

It seems evident from these observations that the Mourning Dove will incubate its eggs regardless of their color. Since no color nor combination of colors caused nest desertion, we have no conclusive evidence whether the bird is color blind or not. Observations of eggs in other nests determined that any sort of damage to the eggshell, such as slight cracks or even small punctures, will cause nest desertion, although this rule is not universal. In many instances a punctured or cracked egg is simply removed by the dove and the other continued to be incubated. The fact that in many cases the returning birds examined the eggs before incubating them would seem to indicate that they noticed that a change had taken place, but the desire to incubate overcame any suspicions aroused by the egg color. There is much evidence from observations of captive birds that condition of the egg is determined through touch. The breast feathers have a tactile sensitivity so that they can determine the weight and structure of the egg. A puncture in an egg is apparently noted first through the stimulus of irregularity. When a dove settles down to incubate a punctured egg, it will quickly arise and examine the egg by turning it over with its bill. If, after several attempts, the egg does not 'feel' right, it will be pushed aside or even carried away. It may be concluded that the color of a dove egg is of less importance to the bird than the structural condition.

SUMMARY

Eggs in Mourning Dove nests were dyed with water colors in a variety of hues. In no instance did the color or colors of the eggs interrupt incubation or inhibit hatching. The presence of punctures or breaks in the eggs produces a greater response in the bird than the color, and may interrupt or stop incubation.

Nebraska Game, Forestation and Parks Commission
Upland Game Bird Survey
Ord, Nebraska

NOTES ON VERACRUZAN BIRDS

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ORNITHOLOGICAL material from Veracruz, accumulated in 1941 and 1942 by field parties from the Department of Fish and Game, Agricultural and Mechanical College of Texas, add to the knowledge of the birds of that Mexican state. In view of the fact that little has appeared in print in the last two decades concerning the summer birds of that region, it seems appropriate to place on record the results of our work.

Camps were established at seven localities in Veracruz, as follows:

(1) North slope of Cofre de Perote, 10,500 feet, July 26 to August 4, 1942, at a sawmill locally known as Pescados. The small hamlet of Conejo was a short distance farther up the mountain. Collecting was done in the immediate vicinity of Pescados and Conejo, except for one trip to the peak. The dominant vegetation was pines, except on the bare peak. Forty-one specimens (18 species) were taken.

(2) Guadalupe Victoria, (5 km. west of Perote; Aguatepec, on some maps) 8,000 feet, July 28 to August 1, 1942, in a stubble field on a rolling, arid plain, near the village. Collecting was done within a radius of one mile. The native vegetation was largely grasses, weeds, and maguey. Seven specimens (two species) were collected.

(3) Five kilometers east of Las Vigas, 8,000 feet, August 1-8, 1942, in a lava-strewn field. Collecting was done within a radius of two miles. The terrain was mountainous; the dominant vegetation was pines. Twenty-three specimens (16 species) were collected.

(4) Five kilometers north of Jalapa, 4,500 feet, July 1-4, 1941, and July 30 to August 8, 1942, on the bank of the Río Banderillo at the San Lucas Martín settlement, about two miles below the town of Banderillo. Collecting was done within a radius of two miles. The woodland, largely of broad-leaved trees and dense thickets, was interspersed with cornfields. A pond, a marsh, and a meadow were nearby. Forty-one specimens (22 species) were collected.

(5) Puente Nacional, 500 feet, July 6-9, 1941, near the junction of a small, clear creek and the Río Antigua. Collecting was done within a radius of one mile. The vegetation was arid tropical on the uplands and tropical in the canyons and small valleys. Forty-one specimens (23 species) were taken.

(6) Plan del Río (32 km. airline southeast of Jalapa on highway to Vera Cruz) 1,000 feet, July 25-31, 1942, on a small creek that empties into the main river a short distance below the town. Activities were confined to the immediate vicinity. The vegetation was arid tropical on the uplands, but tropical (bananas, mango, etc.) along the stream. Fifty-four specimens (23 species) were collected.

(7) At sea level near the small town of Boca del Río, about five miles south of Vera Cruz. Specimens collected here will be reported upon separately in conjunction with a collection made at the same locality by a party from Cornell University.

In all, 208 specimens, representing 79 species, were collected. To be sure, this is but a fraction of the more than 600 kinds of birds recorded from the state (Loetscher, MS.), but we are able to report one hitherto unrecorded species (*Coccyzus minor continentalis*) and to

establish summer records of such birds as *Buteo jamaicensis calurus*, *Bolborhynchus lineola lineola*, *Tyto alba guatemalae*, *Tachycineta thalassina thalassina*, and *Passerina versicolor versicolor*.

Dr. George M. Sutton, Cornell University, generously made available to me a thesis by Dr. Frederick W. Loetscher, Jr., on the "Ornithology of the Mexican State of Veracruz with an annotated list of the birds," and offered many helpful suggestions. Also, I acknowledge the helpfulness of Dr. Alexander Wetmore, U. S. National Museum, in identifying specimens of *Habia* and *Chlorospingus*; of Dr. J. Van Tyne, Museum of Zoology, Ann Arbor, Michigan, in comparing specimens of *Buteo*, *Falco*, *Tyto*, *Turdus*, *Otocoris*, *Toxostoma*, *Myiochanes*, and *Empidonax*; of Dr. John W. Aldrich, U. S. Fish and Wildlife Service, in comparing all material marked with an asterisk; and of the Texas Cooperative Wildlife Research Unit, College Station, in supplying certain equipment and personnel for the 1941 field party.

LIST OF SPECIES

**Butorides virescens eremonomus* Oberholser, GREEN HERON. 1 ♀, Plan del Río, 1,000 ft., July 28, 1942 (weight 184.7 grams). Green Herons were encountered several times in June and July: on the Río Axtla near Tamazunchale, San Luis Potosí; at Boca del Río, Veracruz; and at Plan del Río, Veracruz. At Plan del Río three or four were observed in a two-mile stretch of riparian vegetation along the creek. These records would seem to warrant considering the species a breeding bird in Veracruz, a status that is questioned by Loetscher (MS.). Aldrich states that our specimen is much lighter below than *virescens* and smaller and darker-necked than *anthonyi*. Our specimen and one in the Biological Survey Collection from Los Reyes, Michoacan, seem to substantiate the characters ascribed to this race. Peters (Checklist of Birds of the World, 1: 103, 1931) places it as a synonym of *anthonyi*.

**Buteo jamaicensis calurus* Cassin, WESTERN RED-TAILED HAWK.—1 ♂, Cofre de Perote, 10,500 ft., July 27, 1942. The Red-tailed Hawk was frequently seen in the higher mountains of central Mexico where it doubtless breeds. Our Mexican specimens have been compared by Dr. Van Tyne, who states (*in litt.*) that they "seem to be straight *calurus*."

**Falco sparverius sparverius* Linnaeus, EASTERN SPARROW HAWK.—1 ♂, Cofre de Perote, 10,500 ft., July 30, 1942 (testes small; weight 92.9 grams). The Eastern Sparrow Hawk was a common summer bird at higher elevations in southern México. Our parties observed or collected it at Monte Río Frío, Mount Popocatepetl, Pico de Orizaba, and Cofre de Perote. Dr. Van Tyne referred our specimens tentatively to the race *sparverius*. In slightly smaller size, darker coloration above, and reduction of reddish patch on the pileum, they tend toward *tropicalis*.

**Ortalis vetula mcalli* Baird, TEXAN CHACHALACA.—1 ♀, Puente Nacional, 500 ft., July 8, 1941. Chachalacas were common in tropical parts of Veracruz. Our parties reported them from Jalapa, Plan del Río, and Boca del Río, but took no specimens. Birds from Jalapa, although intermediate, are nearer *vetula*, as pointed out by Wetmore (Proc. U. S. Nat. Mus., 93: 245, 1943). In central Veracruz, *mcalli* is a bird of the arid tropical belt, whereas *vetula* occurs in the humid tropical (see Brodtkorb, Proc. Biol. Soc. Washington, 55: 181, 1942).

**Scardafella inca* (Lesson), INCA DOVE.—1 ♀, Puente Nacional, 500 ft., July 7, 1941; 1 ♂, Plan del Río, 1,000 ft., July 29, 1942 (weight 53.4 grams). Inca Doves were common in the arid tropical section of central Veracruz where they doubtless nested, as evidenced by the large testes of the male taken at Plan del Río.

**Lepiotila verreauxi fulviventris* (Lawrence), BUFF-BELLIED DOVE.—1 ♂, Puente Nacional, 500 ft., July 7, 1941; 2 ♂, Plan del Río, 1,000 ft., July 28–29, 1942 (testes enlarged; weight 171 and 181 grams). This large, short-tailed dove was common in arid-tropical portions of central Veracruz, occurring from sea level to at least 4,500 ft. at Jalapa, where we observed it but did not collect specimens.

**Aratinga astec astec* (Souancé), AZTEC PAROQUET.—1 ♂, 2 ♀, 1 non-sexed, Puente Nacional, 500 ft., July 7–9, 1941. This small parouquet occurred in the riparian vegetation along the small stream that empties into the Río Antigua below Puente Nacional. It was the only member of the parrot family encountered by our party at this locality.

**Bolborhynchus lineola lineola* (Cassin), BARRED PAROQUET.—1 ♂, Jalapa, 4,500 ft., July 12, 1941; 3 ♀, Jalapa, 4,500 ft., August 2–3, 1942 (weight 51.2 to 54.3 grams). Moderately common in the forested areas along the Río Banderillo. In August, 1942, we observed them in flocks in the taller trees, eating what we took to be berries. They seemed unafraid of man for when we shot into the flock, the remaining birds circled two or three times and again alighted to resume their feeding activity. The ovary of each of the two adult females collected in August was small. The third female is more bluish green ventrally and presumably is a young of the year.

**Coccyzus minor continentalis* van Rossem, MANGROVE CUCKOO.—1 ♂, Plan del Río, 1,000 ft., July 29, 1942 (testes small; weight 55.8 grams). Apparently rare in Veracruz; the specimen taken was the only one observed by our parties in two seasons of work in that state. It was encountered in the riparian vegetation along the small Río Salado (local name) a short distance east of Plan del Río. Our specimen seems to be the first to be recorded from Veracruz; Loetscher (MS.) does not list the species.

**Piaya cayana thermophila* Sclater, CENTRAL AMERICAN SQUIRREL CUCKOO.—1 ♂, 1 non-sexed, Puente Nacional, July 7, 1941. These long-tailed cuckoos were observed daily in the vegetation along a small creek near camp.

**Crotophaga sulcirostris sulcirostris* Swainson, GROOVE-BILLED ANI.—1 ♂, 1 ♀, Puente Nacional, 500 ft., July 7–8, 1941; 1 ♂, 1 ♀, Plan del Río, 1,000 ft., July 29, 1942 (weight: male, 85 grams; female, 90.6 grams). Common throughout the tropical sections of eastern México, seeming to prefer arid-tropical vegetation. At Plan del Río and Puente Nacional it was one of the most conspicuous birds. In July, numerous young of the year were in evidence.

**Tyto alba guatemalae* (Ridgway), CENTRAL AMERICAN BARN OWL.—1 ♀, Jalapa, August 6, 1942 (ovary enlarged; weight 452.8 grams). This specimen constitutes the third record for the state of Veracruz; others have been taken at Orizaba and Córdoba (Loetscher, MS.). It is darker both dorsally and ventrally than *pratincola* from southern Texas, Nuevo León, and the Valley of México, and matches the lighter-colored specimens of *guatemalae* from Central America in the Biological Survey Collection. This record extends considerably northward the known range of this race.

The bird was shot from a tall tree at the edge of a marsh. Mexicans living close by reported Barn Owls to be common. We observed several large owls, presumably of this species, shortly after dusk on several occasions at this locality.

**Streptoprocne zonaris mexicana* Ridgway, MEXICAN COLLARED SWIFT.—5 ♂, 5 ♀,

Plan del Río, 1,000 ft., July 30, 1942; gonads of all adults small (non-breeding condition); average weight, 112 grams (104.7–127.4). Collared Swifts were observed by our parties at Jalapa, Cofre de Perote, Boca del Río, and Puente Nacional, in Veracruz, but we were unable to collect specimens because the birds flew so high. At Plan del Río several thousand Collared Swifts roosted on the nearly vertical rock wall behind a waterfall. There they gathered each night, arriving in considerable numbers at about 6:10 P. M. The flight increased until about 6:30, then diminished, with the last birds arriving shortly before dark. The grayish rocks became black with swifts as they clung to the wall in close formation, with adults and nearly full-grown young of the year roosting together. The latter could be distinguished in flight by the narrowness of the white chest band.

Amazilia cyanocephala cyanocephala (Lesson), RED-BILLED AZURE-CROWN.—1 ♀, Jalapa, 4,500 ft., August 3, 1942 (weight 3.6 grams; ovary small). At our Río Banderillo camp numerous individuals were observed sipping nectar from brightly colored flowers and pursuing each other in aerial maneuvers.

**Trogon melanocephalus melanocephalus* Gould, BLACK-HEADED TROGON.—1 ♂, Puente Nacional, 500 ft., July 7, 1941. This trogon was a rarity at Puente Nacional, where it frequented the more open forest in the narrow valleys.

**Trogon mexicanus mexicanus* Swainson, MEXICAN TROGON.—1 ♂, Las Vigas, 8,000 ft., August 6, 1942 (testes small; weight 69.3 grams). We observed several adults and young of the year at our Las Vigas camp flying low over small bushes and alighting in pine trees much in the manner of jays. We saw them only in pine or mixed forests.

Megaceryle torquata torquata (Linnaeus), RINGED KINGFISHER.—1 ♀, Puente Nacional, 500 ft., July 6, 1941. This large kingfisher was encountered by our parties at a number of localities in México, from Río Ramos, Nuevo León (near Monterrey at an elevation of nearly 1,500 feet) southward through the lowland region to Puente Nacional, Plan del Río, and Vera Cruz. It was extremely difficult to approach within shotgun range; our specimens were all collected by waiting for the birds to fly over. At Puente Nacional and Plan del Río three species (*Chloroceryle amazona*, *C. americana*, and *M. torquata*) occurred together along the same stream, and each apparently got along well with the other two. This suggests sharply defined differences in feeding and breeding requirements.

Chloroceryle amazona (Latham), AMAZON KINGFISHER.—1 ♂, 2 ♀, Puente Nacional, 500 ft., July 7, 1941; 3 ♂, Plan del Río, 1,000 ft., July 27–29, 1942 (testes small; weight from 109.5 to 134 grams). This large green kingfisher was common along all the streams we visited in the lowlands of eastern Veracruz. Its range probably extends northward in Veracruz as far as Tampico, as we procured specimens on the Río Axtla, a tributary to the Río Panuco, in southeastern San Luis Potosí.

Chloroceryle americana septentrionalis (Sharpe), TEXAS GREEN KINGFISHER.—1 ♂, 1 ♀, Puente Nacional, 500 ft., July 6–7, 1941; 2 ♀, Plan del Río, 1,000 ft., July 28–29, 1942 (gonads small; weight 38.4 and 42.7 grams). This small green kingfisher was abundant along all streams we worked in the lowlands of México from Texas south to Veracruz and Guerrero. It was more numerous than either of the other two kingfishers.

**Momotus caeruliceps* (Gould), BLUE-CROWNED MOTMOT.—3 ♂, Puente Nacional, 500 ft., July 7–8, 1941. This is the only locality in Veracruz at which we encountered motmots. They were quite common in the riparian growth along a small stream in a canyon a short distance from the village. Although these specimens are from the southern known limit of the range of *caeruliceps*, they show no black in the center of

the crown that would indicate intergradation with the *lessonii* group, which ranges northward from Central America into southern Veracruz.

Colaptes cafer mexicanus (Swainson), MEXICAN RED-SHAFTED FLICKER.—1 ♂, Las Vigas, 8,000 ft., August 7, 1942; 3 ♂, Cofre de Perote, 10,500 ft., July 26–30, 1942 (weights varied between 116.6 and 159.8 grams). The Mexican Red-shafted Flicker was one of the conspicuous birds of the coniferous forests of eastern Veracruz, occurring from the lower limits of this belt to timberline. In late July and early August we observed numerous young of the year. The testes of all these specimens, except the one from Las Vigas, were small.

**Centurus aurifrons grateloupenensis* (Lesson), LESSON'S WOODPECKER.—2 ♂, 2 ♀, Puente Nacional, 500 ft., July 6–8, 1941; 1 ♂, 1 ♀, Plan del Río, 1,000 ft., July 27–28, 1942 (gonads small; a male weighed 90.6 grams; a female, 70.3). The Lesson's Woodpecker was common in the arid tropical region of eastern Veracruz.

**Balanosphyra formicivora formicivora* (Swainson), ANT-EATING WOODPECKER.—1 ♀, Jalapa, July 3, 1941. The Ant-eating Woodpeckers occurred at middle altitudes in the broad-leaved forests, where they probably are non-migratory. At lower elevations, in the arid tropical region, they were replaced by *Centurus* and *Dryobates scalaris*, and at higher elevations, in the coniferous forests, by *Colaptes*, *Dryobates villosus*, and *D. stricklandi*.

**Dryobates scalaris scalaris* (Wagler), ORIZABA WOODPECKER.—1 ♂, Plan del Río, 1,000 ft., July 28, 1942 (testes small; weight 35.5 grams). This small woodpecker was moderately common in the arid-tropical region near Puente Nacional and Plan del Río.

**Dryobates villosus jardinei* (Malherbe), JARDINE'S HAIRY WOODPECKER.—2 ♂, 1 ♀, Cofre de Perote, 10,500 ft., July 26–30, 1942 (gonads small; weight, adult male, 56.1 grams; female, 51.7 grams). Although specimens were not collected at Las Vigas, this woodpecker was observed there on several occasions. Seemingly this species occurs in all the pine forests of the 'tierra fria,' from an elevation of 7,000 feet to near timberline. They prefer thickly wooded areas in which the trees are large.

**Lepidocolaptes affinis affinis* (Lafresnaye), ALLIED WOOD-HEWER.—1 ♂, Las Vigas, 8,000 ft., August 7, 1942 (testes small; weight 28.0 grams). This species was observed by our party only in the pine forests near Las Vigas. The individual collected was feeding on the trunk of a tall pine much in the manner of a creeper.

**Tityra semifasciata* subsp.?, TITYRA.—1 ♂ im., Puente Nacional, 500 ft., July 8, 1941. This species was encountered by our parties only at Puente Nacional where it occurred in the tropical vegetation in the canyons. This specimen is much paler above than any Mexican specimen of *personata* available for comparison. In color it is nearest examples of *deses* from Yucatan, but is slightly paler and distinctly more grayish. In body color it resembles *griseiceps*, but is more brownish and has a darker head. It differs markedly from the dark brown specimens available from southeastern Coahuila, San Luis Potosí, and southern Veracruz.

**Sayornis saya saya* (Bonaparte), SAY'S PHOEBE.—1 ♂, Guadalupe Victoria, 8,300 ft., July 30 (weight 29.6 grams). The presence of this species in Veracruz in late July suggests that it may possibly breed in the vicinity of Perote and Guadalupe Victoria. The testes of this individual were small, however, so it may have been an early migrant.

**Sayornis nigricans nigricans* (Swainson), BLACK PHOEBE.—1 ♂, Jalapa, 4,500 ft., July 2, 1941. The Black Phoebe was a fairly common summer bird on the plateau of central México, but its occurrence at Jalapa was unexpected. Several individuals were noted along the river near the village of Banderillo. These birds probably nested in the vicinity.

**Tyrannus melancholicus couchii* Baird, COUCH'S KINGBIRD.—1 ♂, young, Jalapa, 4,500 ft., July 3, 1941; 1 ♂, Jalapa, 4,500 ft., July 30, 1942; 1 ♂, Plan del Río, 1,000 ft., July 29 (adults weighed approximately 45 grams). This flycatcher was one of the common tyrannids in the lowlands of Veracruz, reaching an elevation of at least 4,500 feet at Jalapa. The adult male from Jalapa is darker both ventrally and dorsally than specimens from Plan del Río and from Nuevo León. Also, it is smaller (wing 106.5 mm., tail 85), suggesting that it may possibly represent the race *T. m. chloronotus*. The specimen from Plan del Río differs in no essential from specimens from northeastern México (typical *couchii*).

**Legatus leucophaius variegatus* (Sclater), GREATER STRIPED FLYCATCHER.—1 ♂, Jalapa, 4,500 ft., July 2, 1941. This medium-sized flycatcher was observed by our parties only at Jalapa where one specimen was taken in riparian vegetation along the Río Banderillo, near the village of San Lucas Martín.

**Myiodynastes luteiventris luteiventris* Sclater, SULPHUR-BELLIED FLYCATCHER.—1 ♂, Puente Nacional, 500 ft., July 8, 1942. This species was fairly common in the lowlands of eastern México from Monterrey south at least to Vera Cruz. It seemingly is partial to a riparian habitat.

Megarynchus pitangua mexicana (Lafresnaye), MEXICAN BOAT-BILLED FLYCATCHER.—1 ♂, Puente Nacional, 500 ft., July 8, 1941; 1 ♂, 1 ♀, Plan del Río, 1,000 ft., July 27, 1942 (testes enlarged, but ova of female small; adult male weighed 83.9 grams; female, 76.8). This large yellow-bellied flycatcher was commonly observed in the more open country of eastern Veracruz, often being one of the conspicuous birds along the highways. Its range northward in Veracruz extends at least as far as the drainage system of the Panuco River as we have specimens from the Río Axtla.

Myiozetetes similis texensis (Giraud), GIRAUD'S FLYCATCHER.—1 ♂, 1 ♀, Jalapa, 4,500 ft., July 2, 1941; 1 ♂, 3 ♀, Plan del Río, 1,000 ft., July 24–29, 1942 (gonads small; adult male weighed 35.8 grams; adult females, 33.1; 34.4; 36.6 grams). This species was by far the most abundant flycatcher in the lowlands of Veracruz. It seemed to have a preference for xerophytic vegetation and open, brush-dotted pastures. In late July, numerous young of the year were in evidence.

**Myiochanes richardsonii sordidulus* (Sclater), MEXICAN WOOD PEWEE.—1 ♂, Cofre de Perote, 10,500 ft., July 29, 1942 (testes small; weight 13.2 grams). The Mexican Wood Pewee was not a conspicuous summer bird on Cofre de Perote, but it doubtless breeds there.

**Empidonax affinis affinis* (Swainson), FULVOUS-BREASTED FLYCATCHER.—1 ♂ juv., Las Vigas, 8,000 ft., August 2, 1942 (weight 11.3 grams). This flycatcher, determined as *affinis* by Van Tyne, was found by us in Veracruz only at this locality, although special efforts were made to collect specimens of *Empidonax* elsewhere. The bird was in a pine association.

**Otocoris alpestris chrysolæma* (Wagler), MEXICAN HORNED LARK.—3 ♂, 3 ♀, Guadalupe Victoria, 8,300 ft., July 28–30, 1942. The Mexican Horned Lark was a common summer bird of the semi-arid plateau above an elevation of 7,000 feet. In Veracruz, we observed it at Limón, Guadalupe Victoria, Perote, and as far east as near Cruz Blanca where the prairie gives way to pine forests. At the time of our visit, numerous small flocks, composed mostly of nearly full-grown young, were observed at the localities listed above. The species was not seen elsewhere in Veracruz. Adult males weighed 28.8 and 31.2 grams; immature male, 29.6 grams; females averaged 27 grams (26.4–28.0). Two of the females and one of the males had enlarged gonads.

Tachycineta thalassina thalassina (Swainson), MEXICAN VIOLET-GREEN SWALLOW.

—1 ♂ juv., Guadalupe Victoria, 8,300 ft., July 29, 1942 (weight 27.6 grams). This specimen establishes with some degree of certainty the Mexican Violet-green Swallow as a breeding bird in Veracruz. It is small for *thalassina* (wing 115 mm.), but larger than specimens of *lepida* of comparable age from western Texas.

Stelgidopteryx ruficollis fulvipennis (Sclater), SALVIN'S ROUGH-WINGED SWALLOW.—1 ♂ juv., Jalapa, 4,500 ft., July 2, 1941; 1 ♀ juv., Jalapa, 4,500 ft., August 4, 1942 (weight 16.9 grams). Rough-winged Swallows were abundant at our Río Banderillo camp where they fed daily over a small marsh and water-storage pond.

Psilorhinus morio morio (Wagler), BROWN JAY.—2 ♂, Puente Nacional, 500 ft., July 7–8, 1941. Brown Jays were the most conspicuous members of the Corvidae in the lowlands of central Veracruz. At Puente Nacional they showed preference for fence rows in open range land, and family groups kept in a loose flock as they moved from place to place. In early July, young of the year were nearly full grown.

Xanthoura yncas luxuosa (Lesson), GREEN JAY.—1 ♂, Jalapa, 4,500 ft., July 2, 1941. The Green Jay was infrequently observed in Veracruz. This specimen was taken in a 'jungle' of chaparral bordering a cornfield along the Río Banderillo. Two others were observed there, but they were too wary to be approached within shotgun range.

Aphelocoma coerulescens sumichrasti (Ridgway), SUMICHRAST'S JAY.—1 ♀, Cofre de Perote, 10,500 ft., July 26, 1942 (ova small; weight 94.3 grams). Of the three species of jay that occur on the slopes of Cofre de Perote, this one was by far the rarest, although it was common in the broken juniper-pine areas farther west at lower elevations. This is probably the third or fourth specimen known from Veracruz, but additional collecting may reveal that it is not so rare as present evidence indicates.

Aphelocoma sordida sieberii (Wagler), SIEBER'S JAY.—2 ♂ im., Cofre de Perote, 10,500 ft., July 29, 1942 (weights 123.3 and 132.7 grams). Sieber's Jays were not common on Cofre de Perote, but that they do nest on the mountain is evidenced by the family group observed on July 29 from which these two specimens were taken. The birds are molting, but most of the ventral feathers are of the juvenal plumage.

Cyanocitta stelleri coronata (Swainson), BLUE-CRESTED JAY.—3 ♂, 4 ♀, Cofre de Perote, 10,500 ft., July 26–31, 1942. This was the most common jay on the slopes of Cofre de Perote. Family groups were observed several times in late July, when the young of the year were nearly full grown and much in evidence.

Loetscher (MS.) devotes considerable attention to a discussion of the relationships of *C. s. azteca* and *C. s. coronata*; the crux of the problem has to do with the color of the crown. In the original description of *coronata*, the crown is indicated as blue; in *azteca*, as black "more or less tinged with blue." Both subspecies have been reported from the same localities in Veracruz. The series of *C. stelleri* obtained by our party in México throws additional light on this problem.

In the series from Cofre de Perote the color of the crest ranges from 'light' blue through a darker blue to blackish blue. Nearly the same condition is found in a series of ten specimens from Monte Río Frío (10,500 ft.), 55 kilometers east of México City. Three topotypes of *azteca* in the U. S. National Museum are equally intermediate between the black-headed and blue-headed races. Two of them are definitely blue-headed; one is black-headed.

The average color of the crown of specimens from central México is darker, more blackish, than those from Cofre de Perote, but the fact remains that considerable variation in color is present in both series and these variations are approximately equal—the Cofre de Perote specimens vary farther to the side of blue, the ones from near Río Frío, to the black. Since all our specimens were taken before any migration could have mingled populations, it seems clear that we have to do with two variable subspecies, neither one of which is well differentiated except in the extreme variants.

To establish the identity of *azteca*, it becomes necessary to establish a more restricted type locality for *coronata*. The type of *azteca* was from the mountains near Mirador, Veracruz; that of *coronata* was collected by Bullock from "the tableland" of Mexico. Perusal of Bullock's 'Six Months Travels in Mexico' reveals that he visited a relatively limited area which could have been the source of the type of *coronata*. He made the round trip between Vera Cruz and México City by way of Jalapa, Perote, Puebla, and Río Frío, stopping at all of these places. At Perote he first emerged onto "the tableland." In reaching the town of Perote, which is situated in the arid desert lands, it was necessary for him to cross through the pine forest that extends down the northeastern slopes of Cofre de Perote, through the present town of Las Vigas and on down the mountainside a short distance. This tract of timber is at present occupied by *coronata*. *Cyanocitta stelleri* does not occur at Jalapa or Puebla, two of the other localities Bullock mentions.

On pages 444 and 445, in the account of his travels back to Vera Cruz from México City, Bullock mentions stopping at Río Frío. In fact he was forced to stop there, as his wagon broke down at a near-by locality called San Martín. He called this a high, cold situation, and while stopping there he collected several species of birds, including "two kinds of blue jays . . . all undescribed." The fact that Bullock mentioned that the jays found at Río Frío were new indicates that he had not encountered them before, and would virtually eliminate the possibility of his having taken them at Cofre de Perote *on the way in*. Of course, he could have taken them *on the way out*. It seems likely that Swainson's type of *coronata* would have been one of these birds.

Swainson does not state how blue the crowns of his birds were. In his description of *Garrulus coronatus* [Philos. Mag. (n. s.), 1 (5): 437, June, 1827] he states that *coronatus* is "crested; blue, sides of head blackish; chin, front, and eyebrows whitish." This statement could refer to almost any of the variants found on the tableland. Another

confusing statement in Swainson's description is that "this elegant bird, remarkable for its full and lengthened crest, occurs in various parts of the tableland." This would indicate that he had specimens from more than one locality before him. As suggested to J. W. Aldrich by A. J. van Rossem (*in litt.*), he may even have had some specimens from Real del Monte that were almost certainly not taken by Bullock, but by a Mr. Morgan. Swainson's type of *coronata* cannot be found.

In view of the extreme uncertainty as to where the type specimen of *coronata* was taken, and the probability that the original description was based on specimens from several scattered localities, it seems justifiable to choose either Cofre de Perote or Río Frío as the type locality, since *C. stelleri* is known to occur at both of these places and Bullock was known to have collected there. Because the jays in the vicinity of Río Frío are black-headed, not blue-headed, it seems advisable to restrict the type locality of *coronata* to the vicinity of Cofre de Perote where blue-headed birds do occur.

This conclusion is in disagreement with that reached by Brodkorb (*Auk*, 61: 400-404, 1944) who restricted the type locality to Real del Monte, Hidalgo, a locality not mentioned by Bullock in his 'Travels.'

The type specimen of *azteca* was collected in June, 1864, by Dr. C. Sartorius near Mirador, Veracruz, and entered in the catalog of the U. S. National Museum on February 6, 1865. Since Mirador is also on the eastern edge of the highlands and is only a short distance from the Cofre de Perote, it seems that Ridgway described an extreme variant toward the black in a population whose normal color is bluish. Because of this, it seems necessary to place *azteca* in the synonymy of *coronata*, which has priority by more than half a century. This procedure leaves the birds from the high mountains in the vicinity of México City without a name. I propose that they be known as

***Cyanocitta stelleri atriceps*, new subspecies**

Type.—Male, adult; no. 3398, Texas Cooperative Wildlife Research Collection; north slope of Mount Popocatepetl, 13,500 feet, state of México, México; collected July 20, 1942, by Joseph M. Vajdos; original number 88.

Diagnosis.—A member of the *Cyanocitta stelleri* group with crest dark blue or black. Differs from *C. s. coronata*, as known to me by seven specimens from the Cofre de Perote, Veracruz, in slightly larger size and darker color; the blue of back, tail, wings, and crest deeper.

Measurements.—Averages and extremes of eight adult males: wing,

148 mm. (141–153); tail, 138 (130–148); exposed culmen, 27.8 (26.0–28.8); depth of bill at nostril 9.5 (9.0–10.3); tarsus, 43.1 (41.2–44.5). Of four adult females: wing, 147 (143–151); tail, 136 (131–144); exposed culmen, 27.0 (24.5–29.4); depth of bill at nostril, 9.4 (9.0–9.5); tarsus, 43.1 (42.0–44.0).

Specimens examined.—4 ♀, 11 ♂, from the high mountains in the state of México, as follows: Mount Popocatepetl, 13,500 ft., 3; Laguna Zempoala, 45 km. southwest of México City, 9,400 ft., 2; Monte Río Frío, 45–55 km. east-southeast of México City, 10,000–10,500 ft., 10.

**Parus sclateri sclateri* Kleinschmidt, SOUTH MEXICAN CHICKADEE.—1 ♂, Las Vigas, 8,000 ft., August 7, 1942 (testes small; weight 11.3 grams). We observed this chickadee daily at all camps in the coniferous forests of central México, including Las Vigas and Cofre de Perote. In early August, family groups of adults and nearly full-grown young were much in evidence.

**Sitta pygmaea flavinucha* van Rossem, YELLOW-NAPED PYGMY NUTHATCH.—1 ♂, Cofre de Perote, 10,500 ft., August 4, 1942 (testes small; weight 15.7 grams). Pygmy Nuthatches were seen daily on Cofre de Perote and again at Las Vigas. In late July and early August, numerous young of the year were following their parents in family groups.

**Troglodytes brunneicollis* subsp.?, BROWN-THROATED WREN.—1 ♂, Las Vigas, 8,000 ft., August 4, 1942; 1 ♂, Cofre de Perote, 10,500 ft., July 30, 1942 (testes small; weights 13.0 and 13.6 grams). These small wrens were abundant in the coniferous forests of the central Mexican highlands. Veracruz specimens of this wren are more grayish brown than typical *brunneicollis* from Oaxaca and are darker and more grayish than *culaquita* from the vicinity of México City. The Veracruzian population apparently represents an undescribed race.

**Heleodytes rufinucha rufinucha* (Lesson), RUFOUS-NAPED CACTUS WREN.—1 ♀, Puente Nacional, 500 ft., July 7, 1941; 1 ♂, 1 ♀, Plan del Río, 1,000 ft., July 28, 1942 (adult male weighed 31.8 grams; adult female, 28.9 grams). This large wren was common in the arid tropical region of central Veracruz below an elevation of 4,000 feet. The male from Plan del Río had enlarged testes.

**Melanotis caerulescens caerulescens* (Swainson), BLUE MOCKINGBIRD.—1 ♀, Jalapa, 4,500 ft., July 2, 1941. Contrary to the experience of other investigators, we encountered this species only once in two seasons of collecting in central Veracruz. This specimen was taken in a thicket of small, broad-leaved trees near a cornfield.

**Toxostoma curvirostre curvirostre* (Swainson), CURVE-BILLED THRASHER.—1 ♂, Cofre de Perote, 10,500 ft., July 26, 1942 (testes small; weight 77.4 grams). The occurrence of this typically desert bird on the pine-clad slopes of Cofre de Perote was entirely unexpected. It was observed on several occasions in the desert at Laguna Alchichica, across the line in Puebla, where two specimens were taken, and at Limón in the extreme western arid highlands of Veracruz. Probably the bird on Cofre de Perote was a post-nesting straggler.

Specimens from east of the Valley of México are very pale above and below and are lightly spotted. Apparently they are different from typical *curvirostre* (cf. Moore, Proc. Biol. Soc. Wash., 54: 214, 1941).

**Turdus migratorius phillipsi* Bangs, VERA CRUZ ROBIN.—1 ♂, 1 ♀, Las Vigas, 8,000 ft., August 7, 1942; 2 ♂, 3 ♀, Cofre de Perote, 10,500 ft., July 29–August 5, 1942 (adult males weighed 78.3 and 78.6 grams; females 74.2, 74.3 and 81.4 grams).

This species was common in the forested areas of the central plateau, occurring in all of the coniferous forests visited by us. At Las Vigas and on Cofre de Perote it was common in July and August, when the spotted young of the year were seen following the older birds about in family groups.

**Turdus assimilis assimilis* Cabanis, JALAPA ROBIN.—1 ♀, Jalapa, 4,500 ft., July 2, 1941. This thrush seems to be relatively rare in central Veracruz, as we observed it only once in 1941 and it was not encountered at all in our short stay at Jalapa in 1942. *Turdus grayi* appears to outnumber *assimilis* ten to one.

**Turdus grayi tamaulipensis* (Nelson), TAMAULIPAS THRUSH.—2 ♂, Jalapa, 4,500 ft., July 2, 1941; 3 ♂, 1 ♀, Plan del Río, 1,000 ft., July 27–30, 1942 (adult males weighed from 79.3 to 88.3 grams; adult female, 88.5 grams). This thrush was common in the open broad-leaf forests, cultivated areas, and pastures. Its vertical range in Veracruz appears to be below 5,000 feet, but that it can be expected to ascend higher is evidenced by the fact that we have a breeding female from the northern plateau (Tasquillo, Hidalgo) at an elevation approaching 6,000 feet. The testes of specimens taken in late July were still enlarged and a female had a well-defined brood patch. Our specimens are somewhat darker above than typical *tamaulipensis* from Ciudad Victoria, but they are closer to this race than to the more rufescent *grayi* of Guatemala.

**Myadestes obscurus obscurus* Lafresnaye, BROWN-BACKED SOLITAIRE.—1 ♂, Jalapa, 4,500 ft., July 4, 1941. We found this bird only at Jalapa. It was taken in a riparian association along the Río Banderillo a short distance from the village of San Lucas Martín.

**Catharus occidentalis occidentalis* (Sclater), RUSSET NIGHTINGALE THRUSH.—1 ♂, Las Vigas, 8,000 ft., August 3, 1942 (testes small; weight 26.2 grams). This thrush was fairly common at Las Vigas. This race doubtless is the breeding bird in the vicinity of Las Vigas as it is on Pico de Orizaba. We collected specimens of the paler race (*C. o. fulvescens*) only in the mountains near México City.

**Sialia sialis guatemalae* Ridgway, GUATEMALAN BLUEBIRD.—1 ♀, Jalapa, July 4, 1941; 2 ♀, Jalapa, August 3, 1942 (adult female weighed 28.4 grams). This species was collected only at Jalapa, but bluebirds thought to be of this race were observed near Las Vigas. In early August, family groups of adults and nearly full-grown juveniles were observed daily in the brush and trees surrounding a small marsh north of Jalapa.

**Sialia mexicana australis* Nelson, NELSON'S BLUEBIRD.—1 ♂, Cofre de Perote, 10,500 ft., July 27, 1942 (weight 32.9 grams). Nelson's Bluebird is characteristic of the central highlands. We encountered it in Veracruz only at Las Vigas and on Cofre de Perote. At the time of our visit, numbers of nearly full-grown young accompanied their parents in family groups.

**Vireo huttoni mexicanus* Ridgway, MEXICAN VIREO.—1 ♀, Las Vigas, 8,000 ft., July 31, 1942 (ova minute, weight 13.6 grams). This vireo was common in the coniferous forests of the central Mexican plateau, occupying an altitudinal range from about 7,000 to 12,000 feet.

**Tangavicus aeneus aeneus* (Wagler), RED-EYED COWBIRD.—1 ♀, 4 ♂, Jalapa, 4,500 ft., July 30, 1942; 1 ♂ juv., Plan del Río, 1,000 ft., July 27, 1942 (female weighed 62.4 grams; four males averaged 70.4 (69.3–72.2) grams). Red-eyed Cowbirds were the most conspicuous birds observed at our Río Banderillo camp north of Jalapa, where, in late July and early August, they congregated in large flocks.

**Cassidix mexicanus mexicanus* (Gmelin), GREAT-TAILED GRACKLE.—1 ♂ juv., 1 ♀, Puente Nacional, 500 ft., July 8, 1941; 1 ♀, Jalapa, 4,500 ft., July 30, 1942

(adult female weighed 122.3 grams). The Great-tailed Grackle was one of the commonest birds observed in Veracruz below an altitude of 5,000 feet. The bird was again encountered on the plateau in the state of Puebla, suggesting that the altitudinal range in Veracruz may be as high as 7,500 feet in favorable localities.

**Dives dives dives* (Lichtenstein), SUMICHRAST'S BLACKBIRD.—2 ♂, Puente Nacional, 500 ft., July 6-7, 1941; 2 ♀, Plan del Río, 1,000 ft., July 27, 1942 (ova small; adult females weighed 101 and 102 grams). Common in the tropical parts of Veracruz from sea level to at least 2,000 feet.

**Icterus spurius* (Linnaeus), ORCHARD ORIOLE.—1 ♂, Plan del Río, 1,000 ft., July 27, 1942 (testes small; weight 20.8 grams). The presence of the Orchard Oriole at Boca del Río in mid-July (one specimen taken) and at Plan del Río in late July suggests that the species may remain the year round in Veracruz. Loetscher (MS.) reports the species for May 15.

**Icterus gularis tamaulipensis* Ridgway, ALTA MIRA ORIOLE.—3 ♂, 1 ♀, Puente Nacional, 500 ft., July 6-8, 1941; 2 ♂, 2 ♀, Plan del Río, 1,000 ft., July 30, 1942 (adult male weighed 78.2 grams). This oriole was a common inhabitant of the arid-tropical region of Veracruz where, in summer, it was the most conspicuous member of the genus. Three of the specimens from Plan del Río were nearly full-grown young of the year; the testes of an adult male were enlarged.

**Thraupis abbas* (Lichtenstein), ABBOT TANAGER.—1 ♀, Puente Nacional, 500 ft., July 8, 1941; 1 ♂, 2 ♀, Plan del Río, 1,000 ft., July 28, 1942 (two females weighed 41 and 48 grams; the male, 41 grams). Common in the arid-tropical part of central Veracruz. At both the localities mentioned above the birds were taken in a riparian association. The ova of the females were small, but the testes of the male were considerably enlarged.

**Piranga flava dextra* Bangs, EASTERN HEPATIC TANAGER.—1 ♂, 1 ♀, Las Vigas, 8,000 ft., August 6-7, 1942 (gonads small; male weighed 49.1 grams; female, 45.3 grams). This tanager was observed frequently at Las Vigas and near Conejo on the north slope of Cofre de Perote, although no specimens were collected at the latter locality. At these stations it occurred in stands of pines.

**Piranga bidentata sanguinolenta* Lafresnaye, LAFRESNAYE'S TANAGER.—1 ♀, Jalapa, 4,500 ft., July 2, 1941. This tanager was uncommon in central Veracruz; we observed it once in two visits to that section of the state. This specimen was taken in a riparian association.

Habia gutturalis salvini (Berlepsch), SALVIN'S ANT TANAGER.—1 ♀, Puente Nacional, 500 ft., July 6, 1941. This appears to be another rare tanager in central Veracruz. Its seeming rarity may be due to its seclusive habits, preferring, as it does, the denser thickets.

Chlorospingus ophthalmicus ophthalmicus (Du Bus), BROWN-HEADED CHLOROSPINGUS.—1 ♂, Jalapa, 4,500 ft., July 2, 1941. We recorded this species only at Jalapa.

**Saltator atriceps atriceps* (Lesson), BLACK-HEADED SALTATOR.—1 ♂, Puente Nacional, 500 ft., July 6, 1941. This large, black-headed, green-backed fringillid was moderately common in the tropical parts of central Veracruz. At Puente Nacional it occurred in the dense riparian vegetation along the Río Antigua.

**Saltator coerulescens grandis* (Lichtenstein), LICHTENSTEIN'S SALTATOR.—1 ♂, Plan del Río, 1,000 ft., July 28, 1942 (testes enlarged; weight 58 grams). This somber-colored saltator is by far more common than *S. atriceps* in central Veracruz. We observed it frequently at Boca del Río and Plan del Río.

**Richmondia cardinalis coccinea* (Ridgway), JALAPA CARDINAL.—1 ♀, Plan del

Río, 1,000 ft., July 29, 1942 (ova small; weight 37.3 grams). Common in the arid-tropical section of central Veracruz.

**Passerina versicolor versicolor* (Bonaparte), VARIED BUNTING.—1 ♂, Jalapa, 4,500 ft., July 8, 1941; 1 ♀, Plan del Río, 1,000 ft., July 29, 1942 (adult male weighed 13.6 grams). The Varied Bunting was fairly common in central Veracruz. Loetscher (MS.) records it only from Jalapa and Orizaba on the basis of old records by Sclater. We observed several individuals at Jalapa and Plan del Río and the enlarged testes of the male from the latter locality establish the species as a breeding bird in the area.

**Hesperiphona vespertina montana* Ridgway, MEXICAN EVENING GROSBEEK.—2 ♀, Cofre de Perote, 10,500 ft., August 4, 1942 (weights 52.3 and 53.6 grams). We recorded the Mexican Evening Grosbeak in Veracruz only on Cofre de Perote, where it was not common. The two specimens taken had minute ova; the birds were molting.

**Spinus pinus macropterus* (Bonaparte), MEXICAN PINE SISKIN.—2 ♂, 3 ♀, Cofre de Perote, 10,500 ft., July 26–28, 1942 [average weight 13.3 (12.0–13.9) grams]. This siskin was as numerous as the Striped Ground Sparrow (*Plagiospiza*) in the coniferous regions of central México. Its distribution in summer coincides with that of pines and firs and on Cofre de Perote it occurred in considerable numbers. The birds were just entering the breeding season in late July; females contained ova as large as 5 mm. in diameter and the testes of males were considerably enlarged.

**Spinus notatus notatus* (Du Bus), BLACK-HEADED SISKIN.—1 ♂, Jalapa, 4,500 ft., July 4, 1941; 1 ♀, Jalapa, 4,500 ft., August 3, 1942 (weight 14.5 grams). At Jalapa this siskin was common in tree-bordered meadows and cornfields. Often it associated with *S. p. psaltria*. The ovary of the female was enlarged.

**Spinus psaltria psaltria* (Say), ARKANSAS GOLDFINCH.—1 ♂, Jalapa, 4,500 ft., July 2, 1941; 1 ♂, 1 ♀, Jalapa, 4,500 ft., July 31, August 3, 1942 (weights 10.1 and 10.0 grams). Common in the vicinity of Jalapa. It was partial to weed patches, cornfields, and other open terrain. Frequently it occurred in mixed flocks with *Spinus notatus*.

**Pipilo ocai ocai* (Lawrence), COLLARED TOWHEE.—2 ♂, 1 ♀, Las Vigas, 8,000 ft., August 7, 1942; 1 ♂, 1 ♀, Cofre de Perote, 10,500–11,500 ft., July 26, 30, 1942 (females weighed 51 and 53.2 grams; males 48.0, 52.6, and 53.8 grams). We found this towhee to be restricted in summer to the coniferous belt above an elevation of 7,500 feet. It was a common breeding bird at Las Vigas and near Conejo on Cofre de Perote. One of the males from Las Vigas is immature; the ova of the adult female were enlarged, suggesting two or more broods yearly. For use of the name *ocai* rather than *torquatus*, see van Rossem (Wilson Bull., 52, no. 3: 173–174, 1940).

**Pipilo fuscus potosinus* Ridgway, PLATEAU BROWN TOWHEE.—1 ♀, Guadalupe Victoria, 8,300 ft., July 30, 1942 (ova enlarged; weight 50.6 grams). Common residents of the deserts of eastern México, occurring in Veracruz in the vicinity of Limón and Guadalupe Victoria. I have compared specimens from Laguna Alchichica, Tlaxcala, Pachuca, and Guadalupe Victoria with near topotypes of *P. f. fuscus* from the Valley of México and am convinced that the Brown Towhees from the eastern and northern sections of the Mexican plateau are inseparable from each other and yet separable from *fuscus*. The possibility suggested by Loetscher (MS.) that the bird of Veracruz is not *potosinus* cannot be confirmed or refuted by materials available as I have examined no specimens from near the type locality of *potosinus*. Measurements and color of birds from the eastern plateau, however, are essentially those recorded for *potosinus*.

**Plagiospiza superciliosa superciliosa* (Swainson), STRIPED SPARROW.—2 ♂, 2 ♀,

Las Vigas, 7,900 ft., July 30–31, 1942; 2 ♂, 1 ♀, Cofre de Perote, 10,500 ft., July 30–August 4, 1942 [males averaged 46.3 grams (40.0 to 53.7); two adult females, 38.3 and 39.8 grams]. This sparrow is characteristic of the coniferous belt of central México. It occurred on all the high mountains visited by us (Cofre de Perote, Orizaba, Popocatepetl, Iztaccihuatl, Tres Cumbres, etc.) at elevations ranging from 7,900 feet at Las Vigas to nearly 14,000 feet on Mount Popocatepetl. It preferred open meadows and was one of the common timberline sparrows. One of the females from Las Vigas is a nearly full-grown young of the year. The adult female had a well-developed brood patch and the testes of the two males were considerably enlarged.

**Aimophila rufescens rufescens* (Swainson), RUSTY SPARROW.—1 ♀, Jalapa, 4,500 ft., July 2, 1941. Widely distributed in central Veracruz, preferring thickets in the vicinity of water.

Junco phaeonotus phaeonotus Wagler, MEXICAN JUNCO.—1 ♂, Las Vigas, 8,000 ft., August 4, 1942; 1 ♂, Cofre de Perote, 10,500 ft., August 4, 1942 (testes small; weights 21.5 and 22.5 grams). A common breeding bird in the conifer-clad areas of the Mexican plateau, occupying an altitudinal range from near 7,000 feet to timberline (specimens were taken on Mt. Popocatepetl at 13,500 feet).

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THE HOMING ABILITY OF THE CARRIER PIGEON ITS VALUE IN WARFARE¹

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THE homing ability of the carrier or homing pigeon² is, in a general way, well known—so much so that this, their chief characteristic, is frequently employed in metaphor and simile as an expression of precision and accuracy which would rebound much to the discomfiture of the writer were all in full possession of the relevant facts. In the light of recent occurrences, the subject is not without topical interest and the biologist, on examining the data and experiments described below, may be able to fill in some of the gaps which puzzle the pigeon enthusiast. For the latter invariably knows his birds well, develops his own method of selecting the wheat from the chaff, from personal experience constructs his own theories, but all too often fails to view his subject objectively and shrouds his conclusions with an anthropomorphic and teleological aurora that defies clear vision.

It is the intention of the writer to review in this paper the known achievements of the homing pigeon; the uses to which they have been

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² The terms "carrier" and "homing" pigeon are used interchangeably in this paper,