

The ninth in  
Nature Magazine's  
series of educational  
inserts

# Upland Game Birds and Waterfowl

CANADA  
GOOSE



By E. LAURENCE PALMER

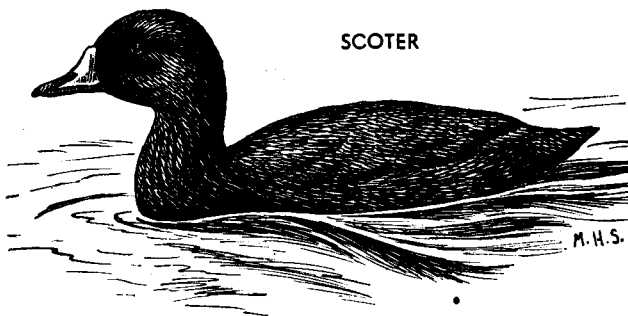
**T**HE GREATEST amount of hunting of birds centers around the pheasants, quail and grouse of the highlands and the ducks and geese of the waterways. In the hectic demand of certain portions of our populations for something to shoot at, we have frequently made over the bird population to suit the shooters. We have even gone to the extent of raising thousands of birds in pens and freeing them only a short time before the date when hunters may legally harvest them.

Where introduced species relieve the native ones from bearing an undue burden of hunting, and do this

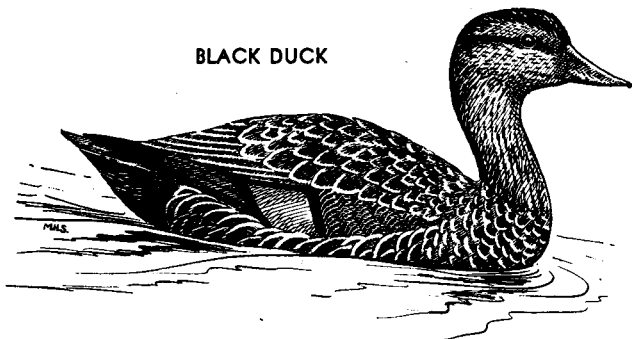
without interfering with the normal activities of the local species, it may be difficult to find objections to the introduction of alien species, but usually the native species suffer. In the northeastern part of the United States, the fields and woodlands that once supported the turkey, ruffed grouse, and bobwhite quail are now overrun with the mongrel Mongolian pheasant. Grouse, which are susceptible to the diseases of poultry, cannot long thrive where poultry abounds. In the Middle West, the prairie chicken is giving way to the pheasant, and in the plains regions of Canada the Hungarian partridge is estab-

lished.

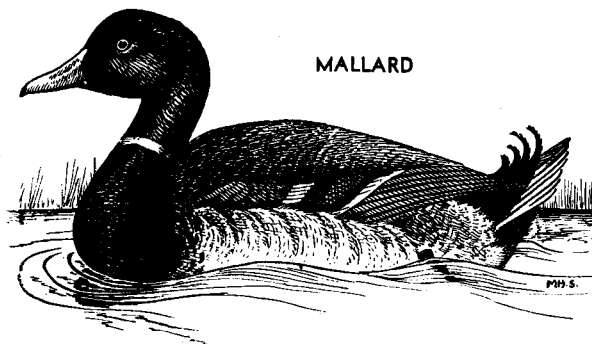
SCOTER



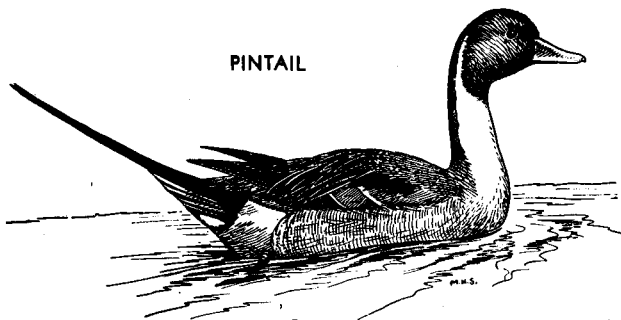
BLACK DUCK



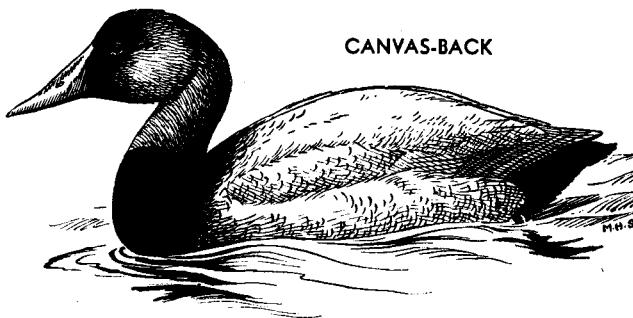
MALLARD



PINTAIL



CANVAS-BACK





BOBWHITE QUAIL

lishing itself. Given time, our native species are likely to hold as small a part in the game bird fauna as does the Indian in the human population.

Man is intelligent. He can get what he wants in most cases. It seems fitting, then, that one of this series of articles should deal with the problems of our native game birds. If we know that prairie chickens are go-

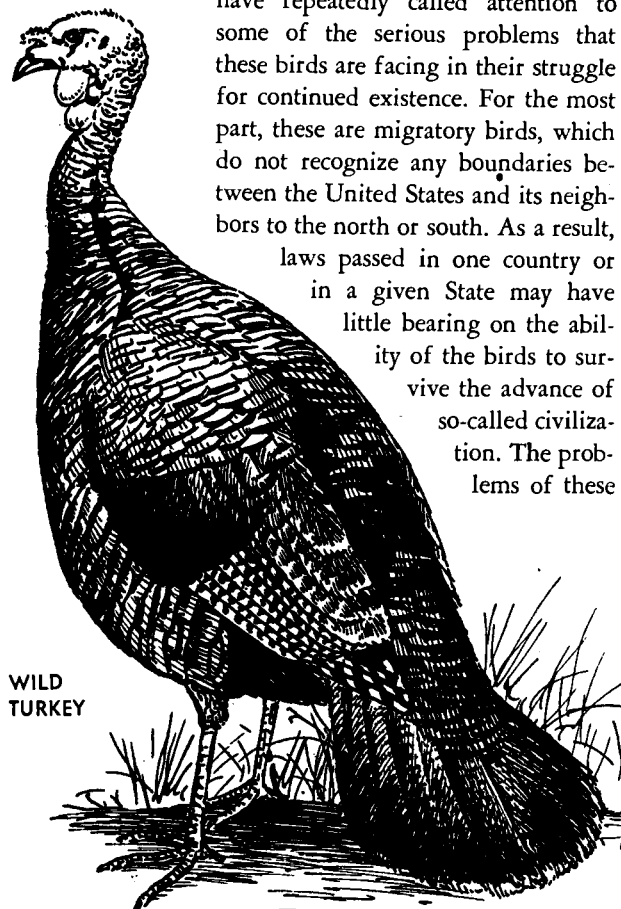
ing out of the picture where pheasants come in, and do nothing about it, we have no complaint to make against others about the result. If Nature educators know this, and fail to bring it to the attention of all, they are not fulfilling their obligations.

Some conception of how the take of introduced birds of the uplands compares with that of other birds may be shown by the 1938 returns from Pennsylvania. In that year, this State yielded 710 tons of ringnecked pheasants, 149 tons of ruffed grouse, 34 tons of wild turkeys, and 20 tons of quail. There were harvested also 27 tons of waterfowl, 9 tons of woodcock and one ton of shore birds, species not indicated.

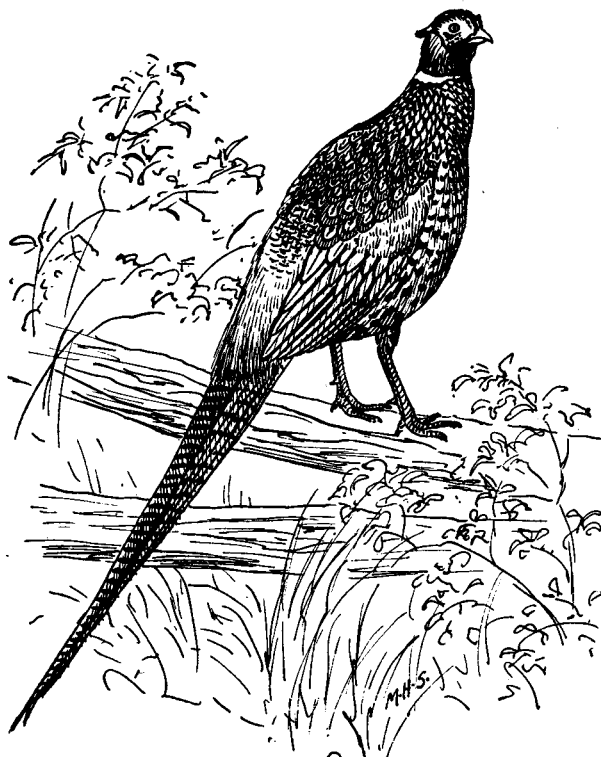
Next in importance to the land birds in satisfying the lust of man to kill come the true waterfowl, the ducks, geese, and swans. *Nature Magazine* and other periodicals

have repeatedly called attention to some of the serious problems that these birds are facing in their struggle for continued existence. For the most part, these are migratory birds, which do not recognize any boundaries between the United States and its neighbors to the north or south. As a result,

laws passed in one country or in a given State may have little bearing on the ability of the birds to survive the advance of so-called civilization. The problems of these



WILD TURKEY

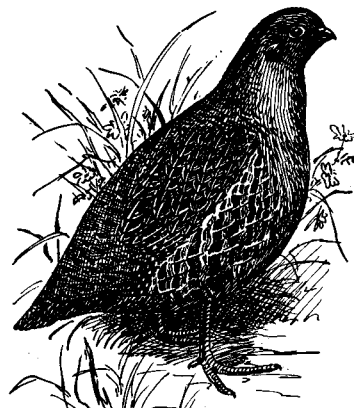


RING-NECKED PHEASANT

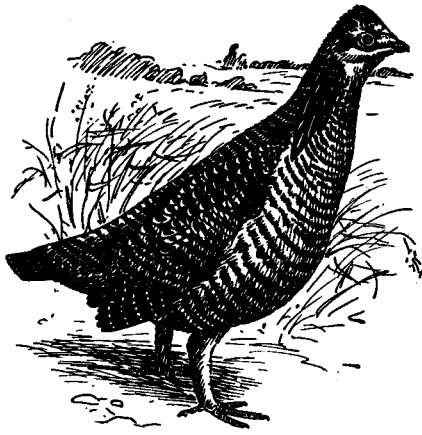
birds, as with the upland species, are matters of international agreement and call for true cooperation between all parties.

Early in the present century it was realized that our waterfowl and other migratory game birds were vanishing. Breeding mainly in northern Canada and Alaska, and forced to seek warmer regions in winter, they were fading away under a competitive persecution that was hampered with little restraint, and which asked no questions about the origin of the birds shot, or their future. After several years of study and conference by the conservationists of the United States and Canada, a treaty for their protection between the two countries was ratified. Shooting in the spring, when the birds were already mating, was forbidden, and other restrictions were adopted in the respective acts that gave the treaty force in the two countries. In the United States, the Secretary of Agriculture (now of Interior), through the Biological Survey, which had furnished the data that made the treaty possible, administers the Treaty Act. Canada's officer is the Commissioner of National Parks.

The Biological Survey, after consultation with the States concerned, recommends certain regulations governing the hunting of migratory birds each year. These, if satisfactory, are approved by the Secretary. Of



HUNGARIAN PARTRIDGE



PRAIRIE CHICKEN

course all the states do not think alike as to the amount of protection deserved, and it is never possible to embody in the regulations all the privileges desired. In one important feature, however, all states are treated alike by the treaty, for all are empowered to make and enforce "laws or regulations which shall give further protection to migratory birds". Unfortunately, this privilege is seldom invoked. If a desire for real protection, rather than a striving for killing privileges, were the goal sought by all our states, the birds would be better off.

Some idea of the reduction in abundance of some of the waterfowl species may be gained by noting the numbers shot in New York. A survey of the take of ducks in that State shows something like the following for a fifteen year span: 1921, 180,721; 1924, 148,771; 1927, 138,638; 1931, 55,242; 1935, 40,578; 1936, 51,439. The record of take of geese in the same period for New York shows a drop from 3276 in 1921, to 666 in 1936.

Records of the take in other states would show larger or smaller numbers during this period, but the proportional decline would probably be about the same. Various interests in different parts of the country are closely tied in with the waterfowl. Some birds that rear their young and get fat on food of the Middle West migrate by way of New England. What section, if any, is entitled to harvest these birds? Can the easterner justly seek to change the open season nationally so that the birds may be shot only when they are in the East, or should the mid-westerner be allowed to harvest all he can get while the getting is good? With the north-south migrants, the majority, of course, the problem is even more complicated. The Canadians get their spring breeding stock from the States, while the States get most of their autumn harvest from birds reared in Canada. The

increase is needed by both countries. Who is to say what proportion each section shall get for its contributions? The only answers to these and other problems rest in mutual understanding and cooperation.

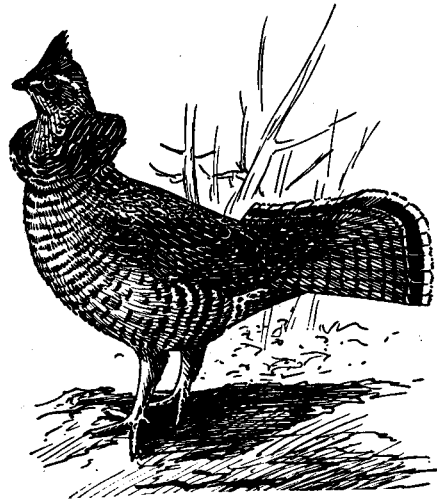
The birds that come from the "haunt of coot and hern" have been almost completely forgotten in the mad scrambles for more game birds in America. Like the ducks and geese, they migrate variously on the continent. They vary greatly in numbers at different times of the year and at different places.

The fates that face some of these birds have been recognized, and the shooting of such species as the yellowlegs and the plovers has been outlawed within the past two decades. In the case of others—the snipe and woodcock—shooting has been continued for reasons not explained, but certainly not biological ones. In New York the take

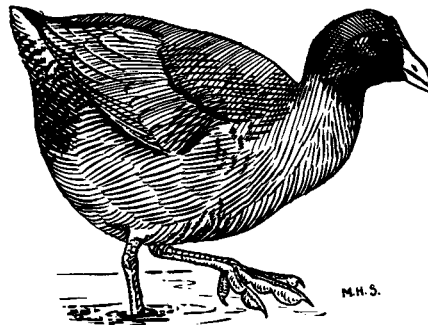
of snipe dropped from 9847 in 1921 almost steadily to 510 in 1936. Yet shooting of these birds still continues as a legal activity.

For the coots, rails and gallinules an almost ridiculous situation exists. In New York, in 1936, it was legal for any one of thousands of licensed gunners to take during the season a total of 1350 coots, rails and gallinules, yet the whole state that year produced for all the hunters combined only 1046 of these birds. The take had consistently dropped from a total of 8161 in 1921 to 1046.

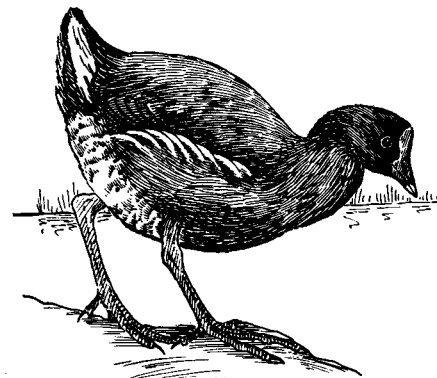
Lately the number of days of open season has been increased from 30 in 1936, to 46 in 1939. The legal daily bag-limit of coots has been raised from 5 to 25, and the legal seasonal take of coots, gallinules and rails has risen from 1350 in 1936 to (Continued on page 220)



RUFFED GROUSE



AMERICAN COOT



FLORIDA GALLINULE

COMMON NAME SCIENTIFIC NAME	CANADA GOOSE <i>Branta canadensis</i>	AMERICAN SCOTER <i>Oidemia americana</i>	BLACK DUCK <i>Anas rubripes</i>	MALLARD <i>Anas platyrhynchos</i>
<b>DESCRIPTION</b>	Length, to 3½ feet. Wing-spread, to 5½ feet. Weight, to 18 pounds, with female smaller than male and young often weighing under 8 pounds and duller in color. Goslings, olive yellow. Bill and feet, black. Call, a high or low-pitched "honk". Fly in great V-shaped formations.	Length, to 21 inches. Wing-spread, to 35 inches. Females, smaller than males. Practically all-black ducks but orange or red at base of bills. The related white-winged scoters are possibly commoner and show conspicuous white patches on wings and smaller white patches around or near eyes.	Length, to 23½ inches. Wing-spread, to 3 feet. Weight, to 3 pounds, 10 ounces, with female to under 3 pounds. Resemble female mallards but lack white borders on blue on wings and with conspicuous white beneath wings when in flight. Males, bill yellowish; females, olive. Males' legs, more orange.	Length, to 28 inches. Wing-spread, to 40 inches. Weight, to 3¾ pounds. Female, smaller than male. Male, breeding and in winter, with green head, white collar, white wing-bars. In flight, shows white tail border. Female, mostly brown but with blue, basal wing-borders, white-bordered.
<b>CLASSIFICATION AND RANGE</b>	Family Anatidae with the swans and ducks. Order Anseriformes. Reported from Pleistocene times from Florida, Oregon and California. Breed northern California to Gulf of St. Lawrence (formerly New England) north to beyond limits of tree-zone. Winter, southern Canada to southern United States.	Like the canvasbacks, diving ducks. Family Anatidae, Order Anseriformes. Related surf scoters known from Pleistocene of California. Breed, Siberia to Newfoundland through northern Canada. Winter, Atlantic coast Newfoundland to Florida; on Pacific, Aleutians to California, Japan and China; occasionally in interior below Great Lakes to Gulf.	Family Anatidae with the geese and swans. Order Anseriformes. Reported from Pleistocene of Florida. Breed, Manitoba to Labrador and south to North Carolina and Colorado. Winter along Atlantic coast of United States and south to Florida, Texas and occasionally California. Extending range westward.	Family Anatidae with the geese and swans. Order Anseriformes. Pleistocene of Oregon and California. Breed, Alaska to Nova Scotia, Iceland, Europe, Asia and Africa, south to lower California, Texas and Virginia. Winter, Alaska to Nova Scotia and south to southern Mexico and Panama.
<b>LIFE HISTORY</b>	Males, ganders, mate with females, geese, for life, breeding when three years old and defend geese while on the nest which is usually on ground but sometimes in trees. Females incubate, 5 to 9, 2¼ by 3½ inch, greenish eggs, 28 to 30 days, from late April to mid July. One annual brood. Adults have one complete annual summer or fall molt losing flight feathers.	By May, arrive breeding grounds. Nest, well concealed in grass on banks with down-lining and 6 to 10, pale yellow, 2½ by 1¾ inch eggs. Incubation, probably 4 weeks. One annual brood. Individuals molt at any time of year. Young, dark brown with white throat. Adults partial molt in spring before mating, complete molt in late summer after rearing period.	Males, drakes, court female ducks by short flights and heads bobbing. Nest, commonly on ground, sometimes in trees, down-lined eggs, 6 to 12, greenish gray, 1½ by 2¾ inches. Incubation, 26 to 28 days, by female. One annual brood. Young, fluffy, yellow, darker above than mallard. Immature young, more striped below than adults. Voice, loud "quack".	Male, drakes, court female ducks by bowing and pursuit but desert when nest is established. Nest usually on ground near water, down-lined, with 5 to 14, 2¼ by 1½ inch, pale green or buff eggs. Incubation, 23 to 29 days. One annual brood. Young, fluffy yellow, with brownish green top and back of head, and sides gray, with brown spots.
<b>FOOD AND ENEMIES</b>	Powerful. Feed largely on roots, grain and other vegetable matter or on insects such as grasshoppers. Eel-grass, a favorite aquatic food. Intelligent in escaping hunters, when wounded lying flat effectively on water or in weeds. Apparently young accept leadership of older birds. Flight speed, highly deceptive, 100 to 120 feet per second.	Food, largely mussels, clams, scallops and similar shellfish taken by diving to depths of 40 feet in sea. May fly inland in long flocks and there feed on fresh-water shellfish when weather at sea is too rough. Excellent swimmers and divers, good fliers but rather helpless when on land. Are generally less suspicious than many other ducks.	Food, ¾ plants, ¼ animal. One-half of plant food is pond-weeds, eel-grass, wild celery, but grain welcome where it is available. Animal food may include crayfish and fishes but these affect value of ducks as food for man. May eat shrimps and mussels useful to man. Among wildest of ducks, not being domesticated easily. Flight speed, 55 to 90 feet per second.	Excellent destroyers of mosquito wrigglers and other aquatic insects but feed on grain when available as do domestic ducks of which they are the progenitors. Better than goldfish as mosquito destroyers. Mate readily with domestic ducks, mingle with other species of ducks freely; may nest in park or other semi-civilized place. Flight speed, 55 to 90 feet per second.
<b>RELATIONS TO MAN</b>	Among commoner and most valuable of wild waterfowl. Formerly more abundant than at present. In early days, supplied much food and filled many feather beds. Rank high in supporting industries dependent on hunting. Numbers have decreased to an unwarranted measure. Take in New York dropped from 3,221 in 1928 to 666 in 1936. Legal bag limit, 4 a day.	Inferior as food because of animal diet but if entrails are quickly removed and birds cooked properly may be edible. Great flocks over shellfish beds may do some damage, related white-winged scoters sometimes using mussels for nearly ¾ entire diet. Difficult to get when wounded because of superior diving ability.	Because of wildness can be reared and freed with assurance that birds will provide good sport by wariness. Possibly most valuable food and game ducks of eastern United States. Migration towards seaboard begins in September but birds visit freshwater regularly. Feed commonly at night when disturbed too much. Remarkable hearing.	Probably most valuable ducks in world because of wide distribution, due in part to adaptability. Many are reared and freed to repopulate wild flocks but mallards do not become as shy as black ducks or some other species and so are more easily shot. Along with other species of ducks, mallards have decreased in numbers.

<b>PINTAIL</b> <i>Dafila acuta</i>	<b>CANVAS-BACK</b> <i>Nyroca valisineria</i>	<b>SORA RAIL</b> <i>Porzana carolina</i>	<b>AMERICAN COOT</b> <i>Fulica americana</i>	<b>FLORIDA GALLINULE</b> <i>Gallinula chloropus</i>
<p>Length, to 30 inches. Wing-spread, to 3 feet. Weight, to 2¾ pounds. Conspicuous field character, long, slender tails, white necks of males and white borders on base of wings and on males across rumps. Females show conspicuous, wedge-shaped tails and white basal wing-borders.</p>	<p>Length, to 2 feet. Wing-spread, to 3 feet. Weight of male, 3 pounds; of female, 2 pounds. Bill, longer than head and continuing profile into narrow wedge. Male head and neck, dark chestnut; body, mostly white. Female head and neck, redder; body, grayer. Blackish rump, both sexes.</p>	<p>Length, to 9¾ inches. Wing-spread, 14½ inches. Weight, to 4 ounces. Females, smaller than males. Sexes similar. Adults, with conspicuous black on faces and throats which is absent in young. Flight, relatively slow, making easy marks for hunters. Back, streaked olive. Breast and sides of head, slate.</p>	<p>Length, to 16 inches. Wing-spread, to 28 inches. Weight, to 22 ounces. General appearance, gray with darker heads, necks and tails. Bills, white. White under tails. Sexes, colored alike. Feet, with webs of toes, wavy margined, but not connected for most of length. Eyes, red.</p>	<p>Length, to 14¾ inches. Wing-spread, to 23 inches. Weight, to 14 ounces. In field, resembles coot but has bill and plate on front of head red instead of white. Sexes, colored alike. White streak appears along side. Tail, black above and white beneath. General color, slate. Toes lack scalloped webs of coot.</p>
<p>Family Anatidae, with the geese and swans. Order Anseriformes. Pleistocene of Oregon. Breed, Arctic Alaska to New Brunswick and south to California and New Jersey but rarely east of Lake Michigan. Winter, Alaska to Massachusetts and south to Panama but uncommon in the east. Related Old World form.</p>	<p>Family Anatidae with swans and ducks. Order Anseriformes. Reported from Pleistocene of Florida and Oregon. Breed, New Mexico to Wisconsin, north to central Alaska and western Manitoba. Winter, southern British Columbia to New York, south to central Mexico and Florida.</p>	<p>Family Rallidae with gallinules and coots. Order Gruiformes. Related Virginia, clapper and king rails known from Pleistocene. Breed, British Columbia to Hudson Bay and south to California and Maryland. Winter, California to Florida and south to Venezuela and Peru. Accidental in England, Greenland.</p>	<p>Family Rallidae, with rails and gallinules. Order Gruiformes. Allied races and closely related species in Europe, Asia, Africa and Australia. Fossil records from Pleistocene of Oregon. Breeds British Columbia to New Brunswick south to Nicaragua. Winter, Alaska to Massachusetts to Costa Rica.</p>	<p>Family Rallidae, with rails and coots. Order Gruiformes. Reported from Pleistocene of Florida. Breeds central California to southern Ontario, south to lower California and Panama. Winter, southern California to South Carolina and south, with closely related species in South America and Eastern Hemisphere.</p>
<p>Drakes mate early with ducks, May to mid July. Nest in grass or sheltered, 5 to 12, greenish buff, 1½ by 2 inch eggs. Incubation, by females, 22 to 23 days. One annual brood. Ducklings, grayer or browner than usual associates, later colored like females though grayer, but take on breeding plumage when about 22 months old. Fall molt of adults, September to November.</p>	<p>Male, drake, mates with the female, duck, after courtship. Nest of weeds surrounded by water, down-lined, with 7 to 15 eggs, olive gray, 1¾ by 2½ inches, often with eggs of redhead and ruddy duck mixed in. Incubation, by females, 28 days. Young, deep yellow, with darker heads, but when immature resemble female. One annual brood beginning May-June.</p>	<p>Commonly nest in marshes but occasionally in grain. Nest, supported by grass stems and concealed by grass. Eggs, 4 to 17, cream to light brown, 1½ by 1¾ inches. Incubation, about 14 days, by females, with probably single annual brood. Nesting May and June. Young, black with orange throat-tufts and bills yellow with red bases. Adults have complete molt, July.</p>	<p>Breed often in colonies, with nests of plants near water. Eggs, 6 to 15, cream-clay colored, 2 by 1¼ inch. Incubation, about 27 days but young hatch at different times, the first being cared for by fathers. Young, black with orange-tipped feathers and black-tipped bills, orange red. Immature, like adults but more olive or lighter in color.</p>	<p>Nest in marsh lands, building more than one nest but occupying but one. Nest, of plant material. Eggs, 8 to 17, buff and spotted 1½ by 1½ inches. Incubation, 22 to 25 days. Nesting, late spring. Young, downy black with white-tipped, hair-like feathers at throat; top of head, bare; bill, red but black-tipped. Young, like adults by December.</p>
<p>Food, largely vegetable matter including grain where available but also including aquatic insects, grasshoppers and the like. Can dive and swim readily under water particularly when wounded but is normally surface feeding species. Extraordinarily alert and take to wing suddenly when disturbed, rising steeply immediately. Flight speed, 60 to 100 feet per second.</p>	<p>Food, largely water plants or grain; may even feed on decaying fish, in latter case, are themselves not good food. Young birds develop feathers by 10 weeks. Molts, partial in late July and August, with wing molt in October prior to southern migration. Flocks often fly in V-formation of geese. Winter in "rafts" on lakes. Flight speed, 130 to 160 feet per second.</p>	<p>Food, insects, small crustaceans, seeds and grain, being essentially useful. Southern migrations usually do not begin until frost, so may be irregular even though hunting seasons are not. May cross Gulf of Mexico in southern flight and have been found hundreds of miles at sea. Can swim and dive if necessary for escape or food.</p>	<p>Food, largely vegetable matter such as grasses, water-weeds, roots, seeds and tubers, but also including some small animal forms. Coots are rather unsuspecting, ungainly birds which patter along the water surface when taking to wing and gather in enormous flocks sometimes giving a false impression of their abundance. May hide rather than fly.</p>	<p>Food, plants and animals of habitat, the marsh lands, including grasshoppers and seeds where available. When on water, birds float high and when swimming move head back and forth like chickens. Do not swim as well as coots and prefer to stay more among plants at water's edge. Call, something like clucks of hens but louder.</p>
<p>Among the most beautiful of wild ducks and the earliest to visit the East in spring migration. Desirable as game birds because of alertness, great speed in flight and exceptional food value when taken. Could probably be made to be more abundant.</p>	<p>Possibly the most valuable of game ducks. Flavor of flesh considered superior when birds have fed on wild celery (<i>Valisneria</i>). May survive shore hunting, since are strong divers and swimmers and may feed at a distance from shore in safety but numbers dropped seriously in the East in recent years. Commercial value in East, and consequent scarcity, due to overpraised flavor.</p>	<p>Considered as game birds in spite of size and easy flight. Records of individual hunters in Connecticut show takes of 181 birds in a day. Impossible today for a hunter to get season's limit. New York's records for all hunters show the following: 1921, 2,734; 1924, 222; 1928, 241; and yet there is a 45 day season recently increased from 30 days.</p>	<p>Inferior table birds but relatively easily shot. The legal season's take per hunter might total 1150 although the combined take of all hunters in such states as New York for rails, gallinules and coots in 1936 did not reach this number. Bag limit increased recently from 5 to 25 birds a day. Eggs, edible but inferior.</p>	<p>Considered game birds in spite of relatively small numbers. Examples of takes include Minnesota, 1929, 247; New York, 1921, 551; 1924, 353; 1928, 284. Because of resemblance to more abundant coots could obviously be easily mistaken for them. Do no damage and deserve more protection than they get. It is legal for a hunter to take 450 a season.</p>

COMMON NAME SCIENTIFIC NAME	WILD TURKEY <i>Meleagris gallopavo</i>	BOB-WHITE QUAIL <i>Colinus virginianus</i>	RING-NECKED PHEASANT <i>Phasianus colchicus torquatus</i>	HUNGARIAN PARTRIDGE <i>Perdix perdix</i>
DESCRIPTION	Length, to 50 inches; tail, 18½; wings, 21. Weight, to 40 pounds. Differ from domestic turkey in having chestnut instead of white tips to the tail feathers and upper tail coverts. The two birds interbreed freely. Four native sub-species recognized.	Length, to 11 inches but normally 10. Individual wing, to 5 inches. Weight, to 9 ounces, commonly 6. Lower breast, with blackish bars or U-shaped marks. Tail, short. Conspicuous white throat and band across side of head through eye, duller in female. Black on head of male is buff in female.	Length, to 3 feet, half may be tail; female, about 20 inches. Wing, to 10 inches. Weight, to 4½ pounds. Male, with strong spurs, brilliant coloration, white collar and "ear-tufts"; wattles, vary. Females, brownish to chestnut, much less conspicuous in vegetation; both sexes, excellent hidiers.	Length, to 14 inches. Individual wing, to 6½ inches. Tail, to 3½ inches. Weight, to 15 ounces, the males sometimes being slightly the heavier. Appear in field, intermediate between grouse and bobwhite. Breast, gray, speckled finely with black; in young, with buffy brown.
CLASSIFICATION AND RANGE	Family Meleagridae. Order Galliformes. Fossil species from Pleistocene of Pennsylvania, Tennessee, Arkansas and Florida. Related species from Colorado Oligocene, California Pleistocene. Modern turkey, Texas and Oklahoma, east through Pennsylvania and Florida with Merriam's to southwest. Formerly wider range.	Family Perdidae, with partridges. Order Galliformes. Reported from Pleistocene of Florida and Tennessee. Range of four sub-species covers most of United States. Resident. Eastern form from Dakota through southern Ontario and south to northern Florida and eastern Colorado but generally mixed with other races; introduced widely; mixed with Mexican forms.	Family Phasianidae. Order Galliformes. Related species reported from Oligocene of Oregon and Miocene of Nebraska. Native of eastern China from Canton to the Yangtze. Four races introduced, mingled and established particularly in grain and corn areas of the United States, England and other parts of the world.	Family Perdidae, the quails and partridges. Order Galliformes. The partridge of Sweden, the British Isles, France, Switzerland and the Pyrenees with close races in Asia, Spain and Italy. Introduced in North America with variable success, thriving best in Saskatchewan, Alberta and British Columbia and northwest States.
LIFE HISTORY	Males gobble and fight for harem of females but do not help in nesting or rearing activities. Nest on ground, under cover, with 10 to 14, pale buff or speckled brown, 2 by 2¾ inch eggs. Incubation, 28 days. Young need not eat for 2 days after hatching but can run and hide under guidance of the hen though 2 or 3 hens may unite to raise broods.	May keep mates more than one year though cocks fight at beginning of breeding season. Cocks build nests on ground in field, several pairs may use same nest. Eggs, 7 to 28, white, about 1 by 1½ inches, incubated by cock or hen 23 to 24 days, average hatch, 86 percent. Young leave nest on hatching; reared by both parents; family together through first winter.	One cock may control a dozen hens, fighting cocks of his own kind and domestic roosters. Nest, in grasses, on ground made by hens. Eggs, 6 to 12, olive buff, 1½ by 1¾ inches. Incubation, 26 days, by hens only. Young cared for by females until fall when molt takes place and sex differences are obvious. Adults molt once a year. One brood normally.	Males fight viciously during mating season, do not assist in incubating but help rear young. Nest, hidden on ground by grasses; contains 6 to 18, plain olive eggs. Incubation, 24 days. Young able to run soon after hatching, feeding on small insects. Young molt to adult plumage late fall after being downy, spotted chestnut at first.
FOOD AND ENEMIES	Food, largely seeds, nuts, grain and insects depending on the season and the accessibility of food and cover. Since the birds have to be cautious they are not common ordinarily near habitations, but in early days used to feed with poultry in such places as Albany, New York. Now they are no longer found in New York, New England or southern Canada.	Food, largely injurious insects such as grasshoppers, June beetles, potato beetles, chinch bugs, and squash bugs during summer; dried berries, weed seeds, during winter. Hunters who examine crops of birds killed may hesitate to kill other quail. Winter coveys of less than 10 unlikely to withstand severe cold and wind. Individual range, about 1 square mile. Flight speed, 65 to 85 feet per second.	Food, a variety of plant and animal materials with roughly twice as much vegetable as animal matter through year. Do destroy great numbers of injurious insects as well as corn and other cereals. Crowd out native game birds such as quail and prairie chickens because of aggressive nature and ability. Average population, Middle West, one bird per acre.	Food, estimated 40½ percent insects including 23 percent of harmful species, 50 percent vegetable material other than grain, and only 3½ percent grain; the rest, miscellaneous material. Introduced as game birds rather than as insect enemies. 6,000 planted in Iowa in 1913-14. Flock together in the winter.
RELATIONS TO MAN	Undoubtedly the grandest of America's game birds, which through unwise treatment has been greatly restricted in its range. Attempts to re-establish it as far north as Minnesota have failed. In certain States, such as Texas, where game is "managed" the take in given areas is limited to the surplus and a steady supply is assured, according to reports.	In some states, considered game birds, in others they are song birds. The take of quail in New York State recently was as follows: 1927, 14,170; 1930, 9,013; 1934, 4,064; 1936, 3,112, and yet the crop was reported to be good. In certain states, take is determined by a preliminary survey to guarantee adequate breeding stock. Too useful alive to be killed as game.	Most important game birds; may be reared in captivity and yet become wild on being freed. Minnesota has had annual pheasant kills in excess of a million birds; New York averages around 200,000. Are probably more abundant in America than in lands from which they were introduced. Conservation Departments maintain expensive pheasant farms.	In Europe are shot by thousands by hunters sitting in ease while birds are driven to take wing over obstructions, a practice which somehow does not fit in with American conception of sport or sportsmanship. May become established to supplement quail, prairie chicken and pheasants, but should not be allowed to displace native species.

<b>PRAIRIE CHICKEN</b> <i>Tympanuchus cupido americanus</i>	<b>RUFFED GROUSE</b> <i>Bonasa umbellus</i>	<b>WOODCOCK</b> <i>Philohela minor</i>	<b>WILSON'S SNIPE</b> <i>Capella delicata</i>	<b>LESSER and GREATER YELLOW-LEGS</b> <i>Totanus flavipes</i> and <i>T. melanoleucus</i>
<p>Length, to 18½ inches of which 4½ is tail. Individual wings, to 9 inches. Weight, to 2 pounds. Sexes, about equal in weight but cocks with long tufts of feathers on sides of neck back of distensible, orange, yellow area exposed in courtship, also erectable bare spots over eyes in males.</p>	<p>Length, 17 inches with 6¼ inch tail. Finely barred with brown and gray, with outer tail tip, light gray. Ruff on sides of neck, larger in the male. Crest on head. Upper parts of tarsus feathered. Underparts, white with a buff tinge, heavily barred on flanks.</p>	<p>Length, to 1 foot. Wing-spread, to 20 inches. Bills, to 3 inches. Weight, males to 6 ounces; females, to 8 ounces. Whistle in flight and have blunt wings instead of the pointed ones of the Wilson's snipes; also more stocky, and more nocturnal, browner. Fluttering flight.</p>	<p>Length, to 11¾ inches. Wing-spread, to 20 inches. Weight, to 5 ounces. Sexes, alike. Extremely long bills, streaked plumage, white bellies, zigzag irregular flight and weak, cracking cry serve to identify. Lighter in color and slimmer than the woodcocks and larger than spotted sandpipers.</p>	<p>Length of lesser, 11 inches; of greater, to 15 inches. Wing-spreads, 21½ and 26. Bills, under 2 and over 2 inches. Weights, to 3⅓ ounces and to 10 but generally over 5 ounces. Legs, long and yellow. Females, generally smaller than males but sexes colored alike.</p>
<p>Family Tetraonidae with turkeys, quails and pheasants. Order Galliformes. Two related species from Pleistocene of New Jersey and Oregon. Four American subspecies of which one, the heath hen, has become extinct in 1930. Range, west-central Canada to Ohio, south to Colorado and Kentucky, formerly to Pennsylvania; now extinct east of Indiana.</p>	<p>Family Tetraonidae with turkeys, quails and pheasants. Order Galliformes. Reported from Pleistocene in California, Tennessee, Maryland and Pennsylvania. Resident. Six subspecies, the eastern ranging from Minnesota to Massachusetts, south to Kansas and Georgia; others, through wooded northern United States, Canada, and Alaska.</p>	<p>Family Scolopacidae, with snipes and sandpipers. Order Charadriiformes. Breed, southern Manitoba to southern New Brunswick and south to Colorado, northern Florida and southern Louisiana. Winter southern Missouri to New Jersey and south to Texas and Florida. Occasional in Bermuda, Newfoundland and Montana.</p>	<p>Family Scolopacidae with woodcock and sandpipers. Order Charadriiformes. Breed, Alaska to New Brunswick to southern California and Pennsylvania. Winter, Alaska to Virginia and south to southern Brazil but occasionally as far north as Nova Scotia. Sometimes found in Hawaii, Great Britain and Greenland.</p>	<p>Family Scolopacidae, with woodcocks and sandpipers. Order Charadriiformes. Greater Yellowlegs from Pleistocene of California. Breed (1) Alaska to Newfoundland through central Canada; (2) south into United States. Winter mainly Argentine, Chile and Patagonia but also in southern United States.</p>
<p>Males court many females by booming and strutting but fight other males first. Nest, on ground sheltered by grass with 10 to 14 buff, speckled eggs, 1⅓ by 1¼ inch eggs. Incubation, 23 days, the young in Minnesota hatching about June. Young molt in fall to plumage like the adults which have two molts a year. One annual brood.</p>	<p>Males court females by strutting and drumming by vibrating wings while on a log. One male may mate with a number of females whose nests are hidden from male. Nest, in depression, in leaves, in woodlands, reasonably near opening, with 8 to 14, pale brown eggs. Incubation, 21 to 28 days. One annual brood cared for by mother.</p>	<p>Males court females by high spiral flight producing twittering sounds, followed by strutting. Nest on dry ground near wet ground, a hollow, leaf-lined. Eggs, 3 to 4, variable in color, 1½ by 1⅓ inches. Both sexes incubate, 20 to 21 days and care for one brood a year. Young, downy when hatched, brownish white; may be carried by parent.</p>	<p>Males court by remarkable great, spiral flight with "winnowing" sound commonly at dusk. Nests on or near ground of grass, not elaborate, with 3 to 4, greenish brown, spotted or blotched, 1½ by 1⅓ inch eggs. Incubation, about 20 days. One annual brood. Young, yellow, darker above, with dark line eye to bill. Young, like adults by fall; mature year later.</p>	<p>Males court by calling and flying. Nest, hollow on ground. Eggs, 4, pear-shaped, variable blotched or plain, 1⅓ by 1⅓ inches, incubated chiefly by females; probably one annual brood. Young, similar to adults but generally darker and showing little seasonal change. Flock in fall, being then more common in East than in spring migration.</p>
<p>Food, animal matter such as insects, 14 percent; 86 percent vegetable matter such as grass, fruits, acorns and berries. In the winter, females may flock together and move to southern part of range. Species extended its range with the cultivation of grain but has been reduced in range by excessive hunting practices. Flight speed, 65 to 85 feet per second.</p>	<p>Food, largely insects in summer but may eat tree buds, fruit and other vegetable material in winter. Young, not fed by mother. Subject to many diseases of poultry and so until practice of rearing on wire was established could not be reared in captivity. This now seems to be solved, though production is not what might be desired.</p>	<p>Food, principally earthworms but grubs and beetles and other insects may be substituted when worms are not available. After July molt, young are like adult but may not mature until next year. This, coupled with relatively small number of eggs, and tendency of birds to congregate in migration, makes it difficult for them to stand too heavy hunting.</p>	<p>Food, largely insects and other small animals but partly plants. Can hardly be considered injurious. Can dive and swim well using wings under water. Believed sound is produced by vibration of outer tail feathers during downward plunge of courtship flight. Feed by probing deeply in soft, wet soil with long bill. Flight speed, 50 to 70 feet per second.</p>	<p>Food, essentially small water animals, the lesser apparently eating less fish than the greater. Become fat in fall before southern migrations begin. Fall migration among earlier of larger birds moving south. Commonly recognized as gleaners of mudflats, sewer beds and salt marshes but less common on sand beaches. Paired calls easily imitated.</p>
<p>The native game bird of the prairie country, being supplanted in part by the pheasant but worthy of adequate protection because of general good qualities. With persecution, it has taken to woodlands and is now commonly found there. There seems to be a periodic abundance and scarcity similar to that with grouse. Splendid game bird.</p>	<p>Possibly finest native upland game birds left in much of the country and though they lack the size of wild turkeys yet they supply superior sport and excellent flesh. Where undisturbed may appear dumb but where hunted are exceptionally shy. Suggested peak population every 10½ years. Average brood range, 40 acres. Broods remain together into winter.</p>	<p>Considered superior game birds because of flesh but really seem too small to be sought too much. Take in New York State follows; 1921, 23,870; 1927, 19,614; 1931, 17,834; 1936, 15,544. Practically wiped out of upper Mississippi valley. Bag limit of 4 a day is too high in view of decreasing numbers and birds should be protected until recovered in numbers. Winter 1939-1940 disastrous in south.</p>	<p>Recognized as game birds because of remarkably confusing flight, flesh being good to eat but are really too small to justify birds' being killed. Abundance may be assumed by take in New York; 1921, 9,847; 1924, 4,444; 1927, 1,300; 1931, 1,571; 1936, 510. Fortunately market hunting is now illegal. Bag limit obviously too high or season too long. Danger of extinction not officially recognized.</p>	<p>Formerly considered game birds but now fortunately on the protected list. New York take of the two species may tell story: 1921, 9,733; 1924, 5,211; 1927, 252, and yet one species has survived since Pleistocene. It is hoped that closing chapter may not be written in this century. Long migrations, useful habits, past survivals, justify better protection.</p>

WILSON  
SNIPE

(Continued from page 215) 2,530 in 1939. We are glad that we do not have to explain all the reasons for these decisions. Is it strange that conservationists wonder where the vanishing point of some of these species may be?

One who thinks of game birds only as gun fodder, who in his mind's eye looks forward to birds exploding in the air into a cloud of feathers at the report of his gun, may wonder why some people who do not shoot are concerned about the birds.

Well, there are those of us who get a real kick out of watching the shore birds—just watching them—and we extend our interests to the other game birds as well. Anyone who has lived for years where the bob-white's call takes the place of an alarm clock; anyone who has photographed the crazy stilts and curlews on the Bear River marshes in Utah, or who has been accompanied on shell collecting trips in Florida or California by sanderlings, coots, or almost any of the ducks, somehow feels that these birds should be as much a part of these environments as the waves and the mud and the sand. In contrast is the Iowa hunter the author knew who once said that he loved quail so well that he watched a covey in the snow fully five minutes before he shot them while they sat.

Would that more people had seen young soras around a nest, an avocet trying to lead a foe from its brood, a flock of ibises against a sunset, ducks standing on their heads feeding in shallow water, a mother grouse fighting to protect her young, a willet on a fencepost, a snipe on its

### ACKNOWLEDGMENTS

This article is based on similar ones by the author published as numbers of the Cornell Rural School Leaflet by the New York State College of Agriculture at Cornell University. Modifications felt to be improvements have been made on the material originally published. Appreciation is expressed to the College for permission to revise and use the material, and to the books that were used to supplement the author's personal experiences. Suggestions for school room activities appear on the School Page. The illustrations, by Hope Sawyer, are new and are copyrighted. The books and pamphlets most commonly used are given elsewhere on this page.

nest, woodcock in their courtship act, or the faithfulness of a pair of Canada geese. These are but a few of the things that have entered into the author's experiences which make him feel as he does about these birds. Those who would kill should avoid knowing their prey too intimately. The powder companies who also manufacture films for cameras might profit more by encouraging photography than by promoting killing.

Every community with a body of water should establish a waterfowl sanctuary. Those undertaking such a project will have to face all sorts of opposition and threats, but the end will justify itself, as the writer knows from experience. Tourist bureaus could help this situation by calling attention to the existence of these sanctuaries where visitors may see what they are like, and go home with a determination to duplicate the situation there. State and community outlines in science should list the local sanctuaries, and children should be encouraged to go, to see, and to be conquered.

### REFERENCES

*American Waterfowl Management*, by Miles D. Pirnie. Game Division, Michigan Department of Conservation.  
*Game Management*, by Aldo Leopold. Charles Scribner's Sons, New York, 1933.

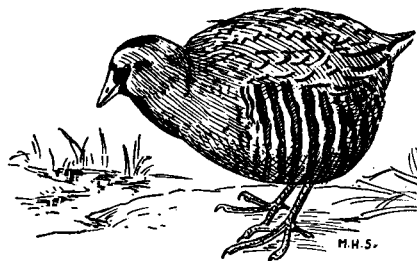
*Improving the Farm Environment for Wild Life*, Bulletin 1719; and *Game Management on the Farm*, Bulletin 1759; United States Department of Agriculture.

*Wildfowl Food Plants*, by W. L. McAtee. Collegiate Press, Ames, Iowa, 1939.

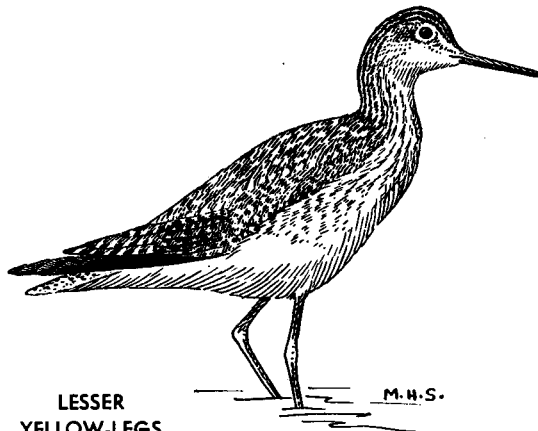
*Foods of Game Ducks in the United States and Canada*. Technical Bulletin 634, United States Department of Agriculture.

Numerous other reports by the State Departments of Conservation, and the Biological Survey and other government agencies, contributed isolated notes, as have the splendid State books that have been published: *The Birds of New York*, by E. H. Eaton, 1910, 1914; *Birds of Massachusetts and Other New England States*, by E. H. Forbush, 1925-1929; *Birds of Minnesota*, by T. S. Roberts; *Florida Bird Life*, by A. H. Howell, 1932; *The Birds of Canada*, by P. A. Taverner; *The*

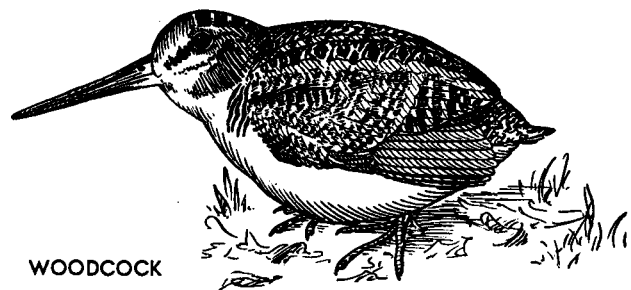
*Birds of Louisiana*; *The Birds of New Mexico*, by Florence M. Bailey, 1928; *Bird Studies at Old Cape May*, by W. Stone, 1937. Revealing past conditions are the writings of Bishop, Bruette, Grinnell, Hornaday, Mershon, Sandys, Sanford, Van Dyke, and others.



SORA RAIL



LESSER  
YELLOW-LEGS



WOODCOCK