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## Game Birds of the World: A catalog of the Madson collection

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**Authors**

Paul A. Johnsgard, Eric Fowler, Michael Forsberg, Mary Bomberger Brown, Dee Ebbeka, Jacki Loomis, and Patricia W. Freeman

# Game Birds of the World

A catalog of the  
Madson collection



University of Nebraska–Lincoln



MP-110



# **Game Birds of the World**

## **A catalog of the Madson Collection**

*A gift of former student Dr. Everett C. Madson MD  
in honor of Professor Emeritus Paul A. Johnsgard PhD*

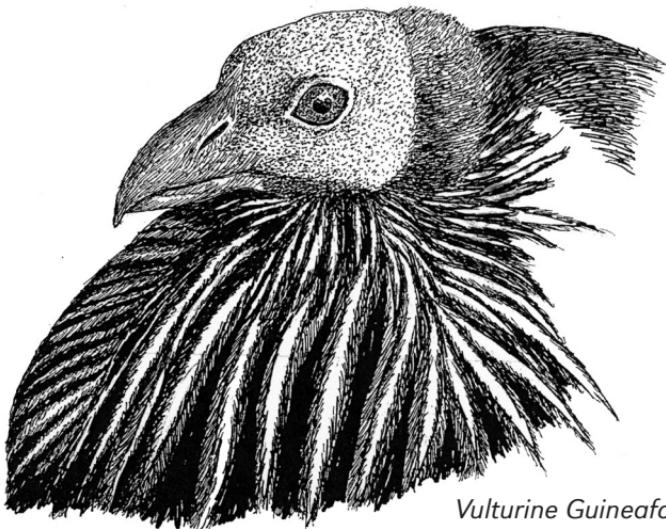
*Now part of the collections of the  
University of Nebraska State Museum–Zoology*

Species profiles and line drawings by  
Paul A. Johnsgard

Photographs by  
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Editing, compilation and production by  
Mary Bomberger Brown  
Dee Ebbeka  
Jacki Loomis  
Patricia W. Freeman

School of Natural Resources  
University of Nebraska State Museum



*Vulturine Guineafowl*

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# Foreword

*This remarkable collection of ornithological specimens is a gift of Everett C. Madson, M.D., a graduate of the University of Nebraska-Lincoln, to the University of Nebraska State Museum in honor of Paul Johnsgard, Ph.D., Professor Emeritus of the School of Biological Sciences.*

During the summer of 2013, I was asked, as Curator of the Zoology Division for the University of Nebraska State Museum (UNSM or Elephant Hall), to respond to a former undergraduate student, now a medical doctor living in Omaha, who wanted to donate a personal collection of trophies to the Museum. This is not an uncommon request particularly for trophies of large mammals. Few museums have enough space and UNSM is especially full. Any new material means I have to have good reasons before a decision can be made whether to accept a gift donation or not.

In my initial correspondence with the donor there were birds involved, and I asked that he send a list and any data regarding species identifications, collection dates and collection localities. Just before Christmas, I received the list. It was a three page, single-spaced list of 163 individual game birds of 103 species from around the world. Clearly, this collection was a force to be reckoned with, especially since I had only just found the photos that had been sent six months earlier.

The research branch of the University of Nebraska State Museum is over 140 years old and retains and protects millions

of specimens for research and educational purposes, just as the Smithsonian Institution in Washington DC, the American Museum of Natural History in New York City, and Field Museum in Chicago do, but on a smaller scale. Most specimens never go on public exhibit and the majority of the specimens in the vertebrate collection (birds, mammals, amphibians, reptiles, and fish) that I oversee are of small, non-game species. For each specimen, we record the exact locality of collection, who collected the specimen, date of collection, habitat where the specimen was collected and any other ancillary information that is available. The specimens are invaluable documentation of nature through time and across space for the benefit of future generations. Oftentimes when a potential gift to the Museum includes game species, the species involved are common, possibly not native to the area where they were collected, already described and named long ago, and perhaps not particularly interesting to study. But these were a remarkable world-wide assortment of species, and I knew I had to see it.

I mentioned this potential gift to John Carroll, the Director of the University of Nebraska's School of Natural Resources. I knew John had studied several species of grouse during his career and thought that he would, at the very least, be interested in seeing the specimens. Only a few weeks before, I had been encouraged to distribute some of the wealth of specimens the Museum retains to other venues to increase

awareness of natural history and the remarkable resource that is our Museum. Many of the undergraduate students in the courses I teach have a keen interest in wildlife, ecology, and conservation and a passion for hunting and fishing. If the Museum accepted the gift, might not Hardin Hall and the School of Natural Resources be the perfect place to display the specimens?

One afternoon in January 2014, John and I traveled to Omaha to the home of Dr. Everett C. Madson, who asked us to call him "Buzz". His basement was overflowing with ducks, geese, grouse, turkeys and quail. A word here about mounted birds - because of their structure, bird feathers pick up dust just like, well, a feather duster, so many taxidermied birds are kept behind glass or in exhibit cases or they become very dusty. The bulk of Buzz's collection was under Plexiglas in professionally and exquisitely made habitat displays – habitat boxes. This list was entirely unique and irresistible. And the specimens came from countries around the globe. These were near perfect Aristotelian examples of these species on the planet!

I have spent nearly 50 years among museums and natural history collections small and large, including two of the three mentioned above. Further, art was my undergraduate minor after biology. Never before have I seen birds so beautifully and thoughtfully arranged in such natural, graceful poses, and, importantly, protected from dust and damage to the feathers. John and I were astonished ... blown away...agog.

All my reservations evaporated. I accepted the gift as a donation to the Museum and with encouragement from John to exhibit them in Hardin Hall.

The birds from that crowded basement are now distributed throughout Hardin Hall – large ones on display in large public spaces, smaller ones in offices, sometimes rotating temporary custodians so they can be enjoyed by as many as possible. Buzz has visited the building, and I am not certain he had ever seen them displayed in a space as large as in Hardin Hall; it is a magnificent sight. Faculty, staff, students and visitors notice them, enjoy them, and are excited and delighted by them. It is my sincere hope that Buzz, his family and friends and any who are interested in the natural world and its beauty will enjoy this wonderful gift to the University. Thank you to Buzz for the gift and to Paul A. Johnsgard for touching Buzz so deeply as a teacher during his undergraduate years.

*The Madson Game Bird Collection is now an official part of the University of Nebraska State Museum's Biodiversity Laboratory of Zoology where I have been Curator since 1981. The specimens are on loan to the University of Nebraska's School of Natural Resources, where I have been a professor and mentor since 2003.*

July 2014  
Patricia W. Freeman, Professor,  
School of Natural Resources  
Head,  
Biodiversity Laboratory of Zoology  
University of Nebraska State Museum

# Introduction

One winter day in late 2013 I had a phone call from a gentleman who identified himself as Dr. Everett (Buzz) Madson, an ophthalmologist from Omaha, and who said he had been a student of mine in the Introductory Zoology class that I taught for nearly 30 years at the University of Nebraska –Lincoln. Roughly 5,000 undergraduates had enrolled in that class with me over the years, and I confessed to not remembering him personally. He told me that my lectures, especially those on parasite life histories, had greatly impressed him, and had influenced his decision to go into medicine as a career. Additionally, Dr. Madson told me that during



Capercaillie

much of his life he had hunted gamebirds over many parts of the world, and had amassed a collection of nearly 100 mounted specimens as a result. He said that he intended to donate the collection to the University of Nebraska State Museum, and to dedicate the gift to me in remembrance of my influence on him.

I was quite surprised by this news, but knew from my long association with museums that it was unlikely that the curators would be able to accept the gift, since full-body mounted specimens of large birds require a great deal of space, a commodity that most museums have none to spare. Nevertheless, in March of 2014 I was informed that the collection had indeed been accepted, and I was invited to visit Hardin Hall to examine it. When I did, I was amazed by the species diversity present in the collection, and by the remarkably lifelike quality of the taxidermy, the equal to any that I have ever seen. Some of the species included, such as the Alaskan emperor goose and Steller's eider, the European capercaillie, the Australian black swan, and the South American white-cheeked pintail, evoked my cherished memories of having studied these birds in the wild, during a lifetime of bird research around the world.

I agreed to check the specimens for accuracy of identification, and also agreed that their high quality and diversity warranted a special publication, describing the highlights of each of the species' evolutionary, behavioral and reproductive characteristics. To that end I have written short summaries of these aspects of their biology, providing only a bare minimum of information on each, but hopefully enough to stimulate the reader to read further. Such information sources include my many monographs on

these birds, upon which I have heavily relied in producing these "cameo" introductions to the birds and their lives.

In this way I hope the mounted specimens will, like museum collections everywhere, offer sufficient educational value and evoke enough interest as to warrant their preservation and exhibition. Perhaps seeing and reading about one or more of these birds will generate the same spark of curiosity and desire for more knowledge in somebody just as my comments on parasite life histories had on an undergraduate student some 40 years ago, and thereby influence his or her life.

One of the most decisive events of my life occurred on a fall afternoon in the late 1930s, when I was about eight years old and was growing up in a small town in eastern North Dakota. It was the worst of the Depression years, and my father regularly went hunting for pheasants to supplement the family larder. I often went along to help flush birds from the weedy cover along the roadsides. Once we were standing along the road after a walk through a nearby draw. Suddenly Dad cocked his head to listen. In the distance I heard a sound like a thousand dogs yelping excitedly. "Those are snow geese," said my father, pointing up to the sky, and with those words I was forever captivated. There, in ragged V-formation, was a skein of white birds sprinkled across the zenith. They were the

first wild geese I had ever seen, and I strained to watch them until they disappeared from sight.

I have often wondered if my father remembered that incident, which became imprinted on my mind and altered it forever. Since then I have been entranced by the



Snow Geese

beauty and mystery of waterfowl and have managed to see more than 140 of the world's nearly 150 species. I have tracked down the nesting grounds of the snow goose in arctic Canada, watched the courtship of spectacled eiders along the coastal tundra of northwestern Alaska, waded through the tropical swamps of Colombia and Jamaica in search of masked ducks, climbed the Andean slopes of South America to find torrent ducks, and canoed across Australian billabongs to observe the strange freckled duck. I have photographed clouds of Egyptian geese and lesser flamingos while hiking the barren shorelines of the Rift Valley lakes of Kenya and

Tanzania, occasionally breaking through the surface pan to sink knee-deep into a quicksand-like morass. Near Wyoming's towering Teton peaks, I have filmed nesting trumpeter swans and watched a mother common merganser carry a brood on her back while negotiating a swift mountain stream.

Throughout my life I have never ceased to wonder at the mysteries of birds—from their unerring ability to navigate from the arctic to the tropics and back again, to their wonderful languages of sound and movement, their mastery of the aerial and aquatic environments, and the unending visual delights of their take-offs, flights, and landings. In opposition to a former U.S. president who once suggested that if you have seen one redwood, you have seen them all, it is truly fair to say, "After you've seen all the local birds, look again, because you have not really observed any of them." Indeed, once you have learned the rudiments of appreciating birds, namely by learning to tell the species apart, you have only barely begun to understand them.

Perhaps the most remarkable scenes involving waterfowl that I have ever experienced were in the South American Andes. There, in the ice-cold streams that pour down from the alpine snow fields and glaciers, one of the most unusual ducks in the world ekes out a precarious existence. The incredibly streamlined torrent duck looks as if it had been designed in a wind tunnel. Like a woodpecker, it uses its long, stiffened tail as a prop when standing

on slippery rocks and probably as a rudder for maneuvering while swimming underwater. It feeds almost entirely on aquatic insect larvae, which it obtains by diving into the torrential streams and probing with its narrow rubbery-like bill into the rock crevices of the stream bed. Even one-day-old torrent duck hatchlings are taken by their parents to the swirling streams cascading down the mountain slopes. The ducklings almost unhesitatingly enter the current behind their parents, and at times are immediately swept downstream. They may be carried a quarter mile or more over a series of rapids and small waterfalls before coming to rest in a stretch of calm water, or until they are able to scramble out to the safety of a large flattened rock in mid-stream. How the parents are ever able to keep their brood together, let alone raise some of them to fledging age, is a marvel to anyone who has had the good fortune to observe these birds in the wild.

Equally memorable was the summer I spent in Australia, where I went to try to find several rare and little-known species of ducks. These included the Australian bluebill and the bizarre musk duck, which are diving ducks with long, stiffened tails that place them in the group of ducks called stiftails. The stiffened tail feathers probably serve as underwater rudders, but they can also be cocked vertically above the back during courtship displays. In the case of the musk duck, the male carries his displays to the extreme. He not only cocks his

tail until the feathers touch his back and inflates special pouches in his throat, but a black lobe that hangs from the base of the bill is also engorged, making the bird resemble some prehistoric reptile when seen at any distance. This posture, and the male's associated loud whistles and splashing sounds, serve to attract pre-nesting females, and may help to ward off less dominant males from the displaying bird's territory. Curiously, they seem to attract non-displaying males, which may approach as close as they dare to the displaying bird, and perhaps thereby gain some chance of side-tracking a female's attention while the dominant male is preoccupied with his display activities.

Closer to home, I return each spring to the Platte River in a kind of annual pilgrimage to rekindle my sagging spirits after a long Nebraska winter. As I leave my home in early March and drive the hundred-odd miles to the Platte Valley in east-central Nebraska, I glance at the dirty snow in the ditches and the still-dead fields of last year's corn and milo. Here and there a small cloud of blackbirds undulates around a field or disappears toward the north, a taste of the great migrations that will soon fill the Nebraska skies. I know that within a mile of reaching the Platte River I will be able to see the traceries of ducks, geese, and sandhill cranes along the horizon. I slow down, turn off the radio, and in spite of the cold weather open my car window slightly, to listen

for a more ancient and celestial melody: the chorus of wild cranes.

As I cross the bridge over the first of the Platte's several broad and usually shallow channels, I note with pleasure that they are mostly ice-free, at least enough to provide safety for roosting waterfowl and cranes. These birds seek out areas of open water where coyotes cannot make nocturnal raids and where shallow backwater stretches allow them to doze without being swept downstream. I turn off the Interstate at the first exit and head for the nearest gravel road that parallels the river, watching for waterfowl and cranes feeding in the nearby fields or tumbling out of the sky in near free-fall flight to land in them.

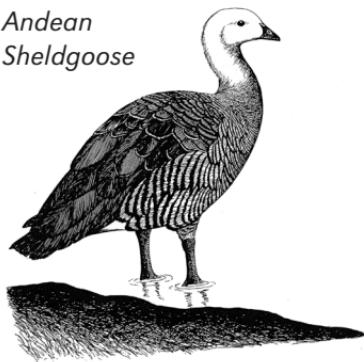
There are several species of geese that migrate abundantly through the central Platte Valley, greater white-fronted geese, snow geese and Canada geese, which collectively might number several million birds. The Canadas are an assortment of sizes, ranging from tiny arctic-breeding cackling geese no larger than mallards to



Hooded  
Merganser

the regal "Giant" Canada geese that outweigh the cackling geese four- or fivefold. The sonorous calls of the largest geese nearly drown out the yelping notes of the small ones, and all blend with the laughing screams of the white-fronts and the rolling, whooping calls of the cranes.

*Andean  
Sheldgoose*



It is a wild, exciting scene, and best experienced by lying flat in the tall grasses that grow along-the riverbank, with your eyes directed upward, simply waiting for the sky to be punctuated with long lines of geese and cranes. By lying very still I can occasionally catch by surprise a common merganser or two floating downstream in a fast channel, or hear a beaver strike the water with its tail as it suddenly becomes aware of my presence.

If the Platte Valley is exciting in early March, the Missouri Valley separating southeastern Nebraska from Iowa and Missouri is overpowering. Over a million snow geese push northward then, assembling in the valley from wintering areas ranging from southern Missouri south to the Gulf of Mexico. They some-

times form up in single flocks of 100,000 to 200,000 birds, transforming the sky into a feathered blizzard. With the first break in winter weather I head my car east, straining my eyes in the pale dawn light to see the long lines of geese that I know will be streaming north through the entire central Missouri River valley, from Squaw Creek National Wildlife Refuge near the Missouri and Kansas border north to the vicinity of DeSoto National Wildlife Refuge near Omaha-Council Bluffs. On these days I relive my youth, remembering otherwise long-forgotten North Dakota springs by whether or not I was able to be at the proper rendezvous to meet the snow geese and celebrate the annual spring renewal of life with them.

The snow geese flocks in spring are filled with an almost palpable sense of urgency. Should a single bird suddenly take flight in alarm the entire flock is likely to follow, causing the whole surface of the marsh to seemingly lift in unison, amid a din that eclipses that made by a massive crowd at an athletic event. As the birds circle the water, they sparkle like gigantic snowflakes in the sky, their plumage alternately flashing and becoming subdued as they turn into and away from the sun. Then, satisfied that all is well, they tumble back into the marsh, the last birds side-slipping downward to join their compatriots already on the water. Here and there an American bald eagle perches in a tall cottonwood or stands on a floating slab of ice, carefully

scanning the incoming and outgoing flocks for any individuals that take flight with difficulty or lag behind the others. Such birds are generally unable to live for long. Scattered piles of white feathers around the marsh are mute testimony to the dreadful efficiency with which eagles keep the flocks culled of any birds unlikely to survive the long flight to the arctic breeding grounds, or unlikely to compete effectively with the others for precious space in the nesting colony once there.

It is not hard to appreciate waterfowl, cranes, eagles or other birds; it is necessary only to immerse yourself in their world and become at one with them. Remember that their sensory world is not the same as ours; it has different parameters of time and sound and imagery. Birds can respond to levels and durations of light and sound that far surpass our own abilities and understanding, and they probably can see details of their environment with a degree of precision and clarity that we cannot imagine. They were doubtlessly traversing the boundaries of North America and Eurasia, and probably transmitting the details of their migrations from one generation to the next, at a time when our knowledge of the world's geography was limited to the view provided from a nearby tree or hilltop, and our communication consisted of gibberish. Even our vaunted modern mechanical navigation systems are incapable of matching those of hundreds of migratory bird species, and we are still often unable

to communicate with all the members of our own species without resorting to primitive gestures.

Someone once suggested that, as to its informative and communicative value, a picture is worth a thousand words. If that is true, then an actual three-dimensional representation of a living animal should be able to transmit far more information than a simple photo or drawing, or even an extended essay. It is up to the person who views this amazing collection to try to imagine the bird in life, with its movements, vocalizations, and natural surroundings all intact and present. If one can succeed in this simple "mind-experiment," it might stimulate one's decision to go out and search for the "real thing," which would no doubt prove to be infinitely more interesting and intellectually rewarding.

August 2014  
Paul A. Johnsgard  
Professor Emeritus,  
School of Biological Sciences  
University of Nebraska–Lincoln



Falcated Duck

All drawings by Paul A. Johnsgard

# **Paul A. Johnsgard**



Paul A. Johnsgard grew up exploring the woods and prairies of North Dakota near Christine and Wahpeton. After graduating in 1951 from the North Dakota State School of Science in Wahpeton, he transferred to the North Dakota Agricultural College (now North Dakota State University) in Fargo to complete majors in zoology

and botany (BS 1953). As an undergraduate student he wrote and illustrated a 16-page booklet on the waterfowl of North Dakota. A MS (1955) from Washington State College (now Washington State University) in Pullman resulted from his research on the ecology of wetlands in central Washington's Potholes region. Paul com-

pleted a PhD (1959) at Cornell University under Charles Sibley, studying the behavior, morphology and evolutionary history and relationships of the North American mallard-like ducks. During his three Cornell years, he also began the egg-white protein electrophoresis technique famously used by Sibley in his later studies on the taxonomy of the world's birds; the first avian taxonomic studies based on molecular material. Paul spent two postdoctoral fellowship years in England at the Wildfowl Trust (now Wildfowl and Wetlands Trust) in the company of Sir Peter Scott, Janet Kear, G.V.T. Mathews, and Hugh Boyd, researching comparative waterfowl behavior, which culminated in his first book, the now classic *Handbook of Waterfowl Behavior*. At Sibley's suggestion, Paul applied for and later accepted a teaching position in the Zoology Department at the University of Nebraska-Lincoln (1961). By his second year at UNL, he had advanced from instructor to assistant professor with tenure. The opportunity to study waterfowl behavior, experience the annual spring migration of sandhill cranes, enjoy lekking prairie-chickens and grassland birds, and live amidst the grandeur of the prairies conspired to keep Paul at UNL for his entire teaching career of 40 years. Paul mentored 12 PhD students and 12 MS students, and taught zoology, ecology, ornithology and animal behavior to more than 7,000 thousand students at UNL, and ornithology for 17 years at

Cedar Point Biological Station near Ogallala, NE. In addition to being a skilled pen and ink artist, Paul is photographer and has illustrated his writings with thousands of photos and drawings.

Paul A. Johnsgard is Foundation Professor of Biological Sciences Emeritus at the University of Nebraska. He received the Distinguished Teaching Award, Outstanding Research and Creative Activity Award, and an Honorary Doctor of Science degree from the University. He also was awarded a Guggenheim Foundation Fellowship, the National Wildlife Federation's National Conservation Achievement Award, the National Audubon Society's Charles H. Callahan Award, and the American Ornithologists' Union's Ralph Schreiber Conservation Award, all in recognition of his ornithological writing and conservation work. To date he has written nearly 60 scholarly books, including nine world avian monographs, several non-technical and fictional books, more than 100 peer reviewed articles and about 150 nature-related popular articles, making him the world's most prolific author of ornithological literature.

#### *Mary Bomberger Brown*

For additional biographical information:

"My Life in Biology: Paul A. Johnsgard", *Nebraska Bird Review* 2010, 78:

103-120 and <http://digitalcommons.unl.edu/biosciornithology/25/>

# **Everett C. Madson**



Everett “Buzz” Madson MD was born and raised in Omaha, Nebraska. Following graduation from Omaha’s Benson High School, he enrolled as a pre-medical student at the University of Nebraska-Lincoln and graduated with honors (Phi Beta Kappa; BS 1966). While an undergraduate student at UNL, Buzz played on the freshman football team, served as president of the Interfraternity Council and belonged to Kosmet Klub, Phi Delta Theta fraternity, and the Innocents Society. Buzz attended Case-Western Reserve Medical School in Cleveland, Ohio (MD 1970). Following an internship at Case-Western, he completed an ophthalmology residency at the University of Iowa Medical School. In 1975, Buzz returned home to Omaha and joined the ophthalmology practice of Dr. Filkins and Dr. Meissner. Over the years, the practice grew and, after a number of name changes, is now known as Midwest Eye Care, the largest ophthalmology group in the state.

Upon graduation from the University of Nebraska, Buzz married his high school sweetheart, “Percy” Wood, and together they raised a family of six (3 boys and 3 girls). The nickname “Buzz” comes from his family as his father (Everett Madson, Sr.) was called “Bus” (because of his Buster Brown haircut as a boy) and so little Everett Jr. naturally became “Bussy”, which eventually became Buzzy then Buzz; to this day, in the office, he is known as Dr. Buzz.

In grade school Buzz often fished at local lakes for catfish and bullheads bringing these prizes home to clean and cook. Cleaning and dissecting the squirrels and rabbits he hunted with a BB gun sparked his interest in anatomy and physiology. The proceeds from a newspaper route in junior high school enabled Buzz to buy the used Remington shotgun that he used during his high school years to hunt birds, mostly pheasants. Medical school lead to a hiatus in fishing and hunting, but during his residency years, Buzz began hunting pheasants again.

After he returned to Omaha to practice medicine, Buzz began hunting birds in Nebraska, North Dakota and South Dakota, then going on hunting expeditions to Africa, Alaska, Canada, New Zealand, Russia, South America, and Spain. As Buzz’ bird hunting experiences expanded around the world so did his interest in preserving these beautiful creatures as works of art.

During their undergraduate years at UNL, Buzz and Percy had the great good fortune to take zoology classes with Dr. Paul Johnsgard, in their opinions, a wonderfully knowledgeable and captivating professor. Buzz and Percy remember well listening to Dr. Johnsgard lecture in Bessey Auditorium all those many years ago.

It is with great pride that Dr. Everett “Buzz” Madson dedicates this collection of bird specimens in respect of Dr. Paul Johnsgard.

# **Species Profiles**

## **by Paul A. Johnsgard**

The taxonomic sequence and nomenclature of waterfowl, gallinaceous birds and shorebirds used here follows my world monographs:

*Ducks, Geese and Swans of the World* (1978)

*The Grouse of the World* (1983)

*The Pheasants of the World* (1986)

*The Quails, Partridges and Francolins of the World* (1988)

*The Plovers, Sandpipers and Snipes of the World* (1981)

Most of the following text is derived from these books, as well as from my: *Handbook of Waterfowl Behavior* (1965)

*North American Game Birds of Upland and Shoreline* (1975)

*Ducks in the Wild: Conserving Waterfowl and their Habitats* (1992)



*Spotted Tinamou*

## Spotted Tinamou (*Nothura maculosa*)



Tinamous are an ancient branch of the bird phylogeny, which appear to be related to the large, flightless birds such as rheas, emus and ostriches, which lack keels on their sternums. Tinamous have keeled breastbones and can fly well, at least over fairly short distances. There are nearly 50 species of tinamous, which range from Mexico to southernmost South America and from sea level to the alpine zone. They range in size from that of a domestic chicken to a small quail, and, apart from a longer, slimmer beak, might well be confused with one of the gallinaceous species. Tinamous are mostly varied hues of brown and buff, matching the colors of dead vegetation, and the birds run well, often preferring that mode of escape over flight. All tinamous nest on the ground, and lay eggs that are notable for being highly colorful and with porcelain-like surfaces. The eggs are incubated by the male, and hatch in 2–3 weeks. The chicks are precocial, and are self-sufficient within a few weeks.

The spotted tinamou is a relatively small grassland species ranging from eastern Brazil to southern Argentina. Its back and chest have a combination of streaked and spotted feathers, and its conspicuous large eyes are yellow to yellowish orange. To a greater degree than with many tinamous, it is inclined to “freeze” rather than run when frightened, which means it is likely to flush at close range.

References: Elliot et al. 1992; Sick 1993

## White-faced Whistling Duck (*Dendrocygna viduata*)



This distinctively patterned is readily recognized by its white "mask" that extends back to encompass the eyes. It is also uniquely marked with fine black-and-white barring on the flanks, and its underparts are black, which differs from the usual dark-above, light-below combination of colors that provide optimum camouflage. This species ranges from the tropical forests of equatorial South America and Africa to the temperate marshes and shallow lakes of southern Africa and Argentina. It occupies habitats ranging from fresh to brackish waters and from wilderness areas to sewage lagoons or farm ponds. Generally, open-country and freshwater habitats seem to be favored. It feeds by wading as well as swimming and diving, and consumes a variety of plant and invertebrate life.

Although pair bonds are strong in all whistling ducks, the white-faced is unique in that paired birds spend much time in mutual preening. Breeding in both Africa and tropical South America is timed to coincide with the rainy season. Nests are built on dry land or in shoreline reed beds, and 8–12 eggs are usually laid. Observations of wild birds indicate that incubation (by both parents) requires 30–31 days. Like giant bumblebees, the extremely attractive ducklings are a strongly patterned yellow and black. They require about 60–70 days to fledge. Predators, such as foxes, lizards, and caracara, often take the eggs, and storks and caimans capture a considerable number of young.

References: Johnsgard 1978; Elliot et al. 1992; Sick 1993; Urban et al. 1996

## Black Swan - left (*Cygnus atratus*)



The black swan is one of the more social of the swans. Many lakes in southern Australia regularly support from 5,000–15,000 swans, and in Lake Ellesmere of New Zealand an estimated 60,000–80,000 individuals may occur. Such large flocks are of dynamic composition, but are comprised of the stable pair and family units of all swans. Most swans are essentially nomadic, moving widely as weather and availability of suitable habitat dictate. Pair formation presumably usually occurs during the second winter of life.

The timing of breeding in black swans is fairly variable. In large colonies, the nests may be as close as a few feet apart or practically touching each other. It has been suggested that the slow growth rate of the cygnets, their vegetarian diets, and perhaps their increased protection from predation have facilitated the evolution of colonial nesting in this species. Both sexes help build the nest, and a clutch of 4–10 eggs (most often 5–6) is laid on an alternate-day basis. The male helps incubate and under natural conditions the average incubation period is about 40 days, but it ranges from 35–45 days.

References: Johnsgard 1978; Marchant and Higgins 1991; Elliot et al. 1992; Kear 2005

**Tundra (Whistling) Swan - (*Cygnus columbianus*)**

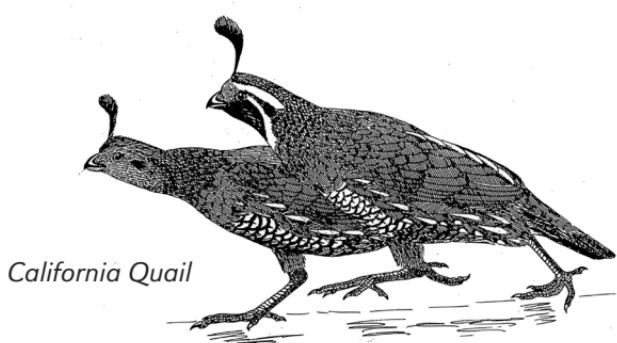


The name "tundra swan" has been adopted as a collective vernacular name for the whistling and Bewick's swans, which occupy comparable breeding habitats in the New World and Old World respectively, and which are now accepted as representing a single species. Grassy lowland tundra is the primary nesting habitat of the whistling swan; upland tundra and rocky tundra support few if any breeding swans. During winter, whistling swans congregate in grassy river valleys, estuaries, and bays, particularly in Chesapeake Bay, Currituck Sound, and in the Central Valley of California. Field-feeding on dry-land situations such as in cornfields is locally common and seems to be a rather recent innovation in whistling swan behavior. Like other swans, the birds are basically adapted to harvesting succulent submerged and emergent aquatic plants, including leaves, stems, and rootstalks.

Whistling swans have bred so rarely under captive conditions that we are unsure of the normal time of reproductive maturity, but probably few if any birds breed before they are four years old. This also seems to apply to the Eurasian Bewick's race, which has been much more thoroughly studied. Some young swans remain with their parents through their second or even sometimes their third winter of life, which indicates the strength of family bonding in wild swans. Swans are very long-lived, and in one instance a captive Bewick's swan is known to have nested over an approximately twenty-year period with five different mates.

Like the trumpeter swan, the normal clutch size is five eggs, and the incubation period is very similar, lasting about 30–32 days. Following hatching, both sexes guard the young, but the male continues to perform the majority of aggressive chasing and displaying. The fledging period of the young is still somewhat uncertain, but probably requires 60–75 days. As soon as the young are fledged and the adults have completed their postnuptial molt the birds begin to gather and to leave the breeding areas.

References: Johnsgard 1975b, 1978; Elliot et al. 1992; Kear 2005



## Greater White-fronted Goose (*Anser albifrons*)



Greater white-fronted geese often mix with Canada geese while on migration and in wintering areas, and frequently feed in the same fields with them. They apparently have much the same pattern of pair-bonding and family bonding, and young birds tend to remain with their parents even through the breeding season. It has been reported that much of the territorial defense against humans and mammalian predators is undertaken by yearling non-breeders, which intercept intruders and attempt to lure them away from nest sites.

As in other geese, pair bonds are permanent and potentially lifelong. Upon returning to their arctic breeding areas, flocks of white-fronted geese begin to break up and to disperse widely over the tundra. Individual females often choose low hills for nesting sites, and even in low tundra vegetation the incubating birds may be very hard to locate. The clutch size averages about five eggs, with considerable yearly variations associated with varying environmental conditions. Only the female incubates, while the male remains close at hand to help guard the nest. Incubation requires 23–25 days, and as soon as hatching is completed the male rejoins the family and the group moves to inland ponds, especially those providing heavy escape cover. The young birds fledge in a surprisingly short time, about 45 days, during which period the adults also undergo their own flightless period of about a month. The adults are thus able to fly about the same time as or shortly after the young have fledged, and leave the breeding areas soon afterwards.

References: Johnsgard 1975b, 1978; Elliot et al. 1992; Kear 2005

## Lesser White-fronted Goose (*Anser erythropus*)



The lesser white-fronted goose nests not only on tundra, but also on the lower parts of mountain streams, on mountain foothills, mountain lakes, and even on alpine precipices, often in thawing boggy areas or on stone fields. Like the larger species, it is a vegetarian, foraging in spring on freshly sprouting greenery. The very short bill of this species probably allows for extremely close cropping of low grasses, and on the wintering grounds the birds are sometimes found with white-fronted geese on saltwort-dominated steppes and other semiarid terrain. Lesser white-fronted geese return to their subarctic breeding grounds of Russia toward the end of May or the beginning of June, and as early as the first half of May in Lapland.

The nest sites are usually on newly thawed areas close to water, often on tundra, under dwarf birch vegetation, or in rocky areas on mountains. There is no indication that the birds are at all colonial or tend to nest in the vicinity of raptors or gulls. Clutches typically are of from 3–8 eggs, and most often consist of 4 or 5. The incubation period, based on information from captivity, is 25 days, and as in other geese incubation is performed by the female, with the male remaining close at hand throughout the entire period. Almost nothing is known of the birds' behavior during the fledging period, which requires about five weeks, but undoubtedly the adults complete their own flightless period during this time. During the period of molt the birds often move to mountain lakes or the mouths of rivers with low accessibility to humans.

References: Johnsgard 1978; Elliot et al. 1992; Kear 2005

## Greylag Goose (*Anser anser*)



In the Hebrides, mated pairs begin to occupy nesting islets several weeks before egg laying, which usually occurs in mid-April. In Scotland, egg-laying occurs in late March or early April. There the nests are typically close to water and grazing fields, and in most cases are placed on wooded islands, presumably because of danger from foxes. On favored islands the nests may be greatly concentrated. Nest building is performed by both sexes and usually requires from 3–6 days for completion. Laying is done at the rate of one egg per day, and clutches seem to vary considerably in size, from 2–12 eggs, but averaged between 5 and 6 eggs in each of these two areas. Clutches larger than nine eggs presumably represent the egg laying efforts of two females; broods of up to 12 goslings have been reported.

Incubation by the females begins with the last or the penultimate egg and requires 28–29 days. Males remain by the nest throughout this period, standing sentinel, and undertake the major nest-defense responsibilities. Females leave their nests to defecate, and although they usually sleep on the nest, they may also forage some at night. Predators are apparently all avian rather than mammalian, consisting primarily of gulls and crows, and nesting success is in part related to effectiveness of concealment from overhead. The fledging period is about 8–9 weeks, appreciably longer than that for arctic-nesting geese, and certainly long enough to allow both parents to complete their 35-day flightless periods in the interim.

References: Johnsgard 1978; Elliot et al. 1992; Kear 2005

## Snow Goose (*Anser caerulescens*)



In the lesser snow goose (*Anser c. caerulescens*), where there are two genetically determined color morphs, mate choice is strongly influenced by early experience, with birds tending to pair with individuals that match the color of their parents. Since the morph type of parent and that of offspring are usually the same, the incidence of mixed matings and thus heterozygotic or "hybrid" offspring is considerably less than would be brought about by random matings. In recent decades, however, the "blue" morph of the lesser snow goose has become relatively more common on more northerly and westerly breeding grounds.

Snow geese arrive on their high arctic breeding grounds just as the terrain is beginning to become snow-free. The birds often nest near or among other arctic geese, such as brant or cackling geese, and sometimes nest close to snowy owls, presumably for protection from other potential predators such as gulls and jaegers. The four- or five-egg clutch is laid at the rate of one egg per day, and the female begins incubation as soon as the clutch has been completed. During the 22–23 day incubation period the female scarcely leaves the nest. The male remains near to defend it from arctic foxes or other possible disturbances. Because of her fasting during incubation, the female loses a good deal of weight and may even freeze or starve to death on the nest if she is not in ideal physical condition at the onset of nesting. The young leave the nest only a few hours after they all have hatched, and usually are led by the parents out of the nesting colony to safer areas, such as shallow lakes or the tidal zone, for brood-rearing. They fledge in about six weeks, and soon thereafter the birds begin to flock in preparation for their southward migration.

References: Johnsgard 1975b, 1978; Elliot et al. 1992; Kear 2005

## Ross's Goose (*Anser rossii*)



Like the lesser snow goose, this arctic-breeding species is highly colonial and gregarious. In the few areas where they share nesting grounds, the Ross's doubtless are at a disadvantage when competing for territorial space or nesting sites due to their smaller size. In recent years, the Ross's goose's breeding range has greatly expanded, putting the two species in greater contact, and an increasing number of apparent hybrids between the two species have been found. Pair bonds, once established, are permanent, and family bonds seem to be quite strong, since yearlings remain with their parents until incubation of the next clutch of eggs is begun.

Female Ross's geese build their nests on a variety of substrates, but the preferred location is an environment of small birch stands and rocks, where ample protection from the elements and adequate space for grazing can be found. There is a relatively small average clutch of about four eggs, and birds that initiate their nests only a few days later than normal have even smaller clutches. By laying a small clutch the female avoids depleting her post-laying energy reserves, and thus increases the likelihood that she can effectively incubate and brood her eggs and young. Incubation lasts about 22 days, with the male remaining close at hand. As soon as the eggs have hatched he joins the family. Thereafter, the male undertakes the defense of the family, as the female leads the brood away from any source of danger. The young birds fledge in about 40–45 days, and by that time the adults have completed their postnuptial molt, thus allowing the onset of the fall migration.

References: Johnsgard 1975b, 1978; Elliot et al. 1992; Kear 2005

## Emperor Goose (*Anser canagicus*)



Like other geese, emperor geese have strong and permanent pair bonds and relatively strong family bonds. Disintegration of the family bond apparently occurs among wintering flocks during the first winter of life and becomes completed by the time the birds have returned to their breeding areas. A rather small territory is defended around the nest site, with the male undertaking the major defensive role.

Emperor geese frequently select nesting sites used in previous years. The nests are most frequently situated in vegetative growth of the previous year, and usually are in slightly elevated situations that allow for excellent visibility and good drainage. The first egg is usually laid on the same day that the nest is constructed, and thereafter eggs are laid at approximate daily intervals until the clutch, averaging five eggs, has been completed. Incubation begins with the completion of the clutch and is performed only by the female, with the male defending the site. Although females leave their nests for short periods during the early stages of incubation, they sit almost continuously during the late stages, feeding on vegetation immediately around the nests and drinking dew or water from small depressions. The average incubation period is 24 days, and the brood normally leaves the nest within 48 hours of hatching. The young birds' fledging period has not been definitely established but is probably about 50–60 days, and allows them to attain flight by the end of August in most cases. The birds remain in family groups through the fall migration to the wintering grounds.

References: Johnsgard 1975b, 1978; Elliot et al. 1992; Kear 2005

## Canada Goose (*Branta canadensis*)



There is a remarkable range in the breeding ranges, plumage darkness and body sizes of the *Branta* geese collectively called Canada geese, varying from 12–13 pound birds nesting in the Great Plains to 3-4 pound versions that nest in the high arctic. The smallest of these, the high-arctic nesters, have recently been separated from their larger relatives on the basis of genetic evidence, and are now called cackling geese. Pair bonds in all are strong and essentially lifelong. Separation from a mate, or its death, results in the formation of a new pair bond, usually during the next breeding season. In older, experienced, and "acquainted" geese, pair bonds can be formed very rapidly, even in a few hours, and such bonds will persist as long as both members remain alive. Brood-mates retain family bonds well into their second year, and migrating flocks of Canada and cackling geese basically consist of units comprised of pairs and families, with no single "flock leader," as is often imagined.

Nest-building is normally done by the female almost exclusively, although rarely the male participates to a limited extent. Generally, these geese prefer to nest in locations that allow good visibility, a firm and

## Cackling Goose (*B. hutchinsii*)



fairly dry nest foundation, close proximity to water, and nearness to suitable foraging and brood-rearing habitats. Elevated sites are preferred over lower ones, and sand seems to be preferred over cobblestone as a substrate. The eggs are laid at approximately daily intervals until a clutch averaging about five eggs has been completed. There is no obvious geographic variation in clutch sizes, but incubation periods tend to be slightly shorter in the tiny cackling geese (about 24 vs 28 days) as compared to the largest subspecies. Likewise, the fledging period of the cackling goose is sometimes as short as 42 days, while in the largest races of Canada goose it may be as long as 86 days. In all, the adults undergo their own flightless periods during the latter part of the fledging period of their offspring, and larger forms remain flightless for longer periods than do the smaller ones. In some populations there is a substantial "molt migration" by adult non-breeders, which may fly a thousand miles or more to traditional molting areas before becoming flightless.

References: Johnsgard 1975b, 1978; Elliot et al. 1992; Kear 2005

## Barnacle Goose (*Branta leucopsis*)



On Novaya Zemlya, these geese typically seek out rocky outcrops, ledges of steep cliffs, or the tops of low hills for nesting, which is done in scattered colonies that are highly conspicuous. Observations in northeastern Greenland indicate comparable nest sites, as on a nearly vertical basalt exposure about 50 meters high, where the birds chose flat and gently sloping ledges about nearly a yard deep and one or two yards wide. Evidently nest sites are often used year after year and gradually accumulate nesting materials. The clutch size typically ranges from 4–6 eggs, but up to nine have been reported. The inaccessibility of nests to most ground predators probably reduces nesting losses and is presumably the reason for the cliff-side nesting; even the birds have difficulty in landing on the small ledges. Incubation is performed by the female alone and requires from 24–25 days. There is evidently a rather high incidence of non-nesting or unsuccessful nesting, judging from the low percentages of goslings reported both on the breeding grounds and in wintering areas.

References: Johnsgard 1975b, 1978; Elliot et al. 1992; Kear 2005

## Brant (*Branta bernicla*)



Brant geese are highly social birds, and begin to form flocks shortly after the young have hatched. This results in mixed broods often tended by more than one pair of adults. Like other geese, brant arrive on their arctic nesting areas as pairs, and the birds quickly begin to seek out suitable nest sites, often on small islands or peninsulas where the danger of predation by foxes is reduced. The birds nest in a semi-colonial manner, and a substantial proportion of nests are located in sites that had been used the previous year, presumably by the same birds. Eggs are laid at the rate of one per day, and the average clutch size is usually close to four eggs. There are considerable year-to-year variations in clutch size, associated with weather at the time of nest inception. Males remain very close to their mates throughout the incubation period, although the tiny size of these birds makes them rather ineffective in preventing predation by foxes or by larger avian predators, such as glaucous gulls. Gulls and jaegers are very serious enemies of young goslings, especially during the first week or two of life. The incubation period averages 24 days, and another 45–50 days are required to bring the young birds to fledging. The young birds are led away from the nest soon after hatching, usually moving to the tidal flats where they feed on larvae and small crustaceans. At this time the adults also undergo their month-long flightless period, and frequently both adults and young attain the power of flight only shortly before the onset of freezing weather.

References: Johnsgard 1975b, 1978; Elliot et al. 1992; Kear 2005

## Red-breasted Goose (*Branta ruficollis*)



Red-breasted geese are highly vocal and relatively aggressive among themselves, and perhaps their unusually bold coloration is related to its role in emphasizing their threat displays, which in part involve a vibration of the "mane" feathers and involves mutual head dipping alternated with a very erect attitude as the male faces the female.

These very small geese arrive on their arctic breeding grounds in small flocks of 3–15 birds, at about the time that the tundra is starting to become free of snow and grasses are starting to sprout. The birds often nest in small colonies of four or five pairs, often on steep river banks, in shrub- or grass-covered gullies or ravines, or in small depressions on sloping ground. The nests are often quite conspicuous, and almost invariably the birds nest in close vicinity to peregrine falcons or rough-legged hawks, or even near colonies of larger gulls such as glaucous gulls or herring gulls. It was reported in one study that 19 of 22 peregrine nests had up to five red-breasted geese pairs nesting nearby, from as close as 50–300 feet away from the peregrine nest. This remarkable nesting association apparently evolved as an anti-fox adaptation. The clutch size is typically from 3–7 eggs, and five eggs would represent the normal clutch. Incubation is performed by the female alone, but the male remains nearby throughout the incubation period of 23–25 days. Hatching typically occurs by the end of July, and molting by adults must begin at about the same time, since most of the adults and juveniles are flying by the last third of August, suggesting a very short fledging period for the young.

References: Johnsgard 1978; Elliot et al. 1992; Kear 2005

## Andean [Upland] Sheldgoose (*Chloephaga picta*)



This species is the most abundant of all the sheldgeese, and some flocks must be enormous. These flocks move around considerably according to the local food supplies, and strongly compete with sheep flocks. Where they are extremely abundant, their excrement may drive sheep away, and on some sheep estancias in Tierra del Fuego as many as 75,000 eggs have been reported destroyed in a single year. On the Falkland Islands, flocks of up to 100 birds are commonly seen.

In Chile, nesting occurs during November, but in the Falkland Islands it may extend from early August to late November, with most activity between mid-September and late October. Chilean nests have been found scattered indiscriminately over the countryside but usually are near water, while in the Falkland Islands the nests are typically placed among ferns or other herbaceous vegetation. The usual clutch size is 5–8 eggs, and incubation by the female requires 30 days. Males remain near the nest at this time and shortly after hatching the young are led to water. A nine- to ten-week fledging period for this species on the Falkland Islands has been reported. By late December, adults have begun their molt and become flightless, and at that time the birds move near the seacoast.

References: Johnsgard 1978; Elliot et al. 1992; Kear 2005

## Ruddy Shelduck (*Tadorna ferruginea*)



Ruddy shelducks are usually found in pairs or family groups, and large flocks are probably limited to molting assemblages on certain Russian lakes. Flocks of moderate to large size have at times been seen on the wintering grounds in India, but the basic aggressiveness of this species probably tends to keep flock sizes small. Pair bonds are fairly strong and tend to be permanently held. Migratory movements are well developed in this species, and generally involve southward flights of varying distances. At least until recently there was a regular flight of birds from Morocco northward to the coast of Spain for the winter season, the only known case of an African bird species wintering in Europe. Probably the species' major wintering grounds are in Azerbaijan, and the primary breeding area is from the Caspian Sea eastward.

In Russia, breeding birds arrive already in pairs, and they often appear in the breeding areas before the lakes are ice-free. Nests are placed in hollow cavities, including the hollows of larches, at heights of up to more than 30 feet, in ground burrows, in rocky cliff crevices, or even in ruined buildings. Like many other hole-nesting birds, females of this species may make a snake-like hissing sound when disturbed on the nest. The clutch averages from 8–12 eggs, which are deposited daily, and incubation begins with the last egg. It requires from 27–29 days, and is carried out entirely by the female. The male warns of danger, and may make threatening flights toward intruders. Both adults closely tend the brood, which feeds in the shallows on aquatic insects, brine shrimps, or even locusts. Recently fledged young have been seen from mid-July to late August. Postnuptial molt in adults begins about the time that the young become independent.

References: Johnsgard 1978; Elliot et al. 1992; Kear 2005

## New Zealand [Paradise] Shelduck (*Tadorna variegata*)



The counterpart to the Australian shelduck in New Zealand, the New Zealand shelduck is commonly known in that country as the Paradise shelduck. The two species are very similar, and certainly are very closely related; however, the New Zealand shelduck generally has darker body plumage, especially on the breast. The female has an entirely white head, making it the most attractive of all the "typical" shelducks. The female exhibits a greater seasonal plumage change than does the male, shifting from a dark and rather male-like body plumage in the non-breeding season to a more rusty brown during breeding. Juveniles typically resemble adult males during their first autumn, but may have some white on the face and around the eyes in a pattern resembling that of the female Australian shelduck. The adult plumage is attained during the first winter.

Once pair bonds are formed, the birds are monogamous and apparently have lifetime breeding associations. Breeding occurs only if the males are able to establish and hold territories. Established pairs re-form their bonds after the molting period and reclaim their territories.

Like other shelducks, females of this species seek out tree holes, hollow logs, rabbit burrows, rock crevices, or other cavities for their nests. A clutch of 8–10 eggs is laid and incubated by the female for about 32–33 days, while the male guards the nearby territory. The male returns to the nest at the time of hatching, when the entire family moves to a nursery area within the breeding territory. Both sexes defend their brood until they fledge at about eight weeks of age.

References: Johnsgard 1978; Marchant and Higgins 1991; Elliot et al. 1992; Kear 2005

## Radjah Shelduck (*Tadorna radjah*)



The radjah shelduck is a beautiful little white-headed shelduck with nearly white eyes and a blackish breast-band that interrupts its otherwise white underparts. Like other shelducks, it has iridescent green speculums, but in this species they are bordered with a black bar in front and a white bar behind. The back color varies from brown (in Australia) to black (in the East Indian population) and the sexes are essentially identical in appearance, although the female has a slightly narrower black breast-band than the male. Only their voices—a querulous rattling in females and a wheezy whistle in males—serve to identify the sexes easily.

These birds are strongly monogamous and probably retain permanent pair bonds after they mature, presumably at two years of age. They breed solitarily, and at the start of the season establish and defend a territory that includes a nest site (usually a hollow tree), a foraging area, and a brood-rearing area. Little is known of this species' biology in the wild, but the birds apparently forage mostly on mollusks and other aquatic invertebrates, and may remain on their breeding territories as pairs or family groups throughout the dry non-breeding season if water conditions permit. The normal clutch-size is uncertain, as it seems to be frequently inflated by dump-nesting, but probably averages fewer than ten eggs. Incubation is believed to last about 30 days, and the young are tended by both parents.

References: Johnsgard 1978; Marchant and Higgins 1991; Elliot et al. 1992; Kear 2005

## Ashy-headed Sheldgoose (*Chloephaga poliocephala*)



This small sheldgoose is native to southern South America, where it inhabits wooded and swampy habitats, where rushes and other wetland plants occur in small openings in temperate forests. Unlike the upland goose, this species readily perches in trees, and usually nests among them. However, they forage on the same grasses and herbs as the other species of this strictly South American group of goose-like birds.

Although few nests have been found in the wild, they have usually been hidden in tall grasses that are arched over the nest, concealing it, or in the hollows of burned trunks and branches in large trees. Nesting apparently is well underway by November, with many chicks hatching by late November. Clutches are usually of 4–6 eggs, and incubation by the female lasts 30 days. Little is known of the post-hatching period in wild birds, but the birds move north in small flocks as winter approaches, generally to about as far north as Buenos Aires Province. Outside the breeding season ash-headed sheldgeese gather in flocks from southern Chile and Argentina south to Tierra del Fuego.

References: Johnsgard 1978; Kear 2005

## White-winged Wood Duck (*Carina scutulata*)



Tropical marshes, swamps and jungles containing pools of water are the preferred habitat of this very rare species. The birds evidently avoid moving waters, and disappear when human activities encroach on their jungle environment. Waterlogged depressions in tropical evergreen forest, especially with dead trees in the water, are often used, as are shallow wetlands in dense canebrakes and tall elephant grass jungle. There is no indication of a strong flocking tendency in these birds. Usually they are to be found in pairs or small groups, perhaps families, of 5–6 birds on small ponds. The birds spend most of the daylight hours perching in trees and toward dusk fly to rice fields, open waters, and marshes to forage at night, returning again at dawn. There are no known migrations.

Almost no nests have ever been located, but one was found in a tree standing beside a stream. The nest was in a decaying hollow at the first major branching nearly 20 feet above ground. The birds reportedly sometimes nest on the ground or on masses of branches in trees, presumably the deserted nest of another species. The probable clutch size is about ten eggs, but range from 6–13 in captivity. Probably the female performs all incubation and brood-rearing duties, judging from what is known of related species, but pair bonds are present and the male may remain with the family.

References: Johnsgard 1978; Elliot et al. 1992; Kear 2005

## African Pygmy Goose (*Nettapus auritus*)



Some people might argue that the African pygmy goose is the most beautiful of all ducks. Unlike the mandarin and North American wood duck, the male does not lose his glorious coloration when the breeding season is over. Both sexes have a stunning white speculum set off against otherwise dark green to blackish wings, chestnut flanks and breasts, and with whitish underparts and face. The male differs from the female in having a black-edged area of iridescent green on the rear of the head and upper neck, a sharply defined black crown, and a bright yellow, black-tipped bill. Often found perching on a low, partly submerged tree, this bird adds a touch of brilliant color to a tropical forest pond scene. Like other pygmy geese, it is a dainty bird, floating as lightly on the water as a brightly colored autumn leaf, and occasionally plucking seeds from a water lily, or even diving for food. It is usually found in small flocks, perhaps representing family groups. Pair bonds may be fairly permanent, inasmuch as no seasonal plumage variation exists, breeding seasons are seemingly variable, and the birds do not appear to migrate.

Nesting probably occurs during the warmer and wetter parts of the year. Nests are typically in tree hollows as high as 80 feet above ground, but have also been found in cliff holes, termite nests, and even in a cavity in the roof thatching of a hut. Surface-nesting in thick grass clumps has also been reported, so the birds may be quite flexible in this regard. The male is said to accompany the female when the pair is nest-hunting. The typical clutch-size in captive birds numbers about nine eggs, with a maximum of 12. African pygmy geese have bred only rarely in captivity, but in one case incubation was found to require 23–24 days, which is a very short time for a cavity-nesting duck.

References: Johnsgard 1978; Elliot et al. 1992; Urban et al. 1996; Kear 2005

## Ringed Teal (*Callonetta leucophrys*)



The ringed teal is one of the most attractive of the teal-like ducks, and it has occasionally been grouped with the more typical teal in the genus *Anas*. However, in the 1960s I determined that the species' behavior has much more in common with the American wood duck, mandarin, and especially the Brazilian teal, and reclassified it as a perching duck. More recent anatomical studies have generally confirmed that conclusion. It occurs from southern Brazil south to Argentina, where it inhabits mostly forested areas; especially marshes surrounded by forests, and periodically flooded lowlands. The birds fly swiftly, with both sexes showing beautiful white wing patches on the upper wing coverts, in front of iridescent green speculums on their secondaries.

Ringed teal have strong, possibly permanent pair bonds. Like most perching ducks, the female is a hole-nester, and in the wild often nests in the large stick nests of monk parakeets. Clutch-sizes number 6 to 12 eggs. Incubation, which lasts 26–28 days, is probably by the female alone, although males will at times enter the nesting hole to join the female. After hatching occurs, the male leads the family and plays a primary role in the defense and care of the brood.

References: Johnsgard 1978; Elliot et al. 1992; Sick 1993; Kear 2005

## North American Wood Duck (*Aix sponsa*)



The North American wood duck is largely limited to wooded areas in North America, where it is most abundant east of the Great Plains and south of Canada. It has extended its range in recent decades, partly because of extensive nest box erection programs in areas where natural tree cavities are rare or lacking. Displays in this species are conspicuous and have evolved to maximally display the crest, the brilliant body patterning, and the iridescent upper wing coloration. The pair bond lasts only through a single breeding season, but may be reformed the following fall if both birds come back into contact.

Tree cavities are typically used for nesting, although nest boxes are often chosen as well, especially if the female was hatched in one. Both sexes participate in the search, but the final choice of a site is evidently made by the female. In areas where suitable nest cavities are limited, competition over nest sites may result in more than one female wood duck laying her eggs in a single location, or in mixed clutches of wood duck and goldeneye or hooded merganser eggs. Even in normal clutches the number of eggs laid is surprisingly large; 13–16 eggs is probably a typical range. Incubation by the female begins with the last egg and requires about 30 days. During this period the male abandons his mate and, after moving into relatively heavy cover, begins his postnuptial molt. As soon as their young have left the nesting cavity by jumping to the ground a day or so after hatching, females lead their broods to the nearest water.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Urban et al. 1996; Kear 2005

## Mandarin Duck (*Aix galericulata*)



It is hard to imagine a more appropriate name for the mandarin duck; its image served as one of the badges of rank among the mandarins of imperial China. The Chinese and Japanese have held this duck in special esteem for thousands of years, and have used it as a symbol of happiness and marital fidelity. Appropriately, it is limited to the heart of the Orient in eastern China and Japan. Feral flocks have become locally established in Great Britain and northern Europe by aviculturists, and some feral birds may locally occur in California. The male in full plumage has a pair of remarkable "sail" feathers (modified tertials) that are held vertically above the back while swimming, ornamental narrow chestnut feathers that hang down from the cheeks, and a broad white eye-stripe that is bounded above and below by darker feathers and terminates in a long, shaggy crest. The female is demurely patterned in gray and olive tones, but like the male has bluish iridescent speculums on its secondaries, which are bounded behind with narrow black and white stripes. The male in non-breeding plumage closely resembles the female, but has a reddish bill.

Like American wood ducks, mandarins have beautiful courtship displays, which include exaggerated body- and head-shaking displays, neck-stretching while calling ("burping") and mock-drinking. The ornamental sail feathers are held upright, and are ceremonially preened during a mock-preening display that immediately follows mock-drinking. Males often display among themselves, in the absence of a female. Pair bonds often persist between breeding seasons, and males accompany their mates on nest-site searches among the trees. Their incubation and brood-rearing biology is almost identical to that of American wood ducks.

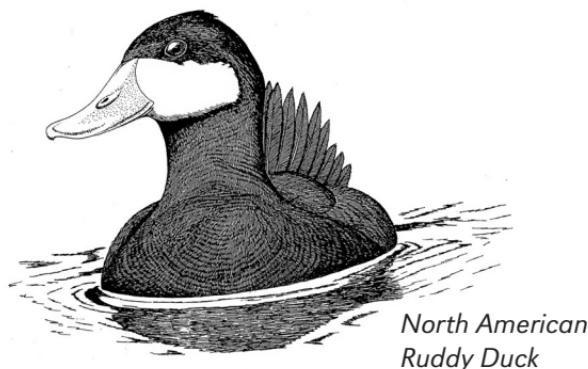
References: Johnsgard 1978; Elliot et al. 1992; Kear 2005

## Brazilian Teal (*Amazonetta brasiliensis*)



In South America, flock sizes of Brazilian teal appear to be quite small, and flocks probably consist of family units. The pair bond is seemingly quite strong and, considering the absence of a dull non-breeding "eclipse" plumage in males, is quite probably permanent. Very few nests have actually been found in the wild, but evidence supports the idea that the birds normally nest on sedge hummocks surrounded by water, although at least one nest has been found in a tree about eight feet above the ground. The clutch size is from 6–8 eggs, which are incubated entirely by the female. The incubation period lasts 25 days; and as soon as hatching occurs, the female and brood are joined by the male, who helps protect the young.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005



## American Wigeon (*Anas americana*)



Like the American "bald" eagle, the American wigeon has traditionally been called the baldpate, in reference to the white feathered area on the crown or "pate" of the male when in breeding plumage. American wigeon is certainly a preferable name, as it is a close relative of the Eurasian wigeon and the South American Chiloe wigeon. In all three wigeon species the male has a loud courtship whistle, uttered as his opens his bill widely and points it toward the courted female, while lifting his folded wings enough so that the iridescent speculum feathers are visible.

The American wigeon is probably most common as a breeding bird in western Canada, especially on lakes or marshes that are surrounded by brushy nesting cover or have sedge-lined meadows for alternative nesting sites. The nests are always extremely well concealed. Incubation by the female requires about 24–25 days. Before hatching occurs, the male abandons his mate and sometimes flies considerable distances before beginning his post-breeding molt and associated month-long flightless period. Depending on geographical location, the ducklings may fledge in as little as 37 days, under the conditions of perpetual daylight and associated constant foraging in northern areas, or in as much as 48 days in the southern parts of its range. Soon after fledging the young birds begin their fall migration.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Chiloe Wigeon (*Anas sibilatrix*)



Chiloe wigeons are common birds in southern South America, and their vernacular name refers to the Chiloe Island of southern Chile. They are strongly gregarious and highly sociable, at least during the nonbreeding season. Flocks often number in the dozens of birds and may reach as many hundreds on migration and in wintering areas. Nevertheless, even in such flocks pair bonds probably persist.

Nesting in central Argentina occurs from September to November, and in Chile it begins in August in the central provinces and a month or two later farther south. On the Falkland Islands nesting occurs between September and late December, and in Tierra del Fuego females have been found incubating eggs as late as January. The nest is located on dry ground, often in tall grass or among thistles, and frequently may be a considerable distance from water. The usual clutch ranges from 5–8 eggs, which are incubated only by the female. The normal incubation period is 26 days. With the hatching of the young, the male returns to help guard and rear the brood.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Falcated Duck (*Anas falcata*)



Falcated ducks are relatively social, and on migration and wintering areas occur in flocks that range from small to fairly large. They reportedly often associate with other species, including gadwalls and presumably other species of *Anas*, in wintering areas. Pair formation occurs during fall migration, and is obviously seasonal but nonetheless is strong.

Nesting occurs in Russia in May, June, and perhaps early July. The nest is placed in tall grass or small bush cover, usually near lakeshores, but at times as far as 250 feet from the nearest water. The reported clutch range in wild birds is from 6–9 eggs, with eight apparently being the most typical number. The male reportedly remains in the vicinity of the nest for the first half of the brooding period and joins the female during her foraging or rest periods. The incubation period is 24–25 days, with ducklings appearing in Russia as early as mid-June and as late as early August.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Gadwall (*Anas strepera*)



The gadwall's lack of iridescent plumage sets it apart from nearly all other widespread Northern Hemisphere dabbling ducks. However, this name does not begin to suggest the subtle beauty present in the full-plumaged gray, buff, and brown male, with its two-toned brown head, delicately scalloped and penciled grayish breast and flanks, and black rump. The mostly white wing speculum is perhaps the best field mark for recognizing gadwalls of either sex and in any plumage. As their scientific name implies, gadwalls are somewhat obstreperous during their prolonged fall-to-spring courtship period.

Pairs have normally been formed by the time the birds arrive on their northern prairie breeding grounds. These often consist of rather alkaline, permanent marshes, especially those having grassy islands that offer ideal nesting cover. Sometimes a colony-like nesting situation develops, with several females nesting on the same small island. The males typically desert their mates while the latter are incubating their clutches of about ten eggs. Incubation requires about 26 days. After hatching, the ducklings are gradually moved to larger and deeper marshes during their 50- to 60-day fledging period. By the time the young have finally learned to fly, it is early autumn in central and northern Canada, and the fall migration soon begins.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Green-winged Teal - lower front (*Anas crecca*)



Like other *Anas* species, green-winged teal become mature during their first winter of life. A prolonged period of social display begins on wintering areas which persists through the spring migration, and is completed about the time the birds return to their breeding grounds. Groups of courting green-winged teal are notable for their animation and the rapidity with which one display follows another. Pair bonds are held only until incubation begins.

Green-winged teal are among the earliest of spring waterfowl migrants, and arrive on nesting areas almost as soon as they become snow-free. Pairs soon begin nest-site searches, with the female making the final choice, while accompanied by her mate. Females usually line their nests with considerable amounts of down, and their nests are extremely well concealed from the sides and from above, in heavy grass, weeds, or brushy cover. The average clutch is about 8–10 eggs, laid at daily intervals. The incubation period of 21–23 days begins with the completion of the clutch, and males usually desert their mates at about the time incubation begins. Males may fly some distance to special molting areas before becoming flightless.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Mallard - upper back (*Anas platyrhynchos*)



Mallards are widely spread around the world, and are familiar as domesticated and feral birds in city parks, so they require little description. Indeed, species definitions are impossible in this highly variable species, and I have suggested that the American black duck might logically be included as a race of the mallard, along with the sedentary mottled duck, Florida duck, Mexican duck and Hawaiian duck. In all of these populations males have lost much or all of their bright breeding plumage. These changes may be a result of inbreeding and natural selection for a sedentary life. Bright male colors and elaborate social displays are associated with intense male competition for mates in large, mobile populations. Unlike males, females tend to be rather similar in appearance in all populations. All have wing speculum patterns that are generally iridescent blue or violet, with all-white or black-and-white leading and trailing borders. During courtship, the males perform generally the same social displays, although the Pacific island populations perform them less frequently and with less intensity.

Mallards become mature rapidly, and young males may begin displaying within four or five months of their hatching. Display occurs over a period of many months, frequently starting in September and persisting until May. In all the races, clutch-sizes average 8–10 eggs, and incubation typically requires about 28 days. Even in the sedentary races, the males do not participate in brood care, although it is possible that pair bonds are fairly permanent in at least some of these populations

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## American Black Duck (*Anas rubripes*)



About 50 years ago, I hesitantly suggested that since the American black duck is not a reproductively isolated species, its existence as a genetically distinct entity might become threatened by an increasing rate of hybridization with mallards, which have expanded into eastern North America in association with deforestation and releases of captive-raised birds by game agencies and sportsmen's groups. My prophecy has materialized at a rate that I would not have dared to suggest, and it is now apparent that the future of the North American black duck as a distinct species is in great jeopardy. In addition to hybridization, much of the original eastern hardwood forest swampland and similar wetlands that were the black duck's favored nesting habitat have disappeared. Biologists and naturalists have every right to be concerned about the future of the black duck, which used to be the prize trophy bird of Atlantic coast hunters.

The social displays and reproductive biology of the American black duck is essentially identical to that of mallards. Male mallards are as likely to court female black ducks as they are mallards. As a result, the female black ducks must make the correct choices of mating partners, which should be easy, given the marked plumage differences between the two types. They frequently make the wrong choice perhaps because of the mallard's more impressive male plumage or perhaps simply because far more male mallards than black ducks are now available as mating partners.

References: Johnsgard, 1975a 1978; Elliot et al. 1992; Kear 2005

## Northern Pintail (*Anas acuta*)



This pintail species includes three distinct races: the northern pintail, occurring widely throughout much of the Northern Hemisphere; and two additional races (sometimes considered separate species) that are found on the isolated Kerguelen and Crozet islands of the sub-Antarctic waters of the Pacific Ocean. Like the Hawaiian and Laysan variants of the mallard, these island forms are smaller and duller colored than the widespread race. They probably are small, inbred populations, which have lost many of their original pintail-like traits during their periods of isolation.

Northern pintails tend to be highly migratory, nesting farther north in the high arctic than any other dabbling duck. Females there begin nesting on the tundra very early. The incubation period is a short 21 days, and at least in Alaska the young can be brought to fledging in 35–42 days, making possible breeding in areas having frost-free periods of only two months. During this time, the females must also complete their post-breeding molts. Then the long migration begins, occasionally to areas as far south as Colombia in the Americas, and to Tanzania in Africa.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Brown [Yellow-billed] Pintail (*Anas georgica*)



Flock sizes and sociality may well differ between the abundant South American mainland form and the relatively rare South Georgia race, but the latter is much better studied. Breeding seasons undoubtedly vary widely across the enormous range of this species, and even in temperate regions such as Chile they appear to be quite prolonged. Two broods are evidently raised in the central provinces there, the first nesting starting in August and the second brood appearing in January or February. In the mountains and to the south the nesting is more restricted, and occurs between October and December. Nesting sites chosen by brown pintails are simple, merely scrapes on dry ground reasonably close to water, or hidden in coarse grass, rushes, or tussock grasses. The clutch size of the Chilean race is normally between four and ten eggs, probably averaging about seven. However, on South Georgia the brown pintail apparently never lays more than five eggs, which probably reflects its smaller body size as well as local ecological factors. Only the female incubates, and, at least for the Chilean race, the incubation period is 26 days. The male apparently normally joins the female after hatching to help rear the brood.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## White-cheeked [Bahama] Pintail (*Anas bahamensis*)



Small flocks appear to be the usual rule in this Central and South American species, with a few observations of flock sizes numbering more than 100 birds. The birds usually are found alone, but at times also associate with brown pintails, whose foraging behavior and preferred foods must doubtless be similar.

Few nests of these pintails have been found in the wild, but in the Bahamas the birds have been reported to nest in thickets of mangroves, with the eggs being placed in a simple nest among their roots. Breeding in Trinidad and Tobago occurs from August to November, and in Surinam breeding records extend from May to October. Apparently the greater subspecies nests in the austral spring in the southern parts of its range, specifically October and November, while the Galapagos population is said to have a more extensive nesting period, probably lasting from October until July. The usual clutch size is from 6–10 eggs, and the incubation period is 25 days.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Silver Teal (*Anas versicolor*)



This attractive little South American duck is often and appropriately called the *versicolor* teal, presumably because of its multicolored plumage. However, silver teal also describes it fairly well, inasmuch as its plumage is generally silvery gray on the flanks and hindquarters, with darker vertical barring and penciling. The head is buffy to white below the eyes and dark blackish brown above, as if dark caps had been pulled down over the bird's eyes. The bill is mostly or entirely blue, although in the lowland (including the Falkland Islands) races it is yellow toward the base. The alpine-nesting Andean race is considerably larger and generally more plainly patterned throughout, but all races have a green speculum that is narrowly bounded in front with white and behind with black and white borders. The sexes are nearly identical in appearance. Like some other South American ducks, silver teal have strong pair bonds. Observations in Argentina indicate that bi-parental brood care is well developed in this species, with eight of ten broods attended by both parents, and males showing active involvement in brood protection.

Females of the Andean race lay rather small clutches of 6–7 eggs, and their lowland counterparts lay larger ones of 8–10 eggs, usually on the ground in heavy herbaceous cover. The incubation period of both races lasts 25–26 days, and fledging probably requires about two months.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Blue-winged Teal (*Anas discors*)



According to its scientific name, this is a "discordant duck," but most people would agree that it is highly attractive in voice as well as appearance. Although it is limited as a breeding bird to North America, during its long migrations it regularly reaches northern South America and has even straggled as far as Chile. The male in breeding plumage has a beautiful plum-tinted head with a crescent-shaped white patch on each cheek. In both sexes baby-blue anterior upper wing coverts are present in front of white-bordered iridescent green speculums on the secondaries. Blue-winged teal are late spring migrants, often having traveled all the way from Central America or even northern South America. They have little time to form pair bonds once they reach their breeding areas, so probably much of the courtship occurs en route. All of the more elaborate male displays found in, for example, green-winged teal, are lacking, indicating that these two groups of teal-sized birds evolved from rather different ancestors.

Females nest under sometimes rather low grassy or sedge cover, usually along the edges of prairie ponds or marshes. They lay surprisingly large clutches of 10–11 eggs. Incubation lasts 21–23 days, and the female rears her often-large brood on her own. The young fledge in about 40 days, with the female starting her own flightless period at about the time her young are themselves able to fly. By then, post-breeding males are starting to regain their flying abilities, and some may have already begun to leave their breeding areas.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Sick 1993; Kear 2005

## Cinnamon Teal (*Anas cyanoptera*)

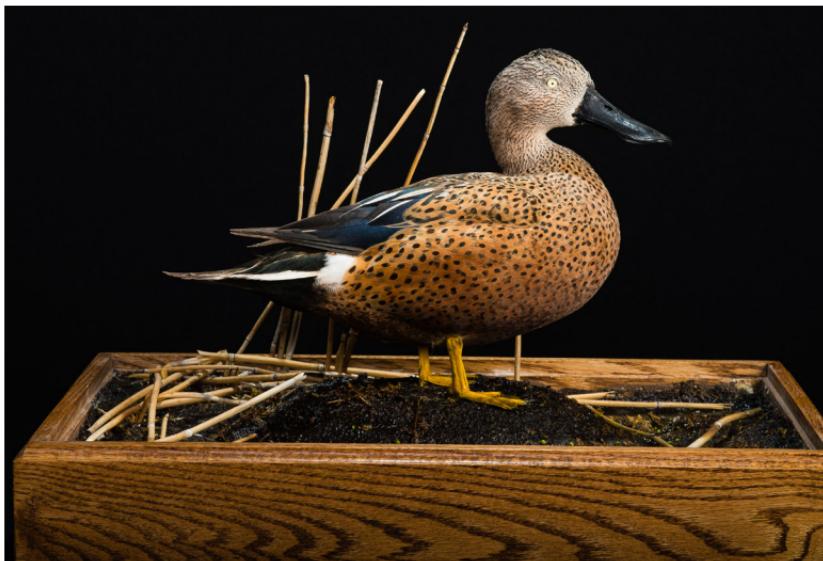


People living from the Great Plains west to the Pacific coast in North America are most likely to see this attractive little duck, although other races live in the Andes and Patagonian lowlands of South America. In the western United States, the cinnamon teal and the blue-winged teal coexist in apparent harmony, but they must compete to some degree for food, and males will even occasionally court females of the other species. The cinnamon teal has a slightly longer bill than the blue-wing, and this difference, plus a generally more rusty plumage, often helps to identify it correctly in the field. The upper wing patterns of both sexes are exactly like the blue-winged teal's, associating it not only with that duck but also with the several species of shovanders. The cinnamon teal's long and slightly "droop-tipped" bill also shows this ancestral affinity.

The cinnamon teal seems to be most abundant on the rather alkaline shallow marshes of the western inter-mountain plains, where saltgrass cover provides it with limited nesting protection. For this reason, islands having high grassy cover are preferred for nesting sites. The male occasionally abandons his mate about the time that the clutch of 9–10 eggs is completed. Incubation lasts 23–25 days, and 35 days are needed to bring the young to fledging.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Red Shoveler (*Anas platalea*)



This South American species of shoveler has a reddish-toned and dark-spotted male plumage that resembles the cinnamon teal's, and its bill is also perhaps slightly less modified for filter-feeding than those of the other three species. It is somewhat larger than the cinnamon teal, and the male has distinctive yellowish eyes and a rather pale head. The female closely resembles the female cinnamon teal in plumage pattern and color. Although its range overlaps the teal's, it seems to prefer brackish waters and coastal lagoons to freshwater habitats. This bird is an effective filter-feeder, consuming plankton-sized materials and probably some larger foods, and is the only true shoveler species breeding in South America.

Pair bonds, which are evidently rather strong, are rapidly formed or re-formed in fall flocks. A major male courtship display of this species, as well as other shovellers, is mock-feeding, which red shovellers perform immediately after uttering soft *took* notes that probably attract the female's attention. Females nest in grassy vegetation and lay clutches of 5–8 eggs, which they incubate for about 25 days.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Rosybill [Rosy-billed Pochard] (*Netta peposaca*)



The rosybill (or rosy-billed pochard) is an attractive diving duck that is common over many parts of southeastern South America. The male has a brilliant red bill that is inflated at the base, contrasting with a black head, breast, and back, and with gray flanks and a white patch under the tail. Their white wing stripes are evident only in flight. The species is found on warm lowland marshes and lakes from northern Argentina north to southern Brazil. Pair bonds in rosybills appear to be temporary; there are no accounts of males helping to rear the young. Courtship is marked by conspicuous displays on the part of both sexes.

The female tends to build the nest over water rather than on land, and tends to dump its eggs in the nests of other species. In turn, its nest is often "parasitized" through the addition of eggs laid by black-headed ducks. Clutch sizes of non-parasitized nests average about ten eggs. Incubation lasts about 28 days (compared with 21 days for the black-headed ducks, whose highly precocial ducklings thus hatch about a week before any of their host's eggs). After hatching, broods often amalgamate, and female rosybills tending large numbers of young have at times been seen.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## **Canvasback (*Aythya valisineria*)**



The canvasback is one of the most distinctive of all North American ducks, and the one most highly prized by hunters. It is the largest of the diving duck group called pochards, and both sexes have long, sloping bills that give them a regal appearance. The whitish gray (canvas-colored) back and flank coloration of the male is also distinctive, and in winter plumage the female likewise has paler grayish sides and back than do any of the other pochard species. Limited to North America, this bird is most common on the tule- and cattail-lined prairie marshes of the northern plains, but locally extends its nesting distribution all the way to the Arctic Ocean and Bering Sea. It is mostly vegetarian, with pondweeds, water lilies, and wild celery among its favorite freshwater foods. In winter it concentrates on estuaries where eelgrass and wigeon grass grow abundantly. On their breeding grounds the birds occupy rather large home ranges, with little or no territorial aggression evident between nearby pairs.

The female constructs its partly floating nest in dense beds of emergent vegetation. It needs stable-water habitats, along with nearby areas of open water for foraging and easy take-offs and landings, for successful breeding. Incubation of the 9–10 eggs requires 24–25 days, and fledging takes 60–70 days, during which time the female may begin her own molting period and abandon her young before they have fledged.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Redhead (*Aythya americana*)



Like the canvasback, ring-necked duck, and lesser scaup, the redhead is exclusively a North American species of pochard. Its breeding range, which overlaps with those of the other three, centers on the prairie marshes of southern Canada and the northern United States. These marshes offer a mix of open water that is rich in submerged aquatic plants and invertebrate life for their foraging needs and beds of emergent vegetation for nesting cover.

Females may begin nest-building from two days to a week before egg-laying begins. Brood parasitism plays a significant role in the breeding biology of redheads, and apparently a considerable number of females never build nests at all but rather simply deposit their eggs in nests of other marsh-nesting waterfowl, especially other redheads, canvasbacks, and ruddy ducks. Eggs are laid at the approximate rate of one per day, and the parasitically laid eggs have lower hatching success than those that are incubated by the female laying them. Clutch sizes are thus highly variable, but average 7–8 eggs. Incubation requires about 24 days, and before its completion the males desert their mates and begin their postnuptial molt. Not only do redheads have a rather low hatching success as a result of nest desertion and the influence of parasitically laid eggs, but they also are relatively poor parents, often abandoning the brood while the latter are relatively young and still unable to fly. The fledging period is probably 55–75 days.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Ring-necked Duck (*Aythya collaris*)



The ring-necked duck, or ring-bill as it is commonly and appropriately called by most hunters, is another native North American pochard. Its range is centered in central and eastern Canada. In some ways it is rather scaup-like in appearance (males are mostly black with white flanks), but an examination of the plumages of females and ducklings immediately shows that the species is a typical pochard. Like the canvasback and redhead, both sexes have gray rather than white wing stripes; however, the male's bill is more strongly banded with gray, white, and black than any of the other pochards' bills. The female is a rather nondescript grayish brown, usually with a well-defined whitish eye-ring and eye-stripe and fainter banding evident on the bill.

Unlike the other American pochards, this species inhabits forested swamps, bogs, and similar often acidic wetlands of eastern Canada, although it extends locally to British Columbia. The birds form pair bonds as yearlings and thereafter apparently re-establish their bonds annually. On their breeding grounds, females seek out islands, small mats of floating vegetation, and similar sites for their nests, but occasionally nest on dry sites. Clutch sizes average about nine eggs. Incubation requires 26–27 days, and fledging about 7–8 weeks.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Common Eider (*Somateria mollissima*)



The common eider is a widely ranging species whose various populations encircle the globe at high latitudes. These numerous populations vary somewhat in size and plumage. The Pacific race is the largest and most distinctive, the male having a black V-pattern on its throat, and occasionally is regarded as a separate species. Generally, adult birds weigh 3–5 pounds. The male has a black-and-white plumage pattern that includes black crown, white cheeks, greenish yellow sides of the head, and an all-white back and breast. The female is strongly vertically barred with tones of brownish buff and blackish brown, in an overall pattern slightly resembling that of female mallards. In both sexes and all races, the feathers on the sides of the cheeks extend forward, almost reaching the rear edge of the nostrils.

Like other larger eider species, males of this species have a variety of cooing calls that are used during social courtship and are accompanied by various head movements. Females lay rather small clutches of 4–5 eggs; early clutches are larger than later ones, and those of middle latitudes are larger than extreme northern or southern ones. Incubation lasts about 25–30 days, and fledging requires about eight weeks. Eiders often nest colonially, and the young of many females frequently merge to form large crèches, which are attended by several females.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## King Eider (*Somateria spectabilis*)



The king eider is well named; the male in breeding plumage has a magnificent bluish hood that is capped in front by a bright orange-red knob extending from the forehead to the nostrils and outlined in black. The eyes are also outlined from below in black, and in contrast to the common eider and spectacled eider, the back plumage is likewise black. The male has a pair of curious sail-like tertial feathers rising from his inner wings, which, unlike those of the mandarin duck, are constantly held aloft as the male is swimming. The females have a contrasting dark and light brown plumage somewhat like that of the common eider, but the markings are more crescent-shaped rather than tending toward vertical barring. In both sexes, the feathers of the cheeks do not reach as far forward as in the common eider. As in that species, males in eclipse and first-year males tend to be blackish in color, rather than resembling the brown females.

Like common eiders, king eiders have nearly circumpolar breeding ranges, although they don't normally breed in Scandinavia or Iceland. Their courtship calls and vocalizations also recall those of common eiders, and these two similar species have been reported to hybridize occasionally. The start of the egg-laying season occurs as soon as coastal tundra areas begin to become snow-free. Eggs are laid in dry-land nests, sometimes a quarter mile (0.5 km) or more from water. As soon as egg-laying is finished, the males begin to head back to sea, often moving to common molting areas hundreds of miles away. The clutch of about five eggs is incubated for 22–24 days, and the young probably require seven to eight weeks to fledge.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Steller's Eider (*Polysticta stelleri*)



This smallest of the eiders has a range only slightly greater than that of the spectacled eider, and both are mostly centered around the Bering Sea. In this species wintering is known to occur along the Kamchatka Peninsula as well as the Aleutian Islands, with birds also occasionally moving east to winter along the coasts of Scandinavia. The male in breeding plumage can be easily recognized by its mostly white head, tawny-rufous breast, and unique iridescent striping along the back produced by ornamental scapulars. It also has a strange black spot on each side of the breast, a black neck-stripe, and black edging around the eyes and greenish nape. The female is a dark, chunky duck; in common with the male, it has bluish and white-edged iridescent speculum patterns. Males in non-breeding plumage are somewhat more dusky-toned than the females.

Steller's eiders are gregarious birds, and during social display in spring engage in active courtship. One of the most spectacular of the male's displays is called rearing, and consists of a sudden, silent throwing back of the entire body in the water, momentarily exposing the brownish underparts, and just as quickly dropping back and hiding them. Nests are built along coastal tundra, and clutches of six to eight eggs are typical. No doubt the female undertakes the incubation, as males gather and fly to molting areas near the tip of the Alaskan Peninsula. Little is known of the later stages of the breeding cycle, but the incubation period of the clutch is about 26–27 days, and an approximate 50-day fledging period is probable.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

**American (Black) Scoter - lower (*Melanitta americana*)**

**Surf Scoter - middle (*Melanitta perspicillata*)**

**White-winged Scoter - top (*Melanitta fusca deglandi*)**



The American scoter is often called the black scoter, a very similar Eurasian species now regarded as taxonomically distinct. In North America it may be the rarest of the three scoters. The plumage of the adult male is entirely black, and males also have a distinctive swelling at the base of the bill. The female is mostly dark brown, but its head is two-toned with a darker upper half and lighter lower half. Like all scoters, this bird is mostly found along coastlines, but at times winters on large lakes such as the Great Lakes. Like other scoters, it forages for various mollusks such as mussels, usually just outside the zone of breaking waves in waters under 25 feet deep, and at times may dive to depths of at least 40 feet.

American scoters arrive on their arctic tundra breeding grounds rather late, not nesting in Alaska until late June, or about two weeks later than eiders in the same area. The females often nest under dense shrubby cover and lay clutches of 6–9 eggs. Incubation requires 27–28 days, and during this time males abandon their mates and usually migrate some distance before starting their post-breeding molts. The fledging period lasts about six to seven weeks, and fall migration begins very soon after the young are able to fly.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

*Surf Scoter and White-winged Scoter descriptions on next page.*

*Surf Scoter and White-winged Scoter are shown on previous page.*

## **Surf Scoter - middle (*Melanitta perspicillata*)**

Like the other two American scoters, the surf scoter is a fairly common coastal duck along the Atlantic and Pacific shorelines of North America, but unlike the others its range does not extend to Europe and Asia. During winter, it is abundant along rocky coastlines of Alaska and Canada, and young birds or females are occasionally found in freshwater lakes or rivers as well. Like other scoters, the bird forages during much of the year for mollusks, especially mussels, in coastal waters of moderate depth. The adult male can easily be recognized by its white forehead and nape patches that contrast with its otherwise all-black plumage; the female and immature male are mostly dark brown, with darker crowns and small whitish patches on the nape, ear region, and just behind the bill.

Breeding occurs in rather inaccessible brushy habitats near timberline or in heavier woodlands. Nesting mainly occurs in the interior of northern Canada, but few nests have been found. Incubation and fledging periods are uncertain, but an incubation of 27–28 days is likely and a fledging period of 55 days has been reported.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## **White-winged Scoter - top (*Melanitta fusca deglandi*)**

The white-winged scoter is easily recognized by its white secondary feathers, which are present in both sexes and all ages. Otherwise, the male is all black, except for its white eyes and a small, somewhat teardrop-shaped patch of white feathers behind each eye. The male also has some yellow to reddish markings on its bill. The female is mostly dark brown, and in addition to its white wing speculum has small rounded patches of whitish feathers on the ear region and between the eye and the bill. The species has a broad range in both North America and Eurasia (in Britain it is called the velvet scoter) and is perhaps the most abundant worldwide of all scoters. It is the largest and most ponderous of the scoters, but like the others, feeds mostly on mollusks in fairly shallow coastal waters.

Courtship occurs at sea during late winter and spring. By the time they arrive on their breeding grounds, the females are all paired, but nearly a month may elapse before egg-laying begins. The incubation period is 26–29 days, and the young require about 65–75 days to attain fledging, which means that fall migration must begin immediately if the birds are to escape the first winter storms.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Harlequin Duck (*Histrionicus histrionicus*)



The harlequin duck might well be regarded as the most beautiful of North American waterfowl, at least by those persons who are not overwhelmed by the iridescent magnificence of the American wood duck. The harlequin has a more subdued beauty, with only a slight bluish iridescence, mainly on the secondaries. Its elegant combination of indigo, black, white, and chestnut is organized in a complicated "harlequin" pattern. The female is mostly dark brown, with white patches around the ears and on the front of the face. This duck seems to be completely at home either in the fast white-water of mountain streams or among crashing coastal breakers, where it feeds on the invertebrates associated with the rocky bottoms of these habitats. It flies infrequently, and in spite of the bright coloration of the male, it is often very hard to locate in its blue-water, white-foam surroundings.

Harlequin ducks are difficult to study in the wild, and even today little is known of their breeding biology. The males certainly do not participate in brood care, and territoriality is evidently weak or even absent; a surprising situation considering that many stream-dwelling ducks are highly territorial. The females nest in extremely well hidden sites, either on the ground, usually under dense vegetation, or in rocky crevices or other natural cavities. Their eggs reportedly hatch after about 27–29 days, but the fledging period is somewhat uncertain, with estimates ranging between 42 and more than 60 days.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Long-tailed Duck (*Clangula hyemalis*)



This attractive sea duck was once called the oldsquaw in North America, a species that occurs in arctic and sub-arctic waters around the Northern Hemisphere, and is perhaps the most abundant of all the sea ducks. The now-accepted English name “long-tailed duck” is more appropriate and more descriptive, at least for the male, which has a long, pointed tail much like that of the northern pintail. The female, however, has a short tail. Both sexes have an extremely complicated sequence of molts and plumages, making simple descriptions of their appearance almost impossible. Suffice it to say that during the winter the male is mostly white, with a black breast and ear patches, whereas during the summer the head, neck, and breast are mostly black, with the flanks remaining white and a white patch developing around the eyes. The female has piebald black and white head markings throughout the year, but its flanks are always grayish white and its breast is always a mottled or scalloped brown. Both sexes have wings that are mostly dark above and below, the secondaries having a brownish sheen in some cases. They are superb divers, reportedly diving to depths up to 200 feet to obtain their food.

Courtship is a spirited affair, with aerial and aquatic displays. The wild calls of the males carry far over the tundra in one of the most evocative and memorable of all the sounds of the arctic spring. In North America this species migrates as far as extremely high arctic latitudes of northern Greenland and arctic Canada to nest. Females hide their nests in short tundra vegetation and remain constantly on the nest while they incubate their six or seven eggs for 24–26 days. The ducklings grow extremely rapidly, at times fledging in as few as 35 days, which allows the species to breed in areas having only about two months of frost-free weather in summer.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Bufflehead (*Bucephala albeola*)



The name bufflehead (a contraction of an older name buffalo-head), seems descriptive of this beautiful little North American duck, which appears to have a head that is too large for its body. The head of breeding males is magnificently adorned with a triangular white crest bounded in front and below by iridescent tones of green, purple, and bronze. The bufflehead has also been called spirit duck, which perfectly catches the essence of this sprite-like creature, whose presence manages to give life to an otherwise empty woodland pond, regardless of the bird's minuscule size. Besides the male's white crest, its underparts are also entirely white, and a broad white wing patch is evident in flight. The female is duller than the male but has a small white oval mark behind each eye and a smaller white patch on each wing.

Buffleheads are a delight to watch in any season, but during spring they are entrancing. The males court the females endlessly, in wild aerial chases, aquatic tournaments, and underwater attacks on other males. Somehow the females manage to select mates through all this commotion, and on arrival at their breeding grounds seek out nest sites, which are often old woodpecker holes. They lay clutches of eight or nine eggs and incubate them for about 30 days. Another 50–55 days are required to bring the young to fledging; at about this time the female begins her own flightless period.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Barrow's Goldeneye - middle (*Bucephala islandica*)



North Americans are indeed lucky to have all three species of *Bucephala* as native species; the two goldeneyes and the bufflehead are certainly among our most attractive waterfowl species. The Barrow's goldeneye is mostly limited to the western parts of North America from the Rocky Mountains westward, although a few birds winter along the Atlantic coast as well. The male in breeding plumage has a distinctive white crescent between each eye and the bill, and also has a series of white spots extending back along each shoulder. The female greatly resembles the female common goldeneye but at least in western populations has an all-yellow bill and a quite dark brown head with a pronounced forehead bulge. The two species often occur together, and at that time the differences in the females are more readily apparent. This duck forages in fairly deep waters, feeding primarily on mollusks and other invertebrates.

Barrow's goldeneyes engage in prolonged courtship display during spring, when the loud grunting and clicking calls of the males, as well as their splashing, draw one's attention to them. In any case, pair bonds are eventually formed, and females begin to seek out nesting sites. Nests are most often in tree cavities although sometimes in rock crevices; on rare occasions, the birds will nest under dense vegetation. Clutch-sizes number 9–11 eggs, and incubation lasts about 32 days. There is a rather long eight-week pre-fledging period, during the late stages of which the female may abandon her brood and begin her own flightless period.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Common Goldeneye - top and bottom (*Bucephala clangula*)



The common goldeneye is the most widespread and most common of the *Bucephala* species, breeding over large areas of the boreal forests of the Northern Hemisphere, and wintering both on coastal waters and larger freshwater lakes and rivers. This species is among the most conspicuous of the diving ducks in many areas, and the nearly all-white body of the male helps to set it apart from most other divers. In breeding plumage, the male has rounded white spots, rather than white crescents, between the eyes and the bill, and a series of black and white diagonal stripes extending back from the shoulders. Females and non-breeding males have chocolate brown heads and mostly gray bodies, and closely resemble Barrow's goldeneyes. The female never has an all-yellow bill, and its head is more triangular. Males of either species often court females of the other, making identification somewhat more difficult, and hybrids sometimes occur.

Courtship in common goldeneyes is marked by an extreme diversity of male displays. Like the other *Bucephala* species, females prefer nesting in cavities, especially tree cavities where they are available. Such sites are often limited, and competition over suitable sites may lead to multiple use and dump-nesting. The usual clutch-size of a single female is about ten eggs, and incubation averages about 30 days. During the brood-rearing period of about 55–65 days the young of two or more females often become amalgamated, producing rather large assemblages of dependent young.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Hooded Merganser (*Lophodytes cucullatus*)



Most observers would probably admit that the hooded merganser is the most visually attractive of all the mergansers; no other duck species is able to alter its appearance so rapidly and spectacularly as can a male hooded merganser simply by raising and lowering its crest. This white crest, trimmed and surrounded by black, is located in the same place as the bufflehead's, but is far more variable in appearance owing to its highly erectile nature. It ranges from a rather narrow white stripe, in flying birds, to an enormous white oval that is considerably larger than the rest of the head during courtship. The female is also crested, but its crest is mostly rufous brown, and not nearly so varied in shape. The bill of the hooded merganser is shorter than those of other North American mergansers, but nonetheless is an effective fish-catching device. The birds nest in forested woodlands of eastern and western provinces and states, especially along clear-water streams and tree-lined lakes.

Courtship behavior of the hooded merganser is, as might be expected, marked by crest erection, as well as by head-shaking and head-throw displays, all serving to emphasize the large crest. In several ways the species' social behavior is surprisingly like that of the goldeneyes, indicating that these two groups are fairly close relatives in spite of the differences in bill shape. Females select cavities for nesting, often competing with female goldeneyes or American wood ducks for tree cavities, and sometimes even laying eggs in the same cavity. Clutches average about ten eggs, and incubation lasts about 32–33 days. Rivers that are rich in small minnows are favored for brood-rearing sites, and about 70 days are needed to bring the young to fledging.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Smew (*Mergus mergellus*)

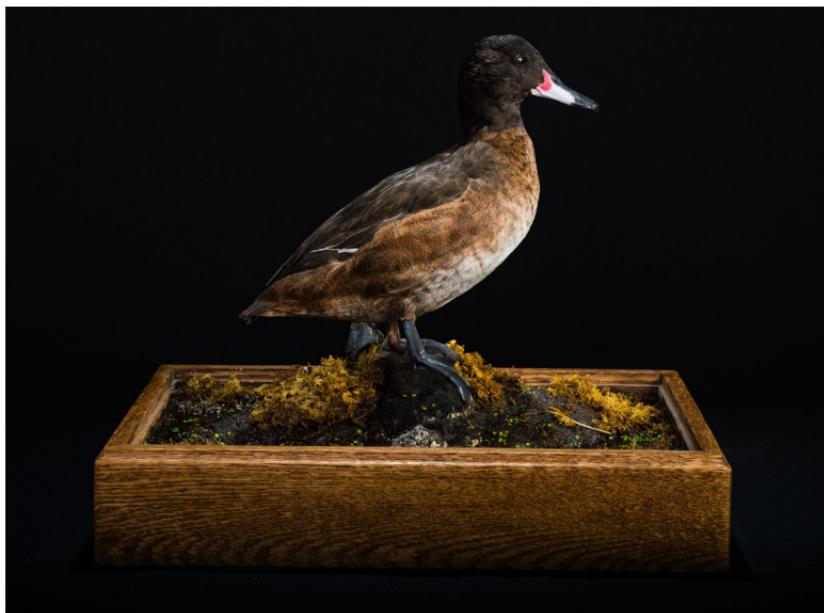


In Europe, smews are roughly the taxonomic counterpart to hooded mergansers but are more marine in distribution. During winter, females and immature birds migrate farther south than adult males, and tend to use inland rather than coastal habitats to a greater degree than adult males. Smew courting groups usually consist of one or two females and up to eight males, with a good deal of shifting of numbers typical. Female smews probably breed initially in their second year of life, judging from what is known of related species.

There is not a great deal known of the nesting biology of smews, but they evidently prefer to nest in hollow broad-leaved trees. They often select cavities so low that they can readily be looked into by humans, and at times will also accept nesting boxes. The nest cavity is lined with abundant whitish down and from 6–9 eggs are laid. Nests with up to 14 eggs have been reported, these presumably the result of multiple laying females. Additionally, the nests of smews often contain mixed clutches with common goldeneyes, and wild hybrids between these two species have been reported. The incubation period is 28 days, during which time the male deserts his mate and moves to a molting area. Females are reportedly very "tight" sitters, and near the end of the incubation period can sometimes be picked up. The fledging period is about ten weeks.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Kear 2005

## Black-headed Duck (*Heteronetta atricapilla*)



The South American black-headed duck is not a typical stiftail, inasmuch as it lacks a lengthened tail, rarely if ever dives for food, and has a bill shape that more closely resembles that of dabbling ducks. More interestingly, perhaps, it is the only species of waterfowl that is a social parasite; no nest or incubating female of the black-headed duck has ever been discovered, and it is believed that they invariably deposit their eggs in the nests of other marsh birds. The black-headed duck is fairly common on the marshes of northern Argentina, north to southern Brazil, where it occurs with several other breeding duck species as well as three species of coots, of which the latter are especially common hosts of its parasitic behavior.

When in breeding condition, males acquire a bluish bill color, which is reddish basally, but show no evident seasonal differences in plumage. Like the ruddy duck, males of this species seem to have a very limited courtship display repertoire. Pair-bonding appears to be weak or absent. The number of eggs laid by a female in the course of a breeding season is unknown. Frequently two eggs are deposited in a single host's nest, at about the time that the host female is completing her clutch, but before incubation gets under way. More than a dozen species of birds have thus been reportedly parasitized by black-headed ducks. However, the hatching success is very low. Only the fairly short incubation period (about 21 days) and the precocial condition of the newly hatched young ensure the survival of the ducklings, which are able to fend for themselves when only a few days old. The fledging period has been estimated at ten weeks.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Johnsgard and Carbonell 1996; Kear 2005

## North American Ruddy Duck (*Oxyura jamaicensis*)



Male ruddy ducks lack the highly abbreviated late summer (“eclipse”) plumage typical of most American ducks, and instead have a prolonged winter plumage that is carried until well into spring. After their arrival on the breeding grounds, male ruddy ducks rapidly undergo a pre-breeding molt into their characteristic rusty breeding plumage, and their grayish bills become gradually infused with cobalt blue hues. By then the males are usually highly territorial, spending much of their daylight hours regularly patrolling the edges of reed beds, with tail erect, neck inflated, and its short horn-shaped feathers raised, searching for both females and possible male competitors.

Unlike the half-dozen or so displays of some ducks, the male ruddy duck persistently does one thing, but does it very well. Inflating its tracheal air sac, the male begins a series of progressively faster bill-pumping movements, tapping the underside of its bill on its inflated neck. This not only produces a hollow thumping sound but also forces air from the breast feathers, causing a ring of bubbles to form around the base of the neck.

Nests are built in rather dense reed beds over water that is deep enough for the female to slip away submerged should danger threaten. The water levels must also be fairly stable, so that the nest is not flooded or left high and dry. Such ecological situations are now rare, and are mostly limited to the prairie marshes, the northern plains states, and central Canada. About eight eggs are laid, which are incubated for 23–26 days. During the rather long fledging period of 52–66 days the young often become separated from their mothers, or simply stray off on their own.

References: Johnsgard 1975a, 1978; Elliot et al. 1992; Johnsgard and Carbonell, 1996; Kear 2005

## Helmeted Guineafowl - right (*Numida meleagris*)



The helmeted guineafowl is the best known of all the six species of this endemic African group of gallinaceous birds. They are believed to provide a kind of phyletic link between the New World Cracidae (guans, chachalacas and curassows) and the more typical quails, partridges and pheasants of the family Phasianidae. They are all medium-sized birds, roughly the size of a domestic fowl, with bare, sometimes brightly colored, heads and necks, and body plumages that tends to be black, with white spots or vermiculations. Like tinamous, they have short wings but legs and toes that are adapted for running and scratching. They have short, stout beaks, adapted for digging and seed-crushing, but they also eat fruit and some invertebrates, such as termites and other insects. Like tinamous, they are highly vocal, and are ground-nesters. Unlike tinamous, their eggshells are not brightly colored, but are notably thick and resistant to cracking. They inhabit all types of vegetation in Africa, from semi-deserts to tropical forests. Except during the breeding season, they are gregarious and while nesting they establish monogamous pair bonds.

This guineafowl is widespread across sub-Saharan Africa, and is very common in areas of mixed savannas and cultivation, and is the only guineafowl species that has been domesticated. Its "helmet" consists of a bony casque of variable height and shape in different races. The species has a varied range of calls, some of which are very loud and can be heard at considerable distances. Monogamous pairs form over an extended period and once paired, males strongly defend their mates against the attention of other males. From 6–12 eggs are laid in simple ground nests, and are incubated by the female or possibly both sexes for 24–27 days. Unlike the young of most birds, which peck their way out of the shell in a fairly consistent and orderly way, the shell is fragmented into small pieces as the hatchlings (called "keets") emerge. The chicks grow remarkably fast, and are able to flutter up to low branches when only about a week old.

References: Cramp and Simmons 1980; del Hoyo et al. 1994; Urban et al. 1996

## Crested Guineafowl - middle (*Guttera edouardi*)



The crested guineafowl is found in forests and woodlands from equatorial Africa south to Natal and Zambia. Apart from its bare blue and red skin on the head and neck, both sexes carry a distinctive crest of downy black feathers. The rest of the body is largely covered with black feathers that are heavily marked with pale blue spots. This spotting extends to the tail and flight feathers.

Like the helmeted guineafowl, crested guineafowl utter a variety of loud calls, both during the day and also at dusk, as the birds are settling into roosts. Simultaneous calling, and possibly also antiphonal calling, is typical, as in some tropical New World quails.

The birds are monogamous during the breeding season, with pairs separating from their flocks and remaining apart until the time that their young are well grown. The nest is a simple scrape in heavy cover, and 4–7 eggs constitute the normal clutch. The shells are very thick and relatively rounded; the function of such thick shells in guineafowl is problematic, but it has been suggested that this feature might make the eggs more fire-resistant. It is thought that incubation is performed by the female only, although both sexes participate in care of the young.

References: del Hoyo et al 1994; Urban et al. 1996

## Vulturine Guineafowl - left (*Acryllium vulturinum*)



This distinctive-appearing guineafowl has a limited distribution in eastern Africa, ranging from Somalia and Ethiopia south to Uganda, and usually is found in semi-arid scrub, but at times it enters riverine woodlands or even dense thickets. It is unique among the guineafowl in its general appearance. The bright blue head skin is replaced by a tuft of chestnut feathers on the nape, below which the lower neck and upper breast are covered very long, lance-like feathers that are black, with wide white shaft-stripes and cobalt blue edges. Most of the body is cloaked in black feathers having white vermiculations, but the lower breast and abdomen are also cobalt blue. The species is unusually long-tailed and long-legged, and the birds are more likely to run than to fly unless they are hard-pressed. Foraging is mostly done on the ground, where the birds consume a variety of plant and invertebrate materials. Roosting is done in tall trees, often near water.

The birds occur in flocks for much of the year, but apparently seasonal rains stimulate such groups to become fragmented, and pair-bonding to begin. Courtship behavior has been studied very little, but it is known that males perform a wing-spreading display. Courtship-feeding of the female is very conspicuous, with the male dropping food before the female while fanning his wings. The nest is a simple ground scrape, and 13–15 eggs are laid on successive days. Incubation periods extend from 23–28 days. By ten days of age the chicks have well-developed wing feathers and can probably fly short distances.

References: del Hoyo et al. 1994; Urban et al. 1996

## Mountain Quail (*Oreortyx picta*)



The mountain quail is widespread in western North America, from Vancouver Island to Baja California. Throughout the year, covey sizes of mountain quail are generally small, up to ten, or not much bigger than a single family plus a few adults that were unsuccessful in nesting. Mate selection begins in early spring, while the coveys are still intact. At that time unmated males select whistling posts, from which they utter repeated *plu-ark* calls, these notes simply proclaim the presence of an unmated male, and thus serve more to attract available females than to ward off other males. Mated pairs become antagonistic toward other quails, and soon spread out over the available nesting habitat.

The nests are usually well concealed, often under fallen pine branches, amid weeds or shrubs at the base of large trees, beside large, shaded rocks, or in masses of shrubby vegetation. Clutch sizes of initial nesting attempts average about 9–10 eggs, and incubation lasts 24–25 days. The male takes an active role in nest and brood defense. Should the female be killed, males apparently will take over incubation, and sometimes broods are seen being tended by only a single bird of either sex. Although re-nesting after a nest failure is typical, there is no evidence that two broods are normally raised in a single season. By late summer the well-grown broods, supplemented by lone birds or unsuccessful nesters, move gradually to lower elevations.

References: Leopold 1969; Johnsgard 1973; del Hoyo et al. 1994

## Scaled Quail (*Callipepla squamata*)



The scaled quail is a bird of the arid grasslands and deserts of the North American southwest, from Colorado to central Mexico. The fairly large winter coveys remain intact until the males begin to come into reproductive condition, at this time unmated males begin their *whock* calling from exposed sites or crowing perches, these calls seem to function like the *bob-white* calls of that species in attracting unmated females. In spite of a long potential nesting season, actual egg laying by paired females may be deferred until the start of the summer rainy season.

Nests are usually located under shrubs or in some other protected and shaded site, and a clutch of 12–14 eggs is typical for initial nesting attempts. Incubation requires from 22–23 days; and although males remain near the nest and help protect it, there has only been a single reported instance of a male being observed incubating. It is known that the male sometimes takes over the care of the newly hatched brood, allowing the female to begin a second clutch. There is a high rate of nest losses from various causes, and during unusually dry years the birds may not even attempt to nest. Repeated nesting attempts usually allow for the eventual hatching of a brood, of which roughly half are likely to survive to the start of the fall hunting season. As the chicks mature, broods gradually become organized into coveys of 20–50 or more birds.

References: Leopold 1969; Johnsgard 1973; del Hoyo et al. 1994

## Gambel's Quail (*Callipepla gambelii*)



The Gambel's quail is a desert-adapted species with a range centered in the Sonoran desert. Coveys normally consist of family units, with variable numbers of non-breeding adults. By late winter, the coveys begin to break up as pairs separate from them and aggression increases among the unmated males. Such birds establish crowing posts, from which they repeatedly utter their distinctive *kaa* calls. Pair formation is a subtle process, occurring over a prolonged period of contact. After a pair bond is formed the birds are strongly monogamous.

Females usually locate their shallow nest scrape in the shade of desert trees or shrubs. A clutch of about 12–14 eggs is laid on an egg-per-day basis. Incubation begins with the laying of the last egg, lasts 21–23 days, and is performed by the female alone, with the male usually sitting on a lookout perch some 40–80 feet away. If the nest is approached by an intruder, the male typically performs an injury-feigning distraction display. Although the male has not been reported to undertake incubation, he sometimes takes over the care of the newly hatched brood, allowing the female to begin a second clutch. Or, after a month or so of care by the pair, the chicks may be left with other older birds and a second clutch initiated. Like other grouse and quail chicks, they initially feed almost exclusively on insects but soon begin to eat succulent vegetation and eventually are almost totally vegetarians.

References: Leopold 1969; Johnsgard 1973; del Hoyo et al. 1994

## California Quail (*Callipepla californianus*)



This western quail ranges from southern British Columbia to the tip of the Baja Peninsula. The winter coveys of California quail are often relatively large, averaging about 30–40 individuals, but coveys of up to 500–600 birds have also been reported. Beginning in late winter, these coveys start to break up as males establish crowing perches. Pairs mated from the past year remain in the covey until they are ready to begin nesting.

Nests are built in a large variety of protected situations; and although they are normally at ground level, they have also been observed in vines and even on rooftops. The eggs are laid at the rate of about five per week, and a clutch averages 13–14 eggs. Incubation is performed by the female and takes 22–23 days. On the loss of a female her mate will often take over the incubation. Males without broods take great interest in young chicks and make excellent foster parents. It may be fairly common for the male member of a pair to take over the care of the first-hatched brood, enabling the female to begin a second. Parents and chicks are gradually joined by unsuccessful adults and later by unmated males, eventually re-forming the coveys. Because of persistent re-nesting and possible double-brooding, productivity in these birds is fairly high, although the mortality rate of chicks between hatching and the fall hunting season may approach 50 percent.

References: Leopold 1969; Johnsgard 1973; del Hoyo et al. 1994

## Northern Bobwhite (*Colinus virginianus*)



Northern bobwhites have the widest range of the American quails, extending from the Atlantic coast to the western Great Plains, and (as an introduced population) in the Pacific Northwest. They occur over most of Mexico and have been introduced in Europe, Hawaii, New Zealand and elsewhere. During the colder parts of the year the social unit is the covey, which usually numbers 10–15 birds. This is the most efficient number for forming their typical circular and heat-conserving roosting groups, with tails touching and heads facing outward. The male's *bob-white* call is characteristic of unpaired birds, and is rarely if ever uttered by mated birds, at least so long as their females are in view. Whistling males thus call attention to themselves, and may succeed in attracting unmated females or those that have lost their mates.

Both sexes participate in nest building, which is initiated by the digging of a scrape. This is then filled with leafy material, and finally grasses or other herbaceous plants are arched over the top, effectively concealing the nest from above. The first egg is deposited in a day or two, and thereafter eggs are laid nearly daily until the clutch of about 14 eggs is complete. Incubation, which is performed by the female, requires 23 days. Males regularly undertake incubation if their mate is killed, and it is possible that males may at times take on the complete responsibility for rearing the brood after a week or so, leaving the female to attempt a second clutch. In most areas, the breeding season is not long enough to allow for double-brooding, although as many as two or three re-nesting attempts will be made if the early ones should fail. As the summer progresses, well-grown broods are joined by adults that were unsuccessful in breeding, and early fall covey sizes thus average about 12–17 birds.

## Montezuma Quail (*Cyrtonyx montezumae*)



Sometimes appropriately called harlequin quail, the Montezuma quail is mainly found in Mexico, but extends north into Arizona, New Mexico and western Texas. During the non-breeding season, these attractive birds form small coveys that probably represent family units. These typically are of 7–8 birds, and rarely are more than 25. They typically feed in close groups, digging out the subsurface bulbs on which they depend heavily, at night they often form semicircular roosts around a rock or clump of grass. The nesting season in the US is relatively late, apparently coinciding with the summer rainy period.

The participation of the male in nest building and incubation is uncertain, but it is probable that he at least assists in nest-building. The nest is a domed structure of grass stems that appear to be woven together, and is roofed over to form a chamber some 4–5 inches high. It also has a side entrance that is usually well hidden by a mat of grass, which hangs down over the opening like a hinged door, falling back into place whenever the female enters or leaves. The average clutch is about 10–12 eggs. Males have been reported sitting on eggs, and have also been observed sitting beside incubating females. The incubation period is fairly long, lasting 25–26 days. During this time the male apparently assumes the major responsibility for defending the nest. When the young hatch they are fed insects, seeds, and bulbs by both parents, but they begin to forage extensively for themselves by the time they are two weeks old. There is evidently little mixing or merging of broods, and most fall coveys appear to be made up of family units.

References: Leopold 1969; Johnsgard 1973; del Hoyo et al. 1994

## Gray Partridge (*Perdix perdix*)



Widespread in the cooler grasslands of North America as a result of introductions, the gray partridge is native to Eurasia. Like the native American quails, the social unit is a moderately large covey of 10–20 birds, rarely more than 30. Each autumn a covey apparently consists of a pair with their surviving young, plus additional reproductively unsuccessful adults. The covey remains intact through winter, and pair formation begins considerably before its spring breakup. The "rusty gate" call, which sounds like *keee-uck*, is the unmated male's advertisement call and is heard especially during early morning and evening hours. Pair formation seems to be a gradual process, and potential pairs often change mates before settling into a permanent pair bond.

The female builds the nest while the male stands guard. The nest is usually located in herbaceous cover, often in alfalfa fields, and is a shallow scrape lined with dead herbaceous vegetation. The eggs are laid at a rate of slightly less than one per day, so that about 20 days are needed to complete a typical initial clutch of 15–17 eggs. Incubation lasts for 24–25 days, and is performed entirely by the female. Males remain close by, however, and at the time of hatching may sit beside the female on the nest. Both parents attend the generally large broods; chick mortality is often high, especially when there is cold weather or rain during the hatching period. Although double-brooding is not known to occur, persistent re-nesting usually results in a relatively large proportion of immature birds in the fall flocks. On the average, about eight chicks per hatched brood survive until fall, giving a normal covey size of 10–12 birds for that time of year.

References: Johnsgard 1973; Cramp and Simmons 1980; del Hoyo et al. 1994

## Himalayan Snowcock (*Tetraogallus himalayensis*)



The native range of this spectacular alpine-adapted partridge is the Himalayas of southern Asia, where it occurs from Afghanistan east to western China. It has been successfully introduced into Nevada, occurring locally in the Ruby and East Humboldt ranges of Elko County, and probably numbers in the hundreds of birds. In the Himalayas the birds range from 12,000–17,000 feet altitude during the summer months, occupying mountain meadows where grass is available. In Nevada they are usually found around glacial cirques and on alpine tundras, remaining above 10,000 feet, even during winter. Their large body size, with males weighing up to nearly seven pounds and females up to about five pounds, probably allows them to survive in the intense cold to which they are exposed.

They are gregarious birds, forming large groups of 10–20 individuals, and rarely may number up to 50. Males utter various loud whistling notes, which very probably serve territorial and advertisement functions. Nests have been found at the extreme crest of hills, or in sheltered locations on the leeward slope. The usual clutch is 4–6 eggs, but at times up to seven or more are present. Only the female incubates, while the male remains nearby as a lookout. The incubation period is about 25 days, and in Nevada the average brood size in one study was 5.7 chicks.

References: del Hoyo et al. 1994; Johnsgard 1998

## Red-legged Partridge (*Alectoris rufa*)



The red-legged partridge is a Eurasian species closely resembling the chukar partridge that has been introduced successfully into western North America. Like the chukar and other *Alectoris* species, this one prefers dry and usually hilly land, varying from sandy to rocky substrates and from level steppes to montane foothills. Areas with low or open vegetation, allowing unobstructed vision and running, and with sloping grades, seem to be particularly favored. It is usually found at fairly low elevations, rarely occurring as high as about 6,500 feet and frequently occurs almost to sea level. Coveys are the typical social unit of red-legged partridge for most of the year; assemblages of up to 70 are fairly common, and groups of up to 200–300 have been recorded during cold weather.

The usual mating system is one of long-term monogamy, but males sometimes acquire two mates, and females have also been known to associate with two males. The eggs are laid at the rate of about two per three days, and the usual clutch-size in England is 11–13 eggs. In Europe there have been numerous instances of double-brooding reported. In these cases the second clutch is laid only a few days after the first, and each member of the pair tends a clutch separately, with the male normally incubating the first. The female typically lays replacement clutches after losing the first nest. The incubation period requires 23–24 days, and the chicks are initially capable of short flights at about ten days. When double-brooding occurs, the young are cared for by a single parent, but otherwise are tended by both members of the pair.

References: Cramp and Simmons 1980; del Hoyo and 1994; Johnsgard 1998

## Himalayan Monal (*Lophophorus impejanus*)



The Himalayan monal ranges from Afghanistan to Bhutan and Assam. It is one of the most highly iridescent and spectacular birds in the world, the adult male having so many shades of structural hues and pigmented colors that it is sometime called “the bird of seven colors.” Males stand very tall, with the feathers of the neck, the mantle, and the abdomen strongly fluffed. The beak is held upright and the birds step slowly and elaborately, moving the head as to make the crest vibrate and shimmer. When males are directing the display toward females they also arch the neck, bringing the crest forward, then call while raising the head and quickly lowering it again, causing the crest to vibrate violently. The male then pulls his head in toward the shoulders, with the beak against the upper breast, compresses the neck feathers and lowers the nearer wing. Then, with the primaries scraping the ground, he circles the female, leaning toward her and raising the farther wing so that it is visible across his back. The male also faces the female and lowers his head while standing erect, half-opening the wings, fluffing the neck feathers, and holding his tail high and fanned. His wings are slowly opened and partially closed, and the tail is slowly flicked up and down. In this posture the head is oriented so that the crest directly points toward the female and shaken, causing the crest to vibrate and shimmer.

Nests are placed in wooded habitats. Clutch sizes are most commonly of 4–5 eggs, with three-egg clutches also fairly common. The incubation period usually lasts 28 days, and in captivity females will often lay a second replacement clutch if the first is removed or unsuccessful.

References: Beebe 1918–1922; Cramp and Simmons 1980; Johnsgard 1986, 1999; del Hoyo et al. 1994

## Reeve's Pheasant (*Syrmaticus reevesii*)



Although some authors have suggested that this Asian pheasant is monogamous, there is reason to consider it presumptively polygynous, given the considerable size dimorphism of the sexes, the substantial sexual plumage differences, and the apparent lack of interest of the male in tending for the young.

Advertisement of territory by males is attained by a combination of wing-whirring and calling. Little is known of reproduction in the wild, as almost no nests have been described from China. Among released birds in Ohio, 16 nests were found, nine of which were in second-growth sapling, and the rest in herbaceous growth. There, the clutch-size averaged 9.5 eggs and ranged from 6–13. Incubation lasts 24–25 days. By the time the young are half-grown they are able to fly at least 800 feet.

References: Beebe 1918–1922; Johnsgard 1986, 1999; del Hoyo et al. 1994

## Golden Pheasant (*Chrysolophus pictus*)



The golden and Lady Amherst's pheasants are very closely related; both are limited to China, and have slightly overlapping ranges. The postural displays of both species are very remarkable and very similar.

In captivity, clutches range from 5–12 eggs, and the eggs are laid at approximate 24-hour intervals. The male takes no interest in defending the nest or looking after the chicks. The incubation period requires 22–23 days. The female remains almost totally immobile during incubation, and after hatching has occurred she does little other than brood her chicks for the first few days. The young are apparently able to fly within 12–14 days after hatching, and are cared for by the female until they are about four months old.

References: Beebe 1918–1922; Cramp and Simmons 1980; Johnsgard 1986, 1999; del Hoyo et al. 1994

## **Lady Amherst's Pheasant** *(Chrysolophus amherstiae)*



No detailed behavioral comparisons of the Lady Amherst's pheasant with the golden pheasant have been made, but it would seem that the two species have very similar vocalizations. Likewise, the display repertoires of these two species are virtually the same, if not identical.

Little is known of the breeding season in China, but it is believed to begin about the beginning of April, and continue through May and into June. There are only two records of clutches taken from the wild, of four and seven eggs. Both nests were found in heavy forests where they had been laid under the protection of a bush. In captivity, clutch sizes of 6–12 eggs are usual and the eggs are probably laid on a daily basis. As with other pheasants, incubation begins with the laying of the last eggs, and lasts some 22–23 days. As with the golden pheasant, only the female tends the young, which grow at a relatively rapid rate. Males do not acquire their full adult plumage until they are two years old, but females often lay eggs in their first year.

References: Beebe 1918–1922; Cramp and Simmons 1980; Johnsgard 1986, 1999; del Hoyo et al. 1994

## Ring-necked Pheasant (*Phasianus colchicus*)



The ring-necked pheasant of eastern Asia is the most widespread and most successfully introduced of all pheasants. Its winter habitat, at least in the colder parts of its introduced North American range, is found in marshes, plum thickets, shelterbelts, and heavy brush in ravines and along railroad right of ways. The ideal spring habitat consists of a diversity of cover types that provide food, escape cover, and nesting sites.

Roadside ditches, particularly those that have an abundance of early-maturing grasses are valuable for nesting. Nests are a depression in the soil to which a lining of feathers and plant materials is added. Eggs are laid at the rate of one per day until the clutch of a dozen or more is complete. Compound clutches, or "dump nests" resulting from the efforts of more than one female, are not uncommon. Incubation begins with the laying of the last egg, and requires approximately 23 days. The female attends her brood throughout their juvenile period, usually for from 6–8 weeks. Brooding habitats must have an abundance of insects, edible green vegetation, and adequate escape and roosting cover. By fall the adults and young begin to gather in fields of ripening grain, from which they gradually move into heavier cover as winter begins.

References: Beebe 1918–1922; Cramp and Simmons 1980; Johnsgard 1986, 1999; del Hoyo et al. 1994

## Greater Sage-Grouse (*Centrocercus urophasianus*)



The greater sage-grouse is the largest of the North American grouse and is dependent on various species of sagebrush for food and cover throughout its range. The most famous aspects of the greater sage-grouse's social behavior are their "strutting" behavior and the formation of large display congregations. Like other North American grouse that display socially in "leks," (prairie-chickens and sharp-tailed grouse), these groups are highly structured, with dominant males ("master cocks") occupying central territories. The territories of the progressively less dominant males are organized in a series of roughly concentric patterns around that central territory. The strutting display is marked by a complex sequence of stepping, wing movements, and inflations of the esophagus that expand two olive-colored skin patches ("air sacs") on the breast. Females are attracted to the lek and invariably move toward the territory of the most dominant male. Apart from this brief contact, males have little contact with females until they merge into fall flocks.

About ten days are needed to lay the clutch of about eight eggs, and another 25–27 days are required for incubation. After hatching, females gradually move their broods to places where food is plentiful, usually in relatively moist areas such as hay meadows, river bottoms, or irrigated areas. After 10–12 weeks the young are fairly independent of their mother.

References: Johnsgard 1973, 1983, 2002; del Hoyo et al. 1994

## Dusky Grouse (*Dendragapus obscurus*)



The dusky grouse of the Rocky Mountains and the somewhat darker sooty grouse of the Pacific Northwest are very close relatives that are both associated with coniferous forests, and were long regarded as a single species. In early spring males begin to establish hooting territories where there is a combination of fairly heavy cover for escape and relatively open vegetation for display sites. Most hooting occurs in early morning and again in the evening, and serves to attract females that are ready to begin nesting.

Evidently nearly all females, including yearlings, attempt nesting. Nests are built in varied locations, but often are under old logs or among the roots of fallen trees in fairly open timber. Eggs are laid at the rate of two every three days, and 6–8 eggs constitute the normal clutch. The incubation period is 26 days. After hatching, the chicks rapidly become independent. Initially the broods use cover that is largely grasses and non-woody weeds; but as these more open habitats dry up, the birds move into deciduous thickets for the remainder of the brooding period. Gradually the broods break up and the young birds disperse singly or in small groups, slowly working their way upward toward the wintering ranges.

References: Johnsgard 1973, 1983; del Hoyo et al. 1994

## Rock Ptarmigan (*Lagopus mutus*)



The rock ptarmigan is part of a group of arctic and alpine grouse that are widely distributed in the Northern Hemisphere, with the rock ptarmigan having the broadest high-arctic distribution of all. The breakup of winter flocks and the establishment of territories by males probably coincide with the emergence of breeding sites from snow cover.

Rock ptarmigan females build simple, shallow nests, the depressions often being little more than might be caused by the weight and movements of the brooding hen. The eggs are laid at an approximately daily rate. Records indicate an average clutch of about seven eggs, with considerable variability. The incubation period is 21 days, and after hatching the female is highly attentive of her young. Females with broods tend to congregate on higher, moist and gently sloping areas where a variety of grasses, shrubs, and herbaceous broad-leaved plants occur. As the broods mature they tend to merge, and these flocks in turn attract groups of other males and females. Thus flocks of several hundred may build up during the fall before the birds begin their movement to winter cover.

References: Johnsgard 1973, 1983; Cramp and Simmons, 1980; del Hoyo et al. 1994

## Capercaillie (*Tetrao urogallus*)



The capercaillie of the northern Eurasian coniferous forests is the largest of all grouse, with males weighing up to about 14 pounds (6.5 kg). Male capercaillies gather at traditional locations for territorial establishment and display. The “alpha” male maintains the largest territory, having a maximum area of about 30 acres (12 hectares) in spring and 25 acres (10.5 hectares) during fall.

Females do not normally roost in the display area but instead they fly in some time after display activity is underway, which may start shortly after midnight. From their perches the females gradually make their way to the territory of the dominant male. Nest sites are usually not far from such display grounds and at times may be somewhat clustered. The nests are shallow scrapes, in thick cover, often at the base of a tree. From 5–12 eggs are laid, with larger clutches of up to 16 almost certainly representing multiple clutches. The incubation period is 24–26 days, and the young can fly when 2–3 weeks old.

References: Cramp and Simmons 1980; Johnsgard 1983; del Hoyo et al. 1994

## Black Grouse (*Tetrao tetrix*)



The black grouse of northern Eurasia is the classic lek-forming species of grouse. Soon after arriving on his territory, the male black grouse assumes his display posture. Females may initially pay little obvious attention to the displaying males. Like other lekking grouse, females nest without any male assistance, laying a clutch of 5–12 eggs, and incubating them for 24–26 days. The young can fly at 2–3 weeks of age.

References: Cramp and Simmons 1980; Johnsgard 1983; del Hoyo et al.1994



*Hazel Grouse*

## Ruffed Grouse (*Bonasa umbellus*)



The ruffed grouse is a North American forest-dwelling species that ranges from the Atlantic coast west to California and northern Alaska. With the onset of spring, male ruffed grouse seek out suitable territories, which are usually marked by the occurrence of well-grown aspens and one or more drumming stages, most frequently a log. Although a territorial male may use more than one drumming log, he typically favors one, and on this he performs his characteristic wing-beating display each morning and evening.

A female will seek a nest site that is usually close to a clump of aspens, the catkins of which she relies upon for food during incubation. Tree bases are a favorite location for nests, and logs, bushes, or brush piles are also frequently used. The clutch normally numbers about 10–12 eggs, laid at the rate of two eggs every three days. The incubation period is 24–25 days; and in contrast to most grouse, this species frequently attempts re-nesting if the first clutch should fail. The chicks are able to fly at the age of 10–12 days. When the young are about 12 weeks of age the families begin to break up and a general fall dispersal of the juvenile birds begins.

References: Cramp and Simmons 1980; Johnsgard 1973, 1983; del Hoyo et al. 1994

## Hazel Grouse (*Bonasa bonasia*)



Male hazel grouse are Eurasian relatives of the North American ruffed grouse. Unlike male ruffed grouse, displaying male hazel grouse “sing” from a prominence, such as a tree branch or stump. There are individual and regional differences in the song, and neighboring males can perhaps recognize one another in this way.

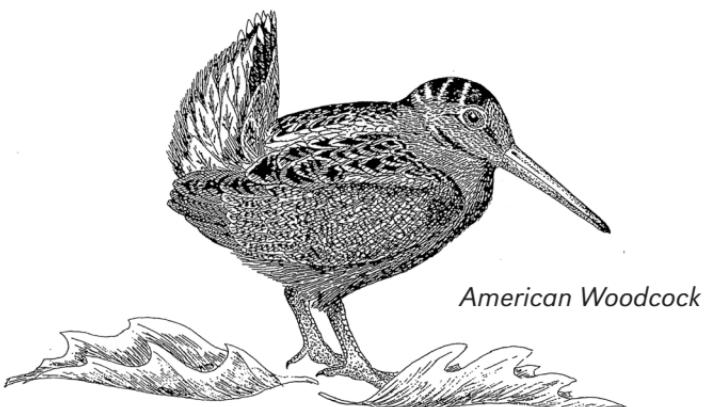
Since the birds are monogamous and probably remain together for much of the year, courtship is fairly simple. Pairs are evidently formed during fall, but during winter the females often wander, and there is no evidence that the same pair bonds are reestablished in the spring. Nest sites are generally very close to or beneath cover provided by tree trunks, shrubs, or young spruce, or the roots of fallen trees. Clutch sizes vary from 3–14 eggs, but often number about ten. An entire ten-egg clutch may be laid in 13–14 days. Incubation probably begins with the last or penultimate egg, averaging about 25 days. During this period the male commonly leaves the territory but rarely may return later to accompany the female and the brood.

References: Cramp and Simmons 1980; Johnsgard 1983; del Hoyo et al. 1994

## Greater Prairie-Chicken (*Tympanuchus cupido*)



Greater and lesser prairie-chickens are now considered separate species, the greater occupying taller native prairies and tolerating the colder temperatures of the northern Great Plains, and the now increasingly rare lesser species found in shortgrass prairies and semi-desert grasslands from Texas and New Mexico to Kansas. Both species are found in mixed-sex flocks during the fall and winter, but by spring the males return to their traditional display grounds, where they reestablish old territories or, in the case of young birds, try to acquire new ones. Like sage-grouse and sharp-tailed grouse, experienced, older male prairie-chickens tend to hold central territories, while the younger males establish peripheral ones. Territorial advertisement consists of the well-known "booming" display, which is called "gobbling" in the lesser prairie chicken. The male, erects the feathered pinnae above his head, drops his wings, stamps his feet, and calls, while inflating his bare yellow (in the greater) to reddish (in the lesser) skin areas on the sides of his neck. Besides the rather soft



## Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*)



call, which is low pitched and dove-like in the greater, and more high-pitched and melodic in the lesser, tail-clicking sounds are produced and the foot stamping is often audible. Males often perform short vertical flights, called "flutter-jumps," usually while uttering cackling calls.

Females build their nests at varying distances from the display grounds at which they were fertilized, and may actually nest nearer to some other display ground. In both species the eggs are laid at an approximately daily rate, and the normal clutch size of initial nesting attempts is from about 12–14 eggs. The incubation period is from 23–26 days. The broods usually remain with their mothers for 6–8 weeks, after which the families gradually disintegrate.

References: Johnsgard 1973, 1983, 2002; del Hoyo et al. 1994



Montezuma Quail

## Sharp-tailed Grouse (*Tympanuchus phasianellus*)



Like prairie-chickens, sharp-tailed grouse are lek-forming North American grassland birds. The general social organization of sharp-tailed grouse and prairie-chickens is nearly identical, the only major difference being the nature of the male displays performed on the "dancing ground." Instead of foot-stamping in place like prairie-chickens, the male moves forward in a circular pattern with his wings rigidly outstretched, his tail cocked and shaken vigorously in rhythm with his stepping movements. The noise produced is primarily mechanical, as a result of the tail feathers being scraped over one another, and the feet alternately striking the ground. Males have several calls as well, and perform a vocal "cooing" display that is comparable to the "booming" and "gobbling" of the prairie-chickens, and involves neck inflation and brief exposure of purplish skin patches.

The eggs are laid on an approximately daily basis until the clutch of around 11–12 is complete. Incubation thereafter requires 23–24 days. After the brood has hatched, the nest site is deserted rapidly and the brood is led to areas where insects and succulent green foods are available. By the time they are ten days old the chicks are flying very short distances, and after 6–8 weeks they are essentially independent of their mother.

References: Johnsgard 1973, 1983, 2002; del Hoyo et al. 1994

## Wild Turkey (*Meleagris gallopavo*)



*Wild Turkey description on next page.*

*Wild Turkey shown on previous page.*

## **Wild Turkey (*Meleagris gallopavo*)**

The several races of wild turkeys native to the United States occupy habitats that range from the wooded swamps of the eastern and southeastern states to the sparsely wooded flatlands and river bottoms of the southern Great Plains and the coniferous forests of the western mountains. In the eastern states, acorns and other nuts are major foods, but turkeys will also eat buds in the manner of grouse. In the Southwest, grasses and seeds are a more important part of the diet than is mast. During the summer, insects, and especially grasshoppers, are regularly eaten by young turkeys and to some extent also by adults. Open hardwood forests containing mature nut-bearing trees such as oaks are preferred by the eastern race (*sylvestris*). The Merriam race (*merriami*) of the western states is most often associated with ponderosa or subalpine pines, arid-adapted oaks, junipers, running water, and a rugged topography. The Rio Grande race (*intermedia*) of the Southwest is typically found in more arid and grass-dominated habitats. The Osceola race (*osceola*) is limited to the swamplands of southern Florida. The Gould's turkey (*mexicana*) is native to Arizona, New Mexico and northern Mexico.

The elaborate and familiar strutting displays of the domestic turkey provide a good idea of the social behavior patterns of wild turkeys, which are polygamous. In late winter the flocks of adult males begin to break up, and the "gobbling" season begins. Gobbling males tend to avoid one another, and by their calls and strutting postures attract adult females. Several rival males may occupy display areas or "strutting grounds," but these birds are usually separated by several hundred yards. A harem of about 5–6 females, rarely as many as 14, is gradually formed.

Females select nesting sites that are located near the strutting ground as well as close to a source of water. The nest is normally well concealed by low vegetation and also situated so as to have at least one ready escape route. Eggs are laid at the average rate of two every three days, and a clutch of 10–13 is typical. Incubation requires about 28 days, and is entirely done by the female, who also undertakes the care of the young. Within a week the chicks are able to make short flights and soon begin to roost in trees. Sometimes two or more hens with broods will join company, and these groups are likely to remain intact until the next breeding season.

References: Johnsgard 1975a; del Hoyo et al. 1994

## Ocellated Turkey (*Meleagris ocellata*)



The ocellated turkey has a limited range in the Yucatan Peninsula of Mexico and northern parts of Belize and Guatemala where it occurs in tropical scrub forests, overgrown cultivated areas, clearings, and brushlands. It is generally found in small groups, and is wary and rarely seen except where it is fully protected. Adult males differ markedly from the North American wild turkey; the head and neck are bright blue, with orange warts, a conspicuous red ring around the eye, and a forehead wattle that can be engorged during display, but otherwise hangs down over the beak. There is a protuberance on the crown that can be enlarged during display. Much of the body plumage resembles the North American species, but the longer upper tail coverts and tail feathers are tipped with large iridescent bluish eyespots (ocelli), and are tipped with gold.

Foraging is done mostly on the ground, but roosting takes place high in trees. The reproductive behavior of this species is probably much like that of the North American turkey, but its vocalizations are quite distinctive. Males call in a series of six or seven bongo-like notes that speed up in volume and cadence until they reach a crescendo. The female makes a well-concealed nest on the ground, and lays a clutch of 8–15 eggs. Incubation requires about 28 days, and the family leaves the nest within 24 hours after hatching.

References: Leopold 1969; del Hoyo et al. 1994

## American Woodcock (*Scolopax minor*)



It seems that woodcocks are polygamous if not promiscuous and males apparently do not assist with brood rearing. After their spring arrival on the breeding grounds, males establish territorial singing grounds, from which they exclude other males and at which they perform dawn and dusk song flights.

The relatively rudimentary nest of the woodcock is built entirely by the female, often in sparse cover at the base of a shrub or small tree, or near the edge of a shrub thicket. The clutch normally contains four eggs. They are laid at a daily rate, and the incubation period of 20–21 days begins after the last egg is laid. During incubation the female is a notoriously "tight" sitter, relying on her effective camouflage to avoid detection. She feigns injury when forced from a hatching nest; and shortly after the chicks hatch, they will "freeze" rather than run when threatened. The young make their first flights when they are about two weeks old, and can fly well by three weeks. Broods probably break up some 6–8 weeks after hatching, and apparently the birds gradually migrate southward at low altitude in loosely scattered flocks. Evidently most woodcocks migrate to traditional wintering areas each year and return to their natal locations for breeding.

References: Johnsgard 1975a, 1981; del Hoyo et al. 1996

## Wilson's Snipe (*Gallinago wilsoni*)



The Wilson's snipe is the North American representative of a snipe type that also occurs widely in Eurasia, and which in Britain is called the common snipe. The Wilson's snipe's wintering habitat includes a variety of marsh types—delta and prairie marshes, rice fields, and cattail thickets—all characterized by wet organic soils. Marshes are also used during migration, but breeding usually occurs in bogs or low tundra vegetation. At times flocks are seen migrating at a fairly high altitude and they probably migrate mainly at night.

The most common male territorial display is "bleating," or "winnowing," an aerial performance in which the male (and later also the female) rises into the air, and then performs a series of swooping dives. In these dives the wings are partially closed and the tail feathers are fully spread. The resulting interruption of airflow from the wings past the vibrating outer feathers produces an eerie tremolo sound. This snipe is monogamous, and the male remains with his offspring through the brood-rearing period. The nest is usually built in wet, marshy ground, especially where low grass clumps or brush rises above the surface of the bog, and is simply a depression in a clump or tussock, lined with grasses or dead leaves. The clutch size is nearly always four eggs. Incubation, performed entirely by the female, normally takes 18–19 days. Typically the male adopts the first two chicks that hatch, while the female cares for the latter two, and the parents raise their chicks separately. The chicks are fed by the parents, who probe in the mud and allow them to eat as the bill is withdrawn. Chicks make their first short flights at the age of about 15–18 days. By the time they are about six weeks old they begin to form groups ("wisps") with others of their own age and sometimes such flocks may number in the hundreds. These young birds apparently migrate south together in advance of the adults.

## Purple Swamp Hen - right (*Porphyrio porphyrio*)



The purple swamp hen of Australia is generally considered to be the same species as the more widespread purple gallinule of Africa, Madagascar, southern Asia, and the East Indies. Gallinules are relatively shy and are usually found in rather inaccessible habitats. Vocalizations are an important part of their social communications, and both sexes have an astonishing variety of notes.

Breeding groups or 3–4 adults or subadults are formed. Polygynous mating and egg-laying by up to five or six birds in the same nest or closely adjacent nests have been observed. A well-developed and carefully constructed runway is built from the water to the nest and is invariably used by the adults. The clutch size is usually about 6–8 eggs, probably laid on consecutive days. Incubation is shared by both sexes, in several-hour shifts, and the changeover may be marked by the presentation of a reed or leaf to the incubating bird, which adds it to the nest before leaving. Incubation lasts about 22 days. Depending on when incubation began, the young may hatch all at the same time or at intervals over a period of up to a week. They are fed by the parents, mainly insects and other small animals. After a few days the chicks leave the nest and closely follow the parents, who continue to feed them for several weeks. By about five weeks of age the young can largely feed independently, and they can fly in about 6–7 weeks.

References: Johnsgard 1975a; Cramp and Simmons 1980; del Hoyo et al. 1996; Higgins and Davies 1996

## Spot-winged Pigeon (*Columba maculosa*)



The spot-winged pigeon is native to South America, ranging from southern Peru south through Bolivia, Uruguay and Paraguay to northern Argentina. It is found in arid, semi-arid and cultivated areas where trees are available for nesting and roosting. Its back, upper wing-coverts and secondaries are patterned with triangular creamy white markings, producing an overall spotted effect. The tail is bluish gray, with an ill-defined black terminal band.

These pigeons are ground foragers, primarily eating seeds, and generally resemble rock pigeons in their foraging behavior. The spot-winged pigeon's voice is somewhat similar to that of the rock pigeon, but is harsher and more guttural. The species' biology and behavior in the wild is still largely unknown. No doubt the species is monogamous, like other pigeons, and the birds are said to nest in trees and have clutches of one or two eggs. Probably, as in most pigeons, the male incubates by day and the female at night. In the rock pigeon the incubation period lasts 17–18 days, and in the band-tailed pigeon it is 18–20 days. All pigeons and doves produce a nutrient-rich crop secretion called pigeon milk, which is regurgitated and fed to the nestlings. In the band-tailed pigeon fledging occurs at 20–28 days, and in the rock pigeon the young are independent by 35 days of age. Multiple brooding is likely, since most pigeons are multi-brooded, producing several broods per year, and at least in Argentina this species is believed to nest year-around.

References: Goodwin 1967; del Hoyo et al. 1996

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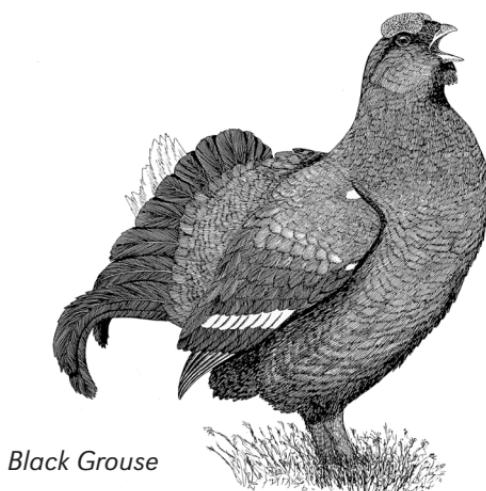
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