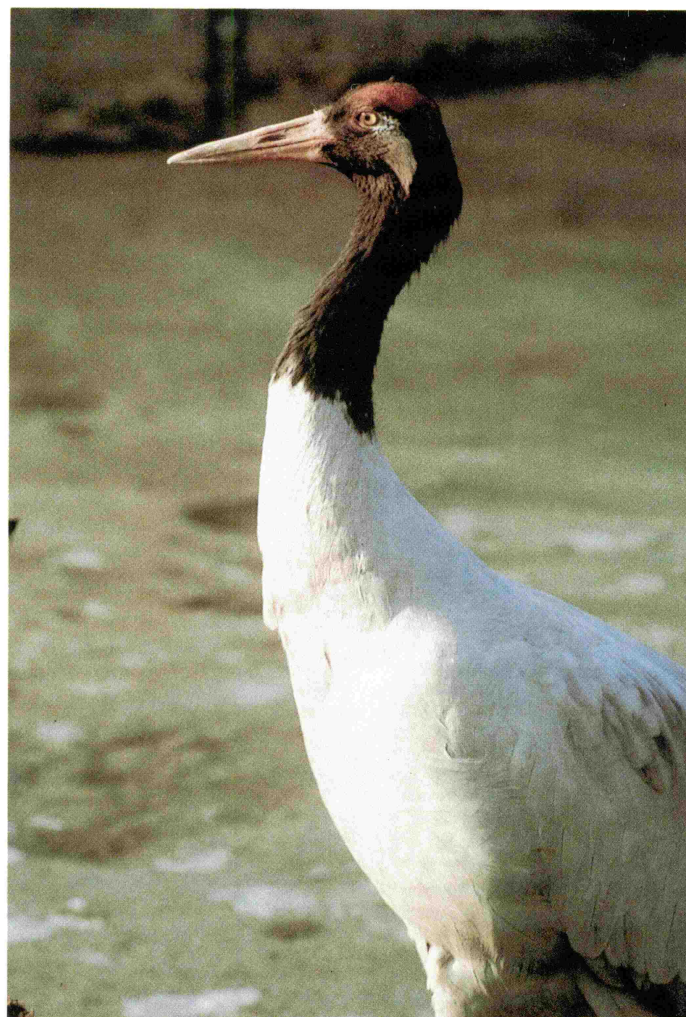


Black-necked Cranes in Nongbaotan

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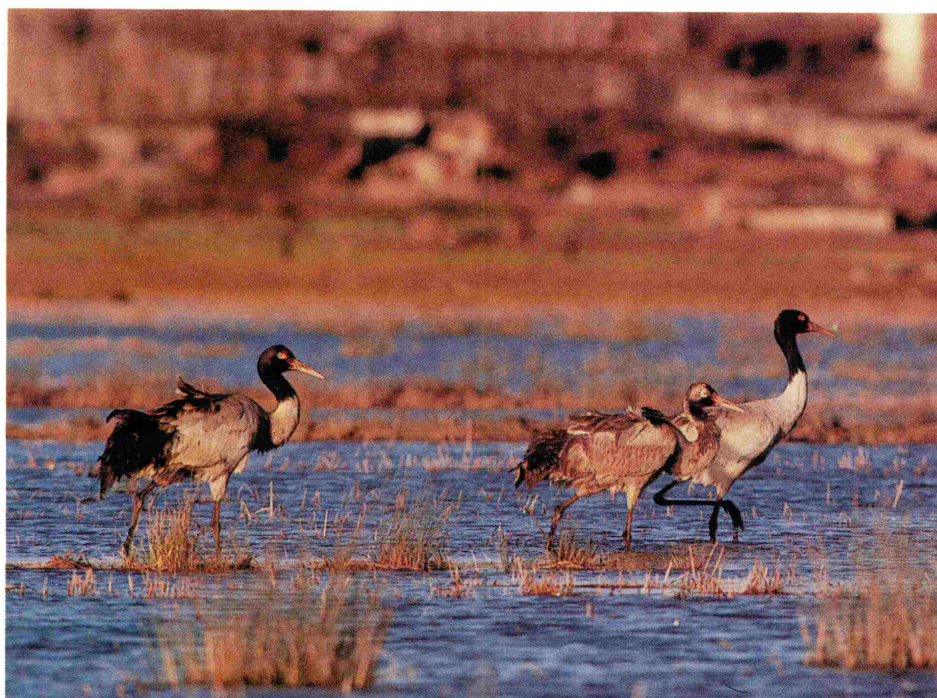


This close-up of an adult Black-necked Crane shows its sharply contrasting black neck and head. Its reddish crown is similar to several other cranes.

The black-necked crane (*Grus nigricollis*) is a species endemic to China. It is rare and estimates indicate a total of 900 birds exist. Ornithologists from many countries have always wanted to know more about this species. So, between June and August 1986, a group traveled to the Nongbaotan marshland to observe and study the reproductive habits and characteristics of the black-necked crane.

Geography

Nongbaotan is in Yushu County, Yushu Tibetan Prefecture, Quinghai Province, Peoples Republic of China. The lake is located two-thirds of a mile (1.08 km) from Exining. The area involved in the study is a vast expanse of low-lying land. Many springs and seven streams empty into one large wetland. The marsh is 15.5 miles (25 km) long, from one to two miles wide, and is completely surrounded by mountains. This area is a popular habitat for the black-necked crane. The entire wetland covers an area of 29 square miles (75 sq. km), but only 17 square miles (45 sq. km) of the wetland is actually suitable crane habitat. The habitable area is a grassy marshland interspersed with five ponds. Water depths range from eight inches to 98 inches (0.2 to 2.5 meters). Grassy mounds also prevail.



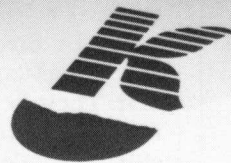
This family group of Black-necked Cranes is a close knit unit even when they are in their wintering habitat (Cao Hai) in the People's Republic of China.

Nongbaotan is 13,780 feet (4,200 m) above sea level. The air is thin. This means that there may be breathing difficulties when walking in this area. There is an average of 2,300 hours of sunshine per year. Temperatures vary greatly, running about 13 to 15 °C at noon, dropping to 2 to 4 °C between 2:00 a.m. and dawn.

Rain was plentiful in 1986. As a direct result of this rain, an island used by the birds, 1600 feet long and 330 feet wide (110 m), was in evidence. This island was primarily used by bar-headed geese. In 1980, the area supported but a few dozen birds; while in 1986, 2,000 nests were counted. Nests of the common Merganser and white-headed ducks were also observed. There were 19 breeding pairs of black-necked cranes in the entire Nongbaotan region; eight pairs brooding in each district. One lone pair appeared to move about in an idle manner. A single crane, whose mate was shot by a hunter the previous year, moved about with no real purpose. There were many additional black-necked cranes in this area. These birds moved in flocks and the study party was unable to locate their mating area. Because of these difficulties, the study team decided to concentrate their work on the activities of a single pair of black-necked cranes.

On June 3rd, the study party started early in the morning. At 9:00 a.m., a pair of birds flew into the midst of a herd of cows, landing less than 650 feet (200 m) from the study group. After landing, the birds walked about slowly, foraging for food. Suddenly, one of the birds spread its wings and picked a stick up from the ground with its bill. The stick was tossed into the air. The bird flapped its wings, and ran around in a large circle. As it was running around in this circular pattern, it appeared to be in a "happy" mood. At almost the same time, the other bird lowered its head, bowed, spread its neck and beat its wings. All the while the bird was, in effect, rising and falling and presenting an elegant figure. When the study team attempted to take pictures of the birds, the birds "spotted" the people. The dance stopped and the birds immediately walked toward the hinterland of the marsh. As they walked away, they issued rhythmically and in unison, a unique cry. The male had a sonorous, monosyllable cry, sounding like "ga-ga-ga." The female bird, however, sounded a

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disyllabic, uneven cry, in a shrill voice, sounding a "ga-ge-ge-gagege." As the birds sang in unison, they raised their bills and pointed them vertically toward the sky. All these sounds were quite different than those uttered by the red-crowned crane. Distinctive differences between the activities of the black-necked crane and the red-crowned crane were noted. For example, while singing in unison, the black-necked crane will usually partially spread its wings, while the red-crowned will never spread its wings.

The study team followed the birds as they headed toward a nearby rivulet. The birds managed to keep an unchanging distance between themselves and the study party. When the study party walked faster, the male crane would utter some very short, quick sounds of fear. Finally the two cranes, one following the other, took to the sky.

As the birds flew, they stretched and straightened their long legs to the rear. Their heads and necks extended forward. They flapped their wings slowly. While in flight, they uttered a deep cry: "gage-gage." The two birds then landed about 1,000 feet (300 m) from the study party. As the birds landed, they held their legs in a vertical position, flapping their wings repeatedly. When they touched the ground, they ran with long strides for a short distance. Eventually the birds stopped, craning their necks as though looking for hazards. Once settled, the birds walked slowly along the marshland shore, foraging for food.

The two birds reached the vicinity of nest number 5. A few moments later they were attacked by another, larger black-necked crane. The male being studied fought against the guard bird. The two birds beat each other with their wings, insteps and bills. They grappled and rolled about on the ground. The female stood by watching, but other than pacing about, took no part in the fight. During the minute or so of fighting, the guard bird knocked the invader to the ground several times. Eventually, the invader withdrew and retreated to the vicinity of his mate. The guard bird continued to bow. It extended its neck again and again. The guard bird chased the other two cranes, staying "hot on their trail" until it drove them out of its nesting area.

The study group came near nest number 5. A crane was sitting on eggs

within the nest but it did not move at all. The nesting bird did appear restless but just continued to watch the intruders.

Similarity of Species

The feathers of the male and female black-necked cranes are the same color. The study party determined sex of the birds by listening to the mating cry. They also observed the body shape, each bird's unique actions and behavior. The neck of the male is thick and strong, usually spreads to the frontal and upper part. The female has a thin neck, which she often bends.

On the 5th of June, the study group heard the call of the black-necked crane looking for its mate. This call was a "ge-ge-ge." Observation showed the two cranes loafing in the grasslands, not far from the campsite. Both birds were "displaying." Their heads and necks were put forward. The birds uttered the mating call while walking, the male behind the female. Eventually the female stopped on a smooth area of grassland. The bird spread its wings as the male approached. The male's cry became loud and sonorous, a "ge-ge-ge." The female curved its legs slightly backward and the male leaped onto the female's back. It flapped its wings again and again to keep its balance. The female's head and neck inclined forward. The tail rose and the cloaca appeared. The male pushed down over the female. Both birds then sang in unison as they danced and swung about for almost two minutes. The birds then parted and returned to foraging for food.

Nests, Eggs and Chicks

The study group determined the general location of every black-necked crane nest. It was decided that a check would be undertaken of nest number 1. Getting to the nest area involved the use of a rubber boat and a trip over water. When the study group was about 1,600 feet (500 m) from the nest, the female crane, sitting on the nest, rose very quietly and walked to the right of the nest. The bird was bending and extending its neck, clearly uneasy with the approach of humans. The study party knew the bird would probably not fly, lest it attract the intruders to the nest. As the study party got within about 65 feet (20 m) of the nest, they heard a soft "ji-ji." Excitement was then the word as the study group found a

chick breaking through its shell. The head and neck were out of the shell. Another nestling, one day old, was also in the nest. The nest was elliptical in shape and was built in the sands in shallow water. Construction involved stems and leaves of rushes, lumps of mud, and roots of many different species of waterweeds. The overall nest size had a diameter of 35 inches by 43 inches (90 x 110 cm). It had a depth of 2-1/2 inches (6 cm). The inside diameter of the nest was 22 inches by 23-1/2 inches (56 x 60 cm).

Laying Period

Black-necked cranes usually lay their eggs between early May and early June. Each pair produces one clutch per year. The incubation period for the eggs is 30 to 31 days. Eggs are elliptical in shape. The shell is thick and solid. When first laid, the egg surface is grey/white and greenish. It also has some brown spots. The spots appeared to be more numerous near the large end of the egg. The size of the eggs ranges from 2.45 inches (6.3 cm) to 2.3 inches (6 cm). Eggs weigh between 6.2 oz. (178 g) and 7 oz. 202 g).

Black-necked cranes take turns incubating the eggs. When one sits on the eggs, the other will guard the nest. These tasks were exchanged five to six times every day. Eggs were "sunned" when there was enough sun available. Each bird turned the eggs in the nest once. The study group determined the time used to turn the eggs was about 1.5 to 3.5 minutes. To turn the eggs, the sitting bird would stand and then lower its head and rearrange the eggs. The bird would then sit on the eggs, evidently to determine if the repositioning of the eggs had left the nest "comfortable."

On afternoons when the weather was good, both parents would leave the nest to forage for food. The birds would stay off the nest for about 25 minutes. This procedure took place in the latter part of the incubation period and as the number of times increased for the eggs to be sunned.

Hatching

The eggs hatched in about 30 days. A small pipping hole was observed at the large end of the egg. This single hole was followed by two or three more holes and these eventually formed an elliptical line. It was known that the "nestling" turns about in the eggshell to peck at the



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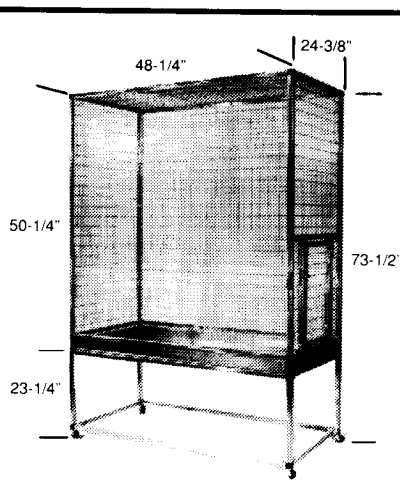
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eggshell. The holes were gradually enlarged and after about 24 hours, the eggshell was broken in two. The edge of each half of the egg was neat. The entire hatching process consumed between 24 and 26 hours.

When the baby bird was out of the shell, it could open its eyes. The chick was very weak and its down was wet. The chick lay prone in the nest, stretching its head and neck out straight. The chick cried "ji-ji" continuously. The baby bird was clearly examining its new habitat. Its dried down was brown, and its bill was red. The tip was reddish. Its belly was light brown, and its insteps were pink. The chicks began to move after being "warmed" for 24 hours by the mother. The study group weighed ten baby birds: first weights ran 4.3 oz. to 4.8 oz. (125 to 136 g), the bill lengths were .88 to 1 inch (22 to 25 mm), wing lengths 1.36 to 1.52 inches (34 to 38 mm) and insteps 1.68 to 1.92 inches (42 to 48 mm).

Watching Young

About ten hours after the nestling broke through its shell, it could walk haltingly. The chicks walked with wings extended to maintain equilibrium. When threatened, the chicks pulled back their heads and necks and lay prone in the nest. No sounds were uttered. The study group believed these actions demonstrated the chicks have an inherent ability to avoid enemies. A day later, the chicks could drink water and swim. The chicks had a well-developed oil gland at the base of their tails, so their feathers were not drenched with water when swimming. The adult bird's oil gland has degenerated so it cannot "oil" its feathers. It was easy for the adult birds' feathers to get very wet. A baby bird two days out of the egg could follow the parents and flee for its life should any sign of danger appear. The parents gave a defense call by uttering a signal: "guo-guo-guo." When that call was uttered, the nestling would at once lay very still in a thick growth of grass. The chick wouldn't utter a sound until the parents sounded the "okay," a deep "gu-gu-gu." On hearing that sound, the chicks rushed out of their hiding place in the grass.

After only 48 hours out of the egg, the nestling began looking for food. Both parents participated in rearing the chicks. The parents spent most of each day foraging for food. Each parent delivered food to the chicks.

Now and then, one of the parents would place a bit of food on the chick's bill. At other times, one of the parents would put a bit of food in front of the chick, holding the piece in its bill. In such ways, the parents would train the chicks to seek food on their own. The study group observed such procedures when the chicks were but two days out of the eggs. These feeding tactics were gradually eliminated as the chicks grew in size and age.

During the period the chicks were in the nest, the parents appeared to watch the air temperature. If the air turned cold, the parent would sound a call "ji-ji-ji." One parent would immediately lie prone in a thick growth of grass. The parent would then relax its wings. The chicks then went beneath the parent bird, entering under the tail. When the weather warmed or cleared, the chick would leave the parent's protection and proceed to play or feed. The study group determined that the younger the baby, the less range of movement it had. The young chick would leave the nest late to forage and play and would always return early.

When the first chick was four days old, the parents moved about 33 feet (10 m) from the nest. At the sixth day, it was 66 feet (20 m). As for the chicks, their movements also increased with age. The chicks expanded their range from the nest gradually step by step. The chicks never failed to return to the nest for the night. The parents were always nearby, guarding the nest and the nesting area. Many times one of the parents would be standing by the nest guarding it, standing on one leg, head under its wing.

The feeding of the baby birds was monitored by the study group through the use of field glasses. They watched as the parents dug and ate grass roots and tender buds. They also watched as the parent birds caught insects which were fed to the baby chicks when they were ten days old, or less. Now and then one of the parents would catch a frog. The parent bird would literally chop the frog into pieces, using its beak. With great patience, the parent bird would feed these bits to the chicks.

Ornithologists interested in seeing and studying the black-necked cranes are most welcome to come to the Nongbaotan marshland. In the future, we hope to see many such people come from many countries. ●