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THE EARLY HISTORY OF ORNITHOLOGY IN TEXAS

Part 1. Birds Reported by Missionaries and Explorers in Texas, 1535–1778

Part 2. Cultural Ornithology of the Indians of Texas

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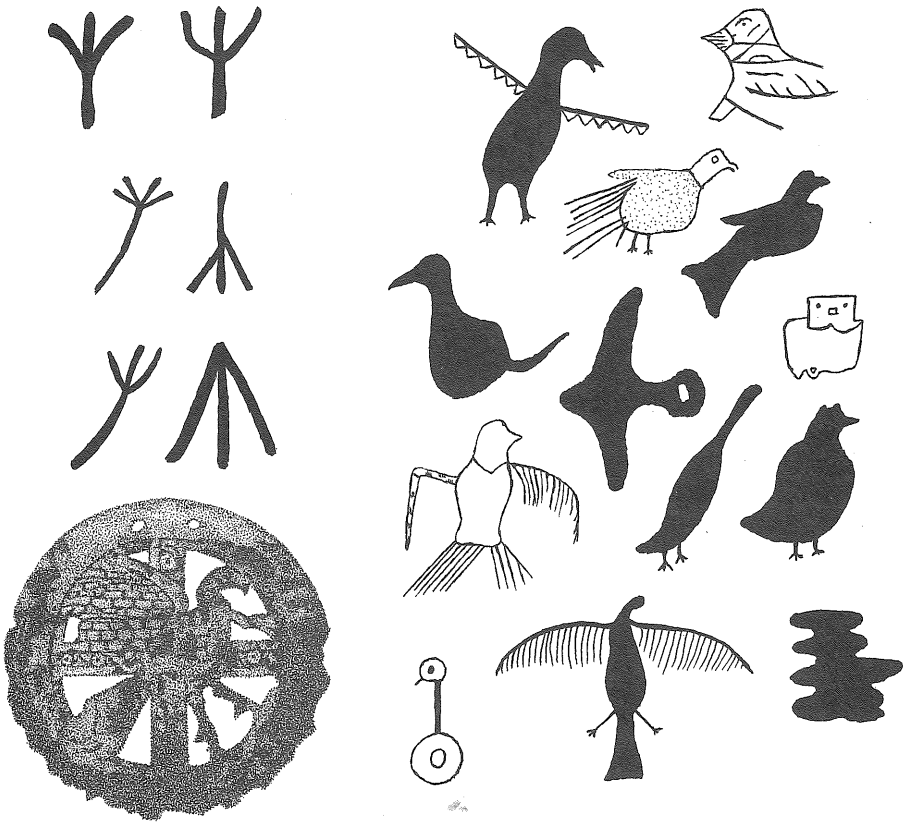

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Part 1.

BIRDS REPORTED BY MISSIONARIES AND EXPLORERS IN TEXAS, 1535–1778

ABSTRACT.—The first recorded observation of Texas bird life was made by Cabeza de Vaca who, in the summer of 1535, noted that his Indian companions returned from a hunt with "birds, quails, and other game." Birds belonging to ten orders were reported during the period from 1535 to 1778. Species identified with some certainty include Roseate Spoonbill (*Ajaia ajaja*), Canada Goose (*Branta canadensis*), Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*), Greater Prairie-Chicken (*Tympanuchus cupido*), American Coot (*Fulica americana*), and American Oystercatcher (*Haematopus palliates*). Other birds were identified in only a generic or familial sense. The "magpies" reported in Texas were probably grackles, the "peacocks" displaying turkey cocks, and the "bustards" Canada Geese. The historical record suggests that turkeys, quail, and prairie chickens were plentiful in early Texas. Ducks, geese, and cranes were abundant during the winter. Reports of prairie chickens at San Antonio and around the missions in east Texas during 1691 suggests that the range of the Greater Prairie-Chicken once extended further north. References to passerine birds, other than "crows," "magpies," "starlings," and "song birds" are noticeably lacking. There are no references to doves, cuckoos, parrots, or woodpeckers. Also absent are reports of now extinct species such as the Passenger Pigeon (*Ectopistes migratorius*), Carolina Parakeet (*Conuropsis carolinensis*), and Ivory-billed Woodpecker (*Campephilus principalis*).

THE ORIGIN OF TEXAS ORNITHOLOGY

The ornithology of Texas had its formal origin with the observations made by Cabeza de Vaca in the summer of 1535. Over the next 243 years, a large number of Europeans entered Texas for purposes of exploring, converting the Indians, colonizing the frontier, and establishing trade. Many of these individuals kept journals that contain occasional references to birds. Collectively, these observations provide a historical perspective on the bird life of Texas prior to the influx of Americans during the early 1800s.

Oberholser (1974) believed that the sighting of Wild Turkey (*Meleagris gallopavo*) near the Canadian River on 5 August 1820 by the Long Expedition represented the first definite record of any species of bird in Texas. In reality, Wild Turkeys were first noted in 1685 by Joutel (Foster 1998) and are one of the most frequently mentioned birds in later accounts. Other species that can be identified with some certainty from the early records include Roseate Spoonbill (*Ajaia ajaja*), Canada Goose (*Branta canadensis*), Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*), Greater Prairie-Chicken (*Tympanuchus cupido*), American Coot (*Fulica americana*), and American Oystercatcher (*Haematopus palliates*). Most birds are identified in only a generic or familial sense.

Additional information on the birds of Texas may yet be recovered from the Spanish records. Many records have not been translated and some translations are unsatisfactory, e.g., a comparison of the Kress (1931) and Forrestal (1931) translations of the diary of Fray Gaspar Jose de Solis reveals both contradictions and omissions of information relating to birds. In addition, the accurate translation of bird names requires both a facility in the language, as well as a knowledge of classification and the numerous common names that have been applied to a species in times past.

EXPEDITIONS AND OBSERVERS

Listed below are those expeditions and individuals who recorded observations on the birds of early Texas. The date following each name represents the year during which the observations were made. Entries are arranged in chronological order. The purpose of each expedition, its point of entry into Texas, route of travel, and personnel can be found in Inglis (1964), Foster (1995), and *The Handbook of Texas* online.

ALVAR NUNEZ CABEZA DE VACA (1535). Cabeza de Vaca was the first European to leave a record of the birds of Texas. He was born about 1490 near Seville, Spain, and came to the New World in 1528 as a member of the Narvaez Expedition. After being shipwrecked on the Texas coast, he lived among the Indians until

finding his way to Mexico in early 1536. During late summer 1535, while near the mouth of the Pecos River in present Val Verde County, Cabeza de Vaca reported that his Indian companions returned from a hunt with "birds, quails, and other game" (Bandelier 1904, Oberholser 1974). The observations of Cabeza de Vaca were first published in 1542. The title page of the second edition of his book, *La relacion y commentaries* . . . (1555), bears the image of a fierce, double-headed eagle (Fig. 1).

DIEGO PEREZ DE LUXAN (1583). Perez de Luxan was a member of the Antonio de Espejo Expedition that left the interior of Mexico in November 1582 and crossed the Rio Grande into Texas near the present town of Presidio. Moving north on the Texas side of the river, the Spaniards arrived on 9 January 1583 at an overflow of the Rio Grande below El Paso that they named La Cienaga Grande (The Big Swamp). At La Cienaga Grande, Luxan noted an abundance of "ducks, geese, and cranes" (Hammond and Rey 1929).

JUAN DOMINGUEZ DE MENDOZA (1684). In 1683, Mendoza was appointed by the governor of New Mexico to lead an expedition to the Jumano Indians in Texas. The party left from Real de San Lorenzo below El Paso in December and followed the Rio Grande to present Presidio. From Presidio they moved north, crossing the Pecos River and then traveling east to arrive at the Middle Concho River by 4 February 1684. After crossing the Middle Concho, Mendoza noted "wild hens which make noise at dawn." Wild hens were again seen the following week. On the Rio San Pedro near present San Angelo, there was seen a "variety of very agreeable songbirds." Further down the river there was found "a variety of birds and wild hens." The last mention of birds by Mendoza was of wild hens seen on 15–16 March at San Clemente, a point on the Colorado River not far from Ballinger (Bolton 1908b).

HENRI JOUTEL (1685–1686). Joutel was born in Rouen, France. After serving in the army, he returned home and soon joined with La Salle who was then organizing his expedition to the Gulf of Mexico. The expedition left France in July 1684 and, after overshooting the mouth of the Mississippi River, made landfall at Matagorda Bay during January 1685. That spring, Fort Saint Louis was constructed on Garcitas Creek, one of the small streams that flows into Lavaca Bay, a major branch of Matagorda Bay.

Joutel kept a journal while he was in Texas that included a list of the birds seen in the vicinity of Matagorda Bay, Lavaca Bay, and Fort Saint Louis (Foster 1998:126–127). Although many identifications are generic, his observations are more detailed than those other diarists. Birds specifically identified by Joutel include Roseate Spoonbill, Canada Goose, American Coot, and American Oystercatcher.

Joutel accompanied La Salle in January 1687 during his commander's attempt to find the Mississippi River and a passage north. Following the murder of La Salle, Joutel led the group into Canada from whence they eventually reached France in November 1688 (Foster 1998).

ALONSO DE LEON (1689). Alonso De Leon was born in Cadereyta, Mexico, and in 1688 was appointed governor of Coahuila. Between 1686 and 1690, he led five expeditions into Texas. His fourth expedition crossed the Rio Grande on 2 April 1689 in northwestern Webb County and, after traveling six leagues into Texas, reached some pools where the party made camp. At nightfall "more than three thousand crows" appeared near the camp, inspiring De Leon to name the site *El Paraje de los Cuervos* [Place of the Crows]. De Leon's diary contains no further references to birds (West 1905). Foster (1995:238) has placed the location of this crow roost about 10 miles north of the Rio Grande in Maverick County.

DAMIAN MASSANET (1690–1691). Father Massanet was one of the founders of the College of Santa Cruz de Queretaro. Massanet accompanied Alonso De Leon on his expeditions of 1689 and 1690. In early May 1690, after crossing the Lower Colorado River and traveling north for one day, Massanet visited an Indian camp where three Wild Turkeys were being roasted (Bolton 1908a). While with the expedition of Teran de los Rios in June 1691, Massanet recorded seeing a "great number of wild chickens" around San Antonio (Hatcher 1932).

FRANCISCO CASANAS DE JESUS MARIA (1691). Casanas was a Franciscan who in 1690 accompanied Alonso De Leon to establish the first missions in east Texas. After living for over a year among the Indians, Casanas sent the viceroy a detailed report that included a description of the birds in Texas. According to Casanas, "There are many . . . prairie chickens, and wild ducks; but these are to be had only in the winter time. There are two other kinds of ducks, much smaller, but good to eat. There are likewise many kinds of fowls not so large as chickens in Spain. They come at the same time as the wild ducks . . . [there are] many kinds of birds that stay in the country year round, such as partridges, quails, herons, and an endless number of birds that sing very melodiously in the spring" (Hatcher 1927a). In February 1692, Casanas returned to Mexico and later worked among the Ximes Indians in New Mexico where he was killed by Apaches in 1696.

Fig. 1. Title page of *La relacion y commentarios del gouernador Aluar nunez cabeza de vaca, de lo acaescido en las dos jornados que hizo a las Indias . . .* (2nd edition, 1555). The original edition of *La Relacion y Commentarios . . .*, published in 1542, contains the first known mention of Texas birds. Photograph courtesy of the Center For American History, UT-Austin. CN Number 00835.

ESPINOSA-OLIVARES-AGUIRRE EXPEDITION (1709). The journalist of this expedition was Fray Isidro Felix de Espinosa. The expedition entered Texas about thirty miles south of Eagle Pass. Turkeys were seen east of the Hondo River and along the Guadalupe River. At the San Marcos River, Espinosa noted a great "variety of birds of various colors and sweet song" and that turkeys were found "at every step" (Tous 1930a).

RAMON EXPEDITION (1716). This expedition, led by Captain Domingo Ramon, left Saltillo, Mexico, in February 1716. In the latter part of April, the expedition arrived at Mission San Juan Baptista on the Rio Grande where they were joined by Fray Isidro Felix de Espinosa. Ramon and Espinosa kept daily journals, both of which contain references to birds. Turkeys (Fig. 2) were mentioned four times by Ramon and, while traveling

northwest of the San Gabriel River, he noted the presence of "various wild fowls" (Foik 1933). Turkeys were mentioned twice by Espinosa. The expedition's campsite [18 May] on the bank of the Guadalupe River was described by Espinosa as "a delightful grove for recreation and the enjoyment of the melodious songs of different birds" (Tous 1930b). Espinosa remained in Texas until late 1719 before returning to Mexico.

FRANCISCO CELIZ (1718). Fray Celiz was a priest who served as chaplain of the Alarcon Expedition that entered Texas in April 1718. His diary records that on 16 May, as the expedition was preparing to cross the Guadalupe River near New Braunfels, twenty-four "buzzards" were seen close to where they were stopping. Governor Alarcon, distressed by their presence, asked the chaplain "Father, what are those birds looking for?" In response to this question the priest replied "They may have come to make happy over the funeral rites of somebody present . . ." Judging from this answer, these birds were vultures, rather than "buzzard" hawks, i.e., buteos (Hoffman 1935).

BERNARD DE LA HARPE (1718–1719). La Harpe, a French entrepeneur, arrived in Louisiana in 1718 and, in April 1719, he established a trading post among the Caddo Indians in present Red River County, Texas. Near the place where La Harpe built his post was "an expanse two leagues long covered with ducks, swans, and bustards [geese]" and, not far away, "turkey . . . snipe, and other fowls" (Smith 1958).

BACHILLER JUAN ANTONIO DE LA PENA (1721). Pena was the journalist of the Aguayo Expedition that entered Texas on 20 March 1721. Between the Rio Grande and present Austin, Texas, Pena recorded turkeys and quail nine times. Turkeys were observed to be particularly abundant along the road from Goliad to San Antonio (Forrestal 1934).

ISIDRO FELIX DE ESPINOSA (1722). Espinosa was a Franciscan who visited Texas as a member of the Espinosa-Olivares-Aguirre Expedition (1709), the Domingo Ramon Expedition (1716), and the Aguayo Expedition (1721). The observations made on these expeditions, the last of which was completed in 1722, were incorporated into Espinosa's history of the missionary work of the Franciscans published in 1746. In this work, Espinosa noted that wild ducks were a staple food of the Indians of East Texas to which were added during the winter "many bustards and cranes, while partridges and quail are abundant during the entire year" (Hatcher 1927b).

PEDRO DE RIVERA Y VALLALON (1727). In 1724 Brigadier General Rivera was commissioned to conduct a tour of the frontier defenses in New Spain. Texas was the last province to be visited. Rivera's tour took

Fig. 2. A soldier with the 1716 Ramon Expedition stalks wild turkeys. *Guajolotes* (wild turkeys) were frequently noted and often hunted for their meat. From *Expeditions into Spanish Texas*, 1698-1768 by Wm. C. Foster (1995).

place from early August through late December 1727. His description of the bird life was brief: "Birds are plentiful, in particular the turkeys, which are in flocks, and nocturnal birds called owls, with a song so mournful that it saddens the heart" (Jackson and Foster 1995:42).

PIERRE MARIE FRANCOIS DE PAGES (1767). Pages was born in Toulouse, France. He joined the navy as a young man but, while in Santo Domingo, left his ship to begin an extended journey around the world. He sailed first for New Orleans, traveling from there to Natchitoches, Nacogdoches, San Antonio, Laredo and then into the interior of Mexico. Following his arrival at San Antonio, Pages commented that his "greatest surprise in this part of the world [was] the immense swarms of cranes which frequent the borders of the rivers." Pages published an account of his travels that was translated into English in 1791. This book is reportedly the first in the English language to describe Texas (Sibley 1967).

GASPAR JOSE DE SOLIS (1767–1768). Fray Solis was a member of the College of Zacatecas. In November 1767, he began a tour of the missions of Texas returning to Zacatecas in October 1768. Solis was

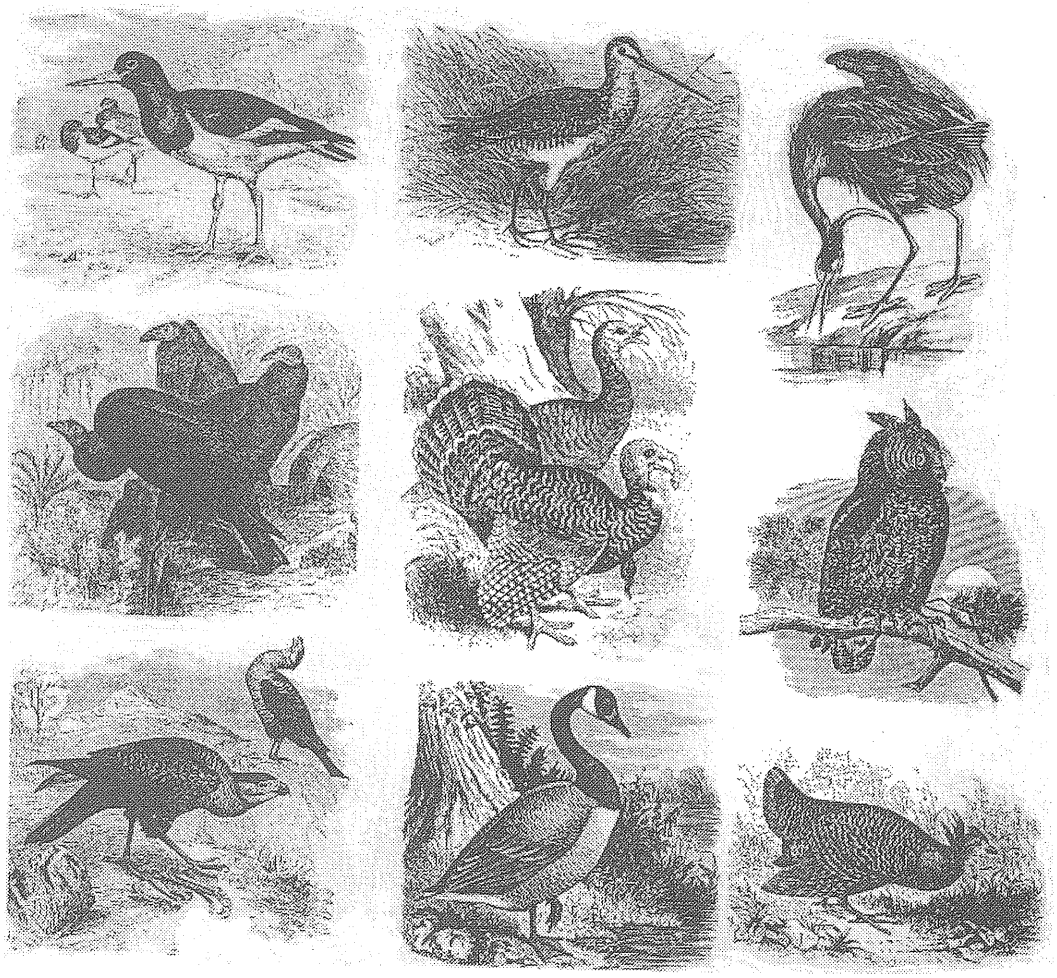

Fig. 3. Birds seen in Texas by missionaries and explorers, 1535-1778. Top row: American Oystercatcher, Common Snipe, Great Blue Heron. Middle row: Turkey Vulture, Wild Turkey, Screech Owl. Bottom row: Crested Caracara, Canada goose, and Greater-Prairie Chicken. Illustrations from *Key to North American Birds* (1890) by Elliott Coues.

a keen observer of both plants and animals, mentioning many different species in his journal. On the road from Zacatecas to the Rio Grande, he recorded seventeen types of birds and observed "many other birds with whose names [he was] not familiar." Within Texas, Solis noted that the Indians at the Goliad missions hunted turkeys, geese, ducks, hens, partridges, cranes, quail and other birds. Along the San Antonio River between Goliad and San Antonio, he recorded herons, ducks, geese, turkeys, quail, partridges, hawks, eagles, owls, and other birds. Solis also noted that some of the birds along the San Antonio River made sounds different from the birds in Spain (Forrestal 1931, Kress 1931).

JUAN AUGUSTIN MORFI (1777–1778). Father Morfi, a Franciscan priest, accompanied Teodoro de Croix on his inspection tour of Texas. Morfi's diary covers the period from August 1777 through March 1778. In January 1778, he observed turkeys, ducks, geese, and cranes in the fields around the missions at San Antonio (Schuetz 1980). Morfi's *History of Texas* includes a brief description of the bird life: "The number of ducks, wild geese, and cranes, of all kinds, that are seen as soon as the cold weather begins, and that remain here [in Texas] until the heat drives them farther north is surprising. Along the banks of the streams and the outskirts of the woods the droves of turkeys are so numerous that they disturb the traveler with their clucking. The number of magpies, quails of all kinds, and wild hens, is incalculable" (Castaneda 1935).

ANNOTATED LIST OF BIRDS REPORTED BY MISSIONARIES AND EXPLORERS IN TEXAS, 1535–1778

ORDER 1. PELICANIFORMES

Pelicans. Joutel saw many of these large birds around Matagorda Bay. He called them "large gullets" because of their big throats and also described their habit of filling their pouch with fish (Foster 1998:126). Joutel did not distinguish between the two species of pelicans that occur along the Texas coast.

Cormorants. Recorded by Joutel at Matagorda Bay. Joutel did not distinguish between the two species of cormorants found along the Texas coast.

ORDER 2. CICONIIFORMES

Herons. Seen in 1685 by Joutel at Matagorda Bay. Casanas reported herons to be residents around the east Texas missions. Herons were seen in 1768 by Solis along the San Antonio River between Goliad and San Antonio. The Spanish name *garza*, is used for both herons and egrets and it is unlikely that Casanas and Solis distinguished between the two groups.

Roseate Spoonbill (*Ajaia ajaja*). Joutel called these birds *spatulas* with reference to the shape of the bill. His mention of their pale red plumage leaves no doubt that he was referring to the spoonbill (Foster 1998:127).

Vultures. Referred to by Joutel as *aigles corbins* and described as being "black and very much like crows, in appearance as well as their perchant to kill. They have heads like turkeys" (Foster 1998). Joutel did not clearly distinguish between the Turkey Vulture (*Cathartes aura*) and the Black Vulture (*Coragyps atratus*), both of which occur along the Texas coast. Vultures were also seen along the Guadalupe River by Celiz in 1718.

ORDER 3. ANSERIFORMES

Swans. Reported by Joutel at Matagorda Bay and by La Harpe near his trading post on the Red River. The two species that occur in Texas were not distinguished.

Geese. Reported in January 1583 by Perez de Luxan at La Cienaga Grande on the Rio Grande and by Joutel at Matagorda Bay in 1685. Solis noted in 1768 that geese were hunted by the Indians at Goliad and he also

saw geese along the San Antonio River between Goliad and San Antonio. Morfi saw a "multitude" of geese in the fields around the missions at San Antonio during January 1778.

Canada Goose (*Branta canadensis*). Specifically mentioned by Joutel as occurring at Matagorda Bay in 1685. *Outardes* or bustards were Canada geese (Foster 1998:76).

Teals. Seen by Joutel at Matagorda Bay. Joutel did not distinguish between the three species that occur on the Texas coast.

Ducks. Perez de Luxan saw ducks during January 1583 at La Cienaga Grande on the Rio Grande below El Paso. Joutel also saw ducks at Matagorda Bay in 1685. Casanas made general reference to "wild ducks" in east Texas and then specifically mentioned "two other kinds of ducks, much smaller, but good to eat." Solis noted ducks around Goliad and along the San Antonio river between Goliad and San Antonio. During January 1778, Father Morfi saw a "multitude" of ducks feeding in the fields around the missions at San Antonio.

ORDER 4. FALCONIFORMES

Hawks. Hawks were seen in March 1768 by Solis along the San Antonio River between Goliad and San Antonio. According to one translation of the Solis diary, these birds were "sparrow-hawks" (Forrestal 1931).

Eagles. The eagles seen by Joutel at Matagorda Bay were referred to as *aigles nonnes* and described as having a white collar and white on part of the head. Foster (1998:127) proposed that these birds might be Bald Eagles (*Haliaeetus leucocephalus*) or Crested Caracaras (*Polyborus plancus*). Eagles were also seen by Solis in 1768 along the San Antonio River between Goliad and San Antonio.

ORDER 5. GALLIFORMES

Prairie-Chickens. Mendoza noted "wild hens" on five occasions during March 1684 in the area around present Midland County, San Angelo and Ballinger. These wild hens were undoubtedly Lesser Prairie-Chickens (*Tympanuchus pallidicinctus*).

At Matagorda Bay, Joutel saw birds that "spread their tails like turkeys and have two cups hanging at the collar of their neck" (Foster 1998:126). Although Joutel referred to these birds as "grouse", it is obvious that they were Greater Prairie-Chickens (*Tympanuchus cupido*).

Casanas noted that many prairie chickens were found around the missions in east Texas. During June 1691, Father Massanet saw great numbers of "wild chickens" on the highlands around San Antonio. The "wild hens" mentioned by Morfi and the "hens" noted by Solis at the Goliad missions were probably Greater Prairie-Chickens.

Wild Turkeys. Turkeys are the bird most frequently reported by the early explorers. Joutel saw them in the vicinity of Matagorda Bay. In May 1690, Massanet observed Wild Turkeys being roasted at an Indian camp on the Lower Colorado River. During April 1709, Espinosa noted that turkeys were present "at every step" along the San Marcos River. Rivera described them as being plentiful in 1727. At San Antonio, Morfi saw flocks of turkeys containing as many as 200 birds. Morfi further described the turkeys in Texas as being so numerous that they "disturb the traveler with their clucking." The "peacocks" seen by Pena at the Nueces River on 29 March 1721 were probably displaying turkey cocks.

Quail. Casanas noted quail around the east Texas missions during 1691. During March 1721, Pena saw "large numbers" of quail on Comanche Creek near present Crystal City and continued to see quail until passing San Rafael Creek north of San Antonio. Solis noted quail at Goliad, between Goliad and San Antonio, east of the Guadalupe River, two days east of the Colorado, and near the Brazos and Navasota Rivers. Morfi noted that the state contained an incalculable number of "quails of all kinds."

Partridges. Espinosa noted in 1722 that partridges were available year-round to the Tejas Indians. Solis reported that partridges were hunted by the mission Indians at Goliad. He later saw partridges along the San Antonio River between Goliad and San Antonio, near La Navidad Creek, and along the Brazos and Navasota rivers.

Ornithologists have at various times applied the name "partridge" to the Northern Bobwhite (*Colinus virginianus*), Scaled Quail (*Callipepla squamata*), and Montezuma Quail (*Crytonyx montezumae*) (Banks 1988). This practice was also probably followed by the Spaniards. However, partridges and quail are sometimes referred to within the same area suggesting that the names were applied to different species.

Grouse. Joutel recognized larger and smaller forms of "grouse" around Matagorda Bay. It can be determined from his description. that the larger form was the Greater Prairie-Chicken. The identity of the smaller form is unknown.

ORDER 6. GRUIFORMES

Coots. The *poule d'eau* was seen by Joutel at Matagorda Bay. This bird is the American Coot (*Fulica americana*) (Foster 1998:126).

Cranes. Perez de Luxan used the word *grullas* to name the cranes he saw in Mexico and later at La Cienaga Grande on the Rio Grande. Joutel noted cranes at Matagorda Bay. In 1767, Captain Pages reported "immense swarms" of cranes along the borders of the rivers. Father Morfi observed cranes feeding in the fields around the San Antonio Missions during January 1778. The cranes seen by these observers were almost certainly Sandhill Cranes (*Grus canadensis*), known in Spanish as *grulla cenicienta*, meaning ash-gray crane.

ORDER 7. CHARADRIIFORMES

Snipe. Joutel reported snipes and jack-snipes (*becassines*) in the vicinity of Matagorda Bay. In April 1719, La Harpe noted that "turkey . . . snipe, and other fowls" were found not far from his trading post on the Red River.

Curlews. Joutel noted "white and brown curlews" at Matagorda Bay. The brown form may have been the Long-billed Curlew (*Numenius americanus*) or some other brown bird with a decurved bill. The white form may have been the White Ibis (*Eudocimus albus*).

Plovers. Seen by Joutel at Matagorda Bay. La Harpe referred to birds seen near his trading post as "bustard-plovers." The identity of these birds is unknown.

Sandpipers. Seen by Joutel at Matagorda Bay. This designation could refer to several different shorebirds.

Oystercatcher. Reported by Joutel to occur at Matagorda Bay. This would have been the American Oystercatcher (*Haematopus palliates*).

ORDER 8. STRIGIFORMES

Owls. Described by Rivera in 1727 as being "plentiful." Morfi noted that there were "as many as three species" of owls in east Texas. Forrestal's translation (1931) of the Solis diary indicates that "screech-owls" were seen along the San Antonio River between Goliad and San Antonio.

ORDER 9. APODIFORMES

Hummingbirds. Joutel saw birds at Matagorda Bay that he called *mouches* [bee or fly]. The plumage of these birds was gray-green and they were seen circling around flowers. These were undoubtedly hummingbirds.

ORDER 10. PASSERIFORMES

Crows. Joutel saw "small crows" at Matagorda Bay. The identity of these birds is unknown. On the evening of 2 April 1689, De Leon saw a flock of "*cuervos*" coming to a communal roost in Webb County. The birds were most likely Chihuahuan Ravens (*Corvus cryptoleucus*).

Magpies. On 28 April 1768, Solis crossed the Trinity River and continued on to San Juan Creek where he observed "a great number of magpies." Morfi described the number the of magpies in Texas as "incalculable." One of the Mexican names for the Great-tailed Grackle (*Quiscalus mexicanus*) is *urraca*, which also translates as magpie (Peers 1968, Santamaria 1959). The Comecrudo Indians on the Lower Rio Grande used the word *yatau* to mean both "black" and "magpie" (Swanton 1940). It thus seems likely that the birds noted by Solis and Morfi were grackles.

Starlings. Reported by Joutel at Matagorda Bay. The identity of these birds is unknown.

Songbirds. The songbirds observed by Mendoza during February 1684 on the Rio San Pedro near San Angelo were probably the same species that presently winter in the area.

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Part 2.

CULTURAL ORNITHOLOGY OF THE INDIANS OF TEXAS

ABSTRACT.—Birds were a resource that provided for many of the physical and psychosocial needs of the aborigines. The ornithological vocabularies of the different tribes provide little evidence of the role that birds played in the lives of the Indians. The archeological and historical records do, however, indicate that about forty species belonging to fourteen orders were used by the Indians. Birds were collected by a variety of methods including blunt-point arrows, firearms, the use of decoys, and concealment within calabashes and pit traps. Tribes such as the Lipan Apaches, Comanches, Kiowas, Kiowa-Apaches, Coushattas, and some Coahuiltecans had taboos against the eating of birds. Feathers were used for personal adornment, as decoration for instruments of war, in the manufacture of feather capes and mantles, and as accouterments for dances and other rituals. The skulls of birds were used by some Caddos as ear ornaments whereas many tribes fashioned the long bones of birds into beads, awls, pipe stems, whistles or flutes (flageolets). Dried or stuffed birds or their parts were often used as amulets or "medicine." Wild Turkeys (*Meleagris gallopavo*) may have been tamed and raised by the Caddos of East Texas. It is concluded that the harvest of birds by the Indians did not seriously impact on the incredible numbers of aves found in early Texas.

ROLE OF BIRDS IN INDIAN CULTURE

Texas was inhabited by a number of very different "tribes" who exploited their environment in different ways. Nearly 600 names for Native American groups in what is now Texas are found in the early literature (Collins 1999). Prominent indigenous tribes at the beginning of the historic period included the Coco, Cujane, Guapite, Karankawa and Copane of the Karankawa group, the Hasinai and Kadohadacho confederacies of the Caddo, the Bidai, Akokisa, Atakapa, Tonkawa, Apache, Jumano, Comecrudo, and numerous bands in southern Texas collectively known as the Coahuiltecans. Later intrusive tribes included, among others, the Comanche, Kiowa and Kiowa-Apache, Wichita, Arapaho, Cherokee, Kickapoo, and Coushatta (Aten 1983, Newcomb 1961, Salinas 1990). The vernacular names of the birds mentioned in this paper follow those published by the American Ornithologists' Union (1998). The binomial names of all species are given in Appendix I.

BIRDS AS A RESOURCE. Birds were a resource that provided for many of the needs of the aborigines. From these creatures of the sky, the Indians obtained both sustenance and plumage with which they adorned their bodies and decorated their instruments of war. Feathers were also valued trade items and of commercial importance to some tribes. Perhaps just as important, birds or their parts could serve as pouhahantes or amulets to protect their owners from harm. Power was also attributed to some species whose feathers and other body

parts were used in dances and rituals. Tribal mythology and folklore often incorporated birds in various roles. The killing of the first bird by a young boy of the Wichita tribe initiated a rite of passage in which clawlike designs were tattooed on the backs of his hands (Newcomb 1961). Birds were also represented in pictographic art and effigies (Fig. 1. A-C) used as personal adornments (Jackson 1935, 1938; Kirkland and Newcomb 1967).

DIFFERENTIAL EXPLOITATION OF BIRDS. Several tribal differences are known regarding the use of birds. The Karankawa did not kill vultures whereas the Comanche harvested this species for its feathers (Casto 1988). The Tonkawa did not kill owls for they believed them to be spirits of the dead. Several tribes had taboos against the eating of birds. The availability of birds was a factor in their exploitation, e.g., Wild Turkey, Northern Bobwhite and Mourning Dove were exploited to a greater degree than migratory species. The Scaled Quail in western and southern Texas was unknown to the Caddos of east Texas who hunted the Northern Bobwhite. Ducks, geese, and other waterfowl were probably exploited to a greater extent by the coastal tribes such as the Karankawa, Atakapa, and Akokisa.

Caloric value and plumage characteristics were also factors in the use of a species. Golden Eagles were widely hunted for their feathers but apparently never eaten. In contrast, the Wild Turkey was a multipurpose bird providing food, feathers, and bones. Surprisingly, the remains of such small species as the Ruby-crowned Kinglet and Carolina Chickadee, neither of which has a high caloric value or brilliant plumage, have been found at archeological sites (Lynott 1978).

TRADE WITH EUROPEANS. The availability of European trade goods and technology in the latter 1600s undoubtedly affected the use of birds. Colored glass beads were favored over beads made from the bones of birds. Brightly colored cloth and ornaments of metal and glass competed with decorative feathers for the attention of the Indians. Fabric garments and blankets replaced feather capes and mantles with the subsequent loss of the art of featherwork. Introduction of the domestic chicken provided a new source of food and feathers. Even more important, the availability of firearms changed hunting strategies and perhaps allowed the exploitation of some species that the Indians had been unable to hunt successfully using earlier methods.

EFFECT OF HUNTING OF BIRD POPULATIONS. The Indians had neither the numbers nor the technology to seriously impact the incredible numbers of birds found in early Texas. It is estimated that in 1690 there were only about 33,200 Indians in Texas of which 7,500 were Coahuiltecan and 8,500 Caddo. In 1691, an unidentified disease reportedly killed 3,000 Caddo in east Texas. Repeated epidemics, warfare, and expulsions from the state resulted in the extinction of several tribes by the early to mid-1800s. In 1838 the Indian population was estimated at 20,000 with that number being reduced to about 10,200 by 1890 (Schoolcraft 1851, Ewers 1973). Any impact by the Indians on bird populations would have been localized. For example, it is possible that the nesting of coastal birds may have been significantly disrupted by the localized egg collecting of tribes such as the Karankawa, Akokisa, and Atakapa.

ORNITHOLOGICAL VOCABULARY OF THE TEXAS INDIANS

Humans tend to give specific names to those things that they perceive to be of value. It would therefore seem that the ornithological vocabularies of the different tribes would serve as an indicator of the importance they attached to birds. By pointing out living birds or supplying freshly-collected specimens for examination by his Indian informants, Edgar Mearns (1896) was able to show that the Moki Indians of eastern Arizona had names for over 200 species of birds.

DIFFICULTY OF COMPILING A VOCABULARY. Vocabularies have been compiled for the Kiowa, Comanche, Atakapa, Caddo, Comecrudo, Karankawa, and Coahuilteco-speaking tribes. Unfortunately, these vocabularies were not compiled by persons with a competence in ornithology. Thus, the ornithological component of these vocabularies is superficial and, in reality, the information they contain probably reflects the limited knowledge and interests of the compilers rather than the actual knowledge of their Indian informants.

KIOWA AND COMANCHE VOCABULARIES. The effect of the limited knowledge of a compiler on the transliteration of bird names is well-illustrated by Harrington's vocabulary of the Kiowa language (Harrington 1928). Fifty-eight species of birds are given distinctive Indian names, yet only 28 species can be recognized at the specific, generic, or familial levels when translated into English. The remaining 30 species are identified in general categories such as owls (4 species), horned owls (3 species), hawks (8 species), blackbirds (5 species), or simply as birds (10 species). Amazingly, the Kiowa had a name for parrots, birds not native to their tribal territory but which they might have encountered on their raids deep into Mexico or on trading

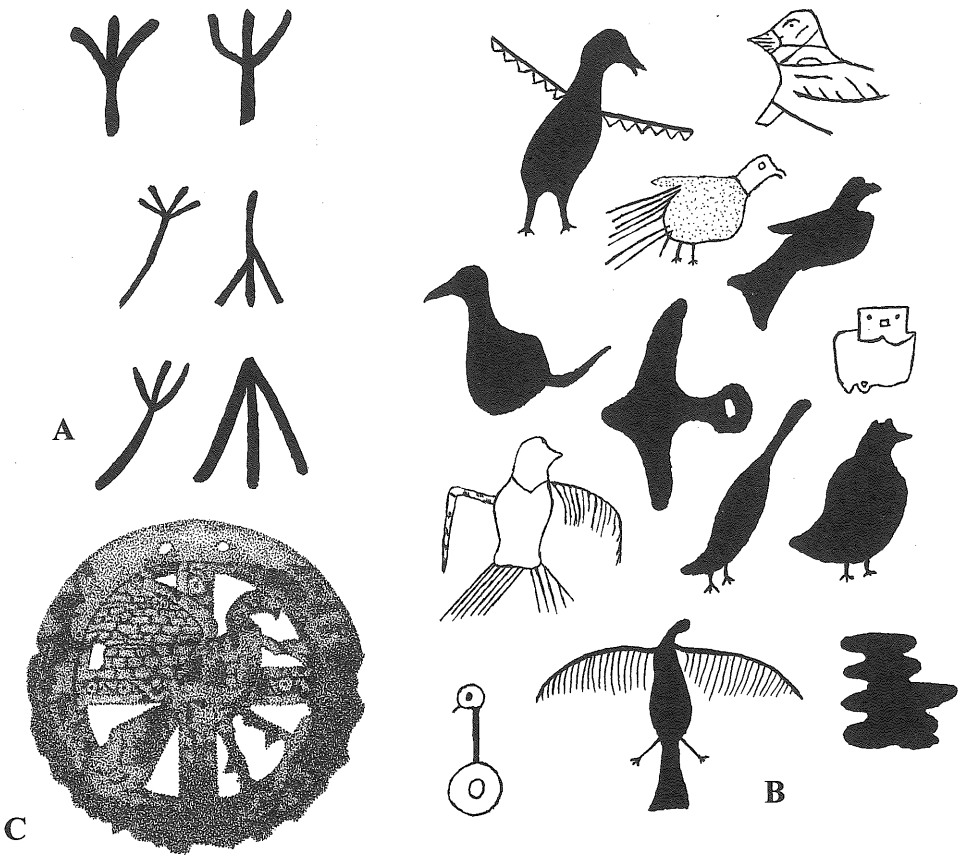

Figure 1-**A**. Pictographs of bird tracks (after Jackson 1938). **B.** Pictographs of birds (after Jackson 1938). **C.** Conch shell gorget (pendant) carved to resemble a turkey cock. Note the spurs, wattle, beard and the equal arm cross used as a background (After Jackson 1935). Gorgets were small breastplates suspended from the neck as an adornment or insignia of rank.

excursions to the pueblos of New Mexico. The Kiowa also had words to identify the feathers of the wing and tail, the quill of the feather, and down feathers. There are only 26 terms relating to birds, their body parts, nests or eggs in the Comanche vocabulary. Most identifications are generic, e.g., woodpecker, crane, swallow, or duck. There are two terms, *cujoni* and *puicobe,* for the Wild Turkey, suggesting perhaps separate designations for the cock and hen (Rejon 1995).

TONKAWA VOCABULARY. Twenty-six different types of birds are identified in the Tonkawa lexicon (Hoijer 1949). Many identifications are generic, e.g., blackbird, hummingbird or owl. The prehistoric Tonkawa obviously had no word for "chicken" since this species was not introduced until the time of the Europeans. However, the Tonkawa term for hawk is translated as "chicken hawk" which is then modified to designate three different types of hawks, i. e., the red-tailed chicken hawk, black-tailed chicken hawk, and the white-tailed chicken hawk. The Greater Roadrunner is identified as the "bird that runs fast" and the Northern Mockingbird as "he who cries (like) all birds." The Tonkawa apparently recognized a relationship between the chicken and turkey for they used the word *hexaman* for both. *Hexaman-tak* or *hexaman-atak* meant turkey or "much chicken" whereas *hexaman-kam* meant chicken or "short turkey." The Indian name for eagle was translated as "much bird." The string of feathers used to decorate the Tonkawa war shield was known as *xacnetan.*

ATAKAPA AND CADDO VOCABULARIES. The names of 29 different birds are given in the lexicon of the Atakapa language (Gatschet and Swanton 1932). Identification of some species is obviously incorrect, e.g.,

timokst is translated as "bustard." The Atakapa also had words for feathers, eggs, the albumen and yolk of the egg, and the bill of the bird. Seventeen types of birds are identified in an 1804 Caddo vocabulary (Sibley 1879). The Caddo apparently distinguished between the raven and the crow which were given different names. *Ounani* was translated as "pheasant," a bird unknown to the Caddo. *Ouaas* meant "pigeon" perhaps with reference to the Passenger Pigeon which once ranged into east Texas. The general designation for a bird was *banit.*

COMECRUDO AND KARANKAWA VOCABULARIES. The Comecrudo Indians who lived along the lower Rio Grande had names for 19 different birds, as well as words for egg, egg-shell, feather and wing. Also included in their vocabulary are names for birds identified as the "magpie" and "chuparosa." The magpie may be either a grackle or jay (Sp. *urraca*) whereas the chuparosa is a hummingbird (Sp. *chupar,* to suck). Names for both the parrot and the parakeet are included in the Comecrudo vocabulary.

Only ten names of birds are known from the language of the Karankawa tribe. However, it is only in this vocabulary that the curlew, pelican, and water-hen (coot?) are mentioned. The published vocabulary of the Coahuilteco language contains only the word *yam* which means bird (Swanton 1940).

The value of these vocabularies to the ornithologist and ethnohistorian is difficult to assess. Omissions and errors in identification are obvious. Their value is further reduced when it is recognized that cultural disintegration was well advanced and that the original relationship of the Indians with the natural world had been greatly altered by the time the vocabularies were collected.

METHODS OF HUNTING AND PREPARING BIRDS

USE OF BLUNT ARROWS. The early 19th century Atakapa Indians living around Lake Charles, Louisiana, reportedly used small arrows with blunt points to kill birds, a strategy that prevented blood from staining the feathers which were in demand as trade items (Dyer 1917). The occurrence of blunt arrows at archeological sites in Chambers, Harris, and Jefferson counties indicates that this same method was also used by the coastal Indians of Texas. One type of blunt arrow point was made of a deer phalange socketed at the proximal end and flattened distally (Fig. 2-A). Similar points were also made of deer antler (Aten 1983, Ring 1994). It is probable that blunt arrow points were also made of wood (Mason 1893).

DECOYS AND CONCEALMENT IN CALABASHES. Berlandier noted in 1828 that the Tonkawa used the dried head of a turkey as a decoy to deceive foraging wild turkeys. The head was held aloft on a stick while the Indians crawled through the undergrowth to within firing range of their primitive flintlocks (Berlandier 1980). A similar technique was also used by the Hasinai Indians in East Texas (Griffin 1954, Foster 1998).

Waterfowl were also obtained through subterfuge. Large calabashes or gourds were first floated in the water near the flocks to accustom them to these strange objects. The hunter would then cover his head with a calabash provided with eyeholes and swim out among the birds which were grabbed by their legs and pulled below the surface. This method was practiced by the Coahuiltecan Indians in northeastern Mexico and the Mescalero Apaches living along the Rio Grande in New Mexico (Cremony 1868, Ruecking 1953). It is probable that this same technique was also used by bands of these tribes that ranged into Texas.

USE OF PIT TRAPS. Eagles were highly prized for their feathers and were often captured by the use of pit traps. A pit large enough to hide a man was first dug on the prairie. The hunter then entered the pit which was carefully covered and the carcass of a bait animal placed on the covering. When an eagle came to the bait, the concealed hunter grabbed it by the legs and pulled it into the pit where it was subdued. This method was widely used by the Kiowas and other tribes who inhabited the plains of north Texas (Koch 1977, Nye 1962).

RITUALIZED HUNTING OF EAGLES. Eagle-hunting among the Caddos was a highly ritualized activity in which only certain medicine men were allowed to kill the bird. The eagle was then plucked and its body reverently buried in the area where it fell. Then followed a ritual cleansing of the eagle-killer and the purification of the feathers before they were distributed. Failure to follow the prescribed ritual placed both the individual and the tribe at great risk. The taboo against non-ritualized killing of eagles was so strong that the tribe abandoned the direct procurement of eagle feathers after the death, in the late 1800s, of the last Caddo who knew the ritual. Following this time, the Caddo purchased eagle feathers from the Kiowa and other tribes (Gleason 1981).

PREPARATION FOR EATING. Birds were presumably plucked or skinned and then either eaten raw, roasted, baked, or boiled. The Hasinai boiled or roasted their meat and served it on little platters made of reeds. In contrast to this civilized mode, the coprolites of Paleoindians from west Texas often contain scales, claws, beaks, bones, and feathers strongly suggesting that small animals such as birds were often eaten whole.

SPECIES OF BIRDS HUNTED FOR FOOD

OBSERVATIONS OF THE SPANIARDS. The first mention of birds being used for food is by Cabeza de Vaca who reported that his Indian companions returned from a hunt in the late summer of 1535 with "birds, quails, and other game." (Bandelier 1922; Oberholser 1974). In 1691, Casanas noted that the Hasinai had available for their use "prairie chickens, and wild ducks . . . (and) many kinds of fowls . . . (that) come at the same time as the wild ducks . . . and many kinds of birds that stay in the country year round, such as partridges, quails, herons, and an endless number of birds that sing very melodiously in the spring (Hatcher 1927). Turkeys occurred in such numbers as to "disturb the traveler with their clucking" (Castaneda 1935). The Hasinai were reported to hunt "wild ducks, bustards [probably geese], cranes, partridges, and quails" (Hatcher 1927).

In 1768, the Karankawa, Cujane, Coapite, and Copane Indians at Mission del Rosario near Goliad hunted geese, ducks, chickens, partridges, cranes, quail, and various species of birds found along the seashore and banks of the rivers. The Aranames, Tamiques, and Manos de Perro at Mission Bahia del Espiritu Santo on the

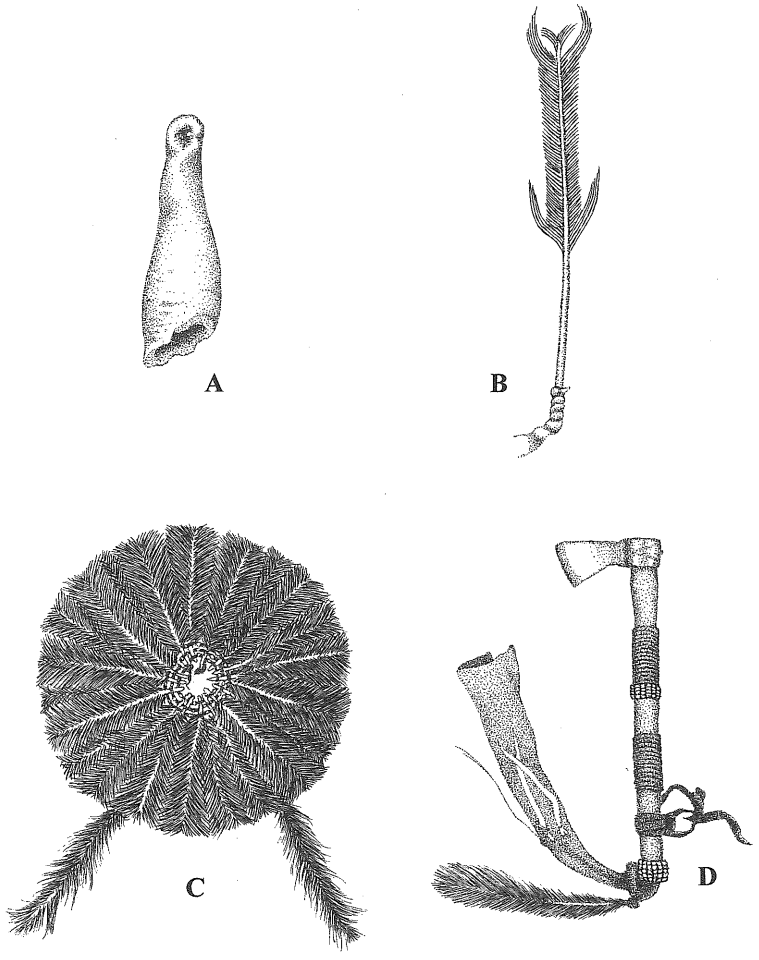

Figure 2-**A**. Socketed, blunt point of a "bird bolt" made from the phalange of a deer (after Aten 1979). **B.** One of the 15 uniquely clipped feathers from a Comanche shield collected in 1868 (after Jones 1968). **C.** Comanche feather ornament composed of 57 clipped Turkey Vulture feathers. The two longer feathers are from an unidentified species (Berlandier 1969). **D.** Tonkawa trade tomahawk with the feather of a Golden Eagle attached to the haft, c. 1868 (after Jones 1969).

San Antonio River near Goliad ate turkeys, ducks, quail, geese, and partridges (Forrestal 1931).

EGGS AS FOOD. Although the eggs of birds were undoubtedly eaten by the Indians of many different tribes, there are few observations to document this assumption. The earliest record is that of Simars de Bellisle who, after being abandoned in 1719 on the shores of Galveston Bay, found himself near death from hunger. During his desperate search for food, he happened upon three Indians, probably Akokisas, who were gathering eggs. Some of the more than 500 eggs gathered by the Indians were cooked and shared with Bellisle, greatly alleviating his misery (Folmer 1940). The Karankawa of the early 1800s were "very fond" of the eggs of sea birds which they obtained in quantity at certain times of the year (Gatschet 1891). Given this meager evidence, it can be assumed that the eggs of wild birds were an important seasonal source of food for those Indians who lived along the coast. The report of Solis that in 1768 the Tejas Indians along the Neches River brought him "chickens and eggs" suggests that eggs were perhaps a staple item in the diet of this tribe (Forrestal 1931).

TABOOS AGAINST EATING BIRDS. Some tribes did not eat birds or would eat them only under exceptional circumstances. The Lipan Apaches reportedly detested the flesh of all fowls with the possible exception of the Wild Turkey (Dennis 1925, Sjoberg 1953). However, the occurrence of the bones of turkeys and other unidentified birds at San Lorenzo de la Santa Cruz, a mission established in 1762 specifically for the Lipan Apaches raises some doubt regarding this assertion (Tunnel and Newcomb 1969).

Comanches would not eat wild birds "unless sorely pressed by hunger" (Newcomb 1961). The Coushattas of the early 1800s declined to eat that species of "game bird" which supplied the sacred egg that was kept in their temple (Dyer 1916). Certain Tamaulipan bands of Coahuiltecan Indians excluded turkeys and doves from their diet (Ruecking 1953) and this exclusion may also have been practiced by some of the bands that ranged into Texas.

USE OF FEATHERS BY THE INDIANS

The earliest observations on the uses of feathers are found in the diaries and reports of the explorers and missionaries. The collection of artifacts and the observations made by Jean Louis Berlandier during 1828–1829 provide information from a later time when the disintegration of the Indian societies was well advanced. The watercolors prepared by Lino Sanchez y Tapia under the direction of Berlandier vividly illustrate how feathers were integrated into the total décor of the Indians (Berlandier 1969).

Feathers were used to indicate social status, as personal adornments, and as decorations for weapons and shields. The ceremonial use of eagle feathers indicates that they were regarded as powerful symbols in the quest for communication with the Great Spirit. In addition, feathers were used for such practical purposes as the fletching of arrows and in the manufacture of feather mantles and capes.

FEATHERS AS VALUED OBJECTS. In December 1582, the expedition of Antonio de Espejo encountered the Otomoaco Indians along the Rio Grande between Presidio and El Paso. Among the gifts presented to the Spaniards by the friendly Indians were "ornaments like bonnets with colored feathers which they [the Indians] said they obtained from the direction of the sea" (Hammond and Rey 1929). It may be assumed from this report that feathers were valued objects and that a trade network existed for their exchange between tribes. The value of feathers to the Hasinai Indians is indicated by their custom of storing their most beautiful plumes in protective cylinders made from sections of cane. The Hasinai were so attracted to beautiful feathers that when they first saw Castilian chickens, they became so excited that "they could not rest until they had the prettiest feather of bright color" (Chabot 1932). Such was the value among the Tejas that the personal plumes of an Indian were interred with his body at the time of burial (Forrestal 1931).

FEATHERS AS SYMBOLS OF STATUS. Feathers were used to grant recognition and to indicate special status. In 1687, members of the La Salle Expedition observed that "elders" of the Tejas tribe wore clusters of feathers fashioned like turbans or coronets on their heads (Cox 1968, Foster 1998). This observation suggests that the feather coronets served to set apart these older and more experienced members of the tribe. In preparation for a gathering or a feast, the Caddos along the Red River greased their hair and applied red-tinted down of swans or geese (Foster 1998). When Martin de Alarcon, governor of Texas, visited Mission La Purisima Concepcion in present Nacogdoches County in 1718, he was joyously welcomed by the Indians. In the ceremonies that followed, the Indians "took the governor by his arms and with great care placed on his head some feathers from the breasts of white ducks" (Hoffman 1935). In 1716, the medicine men of the Hasinai had their own particular insignia of feathers that they wore upon their heads (Hatcher 1927). Feathers worn as adornments were often clipped, cropped, painted or otherwise modified to indicate the special status of the wearer (Koch 1977).

FEATHERS AS PERSONAL ADORNMENT. Feathers worn for adornment were usually hung from the lobes of the ears or placed on the head. The Jumano Indians, encountered in 1582 by the Espejo Expedition at the confluence of the Rio Conchos and the Rio Grande, wore in their hair the feathers of "geese, cranes, and sparrow-hawks" (Hammond and Rey 1929). The Gueiquesale warriors encountered by Father Manual de la Cruz in Uvalde County during 1674 had crowns made of plant leaves above which they wore "beautiful feathers" (Wade 1999). Henri Joutel, a member of the LaSalle Expedition, described the Hasinai as sometimes adorning their long braided hair with exquisitely beautiful feathers tied so that "each one looks like a sprout." In addition, the Hasinai warriors wore leather helmets decorated with plumage and buffalo horns (Griffin 1954).

In 1768, the Karankawa, Cujane, Coapite, and Copane Indians at Mission del Rosario near Goliad were described as having pierced noses and ears from which were hung beads, small shells, and feathers of various colors (Forrestal 1931). The Karankawa of the late 1820s wore "cock feathers behind their ears," an image preserved in the watercolors of Lino Sanchez y Tapia. The Caddos of this same period wore ear ornaments of metal, glass beads, or feathers whereas the Coushatta covered their heads with a "variety of feathers from different birds." The use of feathers to adorn the hair and head is also reported for the Kickapoo, Tonkawa, and Lipan Apache (Berlandier 1969, Roemer 1935). A Shawnee warrior illustrated by Sanchez y Tapia wears a turban-like headcover with five upright plumes in the rear. The Comanche were described as loading "their heads with feathers, arranged in lofty plumes, or dangling in the air in pensile confusion, or wove into an immense hood" (Burnet 1851). Sanchez y Tapia's watercolor of two Comanche warriors shows the mounted Indian with a feathered bonnet of upright plumes and a waist-length, mantle-like trailer of several horizontal rows of feathers. Tapia's painting of a Yamparica Comanche shows a cap and a band with two upright plumes at the rear.

A Comanche headdress and two feather ornaments collected by Berlandier provide important information regarding the feathers used in their manufacture. The headdress consists of a band of clipped Turkey Vulture feathers extending over the cap whereas the trailer is made from forty-three secondary wing feathers of an immature Golden Eagle. Both of the feather ornaments are made from feathers of a Turkey Vulture. The circular ornament (Fig. 2-C) is composed of fifty-seven clipped feathers whereas the linear ornament is made from clipped feathers tried to a buckskin cord. Two headdresses, one of crow feathers and the other of owl feathers stained yellow, were found on the battlefield following defeat of a party of Comanche and Kiowa in Edwards County during December 1873 (Nye 1937).

FEATHERS AS DECORATIONS FOR SHIELDS AND WEAPONS. A Comanche shield collected by Berlandier has four small feathers attached to the center of its cover. Tied to the outer edge of the shield base are seventy-three feathers of an American White Pelican (Berlandier 1969). Two shields collected following a skirmish with Kwahari Comanches in Haskell County during March 1868 are decorated with the feathers of four different species. Attached to the edge of one shield is a single Golden Eagle feather and seven feathers from a Ferrugineous Hawk. Tied to the center of the second shield are nineteen feathers of Wild Turkey and Turkey Vulture and a small roseate of cropped feathers with red flannel in the center. Fifteen of the larger feathers are clipped in a unique pattern (Fig. 2-B) of unknown significance (Jones 1968). Sanchez y Tapia's painting of two Comanche warriors shows the mounted warrior carrying a shield covered with small feathers arranged in seven concentric circles whereas the shield of the footman has a fringe of colored feathers. The lances of both warriors are decorated with small feathers.

Identification of the feathers used by the Tonkawa to decorate their weapons has been made from artifacts collected in 1868 at Fort Griffin (Jones 1969). The quiver has seven feathers attached to the top, three of which are from a Northern Flicker, two from a Golden Eagle, and two from a Wild Turkey. The eight arrows in the collection are fletched with feathers of Turkey Vulture and Wild Turkey. A single feather of an adult Golden Eagle is attached to the haft of a tomahawk (Fig. 2-D).

CEREMONIAL USE OF FEATHERS. In June 1716, the Domingo Ramon Expedition was greeted by the Hasinai Indians with whom they smoked a peace pipe adorned with many white feathers. A similar "pipe with feathers" was later observed within the "fire house" or main temple of the Indians. Near the temple were two smaller houses in which were located two small chests. Within the chests were many feathers of various sizes and colors, white breast feathers, turkey skin, rolls of ornamental feathers, crowns and a bonnet made of skins and feathers, as well as several flutes carved from crane (or heron) bones. Four or five plate-like carvings made from a black wood were also found within the chests. Each plate had four feet and on each plate was carved a head and tail to represent either a duck, alligator, or lizard. It was assumed by the Spaniards that these

feathers, flutes, and animal effigies were used in special ceremonies much as the feather fans were used in the rituals of the Hasinai medicine men (Chabot 1932, Forrestal 1931).

An eagle wing, known as *ygui,* was used by the Hasinai in a ritual conducted each February to forecast the weather for the coming spring. The wing was used in the ritual dance with the Indians later performing motions to indicate that the eagle whose wing they were using had risen on high to consult with the "Big Captain" in regard to the weather for the coming year (Forrestal 1931).

Feathers were often used in the sacred dances of the Indians. In the summer of 1772, the Comanche, Kichai, Yscani, Tawakoni, and Taovaya performed the "feather dance" before the Spanish governor in San Antonio as an expression of their commitment to peace. Following the dance, the governor was given the feathers and buffalo skins in which the Indians had wrapped him during the ceremony (Bolton 1914).

The Comanche Eagle Dance of the 1880s was performed by youths who wished to become warriors. Each dancer wore eagle feathers in his hair and carried a rattle decorated with feathers, paint, and beads, and a wand or fan made from the wing feathers of an eagle (Wallace 1947). In the Comanche Sun Dance, the dancers imitated through their movements and sounds young eagles not yet able to fly. A fan made from the feathers of a Greater Roadrunner was used by the medicine man to invigorate the dancers when they became tired (Linton 1935).

In the Kiowa Sun Dance, the sacred idol (Taime) was dressed in a "white-feathered robe, a headdress of a single feather, and ermineskin pendants." An eagle feather fan was also part of the ceremonial equipment (Newcomb 1961). The dancers in the war ceremony of the Tonkawa wore special headdresses of feathers and cloth decorated with buttons and embroidery (Sjoberg 1953).

FEATHER MANTLES AND CAPES. The manufacture of garments and blankets by attaching feathers to an underlying netting was widespread among the southern Indians. The Natchez Indians who lived in Louisiana only 50–60 miles from the Texas border were highly skilled at featherwork and it is only reasonable to assume that the craft was also practiced by the Caddo of East Texas (Swanton 1946).

Garments of turkey feathers were made by the Nasoni Indians, a tribe of the Hasinai Confederacy who lived between the Neches and Sabine rivers in present Rusk and Panola counties. From the meager descriptions available, it appears that the Nasoni feather garments were blanket-like and worn over the shoulders, being adjusted with little strings (Bolton 1987).

The Comanche used featherwork in making some of their headdresses. Evidence for this assertion derives from David G. Burnet who described the Comanche as sometimes loading their heads with feathers "wove into an immense hood" and from the observation of Berlandier that the Comanche had feather bonnets and "cloaks of feather cunningly fashioned" (Berlandier 1969, Burnet 1851). The most convincing evidence is, however, Lino Sanchez y Tapia's watercolor of a mounted Comanche warrior wearing a cap with six upright plumes. A trailer, fashioned from several horizontal rows of feathers, originates from the posterior half of the cap and gradually widens as it extends downward to cover the entire back of the warrior. Actually, the trailer is a feather cape made by attaching the rows of feathers to some sort of underlying material.

USE OF SKULLS, FEET, BONES, EGGS, AND ENTIRE BODIES

SKULLS AND FEET. Body parts other than feathers were occasionally used as personal ornaments. Some Caddos during the late 1820s used dried bird skulls as ear ornaments (Berlandier 1969, Castaneda 1926). A collection of Tonkawa artifacts from Fort Griffin contains the foot of a Great Horned Owl that was reportedly used as a head ornament (Jones 1969).

USE OF BONES. Bird bones were commonly fashioned into beads (Fig. 3-C) by encircling the shaft with shallow grooves an inch or two apart and then breaking the bone at the weakened points to leave a cylinder which could be strung on a cord (Hester 1997) Awls were occasionally made from bird bones even though their fragility did not commend them to this purpose (Maslowski 1978). Comanche war whistles were made from the ulna of an eagle whereas the Caddos and Wichitas made small flutes or flageolets (Fig. 3-A) from the bones of eagles, cranes, herons, and turkeys (Hatcher 1927, Lorrain 1967, Jelks 1965, Yates 1993). The shafts of bird bones were also used as the stem or mouthpiece (Fig. 3-D) of pipes (Campbell 1947, Jackson 1940).

EGGS AS SACRED OBJECTS. Joseph Osterman Dyer, a physician in Galveston during the early 1900s, described the use of an egg as a sacred object. According to Dyer, the Coushatta Indians maintained a holy house or temple on the lower Trinity River during the 1820s. In the inner sanctum of the temple was a box made of pecan bark decorated with human hair. Within the box were the symbols of procreation and immor-

tality, the egg of a wild bird and a stuffed snake skin (Dyer 1916).

DRIED OR STUFFED BIRDS. Entire birds or their parts were often used as pouhahantes or "medicine." Pouhahantes were amulets capable of protecting those who wore them from harm. Pouhahantes were kept in the lodge or carried on the person. Comanches often set a pouhahante in the center boss of their war shield to provide protection. These small amulets could be bones, or dried whole animals such as rats, lizards, snakes, or birds (Berlandier 1969). The bones of a Common Grackle found within small deerskin bags may represent pouhahantes (House 1978). Protection against ghosts was attributed to a bundle of four tail feathers of a crow which were part of the medicine kit of a Comanche eagle doctor (Jones 1969). The occurrence of bird parts has also been reported in the medicine bundles of Comanche and Kiowa warriors (Hanson 1980).

IDENTIFICATION OF BIRDS FROM ARCHEOLOGICAL SITES

The identification of bird bones from archeological sites has long been neglected (House 1978). This neglect may be attributed to the scarcity of specialists trained in the identification of avian skeletal material and to the lack of adequate reference collections. Perhaps just as important may be the techniques used in examining the site and the fact that the bones of many smaller birds may escape detection. In spite of these difficulties, archeological studies have provided significant information on the use of birds by the native inhabitants of Texas.

EGGS, BEAKS, AND SPURS. Fragments of an egg shell found at a site near Lewisville in Denton County provide evidence of the use of birds at this location (Crook and Harris 1957). The beak of an unidentified woodpecker was found at Landergin Mesa in Oldham County (DeMarcay 1986). The spur of a turkey cock was found at Choke Canyon in southern Texas (Hall, et al. 1986). Non-osteological remains have also been reported for herons and other unspecified birds (House 1978).

BIRD REMAINS IN COPROLITES. Some Indians ate smaller animals in their entirety with the result that many structures passed unaltered through the digestive tract. Thus, bird remains are occasionally found in the dessicated feces, i. e., coprolites, of those Indians who inhabitated dry shelters or caves. Bird remains from coprolites dated circa 6,000 B.P. have been found in samples from Hinds Cave in Val Verde County. Identified species include the Northern Bobwhite and a dove of the genus *Zenaida.* Other osteological remains include those of an owl-sized bird, a quail or dove-sized bird, a bird of unspecified size, as well as the remnants of the beak and tail of a wren-sized bird (Williams-Dean 1978).

OSTEOLOGICAL REMAINS. Bird bones found at archeological sites may be in the form of beads, awls, flageolets, pipe stems or unmodified elements of the disarticulated skeleton. Identification of the disarticulated bones or their fragments is difficult and the results are often reported simply as "unidentified birds", even though the size differences indicate that the remains of several species may be present in the sample.

It is often assumed that the occurrence of bird bones at an archeological site indicates that the birds were used as food. Although this assumption is often correct, it neglects the fact that birds were a multiple use resource and that, in addition to being used as food, their feathers, claws, legs, wings, beaks, bones, and spurs were also used for various purposes.

A relatively few archeological sites have provided most of the species records. Bear Creek Shelter at Lake Whitney contained bones of Green-winged Teal, Northern Pintail, Wild Turkey, Ruby-crowned Kinglet, Carolina Chickadee, Northern Bobwhite, Scaled Quail, meadowlark sp., Corvidae sp., and an unidentified falconiform (Lynott 1978).

Sites in Zavala and Jim Wells counties have yielded Great Blue Heron, Wild Turkey, Northern Mockingbird, Greater Roadrunner, duck sp., and unidentified birds. Scorpion Cave in Medina County contained the remains of Canada Goose, Green-winged Teal, duck sp., Broad-winged Hawk, Northern Mockingbird, warbler sp., and Fox Sparrow (Hester 1975). The Tadlock Site in Wood County on the Upper Sabine River Basin contained the remains of Pied-billed Grebe, Green-winged Teal, Anatidae sp., *Buteo* sp., Wild Turkey, Northern Bobwhite, Barred Owl, Northern Flicker, Pileated Woodpecker, woodpecker sp., American Crow, and unidentified passerines. Wild Turkey was the most common with males, females, and juvenile birds being present. The occurrence of Pied-billed Grebe, Green-winged Teal, and Northern Flicker, which occur in eastern Texas only during the fall and winter, indicates that the site was occupied during these seasons (Perttula and Bruseth 1983). Spanish mission sites have yielded bones of Mallard, goose, swan and unidentified anatids, as well as domestic chicken, turkey, Greater Prairie-Chicken, plover, Black Vulture, and crow (De France 1999, Meissner 1999).

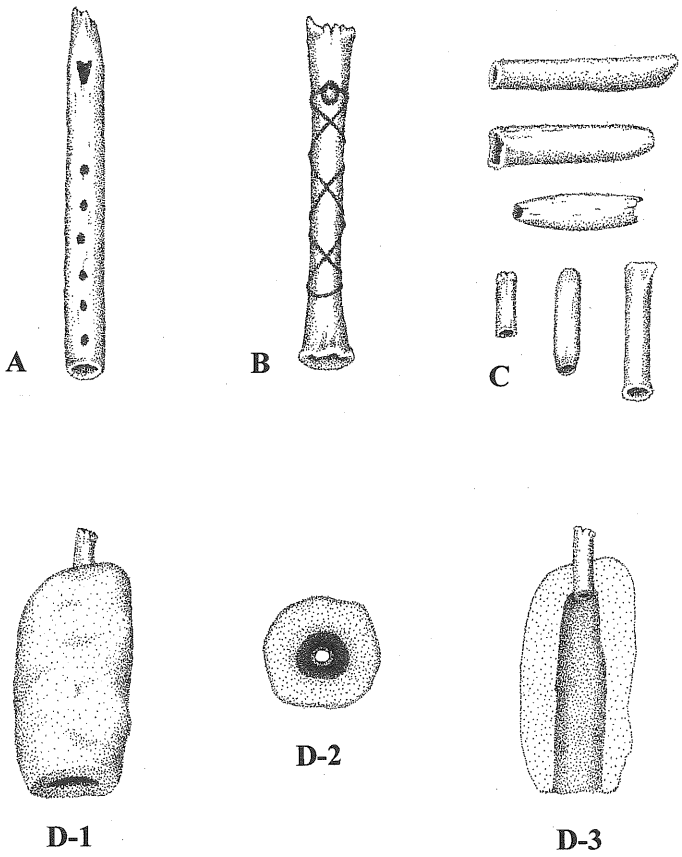

Figure 3-**A**. Eagle ulna flute (after Yates 1993). **B.** Bird bone flageolet (after Jelks 1965). **C.** Beads made from the long bones of birds (after Lorrain 1967, Schuetz 1969, Hester 1997). **D.** Tubular sandstone pipe with a stem made of bird bone (after Campbell 1947). **D-1.** whole view, **D-2.** transverse section, **D-3.** longitudinal section.

Aquatic birds were the main avian component at the Johnson Site in Aransas County on the middle Texas coast. Included within the sample were Mallard, Northern Pintail, American Wigeon, Northern Shoveler, Common Loon, and an unidentified species of *Buteo* (Campbell 1947). In contrast, the Holmes Site on Ingleside Cove yielded only the bones of a Little Blue Heron and an unidentified duck (Ricklis 1996). Northern Cardinal and Wild Turkey have been identified at the Adams Ranch Site in Navarro County (Bruseth and Martin 1987). Sites in Dallas County have yielded remains of Night-Heron, Blue Jay, and Dickcissel (Martin 1988). Passenger Pigeon remains have been found at three prehistoric sites; the George C. Davis Site (A.D. 900–1350) on the Neches River in Cherokee County and the Mitchell and Hatchel Sites (circa A.D. 1200) on the Red River in Bowie County (Lord and Thurmond 1979, Story 2000). Remains tentatively identified as those of an Ivory-billed Woodpecker were found at the Vinson Site in Limestone County (Yates 1993).

IMPORTANCE OF TURKEYS, DUCKS, AND GEESE

WILD TURKEY. The Wild Turkey was perhaps the bird most widely hunted by the Indians. Prior to the beginning of the 20th century, the turkey was widely distributed throughout the state and, as a nonmigratory species, could be hunted year-round (Oberholser 1974). The abundance of the Wild Turkey in former times is suggested by Father Morfi who observed "flocks of more than 100 and 200" along the road between the missions at San Antonio during January 1777 (Schuetz 1980). The frequency with which the remains of turkeys

are found at occupational sites is a strong indication of their importance to the economy of the Indians. A survey by the author showed turkey bones to be present at 25 (47%) of 53 occupational sites from which bird bones were reported.

The Wild Turkey was an important source of meat. At the George C. Davis Site in east Texas, turkey remains were second only to those of white-tailed deer. Since the average adult turkey can supply about 8.5 pounds of meat and the area around the Davis Site can support approximately 400 turkeys, it was calculated that a yearly harvest rate of 20–30% would have supplied the inhabitants of the site with between 782.56 and 1173.84 kilocalories annually without depleting the breeding population (Keller 1974).

The bones and feathers of turkeys were used for various purposes. Beads, pipe stems, and flageolets were made from the long bones of the legs and wings. Turkey feathers were also used in the cape-like garments made by the Nasoni Indians of east Texas. Kwahari Comanches decorated their shields with turkey feathers whereas the Tonkawa used them to fletch their arrows and as decoration for their quivers.

DUCKS AND GEESE. There are numerous references by early Spanish travelers to the seasonal abundance of ducks and geese and their use as food by the Indians. The vast number of anatids seen during January 1777 in the irrigated fields of the missions at San Antonio caused Father Morfi to declare that he had never seen "such a multitude of ducks, geese, and cranes . . . [it is no exaggeration to say that] they covered the entire prairie" (Schuetz 1980). Canada Goose, White-fronted Goose, Green-winged Teal, Mallard, Northern Pintail, American Wigeon, and Northern Shoveler have been identified from archeological sites in southern, eastern, and central Texas. Given the large numbers of anseriforms that were present each fall and winter, it is surprising that their remains do not occur more frequently at occupational sites.

POULTRY RAISING BY THE INDIANS

On 30 April 1768, Fray Gaspar Jose de Solis arrived at a Tejas village near San Pedro Creek in east Texas. Among other observations, Solis noted that the Indians "raise chickens and turkeys." Later in the afternoon, several men and women brought him "chickens and eggs" (Forrestal 1931) or, by a different translation, "hens, young roosters, pullets, and eggs" (Griffin 1954). Chickens raised by the Tejas could have been obtained from the French at Natchitoches with whom the Indians are known to have traded.

It is not known whether the turkeys observed by Solis were domesticated or simply tamed. If only tamed, some sort of restraint would have been necessary but Solis provides no details on this point. It is possible that the Indians may have captured and restrained young turkey poults. This possibility is supported by one translation of the Solis diary that describes the birds in question as being "young chickens and young turkeys (Kress 1931). Since there are no corroborating accounts of poultry raising among the Tejas, the observations of Solis have been questioned by some historians.

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APPENDIX 1.
CHECKLIST OF BIRDS USED BY THE INDIANS OF TEXAS AS REPORTED IN THE HISTORICAL AND ARCHEOLOGICAL LITERATURE

ORDER 1. Gaviiformes
- Common Loon (*Gavia immer*)

ORDER 2. Podicipediformes
- Pied-billed Grebe (*Podilymbus podiceps*)

ORDER 3. Pelicaniformes
- American White Pelican (*Pelicanus erythrorhynchus*)

ORDER 4. Ciconiiformes
- Night-Heron sp.
- Great Blue Heron (*Ardea herodias*)
- Little Blue Heron (*Egretta caerulea*)
- Green Heron (*Butorides virescens*)
- Turkey Vulture (*Cathartes aura*)
- Black Vulture (*Coragyps atratus*)

ORDER 5. Anseriformes
- Greater White-fronted Goose (*Anser albifrons*)
- Canada Goose (*Branta canadensis*)
- American Wigeon (*Anas americana*)
- Mallard (*Anas platyrhynchos*)
- Northern Shoveler (*Anas clypeata*)
- Northern Pintail (*Anas acuta*)
- Green-winged Teal (*Anas crecca*)
- Swan (*Cygnus* sp.)
- Ducks spp.
- Anatidae sp.

ORDER 6. Falconiformes
- Red-shouldered Hawk (*Buteo lineatus*)
- Broad-winged Hawk (*Buteo platypterus*)
- Ferrugineous Hawk (*Buteo regalis*)
- Hawk (*Buteo* sp.)
- Golden Eagle (*Aquila chrysaetos*)

ORDER 7. Galliformes
- Greater Prairie-Chicken (*Tympanuchus cupido*)
- Wild Turkey (*Meleagris gallopavo*)
- Scaled Quail (*Callipepla squamata*)
- Northern Bobwhite (*Colinus virginianus*)
- Quail sp.

ORDER 8. Gruiformes
- Rallidae sp.
- Crane sp.

ORDER 9. Charadriiformes
- Plover (*Pluvialis* sp.)
- Sandpiper sp.

ORDER 10. Columbiformes
- Passenger Pigeon (*Ectopistes migratorius*)
- Dove (*Zenaida* sp.)

ORDER 11. Cuculiformes
- Greater Roadrunner (*Geococcyx californianus*)

ORDER 12. Strigiformes
- Great Horned Owl (*Bubo virginianus*)
- Barred Owl (*Strix varia*)
- Owl sp.

ORDER 13. Piciformes
- Northern Flicker (*Colaptes auratus*)
- Pileated Woodpecker (*Dryocopus pileatus*)
- Ivory-billed Woodpecker (*Campephilus principalis*) (?)
- Woodpecker sp.

ORDER 14. Passeriformes
- Blue Jay (*Cyanocitta cristata*)
- American Crow (*Corvus brachyrhynchos*)
- Crow (*Corvus* sp.)
- Corvidae sp.
- Carolina Chickadee (*Poecile carolinensis*)
- Ruby-crowned Kinglet (*Regulus calendula*)
- Northern Mockingbird (*Mimus polyglottos*)
- Warbler sp.
- Fox Sparrow (*Passerella iliaca*)
- Northern Cardinal (*Cardinalis cardinalis*)
- Dickcissel (*Spiza americana*)
- Meadowlark (*Sturnella* sp.)
- Common Grackle (*Quiscalus quiscula*)
- Passerine spp.

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