

A paradigm for the new era of birding

The Birder's Handbook: A Field Guide to the Natural History of North American Birds

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IN THE SPRING OF 1934, ROGER TORY Peterson revolutionized birdwatching in North America by publishing *A Field Guide to the Birds*. Since then, more than ten million people (some estimates run as high as sixty million) are now looking at birds in the United States and Canada. It has become one of the most popular of the outdoor recreations.

The demand for more information, or easily accessible information about birds, has grown apace with the activity of birding. Today, birders are not just satisfied with identifying and listing; they really want to know what birds are doing, and why and how they are doing it. Even those in the birding community who can afford excursions to the Dry Tortugas, lower Rio Grande Valley, or Aleutian Islands, eventually find that seeing new avian species in North America slows down to happy, rare occasions. They readily further their enjoyment by getting to know their local birdlife and helping to conserve it. Today's available field guides aid identifi-

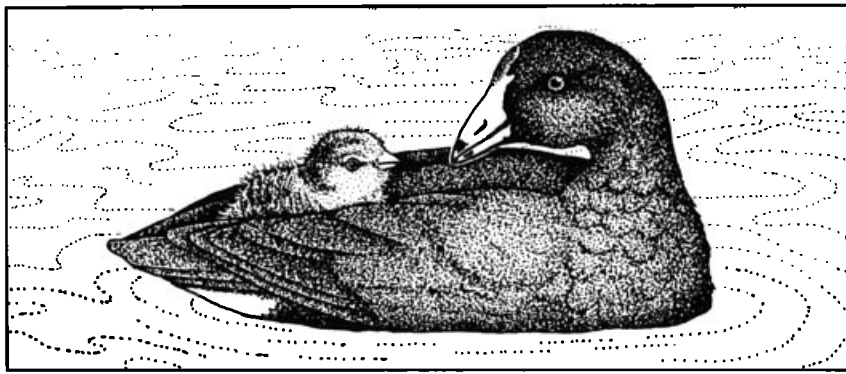
cation and often provide information on North American bird ranges seasonally. Birders with a real zeal for more knowledge are obligated to invest in a small library, and still may be sometimes unable to locate many kinds of data, or will soon discover that what they read might be out-of-date or even inaccurate.

The Birder's Handbook by Paul Ehrlich, David Dobkin, and Darryl Wheye will change all of that, and will very likely occupy a unique place in the libraries, backpacks, and coat pockets of virtually all birders—amateur and professional—who buy it. A remarkable book! It is designed as a portable companion to the field identification guides that most of us carry when birding—a field guide providing an incredible wealth of information on birds that is *not* in the identification guides. But this is not merely “Bent-in-a-backpack” (which in itself might have been a worthy accomplishment). What we have here is a modern, thoroughly detailed, yet critical assessment of the biology of

the nearly 650 species of birds that regularly breed in North America north of Mexico. And it is more.

The Birder's Handbook at first appears unorthodox, but its basic design is based on that of many identification field guides. The left-hand pages contain “treatments” of the natural history of all bird species known to breed regularly north of Mexico. However, on the right-hand pages, instead of illustrations of the birds described on the left, there are more than 200 essays that deal with subjects related to the species on the opposite pages. Thus, once you have identified a bird in the field, you can turn to the treatment and learn the essence of its biology. If time then permits, or perhaps later when you stop for a break, you can go to the opposite page and read an essay that expands some aspect of bird biology, often something directly pertinent to the species you have just seen.

What information do the treatments supply? They are divided into two parts.



find it is highly unlikely that the nest belongs to the warbler, since Black-throated Blues usually build their nests within three feet of the ground.

Beneath the summary line is a paragraph that provides more detailed information. The paragraph for every species is again organized in the same sequence, each category set off by bold-faced headings. **Breeding** gives information on the breeding habitat and the number of broods raised each season. **Displays** provides what is sometimes a necessarily highly condensed but useful description of major sexual/territorial displays. The **Nest** is then described detailing materials used, site selection, the amount of time required to build it, and whether it is reused. Next, a description of shell pattern and size is supplied under **Eggs**. **Diet** expands on what various species eat, often detailing what is fed to the young, and whether additional types of food are used in the nonbreeding season.

Conservation is one of the most interesting segments of the treatment paragraph. There one finds the conservation status of the species, referring to its status on Blue Lists, threats to populations, range expansions and contractions, relative frequency of cowbird parasitism, etc. **Conservation** also includes a vital piece of information absent from identification guides—the species wintering distribution south of the United States-Mexican border. This is in line with the conservation emphasis of *The Birder's Handbook*, and is intended to impress on birders that conservation of the avifauna north of the border is not just a matter of action that is taken in the United States and Canada. It also must involve preserving the tropical habitats where many of "our" birds actually spend more of their lives than they do north of the Mexican border.

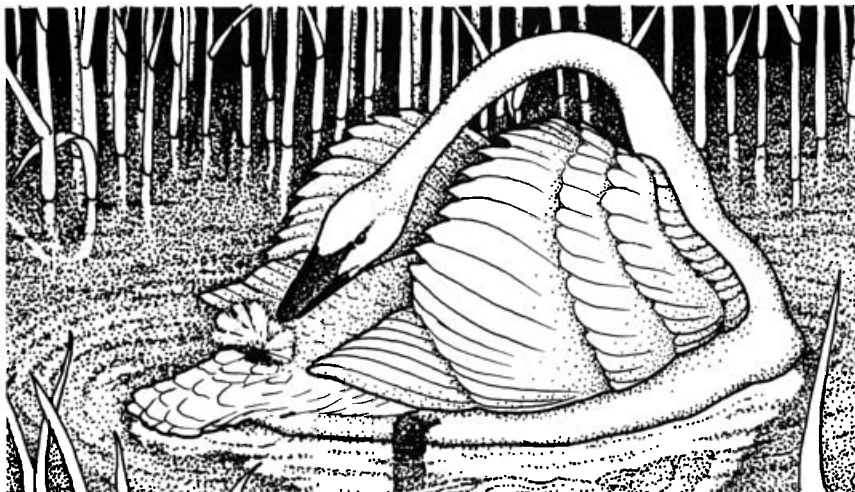
After the conservation segment of the paragraph there is a section of **Notes** which adds information on a great variety of topics: details of breeding, brooding, and feeding behavior, coloniality, diving depths of seabirds, flight characteristics, thermoregulation, geographic variation in songs, siblicide, bathing, migration patterns, distraction displays, competition with other species, flocking, roosting, and winter territoriality. Where the species hybridizes with another, or whether it has recently had its common name changed, or goes by

The first, designed to be digested at a glance (once one is familiar with the format), provides a combination of symbols, numbers, and key words giving the location of the bird's nest (including its normal height above the ground and the full range of known heights), the primary and secondary types of nests and who builds the nest (male, female, both). Next it shows whether the eggs are marked or unmarked, the usual clutch size and clutch-size range, the basic mating system of the species, who incubates, duration of incubation, whether the young are altricial or precocial (including several subdivisions of these categories), length of time until fledging, and who tends the young. This is followed by the major food items consumed during the breeding season and secondary items also listed, along with the major foraging strategies used to get that food.

You will notice in the accompanying preliminary pages that (from left to right at the top of each species treatment) the nest location (e.g., floating on water, shrub, cliff, ground), nest type (plat-

form, scrape, cup), plain or marked eggs, major food item (aquatic invertebrates, fish, insects), and major foraging method (dives from water's surface, gleans from ground, probes into substrate) are all represented by pictographic symbols. The remainder of the information is supplied in words and numbers including, for example, fish as the secondary food item for the Horned and Eared grebes, and trees as secondary nest sites for the Anhinga and Great Cormorant. Keys to all the symbols (9 each for nest locations and nest types, 13 diet items, and 18 foraging techniques) are provided for easy reference in the endpapers, as well as a key to abbreviations used to save space, and the layout of the summary line.

The information is formatted identically for each species, so once one has spent a few minutes becoming familiar with the book, much can be gleaned about a bird at a glance. Suppose, for example, a nest is seen about 40 feet up in a tree and a Black-throated Blue Warbler is singing nearby. By checking the summary line for that species you

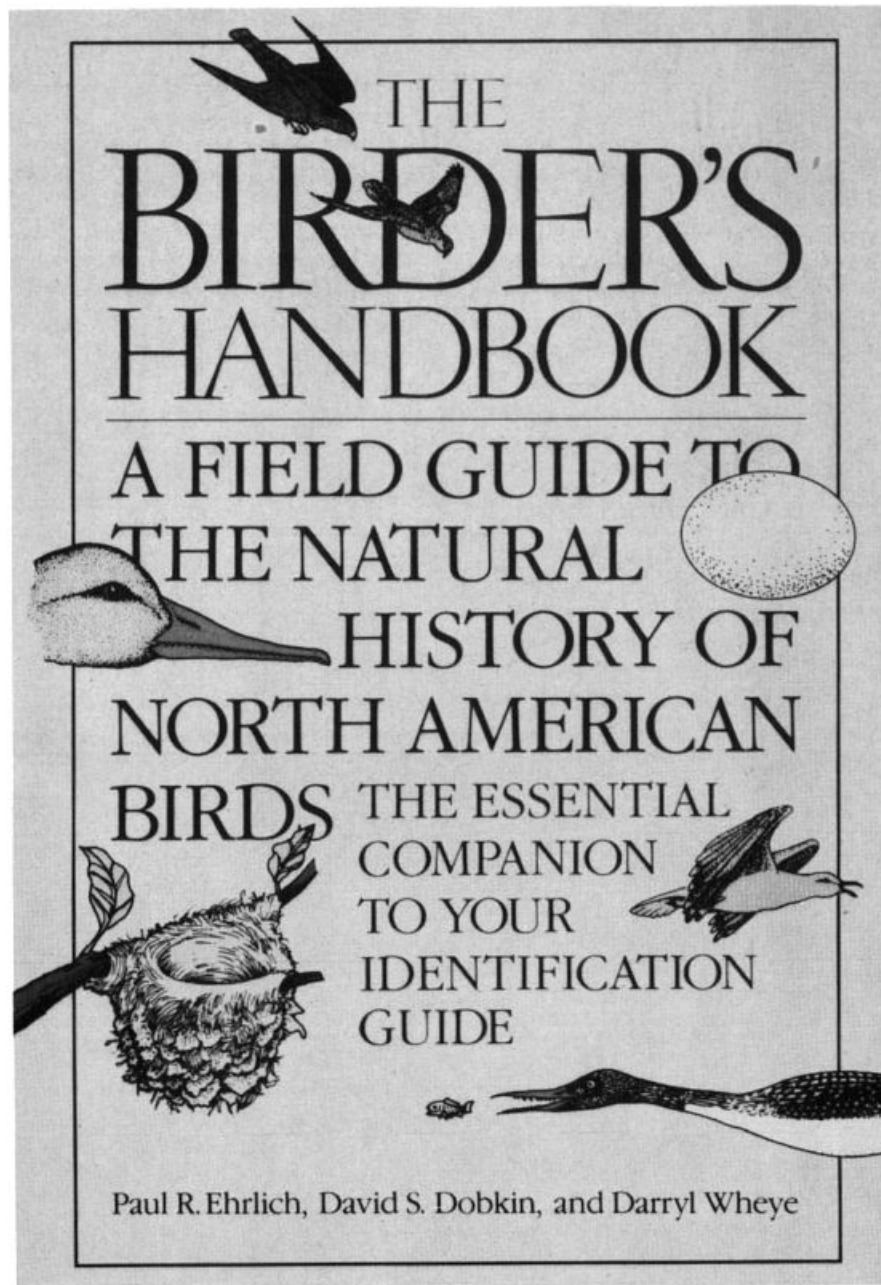


a different name in Europe, are also noted.

Next in each paragraph are citations to a few of the more than 200 Essays that occur on the right-hand pages. This is basically a "suggested reading" list—when you've learned what you can about a bird from the paragraph, it leads you to essays which directly pertain to the biology of that bird and to more general essays. By reading an essay or two after identifying each bird, *The Birder's Handbook* will gradually and painlessly expand your knowledge of bird biology. Most essays are fewer than two pages long, many less than one page.

Finally, each treatment ends with references to the roughly 1600 item bibliography of *The Birder's Handbook*, which for many will justify the cost of the book. The references are designed to provide access to literature on each species, and are extremely up-to-date: more than 90% appear to be from 1975 through 1987. The literature covered is not parochial. For example, for species that are relatively poorly known in North America but well known in Europe, the superb volumes of *The Handbook of the Birds of Europe, the Middle East, and North Africa* are often cited.

Four other features of the treatments deserve notice. First, the scientific name is complete with author's name, (a nice tidbit of information not provided in standard identification guides). Second, when a species is a member of a super-species, a reference is given to a super-species number in a list in the essay entitled "Superspecies." Therefore one can easily determine the other North American members of the superspecies, the status of the superspecies (coded into the list), and also find out what a superspecies is by reading the essay. Third, each species treatment is cross-referenced to its picture in the seven most frequently used field identification guides (Audubon Master Guide, Audubon East and West, Peterson East and West, National Geographic, and Golden). Finally, and most importantly, uncertainty is dealt with frankly and explicitly throughout; based on their thorough searching of the technical literature, and having the treatments reviewed by specialists of most groups, the authors have attempted to minimize errors and correct perpetuated errors that sometimes assume a life of their own through the literature. Where they could find no information, a ? is used alone.



Where data presented are anecdotal, doubtful or extrapolated from closely related species, they are followed by a ? This allows one to see at a glance what is *not* known about North American birds; *The Birder's Handbook* serves as a guide to where research is still needed on the natural history of our avifauna.

The 200+ essays, which compose one-half of the book, present the modern view of the biology of birds and have been divided into segments that are digestible and easily understood. I can only sample their diversity here. Most expand on topics only touched upon in the treatments, such as nest building, vocalizations, egg color, mating systems,

clutch sizes, incubation, diet, nutrition, and foraging patterns. Thus, to cover the topic of *Mating Systems* for instance, the authors include separate essays on "Monogamy," "Polygyny," "Polyandry," "Cooperative Breeding," "Leks," and "Promiscuity."

Other essays cover topics not routinely mentioned in the treatments. They are straightforward descriptions of what birds do and how they do it. Ten essays deal with various aspects of flight—simple aerodynamics, "Soaring," "Why Birds Fly Low Over Water," the speed and altitude of flight, etc., and several deal with various aspects of the structures so essential for flight, feathers

Horned Grebe

Podiceps auritus Linnaeus

NG-22; G-20; PE-34; PW-pl 1; AE-pl 184; AW-pl 181; AM (1)-42



MF
I: 22-25 DAYS
PRECOICIAL 4
F: 45-60 DAYS
MF

4-7
(3-7)
MONOG

BREEDING: Marshes, ponds, and lakes, occ along sluggish streams. Pothole marshes in aspen habitat of s w Manitoba supports highest densities. Usu 1 brood. **DISPLAYS:** Elaborate courtship of varied postures incl "rushing" (both birds rise out of water while side-by-side), weed ceremony, and much head shaking. **NEST:** Floating platform in shallow water, oft anchored in emergent veg; of underwater plants, rotting veg, rubbish, mud. Building continues during laying and incubation. **EGGS:** Bluish-white, chalky, usu nest-stained. 1.7" (44 mm). **DIET:** Aquatic insects, also crustaceans, mollusks. Stomach usu contains feather ball. In winter mostly fish, crustaceans. **CONSERVATION:** Winters within N.A. Blue List 1986; apparently declining. **NOTES:** Usu solitary, but occ may fish in flocks. Feathers occ half of stomach contents. May dive up to 3 minutes and travel 500' underwater. Young hatch asynchronously; eat adults' feathers. **ESSAYS:** Eating Feathers, p. xx; Commensal Feeding, p. xx; Visual Displays, p. xx; Transporting Young, p. xx; Plume Trade, p. xx; Blue List, p. xx; Swimming, p. xx; Eye Color, p. xx; Precocial and Altricial Young, p. xx. **REFS:** Ferguson and Sealy, 1983; Storer, 1969; Sugden, 1977.

Eared Grebe

Podiceps nigricollis Brehm

NG-22; G-20; PE-34; PW-pl 1; AE-pl 183; AW-pl 180; AM (1)-44



MF
I: 20-22 DAYS
PRECOICIAL 4
F: 21 DAYS
MF

3-5
(1-6)
MONOG

BREEDING: Marshes, ponds, lakes. Usu 1 brood, occ 2. **DISPLAYS:** Courtship and pair-bond maintenance: "penguin dance" with partners facing; stereotyped preening; "cat" attitude (elbows and crest raised) by one bird when partner approaches submerged. **NEST:** Floating platform in shallow water; of fresh and decayed veg, anchored in emergent veg. Builds more than 1 nest. **EGGS:** Bluish-white, chalky, nest-stained buff or brown. 1.7" (43 mm). **DIET:** Mostly aquatic insects and larvae, also fish, crustaceans, mollusks, amphibians, feathers. **CONSERVATION:** Winters s to Guatemala. Milliners used feathers for hats, capes, and muffs. Eggs once taken for food. **NOTES:** Dense colonies in shallow water. Young hatch asynchronously; dive and hide, remaining submerged with bill exposed. Chicks ride and are fed on adults' backs. Young of several broods join to form creches. Mono Lake, CA and Great Salt Lake, UT serve as staging areas for fall migration; brine shrimp then comprise >90% of diet. Known in Europe as Black-necked Grebe. **ESSAYS:** Eating Feathers, p. xx; Visual Displays, p. xx; Transporting Young, p. xx; Plume Trade, p. xx; Creches, Swimming, p. xx; Eye Color, p. xx; Precocial and Altricial Young, p. xx. **REFS:** Cramp and Simmons, 1977; Godfrey, 1986; Winkler and Cooper, 1986.

The Blue List

In 1971, the National Audubon Society's ornithological field journal, *American Birds*, began publishing a list, the Blue List, to provide early warning of those North American species undergoing population or range reductions. The Blue List was designed to identify patterns of impending or ongoing serious losses in regional bird populations, not to duplicate the function of the U.S. Fish and Wildlife Service's Threatened and Endangered Species List. Many species on the Blue List remain locally common, but appear to be undergoing noncyclic declines. In contrast, by the time a species is officially listed as Endangered, it often is on its last legs.

Throughout the decade following its inception, *American Birds* solicited reports and recommendations from its readership to incorporate into an annual update of the list. Regional editors forwarded these reports and recommendations to the publication, where nominations to and deletions from the list were compiled. In 1981, *American Birds* published a summarizing "decade list." It included the 69 birds nominated for listing that year as well as all of the species that had previously appeared on the Blue List. Updates of the Blue List continue, and at this writing (1987), 22 species were officially Blue-Listed and another 52 merited "Special" or "Local" Concern. Blue List status is noted under the "CONSERVATION" section of the respective species treatments.

The effectiveness of the Blue List depends on the accuracy of the data supplied by regional compilers and the responsiveness of government agencies accountable for species conservation. Submission of data to the editors of the Blue List is a way for field observers to influence policies of state and federal agencies concerned with avian research and species protection. More information is available from: American Birds Blue List, c/o *American Birds*, National Audubon Society, 950 Third Avenue, New York, NY 10022.

SEE: Birds and the Law, p. XXX; Helping to Conserve Birds—National Level, p. XXX; Metallic Poisons, p. XXX; Wintering and Conservation, p. XXX. **REFS:** Arbib, 1971; Tate, 1981, 1986.

Anhinga

Anhinga anhinga Linnaeus

NG-44; G-36; PE-40; AE-pl 100; AM (1)-102



TREE
4-20'



MF



4
(2-5)
MONOG

MF
1: 26-29 DAYS
ALTRICIAL
F: ? DAYS
MF



AQUATIC
INVERTS
SM VERTS



BREEDING: Freshwater swamps, lakes and sluggish streams. 1? brood. **DISPLAYS:** Courting male performs spiral aerial display; perched, performs wing-waving displays and "reverse bow" by raising tail and bringing neck back with head touching back. **NEST:** Prefers willow clumps; conspicuous, loosely built, bulky platform of sticks, twigs, dead leaves, etc., unlined or lined with green leaves and finer materials. Perennial sites. Male chooses site, brings materials. Oft appropriate heron or egret nest. **EGGS:** Light bluish-white, nest-stained. 2.1" (53 mm). **DIET:** Usu swallows food at surface. Avoids hunting in salt water. Young fed by regurgitation. **CONSERVATION:** Mainly resident in winter, some s to c Mexico. **NOTES:** Usu colonial, oft with egrets and herons. Young hatch asynchronously; brooded continuously by male and female until day 12. Young use bill and feet to climb, but return to nest until fledged. Plumage is very wettable but characteristic spread-wing posture functions to absorb solar energy in cool weather to offset low metabolic rate and high rate of heat loss. Can control buoyancy like grebes. **ESSAYS:** Spread-Wing Postures, p. xx; Feathers, p. xx; Preening, p. xx. **REFS:** Burger et al., 1978; Hennemann, 1985; Owre, 1967.

Great Cormorant

Phalacrocorax carbo Linnaeus

NG-44; G-36; PE-40; AE-pl 102; AM (1)-92



TREE



MF



4-5
(1-6)
MONOG

MF
1: 29-31 DAYS
ALTRICIAL
F: 50 DAYS
MF



BREEDING: Coastal cliffs, lakes and rivers. 1 brood. **DISPLAYS:** Perched male flaps wings to invite female, followed by billing, then roles reverse: female perches, male flies. At nest, pair intertwine necks. **NEST:** Usu on higher portions of rocky cliffs. Bulky, of twigs, branches, grass, seaweed, lined with fine material. Added to yearly. Guano coats vicinity. **EGGS:** Faint green/blue, nest-stained. 2.6" (65 mm). **DIET:** Occ also crustaceans. Young fed regurgitant, first dripped from bill, later offered tureenlike from adult's bill. **CONSERVATION:** Winters near breeding grounds, along e coast of N.A. Regarded as competitor by commercial fishermen. **NOTES:** Colonial, oft assoc with Double-crested Cormorants. Used by fishermen in s e Asia to capture fish, usu with neck rings to prevent swallowing, but well-trained birds need no rings. Eyes adapted for aerial as well as underwater vision. **ESSAYS:** Visual Displays, p. xx; Coloniality, p. xx; Seabird Nesting, p. xx; Bathing and Dusting, p. xx. **REFS:** Cramp and Simmons, 1977; Drury and Hatch, 1985; Erskine, 1972; Milton and Austun-Smith, 1983.

Spread-Wing Postures

Some birds adopt characteristic poses in which they extend and often slightly droop their wings. This behavior is commonly described as "sun-bathing" or "wing-drying." Cormorants and Anhingas frequently assume these postures, which are also seen in both Brown and White Pelicans, as well as in some storks, herons, vultures, and hawks.

The structure of cormorant and Anhinga feathers decreases buoyancy and thus facilitates underwater pursuit of fishes. Hence their plumage is not water-repellent, but "wetable." It has been suggested that the function of the spread-wing postures in these birds is to dry the wings after wetting. Biologists once thought that deficient production of oils from the preen gland necessitate wing-drying behaviors. We now know, however, that the degree of waterproofing of feathers is primarily due to their microscopic structure, not to their being oiled. In addition to helping wing feathers to dry, other suggested functions for these postures include regulating body temperature ("thermoregulation"), realigning of feathers, forcing parasites into motion to ease their removal, and helping the perched bird to balance.

Spread-wing postures may serve different purposes in different species. Anhingas, for example, have unusually low metabolic rates and unusually high rates of heat loss from their bodies. Whether wet or dry, they exhibit spread-wing postures mostly under conditions of bright sunlight and cool ambient temperatures, and characteristically orient themselves with their backs to the sun. Thus, it appears that Anhingas adopt a spread-wing posture primarily for thermoregulation—to absorb solar energy to supplement their low metabolic heat production and to offset partly their inordinately high rate of heat loss due to convection and (when wet) evaporation from their plumage.

Cormorants, in contrast, apparently use spread-wing postures only for drying their wings and not for thermoregulation. Although cormorant plumage also retains water, only the outer portion of the feathers is wettable, so an insulating layer of air next to the skin is maintained when cormorants swim underwater. This difference in feather structure may explain why cormorants can spend more time foraging in the water than Anhingas, and why cormorants can inhabit cooler climates, while the Anhinga is restricted to tropical and subtropical waters.

Spread-wing postures appear to serve for both thermoregulation and drying in Turkey Vultures. These birds maintain their body temperature at a lower level at night than in the daytime. Morning wing-spreading should provide a means of absorbing solar energy and passively raising their temperature to the daytime level. Field observations indicate that this behavior is associated with the intensity of sunlight and also occurs more frequently when the birds are wet than when they are dry.

SEE: Metabolism, p. XXX; Temperature Regulation and Behavior, p. XXX; Black and White Plumage, p. XXX. **REFS:** Clark, 1969; Clark and Ohmart, 1985; Elowson, 1984; Hennemann, 1982, 1983, 1985; Mahoney, 1984.

Whimbrel

Numenius phaeopus Linnaeus

NG-112; G-118; PE-126; PW-pl 26; AE-pl 245; AW-pl 216; AM (D)-358



4
(3-4)
MONOG

MF
I: 27-28 DAYS
PRECOCIAL 2
F: 35-42 DAYS
MF



BERRIES
AQUATIC
INVERTS



PROBES

BREEDING: Sedge meadows, bogs, tundra, heath. 1 brood. **DISPLAYS:** Aerial courtship display: male starts low, then circles high and glides down; repeats. Shorebird Communication, p. xx. **NEST:** Unconcealed, usu near perch in dry portion of wet swale. Well defined or merely pressed into veg. Scantly lined with bits of dry grass, moss, or lichen. **EGGS:** Green/olive to light brownish-buff, marked with olive/reddish-brown. 2.3" (58 mm). **DIET:** Aquatic invertebrates esp crustaceans, also worms, mollusks; few seeds and leaves. In late summer, berries become esp important. **CONSERVATION:** Winters s to s Chile and s Brazil. **NOTES:** Occ nests in loose colony. Long-term pair bond. May not breed until third year. Hummock-bog habitat supports highest nest success; its greater structural complexity affords better nest concealment, and higher nest density improves group defense and results in lower predation. Birds nesting in hummock-bog habitat were more likely to return to the same site than birds in sedge meadow or heath tundra. Young migrate 1 week or more after adults depart. **ESSAYS:** Shorebird Feeding, p. xx; Shorebird Migration and Conservation, p. xx; Spacing of Wintering Shorebirds, p. xx; Site Tenacity, p. xx; Habitat Selection, p. xx. **REFS:** Cramp and Simmons, 1983; Steel, 1983.

Long-billed Curlew

Numenius americanus Bechstein

NG-112; G-118; PE-126; PW-pl 26; AE-pl 246; AW-pl 217; AM(D)-360



4
(3-5)
MONOG

MF
I: 27-30 DAYS
PRECOCIAL 2
F: 32-45 DAYS
MF



MARINE
INVERTS



GROUND
GLEAN

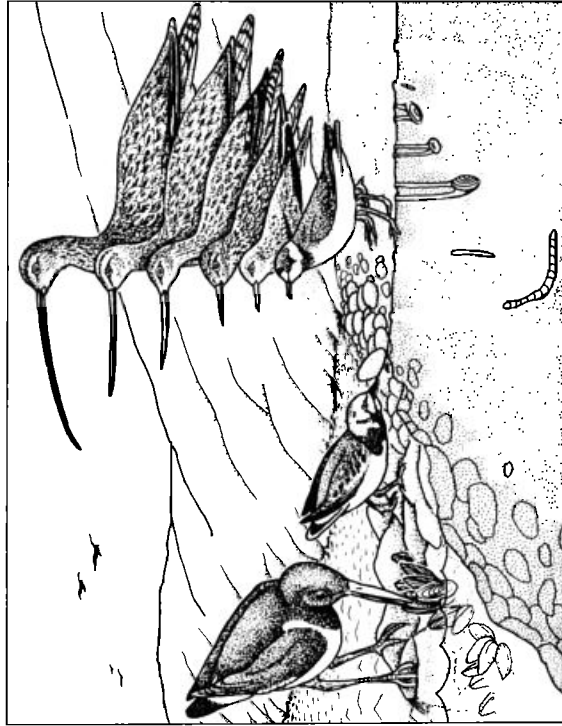
BREEDING: Prairies, grassy meadows, usu near water. 1 brood. **DISPLAYS:** Pair does aerial flight display, nest-scraping display. See: Shorebird Communication, p. xx. **NEST:** In damp grassy hollow or on slope. Occ on substantial platform with 1½" rim. Occ near dry cow pats. Lined thinly with grass, weeds, cow pat chips. **EGGS:** Olive buff, olive, green, buffy white, marked with brown/olive. 2.6" (65 mm). **DIET:** Mostly insects, also worms, burrow-dwelling crustaceans, mollusks, toads, eggs and nestlings of other birds; few berries. **CONSERVATION:** Winters s along beaches, mud flats to Honduras, Costa Rica. Blue List 1981-82, Special Concern 1986. Breeding range much reduced and shrinking. Recent studies also indicate some losses from organochlorine poisoning, but primary problem is habitat loss and degradation. **NOTES:** Adult males cooperatively mob nest predators. Nests usu placed no closer than 750' apart. Males show stronger tendency than females to return to natal area to breed (philopatry); males first breed at 3+ years. Male incubates first, then only at night (female in day). Largest shorebird. **ESSAYS:** Birds and the Law, p. xx; Shorebird Feeding, p. xx; Blue List, p. xx; Site Tenacity, p. xx; DDT and Birds, p. xx; Mobbing, p. xx; Who Incubates?, p. xx. **REFS:** Allen, 1980; Redmond and Jenni, 1982, 1986.

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Shorebird Feeding

Trying to watch warblers feeding is a neck-and-patience-straining exercise—as Robert MacArthur found in the course of his classic study of how these small insect-eaters divide their food resources. Such “resource partitioning” by birds can be observed in much greater comfort, however, while seated behind a spotting scope (perhaps in a shelter) watching waders forage in an estuary.

In such a situation you might see an American Avocet, with its up-curved bill. Its bill seems less strange when you notice how the avocet uses it as a scythe, swinging it back and forth in the water, stirring the bottom and snatching up insects and small crustaceans thus exposed. Nearby a Black-necked Stilt stalks its victims in water six inches or more deep, a habitat inaccessible to the stubby-legged Western Sandpipers snatching invertebrates from the surface of an adjacent mud flat. On the same flat a Long-billed Curlew uses its nine-inch, curved, forcepslike bill to probe the burrow of a large marine worm, while a Dunlin uses its short beak to feel for smaller worms or insect larvae just below the mud's surface. A Semipalmated Plover collects prey from the surface, hunting by sight and alone



Left: American Oystercatcher opening mussels. Center: Ruddy Turnstone foraging under rocks. Right, bottom to top: Semipalmated Plover (searches surface); probing species that forage at different depths — Sanderling, Red Knot, Greater Yellowlegs, Marbled Godwit, Long-billed Curlew.

SHOREBIRD FEEDING 143

Willet

Catoptrophorus semipalmatus Gmelin

NG-114; G-122; PE-128; PW-pl 31; AE-pl 229; AW-pl 215; AM(I)-350



FM
I: 22-29 DAYS
PRECOCIAL 2
F: ? DAYS
MF

4
(4-5)
MONOG

GROUND
GLEAN

BREEDING: Marshy lake margins and adjacent uplands (w); salt marshes, intertidal zone (e). 1 brood. **DISPLAYS:** Nest relief ceremony incl male bow. Prominent white wing-flash in courtship. See: Shorebird Communication, p. xx. **NEST:** Conspicuous, elaborate, or concealed by short, thick veg (esp where wet) on open beach or flat. Grasses bent to form hollow, lined with few dead rushes, dry grass/seed, etc. Completed during laying. Female chooses site. **EGGS:** Olive, marked with olive-brown. 2.1" (53 mm). **DIET:** Aquatic insects, worms, crustaceans, mollusks, fish. **CONSERVATION:** Winters s along coast to n Chile (w) and throughout West Indies to n Brazil (e). Moderately abundant, partly from tolerance of mowing and burning. Market hunters depleted population n of VA; now recovering and range expanding in e. **NOTES:** Semicolonial, oft nesting synchronously. Maintain separate feeding and nesting territories. Strong fidelity to mate and to feeding territory between years. Male incubates at night, occ during midday. Female abandons mate and brood 2-3 weeks posthatch; male attends brood for 2 more weeks. Oft wade to belly and swim. Adults leave breeding grounds before young fledge. Oft defend winter territories along sandy beaches. **ESSAYS:** Transporting Young, p. xx; Determining Diets, p. xx; Color of Birds, p. xx; Site Tenacity, p. xx; Spacing of Wintering Shorebirds, p. xx; Parental Care, p. xx. **REFS:** Howe, 1982; Ryan and Renken, 1987; Sordahl, 1979; Wilcox, 1980.

Greater Yellowlegs

Tringa melanoleuca Gmelin

NG-114; G-120; PE-128; PW-pl 31; AE-pl 228; AW-pl 207; AM (I)-344



MF (?)
I: 23 DAYS
PRECOCIAL 2
F: 18-20 DAYS
MF

4
MONOG ?

INVERTS

BREEDING: Muskeg, tundra. 1 brood. **DISPLAYS:** See: Shorebird Communication, p. xx. **NEST:** Slight depression in moss on small hummock, usu near water by branch or log, occ sheltered. Leaves blow in, or barely lined with grass. **EGGS:** Buff, marked with dark brown, wreathed. 1.9" (49 mm). **DIET:** Small fish, also insects, snails, worms, tadpoles; berries. Oft forages by skimming surface in shallow water. **CONSERVATION:** Winters s to Tierra del Fuego. **NOTES:** Very noisy on nesting ground; female close siter. If clutch lost, renests within 20-30 yd of first nest. Frequently stands on one foot. Defends foraging territory in winter. Small, very vocal winter flocks. **ESSAYS:** Shorebird Feeding, p. xx; Shorebird Migration and Conservation, p. xx; Spacing of Wintering Shorebirds, p. xx. **REFS:** Cramp and Simmons, 1983; Johnsgard, 1981; Myers and Myers, 1979.

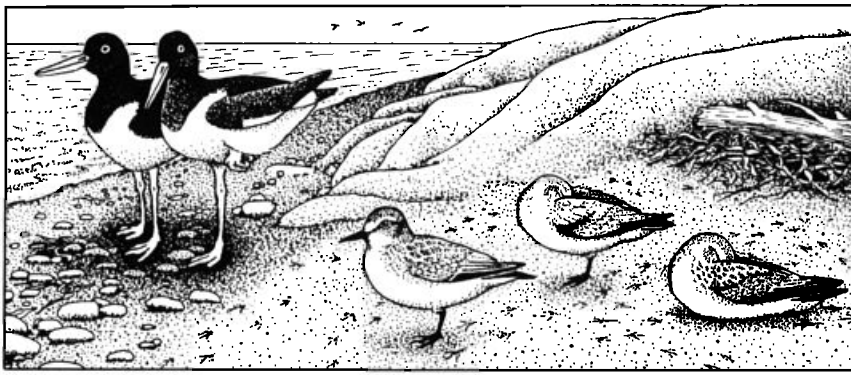
where the pattering feet of a flock will not warn sensitive prey to withdraw into their burrows.

Although crowded together at high tide, shorebirds begin to sort themselves out into preferred feeding habitats as the tide recedes. Least Sandpipers remain on drier, algae-covered mud; beyond them, Red Knots and Dunlins concentrate on bare, wet mud. Farther out, the long-legged Short-billed Dowitchers wade while rapidly probing the mud beneath the shallow water, accompanied by Greater Yellowlegs skimming prey from the water surface or swinging their bills back and forth to snare small fishes. On sandy, wave-washed soils Sanderlings dash nimbly back and forth at the very edge of the ebb and flow, probing the sand for tiny shrimplike crustaceans.

Ruddy Turnstones, as their name suggests, fill their bellies in quite a different way—they turn over rocks, shells, and even cowpies to expose concealed prey and sometimes dig deeply into sand. Oystercatchers, similarly well named, can extract a mussel's meat from between its shells, but that's a story for another essay.

In a single year, one oystercatcher can consume more than a hundred pounds of mussel meat. Indeed, each day many shorebirds take in about a third of their weight in food. When you see huge mixed-species flocks of shorebirds feeding on an estuary, you can view it as a tribute to the great biological productivity of those environments, and an example of the ways that evolution has managed to limit the degree to which each species must compete with others for its food.

SEE: Oystercatchers and Oysters, p. XXX; MacArthur's Warblers, p. XXX; Determining Diets, p. XXX; How Do We Find Out About Bird Biology, p. XXX. **REFS:** Burger and Olla, 1984; Evans et al., 1984; Wander, 1985.



tion called "How to Use This Book" and in the endpapers. There is a separate "Essay Table of Contents" at the back which locates the essays by topic—since in the book they are, as far as possible, placed on the page opposite the species with which they are most appropriate.

As one might expect, so novel and diverse a book was produced by a team of birders with varied and complementary talents. Ehrlich is a biologist best known for his work on the human predicament and the population biology of butterflies, and has written extensively on ecology and evolution. Dobkin is first and foremost a bird ecologist, whose research has included bird song, habitat fragmentation and bird communities, and extensive investigations of hummingbird flower mites. Wheye has done work on the evolution and behavior of butterflies, including the possible role of birds in the evolution of butterfly wing patterns, and brought to the project the perspective of a newcomer to bird biology. The genesis of the project was described by Ehrlich in "Back to Birding" (*American Birds*, Vol. 41, 2, Summer 1987). Together they have produced a compact volume that should impact the birding fraternity as effectively as roof prism binoculars; it is an essential complement to the identification guides you now own. We have included several preliminary mockups of some of the pages from the book, to be published this spring by Simon and Schuster. This modest little classic bears a suitably remarkable bargain price of under \$15.00. Buy two—at this price you can even afford to lose one in a quaking bog.

There are essays on "Metabolism," "Salt Glands," "How Long Can Birds Live?" (which includes a longevity table), "Brood Patches," "Precocial and Altricial Young" (which defines the various types of development), "Bird Milk," "Gull Development," "Anting," "Swallowing Stones," "Creches," and the senses of birds.

Numerous essays deal with behavior. There are several on displays, ranging from those of the courtship of ducks and shorebirds to the function of redwing coverable badges. Sixteen describe feeding methods of different groups: shorebirds, flamingos, raptors, pirates, and others. Territoriality and migration are covered, as are "Transporting Young," "Hoarding Food," "Habitat Selection," "Copulation," "Mobbing" and "Mixed-Species Flocking."

One of the strongest aspects of *The Birder's Handbook* is the coverage of avian evolution, taxonomy, and ecology. Natural selection is thoroughly explained, as is speciation, and coevolution (there are several essays on brood parasitism). The recent research by Sibley and Ahlquist on avian systematics as determined by DNA comparisons is explained and its major results presented. The fossil record of birds is presented, complete with *Archaeopteryx*, *Hesperornis*, and the hot-blooded dinosaurs.

Robert MacArthur's classic study of habitat partitioning by warblers is described, as are "Bird Guilds," "Site Tenacity," W. D. Hamilton's theory on why animals group together to avoid predators (put in an avian context in "Geometry of the Selfish Colony") and the dynamics of bird populations.

In the essays, as in the treatments, conservation figures prominently. The book contains a treatment for the seven North American species that have gone extinct in historic times, as well as an

illustrated essay on each. "The Decline of Eastern Songbirds" and its causes are described. The equilibrium theory of "Island Biogeography" (illustrated by the history of the bird community on Krakatoa), and its significance to bird conservation are explained. There are separate essays on how to help conserve birds at the local, national, and global levels, complete with pertinent addresses for those who wish to get involved.

Treatments are not included for Hawaiian birds or for many oceanic birds that can be seen off our coasts because they are not part of our breeding avifauna, but there are informative essays on "Pelagic Birds" and "Hawaiian Bird Biology." Another nice feature found scattered throughout the book is capsule biographies of bird biologists and short explanations of the origins of bird names.

Many of the essays are illustrated by fine pen-and-ink drawings done by biologist Shahid Naeem—wing shapes, bills, feet, feather structure, thermoregulating shorebird nests, displays, stratification of seabird nests, even one illustrating the contribution of crane displays to human dance. The essays are also cross-indexed with each other, so that one can move easily to related topics, and almost all have references to pertinent literature.

Throughout the book there are touches that show the care invested by the authors to make this mini-encyclopedia "user friendly." There are silhouettes adjacent to each treatment to help orient readers taxonomically (these were not available for the pages reproduced here); a list of birds omitted from the book is included so that you will not wonder whether a species you cannot find is listed under a new name. The symbols and design of the summary line are thoroughly explained both in a sec-

