

## DISTRIBUTION AND MIGRATION OF RACES OF THE MOURNING DOVE

By JOHN W. ALDRICH and ALLEN J. DUVAL

The Mourning Dove (*Zenaidura macroura*) is a widespread species in North America except in the boreal region. It breeds regularly from the Atlantic to the Pacific and from the non-boreal sections of southern Canada south to central México and the Greater Antilles. It is reported to breed locally southward in Central America (Eisenmann, 1955:36) even as far as Panamá (Griscom, 1935:310; Wetmore, 1956:124). Its habitat ranges from the highly mixed and diversified assemblage of trees, shrubs, and openings of suburban and rural residential areas to the extensively open grasslands of the Great Plains. In fact, this species includes within its breeding habitat most ecological types except marshes and heavily wooded areas. The habitats which appear to support the denser breeding concentrations, however, are those associated with the more arid western portions of the continent, particularly the extensive grasslands of the Great Plains and the brush lands of the Great Basin and southwestern deserts. In the east, where deciduous forest is the natural vegetation, Mourning Doves are much less abundant and they occur in greatest numbers in the more open farming country.

## THE PROBLEM

The Mourning Dove is a game bird in some sections, particularly in southern United States; in other parts of the country, it is valued more highly as a songbird. Because of its status as a game bird, the United States Fish and Wildlife Service is especially concerned with evaluating the increases and decreases in population which may occur in any part of the Mourning Dove's range. Various methods are being explored for obtaining indices of abundance and for determining how breeding populations of different abundance levels are related to the migrant populations which provide game birds in some parts of the country. One of the methods being explored for determining the relative contributions of Mourning Dove breeding areas to the localities where shooting must be controlled is to analyze the racial types represented among the birds which have been killed by hunters. The value of this approach is of course dependent upon how much geographic variation exists in the species and how consistent that variation is. In some respects it is less satisfactory than the banding method, but in the absence of adequate samples of breeding populations that have been banded and recovered, the analysis of racial components is the only source of information on migration. In 1950, the senior author attempted to make such a study in Florida by comparing, in the field, the doves in hunters' bags with Mourning Dove skins representative of the known races (Aldrich, 1952). This same technique was attempted in the fall migration seasons of 1951 and 1952 in Texas.

These attempts to determine the breeding areas represented by the doves in hunters' bags showed the lack of information on geographic distribution in the breeding season of the various color types observed among the hunted birds. This provided the main stimulus to find geographically variable characters which would enable us to pinpoint much more definitely the origin of these doves.

## PROCEDURE

The first step was to sort out all of the breeding specimens of Mourning Doves in the United States National Museum, including those in the Fish and Wildlife Service collection. Only specimens taken in late May, June, and July were selected as representatives of breeding populations because of the known continuation of spring migration past the middle of May and the beginning of fall migration in early August (Austin,

1951:157). Although Dahlgren (MS) considered June to be within the spring migration season in Utah, we believe that June migration occurs so infrequently that the large majority of specimens taken in that month would be valid. With this exacting criterion of "breeding specimens," it was soon obvious that the number of specimens would be far too scanty, particularly from the eastern states.

The next step was to borrow as many specimens as we could to fill the gaps in our breeding series. For very helpful cooperation in the lending of specimens, we are indebted to the curators or owners of the following collections: Alabama Cooperative Wildlife Research Unit; American Museum of Natural History; California Academy of Sciences; Chicago Natural History Museum; Joseph Moore Museum, Earlham College; Louisiana State University Museum of Zoology; Minnesota Museum of Natural History; A. F. Ganier, Nashville, Tennessee; Museum of Comparative Zoology; Cleveland Museum of Natural History; Museum of Vertebrate Zoology; University of Kansas Museum of Natural History; University of Michigan Museum of Zoology; University of Wisconsin Zoological Department; and M. G. Vaiden, Rosedale, Mississippi. Even with all of the specimens we could assemble by borrowing we still lacked material from critical areas, particularly those in the midwest and south. Collection of specimens from these areas was done by the junior author, assisted by Gorman M. Bond, between May 25 and June 19, 1953. In this period, 7700 miles were traveled by auto, an average of almost 300 miles per day, and 129 specimens were collected in 12 states. These were shipped in dry ice to Washington where they were prepared for study. In addition, Thomas D. Burleigh, of the United States Fish and Wildlife Service, made special trips to collect breeding doves in the northwestern states and he proceeded east as far as Wisconsin. C. C. Anderson, of the Florida Game and Fresh Water Fish Commission, collected six breeding specimens, specifically for this study, at West Palm Beach, Florida.

Thus we were ready to attempt the analysis of geographic variation with 204 breeding specimens from continental United States, two from México, six from Panamá, and 21 from the Florida Keys and the West Indies. Because of the paucity of summer-taken birds from this last area, doves taken from April through July were used for comparison.

#### GEOGRAPHIC VARIATION

Conclusions from our analyses show that there are four main types of morphological variation in Mourning Doves; these types are geographic and they are distinguishable in all sex and age plumages. The most distinct and consistent trend, at least on the continent, is in tone of coloration, from dark in the east to pale in the west. There is a trend in length of wing from shorter in the tropical region to longer in the northern areas. In progressing westward on the continent there are trends toward increasing bill length and decreasing toe length. There is a slight trend within the United States from more brownish coloration in the south to more grayish in the north. This last is probably better defined as a condition of "color phase" which tends to occur in slightly different frequencies geographically. Thus there are more gray birds in the north and more brown birds in the south. In addition to the main continental variations of size and intensity of color we find deep buff-bellied underparts associated with small size in the birds of the West Indies and the Florida Keys, and relatively large bills and feet associated with very deep brownish coloration in the birds of Clarión Island off the west coast of México. There are other less well defined differences in linear proportions which show up in the statistical analyses of measurements (table 1, and figs. 1 and 2). In all measurements it was noted that males have significantly larger wing, middle toe, and tarsus measurements than females when large samples are compared. Taking all of the noted variations into consideration, there seem to be only five combinations which are distinct enough

to permit the reasonably sure identification of a large majority of any population and which warrant their being called separate races. These races are:

1. The long winged, dark population of eastern United States and southern Ontario—*Z. m. carolinensis*.
2. The long winged, pale population of western United States, southwestern Canada, and temperate México—*Z. m. marginella*.
3. The short winged, short legged, long billed, pale population of Panamá and possibly other parts of Central America—*Z. m. turturilla*.
4. The short winged, dark to medium toned, deep buff-bellied population in the West Indies and Florida Keys—*Z. m. macroura*.
5. The relatively large footed, large billed, very dark brownish population on Clarión Island of the Revilla Gigedo group, off the Pacific coast of México—*Z. m. clarionensis*.

Table 1

Measurements of Races of *Zenaidura macroura* Based on Breeding Specimens Only

Subspecies	Sex	Sample size	Wing			Sample size	Culmen		
			Range	Mean	Standard error		Range	Mean	Standard error
<i>marginella</i>	♂	118	137.0–156.5	144.3	.34	107	12.0–16.5	13.5	.08
	♀	36	131.5–154.0	141.7	.79	34	12.0–15.0	13.5	.01
<i>carolinensis</i>	♂	34	136.5–154.0	144.8	.73	32	12.0–14.5	13.3	.13
	♀	17	130.5–143.0	137.9	.97	17	12.0–15.0	12.9	.23
<i>macroura</i>	♂	11	135.5–140.0	137.8	.52	11	12.0–13.5	12.8	.14
	♀	10	125.5–136.0	132.4	1.04	10	11.0–14.5	12.8	.32
<i>turturilla*</i>	♂	4	135.0–142.0	138.9	1.48	4	13.5–14.0	13.9	.13
<i>clarionensis</i>	♂	4	136.0–146.0	139.9	2.12	4	15.0–15.5	15.1	.13
	♀	3	134.0–138.0	136.7	2.70	4	13.5–16.5	14.9	.69
			Tarsus			Middletoe			
<i>marginella</i>	♂	114	19.5–23.5	21.3	.07	117	18.0–22.0	19.9	.08
	♀	35	19.5–21.5	20.5	.01	36	17.5–21.0	19.2	.01
<i>carolinensis</i>	♂	34	19.5–23.0	21.5	.39	34	19.0–23.0	20.5	.19
	♀	17	19.5–21.5	20.7	.19	17	18.0–21.5	19.4	.21
<i>macroura</i>	♂	11	20.0–23.0	20.9	.31	11	19.0–21.5	20.2	.22
	♀	10	18.0–21.5	20.0	.34	10	16.0–20.5	19.1	.44
<i>turturilla*</i>	♂	4	19.0–20.0	19.8	.02	4	20.0–21.0	20.4	.02
<i>clarionensis</i>	♂	4	22.5–24.5	23.5	.46	4	22.5–24.0	23.1	.31
	♀	4	21.5–23.5	22.3	.43	4	22.5–23.5	23.0	.20

\* Only one female specimen of *turturilla* was available for measurement. This had: wing, 127.0; culmen, 14.0; tarsus, 19.5; middle toe, 19.0.

The various measurements for each race differ disproportionately. One race may have a larger wing but a shorter bill than another whereas a third race may have a larger middle toe but a shorter tarsus. Significant differences in these proportions are brought out by a statistical analysis and graphing of the measurements by Aelred D. Geis of the Waterfowl Biometry Office of the United States Fish and Wildlife Service. To indicate the variability in measurements the standard error was calculated for each mean. Confidence limits were then calculated at the .05 probability level as the mean  $\pm$  "t" times the standard error. These confidence limits, the means, and the ranges are indicated in figures 1 and 2. Where the confidence limits do not overlap, statistically significant dif-

ferences are indicated. When this procedure indicated nearly significant differences, analysis of variance was used to test the significance of the differences.

*Z. m. marginella*.—Statistically, wing measurements were significantly longer than in all races except *clarionensis* and male *carolinensis*. Culmen length was significantly longer than in *carolinensis*

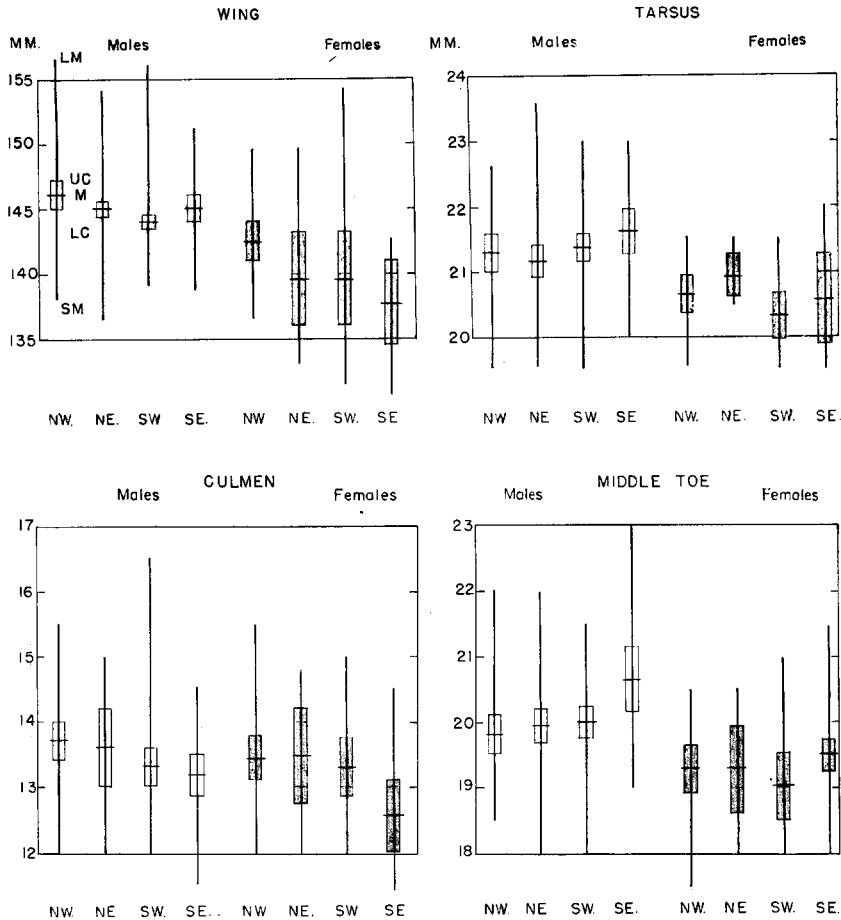


Fig. 1. Comparison of measurements of breeding specimens of *Zenaidura macroura*. NW = Washington, Oregon, Idaho, Montana, Wyoming, North Dakota, South Dakota, and Nebraska; NE = Minnesota, Iowa, Illinois, Indiana, Ohio, Pennsylvania, New Jersey, and to the north and east; SW = California, Nevada, Utah, Colorado, Kansas, Oklahoma, Texas, New Mexico, and Arizona; SE = south of NE area and east of SW area.

and *macroura*, and it was significantly shorter than in *turturilla* and *clarionensis*. The length of the tarsus was significantly longer than in *turturilla* and shorter than in *clarionensis*. The tarsal length was not significantly different from the other races. The middle toe was significantly shorter than in *carolinensis*, *turturilla*, and *clarionensis* but it was not different from that of *macroura*.

*Z. m. carolinensis*.—Females had significantly shorter wings than in *marginella*. The wings were significantly longer than in *macroura* and *turturilla* but they were not significantly different from those of *clarionensis*. Culmen length was significantly shorter than in *marginella*, *turturilla*, and *clarionensis* but it was not significantly different from that of *macroura*. In tarsal length this race differed significantly only from *turturilla*, which was smaller. The average middle toe length of this race was significantly longer than in *marginella* and very significantly shorter than in *clarionensis*.

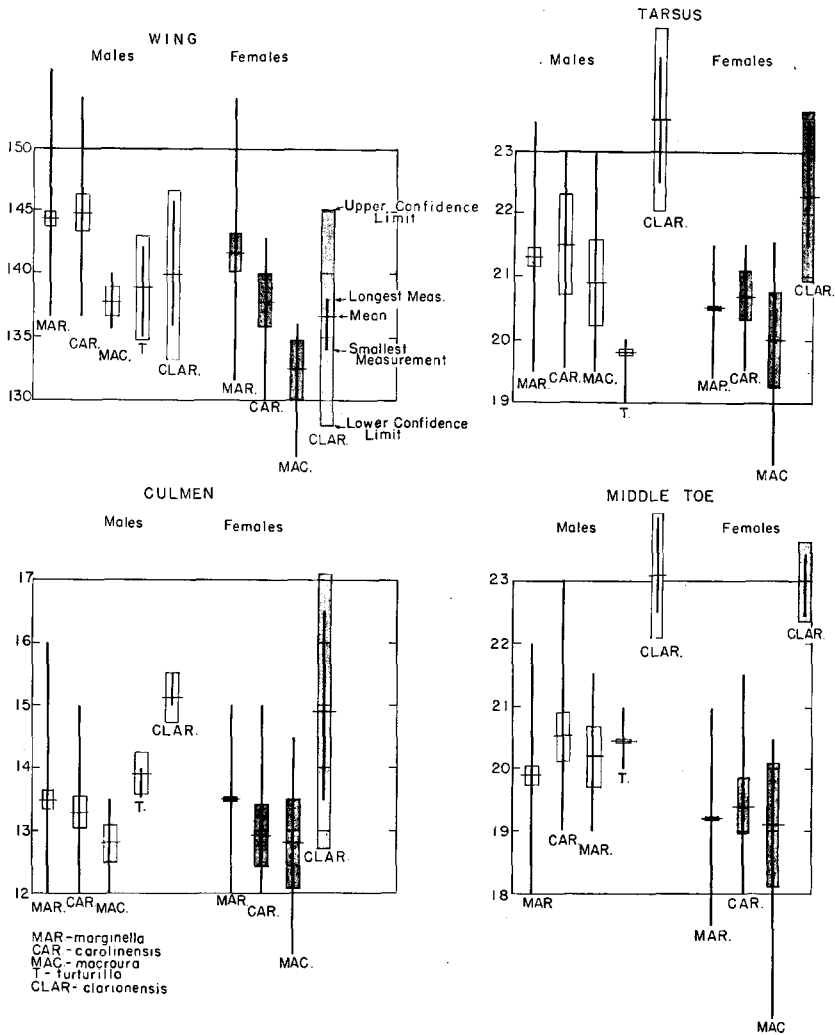


Fig. 2. Measurements of races of *Zenaidura macroura* based on breeding specimens.

*Z. m. macroura*.—The wing measurements of this race were significantly shorter than in *marginella* and *carolinensis*. Culmen length was shorter than in all races except *carolinensis*. The tarsus was significantly longer than in *turturilla* and shorter than in *clarionensis*. The middle toe measurements were significantly different only from those of *clarionensis*, which were much longer.

*Z. m. turturilla*.—A sample of only four males was available. The wings of this race were significantly shorter than those of *marginella* and *carolinensis*. The culmen length was significantly shorter than in *clarionensis* and longer than in *macroura*. It is possible that a larger sample would have indicated a significantly longer culmen than that of *marginella* and *carolinensis*. The tarsus of *turturilla* was significantly shorter than in all other races. The middle toe differed significantly only from that of *marginella*, which had smaller toes, and *clarionensis*, which had much longer toes.

*Z. m. clarionensis*.—The wing measurements did not differ significantly from any other race based on the small sample of four birds of each sex. Lengths of culmen and middle toe averaged significantly longer than in all other races. The tarsus was significantly longer than in all races except *carolinensis*.

The identifications of specimens examined in accordance with the foregoing criteria

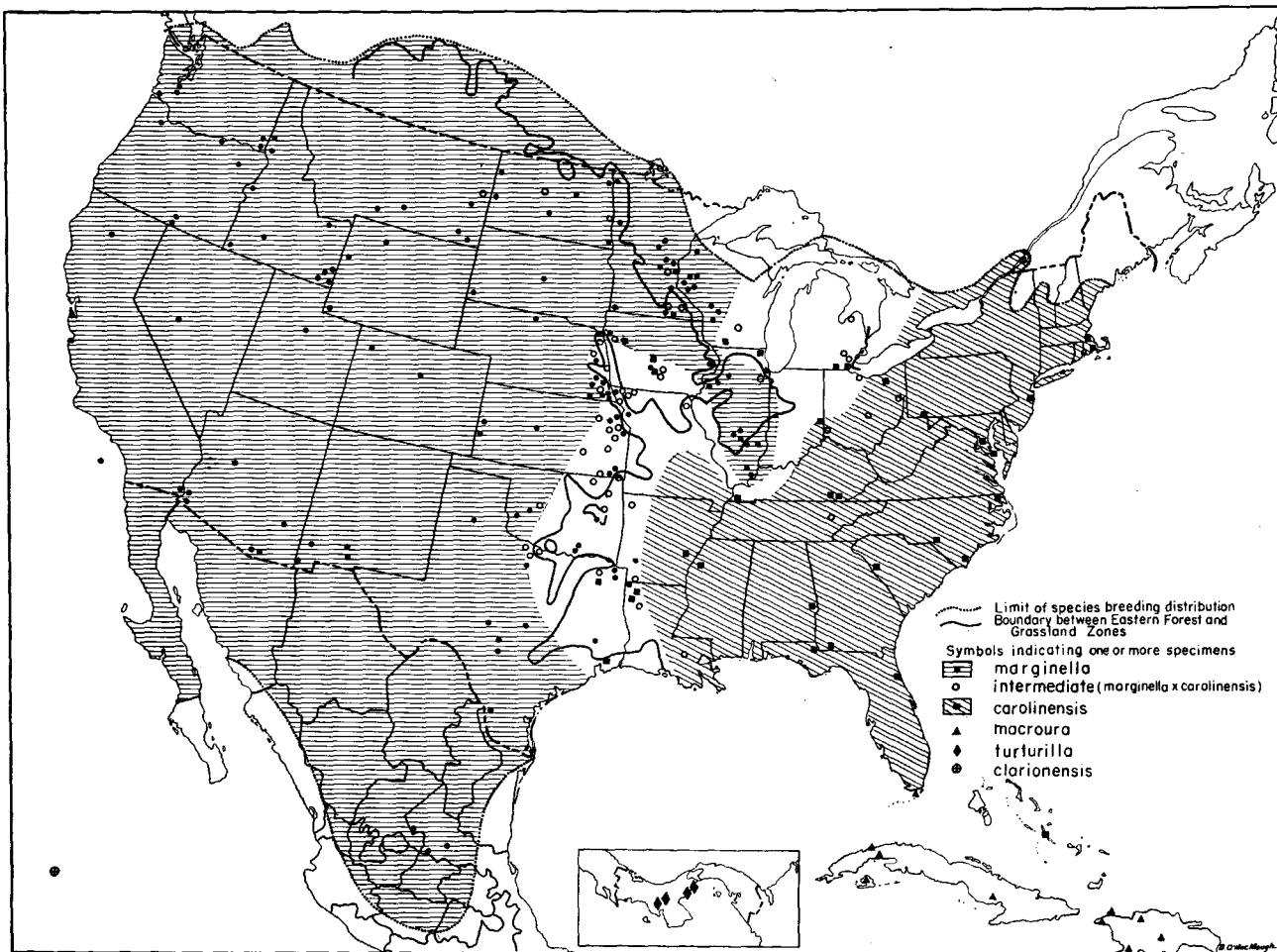


Fig. 3. Breeding distribution of subspecies of the Mourning Dove (*Zenaidura macroura*).

are shown in the list on pp. 122–126, and the localities of breeding specimens are shown on the map (fig. 3).

With the exception of a Central American race, the general and specific characters of all of the races recognized in this study have been described in detail by Ridgway (1916a:339–353). For this reason it would be repetitious to give detailed descriptions of each race here. It will suffice merely to point out how our findings differ from those contained in that important reference. We did not find a satisfactory difference in the size of the black spots and the extent of the metallic glossed areas listed as sex characters by Ridgway (*op. cit.*:343) although it is probable that average differences in these characters do exist. The smaller size and duller coloration, especially the duller, more brownish or drab and less vinaceous underparts of the females, as reported by Ridgway, are quite reliable. In addition, a rather reliable sex character is the relatively bright bluish-gray coloration of the dark areas on the occiput and hindneck of the males.

A difference between *Z. m. carolinensis* of the eastern United States and *Z. m. macroura* of the West Indies is the larger size of the former (*op. cit.*:345), but Ridgway's other characters of the upper parts averaging less brownish and the underparts paler (less darkly vinaceous) in *carolinensis* are not corroborated by the present study. The main color difference between these races, when compared phase for phase, is the less deeply buffy or rufescent coloration below in *carolinensis*, particularly on the belly. No reliable difference in the color of the upper parts of these races is evident, although the majority of the West Indian birds appear somewhat paler than typical *carolinensis* from the Atlantic seaboard of the United States.

Typical *Z. m. marginella* of western United States differs from typical *Z. m. carolinensis* from the east in the much paler coloration of the former throughout; it is not merely "slightly paler" as expressed by Ridgway (*op. cit.*:347). The slightly larger size of *marginella* has generally been considered a character distinguishing it from *carolinensis* (*op. cit.*:347; Rand and Traylor, 1950:179). This is only partly borne out by our measurements. Males show no difference in wing length, although there is an indication of a smaller wing in the small sample of female *carolinensis* and a shorter bill in both sexes (table 1, and fig. 2). On the other hand, there is an indication that *carolinensis* has a larger foot (see toe measurements, table 1, and fig. 2).

The coloration of the back and lesser wing coverts of typical examples of *carolinensis* ranges from a cinnamon brown to a dark Saccardo's umber as in Ridgway (1912:pl. XV) or yellowish, yellow-red 7.5YR–5/4 according to Munsell Color Company (1942). The range in color of typical *marginella* is light Saccardo's umber to buffy brown or yellow-red 10.0YR–6/4 of these same authorities.

When samples of *carolinensis* and *marginella* are selected from well within their breeding ranges, little or no overlap in color characters occurs. Examples from the area of intergradation, of course, show all degrees of overlap. Study of the list of specimens examined (p. 122) discloses what appears to be a complete breakdown of racial segregation within the states located in the zone of intergradation. For example, among the breeding specimens taken in Missouri, one was identified as *carolinensis*, five as intermediate, and five as *marginella*. This type of mixture is found all along the highly interdigitated ecological boundary between natural prairie and woodland from Texas to Michigan (see discussion under Ecological Distribution). This complicates the identification of migrants and it makes completely impossible the identification of many specimens as being definitely from a geographically intermediate zone. Thus, it would seem imperative that separation of geographical intermediates, as well as non-breeders, be made from samples before applying any percentage of separability rule for subspecific validity as was attempted for these subspecies by Rand and Traylor (1950:179–181).

Where only breeding specimens are used, based on the June and July criterion and taken from areas beyond the intermediate zone (fig. 3), a very high percentage of specimens of *carolinensis* can be distinguished from an equally high percentage of *marginella*. In fact, in our samples, only one specimen from the range of *carolinensis* and one from the range of *marginella* appeared to have the characters of the opposite race. The character separating *marginella* from *carolinensis*, and the truly intermediate specimens from typical examples of either race, is as easily detectable in a separate wing as it is in complete skins. Thus, it is practical to separate these components of hunters' bags on the basis of wing samples.

We were unable to verify Ridgway's (1916a:348, footnote) characterization of a distinct subspecies in the Cape San Lucas district of Baja California. No breeding specimens from there have been seen by us, nor did Ridgway examine any. In fact, the species is not now considered to breed that far south in Baja California (Friedmann, Griscom, and Moore, 1950:116). The brown coloration noted by Ridgway as the distinguishing character seems to be somewhat more prevalent among specimens from the arid southwest. However, as pointed out previously in the present paper, this condition is interpreted as that of a color phase which may appear anywhere but which tends to be more prevalent in the southwest than elsewhere.

The existence of a "very distinct form peculiar to the humid coast district of Oregon and Washington" and named *caurina* by Ridgway (1916a:348, footnote) likewise could not be substantiated. The type specimen, United States National Museum 12540 (not "No. 22540") is certainly a very deeply colored specimen when compared with typical examples of *marginella*; in fact, it approaches the richly colored race *clarionensis* in this respect. There is no approach to this race in large size of bill and feet, however, and the over-all resemblance is greatest to *carolinensis*. Cassin (1858:278), in his report on the Wilkes collection, whence this specimen came, reported that specimens of Mourning Doves from Oregon present no characters different from those of the common bird of the states on the Atlantic coast and he noted that they differed from the "smaller species" (*Ectopistes* [= *Zenaidura*] *marginella*) discovered by Woodhouse (1852). This would imply that Cassin saw more than one specimen from the Wilkes collection although there is no evidence of this in his catalogue, which lists only the specimen to which he applies the number 561.

Whether or not the type of *caurina* (a dismantled specimen without an original field label) came from the breeding population of the "humid coast district of Oregon and Washington" cannot be determined from the incomplete information available to us. We lack information on both the date and the exact locality where it was collected. In addition to the red type label of the National Museum, it bears a large card label obviously removed from the base on which the specimen had been mounted. On this label is printed: "U. S. Explor. Exped. Capt. C. Wilkes, U.S.N.—Oregon—T. R. Peale." In handwriting on this label is the number 451 which refers to a species number used in a list of North American birds (Baird, 1858:xliv). In his report on the expedition on which this specimen was collected, Peale (1848:189) commented that the species was observed in Oregon on the Columbia River and listed the specimen in his catalogue under the number 571. The entry in the National Museum catalogue for this specimen, no. 12540, originally made on July 15, 1859, gives the additional following information: "Presented to Chicago Acad. Sci. Jan. 28, 1881." It evidently was returned subsequently to the National Museum. It therefore appears that the type of *caurina* was collected on the Columbia River, probably not far upstream from the Pacific coast, and that there may have been one or two other specimens from that locality in the collection although they are not now extant in either the United States National Museum or in the Philadelphia



Academy of Sciences (de Schauensee, personal communication). There seems no way now of more definitely establishing the locality and time of year of collection. If this specimen was representative of the breeding Mourning Doves of the coastal strip of Washington and Oregon in the early 1840's, that population has certainly become extirpated and replaced by a very much paler race as suggested by Jewett, Taylor, Shaw, and Aldrich (1953:340). Breeding specimens collected west of the Cascades in Washington by Thomas D. Burleigh in late May, 1954, specifically to determine this point, and a specimen in the University of Washington collection taken at Tacoma, June 14, 1913, are typical *marginella*. Burleigh (personal communication) remarked that doves breed rarely in that area today. Slipp (1941:59) summarizes the occurrence of Mourning Doves in the Pacific Northwest and indicates that they have been rare in western Washington since Cooper (1860:219) reported taking many specimens at Fort Steilacoom in the 1850's.

The race *tresmariae*, described by Ridgway (1916b:107) from María Madre Island, Tres Mariás group, Nayarit, off the Pacific coast of México, is of doubtful validity. First, the type collected by Nelson and Goldman on May 5, 1897, is the only known specimen from the Tres Mariás Islands. Further, Nelson (1899:36) said that only a few other Mourning Doves, in addition to the one collected, were seen on the island in the first part of May, and he concluded from their behavior that they were "probably stray migrants." Subsequent visitors to those islands have not recorded the Mourning Dove there (McLellan, 1926:294-295; Kenneth E. Stager, personal communication). In appearance, the type of *tresmariae* is quite typical of *Z. m. carolinensis* except in the intensity of the cinnamon rufous on the forehead and sides of the head. In these respects, it is not quite matched by any specimen from the east. It might be considered as exhibiting intermediacy between *marginella* and the deeply colored *clarionensis* (Townsend, 1890:133) of Clarión Island, which is in line with but farther offshore than the Tres Mariás. However, there is no approach to the large heavy bill and feet of that race. In view of the lack of evidence of a breeding Mourning Dove population either past or present on the Tres Mariás Islands, it is more likely that the type was a stray individual from some breeding population of dark brownish birds, and probably it came from within the range of *carolinensis*. Other dark specimens which have been noted in the present study from areas where one would expect to find *marginella* are: one taken at Laguna, San Diego County, California, June 15, 1894 (another from the same locality and taken on the same date is typical *marginella*); one at Mountain Spring, San Diego County, California, May 15, 1894; one at Baird, California, May 29, 1883; one at New Meadows, Adams County, Idaho, July 22, 1929; one at Hilger, Montana, August 4, 1919; one at Glendive, Montana, May 5, 1916; one at Jarilla Mountains, New Mexico, September 13, 1903; and one at Big Hatchet Mountains, New Mexico, July 19, 1908. However, among these, only the bird from Big Hatchet Mountains is considered as too dark to be within the range of variation of *marginella*.

Swarth (1922:209) reported a specimen taken at the mouth of the Stikine River, southeastern Alaska, which was so dark that he referred it to *carolinensis*, although he suggested that it might be referable to "the coastal subspecies *Z. m. caurina*" discussed previously.

The single specimen seen from the Bahama Islands, taken July 16, 1903, on Long Island, appears to be typical *carolinensis* without any indication of intergradation toward *macroura*. This specimen, taken well within the breeding season, is the only specimen seen from those islands in this study and therefore it constitutes the only first hand information we have for considering the Bahama Islands within the breeding range of *carolinensis*. It has been so considered previously by Peters (1937:84) and by Hellmayr

and Conover (1942:478). Although Bond (1956:65) lists 11 islands in the Bahamas on which *carolinensis* has been recorded, he does not say whether or not it breeds on any of them.

A single specimen collected at Sherwood Plantation, Brady County, Georgia, July 21, 1953, by Herbert Stoddard, is typical *marginella* in every respect. It was indicated on the label as "breeding" and the outline of the testes drawn on the label indicated well developed gonads. However, another specimen from the same locality taken on July 22, and other breeding specimens taken in the general area, are all typical *carolinensis*. The specimen taken on July 21 exhibits one character which indicates that it was not a breeding adult; this is the fresh, unworn condition of the tips of the primaries. In view of this fact, it would seem probable that this bird was a Mourning Dove which was out of its normal breeding area.

The specimen identified as adult *carolinensis*, taken on July 19 at Big Hatchet Mountains, New Mexico, may have been a similar instance of a non-breeding wanderer, either from the east or from an unknown, dark population in the west. It may be seen from the map (fig. 3) that other specimens from that general area are typical *marginella*.

Bond (1956:65) gives the range of *Z. m. macroura* as Cuba, Isle of Pines, Hispaniola, Gonave Island, Tortuga Island, Jamaica, Puerto Rico, and Mona Island. From specimens examined in the present study, this distribution can now be extended to the Florida Keys.

Wetmore and Swales (1931:195) noted that birds from Tortuga Island, Haiti, were darker than those from other parts of that country. They also noted that two birds from eastern Cuba were darker than all other Cuban specimens. These differences in dark and light specimens in both Cuba and Haiti were noted in our study, but because of insufficient breeding material of the dark type we could not reach any conclusions. We segregated all specimens from the Dominican Republic, Haiti, Cuba, and the Florida Keys taken in April, May, June, and July, as probably largely representative of the breeding populations in those areas. With this restriction of material, only the three birds from the Florida Keys and one from Mariel, Cuba, the type specimen of *Z. m. bella* (Palmer and Riley, 1902:33), were of the dark type. It is possible that these birds may represent a race of the humid coastal areas which is distinct from the population of the drier interior. This problem should be studied further after collection of breeding birds from such areas. Until this is done, we have no alternative but to follow the example of Wetmore and Swales (1931:195) and consider the color difference in the West Indian birds as individual variations. Thus we must continue to consider *Z. m. bella* as a synonym of *Z. m. macroura*. Wetmore and Swales (1931:195-197) seem to have resolved the confusion concerning the application of the names *macroura* and *carolinensis* satisfactorily by their restriction of the type locality of *macroura* to Cuba. If further subdivision of Cuban populations into races is subsequently found necessary, it will, of course, require further restriction of the type locality of *macroura*.

There seems to be no question concerning the correct application of the name *carolinensis* (Linnaeus, 1766:286) based on Catesby (1731:24). Catesby says of "The Turtle of Carolina" (Mourning Dove) that "they breed in *Carolina* and abide there always." Thus, the type locality of *carolinensis* has been designated as South Carolina by the American Ornithologists' Union (1931:153). Catesby's plate depicts a dull grayish colored dove which would be unidentifiable as to race.

The type specimen on which the original description of *Z. m. marginella* (Woodhouse, 1852:104) was based is a most disreputable looking object. It was a rather young bird in juvenal plumage. It is now without head or tail and has only one wing. The plumage is so extremely soiled that there is no chance whatsoever of identifying it with

any of the known racial types exhibited by birds in juvenal plumage. The specimen was collected September 6, 1850, by S. W. Woodhouse "in the cross timbers on the north fork of the Canadian [River, Oklahoma]." Specimens from that area collected subsequently have been mostly of the pale western type, although the breeding birds of the area tend to be intermediate. There is no way of knowing where this particular specimen was hatched since juvenal Mourning Doves wander far from their birthplace. However, the name *marginella* has long been associated with the western race of the Mourning Dove and, since this has good basis in precedent, the designation should be maintained despite the inadequacy of the type for establishing this point.

Neither the type specimen nor any of the type series of *Z. m. peninsulari* (Bailey, 1923) from Miami Beach, Florida, have been available for this study, but from the small wing measurements given by Bailey, particularly of the two males, it is believed that they may represent *Z. m. macroura*. That race is known to breed not far distant on the Florida Keys and it has previously been reported in the fall hunting season from the Miami area (Aldrich, 1952:450). Whether or not the type series of *peninsulari* represents the breeding population of the Miami Beach area cannot be determined because the dates of collection (all in February) were well within the migration period.

The southern limits of the breeding distribution of *Z. m. marginella* in México are given by Friedmann, Griscom, and Moore (1950:116-117) as latitude 26°N in Baja California, probably not farther south on the Pacific coastal plain than southern Sonora and the islands offshore, southward on the Central Plateau to Puebla (El Venerable) and Oaxaca (Tamazulapan), and probably nowhere on the Atlantic coastal plain in México. No substantiation could be found for the suggestion by Pitelka (1948:120) that the breeding doves of Oaxaca and Guerrero represent a dark race similar to *carolinensis*. It is believed that most, if not all, of the "dark" specimens examined by Pitelka were migrants from the north and did, in fact, represent the race *carolinensis*. Some of these same specimens were examined in connection with the present study and our determinations were divided between *carolinensis* and *marginella*. None of them, however, was considered to be breeding. The measurements of these specimens, which Pitelka (1948:121) thought were so small as to exclude *marginella*, are actually only slightly smaller than the average for that race according to our measurements.

South of the Central Plateau of México references to the breeding of Mourning Doves are very few and there is little information on their geographic variation. Eisenmann (1955:36) lists the Mourning Dove (without subspecific designation) as "breeding locally Mexico, Brit. Honduras, Honduras, W. Panama." It has been recorded as breeding near Dueñas, Guatemala, by Salvin and Godman (1902:243) and it has been found throughout the year in Costa Rica by Carriker, who considered the individuals that he saw retarded migrants from the north (Wetmore, 1956:125). Hellmayr and Conover (1942:477) mention specimens which they refer to *macroura* from Toledo District, British Honduras, October 17, and Divalá, Chiriqui, Republic of Panamá, November 11, 1900, as well as the record of breeding in Veraguas, Panamá, in 1925, also mentioned by Griscom (1935:310). Wetmore (1956) has made a special effort to collect this species in Panamá and to study its distribution in the field. He has added considerably to our knowledge of its range, which is now known to extend almost throughout the arid tropical savannas of the Pacific slope of Panamá from near the Costa Rican border almost to the Canal Zone. He named this population *Zenaidura macroura turturilla*.

The six Panamanian specimens examined in the present study are pale and they most closely approach *marginella* in this respect. They are small winged like the West Indian birds but they are paler than the average of *macroura*; they are somewhat grayer

and less intensely buffy on the underparts and they have a shorter tarsus and longer bill. They suggest a small variant of *marginella* in color but they are relatively long-toed. Since this extreme southern population differs from *marginella* merely in measurements, it may be assumed that other Central American breeding populations, which may occur between Panamá and the central Mexican tableland, are either referable to the same race as the population of Panamá or they are intermediate between it and typical *marginella*. We have no definitely breeding specimens from this area although we do have two specimens referable to *turturilla*, one from the Department of Santa Rosa, Guatemala, March 27, and one, date unknown, from Chinandega, Nicaragua.

#### ECOLOGICAL DISTRIBUTION

The ecological distribution of *Z. m. marginella* is given by Grinnell and Miller (1944:184) for California as mainly in the Lower and Upper Sonoran life zones, and sparingly in the Transition. Friedmann, Griscom, and Moore (1950:116-117) indicate a similar distribution in México by their designation of range as non-tropical areas up to 9000 feet in the mountains. This seems to be characteristic of the distribution of this race throughout its range. The ecological distribution of *Z. m. carolinensis* is similar to that of the western race in the equivalent eastern life zones—Austro-riparian, Carolinian, and Eastern Transition.

From the standpoint of the correlation of racial differences with major ecological differences, it may be noted on the map (fig. 3) that the distinction between *carolinensis* and *marginella* follows roughly the distribution of the natural or climax vegetation areas of forest and grassland. In the ecotone area between grassland and forest, that is in the prairie woodlands and savannas, the breeding doves show a mixture of racial types or they are intermediate. This correlation is most noticeable in the southern and middle sections of the forest—prairie transition. Typical *marginella* extends eastward in the tongue of natural grassland known as the "Prairie Peninsula" as far as Illinois. It seems to break away from the normal ecological correlation in the extreme northern part of its range where it extends into the area of climax northern hardwood forest as far as central Wisconsin. One is led to speculate whether this latter situation was brought about by relatively recent occupation of the formerly heavily forested northern lands after these were opened up by lumbering, fires, and cultivation, thus making them suitable for invasion by breeding Mourning Doves. The most available source of an abundant breeding stock would have been the grasslands to the west and south occupied by *marginella*.

A further indication of the correlation of racial types with major ecological differences is that the southern limit of the breeding range of *marginella* is not known to descend into the Lower Tropical Zone either in the mountains of southern México or in the lowlands of either coast. Likewise, with the possible exception of a Bahama Island population, *carolinensis* is not known to breed in the tropical region. In fact, in the tropical region, represented by the Florida Keys and the Greater Antilles, *carolinensis* is replaced by *macroura*. Intergradation between *macroura* and *carolinensis* might be expected in southern Florida but no specimens are at hand to demonstrate this. The six specimens collected at West Palm Beach, Florida, August 8, 1956, are definitely *carolinensis* in color with only the small size of one of the two males to indicate possible intergradation toward *macroura*. Although the date of collection is outside our assigned limits for breeding specimens, the larger of the two males and one of the females had gonads in active breeding condition, and it is believed that all six birds represented the breeding population of that area. Thus, there is no definite sign of intergradation between *carolinensis* and *macroura* as far south as West Palm Beach, only 130 miles north of Plantation Key, where typical *macroura* breeds. This situation may result from a

possible invasion of the relatively recently exposed land of the Florida peninsula from the continent to the north by *carolinensis* and from the West Indies to the south by *macroura*.

The increase in wing length in proceeding northward from tropical to temperate regions is a good example of the ecogeographical principle known as "Bergmann's Rule" recently elucidated by Mayr (1956:105). In the United States this trend is continued within the race *marginella* as shown in figure 1 when northern and southern samples are compared.

In comparing tarsal and middle toe measurements of doves from the four quarters of the United States (fig. 1), there were no significant differences among the samples. However, the average wing length of doves collected in the northwest was significantly longer than that of birds collected in the southwest and the southeast. Also, the culmen length of birds collected in the northwest was greater than that of doves taken in the southeast.

#### MIGRATION

In the list of specimens examined (p. 122), it will be noted that there is a very extensive mingling of racial types in the course of migration and postbreeding wandering. Pale birds of the *marginella* type reach the Atlantic seaboard from New England to Florida and the West Indies while dark birds referable to *carolinensis* are noted far to the west. Probably these latter are responsible for the occurrence of dark specimens on the Pacific coast in Alaska and Oregon (type of *caurina*) and on the offshore islands of western México (type of *tresmariae*). Both races are reported in migration as far south as Panamá; *marginella* has been reported regularly and *carolinensis* once (Griscom, 1935:310).

An indication of the rather extensive postbreeding wandering of Mourning Doves away from their normal breeding range is the occurrence of these birds in Newfoundland, Labrador, Mackenzie, and Alaska. The records from Newfoundland are mostly for the fall although there is one as early as July (Peters and Burleigh, 1951:264), and there is one specimen in the United States National Museum taken in January. These specimens indicate that the birds which reach Newfoundland are mostly *carolinensis*, but one specimen, taken "Jan. — 1947," is intermediate between *carolinensis* and *marginella*. The nearest known breeding grounds of the former would be in northern New England and, of the latter, the eastern Great Lakes region. Six records for Labrador were reported by Austin (1932:144) for the months of June, August, September (2), and October (2). The record on June 5, reported by Austin, and the adult male specimen collected at Hay River, Great Slave Lake, Mackenzie, June 16, and examined in the present study, although well within the breeding (or "non-migration") season, are assumed to be wandering, non-breeding individuals because of their great removal, both geographically and ecologically, from the normal breeding range of the species. Slipp (1941:60) and others mention a number of records from Alaska, ranging from July to November, but occurring mostly in September and October. The nearest known breeding area whence these birds might have wandered is in southwestern British Columbia.

The evidence, therefore, seems to indicate that the Mourning Dove is a highly mobile species that may move in any direction from its normal breeding area, when it is not actually engaged in nesting activities. Despite this fact, banding data indicate a high degree of fidelity of adults to the home area during the breeding season (Austin, 1951:160; Quay, 1954:18). Further, the evidence from specimens seems to indicate that the bulk of the birds probably migrate in a generally north to south direction from the breeding areas to the wintering grounds; some individuals of northern origin migrate

as far south as Central America and the Greater Antilles. In reaching these far southern points there is an indication, from the concentrations of migrants in the southern tip of Texas (Texas Game, Fish and Oyster Commission, 1945:80) and on the Gulf coast of western Florida (Winston, 1954:35), that many of these doves are deflected by the Gulf of México and move around it in one direction or another, although there is some evidence that some birds fly directly across the Gulf (Bullis and Lincoln, 1952:36). In the more southern portions of the breeding grounds, including southern United States, a large part of the breeding population appears to be sedentary, individual doves moving very little from the place where they were hatched. The high percentage (75 per cent) of recoveries of banded doves within the same state in which they were banded, particularly in the south (Peters, 1956), is suggestive of this.

It can be readily understood from the above that the Mourning Dove, with its great differences in migratory habits in the various parts of its range, offers a particularly difficult subject for game management. To adequately protect all segments of the breeding population, it is essential to know where these segments are in the various seasons when hunting takes place. There is abundant evidence from game management reports that large concentrations occur during the fall migration in southeastern California and southern Arizona. Field work in connection with the present study has disclosed large migrant concentrations also in southern Texas and southern Georgia.

#### SUMMARY

The Mourning Dove is a widespread species breeding in the non-boreal regions of North and Middle America and from the West Indies south to Panamá. It is hunted extensively in many sections of the United States and in some sections of Canada, the West Indies, and México.

The trends in geographic variation of Mourning Doves are from dark coloration in the east to pale coloration in the west and from shorter wing length in tropical areas to longer in the temperate region. More rusty underparts are associated with birds of the West Indies, and extremely saturated coloration and relatively large bills and feet have been developed by the population on Clarión Island off the western coast of México. The combinations of geographic variation result in the recognition of five geographic races, two of which breed on the mainland of North America. The race *carolinensis* of eastern United States can be distinguished from the western race, *marginella*, by the color of the wings alone, which makes possible the recognition of these racial components from the wings of doves taken from hunters' bags.

Taking Ridgway's account in "Birds of North and Middle America" as a basis, discrepancies in the descriptions of sex and racial characters are pointed out. Two races recognized by Ridgway and one suggested as possibly distinct were not substantiated. The occurrence of dark and pale types among the West Indian populations are considered of possible racial significance, but sufficient breeding material is lacking to study the problem satisfactorily.

The allocation of type specimens and names to the various recognizable races which appears in the most recent literature is considered satisfactory.

The ecological boundaries between tropical and temperate life zones and between the western grasslands and eastern deciduous forest zones, generally speaking, separate distinct races from each other.

There is an extensive postbreeding wandering of birds in all directions, particularly northward, and there is an extensive mingling of racial types during migration.

Concentrations of fall migrants occur in certain areas in the southwestern states and both east and west of the Gulf of México.

## LIST OF MOURNING DOVE SPECIMENS EXAMINED

In the following list, a. refers to adult, no juvenal plumage remaining; im. refers to immature, only a few juvenal primaries remaining, body plumage molt complete; jv. refers to juvenile, some juvenal body plumage remaining; brackets indicate that sex was determined by plumage coloration.

*Zenaidura macroura marginella*

MACKENZIE: Hay River, Great Slave Lake, June 16, 1908, ♂ a. ALASKA: Fort Yukon, Oct. 9, 1916, ♂ im. ARIZONA: Bisbee (7 mi. S), Sept. 14, 1892, ♀ jv.; Fort Huachuca (7 mi. SE), May 15, 1932, ♀ a.; Fort Lowell, Nov. 7, 1893 [♂] im.; Fort Whipple, July 2, 1864, ♂ a.; Graham Mountains, Ash Creek, June 15, 1914, ♂ a.; Huachuca Mountains, July 12, 1929, ♀ a.; Phoenix, Apr. 21, 1922, ♂ a.; Quitovaquito, Feb. 4, 1894, ♂ a.; Safford, July 25, 1914, ♂ jv.; San Bernardino Ranch, Mexican boundary line, Aug. 23, 1893, ♂ a.; Santa Cruz River, W of Patagonia Mountains, May 30, 1893, ♀ a., June 23, 1893, ♂ a., July 9, 1893, ♀ a.; San Pedro River, Mexican boundary line, July 30, 1893, ♂ jv.; Warsaw, Dec. 1, 1893, ♂ a.; Yuma County, 3 mi. east of Dome, May 26, 1918, ♂ a.; Yuma County, Wellton, May 31, 1918, ♂ a. ARKANSAS: Delight, May 15, 1914, ♂ a.; Stuttgart, May 1, 1953, ♂ a., May 6, 1953, ♂ a. CALIFORNIA: Baird, May 29, 1883, ♂ a., May 29, 1883, ♀ a. (not typical, dark); Del Monte, June 20, 1909, ♂ a.; Goffs, Apr. 11, 1905, ♂ a.; Laguna, San Diego County, June 15, 1894, ♀ a. (not typical, dark); Mountain Spring, San Diego County, May 15, 1894, ♀ a., May 15, 1894, ♂ a.; San Clemente Island, Aug. 26, 1894, ♂ a.; Saugus, Los Angeles County, May 16, 1931 [♂] a.; San Mateo County, June 5, 1899 [♂] a.; south of Yolla Bolly Mountain, July 28, 1905, ♂ jv. COLORADO: Empire, Clear Creek County, July 7, 1877, ♀ a.; Maybell, June 23, 1952, ♀ a. CONNECTICUT: New Haven, Aug. 4, 1900, ♂ a. FLORIDA: Norias Plantation, Jefferson County, Dec. 24, 1953, ♀ a.; North Jefferson County, Dec. 24, 1953, ♀ and ♂ a.; West Palm Beach, May 27, 1953, 3 ♂ jv. GEORGIA: Cairo, Grady County, Jan. 1, 1954, ♂ a.; southeast Thomas County, Mar. 25, 1954, ♂ a.; Sherwood Plantation, Grady County, July 21, 1953, ♂ a. ИАНО: Blackfoot, Bingham County, July 8, 1898, ♂ a., May 2, 1931, ♂ a.; Glenn Ferry, July 4, 1910, ♂ a.; Gray, May 29, 1952, ♂ a.; Hauser, Kootenai County, July 21, 1952, ♂ im.; Lewiston, July 12, 1952, ♀ a., Aug. 19, 1954, ♀ a., July 24, 1954, ♀ a., Aug. 21, 1954, ♀ a., Nov. 11, 1918, ♀ im., Dec. 13, 1948, ♀ a., Nov. 16, 1951, ♂ a., Oct. 14, 1951, ♀ a., Jan. 19, 1954, ♂ a., Dec. 28, 1951, ♂ im.; Montpelier, May 20, 1930, ♀ a., June 8, 1930, ♀ a., May 20, 1950, ♀ a., June 21, 1930, ♂ a.; Moscow, May 12, 1950, ♂ a., May 27, 1948, ♂ a., July 19, 1952, ♂ a., Aug. 26, 1954, ♂ jv., Dec. 28, 1950, ♀ im., Aug. 16, 1952, ♂ a.; New Meadows, Adams County, July 22, 1929, ♂ a. (not typical, dark), July 22, 1929, ♀ a.; 3 mi. southeast of Riddle, Owyhee County, July 2, 1932, ♂ a.; Potlatch, Sept. 5, 1954, ♀ jv., Oct. 18, 1953, ♂ jv.; Soda Springs, Caribou County, May 1, 1930, ♀ and ♂ a.; 1 mi. N of Spencer, Clark County, June 12, 1931, ♂ a.; Swan Lake, July 7, 1911, ♂ a. ILLINOIS: Beecher, Will County, Apr. 12, 1955, ♀ a., June 1, 1952, ♂ a., Sept. 12, 1955, ♂ a.; Genessee, Henry County, June 14, 1953, ♂ a.; Glenwood, Cook County, Aug. 2, 1953, ♂ a.; Grayville, White County, June 16, 1953, ♂ a.; Haliday, May 1, 1877, ♀ a.; Hissony, Fayette County, June 16, 1953, ♂ a.; Knoxville, June 15, 1953, 2 ♂ a.; Laçon, July 26, 1913, ♂ a.; Manteno, Will County, Sept. 12, 1954, ♀ a.; Noble, June 3, 1878, ♀ a.; Pana, June 15, 1953, ♂ a.; Ramsey, June 16, 1953, ♂ a.; 4 mi. south of Roseville, June 15, 1953, [♂] a.; West Liberty, Jasper County, June 16, 1953, ♂ a.; Wheaton, May 8, 1921, ♂ a.; White Oak, Montgomery County, June 15, 1953, [♂] a. INDIANA: Wheatland, May, 1885, [♀] a. IOWA: Charlotte, Clinton County, June 14, 1953, ♂ a.; Dallas Center, Dallas County, June 12, 1952, ♂ a.; Pleasantville, Marion County, June 13, 1953, ♂ a.; Prairie City, Jasper County, June 13, 1953, ♂ a.; Sioux City, June 12, 1953, ♂ a. KANSAS: Barber County, May 16, 1911, ♀ a., 10 mi. northwest of Cherryvale, June 9, 1953, 5 ♂ a.; Douglas County, Aug. 4, 1909, ♂ and ♀ a., Aug. 3, 1909, ♂ a.; Fort Hays, June 2, 1871, ♂ a.; Hamilton County, June 30, 1936, ♂ a.; Humboldt, Allen County, June 9, 1953, ♂ a.; 5 mi. west of Iola, Allen County, June 9, 1953, ♀ jv.; Labette County, July 19, 1915, ♂ a., July 21, 1915, ♂ a.; Lawrence, July 30, 1909, ♂ a., July 25, 1921, ♂ a., Sept. 28, 1907, ♂ a., Sept. 11, 1908, ♀ a., Nov. 2, 1907, ♀ a., Aug. 24, 1907, 2 ♂ a., Aug. 24, 1907, ♀ a.; Strong (near), July 15, 1891, ♂ a., July 21, 1891, ♂ a.; Nortonville, June 10, 1953, ♀ and ♂ a.; Okalusa, June 10, 1953, ♂ a.; Topeka, May 19, 1871, 3 ♂, 1 ♀ a., June 10, 1953, ♂ a.; Wallace, Wallace County, July 6, 1911, ♀ a. KENTUCKY: Rock Haven, Apr. 26, 1938, ♂ a. LOUISIANA: Arkana, June 3, 1953, ♂ a.; Morgan City, Nov. 1, 1925, ♀ im.; University, East Baton Rouge Parish, June 6, 1953, ♂ jv., Aug. 5, 1953, ♂ a. MAINE: Mount Desert Island, Teal Harbor, Aug. 12, 1902, ♂ a. MARYLAND: Chevy Chase, May 15, 1930, ♂ a.; Patuxent Research Refuge,

Laurel, Apr. 17, 1894, ♂ a., Oct. 27, 1953, ♀ im.; Whaleyville, Mar. 10, 1951, ♂ a. MICHIGAN: Ann Arbor, May 13, 1941, ♂ a.; Delhi, Washtenaw County, May 2, 1935, ♀ a.; Kalamazoo, May 9, 1886, ♂ a. MINNESOTA: Anoka County, July 22, 1940, ♂ a.; Brainerd, July 9, 1954, ♂ a.; Camden, May 14, 1946, ♂ a.; Deerwood, July 12, 1897, ♂ a.; Elk River, July 6, 1954, ♀ a.; Fort Snelling, May 23, 1903, ♀ a.; Hayfield, July 5, 1954, ♂ a.; Hennepin County, June 26, 1948, ♂ a.; Luverne, June 6, 1916, ♂ a.; Madison, May 13, 1895, ♂ a.; Minneapolis, May 16, 1892, ♀ a., Aug. 30, 1890 [♂] and ♀ a.; New Ulen, May 15, 1954, ♀ a.; Princeton, July 7, 1954, ♂ a.; Rochester, June 16, 1954, ♂ a., June 19, 1954, ♂ a.; St. Paul, June 17, 1954, ♀ a.; Warren, Marshall County, June 14, 1928, ♂ a. MISSOURI: Charleston, May 12, 1879, ♂ a.; Gregory, Clark County, June 15, 1953, ♂ a.; Kenmore, June 10, 1953, 2 ♂ a.; Phelps City, June 11, 1953, ♂ a.; Skidmore, June 10, 1953, ♂ a. MONTANA: Billings, June 10, 1954, ♂ a.; Crow Agency, Aug. 8, 1916, ♂ a.; Gallatin Station, Sept. 8, 1888, ♂ jv.; Glendive, July 15, 1954, ♀ a., May 5, 1916, ♂ a. (not typical, dark); Greycliff, July 16, 1954, ♂ a.; Hilger (5 mi. NW), Aug. 4, 1919, ♀ a. (not typical, dark); Livingston, June 9, 1954, ♂ a.; Miles City, June 25, 1918, ♂ a., July 15, 1954, ♂ a.; Moorhead, June 21, 1916, ♀ a. NEBRASKA: Auburn, June 11, 1953, ♂ a.; Crete, Saline County, July 15, 1880, ♂ a.; Dunbar, June 11, 1953, ♂ a.; Johnson, June 11, 1953, ♀ and ♂ a.; Louisville, June 11, 1953, ♂ a.; Peru, June 11, 1953, ♂ and [♂] a.; South Sioux City, June 12, 1953, ♂ a.; Springfield, June 11, 1953, ♂ a.; Valentine, July 27, 1933, ♀ a.; Brownsville (west of), June 11, 1953, ♂ a. NEVADA: Carson City, Apr. 23, 1868, ♂ a.; Head of Reese River, May 23, 1898, ♂ a. NEW JERSEY: Cape May, Apr. 1842, ♀ a. NEW MEXICO: Animas Mountains, Aug. 6, 1908, ♂ a.; Corner Monument, 100 mi. west of El Paso, Apr. 24, 1892, ♂ a., May 5, 1892, ♂ a.; Dog Spring, Grant County, May 21, 1892, ♂ and ♀ a.; La Mesilla, July 11, 1913, ♂ a.; Las Cruces, July 22, 1913, ♂ a.; Rinconada, May 1, 1904, ♂ a.; Santa Fe, June 20, 1874, ♂ jv. NORTH DAKOTA: Bismarck, July 13, 1954, ♀ and ♂ a.; Drayton, June 18, 1915, ♂ a.; Fargo, June 12, 1954, ♀ a., July 12, 1954, 2 ♂ a.; Grafton, May 9, 1912, ♂ a.; Grassy Butte, July 14, 1954, 2 ♀ a.; Lac Aux Morts, May 29, 1901, ♀ a.; Turtle Lake, McLean County, July 9, 1925, [♂] a.; Wahpeton, June 9, 1915, ♂ a.; Williston, July 14, 1954, 2 ♂ a. OKLAHOMA: (Type specimen of *marginella*) In the cross timbers on north fork of Canadian River, Sept. 6, 1850, — jv.; Madill, Marshall County, July 26, 1954, 3 ♂ a.; Minco, May 31, 1905, ♂ a.; Morris, June 7, 1953, ♂ a.; Muskogee, June 8, 1953, 2 ♂ a., June 8, 1953, 2 ♂ and 1 ♀ jv.; Pryor, June 8, 1953, ♂ a.; Sayre, June 10, 1952, ♂ a.; Willis, Marshall County, June 23, 1954, ♀ a. OREGON: Adel, June 19, 1930, ♂ a., June 3, 1930, ♀ a., May 9, 1930, ♂ a.; Hart Mountains, Lake County, June 22, 1928, 2 ♀ a.; Nyssa, Malheur County, May 28, 1933, ♀ a., May 23, 1933, ♂ a.; Ordance, July 31, 1954, ♀ a., Nov. 20, 1954, ♂ im.; Portland, May 18, 1933, ♂ a., Aug. 9, 1924, ♀ im.; Wallawa, Wallawa County, June 15, 1930, ♂ a.; Wallawa Lake, Aug. 25, 1897, ♂ a.; Wood Ranch, 5 mi. southwest of Ontario, May 16, 1916, ♂ a. SOUTH CAROLINA: Christchurch Parish, May 11, 1911, ♂ a. SOUTH DAKOTA: Custer, June 12, 1954, ♂ and ♀ a.; Pierre, June 14, 1954, ♂ a. TENNESSEE: Hickory, Apr. 20, 1937, ♀ and ♂ a.; Hornbeak, May 4, 1937, ♀ a.; Waynesboro, May 13, 1937, ♂ a. TEXAS: Brownsville, Apr. 13, 1922, ♀ a., June 2, 1924, ♂ jv.; Cameron County, July 2, 1924, ♀ jv.; Carterville, Cass County, June 4, 1954, ♂ a.; Chinati Mountains, Presidio County, Aug. 5, 1887, ♀ im.; Falfurias, Nov. 24, 1951, ♀ a.; Fort Stockton, —, [♀] a.; Leesburg, June 4, 1953, ♂ a.; Linden, June 4, 1953, ♂ a.; Menard County, June 6, 1952, 2 ♂ a.; Killeen (11 mi. NW), Coryell County, July 23, 1950, ♀ a.; Parker County, June 5, 1953, 2 ♂ a.; San Elezario, Dec. 14, 1854, ♂ a.; Tarrant County, June 6, 1953, 3 ♂ a., ♂ jv. UTAH: Farmington, May 17, 1911, ♂ a.; Provo, July 25, 1872, ♀ a., July 30, 1872, ♂ a. VIRGINIA: Smith's Island, Sept. 7, 1895, ♂ im. WASHINGTON: Clarkston, July 24, 1952, ♀ a.; Fort Steilacoom, —, [♂] a.; Grande Ronde River, June 14, 1919, ♀ a.; Orting, Pierce County, May 28, 1954, 2 ♂, ♀ a.; Palouse, Aug. 2, 1950, ♂ jv.; Pullman, Sept. 28, 1954, ♂ jv.; Renton, May 22, 1954, 2 ♂ a.; Snake and Palouse rivers, May 22, 1860, ♂ a.; Yelm, Thurston County, May 27, 1954, ♀ and ♂ a. WISCONSIN: Babcock, June 25, 1954, ♂ a.; Baldwin, June 29, 1954, ♂ a.; Black River Falls, June 24, 1954, ♂ a.; Camp Douglas, July 9, 1890, ♀ a.; Durand, July 3, 1954, ♂ a.; Ellsworth, June 30, 1954, ♀ and ♂ a.; Milton, Apr. 19, 1896, ♂ a.; New Lisbon, June 23, 1954, ♂ jv.; Spooner, July 2, 1954, ♀ a.; Turtle Lake, June 29, 1954, ♂ a.; Wayerhauser, July 1, 1954, ♂ a. WYOMING: Fort Bridger, July 4, 1858, ♂ a.; Greybull, June 14, 1910, ♀ a.; Wilson (10 mi. S), Teton County, July 30, 1947, ♀ a. BAJA CALIFORNIA: La Paz, Feb. 17, 1882, ♀ a.; San Nicholas, N of Cape San Lucas, Oct. 1859, ♀ im. CHIAPAS: Cluapo, Ginetta Mountains, Jan. 25, 1869, ♂ a. CHIHUAHUA: Colonia García, Feb. 25, 1904, ♀ a. COLIMA: Plains of Colima, Jan. 1863, ♂ a. GUERRERO: Amojileca, 20 km. W Chilpancingo (5800 ft.), Oct. 23, 1944, ♂ jv.; Chilpancingo, Feb. 17,



1944, ♂ a. MICHOACÁN: Quiroga, north side of Lake Pátzcuaro (6800 ft.), Feb. 21, 1945, 2 ♂ a. MORELOS: Lake Rodeo, 5 km. east of Tetecala (4000 ft.), Jan. 27, 1945, ♂ a., Jan. 28, 1945, ♀ a. OAXACA: Tlacolula, 30 km. SE Oaxaca (5000 ft.), Sept. 7, 1947, ♀ im., ♀ and ♂ a.; Tamazulapan, 6 km. E (6600 ft.), Sept. 5, 1945, ♂ a. SAN LUIS POTOSÍ: Salinas, Aug. 2, 1947, ♀ a.; Labor del Río, Aug. 10, 1947, ♀ a.; Villa de Reyes, Laguna de las Rusias, Aug. 6, 1947, [♀] a.; Bledos, May 12, 1951, ♂ a. SONORA: Nogales, Oct. 25, 1893, [♂] a.; Hermosillo, May 6, 1892, ♂ a. VERACRUZ: Orizaba, —, [♀] a.; Tres Zapotes, Mar. 11, 1939, ♂ a. GUATEMALA: Chimaltenango, Nov. 7, 1936, ♀ a.; Panajachel, May 2, 1946, ♀ a. NICARAGUA: Chinandega, —, [♀] a.; Sucuya, —, ♀ a. EL SALVADOR: —, [♂] a. COSTA RICA: San Jose, —, [♂] a.

*Zenaidura macroura carolinensis*

NEWFOUNDLAND: 1929, ♀ im.; Badger, Dec. 5, 1944 [♂] a.; Port aux Basques, Oct. 5, 1946, [♂] im.; Red Island, Dec. 2, 1946, [♀] im.; Rose Blanche, Oct. 22, 1946, ♂ im.; St. John's, Dec. 1945, [♀], im. ALABAMA: Auburn, June 25, 1936, ♀ a., July 1, 1936, ♀ a., June 26, 1936, ♀ a., Aug. 12, 1936, ♂ im. ARKANSAS: Stuttgart, May 24, 1953, ♂ a., June 16, 1953, ♂ a. DISTRICT OF COLUMBIA: Washington, Sept. 2, 1878, ♂ jv., June 9, 1875, ♂ a., April 12, 1888, ♂ a., April 21, 1874, ♂ a., April 5, 1910, ♂ a. FLORIDA: Big Lake George, Mar. 22, 1886, ♂ a.; Cape Sable, Mar. 27, 1926, ♂ a.; Gainesville, Jan. 1, 1930, [♂] a.; Glass, June 1, 1953, ♂ a.; Hialeah, Dade County, Oct. 28, 1948, ♀ im.; Homestead, May 30, 1953, ♀ jv.; Lake Harvey, Feb. 18, 1896, ♀ a.; Matanzas Inlet, May 22, 1894, ♂ a.; Miami, Nov. 24, 1904, ♀ im.; Overstreet, Feb. 9, 1920, ♂ a.; Sebring, Mar. 20, 1923, ♂ a.; West Palm Beach, May 27, 1953, 2 ♀ im., Aug. 8, 1956, 2 ♂, 4 ♀ a. GEORGIA: Milton County, Feb. 28, 1913, ♂ and ♀ a., Sept. 15, 1913, ♀ jv.; Roswell, Nov. 10, 1912, ♂ a., Nov. 5, 1915, ♀ im.; Sherwood Plantation, Grady County, July 22, 1953, ♂ a. IDAHO: Lewiston, Jan. 24, 1952, ♂ a. ILLINOIS: Fox Lake, May 26, 1905, ♂ a.; Genesee, July 16, 1897, ♀ a.; Glenwood, Jan. 1, 1955, ♀ a.; Oconee, June 16, 1953, ♂ jv. INDIANA: Richmond, July 25, 1896, ♂ a. IOWA: Charter Oak, June 12, 1953, ♂ a.; Des Moines, June 13, 1953, ♂ a.; Pleasantville, June 13, 1953, ♂ a.; Prairie City, June 13, 1953, ♂ a.; Yale, June 12, 1953, ♀ a. KANSAS: Garnett, June 9, 1953, ♀ a.; Strong, July 18, 1891, ♂ a. KENTUCKY: Canton, Oct. 29, 1938, ♂ a.; Hickman, May 31, 1938, ♀ a.; Madisonville, Oct. 20, 1938, ♀ im.; Montecello, June 15, 1938, ♂ a.; Rocky Branch, June 7, 1938, ♂ a. LOUISIANA: Alexandria, Mar. 19, 1953, ♂ a.; Bienville, July 18, 1933, [♂] a., ? jv.; Colfax, June 2, 1953, ♀ a.; Coushatta (3 mi. S), June 3, 1953, ♂ a.; Coushatta (8 mi. S), June 3, 1953, ♂ jv.; New Orleans, July 30, 1938, ♂ jv.; University, East Baton Rouge Parish, June 6, 1953, 2 ♀, ♂ a., June 11, 1953, ♂ im., Aug. 5, 1953, ♂ a. MARYLAND: Baltimore, Mar. 14, 1885, ♀ a.; Cornfield Harbor, July 17, 1894, ♂ a.; Halfway, Aug. 17, 1924, ♂ jv.; Laurel, Mar. 3, 1889, ♀ a., July 30, 1877, ♂ jv., May 3, 1889, ♂ a.; Laurel, Patuxent Research Refuge, Oct. 22, 1953, ♂ and ♀ a., Oct. 23, 1953, ♀ a., Oct. 27, 1953, 2 ♀ im., 3 ♂ im., ♂ a., Oct. 29, 1953, ♂ a.; Skaggsville, Howard County, Dec. 7, 1923, ♂ a.; Takoma Park, July 22, 1931, ♂ jv.; Washington County, June 19, 1953, ♀ jv. MASSACHUSETTS: Chathamport, Aug. 28, 1886, ♀ a.; Sherborn, May 26, 1885, ♀ a.; Taunton, May 26, 1908, ? jv.; Wareham, Aug. 10, 1882, ♀ a. MICHIGAN: Ann Arbor, May 29, 1954, ♂ a., Aug. 19, 1933, 2 ♀, ♂ a.; Pittsfield, Washtenaw County, May 27, 1928, ♂ a.; Portage Lake, Livingston County, May 8, 1935, ♂ a.; Clinton (9 mi. W), Washtenaw County, Aug. 13, 1935, ♀ and ♂ a., Aug. 23, 1935, ♂ a.; Waterloo, Sept. 12, 1922, ♂ jv., Nov. 7, 1920, ♀ a. MISSISSIPPI: Carriere, Aug. 12, 1919, ♂ a.; Rosedale, June 16, 1941, ♀ a.; June 14, 1952, ♂ a., June 1, 1952, ♂ a., Aug. 31, 1951, ♂ a. MISSOURI: Gregory, June 15, 1953, ♀ a.; St. Louis, May 8, 1857, ♀ a. NEW JERSEY: Camp Gaw, Franklin Lakes Borough, Nov. 10, 1930, ♂ im.; Lakehurst, June 1, 1924, ♂ a. NEW MEXICO: Big Hatchet Mountains, July 19, 1908, ♀ a.; Juarilla Mountains, Sept. 13, 1903, ♂ jv. NEW YORK: Cayuga Lake, May 4, 1913, ♂ a.; Long Beach, Aug. 12, 1919, ♂ a. NORTH CAROLINA: Asheville, Dec. 18, 1930, ♀ a., Jan. 30, 1934, ♂ a.; Engelhard, Oct. 17, 1939, ♀ im., Oct. 16, 1939, ♀ a.; Fort Macon, Apr. 24, 1869, ♂ a., July 6, 1915, ♂ a.; Rockingham, June 1, 1939, 2 ♂ a.; Smith Island, May 22, 1939, ♀ a. OHIO: Circleville, Nov. 26, 1880, ♀ a.; Cleveland, May, 1892, ♂ a.; East Claridon, May 19, 1937, ♀ a.; Ottawa County, Bay Point, June 8, 1937, ♀ a., June 24, 1935, ♀ a.; Pickerington, June 18, 1953, 2 ♂ a.; Rockport (Rocky River), —, [♀] a.; Sandusky, May 10, 1946, ♂ a.; Shaker Heights, May 1, 1942, ♀ a.; Solon, June 29, 1944, ♂ a.; South Euclid, June 30, 1937, ♀ jv. OREGON: (Type specimen of *caurina*) [♂] im. PENNSYLVANIA: Carlisle, Sept. 20, 1943, ♂ a.; Chester County, Dec. 29, 1884, ♂ a.; Erie, Apr. 29, 1894, ♂ a. SOUTH CAROLINA: Chester, Sept. 26, 1940, ♂ jv.; Christchurch Parish, Apr. 29, 1911, ♂ and ♀ a., May 11, 1911, ♀ a.; Kershaw County, Dec. 27, 1904, ♂ a.; Lynch-

burg, Nov. 8, 1940, ♂ a., Nov. 8, 1940, 2 ♂ im.; McCormick, June 7, 1940, ♂ a., June 13, 1940, ♂ a. (not typical, pale). TENNESSEE: Nashville, May 19, 1945, ♂ a.; Pikeville, May 21, 1937, ♂ jv.; Tiptonville, Oct. 20, 1937, ♂ jv.; Waynesboro, May 12, 1937, ♀ a. TEXAS: Brownwood, Aug. 25, 1888, ♀ jv.; Citrus City, Hidalgo County, Oct. 12, 1952, 2 ♂ a.; Leesburg, June 4, 1953, ♀ a.; Pittsburg, June 4, 1953, ♂ a.; Tarrant County, June 6, 1953, ♀ jv. VERMONT: (northern), Sept. 4-5, 1905, ♂ jv. VIRGINIA: Cape Charles, Dec. 28, 1914, ♀ a.; Falls Church, Sept. 25, 1923, ♀ jv., Nov. 10, 1904, ♂ im.; Four Mile Run, Arlington County, July 22, 1894, ♀ im.; Mount Vernon, Oct. 21, 1892, ♂ a. WISCONSIN: Beaver Dam, Dodge County, May 12, 1899, ♀ a.; Lake Koshkonong, July 29, 1897, ♂ and ♀ a.; Madison, Aug. 22, 1949, ♂ a.; Platteville, June 27, 1889, ♂ a. GUERRERO: Ciruela (10 km. S Atoyac, 500 ft.), Dec. 11, 1944, ♀ a.; Polintla (6 mi. S Arcelia, 1600 ft.), Nov. 29, 1944, ♀ im. VERACRUZ: Mirador, Oct. —, ♀ a.; Orizaba, —, [ ♀ ] a.; Tres Zapotes, May 2, 1940, ♂ a. NAYARIT: (Type specimen of *tresmariae*) Tepic, Tres Marias Islands, May 5, 1892, ♂ a. GUATEMALA: 1877, [ ♀ ] a. NICARAGUA: Realejo, Feb. 7, 1864, ♀ a. BAHAMA ISLANDS: Long Island, July 16, 1903, ♂ a. HAITI: l'Atalage, Jan. 9, 1929, ♀ a.; Port au Prince, —, ♀ a.

*Zenaidura macroura carolinensis* x *marginella*

NEWFOUNDLAND: Jan., 1947, ♂ a. ALABAMA: Auburn, July 13, 1936, ♂ jv., June 10, 1936, ♂ jv. ARIZONA: Warsaw Mills, Dec. 1, 1893, ♂ im. ARKANSAS: Delight, May 16, 1914, ♀ a.; Fayetteville, June 4, 1951, ♂ a.; near Bradley, U. S. Route 10, 5 mi. north of Louisiana line, June 3, 1953, ♂ and ♀ a.; Stuttgart, Sept. 28, 1951, ♀ im. CONNECTICUT: Woodbridge, New Haven County, May 12, 1900, ♀ a. DISTRICT OF COLUMBIA: Washington, Mar. 5, 1891, ♂ a. FLORIDA: Gainesville, Nov. 27, 1929, ♂ a.; West Palm Beach, May 27, 1953, ♀ a., ♂ jv. GEORGIA: Athens, Feb. 13, 1929, ♂ a.; Roswell, May 11, 1904, ♂ a. ILLINOIS: Beecher, Will County, June 15, 1952, ♂ a.; Crete, Will County, June 14, 1953, ♂ jv.; Fox Lake, Lake County, May 26, 1905, ♂ a. INDIANA: Wheatland, Jan. 19, 1888, ♀ a. IOWA: Castana, June 12, 1953, ♂ a. KANSAS: Cherokee County, June 23, 1915, ♀ a.; Douglas County, July 30, 1909, ♀ a.; Washington Creek, Douglas County, Aug. 2, 1909, ♀ a.; Garnett, June 9, 1953, ♀ a.; Lawrence, Sept. 11, 1908, ♀ a., Aug. 24, 1907, ♀ a.; Cherryvale (10 mi. NW), June 9, 1953, ♂ a.; Ozawkie, June 10, 1953, 3 ♂ a.; Strong, July 15, 1891, ♀ a.; Thompsonville, June 10, 1953, ♂ a.; Topeka, May 19, 1871, ♀ a.; Topeka (5 mi. NE), June 10, 1953, ♂ a. KENTUCKY: Madisonville, Oct. 21, 1938, ♂ a.; Waverly, May 16, 1938, ♂ a. LOUISIANA: Colfax (3 mi. N), June 2, 1953, ♂ a.; University, East Baton Rouge Parish, June 7, 1953, ♂ a., June 6, 1953, ♂ a., Aug. 5, 1953, ♂ a. MARYLAND: Swanton, July 19, 1899, ♀ jv.; Takoma Park, Feb. 5, 1946, ♀ a. MICHIGAN: Ann Arbor, May 4, 1904, ♂ a., July 31, 1937, ♂ a., June 14, 1942, ♂ a.; Powers, Jan. 5, 1923, [ ♂ ] a.; Rush Lake, Huron County, Aug. 4, 1908, ♀ a.; Sand Point, Huron County, July 14, 1908, ♀ a.; Wayne County, Apr. 20, 1909, ♀ a. MINNESOTA: Fort Snelling, May 15, 1903, ♀ a.; Kasson, June 19, 1954, ♀ a.; Mazeppa, June 20, 1954, ♀ a.; Minneapolis, July 26, 1932, ♂ a. MISSISSIPPI: Bay Saint Louis, Oct. 7, 1898, ♂ im. MISSOURI: Dothan, June 10, 1953, 2 ♂ a.; Maitland, June 10, 1953, ♂ a.; Quitman, June 10, 1953, ♂ a.; Skidmore, June 10, 1953, ♀ a. MONTANA: Glendive, July 15, 1954, ♀ a. NEBRASKA: Lorton, June 11, 1953, ♂ a.; Nickerson, June 11, 1953, [ ♀ ], ♀ a.; Orum, June 11, 1953, ♀ and ♂ a.; South Sioux City, June 12, 1953, 3 ♂ a. NEW YORK: Lawrence, Aug. 1, 1919, 2 ♂ im.; Montauk Point, Aug. 12, 1911, ♀ im. NORTH CAROLINA: Asheville, Jan. 20, 1934, ♂ a.; Southport, May 11, 1939, ♀ a. NORTH DAKOTA: Turtle Lake, July 9, 1925, ♂ a.; Valley City, May 22, 1912, ♂ a. OHIO: Bay Point, Ottawa County, June 8, 1937, ♀ a.; Guilford Lake, Columbiana County, June 13, 1939, ♂ a.; Mentor, May 27, 1937, ♀ jv.; Pickerington, June 18, 1953, ♂ a.; Union Township, Clermont County, July 25, 1940, ♂ a. OKLAHOMA: Fobb, Marshall County, July 23, 1954, ♂ im.; Lenapah, June 8, 1953, 2 ♂ a.; Muskogee, June 8, 1953, 4 ♂, ♀ a.; Pryor, June 8, 1953, ♀ a.; Yukon, June 7, 1953, 2 ♀ a. SOUTH CAROLINA: Beaufort County, May 1, 1941, ♂ a. TENNESSEE: Norris, June 11, 1938, ♂ a.; Rockwood, Apr. 8, 1884, ♂ a. TEXAS: Falfurias, Nov. 24, 1951, ♂ im.; Johnson County, June 5, 1953, ♀ and ♂ a.; Leesburg, June 4, 1953, ♂ a.; Parker County, June 5, 1953, 2 ♂ a.; Premont, Nov. 22, 1951, ♀ jv., ♀ im.; Tarrant County, June 6, 1953, [ ♂ ], ♂ a., ♀ jv. VIRGINIA: Falls Church, May 17, 1938, ♂ a. WISCONSIN: Beaver Dam, Dodge County, May 27, 1900, ♂ a., May 12, 1899, ♂ a.; Lake Koshkonong, Aug. 5, 1897, ♂ and ♀ a., July 29, 1897, ♂ a. CHIHUAHUA: Casas Grandes, May 31, 1899, ♂ jv. VERACRUZ: Orizaba, —, [ ♀ ] a. CUBA: Las Villas Placetas, Feb. 27, 1948, ♂ a. COSTA RICA: Liberia, Nov. 1, 1940, ♂ a.; San Jose, —, ♂ a.

*Zenaidura macroura macroura*

FLORIDA: Plantation Key, May 29, 1953, 2 ♂, ♀ a. CUBA: [♀] im., [♂] a.; N Sophie, Jan. 28, 1861, ♂ a. STATE OF CAMAGUEY: Jababo, May 1, 1930, ♂ a.; Minas, Mar. 7, 1948, ♂ a.; Rabchardo Cay, Sept. 5, 1930, ♂ a., ♂ im. STATE OF HAVANA: Havana, Jan. 11, 1927, ♀ a.; Laguna Ariguanabo, Apr. 21, 1920, ♂ a. ISLE OF PINES: Sept. 26, 1930, [♂], ♀ a.; Nueva Gerona, July 2, 1900, ♂ juv., July 5, 1900, ♂ and ♀ a., July 7, 1900, ♂ a.; Santa Fe, Apr. 2, 1948, ♂ a. STATE OF MATANZAS: Bolandran, Feb. 9, 1949, ♂ a.; Matanzas (9 mi. NW), Feb. 11, 1949, 2 ♂ a.; Perico, Feb. 10, 1949, ♂ a. STATE OF ORIENTE: El Guamo, Feb. 27, 1900, [♀], [♂] a., Mar. 25, 1900, ♂ and ♀ a., Nov. 30, 1901, ♂ a., Jan. 22, 1949, ♂ a., Dec. 31, 1901, ♀ a.; Guantánamo, San Carlos Estada, Apr. 1, 1915, [♀], ♀ a., Feb. 18, 1915, ♂ a., Feb. 15, 1913, ♀ a., Sept. 22, 1917, ♀ im., ? juv., Feb. 9, 1914, ♀ and ♂ a., Sept. 12, 1915, ♂ a., Oct. 31, 1914, ♂ a., Aug. 4, 1918, ♀ im., Sept. 15, 1918, 2 ? juv., Sept. 17, 1915, ♀ im., Aug. 7, 1915, ♂ juv.; Holguin, Mar. 6, 1948, ♂ a.; Port Gibara, Feb. 22, 1930, ♂ a. STATE OF PINAR DEL RIO: Consolacion del Sur, Feb. 1, 1949, ♂ a.; Guanajay, May 1, 1900, ♀ a.; Mariel, May 10, 1900, ♀ juv., (type specimen of *bella*) May 9, 1900, 2 ♂ a.; Vinales, Feb. 1, 1949, ♀ and ♂ a. STATE OF SANTA CLARA: Cumbre, Feb. 11, 1949, ♂ a. HAITI: Bombardopolis (NW), Mar. 21, 1917, ♀ a.; Fort Liberty, Feb. 15, 1929, ♂ a.; La Gonave, En Cafe, Mar. 5, 1929, ♂ a.; Moustique, Mar. 10, 1917, ♂ a., May 4, 1917, ♀ a.; Port au Prince, Mar. 28, 1930, ♂ a.; St. Marc, Feb. 25, 1929, ♂ a.; St. Michel, Jan. 6, 1929, ♀ a.; Thomazeau, May 22, 1931, 4 ♀, ♂ a.; Tortuga Island, Jan. 30, 1917, ♂ a., May 18, 1917, ♂ a., Jan. 31, 1917, ♂ a. DOMINICAN REPUBLIC: Constanza, Sept. 28, 1916, ♂ juv., May 1, 1919, ♀ a., Sept. 22, 1916, ♂ a., Oct. 1, 1916, ♂ im.; Yaque River near Mount Cristi, June 22, 1927, ♂ a.

*Zenaidura macroura turturilla*

GUATEMALA: Dept. de Santa Rosa, Cerritos, Mar. 27, 1946, ♀ a. NICARAGUA: Chinandega, —, [♀] a. REPUBLIC OF PANAMÁ: COCLE PROVINCE: Anton, May 16, 1953, ♀ a. (type specimen of *turturilla*). PANAMA PROVINCE: El Espino, Apr. 1, 1951, ♂ a. VERAGUAS PROVINCE: San Francisco, Mar. 12, 1931, ♂ a.; Sona, May 20, 1953, ♂ a., June 5, 1953, ♂ a., —, [♂] a.

*Zenaidura macroura clarionensis*

NAYARIT: (Type specimen of *clarionensis*) Clarión Island, Mar. 4, 1889, 3 ♂, 2 ♀ a., Mar. 4, 1889, ♀ im., Apr. 28, 1925, ♂ a., Apr. 27, 1925, ♀ a.

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