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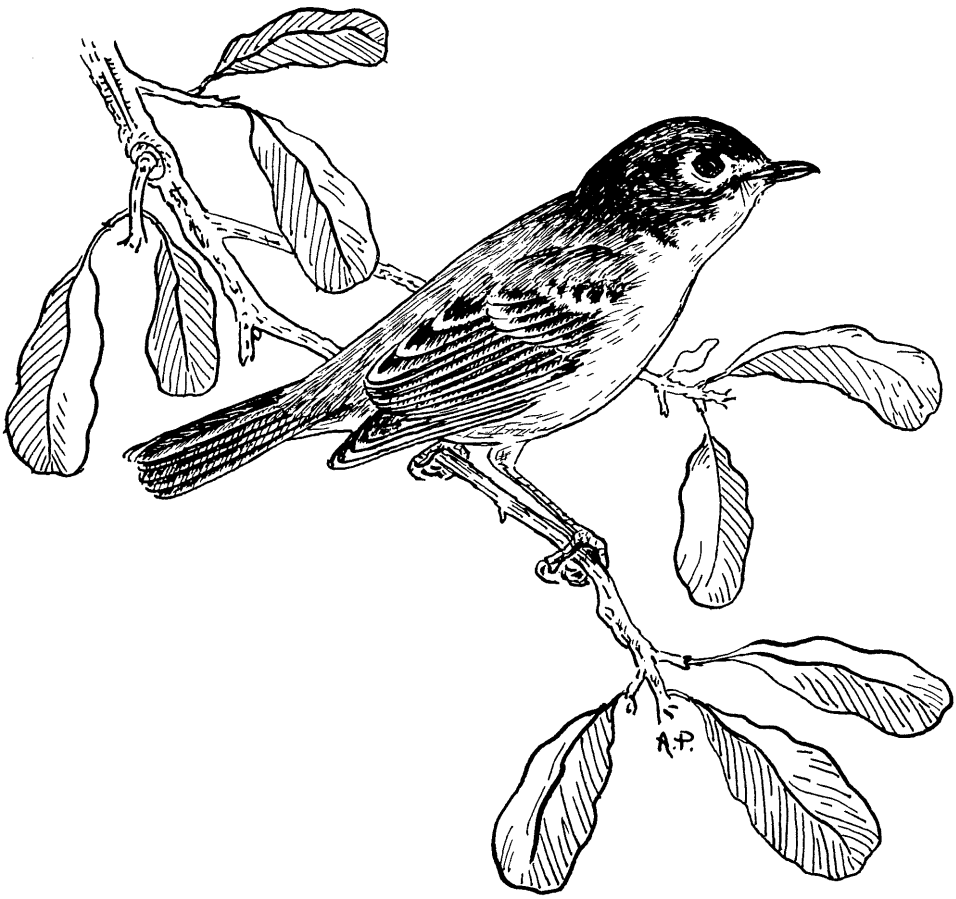
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Contents

A Possible Hybrid Ladder-Backed × Downy Woodpecker in Central Texas

Charles W. Sexton

Department of Environmental Protection, City of Austin,
P.O. Box 1088, Austin, Texas 78767

ABSTRACT.—A small, unusually-plumaged woodpecker was observed in a residential area of Austin, Texas, in September 1982. The plumage pattern combined characteristics of both Downy and Ladder-backed woodpeckers. Although the hybrid origin of the Austin bird is suggested, no other hybrids between these species have been reported. I suggest why hybridization between these species might occur in central Texas, especially in an urban area.

On 6 September 1982, I observed a small woodpecker with unusual plumage characteristics in Austin, Travis County, Texas. It appeared to combine features of the Downy Woodpecker (*Picoides pubescens*) and Ladder-backed Woodpecker (*Picoides scalaris*) (*fide* L. Short, pers. comm.), although no hybrid between these two species has previously been reported (Cockrum 1952; Short 1971). The bird was observed at close range from 1630 to 1700 CST as it foraged in a plateau of live oaks (*Quercus fusiformis*) and cedar elms (*Ulmus crassifolia*) in a well-wooded residential area within the city limits of Austin. I sketched the bird immediately, but subsequent attempts to relocate and photograph the bird failed.

Description

The woodpecker was about the size of *P. pubescens* or *P. scalaris* but no other *Picoides* was nearby for direct comparison. The first field marks noted on the bird suggested a Downy Woodpecker: primarily the long white stripe down the back and clean white underparts. However, certain features were atypical: (a) a broad red crown patch, more extensive than typical male *pubescens,* (b) heavily barred wings more closely resembling those of *scalaris,* and (c) a face pattern combining certain features of both *pubescens* and *scalaris* (Fig. 1). A conspicuous *pubescens*-like feature in the face pattern was the lack of connection of the black auricular area with the black malar stripe. The *scalaris* face pattern was represented by the complete white facial outline (i.e., lack of auricular-nuchal connection) (Short 1971).

The bird gave several call notes and two rattle calls. In my field notes I described the call notes as being "like Downy, single." The rattle calls were two-parted, starting with 8 to 10 notes on the same pitch followed by about a dozen descending notes. The two parts each had a "somewhat different timbre," but I made no further mention in my notes of this difference.

Analysis and Discussion

Without a specimen or photographs, it is difficult to be certain of the hybrid origin of the bird. Based on the evidence from other *Picoides* hybridization, Short (1971) predicted the possibility of *pubescens* × *scalaris* hybridization in central

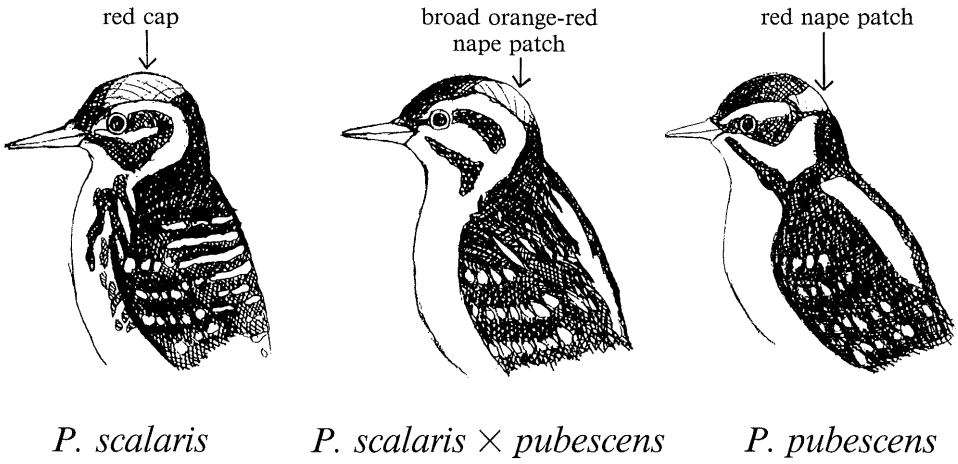

Fig. 1. Comparison of plumage patterns in *P. scalaris, P. pubescens,* and a possible hybrid from Austin, Texas.

Texas. Jerome A. Jackson (pers. comm.), however, suggests that, although unusual, the plumage of the Austin bird might simply represent a young male *pubescens* in molt. The hybrid origin of the bird is suggested when compared with other *Picoides* hybrids (Short 1971). Three hybrids between *pubescens* and Nuttall's Woodpecker (*P. nuttallii*) were described from California by Short (1971). Qualitative features which are analogous in the *pubescens* × *nuttallii* birds and the Austin bird include the aforementioned absence of the auricular-malar connection, primarily white outer retrices, and a broad red nuchal patch (broader than *pubescens*). One difference is the *pubescens*-like white back (with irregular margins, however) in the Austin bird while the described *pubescens* × *nuttallii* hybrids have barred backs with narrow black bars. Likewise, all three of the *pubescens* × *nuttallii* hybrids showed spotting on the sides while the Austin bird appeared to be unmarked. The only other pertinent hybrid is a single female Ladder-backed × Hairy Woodpecker (*P. villosus*) described from the Sierra del Carmen, Coahuila, Mexico (Miller 1955). The dorsal pattern in that bird consisted of irregular barring, and the underparts had spotting intermediate between *scalaris* and *villosus.*

It is likely that the Austin bird was raised locally. While the September date of observation was at a time when both species undertake post-breeding wandering, neither species is highly migratory. Furthermore, there are some reasons why hybridization might be expected in central Texas and specifically in the urbanizing Austin area. The breeding ranges of *pubescens* and *scalaris* are primarily allopatric in Texas with narrow zones of contact in the Panhandle and along the Balcones Escarpment from Dallas to Austin (Oberholser 1974). In the Austin area, the zone of geographical overlap of these species may be as much as 60 km wide. *Scalaris* occurs commonly in upland woodlands of live oak and mesquite (*Prosopis glandulosa*) and is most common west of Austin (Simmons 1925; Kutac and Caran 1976; Travis Audubon Society 1984). *Pubescens* occurs in bottomlands and other woodlands most commonly from Austin eastward (Simmons 1925; Kutac and

Caran 1976). Both *scalaris* and *pubescens* nest locally within the city limits of Austin; however, neither could be considered common in town (Sexton, unpubl. MS). The situation therefore is one of local sympatry, with a degree of ecological separation within native habitats, and with both species relatively uncommon in the area of contact in the Austin urban area.

Urbanization in Austin has caused a disruption and blurring of the relatively sharp ecological and habitat boundaries along the Balcones Escarpment of central Texas (Sexton, unpubl. MS). Numerous plantings of bottomland trees such as pecan, American elm (*Ulmus americana*), sycamore (*Platanus occidentalis*), sugar hackberry (*Celtis laevigata*), and other hardwoods have converted former areas of juniper-oak woodland and even grassland to mixed hardwood forest in residential areas (Sexton, unpubl. MS), creating a "hybrid" habitat that provides elements conducive to the colonization by either *pubescens* or *scalaris*. The fact that the two species are uncommon in residential areas of Austin may be attributed to (a) the "hybrid" nature of the residential woodland which may poorly match the innate habitat selection criteria of either species (Hilden 1965; Anderson and Shugart 1974; Gauthreaux 1978), and (b) other influences of urbanization on such facets of their biology as food supplies, foraging sites, nest sites, predation pressures, and human disturbances (Erz 1966; Thomas et al. 1977; Guth 1980; Beissinger and Osborne 1982; Sexton, unpubl. MS). Hybridization may be induced in part by a rarity of potential mates.

It is apparent that ecological conditions are appropriate in the Austin area to create a situation conducive to occasional hybridization between *P. pubescens* and *P. scalaris*. Hybrid individuals of this combination should be looked for in the area and elsewhere in urbanizing areas along the zone of contact in central and north-central Texas. Further details of plumage characters and vocalizations would aid the study of hybridization between not only these species, but of woodpeckers in general (Short 1971; Winkler and Short 1978).

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Dr. Lester Short provided valuable analysis of the Austin bird and comments on *Picoides* hybrids in general. I would like to thank Dr. Jerry Grubb, Dr. Jerome Jackson, Becky Lasley, Greg Lasley, Rob Reid, and an anonymous reviewer for comments on earlier drafts of this paper.

Literature Cited

Anderson, S. H. and H. H. Shugart, Jr. 1974. Habitat selection of breeding birds in an east Tennessee deciduous forest. Ecology 55:828–837.

Beissinger, S. R. and D. R. Osborne. 1982. Effects of urbanization on avian community organization. Condor 84:75–83.

Cockrum, E. L. 1952. A check-list and bibliography of hybrid birds in North America north of Mexico. Wilson Bulletin 64(3):140–159.

Erz, W. 1966. Ecological principles in the urbanization of birds. Ostrich, Suppl. 6:357–363.

Gauthreaux, S. A., Jr. 1978. The structure and organization of avian communities in forests. Pp. 17–37 *in* R. M. DeGraaf (tech. coord.). Proc. workshop on the management of southern forests for nongame birds. USDA For. Serv. Gen. Tech. Rep. SE-14.

Guth, R. W. 1980. Ecology of urban bird communities in the Chicago area. Ph.D. Dissertation, Northwestern University.

Hilden, O. 1965. Habitat selection in birds. Ann. Zool. Fenn. 2:53–57.

Kutac, E. and C. Caran. 1976. A bird finding and naturalist's guide for the Austin, Texas, area. Travis Audubon Society and Austin Natural Science Association.

Miller, A. H. 1955. A hybrid woodpecker and its significance in speciation in the genus *Dendrocopus*. Evolution 9:317–321.

Oberholser, H. C. 1974. The bird life of Texas. The Univ. of Texas Press, Austin.

Short, L. L. 1971. Systematics and behavior of some North American woodpeckers, genus *Picoides* (Aves). Bull. Amer. Mus. Nat. Hist. 145(1):1–118.

Simmons, G. F. 1925. Birds of the Austin Region. The Univ. of Texas Press, Austin.

Thomas, J. W., R. M. DeGraaf, and J. C. Mawson. 1977. Determination of habitat requirements for birds in suburban areas. USDA For. Serv. Res. Pap. NE-357.

Travis Audubon Society. 1984. Checklist and seasonal distribution, Birds of the Austin, Texas region.

Winkler, H. and L. L. Short. 1978. A comparative analysis of acoustical signals in pied woodpeckers (Aves, *Picoides*). Bull. Amer. Mus. Nat. Hist. 160(1):1–109.

Expansion of Red-crowned Parrot, *Amazona viridigenalis*, into Southern Texas and Changes in Agricultural Practices in Northern Mexico

Raymond W. Neck

Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744

ABSTRACT.—Red-crowned Parrots (*Amazona viridigenalis*) have been observed in urban and rural (native vegetation) areas of the Lower Rio Grande Valley, Texas. Observations are concentrated in the cool season of the year. Birds are believed to consist of freely-dispersing wild birds from northeastern Mexico. Human disturbances (agricultural activities) of the natural habitat in northeastern Mexico are probably associated with the movement of these parrots.

Introduction

The Lower Rio Grande Valley of Texas, U.S.A., and Tamaulipas, Mexico (Falcon Reservoir to the mouth of the Rio Grande), contains a striking variety of bird species (Oberholser 1974; Lane 1978). This variety of species results in part from the proximity of the area to the northernmost neotropical bird faunas of eastern Mexico (see Gehlbach et al. 1975). Recently, additional neotropical species have established populations in this area, e.g. Brown Jay, *Cyanocorax morio* (Shiflett 1975; Hubbard and Niles 1975), and Mexican Crow, *Corvus imparatus* (Arvin et al., 1975).

More recently the Red-crowned Parrot, *Amazona viridigenalis* (Cassin), has been sighted in several areas of the Lower Rio Grande Valley. The origin and status of these birds are as yet unestablished. The American Ornithological Union (1983:279) classifies *A. viridigenalis* as "casual" in southern Texas with observations "apparently based on wild vagrants although the possibility of escaped cage birds cannot be excluded." Webster (1982) considers "flocks of wintering Red-crowneds to be genuine post-breeding wanderers from breeding areas in Mexico."

Reports of free-flying *A. viridigenalis* are also known from other portions of the United States. This species is sighted occasionally in north Pasadena, California, but there is no evidence of breeding (Hardy 1973). However, escaped *A. viridigenalis* in southeastern Florida have produced well established breeding populations since the mid-1960's (Owre 1973; Ryan 1979).

Parrots in Southern Texas—Literature Review

Several surveys of the avifauna of the Lower Rio Grande Valley were made in the second half of the nineteenth century. Sclater (1858) and Baird (1859) reported the Thick-billed Parrot (*Rhynchopsitta pachyrhyncha*) on the "Rio Grande, Texas (according to) J. W. Audubon," but no records from Texas have been accepted (Bent 1940:18; Oberholser 1974). Strecker (1912:68) stated that *R. pachyrhyncha* "may straggle across the Rio Grande from Mexico."

Subsequent surveys of the avifauna of this region (Dresser 1865–1866; Merrill 1878; Sennett 1878, 1879; De Laubenfels 1924; Griscom and Crosby 1925–1926) failed to reveal the presence of parrots. Bailey (1916:155) was told that "Mexican parrots" were allegedly seen near Corpus Christi, Texas, following periods of "severe southern winds." Kincaid (in Oberholser 1974:432) discussed records of the Green Parakeet (*Aratinga holochlora*) and the Yellow-head Parrot (*Amazona ochrocephala*) but questioned the origin of these individuals. No records of *A. viridigenalis* were given for Texas, but Kincaid did note that this species "since World War II has been more numerous close to Texas (in Tamaulipas) than the yellowhead" (Oberholser 1974:433).

Contemporary sightings of *A. viridigenalis* in southern Texas date from 29 September 1973 when John C. Arvin sighted individuals at Anzalduas Park near Madero, Hidalgo County, where they fed on seeds of Texas Ebony, *Pithecellobium flexicaule* (Webster 1974). Since that sighting, additional occurrences have been reported periodically. In Brownsville (Cameron County) they have been seen "often but irregularly" and have been reported from Santa Ana National Wildlife Refuge, Hidalgo County (Webster 1977). Mark Adcock and James K. Palman observed one *A. viridigenalis* in June 1978 at Bentsen–Rio Grande Valley State Park, Hidalgo Co. (Webster 1978).

Amazona viridigenalis in Northeastern Mexico

Analysis of previous reports indicates fluctuations in the geographic range and abundance of *A. viridigenalis* in northern Mexico. Salvin and Godman (1889) reported that *A. viridigenalis* occurred "northward to the limit of the forest districts (with) the most northern point recorded being Montemorelos." In 1938 the Semple Expedition did not find this bird north of Ciudad Victoria (Sutton 1939). Other workers observed *A. viridigenalis* near Linares as early as 1939 (Sutton and Pettingill 1942, 1943). *A. viridigenalis* has been increasing relative to other parrots in southern Tamaulipas (Arvin 1977).

Along the Rio Corona in Tamaulipas, Mexico, *A. viridigenalis* feed on seeds of Texas Ebony and Anacua, *Ehretia anaqua* (Gehlbach et al. 1976; Gehlbach 1987). In the Gomez Farias region of southwestern Tamaulipas *A. viridigenalis* feed on "nuts, berries, buds and flowers, and various larger fruits" (Sutton and Pettingill 1942). In a pine-oak forest of the Sierra de Tamaulipas, they are known to feed on pine seeds (Martin et al. 1954), and are also reported to be pests in corn fields (Sutton 1951; Martin et al. 1954). Courtship and sparring occur as early as mid-March in Tamaulipas (Sutton and Pettingill 1942), and nesting occurs in late March and April (Sutton and Burleigh 1940; Sutton and Pettingill 1942). Nests are built in tree cavities, including abandoned woodpecker holes (Sutton and Pettingill 1942). Gehlbach (1987) indicated that along the Rio Corona *A. viridigenalis* requires large natural cavities in Montezuma cypress (*Taxodium mucronatum*) or abandoned nests of the Lineated Woodpecker (*Dryocopus lineatus*) for nesting sites.

Examination of Christmas counts for several years of the 1970's reveals variable but generally increasing numbers of *A. viridigenalis* (see various *American Birds*). Analysis of data has revealed a strong (but insignificant) increase in numbers at Rio Corona while counts at Gomez Farias show an indication of decrease in numbers (Neck and Gehlbach, unpub.).

Amazona viridigenalis in Southern Texas: Personal Observations

Personal observations of *A. viridigenalis* in Texas began during December 1976 in an urban residential area of Brownsville. Many tropical plants have been utilized as ornamentals in this area; relatively little native vegetation remains. This residential area is bordered on one side by a natural "resaca" or abandoned river channel, but the parrots showed no attraction to this body of water.

Weather during initial observations (20 December) was cool (5–8°C) with intermittent mist or drizzle; no parrots were heard or seen. About noon on 24 December, the sky cleared accompanied by a noticeable rise in air temperature. Almost immediately, raucous calls were heard from the crown of a large Tropical Cottonwood tree, *Populus* sp. Within 15 minutes five parrots were observed leaving the tree, circling the general area and flying out of sight. When they returned to the area about 1700 CST, at least ten individuals were seen on branches of a Chinaberry tree, *Melia azedarach* L. Clouds were again present on the morning of 25 December, but, as the temperature rose, ten parrots were seen at 1100 CST and returned about 1700 CST. Better weather existed on 27 December when parrots were heard as early as 0830 CST. Personal observations ceased on 28 December (parrots seen and heard again about 0800 CST), but other observers reported that parrots were present until late February 1977 (initial occurrence of those birds was early November 1976).

Subsequent personal observations since 1976 have revealed that *A. viridigenalis* is most often seen in Brownsville during the fall and winter from mid-October to late March or early April (Table 1). Latest spring sighting was 2 April in 1981, whereas the earliest fall sighting was 7 October in 1984. Following the initial observations in 1976–1977, no *A. viridigenalis* were observed during 1977–1978 or 1978–1979; a similar absence was reported at other southern Texas sites by Arvin (pers. comm.). However, *A. viridigenalis* have been seen in all cool seasons from 1979–1980 to 1986–1987. *A. viridigenalis* were present during the extended period of subfreezing weather of December 1983; birds were sighted during the first observational period (11 January 1984) after this cold period (temperature range on 25 December 1983 in Brownsville was −7 to −1°C). No personal observations of activity patterns of *A. viridigenalis* during this exceptionally cold period are available.

Discussion

Various interpretations of the significance of *A. viridigenalis* in the Valley are possible. These birds could be escapees from the rampant smuggling operations (Arvin 1976) that occur in the area, or they could be naturally dispersing individuals from northern Mexico. Although *A. viridigenalis* does well in captivity (Rutgers and Norris 1972), this species is not an accomplished talker, and is therefore considered an inferior cage bird (Oberholser 1974).

Winter dispersal by *A. viridigenalis* is likely to be at least partially the result of human impact, although the exact workings of this factor remain to be demonstrated. Grain plantings in northern Mexico have greatly increased since the mid-1960's (Table 2) because a major cotton pest, the Tobacco Budworm (*Heliothis virescens*), evolved pesticide-resistance and destroyed the cotton industry (Adkisson 1969; Luck et al. 1977). While the clearing of brushland mentioned by

Table 1. Seasonal occurrence of *Amazona viridigenalis* at Brownsville study plot (— = no observations; O.P. = observation periods). Numbers in parentheses are number of observational periods.

Year	Jan–Mar	Apr–June	July–Sept	Oct–Dec	O.P.
1976	—	—	—	yes (1)	1
1977	—	—	—	no (1)	1
1978	no (1)	no (2)	no (2)	no (2)	7
1979	no (2)	no (2)	—	yes (4)	8
1980	yes (2)	—	no (3)	yes (3)	8
1981	yes (1)	yes (3)	no (1)	yes (1)	6
1982	no (1)	no (1)	—	yes (1)	3
1983	yes (1)	—	no (1)	yes (2)	4
1984	yes (2)	no (1)	no (1)	yes (3)	7
1985	no (2)	no (2)	—	yes (1)	5
Observations	12	11	8	19	—
Years seen	4 of 8	1 of 6	0 of 5	8 of 10	—
O.P. "yes"	6	3	0	16	
O.P. "no"	6	8	8	3	
				$\chi^2 = 19.2, p < 0.001$	

	Oct–March	Apr–Sept
O.P. "yes"	22	3
O.P. "no"	9	16

Fisher's Exact Test, $p < 0.001$

Webster (1977) may have an adverse effect on *A. viridigenalis* by removing some trees suitable for breeding, the grain fields which replace the brushland should provide unnaturally high amounts of food. Such large amounts of food may allow increased survival rates in parrot populations, whereas periodic crop failures might cause a severe food shortage. Significantly, a grain crop failure occurred in Tamaulipas in 1975, the year before personal observations began. Birds in such a situation would be quite likely to disperse into suitable feeding areas, some of which were northward in Texas. Other human activities may have disrupted the normal population dynamics of *A. viridigenalis* in Tamaulipas. In the area of Guemes, Tamaulipas, during the 1970's local residents were killing adults which were depredating citrus and other crops in the fall and collecting nestlings for the pet trade in the spring (Gehlbach, pers. comm.).

Gehlbach (Gehlbach et al. 1976; Gehlbach 1987) indicated that the lack of a true tropical bird fauna in the Lower Rio Grande Valley is due to insufficient rainfall, particularly during the breeding season. Large cavities as a nesting requirement probably limits any breeding in the Valley to urban areas and remnant stands of subtropical riparian woodland, but a pair of *A. viridigenalis* nested and successfully fledged one young in a palm tree at Harlingen, Cameron County, in July 1985 (Lasley and Sexton 1985). Seasonality of observations at the residential plot indicate that *A. viridigenalis* in the Brownsville area may be post-reproductive wanderers. Perhaps most observations of *A. viridigenalis* in the Lower Rio Grande Valley will always involve wandering individuals.

Migration northward for feeding purposes during the winter concomitant with southward movements for breeding purposes in the spring is not typical of birds

Table 2. Cotton and grain hectarage and production (in metric tons) for Tamaulipas. Data from Mexican Census of Agriculture.

Crop	Year	Hectares	Production
Cotton	1960	208,665	191,896
	1970	42,795	40,575
Corn	1960	179,590	435,197
	1970	266,288	420,144
Sorghum	1960	21,367	74,020
	1970	271,900	672,034
Wheat	1960	1,758	3,671
	1970	4,518	7,806

in the Northern Hemisphere but has been reported for a few species. For example, the Fulvous Whistling-Duck (*Dendrocygna bicolor*), was found in the eastern part of its range during winter long before establishment of breeding populations (Bolen and Rylander 1983). Records of *R. pachyrhyncha* in Arizona at "irregular intervals" occurred during winter months (Bent 1940:18). White-winged Doves (*Zenaida macroura*) may move northward in September from central and southern Tamaulipas into southern Texas as a result of tropical storms or food shortages (Cottam and Trefethen 1968:56, 211–212).

Summary

I believe that many of the *A. viridigenalis* in southern Texas are natural fall–winter dispersants from central Tamaulipas. Although escaped parrots undoubtedly exist in Brownsville, at least some of the observed birds are believed to be wild. Periodic crop failures in northern Mexico may push these birds northward as they are known pests to grain and citrus. Breeding of *A. viridigenalis* in the Valley is possible, but highly unlikely as a regular occurrence. Nesting success is to be expected only in years with sufficient spring and summer moisture to increase fruit production; such years are almost non-existent.

A. viridigenalis observed during summer months may include escapes or may represent a small contingent which remains in southern Texas during the potential breeding season. Further observations will be required to determine the status of these summer birds.

Acknowledgments

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Literature Cited

Adkisson, P. L. 1969. How insects damage crops. *In* How Crops Grow—A Century Later. Bulletin of the Connecticut Agricultural Experiment Station 708:155–164.

American Ornithologists' Union. 1983. Checklist of North American Birds. Sixth edition. Allen Press, Lawrence, Kansas, 877 pp.

Arvin, J. C. 1976. Northeastern region. Mexican Birds Newsletter 1(3):9–11.

———. 1977. Northeastern region. Mexican Birds Newsletter 2(1):7–9.
———, J. Arvin, C. Cottom and G. Unland. 1975. Mexican Crow invades south Texas. Auk 92: 387–390.
Bailey, F. M. 1916. Meeting spring half way. Condor 18:151–155, 183–190, 214–219.
Baird, S. F. 1859. Birds of the boundary. *In* United States and Mexican Boundary Survey, Pt. II. Zoology of the boundary, (W. H. Emory) United States Government, Washington, D.C.
Bent, A. C. 1940. Life histories of North American cuckoos, goatsuckers, hummingbirds and their allies. United States National Museum Bulletin 176:1–506.
Bolen, E. G., and M. K. Rylander. 1983. Whistling-ducks: Zoogeography, ecology, anatomy. Special Publication Museum of Texas Tech University 20:1–67.
Cottam, C., and J. B. Trefethen. 1968. Whitewings. D. van Nostrand, Princeton, New Jersey, 348 pp.
Dresser, H. E. 1865–1866. Notes on the birds of southern Texas. Ibis (Ser. II) 1:312–330, 466–495; 2, 23–46.
Gehlbach, F. R. 1987. Natural history sketches, densities, and biomass of breeding birds in evergreen forests of the Rio Grande, Texas, and Rio Corona, Tamaulipas, Mexico. Texas Journal of Science 39:241–251.
———, D. O. Dillon, H. L. Harrell, S. E. Kennedy, and K. R. Wilson. 1976. Avifauna of the Rio Corona, Tamaulipas, Mexico: Northeastern limit of the tropics. Auk 93:53–65.
Griscom, L., and M. S. Crosby. 1925–1926. Birds of the Brownsville region, southern Texas. Auk 42:432–440, 519–537; 43:18–36.
Hardy, J. W. 1973. Feral exotic birds in southern California. Wilson Bulletin 85:806–812.
Hubbard, J. P., and D. M. Niles. 1975. Two specimen records of the Brown Jay from southern Texas. Auk 92:797–798.
Lane, J. A. 1978. A Birder's Guide to the Rio Grande Valley of Texas. L & P Press, Denver, 111 pp.
Lasley, G. W., and C. Sexton. 1985. Nesting season 1985. South Texas region. American Birds 39: 933–936.
De Laubenfels, M. W. 1924. Summer birds of Brownsville, Texas. Wilson Bulletin 36:161–175.
Luck, R. F., R. Van Don Bosch, and R. Garcia. 1977. Chemical insect control—A troubled pest management strategy. BioScience 27:606–611.
Martin, P. S., C. R. Robins and W. B. Heed. 1954. Birds and biogeography of the Sierra de Tamaulipas, an isolated pine-oak habitat. Wilson Bulletin 66:38–57.
Merrill, J. C. 1878. Notes on the ornithology of southern Texas, being a list of birds observed in the vicinity of Fort Brown, Texas, from February, 1876, to June 1878. Proceedings of the United States National Museum 1:118–173.
Oberholser, H. D. 1974. The Bird Life of Texas. University of Texas Press, Austin, 2 volumes, 1069 pp.
Owre, O. T. 1973. A consideration of the exotic avifauna of southeastern Florida. Wilson Bulletin 85:491–500.
Rutgers, A., and K. A. Norris. 1972. Encyclopedia of Aviculture. Volume 2. Blandford Press, London.
Ryan, R. 1979. Established exotics in the ABA area. Part II. Birding 11:164–166.
Salvin, O., and F. D. Godman. 1889. Notes on Mexican birds. Wilson Bulletin 1 (Ser. 6):232–243.
Sclater, P. L. 1858. On a collection of birds received by M. Salle from southern Mexico. Proceedings of the Zoological Society of London 1857:226–230.
Sennett, G. B. 1878. Notes on the ornithology of the Lower Rio Grande of Texas, from observations made during the season of 1877. Bulletin of the United States Geological & Geographical Survey of the Territories 4:1–66.
———. 1879. Further notes on the ornithology of the lower Rio Grande of Texas, from observations made during the spring of 1878. Bulletin of the United States Geological & Geographical Survey Territories 5:371–440.
Shiflett, W. A. 1975. First photographic record of the Brown Jay in the United States. Auk 92:797.
Strecker, J. K. Jr. 1912. The birds of Texas. An annotated check-list. Baylor University Bulletin 15(1):1–70.
Sutton, G. M. 1939. A list of birds observed on the 1938 Semple expedition to northeastern Mexico. Occasional Papers of the Museum of Zoology of Louisiana State University 3:15–46.
———. 1951. Mexican Birds—First Impressions. University of Oklahoma Press, Norman, 282 pp.

———, and T. D. Burleigh. 1940. Birds of Valles, San Luis Potosi, Mexico. Condor 42:259–262.
———, and O. S. Pettingill, Jr. 1942. Birds of the Gomez Farias region, southwestern Tamaulipas. Auk 59:1–34.
———, and D. S. Pettingill, Jr. 1943. Birds of Linares and Galeana, Nuevo Leon, Mexico. Occasional Papers of the Museum of Zoology of Louisiana State University 16:273–291.
Webster, F. S., Jr. 1974. Fall migration 1973. South Texas region. American Birds 28:76–78.
———. 1977. Fall migration 1976. South Texas region. American Birds 31:197–199.
———. 1978. Nesting season 1978. South Texas region. American Birds 32:1182–1185.
———. 1982. Spring 1982. South Texas region. American Birds 36:871–873.

Shorebird Migration at Arlington, Texas: 1977–1986

Robert L. Neill and Joseph F. Kuban

Department of Biology, The University of Texas at Arlington, 76019

ABSTRACT.—A study of shorebird migration was conducted at Arlington, Texas, from March, 1977 to November, 1986. Thirty species were recorded in the spring migration with 25 reported in the fall. Least Sandpipers were by far the most abundant shorebird in fall migration, followed by Lesser Yellowlegs and Pectoral Sandpiper. Least Sandpiper, Pectoral Sandpiper and Wilson's Phalarope were the most abundant shorebirds in the northward migration.

Species that were definitely more common in spring migration included Wilson's Phalarope, Baird's Sandpiper, Stilt Sandpiper, Long-billed Dowitcher, Semipalmated Plover, Willet, Spotted Sandpiper, Black-bellied Plover, Dunlin and Ruddy Turnstone. The White-rumped Sandpiper, Hudsonian Godwit, Long-billed Curlew, and Whimbrel were recorded only in spring migration. Least Sandpiper, Western Sandpiper, Common Snipe, and Buff-breasted Sandpiper were much more abundant in the fall than in spring. Results were similar to observations made in central Oklahoma in the early 1960's.

Repeated censusing of a given habitat yields valuable information about migration despite the many variables involved (Oring and Davis 1965). Although there have been several studies published on shorebird migration from coastal regions (Urner 1929; Urner and Storer 1949; Storer 1951; Recher 1966; Schneider and Harrington 1981; Chapman 1984) only one study has been conducted from the central flyway region. Oring and Davis (1965) reported on shorebird migration from Norman, Oklahoma (1961–1963). This study provides a comparative study from the central flyway, but was conducted 14–23 years later in a somewhat different habitat approximately 200 miles south of Norman, Oklahoma.

Description of Study Area

Observations were made at the Village Creek Water Treatment Plant (Tarrant Co., Texas) solids drying beds from March, 1977–November, 1986 during the migration seasons. The habitat is south of the Trinity River floodplain on the northern edge of Arlington, Texas. The drying beds were bordered on the north and east by a native deciduous bottomland woodland, on the west by an abandoned field, and on the south by a temporary pond and construction site. There were 48 individual rectangular drying beds (160 × 85 m), each capable of receiving anaerobically digested sludge pumped from a central discharge pipe. At any given time approximately 5–10 beds contained fresh sludge material and the remaining beds were either dry, wet from existing rainfall or overgrown with annual weeds (*Helianthus annuus, Conyza canadensis, Iva annua,* and grasses *Gramineae*). The average foraging area used by shorebirds was estimated to be 6.1–12.1 hectares. Beds that received fresh sewage generally did not attract shorebirds but the beds with dried or semisolid sewage, and especially those holding rain water were

frequently used for feeding. Favorable feeding sites contained high densities of fly larva (*Psychodidae*) which served as a major food source for the birds.

Narrow (4 m) grass-covered dikes partitioned the drying beds and these areas were frequently used as foraging sites by Buff-breasted (*Tryngites subruficollis*), Pectoral (*Calidris melanotos*) and Upland Sandpipers (*Bartramia longicauda*).

Survey Effort

At least ten censuses were made during each migration period except for 1977–1978. A total of 136 spring (1 March–30 May) and 139 fall (1 July–6 November) observations were made from 1977–1986. Observation periods lasted about 90 minutes but some lasted from two to three hours during peak migration. The shorebirds were ranked according to their relative abundances following the methodology of Urner and Storer (1949).

In an effort to avoid counting birds more than once, flock size, movement of flocks and presence of crippled or otherwise marked birds were noted. Census counts usually were taken at least 6 days apart thus reducing the likelihood of counting the same birds. Bird populations were frequently monitored (but not counted) between census dates to reduce the risk of duplicate counting.

Results and Discussion

Thirty-one of the 36 species of shorebirds reported from Tarrant County (Pulich 1979) were observed in the study area. The five unrecorded species (Snowy Plover, *Charadrius alexandrinus*; Mountain Plover, *Charadrius montanus*; American Woodcock, *Scolopax minor*; Red Phalarope, *Phalaropus fulicaria* and Red-necked Phalarope *Phalaropus lobatus*), are all considered to be rare migrants and all but the phalaropes would not be expected to visit sewage drying beds.

Two species not recorded in this study but observed by Oring and Davis were the Red-necked Phalarope and the Snowy Plover. Three species (Black-necked Stilt, *Himantopus mexicanus*; Piping Plover, *Charadrius melodus*; and Ruddy Turnstone, *Arenaria interpres*) were seen in our study area but were absent in the Oklahoma survey. Five species unrecorded in the Oklahoma northward migration (Dunlin, *Calidris alpina*; Ruddy Turnstone; Piping Plover; Avocet, *Recurvirostra americana*; Black-necked Stilt) were observed in Arlington in spring migration (Table 1).

The Black-necked Stilt, Whimbrel (*Numenius phaeopus*), White-rumped Sandpiper (*Calidris fuscicollis*), and Marbled Godwit (*Limosa fedoa*) were recorded only from spring migration. All fall migrants were also recorded during the northward migration.

Oring and Davis (1965) unexpectedly found seven species with greatly reduced numbers in fall migration after the nesting season was completed. These discrepancies existed even though coverage and habitat quality were relatively constant throughout their study. Although the species composition was different we also recorded far fewer numbers in fall migration for seven species. The frequently recorded shorebirds with a greater than 50% reduction in number of fall migrants were: Baird's Sandpiper (*Calidris bairdii*), 92%; Long-billed Dowitcher (*Limnodromus scolopaceus*), 71%; Wilson's Phalarope (*Phalaropus tricolor*), 99%; Spotted Sandpiper (*Actitis macularia*), 73%; Willet (*Catoptrophorus semipalmatus*), 84%; Dunlin, 81%; Semipalmated Plover (*Charadrius semipalmatus*), 63%

Table 1. Ranking of shorebirds by abundance in northward migration—1977–1986.

Species	Rank	Total dates	Total individuals	Maximum daily totals
Least Sandpiper	1 (7)*	94	5,372	540
Pectoral Sandpiper	1 (6)	104	4,310	415
Wilson's Phalarope	3 (5)	84	6,312	400
Lesser Yellowlegs	4 (8)	101	4,489	200
Baird's Sandpiper	5 (1)	90	3,915	385
White-rumped Sandpiper	6 (2)	48	2,398	285
Stilt Sandpiper	7 (1)	44	541	131
Semipalmated Sandpiper	8 (3)	53	534	48
Long-billed Dowitcher	9 (12)	38	572	64
Greater Yellowlegs	10 (8)	40	227	58
Western Sandpiper	11 (22)	32	105	20
Spotted Sandpiper	11 (14)	51	152	7
Buff-breasted Sandpiper	13 (4)	20	103	40
Solitary Sandpiper	14 (18)	30	71	8
Black-bellied Plover	15 (20)	15	51	22
Semipalmated Plover	15 (15)	31	71	6
Lesser Golden Plover	17 (10)	18	61	16
Hudsonian Godwit	18 (17)	11	57	17
Willet	19 (18)	8	37	19
Dunlin	20 —	9	28	18
Common Snipe	21 (20)	8	39	5
Ruddy Turnstone	22 —	5	13	7
American Avocet	22 —	2	19	12
Upland Sandpiper	24 (13)	4	7	4
Sanderling	25 (19)	2	2	1
Long-billed Curlew	25 (25)	1	2	2
Black-necked Stilt	27 —	1	1	1
Whimbrel	27 (25)	1	1	1
Marbled Godwit	27 (27)	1	1	1
Piping Plover	27 —	1	1	1

* Ranking of Oring and Davis (1965) is in parentheses.

(Tables 1, 2). Since most of the species return the following spring in good numbers many of these fall migrants appear to be either taking a different southern route or are less inclined to stop during the southward migration.

Least Sandpiper (*Calidris minutilla*), Western Sandpiper (*C. mauri*) and Buff-breasted Sandpiper were much more common in fall migration. Oring and Davis found the Upland Sandpiper, Long-billed Dowitcher and Stilt Sandpiper (*Calidris himantopus*) to be much more abundant in the fall.

Thirty-one species were ranked by relative abundance (after Urner and Storer, 1949). Thirty species were recorded in spring migration and 25 species observed in southward migration (Tables 1 and 2). Oring and Davis (1965) recorded 26 and 23 species respectively. The Killdeer (*Charadrius vociferus*) was not included in either study as it is considered a permanent resident.

There was eighty percent agreement in the top ten ranked species between the two studies for spring migration (Table 1). Oring and Davis found the Buff-breasted Sandpiper (4th) and Lesser Golden Plover (*Pluvialis dominica*) (10th) to be more plentiful in the Norman study. The Long-billed Dowitcher (8th) and Stilt Sandpiper (9th) were more common in our study. These differences may reflect the presence of more grassland habitat in Oklahoma and better mudflats availability in Arlington although the two study sites accommodated both plovers and sandpipers.

Table 2. Ranking of shorebirds by abundance in southward migration—1977–1986.

Species	Rank	Total dates	Total individuals	Maximum daily totals
Least Sandpiper	1 (1)*	123	38,990	2,400
Lesser Yellowlegs	2 (2)	126	3,993	132
Pectoral Sandpiper	3 (5)	104	3,277	142
Western Sandpiper	4 (3)	86	1,096	80
Semipalmated Sandpiper	5 (4)	61	334	48
Stilt Sandpiper	5 (9)	57	343	46
Baird's Sandpiper	7 (6)	52	342	30
Common Snipe	8 (15)	37	231	50
Long-billed Dowitcher	9 (8)	38	168	25
Buff-breasted Sandpiper	10 (7)	36	259	20
Solitary Sandpiper	11 (11)	52	128	11
Greater Yellowlegs	12 (13)	44	134	10
Wilson's Phalarope	13 (11)	23	94	22
Spotted Sandpiper	15 (19)	29	41	3
American Avocet	14 (18)	11	43	11
Semipalmated Plover	16 (14)	19	26	4
Black-bellied Plover	17 (20)	7	13	5
L. Golden Plover	17 (16)	11	16	3
Upland Sandpiper	19 (10)	7	12	5
Ruddy Turnstone	20 —	2	5	3
Willet	21 (21)	6	6	1
Dunlin	22 (17)	5	5	1
Black-necked Stilt	23 —	3	5	2
Sanderling	24 —	1	2	2
Piping Plover	24 —	2	2	1

* Ranking of Oring and Davis (1965) is in parentheses.

There was very close agreement with Oring and Davis in the ranking by abundance for southward migration as 90% of the top ten species were the same. Generally the drying beds in Arlington have fewer deep water pools in the fall and with the increased vegetation may more closely mirror the Norman habitat.

Even though there were noticeable shifts in abundance of a species from year to year (i.e., L. Yellowlegs, Pectoral Sandpiper, Least Sandpiper) our ten year ranking of shorebird abundance was very similar to the ranking reported by Oring and Davis (1965). We can not directly compare abundances of species since the habitats are different but it does appear that the relative abundance of shorebird populations from the central flyway are stable as we did not note any reduced counts that did not reverse within a two year period.

Species Status

Black-bellied Plover (*Pluvialis squatarola*).—Extremes: 31 March–*28 May and 18 August–31 October. Maximum count: 14 May 1981 (22). Entire flock of 14 May 1981 in breeding plumage. Observed foraging on asphalt areas used for stockpiling dried sewage and at pool's edge. Generally fewer than four birds present on any given date.

Lesser Golden Plover (*Pluvialis dominica*).—Extremes: 31 March–*20 May and *28 July–11 October. Maximum count: 14 April 1986 (16). Most frequently foraged at water's edge or in dry beds containing weed species. Relative ranking in fall migration has remained unchanged but fewer birds recorded during spring migration than were reported by Oring and Davis.

Semipalmated Plover (*Charadrius semipalmatus*).—Extremes: *13 April–*23 May and *20 July–9 October. Maximum counts: 23 April 1986 (6); 28 April 1982 (5) and 16 April 1985 (5). Most common away from standing water on semi-solid or dry ground. Peak migration: April 28–May 3.

Piping Plover (*Charadrius melodus*).—Three records. 20 April 1982 (1), 26 July 1979 (1) and 17 August 1985 (1). In all instances the birds foraged on dried, cracked portions of the drying beds. There were only two records for Tarrant Co. prior to 1979 (Pulich 1979). Piping Plover was not reported by Oring and Davis (1965).

Killdeer (*Charadrius vociferus*).—Permanent resident and migrant. Nests on gravel roadways between drying beds. Nest with 3 eggs—16 April 1979. Fledged 3 young. Early migrants arrive in July with a maximum of 400 birds present in early August, 1979.

Black-necked Stilt (*Himantopus mexicanus*).—Rarely occurs in north central Texas (Pulich 1979) but is now being recorded more frequently. Second record for Tarrant Co. on 24 May 1984 (1). Recorded three times in spring 1986 and nested in July 1986—three young fledged.

American Avocet (*Recurvirostra americana*).—Eleven fall records: *16 July–*6 November. Spring records: 30 April 1985 (12), 3 May 1979 (7). Maximum counts: 3 October 1978 (12), 30 April 1985 (12) and 17 July 1981 (11). Avocets were not recorded in the spring in Oring and Davis' study.

Greater Yellowlegs (*Tringa melanoleuca*).—Extremes: 27 March–28 May and *7 July–*22 November. Maximum count: 30 April 1985 (58). Favored shallow pools for feeding. Relative ranking has remained constant since 1963.

Lesser Yellowlegs (*Tringa flavipes*).—Extremes: 24 March–28 May and 14 July–6 November. Maximum counts: Spring—28 April 1979 (200), 24 April 1985 (507) and 23 April 1986 (193). Fall—11 October 1983 (130). Foraged on dry surface and at shallow pools. Average flock size in spring migration ranged from < 30 in 1977–1978 to > 100 in 1977 and 1985. Peak migration 16 April–7 May and 23 August–11 October. Ranking in fall migration remained unchanged when compared to Oring and Davis (1965).

Solitary Sandpiper (*Tringa solitaria*).—Extremes: 31 March–*21 May and 6 July–29 September. Maximum counts: Spring—23 April 1986 (8); Fall—26 July 1983 (11). Most frequently observed feeding at pool's edge near the dike where vegetation was more abundant. Relative ranking has remained constant through the years.

Willet (*Catotrophorus semipalmatus*).—Extremes: 18 April–6 May and 20 July–*19 September. Maximum count: 24 April 1984 (19). Summer observations were all single birds. No Willets were recorded in 1978, 1980 or 1983 in spring migration or in 1980–1982 and 1984 in the fall. Ranking has remained constant.

Spotted Sandpiper (*Actitis macularia*).—Extremes: 20 April–26 May and 24 July–15 November. Maximum count: 14 May 1982 (8). Greatest numbers consistently recorded 11 May–18 May. Less frequent in summer. Ranking has remained stable.

Upland Sandpiper (*Bartramia longicauda*).—Only four records in spring—individual birds noted on 20 and 24 April 1981 and 21 May 1984*. Four birds on 21 May 1984. Seven fall records from 21 July–6 September; 5 birds observed 21 July 1986. More frequently observed at grassland northwest of study site or in

short grass areas found along dike areas. Birds foraged on dried and cracked portions of drying beds. Numbers were drastically reduced from 1961–1963 levels (Oring and Davis 1965). Drying beds do not appear to offer as attractive of food source as the Oklahoma habitat although other grassland species (i.e. Buff-breasted Sandpiper, plovers) do not show a similar drastic reduction.

Whimbrel (*Numenius phaeopus*).—A single bird observed on the gravel utility road (22 May 1979) constitutes the fifth county record (Pulich 1979); also of rare occurrence in 1961–1963 (Oring and Davis 1965).

Long-billed Curlew (*Numenius americanus*).—Two birds observed in fallowed grassy drying bed 19 May 1977.

Hudsonian Godwit (*Limosa haemastica*).—Observed only in spring migration (1977, 1982, 1985, 1986). Extremes: 22 April–19 May. Maximum count: 26 April 1985 (17). Birds fed at rainwater pools in drying beds and at temporary pond 0.3 miles west of drying beds. The species is becoming more common in spring migration. There were only six records for Tarrant Co. from 1955–1977 (Pulich 1979) but eleven sightings at the drying beds since 1977.

Marbled Godwit (*Limosa fedoa*).—A single bird was observed 30 April 1979. This represents the sixth record for Tarrant Co. (Pulich 1979). More frequently reported by Oring and Davis but the grassland habitat near the airfield was probably a more attractive foraging area than the Arlington drying beds.

Ruddy Turnstone (*Arenaria interpres*).—Six spring records: 20 May 1981 (1); 23 May 1979 (1); 23 May 1981 (1); 23 May 1983 (7); 23 May 1984 (3); and 21 May 1985 (1). Fall records: 24 September 1986 (2) and 20 August 1983 (3). One fall and five spring records were known for Tarrant Co. prior to this study (Pulich 1979). Ruddy Turnstones were not recorded by Oring and Davis (1965).

Sanderling (*Calidris alba*).—Only three records: 7 May 1980 (1), 7 May 1983 (1) and 18 August 1981 (2). Although of rare occurrence at this study site, the Sanderling is considered an uncommon migrant along shorelines of local lakes and fish hatcheries (Pulich 1979). Sanderlings were recorded more frequently in Oklahoma and the species may be declining in numbers in the central flyway region.

Semipalmated Sandpiper (*Calidris pusilla*).—Extremes: 28 March–*26 May and 13 July–27 October. Maximum counts: 29 April 1982 (48), 20 April 1984 (40), and 24 September 1979 (30). Ranks lower in spring migration than in 1963–1965 but average flock size was similar to that found in Oklahoma. Ranking in fall migration remains similar.

Western Sandpiper (*Calidris mauri*).—Extremes: 27 March–22 May and *6 July–6 November. Maximum counts: 21 September 1982 (75), 7 September 1982 (67) and 14 August 1981 (50). Nearly a ten fold increase of Western Sandpipers in the fall when compared to spring. Relatively more common in this study in the spring than in the Oklahoma study. Fall ranking remains constant.

Least Sandpiper (*Calidris minutilla*).—Common migrant and winter resident. Extremes: 6 July–23 May. Maximum counts: 22 September 1981 (2,400), 27 October 1981 (2,300), 11 October 1982 (2,040) and 20 October 1984 (2,020). Ranked most abundant in fall migration (both studies) but more abundant in spring in this study. Greatest numbers recorded 1981–1983.

White-rumped Sandpiper (*Calidris fuscicollis*).—Spring migrant only. Extremes

28 April–29 May. Maximum counts: 23 May 1983 (285), 20 May 1981 (250), 19 May 1985 (249). Ranked higher in 1961–1963 but average flock size greater in our study. Greatest numbers recorded 1981–1983.

Baird's Sandpiper (*Calidris bairdii*).—Extremes: *7 July–20 October and *5 March–26 May. Maximum counts: 14 April 1982 (385), 8 May 1984 (223), 24 April 1984 (203) and 13 April 1983 (169). Relative rankings for fall migration are similar but ranked higher in spring at Norman in 1961–1963.

Pectoral Sandpiper (*Calidris melanotos*).—Extremes: 24 March–31 May and *5 July–5 November. Maximum counts: 11 May 1982 (415), 7 May 1982 (285) and 14 May 1981 (250). Average flock size in spring migration of 1982 was more than six times greater than that recorded for low years of 1979 and 1984. Relative ranking has improved since 1961–1963. Peak migration: 7 May–23 May and 9 August–27 August.

Dunlin (*Calidris alpina*).—Five fall and ten spring records. Only 13 records in 25 years prior to 1979. Extremes: 3 May–23 May and 14 August–*1 November. Maximum count: 23 May 1983 (18), all other sightings were of one or two birds. Dunlin's were not reported from the Oklahoma study and were considered rare prior to 1979 in Tarrant Co. (Pulich 1979). Although few in number, Dunlin were recorded every year from 1979–1986 except for 1985.

Stilt Sandpiper (*Calidris himantopus*).—Extremes: 17 July–*1 November and *2 April–24 May. Maximum counts: 17 May 1985 (135), 14 May 1982 (52), 2 September 1981 (46). More common in spring and higher relative ranking compared to 1961–1963.

Buff-breasted Sandpiper (*Tryngites subruficollis*).—Extremes: 30 April–24 May and 30 July–20 October. Maximum counts: 7 May 1982 (26), 12 September 1978 (20), 20 May 1981 (20). Peak migration: 4 May–20 May and 14 August–24 September. Less common in spring but fall ranking similar to that found by Oring and Davis (1965).

Long-billed Dowitcher (*Limnodromus scolopaceus*).—Extremes: 7 March–*23 May and 11 July–5 November. Maximum counts: 7 May 1982 (64), 3 May 1983 (60) and 30 April 1982 (51). Although recorded in greater numbers this species exhibits the same relative ranking as in 1961–1963 (Oring and Davis 1965). Most abundant 13 April–11 May and 9 August–23 October.

Wilson's Phalarope (*Phalaropus tricolor*).—Extremes: *27 March–*29 May and *14 July–*1 November. Maximum counts: 7 May 1980 (400), 30 April 1985 (344), 3 May 1979 (300) and 29 April 1977 (300). Peak spring migration: 1 May–12 May. Numbers of spring migrants may be cyclical as average flock size was greatest in 1977, 1979–1980, 1982 and 1985. Fall migrants number less than one percent of the total recorded in spring. Oring and Davis (1965) also noted 95% fewer in fall migration. Birds noted feeding in shallow pools and on dry ground where individuals may run in circles while picking up food items. Females are more abundant than males, particularly through mid May.

Common Snipe (*Gallinago gallinago*).—Considered a migrant and winter resident. Extremes: 8 September–17 April. Maximum count: 20 October 1983 (13). Greater numbers present in winter. Frequent grassy borders of temporary pools. Ranking in spring migration is unchanged. Improved fall ranking may reflect presence of wintering birds instead of transients.

Literature Cited

Chapman, B. R. 1984. Seasonal abundance and habitat-use patterns of coastal bird populations of coastal bird populations on Padre and Mustang Island barrier beaches [following the Ixtoc I oil spill]. U.S. Fish Wildlife Serv. FWS/OBS-83/31. 73 pp.

Oring, L. W. and W. M. Davis. 1965. Shorebird migration at Norman, Oklahoma: 1961–63. Wilson Bull. 78:166–174.

Pulich, W. M. 1979. Birds of Tarrant Count. 2nd ed. Branch-Smith, Inc. Ft. Worth, Texas. 188 pp.

Recher, H. F. 1966. Some aspects of the ecology of migrant shorebirds. Ecology 47:393–407.

Schneider, D. C. and B. A. Harrington. 1981. Timing of shorebird migration in relation to depletion. Auk 98:801–811.

Storer, R. W. 1951. The seasonal occurrence of shorebirds on Bay Farm Island, Alameda County, California. Condor 53:186–193.

Urner, C. A. 1929. The southward shorebird flight on the New Jersey coast in 1928. Auk 46:311–325.

———, and R. W. Storer. 1949. The distribution and abundance of shorebirds on the north and central New Jersey coast, 1928–1939. Auk 66:177–194.

* Represents an early or late date for the given migration season based on Pulich (1979).

Bird Painting and Tradition: The Gentlings' Achievement

Stanley Archer

Department of English, Texas A&M University,
College Station, Texas 77843

ABSTRACT.—*Of Birds and Texas* (1986) by Scott and Stuart Gentling reproduces in full color 40 original drybrush watercolor paintings of birds found in Texas. The large (22 × 28 inch) format makes it possible to depict the birds—45 species, 86 individuals—life size. Painting in the tradition of Audubon and Fuertes, the Gentlings achieve high artistic standards. They approach the task not as naturalists or illustrators, but as artists. Every painting, including the background, is complete; many place the species within a distinctly Texas landscape or include familiar landmarks in their backgrounds. The composition is richly varied, with settings and backgrounds adapted to the birds' size and pose. Illumination is handled with subtlety, especially tone values or perceived variations in light intensity.

I. Introduction

In 1986, Scott and Stuart Gentling, twin brother artists from Fort Worth, published *Of Birds and Texas,* a major achievement in bird painting and in publishing. Issued unbound, the plates and accompanying printed texts are boxed, forming two large portfolios. The 137 pages include fifty plates printed by offset lithography by the Wind River Press of Austin, reproducing, in full color, original dry-brush watercolor paintings of ten Texas landscapes and forty bird paintings. The remaining 87 pages consist largely of commentary on the paintings and introductory matter, including a 13,000 word essay on birding, "Recollections of a Texas Bird Glimpser," by John Graves. The original bird paintings have been exhibited at the Dallas Museum of Natural History (September–November 1986) and the Fort Worth Museum of Science and History (April–September 1987). Although three of the landscape paintings feature birds, the present study is limited to the bird paintings and, to a lesser extent, the commentaries on them. For in their depiction of Texas birds, the Gentlings draw from a long tradition of ornithological art in America and advance the aesthetic standards of the past in important ways.

The commentary accompanying each painting offers general information about the species and the artists' experiences with the bird. It often gives information about the locale, setting, or terrain in the painting. It sometimes explores, in a non-technical way, the mood of the painting. Readers will find little of scientific interest in the commentary, though the contents will strike responsive chords in birding and nature enthusiasts, and they provide valuable guidance about details of the painting.

The Gentlings' project, which required about a decade to complete, the painting alone being done during 1981–1986, had as its goal the selection of birds from all parts of the state, with no effort to include all species. Choice of species was based upon aesthetic rather than ornithological considerations. As Stuart Gentling

(1986) explained, "With all of the paintings, it was the pictorial idea as a whole and its dramatic form which dictated our choice of a bird, . . . the birds were chosen only as part of a larger scheme. . . ., the overall mood, drama, and setting are of equal importance." Thus, of the wrens, one sees only "House Wren" (Plate XXII); of the hummingbirds, only "Rivoli's" (XLII); of doves, only "Mourning Dove" (XXXI). Most of the subjects occur throughout the state and widely over the United States as well, but there are a few Trans-Pecos specialties—"Zone-tailed Hawk" (XLVI), "Acorn Woodpecker" (XX), and "Flammulated Owl" (XXXII)—and Rio Grande Valley specialties like "Lichtenstein's Oriole" (XLVIII) and "Red-billed Pigeon" (XXIX).

II. The Tradition

American bird painting first appears as a major achievement in the work of Alexander Wilson (1766–1813), whose *American Ornithology* (9 vols., 1808–1814) included 76 plates, hand-colored, depicting more than 250 species. Before Wilson, the English naturalist Mark Catesby (c. 1679–1749) studied the flora and fauna of several southeastern states and published his *The Natural History of Carolina, Florida, and the Bahama Islands* (1731–1743). The work includes plates illustrating native American birds and anticipating later conventions of ornithological art, though Catesby left no lasting influence. Wilson's pioneer work incorporated extensive commentary on species observed during his journeys throughout the Eastern United States. On one such journey, in Louisville, Kentucky, he met John James Audubon. On this occasion, seeing Wilson's painting spurred the merchant Audubon to greater efforts in his avocation, bird painting.

Eventually, Audubon (1785–1851) resolved to surpass Wilson by painting all the species of North America, life-size, in their natural habitats. At first he planned a full and complete painting for each species, including background and sky as elements of the habitat. Once involved in his massive project, however, he found himself pressed for time and left most of the backgrounds incomplete. The finished paintings are primarily devoted to selected waterbirds, waders, shorebirds, and raptors. The backgrounds for these works were often done by assistants like Joseph Mason and George Lehrman, who alone produced forty, and by the engraver Robert Havell. Yet Audubon's painting of the "Goosander" (Red-breasted Merganser, plate 331) includes a completed sky and in the background Cohoes Falls along New York's Mohawk River. Toward the end of his project, which required over two decades, Audubon departed from his aim of painting one species for each plate and produced several composite paintings, like most of Wilson's. On numerous plates, he made an effort to include all color phases of the same species, as with the "Red-headed Woodpecker" (27) and "Little Blue Heron" (307). For other species, he painted several individuals so positioned as to reveal their richly varied coloration more fully, the "Wood Duck" (206) being an important example.

Among the numerous followers of Audubon, Louis Agassiz Fuertes (1874–1927) achieved the greatest stature. He holds special significance for Texas birders, for approximately eighty of his paintings were chosen to illustrate Oberholser and Kincaid's *The Bird Life of Texas* (1974). A prolific illustrator who issued no separate volume of his own, Fuertes had a profound understanding of the principles of art and an intense devotion to the craft of painting. Painting in the Audubon tradition, he portrayed birds somewhat more realistically. He achieved

a high degree of accuracy in his paintings and maintained fidelity to nature in the poses of his birds. He studiously avoided endowing them with human expressions as Audubon sometimes had done. As with Audubon, few of the paintings are finished, for there is seldom a completed background. Among those that are complete, "Mallard and Black Duck" (Plate 1), "Bronzed Cowbird" (28), and "Lewis's Woodpecker" (16) are outstanding examples.

Following the era of Fuertes, bird painters have grown numerous, and most appear to have limited their endeavors to a state or region. Roger Tory Peterson (1981) has made a comprehensive survey of modern bird artists, with brief and informative assessments.

None of the successors of Audubon has approached the scope of his accomplishment in *The Birds of America,* which required eleven years (1827–1838) for publication alone. His Double Elephant Folio, with pages measuring 26½ × 39½ inches, included 435 plates, 489 species by his reckoning, and 1,035 individual life-size bird paintings. Although he left no single work to rival Audubon, Fuertes was exceptionally prolific as an illustrator, painting hundreds of American and exotic species. In addition to the illustrations in the Oberholser and Kincaid volumes, his work is readily accessible in *Birds of America,* ed. T. Gilbert Pearson, *et al.* (1936). This work offers 106 color plates to illustrate more than 300 species, most of the plates being composites.

In their forty plates, the Gentlings have included 45 species and 86 individual birds. Like Audubon's birds, they are life-size, except for "Wild Turkey" (XVI), which was painted life-size but reduced to fit the 28 × 22 inch Great Imperial Folio page. For his press run of 200 copies, Audubon found 161 subscribers willing to pay $1,000 per copy for the completed portfolio. The Gentlings' work had a press run of 500 copies, priced at $2,500 each.

Emphatically, the Gentlings paint within a long tradition. Not only do they acknowledge this reality, they pay generous tribute, even homage, to their predecessors. Their volume is dedicated to the memory of Audubon, and their commentaries frequently note more specific debts. The pose of the "Cattle Egret" (XIII), the commentary acknowledges, was derived from Audubon. To accompany their painting of "Great-tailed Grackle" (XXXIII), they reproduce as an additional plate Audubon's "Great Crow Blackbird" from the original painting that was in their possession. Included among the illustrations in a supplement to Wilson's *American Ornithology,* it was Audubon's first bird painting to be published. They incorporate a previously unpublished commentary by Audubon on the Red-shouldered Hawk, reproducing one page as a facsimile. They acknowledge a debt to Fuertes for the composition of the "Zone-tailed Hawk" (XLVI). And they dedicate their painting of the "Rufous-sided Towhee" (XXXV) to Wilson, whose painting of the species suggested the pose for one of the two birds in their painting. It is difficult to find anything in the Gentlings' approach or technique that is entirely without precedent. Their unique achievement lies in their building on a foundation of established conventions and practices.

III. Composition

The first and most obvious point to be made about the composition in the paintings is that all are complete. None have blank spaces where sky or landscape have been omitted. Without exception, the birds fit into fully developed paintings.

Thus the Gentlings have, albeit on a lesser scale, achieved Audubon's ideal of providing completed paintings. Not all of the settings are natural, though none is unnatural to the species. For example, "House Wren" (XXII) depicts two small wrens actively exploring a pair of western boots on a porch as if seeking a suitable nesting site.

As landscape painters, the artists have made an effort to depict identifiable Texas landscapes in their paintings, in part because they see their work as not merely a celebration of Texas birds but of Texas as well. One can readily identify the rolling plains of North Central Texas, the Staked Plains of the Panhandle, and the Hill Country near Austin. Several paintings are even more specific as to locale. The Brazos River is depicted in the painting "Black-crowned Night Heron" (XXVI). In the background of "Crested Caracaras" (XXXVII), one discerns unmistakably Mission Espiritu Santo at Goliad. The "Zone-tailed Hawk" (XLVI) glides over the Chisos Mountains of Big Bend, with the boot of Boot Canyon a distinct landscape feature in the distance. And "Mourning Dove" (XXXI) stands near a dinosaur track painted from the dry, rocky bed of the Paluxy River near Glen Rose.

As for the birds themselves, the Gentlings normally follow Audubon's plan of one species for each painting. The one exception to this, their composite "Six Migrating Warbler Species" (XL), suggests a graceful concession to the rich tradition of Audubon and Fuertes. In each painting, the birds are depicted life-size, another convention established by Audubon. It is not always easily achieved, for in the "Turkey Vulture" (XI) painting the subject's folded wings overflow into the margins. The number of individuals in a painting may vary from one to seven, though the choices of number appear to rest on aesthetic rather than ornithological grounds. The paintings are not designed to present the various color phases of a species. The "Cattle Egret" (XIII), for example, is represented by a pair, both in breeding plumage. Nor do the Gentlings necessarily position the birds in such a way that the rich coloration is revealed, as Audubon did at times.

For the most part, the positions are natural for the species, yet several are stylized in accordance with tradition or aesthetic consideration. The "Zone-tailed Hawk" (XLVI) is flying with wings folded and tail feathers fanned out to reveal the striking bands. As the notes explain, this configuration is taken from Fuertes, who probably—and untypically—copied a pose Audubon used for several of his hawk paintings. The pose of the Cattle Egrets, according to the commentary, is derived from Audubon, who sometimes depicted the larger species as stately beings condescending to be painted.

Viewers expect from artists new and consequently surprising perspectives, and some perspectives in the Gentlings' collection pose a challenge. One observes that the number of birds painted in flight is unusually large. A flying bird captured by photography or painting represents frozen energy and lends drama. Fuertes painted very few birds in flight, and when he did they were seen at a distance, like the "Bald Eagle" (Oberholser and Kincaid, plate 8), possibly because viewers are not accustomed to seeing birds life-size in flight.

Audubon painted several examples of life-size birds in full flight at an indefinite height, including "Golden Eagle" (181). At times, however, his perspective creates potential problems for viewers. In several sea bird paintings, notably "Leach's Petrel" (260) and "Stormy Petrel" (270), he depicts the birds flying over a turbulent

sea without shoreline, leaving the viewer with a feeling of being stranded in the midst of a boundless ocean.

When a bird is posed on a low branch, on the ground, or on a moderately tall bush or tree, the perspective seems plausible enough, for it is at about the right level for realistic perception. To paint birds in flight, life-size, perhaps twenty-five or more feet above a landscape, is to elevate the viewer to an unaccustomed perspective. Several paintings give the impression of indefinitely high flight. Two "Sharp-shinned Hawks" (XXIII) wing their way over a marsh in early morning light, and two "American Woodcocks" (XIX) fly high over swampy ground, their comical wings frozen in space at the viewer's eye level. The combination of arrested kinetic energy and a perspective that exploits unaccustomed height and proximity to the birds creates an unusual and memorable aesthetic effect.

The rich variety of the Gentlings' composition should assure that everyone interested in bird art will find several appealing. The paintings include some with individual small birds against a picturesque or scenic landscape. Others are of large birds with limited background in view, so that the bird dominates the painting. Still others like the "Cardinal" (XII) and the composite "Six Migrating Warbler Species" (XL) include enough birds that the paintings seem vibrant with life.

IV. Illumination

The work of the Gentlings most conspicuously surpasses that of their predecessors in illumination, or the reception of light. Simply stated, any painting should have a clear and consistent source of light, and for bird painters, since the subject is normally outdoors, that light is the sun. The painter re-creates the way light strikes uneven surfaces in the painting. Fuertes (1979) understood this principle quite well, for he wrote to his pupil, George Miksch Sutton, that in each painting there is a point of brightest bright and one of darkest dark, with orderly degrees of light between these two. To depict this alteration of light intensity is one of the painter's most challenging tasks. Yet a painter cannot exactly reproduce reality; what he must attempt is an illusion that suggests reality. Fuertes, though he understood the theory, was unable to apply his principle consistently. Like almost all bird painters of the past, he confronted two problem areas that prevented excellence in this realm—the purpose and the procedure.

If the purpose is to re-create the actual coloration of a species, as Audubon did with painstaking care, then light subtleties will be largely ignored. This illustrative kind of painting serves best for field guides. It normally assumes a light source behind the viewer, distributed evenly over the bird's entire body. Since magnification reduces light contrasts, with good binoculars it is possible to view birds this way in nature. Yet anyone who has attempted to photograph them knows that in nature light seldom strikes them evenly. Audubon appeared to prefer a strong light source from behind the viewer and to the left, with the subject facing slightly toward the light. His preferred pose usually produced even lighting throughout and often resulted in a flat surface. Artists can compensate and create the illusion of three dimensions by giving great care to feather painting, achieved through an adequate knowledge of pterolygraphy. But serious artists are also inclined to give careful attention to variations in light intensity in order to achieve depth. This is one of the matters Peterson had in mind when he wrote (1981)

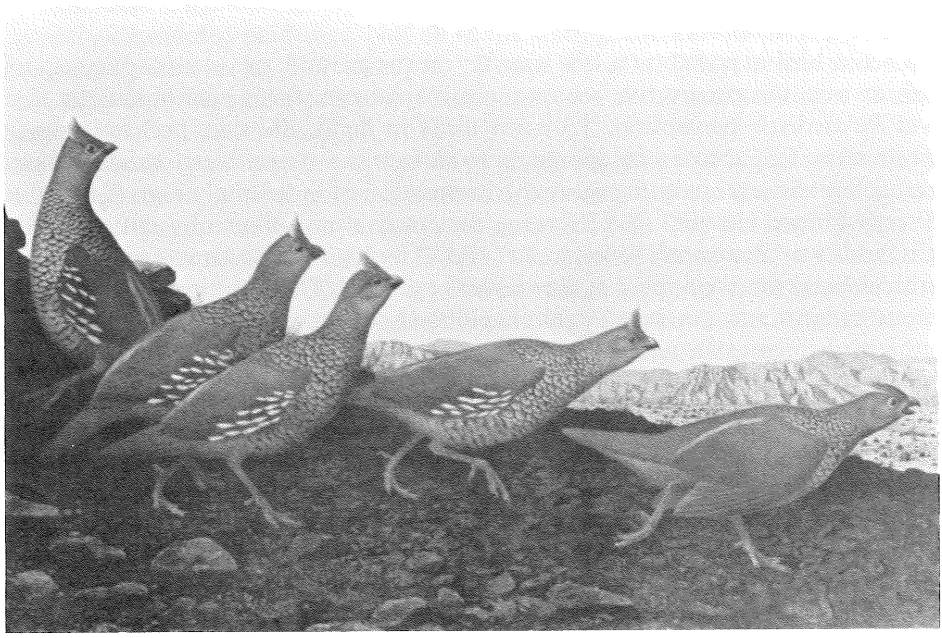

Plate XXV. Scaled Quail.

that he planned to adopt a more painterly manner. His painting "Puffins" (1979) demonstrates sound principles of illumination at work.

As for the procedure, as is well known, Audubon first drew the bird, then painted it. The third and fourth steps were to draw in and complete the background, steps often either ignored or carried out by someone else. From Fuertes' comments about composition, it seems probable that he followed the same procedure, first drawing the bird life-size. This procedure precludes clear initial decisions about lighting that are needed if the illumination is to be consistent. As a consequence, it is not unusual in early bird art to find that shadows in the background take a direction different from those cast by the bird. A painterly approach to the matter requires that illumination be taken into account early in the process.

It is instructive to contrast this procedure to the one used by the Gentlings. Although the paintings are genuine collaborations, their individual responsibilities were usually separable. Stuart had primary responsibility for the design and drawing; Scott for the painting. This division of effort fits their stated intent of placing the bird subject within a unified setting and of considering the painting as a whole. In this approach to the task, decisions about illumination would normally be made before any coloring is applied.

Perhaps the most remarkable element in the Gentlings' illumination is its variety, as if they chose to challenge themselves to produce the full range of lighting possibilities. Two paintings—"Mockingbird" (XXXVIII) and "Black-crowned Night Heron" (XXVI)—represent night scenes. The rest are under daylight conditions from the yellow-green light of early morning in the "Crested Caracara" (XXXVII) to the reddish twilight chosen for the "Flammulated Owl" (XXXII).

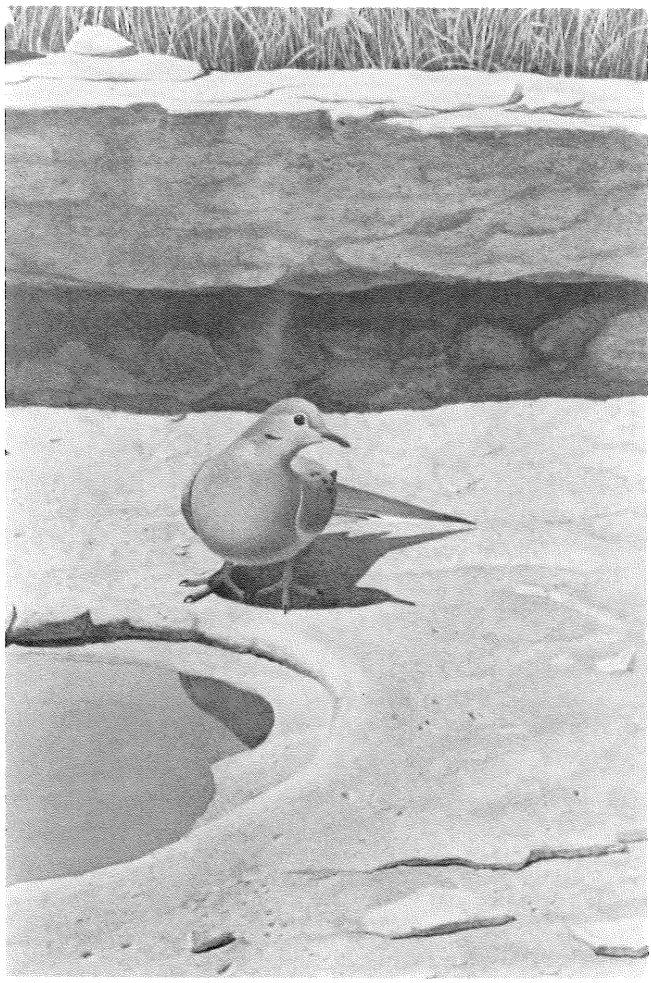

Plate XXXI. Mourning Dove (detail).

Skies in the paintings are variously portrayed as clear, lightly overcast, with broken cloud cover, with a heavy canopy, even with a rainbow. Perhaps the most remarkable lighting effects occur with the "Chuck-will's Widow" (XLV), settled atop a fence post surrounded by flowering trumpet vine, with an ominous wall cloud spawning a tornado in the distance. The dark cloud obstructs afternoon sunlight and creates the yellow-green light that one observes under similar conditions in nature.

The paintings themselves illustrate an interplay of light and shadow consistent with the source. In some of his more finished printings, like the "Whooping Crane" (226) or "Long-billed Curlew" (231), Audubon supplied shadowing, often limiting it to shadows cast by the bird's legs. Fuertes occasionally provides shadowing to indicate the light source, usually with waterbirds, shorebirds, and waders. His illustrations of "Mallard and Black Duck" (Oberholser and Kincaid, plate 1) and "Bronzed Cowbird" (28) serve as good examples of this kind of finishing, though

Plate XLVI. Zone-tailed Hawk.

as with Audubon most of his paintings reveal little attention to illumination beyond the most casual.

The Gentlings' work evinces more careful and consistent treatment of illumination, the "Mourning Dove" (XXXI) representing an excellent illustration of this technique. The painting shows a single bird standing in a dry riverbed beside a water-filled dinosaur track. The entire scene is illuminated by an intensely bright sun high overhead and slightly to the left. The bird and a low rocky ledge behind cast dark shadows against the stony riverbed.

Even more important than light and shadow contrasts is the presence of *tone values*. To explore this phenomenon in the paintings, an examination of the bird subjects is most efficient, though it applies to entire paintings as well. Depending on light conditions and on the way the bird is posed, light will strike the surface with varying intensities. To show this variation is to give a subject the appearance of a third dimension. Although he usually ignored this principle of painting,

Audubon gave it limited attention, often showing how an extended wing obstructs light falling on a bird's body and thereby makes it dimmer. One seldom finds anything beyond the most primitive *values* in Audubon, though his "Sandhill Crane" (261) shows that he understood the essentials. It is instructive, and to Audubon's credit, to compare his painting of the species with Fuertes' (Pearson, plate 24).

For the Gentlings' achievement in tone values, the "Mourning Dove" (XXXI) is again a paramount example. Intense light strikes the bird's body from above and to the bird's right side, creating bright illumination of the head, neck, back, and upper tail feathers. At its most intense point, the light forms a small iridescent spot on the bird's neck. White feathers along the tail edge are brightly illuminated, while the indirect light makes the tail feathers underneath a shadowy light gray. From the head, the natural light gradually dims as it descends along the bird's breast and belly, affecting color as well as brightness. All remains consistent with the light source.

Perhaps the most elegant achievement with illumination occurs in the painting "Scaled Quail" (XXV), where the illumination creates strong contrasts and lower light levels are handled with great subtlety. The painting shows a small covey of five aligned almost in single file, so as to reveal a side view of each. Their heads and necks extend above a ridge line slightly behind them. Light originating from beyond the ridge illuminates their upper portions, while the body parts and feet below the ridge line, partially shadowed, are almost as dark as the shaded rocky soil beneath their feet. In the distance, a bright light splashes over the desert floor and the hills beyond, creating a highly effective contrast.

Not all of the paintings reflect this subtlety in tone values. For one reason, light conditions are so varied that in each painting the situation is different. When sunlight is obstructed by clouds, shadow contrasts and variations in light intensity will be sharply reduced. When the sun is assumed to be behind the viewer, then light on the bird's body will be distributed rather evenly. The "Lichtenstein's Oriole" (XLVIII) serves as a good illustration. Three adult birds in heavy foliage are positioned so that the sun shines directly on them from above and behind the viewer, creating an even distribution on light on their bodies. To find the variation in light, one has to examine the leaves, where sunlight creates elegant interplay of light and shadow.

V. Conclusion

The Gentlings have left an enduring legacy in ornithological art. Their work, it seems certain, will reach increasingly wider audiences and will receive increasing acclaim. The Fort Worth Museum of Science and History has launched a campaign to purchase the original watercolors and has acquired most of them, an effort which will keep the collection intact and accessible to the public. In addition, again following the precedent of Audubon, the Gentlings will soon release a smaller format edition of the prints, affordable to the average person interested in art. Building upon a tradition established by legendary artists of the past like Audubon and Fuertes, Scott and Stuart Gentling have surpassed earlier achievements by bringing their individual talent and vision to the task of portraying Texas birds and landscapes.

Acknowledgments

I would like to acknowledge the generous and expert assistance of the following people: Stuart Gentling, for granting permission to reproduce the paintings and for answers to numerous questions; Nancy Bandy, of The Victoria College Art Department, for helpful suggestions; and Dr. Donald Dyal, head of Special Collections at The Evans Library, Texas A&M University, for his guidance through the Kincaid Collection.

Works Cited

Audubon, John James. 1942. The Birds of America. The Macmillan Company, New York.

Fuertes, Louis Agassiz. 1979. To a Young Bird Artist: Letters from Louis Agassiz Fuertes to George Miksch Sutton. University of Oklahoma Press, Norman.

Gentling, Scott, John Graves, and Stuart Gentling. 1986. Of Birds and Texas. Fort Worth, Texas. Gentling Publications.

Oberholser, H. C., and E. B. Kincaid, Jr. 1974. The Bird Life of Texas. 2 vols. University of Texas Press, Austin.

Pearson, T. G. et al., eds. 1936. Birds of America. Garden City Publishing Company, Inc., Garden City, New York.

Peterson, R. T., and V. Marie Peterson. 1981. Audubon's Birds of America. Abbeville Press, New York.

SHORT COMMUNICATIONS

Great Kiskadees Observed Feeding on Reptiles

Paul C. Palmer

615 South Wanda Drive, Kingsville, Texas 78363

The Great Kiskadee (*Pitangus sulphuratus*), like other flycatchers, feeds on a wide variety of insects. Many observers have reported the kiskadee's habit of feeding kingfisher-like on small fish. At least two sources in Bent (1942. Life histories of North American fly-catchers, larks, swallows, and their allies. U.S. Nat'l Mus. Bull. 179) reported that the species sometimes feeds on fruits and berries. I have on many occasions watched Great Kiskadees feed on the fruits of wild Turk's Cap (*Malvaviscus drummondii*) in my own yard. However, I am unaware of any previous records of kiskadees feeding on reptiles.

In the Spring of 1986 I twice watched kiskadees prey on reptiles. In the late afternoon of 28 March 1986 my wife Nancy and I observed a Great Kiskadee perched on a shrub at the edge of a shallow temporary pond some 15 m off a caliche road west of Ricardo, Kleberg County, Texas. We watched the bird, hoping to see it fishing. The bird dropped from its perch and quickly came back into view carrying an actively wriggling unidentified snake about the same length as the bird, roughly 25–30 cm. It flew with apparent difficulty to the lowest limb of a dead mesquite tree, about 15 m to the east of us and began to strike the snake against the limb in an effort to kill it.

Almost immediately a Loggerhead Shrike (*Lanius ludovicianus*) approached from the south, apparently intent upon stealing the snake. The kiskadee responded by flying off in the opposite direction, carrying the still-twisting snake. Although the kiskadee's flight seemed slowed by its burden, the shrike pursued less than 50 m before giving up the chase. Nothing more was seen of the kiskadee or its catch.

At 0730 of 18 May 1986 I was watching a Great Kiskadee nest known to contain nestlings in a Texas Ebony tree (*Pithecellobium flexicaule*) in a cemetery in Kingsville, Kleberg County, Texas. An adult kiskadee landed in a mesquite tree near the nest site. It carried in its beak a rather bulky lizard, apparently of the genus *Sceloporus*. Judging from the known size of the bird, the reptile was approximately 10 cm long even with almost all its tail missing.

The kiskadee proceeded to beat the lizard against a branch, occasionally pausing to toss and catch it, masticate it, reposition it and then beat it some more. It continued this vigorous activity for 12 min. At the end of that period the bird flew into the nest opening with its prey, now slightly elongated but essentially intact.

Immediately both adults emerged from the nest with the reptile now carried by the second bird. (A bare area on the breast of the first bird made them easy to distinguish.) The first bird wiped its beak and flew away, while the second

began to abuse the lizard in much the same way the other had done. The second bird bashed the lizard for only 2 min before carrying it back into the nest.

With its ability to feed on insects, fish, fruiting plants and reptiles, the Great Kiskadee should be able to continue to make a niche for itself anywhere in south Texas.

An Aerial Counter-Attack by a Cooper's Hawk

Robert E. Wilson

Department of Biological Sciences, East Texas State University,
Commerce, Texas 75428

On January 30, 1985, while I was driving from Royse City to Rockwall on Texas Highway 66, my attention was attracted to two low-flying hawks approaching the highway across an open field. They were flying south into a strong headwind, one behind the other. As I drew closer to the pair, it became evident that the two hawks were on parallel courses, rather than one bird pursuing the other. The first one to cross the roadway proved to be a mature Redtailed hawk (*Buteo jamaicensis*). The second was a young male Cooper's hawk (*Accipiter cooperii*) that was being harassed by a male Red-winged blackbird (*Agelaius phoeniceus*).

Upon crossing the highway and clearing the powerline at the edge of the right of way, the Red-winged blackbird made a diving attack on the Cooper's hawk. The hawk responded by rolling into inverted flight and, with an explosion of black feathers, grasping the blackbird in both talons. From the inverted position, he performed one half of an "inside loop," dropping about three meters in altitude and reversing course with this maneuver. At the lower altitude the hawk, still clutching the blackbird, flew away to the north until I lost sight of him through the passenger-side window.

The reputation of both accipiters, the Sharp-shinned (*A. striatus*) and Cooper's hawks, as aerial predators of other birds is well known. I have seen Sharp-shinned hawks commit daily attacks on a flock of domestic Rock doves (*Columba livia*) when the pigeons were released for late afternoon flights. Forbush and May (1939) mentioned a Sharp-shinned hawk returning the attack of a Red-winged blackbird, driving the blackbird away. Bent (1937) told of a Cooper's hawk diving and "turning over" to take a Northern bob-white (*Colinus virginianus*) from below.

An aerial maneuver known as an "Immelmann turn," consisting of a half-roll and a half-loop (in either order), was developed by German ace Max Immelmann during World War I (Page 1939), as a means by which the pursued became the pursuer. I can find no reference to this technique being used by one bird as a means of discouraging harassment by other birds. It appears on occasion to be fatally effective.

Literature Cited

Bent, A. C. 1937. Life history of North American birds of prey. Pt. 1. U.S. National Museum, Bulletin 167. Washington. 409 pp.

Forbush, E. H. and J. R. May. 1939. A natural history of American birds of eastern and central North America. Bramhall House, N.Y. 554 pp.

Page, V. W. 1939. ABC of aviation. Norman Hensley Co. New York. 418 pp.

Recent Articles about Texas Birds

Karen L. Benson

Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas 77843

—1985—

Anderson, M. E., and R. N. Connor. 1985. Northern Cardinal song in three forest habitats in eastern Texas. Wilson Bull. 97(4):436–449. Found distinct dialects in the songs of cardinals associated with sapling, pole and sawtimber stands.

Boyce, M. S. and R. S. Miller. 1985. Ten-year periodicity in Whooping Crane census. Auk 102(3):658–660. Data suggest variation in mortality affects population fluctuations.

Boyd, R. L., and B. C. Thompson. 1985. Evidence for reproductive mixing of Least Tern populations. J. Field Ornithol. 56(4):405–406. An atlantic race Least Tern banded as a juvenile near Port Lavaca, Texas was found paired with an interior race Least Tern at Quivira NWR in Kansas.

Boydstun, C. P., and C. A. DeYoung. 1985. Distribution and relative abundance of White-Tipped Doves in south Texas. Southwest Nat. 30(4):567–571. Reports abundance in various habitats in Cameron, Hidalgo, Starr, Willacy, Zapata, Brooks, Kenedy, and Webb counties.

Brown, C. R. 1985. Vocalizations of Barn and Cliff Swallows. Southwest Nat. 30(3):325–333. Described 8 vocalizations in Barn Swallows and 4 in Cliff Swallows breeding in north central Texas and south central Oklahoma.

Campbell-Kissock, L., L. H. Blankenship, and J. W. Stewart. 1985. Plant and animal foods of Bobwhite and Scaled Quail in southwest Texas. Southwest Nat. 30(4):543–553. Reports foods eaten by these two species during fall-winter drought conditions.

Eddleman, W. R., and F. L. Knopf. 1985. Determining age and sex of American Coots. J. Field Ornithol. 56(1):41–55. One of the collection sites was Laguna Atascosa NWR, Texas.

Gilmer, D. S., D. L. Evans, P. M. Konrad, and R. E. Stewart. 1985. Recoveries of Ferruginous Hawks banded in south-central North Dakota. J. Field Ornith. 56(2):184–187. 46% of all winter and spring recoveries were from Texas and Mexico, suggesting that Texas is an important wintering area for Ferruginous Hawks produced in North Dakota.

Haig, S. M., and L. W. Oring. 1985. Distribution and status of the Piping Plover throughout the annual cycle. J. Field Ornithol. 56(4):334–345. Gulf of Mexico beaches, sandflats, and mudflats from Campeche, Mexico to the Florida Keys were censused for wintering Piping Plovers. The heaviest concentration of the species was in Texas.

Hamilton, G. D., and R. F. Martin. 1985. Investigator perturbation and reproduction of the Cliff Swallow. Auk 102(1):167–170. Study sites were in south Texas. Major and minor nest-neck breakage significantly affected nestling period, numbers fledged/nest and numbers fledged/numbers hatched.

Hobaugh, W. C. 1985. Body condition and nutrition of Snow Geese wintering in southeastern Texas. J. Wildl. Manage. 49(4):1028–1037. Found that the quality and quantity of wintering-ground food resources were not limiting factors adversely affecting the body condition of Snow Geese.

Iverson, G. C., P. A. Vohs, and T. C. Tacha. 1985. Distribution and abundance of Sandhill Cranes wintering in western Texas. J. Wildl. Manage. 49(1):250–255. Found an average of 363,000 Sandhill Cranes on highly saline pluvial lakes during January and February, 1980.

———, ———, and ———. 1985. Habitat use by Sandhill Cranes wintering in western Texas. J. Wildl. Mange. 49(4):1074–1083. Found habitat components essential to the welfare of the wintering Sandhill Cranes were pluvial lakes for roosting, fresh water for drinking, and milo stubble fields for feeding.

Johnson, D. H., G. L. Krapu, K. J. Reinecke, and D. G. Jorde. 1985. An evaluation of condition indices for birds. J. Wildl. Manage. 49(3):569–575. Compares several methods using data from Greater White-Fronted Goose and Sandhill Crane; 15 cranes were taken near Muleshoe NWR, Texas.

Kerlinger, P., and S. A. Gauthreaux, Jr. 1985. Flight behavior of raptors during spring migration in south Texas studied with radar and visual observation. J. Field Ornithol. 56(4):394–402. Studies were carried out at Santa Ana NWR.

———, and ———. 1985. Seasonal timing, geographic distribution, and flight behavior of Broad-winged Hawks during spring migration in south Texas: A radar and visual study. Auk 102(4):735–743.

King, K. A., D. R. Blankinship, E. Payne, A. J. Krynitsky, and G. L. Hensler. 1985. Brown Pelicans and pollutants in Texas 1975–1981. Wilson Bull. 97(2): 201–214. Data indicate reproductive success has improved and the population is increasing.

McNair, D. B. 1985. A comparison of oology and nest record card data in evaluating the reproductive biology of Lark Sparrows, *Chondestes grammacus.* Southwest Nat. 30(2):213–224. Majority of the records were from California and Texas.

Morgan, J. G., and L. M. Feltner. 1985. A neotropical bird flies north: The Greenish Elaenia. Am. Birds 39(3):242–244. This species was observed 20–23 May 1984 at High Island, Texas.

———, T. L. Eubanks, Jr., V. Eubanks, and L. N. White. 1985. Yucatan Vireo appears in Texas. Am. Birds 39(3):244–246. This species was observed 29 April–27 May 1984 at a coastal motte near High Island, Texas.

Mueller, A. J. 1985. Vertebrate use of nontidal wetlands on Galveston Island, Texas. Texas J. Sci. 37(2&3):215–225. Compared a natural and a man-made wetland; found the natural area received equal or greater use by aquatic birds

except for Black-crowned Night-heron and American Coot. Recorded 234 species of birds using the non-tidal wetlands.

O'Kelley, B. L., and E. G. Bolen. 1985. Hunting pressure on Black-bellied Whistling-ducks as indicated by embedded shot. Wildl. Soc. Bull. 13(4):515–517. Indicates that Black-bellied Whistling-ducks survive hunting incidents in ways paralleling other species of similar target size.

Prescott, K. W. 1985. Eastern Screech-owl captures goldfish in patio pond. Wilson Bull. 97(4):572–573. Observation occurred in Austin, Texas.

Quay, W. B. 1985. Cloacal sperm in spring migrants: Occurrence and interpretation. Condor 87(2):273–280. One of the sampling localities was Galveston, Texas. Suggests a rapid, noninvasive, repeatable method for assessing sex and physiological state.

———. 1985. Sperm release in migrating wood-warblers (Parulinae) nesting at higher latitudes. Wilson Bull. 97(3):283–295. Suggests that precocious sperm-release by high-latitude nesters during spring migration is an adaptation for more rapid onset of reproduction in areas with short summers.

Schram, A. C., H. F. Gonzalez, and C. D. Meador. 1985. Immune response in the Bobwhite quail, *Colinus virginianus.* Texas J. Sci. 37 (2&3):133–139. Results suggest a closer phylogenetic relationship between the chicken, *Gallus domesticus,* and bobwhite quail than between bobwhite quail and the scaled quail, *Callipepla squamata.*

Swanson, D. W. 1985. New nesting record for Botteri's Sparrow, *Aimophila botterii,* in south Texas. Southwest Nat. 30(1):161. Occurred on Welder Wildlife Refuge.

Tacha, T. C., P. A. Vohs, and W. D. Warde. 1985. Morphometric variation of Sandhill Cranes from mid-continental North America. J. Wildl. Manage. 49(1): 246–250. Three hundred thirty-eight specimens were from Texas.

White, D. H., and E. J. Kolbe. 1985. Secondary poisoning of Franklin's Gulls in Texas by monocrotophos. J. Wildl. Dis. 21(1):76–78. June 1983 spraying for sugarcane beetles near Santa Ana NWR resulted in death of 45 Franklin Gulls; scavenged carcasses may have poisoned other wildlife. Demonstrates the dangers of using a highly toxic organophosphate insecticide near areas where wildlife congregate.

Whyte, R. J., and E. G. Bolen. 1985. Variation in Mallard digestive organs during winter. J. Wildl. Manage. 49(4):1037–1040. Birds were collected in Castro County, Texas.

BOOK REVIEW

The following review expresses the opinion of the individual reviewer regarding the strengths, weaknesses, and value of the book reviewed. It is a subjective evaluation and does not necessarily reflect the opinions of other members of the Texas Ornithological Society.

Editorial Note: *Backcountry Mexico; A Traveler's Guide and Phrase Book* may seem an odd book to review in a journal primarily concerned with Texas ornithology. An explanation is in order. Just across the river from Big Bend National Park lies one of the least explored ornithological regions in North America. This region has a continuing impact on the Texas avifauna and should be studied more thoroughly. Many potential explorers are hesitant about traveling in Mexico. *Backcountry Mexico* may ease apprehension and encourage important field work in the region.

Backcountry Mexico: A Traveler's Guide and Phrase Book, by Bob Burleson and David H. Riskind, 311 pp., University of Texas Press, Austin, 1986.

This book is very useful for any traveler who wishes to experience Mexico. It is well written; humorous in places, serious in others, but accurate. The book has 17 major sections, some longer than others, but all necessary for the understanding of the "frontier" of Mexico, and the regions within northern Mexico. The book's title is slightly misleading, because little of the tropics and other areas of southern Mexico are mentioned (the authors' experiences are primarily northern Mexico, as are their phrases and photographs). However, this does not distract from the usefulness of the book. For anyone who wishes an introductory phrase book to learn the "art" of rural Mexico, and to converse with locals along the route, this book is a must for your library and vehicle.

The frontis contains a photograph of small Mexican children with a unique caption; a prayer concerning international friendship. Following the acknowledgments, there is a short, very poetic, and intensely real statement of the essence of backcountry Mexico. I have experienced the same feelings of happiness and solitude from the inhabitants of remote houses and villages as the authors; I applaud them for their introductory comments to the "real" Mexico.

Scattered throughout the book are bits of advice that are extremely important for drivers who have never experienced Mexico's roads. Under Part I, culture, speed bumps (*topes*) mentioned by the authors are of many types, varying from half-raised steel balls to asphalt or concrete bumps that extend completely across the highway. All topes require a speed of less than five mph for safe crossing. The authors' advice on avoiding traffic problems are real, but they may not all work for you. Ultimately, your decisions will tell you if you made the right choice. Their statements concerning bribes are straightforward, and essentially correct.

Section 2 contains excellent advice on personal contact with either sex in Mexico. Section 3 pertains to speaking Spanish and proper manners, while Sections 4 and 5 deal with travel by auto or other means (mules, burros, etc.). Section 6 discusses the accepted way to deal with private land owners. Section 7 pertains

to camping, but the authors clearly state that their book is not intended as a camping guide. Section 8 contains information for aquatic travelers (canoeists) and the advice contained therein is wise. Most Mexicans do not travel the rivers by canoe or boat and therefore may give you information unsuited for your needs. Sections 9–13 cover events surrounding rural village life in Mexico. The authors' Spanish phrases are specific for discussions with villagers, and in detail. For those of us who often visit rural settings in Mexico, this section of the book is extremely useful.

The remaining 128 pages of the book (Part II. Language) covers Spanish grammar, pronunciation, accentuation, phrases, and specific conversation. There are sections dealing with such things as ownership, weather, health, clothing, commands, emotions, buying, etc. that are extremely useful to the traveler. The authors also include a Section (16) on maps, natural history, health, and other general guides as supplements to the traveler. The last chapter (Section 17) contains a glossary of Spanish to English, English to Spanish words.

My only criticism of the book is that it lacks phrases (and words) that are typically heard in southern Mexico. Some of the common words and phrases heard in northern Mexico have completely different meanings in southern Mexico. However, this is not unusual because there are many Indian dialects spoken throughout Mexico. Many Latin Americans from southern Texas occasionally have difficulty speaking with their neighbors in other parts of Mexico.

Having traveled in Mexico when paved roads were few, and bridges spanning rivers nonexistent, I would have given *mucho dinero* for the information contained in this book. Like the authors, I learned the customs, trails, and other essential information through experience. I am extremely grateful that the authors found the time to put their experiences together, and that these experiences resulted in the current book . . . *Backcountry Mexico*. . . . No traveler to Mexico should be without a copy.

James R. Dixon, Dept. Wildlife & Fisheries Sciences, Texas A&M University, College Station, Texas, U.S.A., 77843.

NOTES AND NEWS

ABOUT THE ARTIST.—The illustration of the Black-capped Vireo (inside front cover) is an original drawing by Anne Marie Pulich. Anne is a self-taught artist recognized for her sensitive bird portraits rendered in various media. Her work appears in several books and hangs in many collections throughout the country.

NOTE.—The Black-capped Vireo *Vireo atricapillus* was added to the United States Fish and Wildlife Service's Endangered Species List on 6 October 1987.

ATTENTION AUTHORS.—The *Bulletin of the Texas Ornithological Society* is a semi-annual journal which publishes research reports and short communications in the field of ornithology. Articles on a wide range of subjects are accepted, including documentation of new Texas records, interpretations of laboratory and field studies, historical perspectives on Texas ornithology, and developments in theory and methodology. Although the emphasis is on Texas birds, the *Bulletin* accepts papers which advance the knowledge of birds in general. Original articles, reports and other items submitted for inclusion in the *Bulletin* should be sent to the editor, Robert Benson, Department of Engineering Technology, Texas A&M University, College Station, Texas 77843.

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ROBERT BENSON, Editor
Department of Engineering Technology
Texas A&M University
College Station, Texas 77843

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KAREN L. P. BENSON, Editor
Department of Wildlife & Fisheries Sciences
Texas A&M University
College Station, Texas 77843