are a good mark of *frantzii* when not badly worn and faded.

Catharus frantzii wetmorei new subspecies

Catharus frantzii frantzii (not of Cabanis), Ridgway, 1907: 28, part (Panama); *et auct.*
Catharus occidentalis frantzii, Hellmayr, 1934: 469–470, part (Panama); Ripley, 1964: 168 (same).

TYPES: AMNH 503,875 and 503,876 ♂ ♂; Boquete, Chiriquí, Panama, 17 February and 5 March 1905; collected by H. J. Watson.

DIAGNOSIS: Differs from the only adjacent race, *frantzii,* in decidedly paler back, duller crown, and paler chest, which is more brownish (less sooty or streaky-looking). In fact in dorsal color this race is remarkably similar to the race at the opposite extreme of the species' range (*omiltemensis*).

RANGE: The Volcán de Chiriquí massif; the birds of southern Costa Rica, while intermediate, are also nearest this race.

REMARKS: The inclusion of Panama birds in *frantzii* by earlier authors doubtless led to Hellmayr's mistaken concept of *frantzii* as a highly vari-

able race hardly separable from *alticola*. Curiously, he did not remark on its even closer resemblance to thrushes from southern Mexico.

It is a great satisfaction to dedicate this interesting Panama race to Dr. Alexander Wetmore, for reasons too numerous and, for the most part, too obvious to be listed here.

Catharus frantzii waldroni new subspecies

TYPES: AMNH 144,420–21–22 ♀ ♂ ♀; 6 km northeast of San Rafael del Norte, 1,370–1,520 m alt, northern Nicaragua, 29 March 1917; collected by W. B. Richardson and (2) W. DeW. Miller. Ovaries not enlarged, testes enlarged.

DIAGNOSIS: Smallest of the races. Dorsally very similar to *C. f. juancitonis* (*vide infra*); chest less washed with brown, but crissum usually more or less strongly rufescent, i.e. washed with pale Tawny-Olive.

RANGE: Known only from the type region.

REMARKS: A number of small races of other species are known from this area. For the most part they are of pine-inhabiting birds that here reach the southern limit of pines and thus of their ranges. This has always appeared to be an example of Bergmann's Law, of reduced size in warm regions. It is thus unexpected to find the same reduced size here in *Catharus frantzii,* a species with larger races both to north and south.

Three male *waldroni* measure: wing chord 79.9–83, tail 62–66.2 mm; three females, 78.5–80, 61.5–65.4 mm. Comparative measurements of other races in Central America are available in Ridgway (1907) and Stone (1931); the tail is rarely less than 67 mm in any population south of Oaxaca, Mexico, but I have little confidence in the sexing of much of the material examined.

The race is dedicated to Waldron DeWitt Miller, a leading ornithologist of the early 20th century, who helped explore Nicaragua and had the principal role in describing its novelties.

Catharus frantzii juancitonis Stone

Catharus frantzii juancitonis Stone, 1931: 2 (San Juancito, Honduras); *et auct.*

Catharus occidentalis alticola (not *C. alticola* Salvin and Godman), Hellmayr, 1934: 469, part (Honduras); Ripley, 1964, 168, part (same).

DIAGNOSIS: Larger than *waldroni,* particularly longer-tailed, but similar in dorsal coloration; crown most reddish of the species, and thus slightly more contrasted to the back than in *frantzii.* Ventrally like *frantzii* in white throat and belly, with a distinct brown wash across the chest.

RANGE: Mountains of Honduras and northwestern El Salvador (*fide* Dickey and van Rossem, 1938). Birds of the Sierra de las Minas, northeastern Guatemala, seem intermediate, and I do not attempt to name them.

REMARKS: I fully concur with Stone that *juancitonis* is very distinct from *alticola, contra* Hellmayr. It is, in fact, much closer to *frantzii* despite its isolation from that race by the extensive lowlands of Nicaragua.

Catharus frantzii alticola Salvin and Godman

Catharus alticola Salvin and Godman, Biol. Centrali-Americana, Aves, 1, 1879: 3 (Volcán de Fuego, Guatemala).

Catharus frantzii alticola, Ridgway, 1907: 29; *et auct. plurim., nec non* Rowley and Orr, 1964: 313.

Catharus occidentalis alticola, Hellmayr, 1934: 469 (excluding supposed synonym *juancitonis*); Miller et al., 1957: 193, part (excluding "San Cristóbal" area, Chiapas); Ripley, 1964: 168, part (except above areas).

DIAGNOSIS: The darkest, dullest race ventrally, the throat clouded with gray (rarely whitish) and the chest gray with no marked brown tinge. Back more olive than in any of the preceding races, in strong contrast to crown. (Based on a series labeled Volcán Tacaná, R.T.M.)

RANGE: Mountains of Guatemala (Pacific slope only?) and adjacent southwestern El Salvador (*fide* Dickey and van Rossem, 1938); thence west in Sierra Madre to Paraje El Triunfo, above Mapastepec, Chiapas, and north in eastern Chiapas to Cerro Saxchanal (specimen in Instituto de Biología). Specimens from northern Chiapas seem to belong here, but I have not made direct comparisons with adequate material.

REMARKS: The extensively deep gray underparts are one of the best marks of this race, *contra* Hellmayr's remark quoted above. The description of *alticola* by Rowley and Orr (1964) is incorrect, being actually based on the next race. Northern Chiapas specimens are few, scattered, and mostly in badly worn plumage.

Catharus frantzii chiapensis new subspecies

Catharus occidentalis alticola (not *C. alticola* Salvin and Godman), Miller et al., 1957: 193, part (near "San Cristóbal," Chiapas); Ripley, 1964: 168, part (same).

Catharus frantzii alticola, Rowley and Orr, 1964: 313 ("Chiapas").

TYPES: RTM 56729 and 56752 ♂♂; 10 km "southwest" of San Cristóbal de Las Casas, central Chiapas, 10 April 1954; collected by Chester C. Lamb.

DIAGNOSIS: Remarkably like *C. f. omiltemensis* of the mountains on the opposite side of the Isthmus of Tehuantepec lowlands, but somewhat darker posteriorly, i.e. on tail and upper tail coverts and, usually, on the crissum (at least the short basal feathers). Decidedly paler above and below than the other nearby races.

RANGE: Known only from the type area. A male from farther north (an unstated distance on "camino a Chilil," AMNH) is more reddish above, and seems intermediate.

REMARKS: Four specimens from southeasternmost Oaxaca, April 1964 (LSU) may belong here; they are close to *omiltemensis,* but have not been compared to a series of *chiapensis.* If *chiapensis* be not recognized, it must be united with *omiltemensis,* differing markedly from any other nearby race.

The single definite female seen (AMNH 766,601) is the only female of the species with the wing (chord) over 86 mm (except one probably mis-sexed *wetmorei*). But a "♂" *chiapensis* (WF) is much smaller, and six other males (87–91.6 mm) do not differ significantly in size from Guerrero males.

Catharus frantzii omiltemensis Ridgway

Catharus frantzii omiltemensis Ridgway, Proc. Biol. Soc. Washington, 18, 1905: 213 ("Omilteme," Guerrero); Ridgway, 1907: 20, 29; Griscom, 1937: 198; Phillips, 1962a: 362–364; etc.

Catharus occidentalis fulvescens (not of Nelson), Ridgway, 1907: 27, part (one ♀, possibly mate of type of *omiltemensis,* included here; responsible for maximum tarsal length of 33.5 mm?); Hellmayr, 1934: 467–468, part (both species included); Blake, 1953: 431, part (same); Miller et al., 1957: 193, part (same); Ripley, 1964: 168, part (same).

DIAGNOSIS: A pale, dull race, essentially whitish below with clear gray chest; back variable, olive or *pale* rusty brown, contrasting to crown.

RANGE: Mountains of Pacific slope of Mexico (northwest of Isthmus of Tehuantepec), from at least southwestern Oaxaca (personally taken) and the Michoacán–State of México border (RTM) west to southern Jalisco.

REMARKS: It may eventually prove desirable to separate the extreme northern birds because of their somewhat smaller size. Seven males from State of México to Jalisco measure wing (chord) 80.5–85 mm and (one) 86.5, tail 67–74.6, (one) 75.7; four females range 76.1–81.3 and 65.5–70.4 (one tail still shorter but worn and unmeasurable). Guerrero birds that seem to be correctly sexed measure: four males, 86.6–90.5 and 73.3–77.5 mm; six females, 79–85.6 and 65.6–75. More specimens of known age and sex are needed.

Catharus frantzii nelsoni new subspecies

Catharus occidentalis occidentalis (not of P. L. Sclater), Ridgway, 1907: 26, part (Mt. Zempoaltepec, Oaxaca, part); Hellmayr, 1934: 468, part (same); Blake, 1953: 431, part; Miller et al., 1957: 193, part (Oaxaca, part); Ripley, 1964: 168, part (same).

Catharus occidentalis, Rowley and Orr, 1964: 310, part (Cerro San Felipe, Oaxaca; two of "four adults" with "black tips on the lower mandible and . . . remiges buffy at the bases" are actually this species; examined at AMNH).

TYPE: USNM 142,446 [first year?] ♀; Mt. Zempoaltepec, eastern Oaxaca, 8 July 1894; collected by E. W. Nelson and E. A. Goldman.

DIAGNOSIS: The ruddiest of the northern races dorsally, where in fact it is quite similar to the geographically distant *juancitonis* and *frantzii*; but still brighter below, the chest brownest (least slaty or grayish) of all the races.

RANGE: Mountains facing the Gulf of Mexico, from the type locality north, narrowly, to near Mt. Orizaba, Veracruz (head of Acultzingo grade, RTM).

REMARKS: The characters given above are those of the great majority of a series from "Totontepec, Oaxaca" (RTM). As unfortunately one or more of these may be incorrectly labeled, and the dates are untrustworthy in any case, I have selected as type a specimen taken by the thoroughly reliable and talented collecting team of Nelson and Goldman. It gives me pleasure to name this race for Nelson, in recognition of our great indebtedness to these outstanding naturalists, which can never be sufficiently stressed. In group after group of vertebrates, including *Catharus,* they laid the solid foundation of our knowledge.

I have not made extensive direct comparisons, but specimens from central and even northern Oaxaca (Cerro San Felipe; southwest of Valle Nacional, LSU) appear to me intermediate toward *omiltemensis.*

While this is the first formal ascription of *C. frantzii* to the Caribbean slope of Mexico, its occurrence on Mt. Zempoaltepec was a foregone conclusion from Hellmayr's remarks quoted above.

Catharus frantzii confusus new subspecies

Catharus occidentalis occidentalis (not of P. L. Sclater), Lowery and Newman, 1951: 320, part (southeastern San Luis Potosí, composite series "tentatively . . . placed" here pending reappraisal); Miller et al., 1957: 193, part (same, but suggests birds may be *fulvescens*; also Huauchinango, Puebla, part, excluding March birds; includes *C. o. lambi*); Ripley, 1964: 168, part (same).

TYPES: RTM 49771, 49776, and 49789 ♂♂; 5 km west of Huauchinango, northeastern Puebla, Mexico, 1,700 m alt, 8 (2) and 4 April 1949; collected by Chester C. Lamb.

DIAGNOSIS: Very similar to *nelsoni,* above, but somewhat paler, less ruddy brown, on flanks, crissum, and posterior upperparts.

RANGE: Central western Veracruz (one ♂, 8 km north of Xalapa, RTM) northwest to type locality and presumably southeastern San Luis Potosí.

REMARKS: This is a notable northward extension of range of this species, which however might have been suspected from the critical remarks of Lowery and Newman (1951). They have since divided their San Luis Potosí birds among *C. occidentalis* and *C. frantzii,* a decision in which I heartily concur. Their *frantzii* are only tentatively placed in

confusus (because of proximity to the type locality), as I have not compared them directly.

In this race and *alticola* (and perhaps others), females are often paler, less reddish, than males, as was also noted above under *C. o. occidentalis*.

Male *confusus* tend to be small, the wing (chord) under 82.5 mm, the tail less than 68.5; but one male measures 85.5 and 74.4. Age may be a factor. In *omiltemensis, chiapensis,* and *wetmorei* males usually have the wing over 82 and the tail more than 70 mm.

CONCLUSIONS

The above specific and racial variations are worth summarizing from certain other standpoints. First, the pattern of geographic variation is decidedly different in the two. *C. frantzii* shows random variation, though the characters are too numerous and too striking to be ignored nomenclaturally: birds from Caribbean Oaxaca are strikingly like those of northern Costa Rica, far to the southeast, while those of western Mexico closely resemble those at the opposite extreme of the species' range in Panama. *C. occidentalis,* on the contrary, shows clearly the clinal or convergent type of variation (Pattern 1 of Phillips, 1959: 27). Thus it paralles *frantzii* in color almost throughout their extensive zone of overlap, except in northeastern Mexico; and it differs most from *frantzii* in the northern states of the Republic where the latter species is absent. While talk of character displacement, the opposite tendency, is currently fashionable, I believe that this convergent pattern is more usual in nature. Cases that come readily to mind, besides the swallows (*Petrochelidon*) and the meadowlarks (*Sturnella*) mentioned in my 1957 talk (loc. cit.), are the Screech Owls in general (*Otus*; cf. Marshall *in* Phillips et al., 1964; Marshall, 1967), the *Empidonax traillii* group (in which the only race overlapping widely the boreal "Alder Flycatcher" is the most similar to it), and the Song Sparrow (*Melospiza melodia*) (whose most striking variations, in both color and size, including proportions, all occur in areas away from any contact with its closest relatives in the breeding season). Whether one finds a given situation, such as character displacement, can easily depend on one's point of view and consequent selection of examples. For instance one might easily conclude that *Catharus* ("*Hylocichla*") *fuscescens* and *C. ustulatus* show this phenomenon in western North America. Here the reddish race of *ustulatus,* closely resembling *fuscescens* in some individuals, occurs only west of the Cascade Mountains, i.e. beyond the range of *fuscescens*. But ecologically these two thrushes are well isolated in most areas; *ustulatus* is decidedly the more boreal, and overlaps widely the breeding ranges of the other two northern species, *guttatus* and *minimus*. The latter is superficially very like *ustulatus,* is very gray, and

overlaps chiefly the grayest race of *ustulatus* in a clear case of this same Pattern 1.

If any one valid generalization can be made, it is surely that bird species are independent genetic systems, rarely showing any important geographic variation that is correlated to the presence or absence of related species. In North America (including Mexico) this is well shown by a multitude of sympatric species in such genera as *Accipiter, Limnodromus, "Columbigallina," Amazona, Chordeiles, Trogon, Centurus, Dendrocopos, Lepidocolaptes, Tyrannus, Myiarchus, Empidonax,* jays, wrens, *Toxostoma, Turdus, Catharus, Sialia, Regulus, Vireo, Dendroica,* redstarts, *Agelaius, Icterus,* euphonias, *Saltator,* ground finches (including towhees), and the sharp-tailed and *"Zonotrichia"* groups of sparrows. But analysis of the geographic variations, or their absence, in all these groups is far beyond the scope of the present paper.

A second important point is the striking difference in juvenal plumages. Wallace (1965: 12) suggests "mottle-breasted" juveniles as a possible generic character of southern, traditional *Catharus* (as opposed to northern *"Hylocichla"* with "true spots"); another possible character adduced is "the development of signal colors in *Catharus*—bright orange bills, legs, and eye-rings." Use of these characters would require transferring *occidentalis* to *"Hylocichla,"* for the juvenal breast is distinctly spotted, particularly anteriorly, these spots gradually widening posteriorly until, on the lower breast and sometimes the upper belly, they form narrow scales. Furthermore the species lacks signal colors; at most, in juveniles, the orange-yellow color of the mouth and gape spreads onto or tinges the base of the rami or of the mandibular tomium. The closely related *frantzii* would have to be placed in *Catharus, sensu* Wallace, on the basis of its juvenal plumage, but shows no signal colors except on the lower mandible. I find the arrangement of Dilger (1956) and Aldrich (1968) more satisfactory: Wallace's remaining objection to it is that "else both genera might be combined with *Turdus* to form a truly cumbersome cosmopolitan genus." All the *Catharus* (*sensu* Dilger) that I know are rather distinct, in their slender build, semicrepuscular habits, and to some extent general behavior from any of the *Turdus* group that I have met with. And even if numbers of species or geographic distributions were generic considerations (which I deny), the inclusion of *Catharus* is quite unnecessary to make *Turdus* a "cumbersome cosmopolitan genus" (except for New Zealand, Australia, Hawaii, Madagascar, etc.).

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History Museum, or Field Museum of Natural History; Louisiana State University Museum of Zoology; the collection of George Miksch Sutton; the United States National Museum; the Western Foundation of Vertebrate Zoology; and of course my own. Single specimens were examined from the Minnesota Museum of Natural History, University of Minnesota, and the Instituto de Biología, Universidad Nacional Autónoma de México; and at an earlier date two were seen in the Museum of Comparative Zoology at Harvard University. Without the splendid cooperation of the authorities and owners of these collections, needless to say, my work would have been impossible.

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SUMMARY

Restudy of the vexing question of *Catharus frantzii* Cabanis shows it to be a good species, widely sympatric in Mexico with *C. occidentalis* P. L. Sclater and easily distinguishable in all plumages, including the juvenal. The "complete gradation and lack of correlation" in its two chief characters (in adult plumage) claimed by A. H. Miller is shown, by reexamination of the 40 specimens in the Moore Laboratory of Zoology that formed the major basis of the claim, to be nonexistent (Table 1); nor do I find any warrant for talk of "single populations."

The supposed east-west subspeciation of *C. occidentalis* proves to be based on misidentified specimens of *C. frantzii* from central eastern Mexico (Veracruz, Puebla), whence the latter species had never been reported. Elimination of these birds shows the true variation in *occidentalis* to be essentially north-south.

Variation in *frantzii* is random, though in Mexico it parallels that of *occidentalis* to some extent. New races of both are described. The most important unresolved problem, to which attention is called, is the status of *olivascens* Nelson as a race of *occidentalis* (as generally believed) or a distinct species (as originally described).

The absence of character displacement noted above is considered the usual rule, more common than its presence, where closely related birds are sympatric. The generic arrangement of Dilger is upheld.

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