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Crane Magic

CRANES — WHOSE VOICES PENETRATE the atmosphere of the world's wilderness areas, from arctic tundra to the South African veld, and whose footprints have been left on the wetlands of the world for the past 60 million years or more—are the stuff of magic. They have served as models for human tribal dances in places as remote as the Aegean, Australia, and Siberia. Whistles made from their wing bones have given courage to Crow and Cheyenne warriors of the North American Great Plains, who ritually blew on them as they rode into battle. These birds' wariness, gregariousness, and regularity of migratory movements have stirred the hearts of people as far back as medieval times and probably long before, and their sagacity and complex social behavior have provided the basis for folklore and myths on several continents. Their large size and humanlike appearance have perhaps been a major reason



*“And beauty, touched by love, is
somehow transformed into magic.”*

P. JOHNSGARD

why we have so often been in awe of cranes and why we have tended to bestow so many human attributes upon them.

Cranes have provided the basis for a surprising number of English words that we no longer associate with them. The Greek word for cranes, *geranos* (or *gereunos*), apparently was based on the myth that cranes constantly wage warfare on a tribe of Pygmies, the ruler of whom was named Gerania and had been transformed into a crane by Juno and Diana for neglecting the gods. (A similar myth in India refers to warfare between dwarfs and the fabulous garuda bird.) The geranium plant is so named because of the similarity of the long and pointed seed capsule to a crane's bill. The Romans referred to the cranes as *grues*, apparently from the sound of their calls. The related Latin word *congruere*, meaning to agree, is the basis for the modern English word “congruence,” and both derive from the highly coordinated and cooperative

behavior typical of cranes. Likewise, the English word “pedigree” is derived from the French *pied de grue*, meaning “foot of a crane,” and is based on the characteristic branching pattern of a genealogy. Finally, “hoodwinking” is derived from the practice of sewing shut the eyes of captured cranes in order that they can be more readily tamed and fattened for the pot.

Cranes have been mythically credited with the derivation for several of the letters of the Greek alphabet. Thus, the hero Palamedes supposedly was able to devise several Greek letters simply by watching the convolutions of crane flocks. A similar myth gives the god Mercury credit for inventing the entire Greek alphabet by watching the flights of cranes.

The migratory flights of cranes have probably been observed with interest by humans for millennia, perhaps because cranes generally migrate by day, and also because they typically are organized into coordinated formations during such flights. Edward Topsell (1572–1625), who collected all of the then-available information on the natural history of birds, mammals, and other animals known to the ancient world, wrote at length about crane formations. He believed that the foremost bird in such a formation acted as captain and that all the subordinate birds of the group organized themselves in such a way as to avoid obscuring its view. Various older birds would reputedly take turns at being the flock leader. Topsell erroneously believed that, should a flock member become tired, it would be supported in flight on the backs, wings, or outstretched legs of other flock members. It has also been widely believed in many cultures that cranes will help transport smaller birds on their migrations by carrying them on their backs.

Various early writers proposed the idea that cranes probably swallowed heavy stones or sand before they began a long flight, with the view that such stones would serve as ballast and prevent the birds from being tossed about by gusts of wind. It was believed that at the end of these flights the birds would cast up the stones or sand. Other writers believed that the stones were carried by the feet, from which they could be easily dropped when they were no longer needed.

An equally widely held and appealing view was that a flock of cranes would sleep at night only after posting one or more “watch birds,” which would stand on one leg and hold a heavy stone in the claws of the other foot. Should such a bird fall asleep, it would drop the stone, thus helping to awaken both itself and the other birds of the flock. This idea gave rise to a Christian morality tale, to the effect that Christians must have faith, imitate cranes in their watchfulness, and avoid falling into sin as a crane avoids falling asleep by holding fast to a heavy stone. With such a belief anchor, the faithful could find their way through life safely, and upon arrival in heaven their weighty ballast would be turned to gold. Indeed, in heraldry and in the stone carvings of some medieval cathedrals the images of stone-carrying cranes can often be found.

Even more commonly than in the Christian church, cranes have permeated the religions and mythologies of ancient Eurasian cultures. In central Anatolia, at a Neolithic culture site (Çatalhöyük) dating from 7300 to 6200 BC, modified middle wing bones of a Eurasian crane have been found. Cut marks and holes on the radius bone suggest that they could have been used to attach the wing to the shoulder of a dancer (Russell and McGowan 2003). A “dance of the white cranes” was performed in China at least as early as 500 BC, and in that country it was generally believed that cranes and dragons transported to heaven those

souls who were destined for immortality. It was also believed that old pine trees sometimes were transformed into cranes, or vice versa, both being extremely long-lived. Indeed, in both Chinese and Japanese art there is a recurrent theme of associated pine trees and cranes, and these icons have generally come to symbolize long life, happiness, steadfastness, and love. Because of the belief that cranes help support a soul to paradise, a crane-shaped hairpin may be placed in the hair of a deceased woman, and a representation of a crane may be hung in the window of a house where there has been a death.

Because of their venerated status, cranes were rarely if ever killed and eaten in the Orient, although in India they were sometimes sacrificed. In Egypt the birds were captured for food, together with other waterfowl. Furthermore, in the Temple of Deirel-Barari there is a wall painting of captive cranes walking between slaves, with each crane's bill tied down toward its neck, thus upsetting its balance and making it unable to fly. Other illustrations of demoiselle cranes in captivity occur in Egyptian tombs dating from the fifth to the eighteenth dynasty.

Cranes were also captured and domesticated in ancient Greece, for on a Grecian vase in the Hermitage Museum at Leningrad a scene is depicted of a woman offering a tidbit to a domesticated or captive crane. At least as early as the late Ice Age in Great Britain cranes were killed and eaten by humans; British cave deposits of this era have yielded crane bones, and the bones of a now-extinct crane the size of a sarus crane have been found in human-associated deposits of the late Pleistocene in Britain and France, of the Neolithic period in Germany, and of the Bronze and Iron ages in Britain. Because these bones include crane remains of varied sizes, it has been suggested that perhaps the inhabitants of these sites may have raised crane chicks for their consumption. At least as early as the Chou period, some 2,200 years ago, Chinese royalty raised cranes in captivity.

The tales of ancient Greece include many stories of cranes. For example, it was noted that in Thessaly cranes and storks would sometimes feed on snakes and thus help to protect the people there. As a result, the people of that region were forbidden to kill these birds, a practice that was referred to as *antipalargia* (from the Greek *palargos*, or stork). Similarly, a mountain on the Magaris Peninsula was named Gerania (now Yerania) because the people there followed the calls of cranes to higher ground following a flood.

The story of the death of Ibycus is even better known; this poet of Rhegium was attacked by robbers and mortally wounded. As he lay dying, he saw a flock of migrating cranes overhead, and with his last breath told the robbers that the cranes had seen his murder and would avenge his death. Later, in the Corinth market one of the robbers happened to see a flock of cranes overhead and called out in fear to his friends, "Behold the cranes of Ibycus!" On being overheard, the men were questioned and arrested, and later confessed to the murder of Ibycus.

In a somewhat similar fashion, the sighting of cranes has been associated with death in various other cultures. For example, slaves of the American South believed that if a crane should circle over a house three times, somebody in that house would soon die. An ancient counterpart of this belief may be Pliny's story that the oldest of a flock of cranes would fly around in a circle three times before the flock was due to leave on migration, and then fall down and die of exhaustion. Perhaps these and similar stories derive from the fact that prior to migration cranes do indeed spend much time circling in thermals on sunny days and ride thermals to great heights immediately prior to setting out on long migratory journeys.

The actual migratory journeys of cranes are no less interesting than they were imagined to be by the peoples of medieval times. In recent years it has been possible to follow these movements very closely by using radar or radio telemetry or by following migrating flocks in small airplanes. It is now known, for example, that Eurasian cranes, and probably most other cranes as well, maximally utilize their soaring abilities during migration by exploiting the lifting potential of thermal winds and then gliding in close formation for great distances while seeking out another thermal. Eurasian cranes may thus soar to heights of more than 6,500 feet while in thermals, and their thermal-assisted climbing abilities are especially valuable between about 1,500 and 5,000 feet. Using radio telemetry, it has been found that greater sandhill cranes can fly nonstop as far as 360 miles during a 9.5-hour period, averaging nearly 40 miles per hour. This generally agrees with estimated air speeds for Eurasian cranes of from 37 to 52 miles per hour. Observations on migrating whooping cranes indicate that similar daily migration patterns occur, with single-day trips of up to 510 miles reported, but with most daily movements of less than 200 miles and lasting about 6.5 hours.

In the case of the sandhill crane, the birds prefer to fly only on clear or partly cloudy days. They normally land before dark and usually begin to arrive at roosting sites by about sundown. Nearly all migratory flight in this species occurs at elevations below 6,000 feet, generally between about 1,000 and 3,000 feet, but some greater sandhill cranes must fly over a Colorado mountain pass (North Pass or Cochetopa Pass) at an altitude of 10,000 feet or higher. Sandhills in central Alaska regularly fly past the face of Mount McKinley, but their east-west route does not take them over its crest.

No doubt the demoiselle cranes migrating over the Himalayas from Asia to India encounter much higher elevations than these that must be traversed, as do black-necked cranes migrating to wintering grounds in Bhutan. Black-necked cranes breed at altitudes as high as 4,900 meters (nearly 16,000 feet), so they are no doubt well adapted to survive and migrate at such high altitudes. The Eurasian alpine or yellow-billed chough breeds at still higher altitudes, to about 6,500 meters (over 20,000 feet). This remarkable capacity for alpine survival reflects the inherent capacity of birds to survive at low temperatures and very low oxygen levels as a result of their extremely efficient respiratory system, the high oxygen-carrying capacity of their blood, and their highly effective feathered insulation.

Altitudes used by migrating cranes are high enough that landmarks are visible from great distances and place the birds well above ground turbulence or obstacles. Cranes also choose those days for migratory flights when they can exploit following winds rather than face crosswinds or headwinds. On rare occasions when sandhill cranes have been observed migrating during inclement weather, barometric pressures have been rising in those areas toward which the birds were flying. Equally remarkably, sandhill cranes have been observed to terminate a migration leg early in the day, apparently sensing the approach of bad weather well before it has actually arrived.

Flock sizes of migrating cranes vary greatly, probably influenced by such factors as total population size, levels of social tolerance or gregariousness in the species, degrees of disturbance on roosting and foraging areas, and time of year. In whooping cranes the average flock size is usually of less than five birds and rarely more than ten, probably consisting of a single pair and one or more cohorts of their offspring. Migrating flocks of sandhill cranes

often number in the thousands, but field-foraging flocks often have no more than fifty birds, within which the most common social units are of two or three birds, probably representing pairs or family units. However, the roosting flocks of sandhill cranes are usually much larger. At times these assemblages may contain 70,000 or more individuals, especially in areas of extensive sandbars and very low human activity. These massive roosts are restricted to the relatively few areas of the Platte River that still comprise ideal roosting habitats; as a result, birds are crowded into confined stretches of river. Sandhill cranes tend to return to the same roosting sites day after day and also tend to exhibit year-to-year site fidelity.

The main factor affecting the daily timing of roosting flights is the light intensity, with the majority of the birds arriving at the roost by sunset, nearly all of them within fifteen minutes after sunset. Delayed returns to the roost most often occur under conditions of a moonlit clear sky, moderate to high temperatures, and no wind. Similarly, morning departures from roosts are associated with sunrise; more than half of the birds usually leave the roost by a half hour after sunrise, and nearly all will have left during the first hour. However, heavy clouds, fog, rain, and strong winds will delay morning departures, and the birds may even remain on the roost all day long. Judging from observations of other crane species, much the same pattern of diurnal activity seems to be typical of cranes in general.

Cranes take flight from a running start into the wind, finally springing into the air and slowly gaining altitude. In flight they present an appearance distinctly different from that of geese, in that the wingbeat is shallower and the upstroke is noticeably more rapid than the downstroke. This rapid upstroke is especially conspicuous among frightened birds trying to gain altitude quickly. Furthermore, perhaps because of their less labored flight than that of generally heavier birds such as geese or swans, they rarely maintain a fixed formation for any length of time, except when migrating at high altitudes. Instead, the flock pattern is constantly undulating and changing, without any definite lead bird. At fairly close range the long and trailing legs of cranes also visually set them apart from geese. However, during cold weather it is not uncommon for some of the flock members, especially young birds, to tuck their legs forward into their flank feathers and thus assume a rather gooselike flight profile, albeit with a slower wingbeat and flight speed.

Landing is done into the wind, with the legs dangled pendulum-like, providing for a lowered center of gravity and increased stability, as the tail is spread and the wings cupped. In this way the birds descend parachute-like almost vertically to their roost, finally breaking their descent during the last few seconds by wing flapping. Cranes are unable to match the abilities of ducks and geese to lose altitude by acrobatically flipping their bodies from side to side (“wiffing”), so that their wings’ lifting abilities are lost and a falling-leaf maneuver is created, although occasionally cranes will ineffectively attempt this remarkable behavior.

While flying, and especially during landings and takeoffs, cranes utter a constant clamoring, enabling pair and family members to maintain vocal contact amid the confusion of flock movements. Although it remains to be proven, there seems little doubt that cranes must be able to recognize their mates or other family members by their vocal traits alone, for pairs often maintain “conversational” contact with one another when they are out of each other’s sight. When lone birds have somehow been separated from their social groups, it is common to see them flying back and forth over roosting flocks, calling almost constantly.

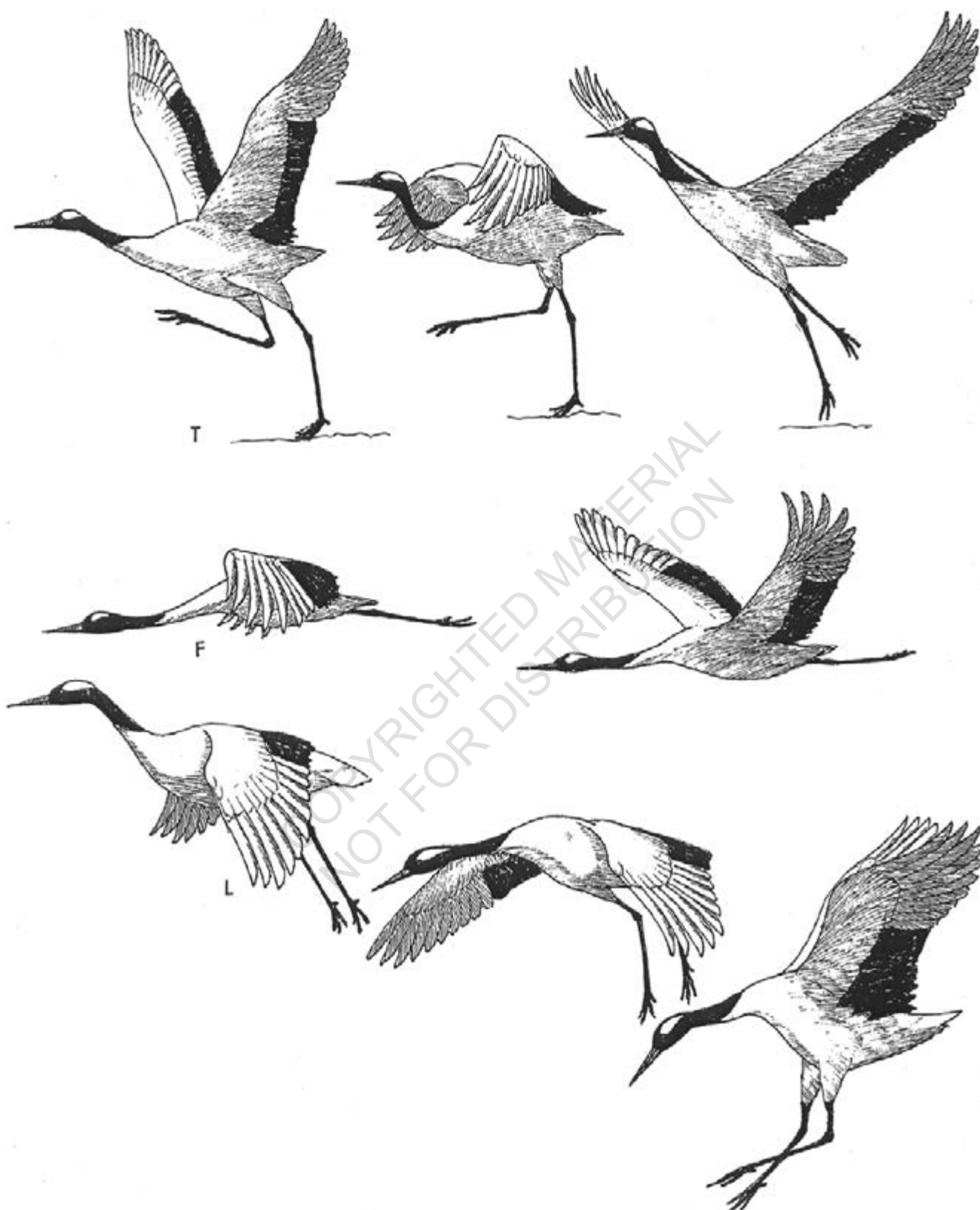


FIGURE 1.1. Crane flight behavior (red-crowned crane), including takeoff (T), flight (F), and landing (L) (after Masatomi and Kitagawa 1975)