

GEOGRAPHIC VARIATIONS OF THE BLACK-BELLIED, FULVOUS, AND WHITE-FACED TREE-DUCKS

By HERBERT FRIEDMANN

The Black-bellied Tree-duck, *Dendrocygna autumnalis*, has two currently recognized subspecies, but the situation as thereby expressed is not in accord with what a study of a good series of specimens and of the literature reveals. It seems to me that the name *autumnalis* has been consistently misapplied to a group of birds that agree neither in appearance nor in geography with the original basis on which this name was formally introduced into scientific nomenclature, and that the birds currently called by this name are actually a composite of two forms, both of which require new names.

Anas autumnalis Linnaeus (Syst. Nat., ed. 10, 1, 1758:127) is based entirely on Edwards (Nat. Hist. Birds, 1751, p. and pl. 194) who definitely states that the specimen he figures "... was brought from the West Indies" In his description, and to a lesser extent in his plate, he shows that "... the whole belly and thighs are black, but where the red on the breast, and the black on the belly unite, these blended colours form a dusky ash colour" West Indian specimens appear to be rare in collections, but I have examined an adult female from Añasco, Puerto Rico, in the United States National Museum, and it upholds Edwards' description in most specifications. Birds from northern Colombia, from the Rio Atrato east to Santa Marta and to the Rio Cogollo, Perija, western Venezuela, and from eastern Panamá (Perme, Veraguas, and Chiriquí, and Darién) agree with this Puerto Rican example. Todd and Carriker (Birds of Santa Marta, 1922:140-141) note that their specimens from Fundación and Tierra Nueva, Santa Marta, Colombia, were more rufescent on the breast than examples from farther east in South America, but they nevertheless call their birds *D. a. discolor*.

Danforth (Jour. Dept. Agri. Puerto Rico, 15, 1931:44) considers the Black-bellied Tree-Duck the commonest of the tree-ducks in Puerto Rico, but he did not collect any specimens. Wetmore (Auk, 65, 1938:53) in recording some bones of this duck from Puerto Rico, writes that "... this species has been found only in small numbers in modern times in the island." However, Bond (Check-list of Birds of the West Indies, 1945:14) informs us that *D. a. autumnalis* has been recorded from Jamaica (by Gosse) and was introduced in 1931 in Piñar del Rio, Cuba, while the other form *D. a. discolor* (type locality Surinam) is a straggler (?) to Puerto Rico (where it may breed), St. Croix, and the southern Lesser Antilles, whence it is known from Barbados, the Grenadines (Mustique) and St. Vincent.

The only serious discrepancy in Edwards is that both in the plate and in the description in the text the whole back of the neck and upper back are given as brick red as in the birds currently called *autumnalis* from Central America and southern United States. However, these birds do not have the gray pectoral area. It is necessary, therefore, to decide which of the two characters is to be taken more seriously. Inasmuch as the one Puerto Rican example examined and the series of the same form from northern Colombia and northern Venezuela are somewhat variable in the amount of rufescent suffusion on the hind neck and upper back, and inasmuch as many, if not most, of Edwards' plates, as well as those of his contemporaries, tend to be too highly colored, it seems wiser to give more importance to the buffy-gray pectoral character than to the absence in Edwards' figure of a similar dorsal one.

Correspondence with James Bond, our leading authority on West Indian birds, has brought out the thought that since the Black-bellied Tree-duck is very rare in the islands,

it is quite possible that the bird described by Edwards did not really come from there at all. In this eventuality the status of *autumnalis* would be made doubtful to the point of making one wonder if it could be considered strictly identifiable. On the whole, and especially since the species is known from the West Indies, even if possibly chiefly as a straggler from some part or parts of the mainland, it seems in the interests of nomenclatural stability to retain the type locality as it stands. It is, of course, quite possible that the bird Edwards saw, and the one I have seen, were both strays from the mainland. In this case our bird must be assumed to have come from northwestern Venezuela or northeastern Colombia.

Inasmuch as the only West Indian (Puerto Rican) specimen seen agrees with most of Edwards' description, which, in turn, is the sole basis of *Anas autumnalis* Linnaeus, it follows that Bond's (sight unseen) allocation of Puerto Rican birds to *discolor* is erroneous. It is true that in Edwards' figure the rufescent color of the hind neck is continuous with that of the back (as is the case in Central American and south Texan birds) while in our one Puerto Rican example there is an extensive break of buffy grayish somewhat (but not nearly as pronouncedly gray) as in *discolor*, but, in the other characters, Edwards' figure and his description and our bird are alike. There is no question as to the distinctness of *discolor*, of which a very large series, including 14 topotypes from Surinam, have been studied, but it does seem that all West Indian records should be placed with the nominate race, at least until actual specimens of true *discolor* are collected in the islands.

There is, on the other hand, an equal certainty that the birds from western Panamá north to southern Texas are not *autumnalis* but are even more distinct from that form than are the birds of the Guianas, eastern Venezuela, Brazil, Ecuador, and Bolivia (*discolor*). If the name *autumnalis* had been bestowed originally on a Central American bird it might have been possible to consider what we must now look upon as true *autumnalis* as a group of intermediates between the other two groups, but unfortunately this is not the case, and it is not correct to apply the name of the West Indian and northern Colombian birds to those of the region from Panamá to Texas. These latter birds have the rufescent color extending completely over the lower throat and the breast to the anterior margin of the blackish belly and also have the same rufescent color of the hind neck continuing without a break of buffy gray into the rufescent of the back. These birds have been called *autumnalis* by practically all recent authors, but, as indicated above, this is erroneous. No name appears to be available for these birds, but before proposing a name, it is necessary to point out that this population is in itself divisible into two races, a more northern one (southern Texas and adjacent parts of northeastern Mexico) with a dark brown belly, and a more southern one (Panamá to Veracruz, Hidalgo, Sinaloa and Sonora) with a deeper blacker color on the abdomen. Both of these races, if they are to be recognized, need names, and for them are proposed the following.

***Dendrocygna autumnalis fulgens* new subspecies**

Type.—U. S. Nat. Mus. no. 112429, adult ♂, collected at Lomita Ranch, Texas, July 31, 1880; ex collection of G. B. Sennett (original no. 271).

Characters.—Similar to the nominate race but with posterior part of lower throat and entire breast dark ochraceous tawny to rufescent antique brown with no area of grayish or buffy grayish between it and the dark belly; hind neck and upper back similarly uniform ochraceous tawny to rufescent antique brown; abdomen, lower sides, flanks, and thighs fuscous to between Prout's brown and mummy brown, with a varying amount of white on thighs and under tail coverts.

Description of type.—Forehead and anterior part of crown dusky isabelline, darkening posteriorly into tawny olive to Sayal brown of crown and occiput; nape darker—between Saccardo's umber and sepia, changing along hind neck into dark ochraceous tawny to rufescent antique brown or tawny hazel; scapulars and interscapulars and upper back tawny hazel to rufescent antique brown, the feathers with darker centers; greater upper wing coverts white, the median upper secondary coverts also

white; lesser upper wing coverts dusky isabelline; the alula chaetura drab, paling on outer webs to light grayish olive; primaries dark chaetura drab to almost black, all but outermost two with a large area of white occupying basal two-thirds of outer webs; secondaries dark chaetura drab, the innermost ones dusky tawny hazel like scapulars but darker; back ashy blackish; lower back, rump, and upper tail coverts black; lores, superciliary area, cheeks and auriculars pale light grayish olive to pale smoke gray; chin and upper throat white, the latter more or less tinged with smoke gray; lower throat, side of lower neck, and all of breast dark ochraceous tawny to rufescent antique brown or tawny hazel, paling slightly at posterior margin of breast to tawny hazel tinged with pale tawny olive; abdomen, sides, flanks, and thighs fuscous brown to between Prout's brown and mummy brown, the thighs and under tail coverts with a varying amount of white mixed with the mummy brown; under wing coverts black.

Measurements of type.—Wing, 234; tail, 70; exposed culmen, 52; tarsus, 64; middle toe without claw, 67 mm.

Range.—The Gulf coast and the Rio Grande Valley of Texas, south to northeastern Mexico; Tamaulipas (Altamira).

Of this race I have examined 4 males and 4 females.

Dendrocygna autumnalis lucida new subspecies

Type.—U. S. Nat. Mus. 359576, adult ♂, collected at Tres Zapotes, Veracruz, May 2, 1940, by M. A. Carriker, Jr.

Characters.—Similar to *D. a. fulgens*, but with abdomen, lower sides, flanks and thighs fuscous black to black, with a slight blue-black gloss.

There is no need to give a full description of the type as it would read exactly the same as that given above for *D. a. fulgens* with the exception of the color of the posterior under parts.

Measurements of type.—Wing, 236; tail, 66.2; exposed culmen, 45.4; tarsus, 61.1; middle toe without claw, 62.8 mm.

Range.—From Veracruz and Sonora and Sinaloa southward to Costa Rica and the western half of Panamá (no Panamanian specimens seen in the course of this study, however); casually to California (one record, specimen apparently lost) and to Arizona (near Tucson).

Of this race I have examined 11 specimens from Mexico (Veracruz, Sonora, and Sinaloa), Guatemala, Costa Rica, and Arizona (near Tucson). I have not seen any California birds, but two from Camoa, Sonora, and two from near Tucson, Arizona, are nearer to *lucida* than to *fulgens*, although not as dark on the abdomen as more southern *lucida*. The California record is placed with this race rather than with *fulgens* on the grounds of geographical probability. Until specimens from there are critically identified it may be best not to accord *lucida* a place in the California list.

Inasmuch as the name *autumnalis* has been consistently misapplied to the Central American and Mexican birds, it may be worth-while giving a description of the race to which the name is now restricted.

Adult (sexes alike).—Similar to that of *D. a. fulgens* but ochraceous tawny of hind neck gradually becomes suffused on interscapulars and upper back with pale buffy wood brown and, more posteriorly, with buffy drab; ochraceous tawny of lower throat paler on breast to between warm buff and light ochraceous buff, the width of this paler area varying individually.

The very gray-breasted race of South America, *D. a. discolor*, occurs from central northern Venezuela, Trinidad, and the three Guianas south to Ecuador in the west, and to Bolivia, northern Argentina, and southeastern Brazil (São Paulo) in the east. In studying this form I have had a series of some 14 Surinam birds (topotypes) as a standard with which to compare 4 examples from central and eastern Venezuela, 12 from eastern Brazil, 7 from Bolivia, and 1 from British Guiana. No constant geographic variations in size or coloration could be discerned in this series.

The Fulvous Tree-duck, *Dendrocygna bicolor*, has two races, *helva*, and the nominate one. The former breeds in fresh-water marshes from central California, central Nevada, southern Arizona, and eastern Texas, and possibly southern Louisiana, south to central México; it winters as far south as Chiapas. The typical subspecies has an amazingly wide and interrupted range, being resident in several widely separated parts of the world: in South America, in Africa, and in India and Burma. In tropical America

it occurs from the Pacific slope of Panamá south through Colombia, Venezuela, Trinidad, the Guianas, Ecuador, Peru (whence there is an apparently valid record from Lake Junin, at an altitude of over 11,000 feet above sea level!) and eastern and southern Brazil (not in the main Amazon valley), to Paraguay, Argentina (south to Mendoza and Buenos Aires provinces), and, possibly only accidentally, to Chile (two records). In Africa, south of the Sahara, it occurs chiefly in the eastern half of the continent (the few West African records being from Lake Chad, from Portuguese Congo, and from Nigeria); it is present from the Sudan and Ethiopia south through Uganda and Kenya Colony, Tanganyika Territory, the eastern and southern Belgian Congo, Nyasaland, Rhodesia, Bechuanaland, and to Natal; also in Madagascar. In India and Burma it ranges from the Punjab to Bengal, and south to Ceylon; also in Nepal, Assam, and Upper Burma (the southern Shan States).

In all this enormous range in which the population of any given continent is obviously completely cut off from those in the other two, no noticeable constant difference in coloration or dimensions has become fixed. When I started my study, I assumed that someone must have made direct comparisons between Indian, African, and American specimens, but a search in the literature failed to reveal any definite evidence to that effect although there are some blanket statements, without details, suggesting that such had been done. Through the kind cooperation of the authorities of the leading American museums I have been able to assemble approximately 100 specimens, 85 of which are sexed and accompanied by good data. Of these 85, 27 are from the mainland of Africa, 14 from Madagascar, 25 from southern South America (Argentina and Chile), 17 from northern and western South America, and 2 from India and Burma. This series, probably the most extensive it has been the fortune of any student to examine, certainly indicates that these birds cannot be divided into geographic groups on the basis of color, pattern, size, or proportions. Coloration does not lend itself to graphic rendition, but the dimensional data may be submitted in the following summary. In each instance the measurements given (in millimeters) are the minimum, the maximum, and, in parentheses, the average.

| General locality | Sex and number of specimens | Wing | Tail | Exposed culmen | Greatest width of bill | Tarsus | Middle toe without claw |
|----------------------------|-----------------------------|--------------------|---------------------|---------------------|------------------------|---------------------|-------------------------|
| Madagascar | 7 ♂ | 201-228 (215) | 48-52.4 (49.7) | 44.2-52.4 (47.9) | 18.5-20.6 (19.7) | 52.2-56.8 (54.6) | 60.3-66.0 (63.1) |
| | 7 ♀ | 207-220 (214.7) | 46.6-56.6 (51.1) | 45.2-49.5 (47.8) | 18.7-20.4 (19.5) | 53.2-58.0 (54.6) | 60.3-66.9 (63.4) |
| Africa | 12 ♂ | 202-242 (216) | 44.2-57.1 (49.2) | 43.1-48.1 (46.2) | 18.5-21.7 (19.8) | 52.1-57.2 (54.2) | 59.0-67.2 (63.1) |
| | 15 ♀ | 203-235 (217) | 41.1-53.3 (48.4) | 41.5-50.0 (46.1) | 18.1-21.1 (19.6) | 50.1-58.9 (54.0) | 57.2-71.4 (63.1) |
| Argentina | 14 ♂ | 213-235 (223) | 42-53.2 (47.9) | 45.1-51.7 (48.6) | 19.1-21.9 (20.5) | 52.1-60.7 (56.7) | 64.1-69.1 (65.8) |
| | 11 ♀ | 201-232 (217) | 43.6-55.4 (50.2) | 45.2-49.4 (47.2) | 18.1-21.2 (19.9) | 52.1-60.3 (55.9) | 59.1-75.4 (66.1) |
| Remainder of South America | 10 ♂ | 210-230 (215) | 45.6-53.5 (50.5) | 43.1-50.5 (47.5) | 17.2-21.0 (19.5) | 52.4-56.2 (54.7) | 61.0-66.6 (64.7) |
| | 7 ♀ | 201-226 (212.5) | 41.1-54.1 (47.2) | 43.1-47.0 (45.0) | 18.9-20.5 (19.5) | 51.7-55.9 (53.1) | 61.5-65.3 (63.8) |
| India and Burma | 2 ♂ | 221-229 | 46.7-55.6 | 46.6-49.1 | 18.7-19.6 | 52.1-60.3 | 62.6-68.7 |
| | 1 unsexed | 216 | 48.1 | 46.2 | 19.3 | 55.2 | 64.1 |

It is puzzling indeed to find so large and discontinuous a part of the earth's surface inhabited by an unvarying population of this species while in a relatively small area in

Mexico and southern United States a different race replaces it. This form, *Dendrocygna bicolor helva* Wetmore and Peters is well differentiated by its smaller and narrower bill. The greatest width of the bill is consistently under 20 mm. in *helva* and equally consistently over 20 mm. in the nominate race. In the original description *helva* is said to be lighter and brighter in color on the under surface and paler on the crown than *bicolor*, but these color differences do not appear to be reliable characters in the large series examined by me. The bill character, however, is sufficient to warrant the recognition of the subspecies. Wetmore and Peters noted themselves that the color differences they described were not too constant, as they inserted in their remarks: "... an occasional specimen of *D. b. helva* approaches typical *bicolor* in dark dull coloration . . ."

A detailed description of the plumages and distribution of *D. b. helva* follows.

Adult (sexes alike).—Top of head between russet and mars brown with a slight wash of dark mouse gray on occiput; sides of head (cheeks and auriculars) and of upper neck tawny olive, each feather margined with buffy brown, producing an appearance of faint streaks, the basic color merging above with color of crown; nape with a broad streak of black, bordered by tawny olive; sides of neck and foreneck lighter than pale olive-buff, the feathers on the middle of foreneck and sides of neck dusky neutral gray basally and laterally, producing an appearance of fine, dark, poorly defined lines, arranged as a half collar; base of hind neck and upper back Verona brown, tipped with cinnamon buff, the feathers of upper back indistinctly darker in a line marking prolongation of black neck stripe; back and wings in general dull black, feathers of back and scapulars tipped broadly with Verona brown, changing distally to cinnamon-buff; lesser and middle upper wing coverts, save on outer portion, russet; outer coverts of these two series black, tipped slightly with russet; greater upper wing coverts, primaries, secondaries, lower back, and center of rump black; sides of rump and lateral upper tail coverts light buff; central upper tail coverts nearly white; rectrices dull black; chin, throat, and upper foreneck dull white, washed more or less with cinnamon buff; lower foreneck and upper breast clay color becoming Sayal brown on lower breast, sides, and abdomen, the feathers tipped indistinctly with pinkish buff; under tail coverts dull white, washed laterally with pinkish buff; an indistinct white line through center of abdomen; feathers of tibiae streaked with ivory yellow; under wing coverts and axillars blackish mouse gray; feathers of sides and flanks long, streaked broadly with dull ivory yellow, the light streaks bordered indistinctly with olivaceous black; bill bluish black, the nail black; tarsi and toes deep bluish gray, the claws long and blackish; iris dark reddish brown to brown.

Juvenal (sexes alike).—Very similar to adult but generally duller, the under parts averaging somewhat paler, the upper wing coverts paler, less russet, the feathers of back with narrower brown edgings, and central upper tail coverts terminally suffused, or tipped, with brownish.

Natal down.—Top of head clove brown; chin, throat, and sides of head dull white, a streak of white extending around back of head on each side and meeting on occiput; a short, dull white streak on each side of head from side of bill to above eye; hind neck clove brown, a streak of clove brown extending on side of head below white streak which encircles head; rest of upper parts uniform bister brown; whole under parts dull white; bill (in dried specimen) dusky brown (apparently light blue-gray in life, according to Shortt's figure in Kortright, "Ducks, Geese and Swans of N. Amer.," 1942: pl. 35, fig. j), with a prominent yellowish nail; feet grayish yellow in dried specimen [dusky gray in life (?) according to Shortt (*cit. supra*)].

Adult male.—Wing, 196-224 (210.1); tail, 45-54 (46.4); culmen from frontal feathering, 44-48.5 (46.4); greatest width of bill, 17.3-19.8 (18.5); tarsus, 52-60 (56.5); middle toe without claw, 65-70 (66.4 mm.); measurements based on 14 specimens from California and Mexico.

Adult female.—Wing, 202-225 (210.9); tail, 47.5-54 (49.6); culmen from frontal feathering, 45-48.5 (46.8); greatest width of bill, 18.1-19.1 (18.5); tarsus, 52-57 (55.2); middle toe without claw, 64-70 (66.9 mm.); based on 14 specimens from Louisiana, Texas, California, and Mexico.

Range.—Breeds in fresh-water marshes from central California (San Joaquin Valley and Pacific slope of southern California; chiefly vicinity of Los Baños, Merced County, but also in Santa Clara, Kern, Los Angeles, San Diego, and Imperial counties); central Nevada (Washoe Lake and Carson); southern Arizona (Fort Whipple); and eastern Texas (Nueces County), and possibly in southern Louisiana (whence summer records but no nesting records are known; Lake Catharine and the Rigollets); south to central Mexico (Lake Chapala, Jalisco, and the Valley of Mexico; apparently absent in Chihuahua and Coahuila).

Winters from its breeding range southward to Guerrero, Tabasco and Chiapas in southern Mexico; wanders northward in California to the Sacramento Valley and Marin County.

Casual north to Washington (Grays Harbor; above Okanogan) and Vancouver Island, British Columbia (Alberni); to Minnesota (Arco, Lincoln County); Missouri (Knox City; New Albany); and east to Florida (Lake Okeechobee) and North Carolina (Swan Island).

Accidental in Cuba and Bermuda; recorded unsatisfactorily from Iowa.

Type locality.—Unlucky Lake, San Diego County, California.

The White-faced Tree-duck, *Dendrocygna viduata*, is another species with a wide and discontinuous distribution, being found in tropical America from Costa Rica (Bebedero and Guanacaste) south through Panamá and most of South America (to Perú, Bolivia, Uruguay, and Argentina), and also in the West Indies (Cuba, Puerto Rico, Hispaniola, and Barbados) and Trinidad. It occurs again throughout Africa south of the Sahara, and in Madagascar, the Comoro Islands, Mauritius and Renuni6n. Many years ago Hartlaub (Jour. für Ornith., 1854:304) separated the Old World population under the name *personata* on the basis of the possession by these birds of a black throat band medially interrupted by white, as contrasted with the continuous black band in Neotropical examples. In an editorial footnote on the same page Cabanis wrote that the distinguishing character of *personata* was not constant, but he gave no indication of what material he had seen.

The name *personata* Hartlaub dates from 1854 as given above. Hartlaub based it on Württemberg in Jardine's Contr. Ornith. (1850:140), but at this point it is, however, a *nomen nudum* as no description is given and not a word as to how, or whether it differs from *viduata*. Prince von Württemberg never published a validation of his name *personata* as was first pointed out by Hartert (Kat. Vogelsamml. Mus. Senckenb., 1891:228).

When I began my study of this species, the limited series in the United States National Museum indicated that, contrary to previous opinion, there seemed to be a sexual dimorphism in this character of the throat pattern and that if birds were separated by sexes African males had the throat band medially interrupted by white while South American ones had this black band continuous across the throat. Females from both continents varied individually in this regard. The total series was small, however—4 Neotropical and 6 African males, 1 Neotropical and 6 African females. At my request Dr. James P. Chapin then examined the far more extensive material in the American Museum, inasmuch as I could find nothing in literature that gave definite data, the only statements, as in the case of *Dendrocygna bicolor*, being blanket pronouncements without supporting evidence. Chapin's notes, which settle the matter, are based on some 85 adults from all parts of the range and are here outlined with a deep sense of gratitude to him for the time and trouble he has taken in this study.

Of 11 South American adults, 5 have complete, broad black throat bands (4♂, 1 unsexed), 4 have the throat bands narrow or slightly broken (2♂, 2♀), and 2 have the bands broadly interrupted by white on the mid-line of the throat (1♀, 1 unsexed). Of 62 African adults 15 have complete broad black throat bands (4♂, 7♀, 4 unsexed), 23 have the throat bands narrow or slightly broken (11♂, 8♀, 4 unsexed), and 24 have the bands broadly interrupted with white medially (15♂, 7♀, 2 unsexed). Of 13 Madagascan adults 7 have complete broad black bands (3♂, 3♀, 1 unsexed), 5 have the bands slightly broken (3♂, 2♀), and 1 has the band broadly interrupted by white medially (1♀). It follows that the apparent sexual difference shown by the Washington series is not real; on the average the black tends to be less extensive in African birds, but in Madagascan examples the condition closely agrees with that in Neotropical series. It follows that it is not advisable, or possible, to recognize *personata* as distinct from *viduata*. There is nothing in the size variations that clearly distinguishes African from South American birds, as is indicated by the following figures based on the material in the United States National Museum.

| Locality | Sex and number of specimens | Wing | Tail | Exposed culmen | Tarsus | Middle toe without claw |
|---------------|-----------------------------|--------------------|---------------------|---------------------|-------------------|-------------------------|
| South America | 4 ♂ | 228-237 (232) | 57.1-61.2 (58.7) | 47.2-49.2 (48.3) | 53.5-61 (56.6) | 56.9-61 (58.1) |
| Africa | 6 ♂ | 216-222 (219) | 54-58 (55.4) | 47-49.1 (47.7) | 48.1-55 (52.6) | 50-56.8 (54.9) |
| South America | 1 ♀ | 231 | 57.4 | 48.7 | 60 | 66.3 |
| Africa | 6 ♀ | 221-225 (223.3) | 53-59.1 (56.3) | 45.3-48.9 (47.4) | 52-55.2 (52.9) | 53-55.2 (54.3) |
| Madagascar | 1 unsexed | 215 | 59.1 | 47.2 | 58.5 | 58.9 |

Dr. Chapin informs me that the 11 Neotropical specimens in New York (both sexes included) have wing lengths of 205-235 mm., and that the 13 Madagascan adults (both sexes) have wings of 210-238 mm. He notes that Bannerman (Birds of Tropical West Africa, i, 1930:151) found the wing length of 75 African specimens to vary from 212-237, tail 58-63, tarsus 45-55 mm.

It is true that South American birds appear to average slightly larger, especially in their tarsal and toe measurements, but the overlap is so extensive that there is no point in trying to use this fact as an argument for subspecific "splitting."

Again, as in *D. bicolor* over most of its range, we have a widely ranging, highly discontinuously distributed species, showing no constant geographic variation.

Acknowledgements.—For loan of material thanks are due to the authorities of the American Museum of Natural History, Carnegie Museum, Chicago Natural History Museum, Museum of Comparative Zoology, Academy of Natural Sciences of Philadelphia, and the University of Arizona.

United States National Museum, Washington, D.C., May 15, 1947.