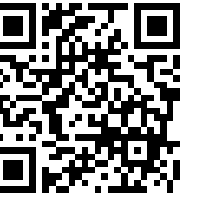
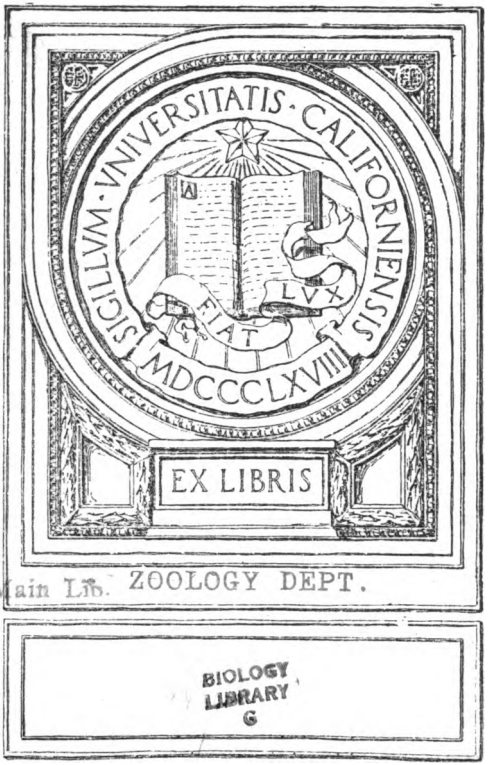


BIRDS OF WEST VIRGINIA

JOHNSTON



Birds of West Virginia

Their Economic Value and Aesthetic Beauty

1923

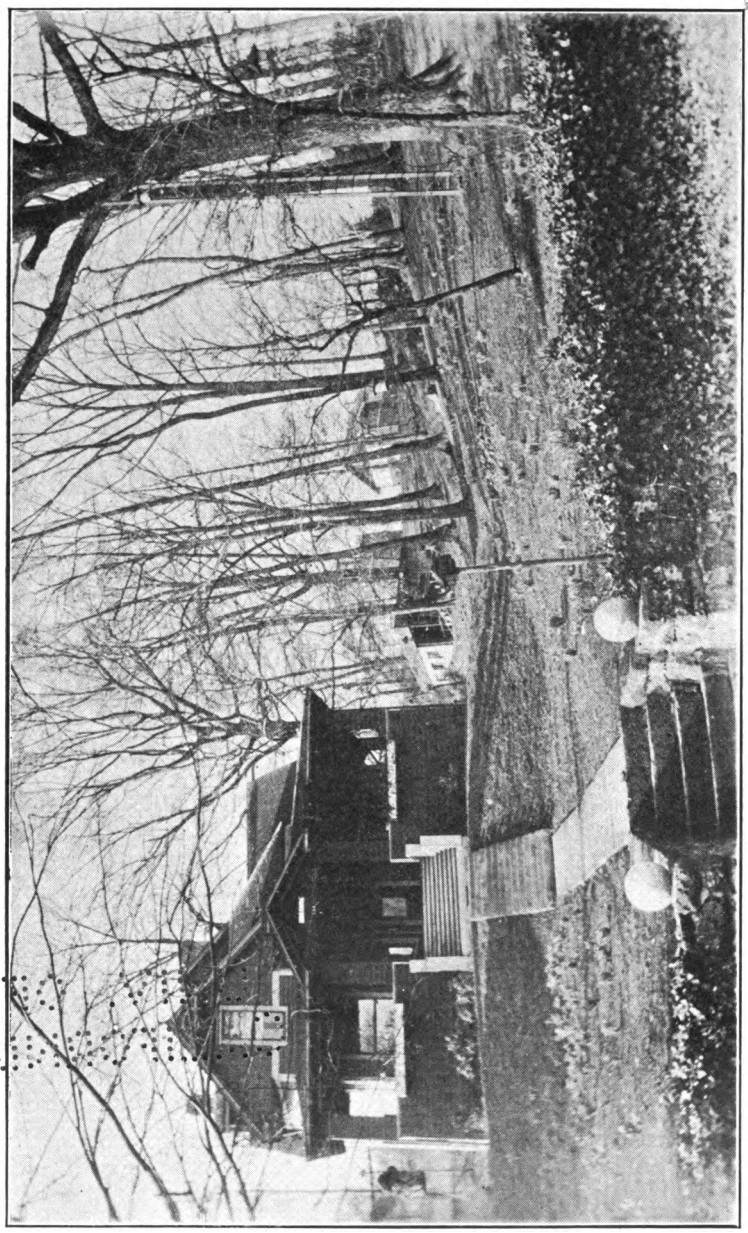
I. H. JOHNSTON, State Ornithologist

Compiled and Published by

STATE DEPARTMENT OF AGRICULTURE

CHARLESTON

J. H. STEWART, Commissioner



"Bird Haven"

ACKNOWLEDGMENTS.

It is a pleasure to make grateful mention of those who have been of service in the preparation of this bulletin. I am under especial obligations to the following:

To J. H. Stewart, Commissioner of The State Department of Agriculture;

To Edward Howe Forbush, State Orinthologist of Massachusetts, for the use of cuts and extracts from a number of bulletins published by him;

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To Earle A., Brooks, author of several West Virginia bulletins;

To William Leon Dawson, A. M. B. D., and Lynds Jones, M. Sc., joint authors of "The Birds of Ohio;"

To Elon Howard Eaton, author of "The Birds of New York;"

To the authors of "Birds In Relation to Man," Weeds and Dearborn;

And to the Biological Department at Washington, D. C.

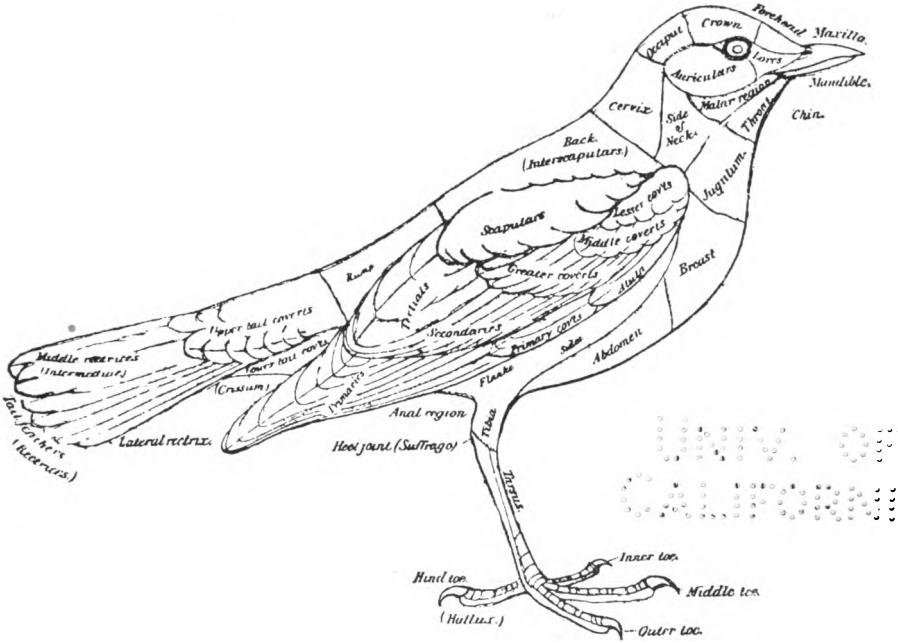
FOREWORD.

Our forefathers found this country teeming with wild life. So abundant was game that men believed the supply was inexhaustible. The story of its destruction and waste is too selfish and bloody to repeat. Old sportsmen who used to brag of their big kills are now ashamed to tell their children how improvident thy were. People were too busy developing themselves along commercial lines to pay much heed to the really beautiful and pleasing things in nature. But the mode of life and of thinking have changed and we find today a great unsatisfied hunger and thirst for more knowledge of our birds. This is not alone confined to naturalists but is found in the small boy on the farm. It is not strange, for the birds are not alone among the loveliest creatures, but also in the economic scheme of life the birds fill a place for which no other creatures can be substituted.

The author of this bulletin is employed by the State Department of Agriculture to prepare a work that would fill a long-felt want. It was originally planned to include fifty pictures of birds but Louis Agassiz Fuertes, the artist who drew the forty plates which have been used is under contract which would not permit him to furnish the ten additional plates for about a year. So, with keen regrets we have gone ahead and published the bulletin without further delay. The writing has necessitated a great deal of technical research; but the stories of the lives of the birds which have been told are from personal experience and have afforded me one of the greatest pleasures of my life. It would add much to my further enjoyment if I could meet and discuss the subjects treated herein with all of the rural and urban people of the State who are interested in bird lore.

I. H. JOHNSTON,
State Ornithologist,
"Bird Haven"
Charleston, W. Va.,

January 1, 1923.

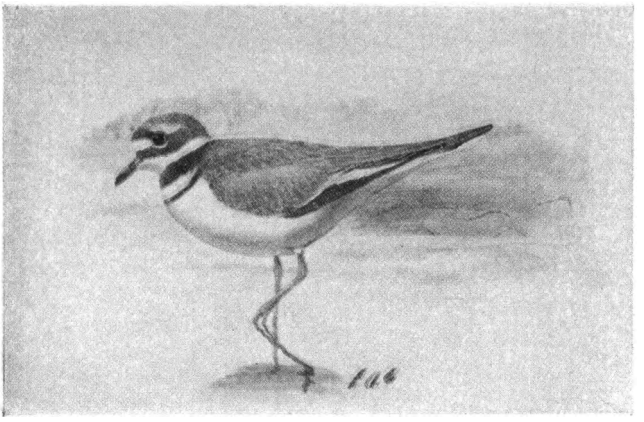


The Topography of a Bird

KILLDEER

A. O. U. No. 273.

Oxyechus vociferus.



Description—*Adults of both sexes:* Bill shorter than head, straight, stout; forehead, chin, and broad ring around upper neck, pure white; below the white collar is a black band, broadest in front, very narrow at the back where it is sometimes incomplete; below this is a white crescent across the chest, bounded below by a broad black band across the breast; rest of under parts pure white; a black bar across front of crown, and a blackish stripe from base of bill across side of head, bounding the white collar above; a white stripe back of the eye, usually ending in buff; top of head and middle of back brownish gray, the feathers often tipped with rusty; lower back, rump and upper tail-coverts light buff to deep rust-red; tail long, much graduated, the middle feathers blackish, tipped with brown the outer feathers white or buffy white at base, with subterminal black spaces and broad white tips; a conspicuous white wingbar, and both primaries and secondaries with large white patches.

Young: Show numerous rusty-edged feathers on the back and wings in fall.

Length: 10 to 11½ inches.

Nest: In a corn field, pasture or open old fields; sometimes a little lining of grass fills the little depression that the bird makes, but usually nothing but a few pebbles which may resemble the four dull buffy white *eggs*, thickly spotted with black.

General Range: Temperate North America, breeding north to New Foundland and Manitoba. Migratory to West Indies and central northern South America and Bermuda.

Range in West Virginia: Common throughout the state. Breeds in West Virginia.

THIS bird should be taken from the game list and be protected and encouraged to remain in the fields where it belongs.

Cowe called the killdeer "noisy plover"—a quite suitable name; but it is easier for people to remember him by the name killdeer, for he is not so bashful and timid that he is afraid to tell his name, and he likes to show off at every possible chance. When he is flying over at night it is the same, "Killdeer, killdeer!" He is a born tattler as every sportsman knows who has hunted ducks or shore birds; he always manages to be between you and the game, jumps up and yells, "Killdeer!" or "Killdee!" for all his life, warning the game that here comes a man who has killed a deer; so you had better look for him.

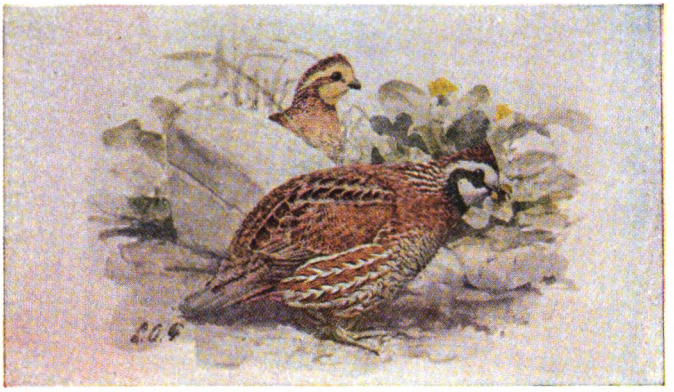
I remember one day I was hunting golden plover on Lake Erie and followed the plover for miles. Every time I would get near them the tattling killdeer would be just between me and the game. He would fly up and cry, "Killdee—killdee—dee—dee—dee!" in the most provoking manner. I decided to shoot him instead, so as he passed me I gave him the first shot but he changed his course just as I fired and I missed him. I quickly followed with the second shot, but he dodged me again, so I decided that he was welcome to live and tattle, for he had saved the golden plover's life at the risk of his own.

While the killdeer likes the lake and river shores, he prefers plowed fields and pasture lands to feed and rear his young. Did you ever try to find a nest of one of these birds? Well, when he or she, whichever is not on the nest, for they both brood, sees you coming, he flies to meet you and explains that it is just over on the other side of the field and you follow and then by his actions you will be just as convinced that it is in the next field. If you should find it by chancing upon it, when the old bird was brooding, it would be just a little depression in the ground with four eggs. She would flutter across the ground, apparently so badly crippled that you would be sure that you could catch her, but that is her game; her cries of distress are really pathetic when you catch her young but you have to have a sharp eye and be a good sprinter, for they leave the nest the day they hatch and are wonderful runners. It is a shame that these birds are retained on the game bird list. They are not considered a good table bird and have an extremely small body, although they look quite large when flying.

QUAIL

A. O. U. No. 289.

Colinus virginianus.



Common Names: BOB-WHITE, VIRGINIA PARTRIDGE.

Description—*Adult male in summer:* Forehead, line over and behind the eye, and entire chin and upper throat pure white, this throat patch bordered everywhere with clear black which forms a crescent on the chest and throat, the horns of the crescent formed by a stripe on each side from bill below eye; top of head mixed black and brown, the nape and back of neck similar, but sharply streaked and spotted with white; interscapulars and sides of chest pinkish brown, more or less barred with black; scapulars and tertiaries rufous or chestnut, heavily barred and spotted with black, the inner edges of tertiaries broadly margined with creamy or pure white; rump streaked with black; tail bluish ash, sprinkled with black and white; breast and belly pale cinnamon to dull white, the chest and breast with numerous v-shaped or brace-shaped black spots and bars; sides of breast and flanks rufous or chestnut, more or less streaked with black and white. *Female:* Similar, but the white head and throat markings replaced by clear buff. In autumn and winter both sexes show less pure black and white, and more rufous and buff, the inner edges of the tertiaries being then pure buff instead of white.

Length: 9½ to 10¾ inches.

Nest: Generally well concealed in brush or long grass, sometimes even approached by a covered arbor or tunnel through the grass, but more often exposed in at least one direction; deeply hollowed, well lined with fine grass. *Eggs.* from 10 to 24, white, unspotted.

General Range: Eastern United States and southern Ontario, from southern Maine to South Atlantic and Gulf States; west to central South Dakota, Nebraska, Kansas, Oklahoma, and eastern Texas. Breeds throughout its range.

Range in West Virginia: Common in all parts of the state excepting the higher mountain regions.

NO farm or orchard should be without them.

"Bob *White!*"is the challenge call of the quail. When he begins to call in the Spring it is a courting or a brooding note. No sportsman would think of shooting a quail when he whistles the cheerful call, "Bob *White!*" It is in the fall of the year when the quail whistles, "Quoi-ree! Quoi-ree"!, that the hunter loses the love and affection for this contented and useful bird. There is, however, a true feminine trait in the quail. They forgive man and renew their confidence in him every Spring, hoping and trusting that he will not backslide again. So they come into his garden and eat his squash, melon, and potato-bugs, hoping all will be well. But alas, the savage blood of man! He must slaughter when the cold weather comes. He is as cruel as a Turk.

Mr. Bob White is a true and devoted husband and sits on the eggs part of the day so that his wife may find food and make her toilet after a dust bath. I once observed a pair of quail feeding in the garden. When the male would find a bug or a choice insect he would call a low chuckling note. The female would run to him and eat the insect. Both of them acted much in the manner of chickens and to me it was very interesting.

I used to have a number of quail in a large pen. One day I found one of the females sitting on a dozen eggs in the dust box. For some reason she deserted the nest in a few days. The male continued to brood on the eggs for a week or more. When they finally hatched he mothered the young birds and showed a great affection for them, but the female, the wretch! would not own them and continued in the company of the other females who belonged to the "I-Will-Not-Assume-Family-Responsibilities Club."

We should protect these valuable game birds from their natural enemies, the Cooper Hawk and the cat. These destroy more birds than the sportsmen. We should have a number of small sanctuaries and game preserves in every county.

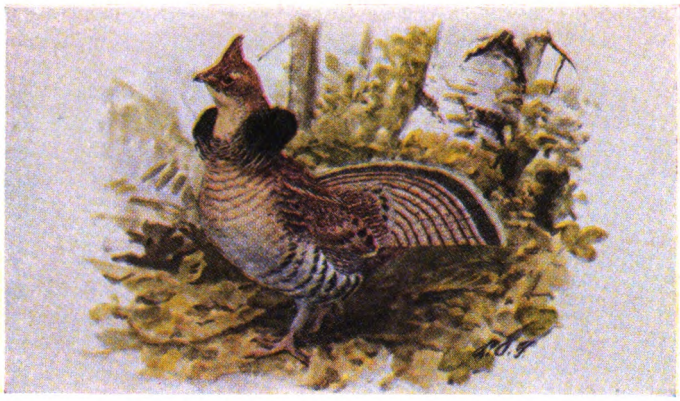
Quail can be propagated successfully. I have hatched them under a hen and had them so tame that they would eat out of my hand. They must have a large range so the young can get plenty of insects.

The quail have no bad food habits and are among the most beneficial birds we have. They feed freely on potato beetles and cinch bugs, clover leaf weevils, cotton boll-weevils, wire worms, locusts and grasshoppers. Weeds of eighty-five different kinds have been found to contribute to the bill of fare, and his marvelous appetite is only satisfied by his capacity. One stomach contained 1000 rag-weed seeds; another contained 5000 seeds of the green fox-tail grass. A quail killed in Virginia on Christmas day had eaten 10,000 pig weed seed. Every farm should have at least one covey, and the farmer should see that they are fed when there are heavy snows.

RUFFED GROUSE

A. O. U. No. 300.

Bonasa umbellus.



Description—*Adults*: Top of head with many arrow cross-bars of black, rusty brown and sometimes white; rest of upper parts mottled rusty-brown and whitish, the scapulars, interscapulars, inner secondaries and wing-coverts usually edged with buffy white and often with large spots of black; each feather of lower back, rump, and upper tail coverts with a lance-shaped or heart-shaped shaft spot of grayish white; neck ruffs clear sooty black, with greenish or purplish metallic gloss at the tip; tail rusty brown to sub-terminal black or brownish black band, and tipped by speckled gray or grayish white. Chin and upper throat clear buff, the lower feathers more or less tipped with dusky; remainder of under parts white, grayish white, or buffy white with numerous cross-bars of deep buff, brown or black, these bars strongest and darkest on sides and flanks, often more obscure on breast and belly,

Length: 15½ to 19 inches.

Nest: The female chooses a nesting site at the foot of a tree or stump or beneath a bush or small hemlock, scratches a slight depression in the ground and lines it with leaves. The *eggs* are 8 to 14, but usually 16, in number, and are a buffy color, usually plain, but sometimes speckled brown.

General Range: Eastern United States, and southern Canada, west to Minnesota, south in the mountains to northern Georgia, Mississippi, and Kansas.

Range in West Virginia: Common in the great deciduous forests in the hill region of the state.

HERE is a bird that should be protected in closed season, and we should do all in our power to encourage its propagation before it is too late.

The Ruffed Grouse is better known in this state by the name of

"pheasant", and in the northern states and Canada he is often called "partridge". With the exception of the wild turkey, the ruffed grouse is our finest game bird, and he tests the mettle of the best sportsmen when he springs up unexpectedly with a roar of wings. The gunner must be quick to draw a bead on him, or he will find that there is a tree between himself and the bird. One day while I was hunting a grouse flew up in front of a hunting companion of mine and he did not shoot, although the bird was in the open. I asked why he did not shoot, and he said because it was too close to him. He was really startled, for the grouse is a noisy bird on wing.

Grouse do the craziest things possible. In fact, they are often found in cities and villages. Only a few years ago I saw one on the river bank in front of the Ruffner Hotel in the city of Charleston. If a dog rushes in on a flock of grouse they will fly up in trees where they are an easy mark for the gunner.

While they are naturally a wild bird, they are easily tamed, and become great pets. Howard H. Cleaves, who is secretary of the Wild Life League of West Virginia, photographed a grouse that was so tame it would ride on a man's arm while he was driving a motor car.

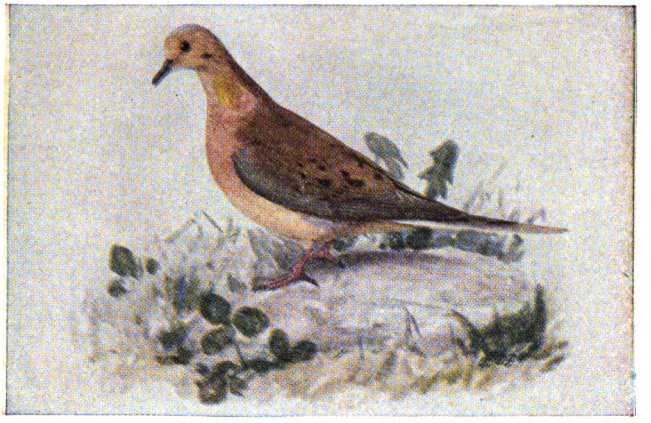
It is a great pity that these birds have been so slaughtered in past years, but under our new game commission our game is being better protected. The grouse can be propagated, but has to have a large run or they become too fat and die with gout or apoplexy. The males are very pugnacious and do not get along well with other males. They are rough on the females. They drive them off the nests and abuse them very badly, even when in the wild state. It is best to separate the males from the females after they have mated, for each egg does not require a separate fertilization like most other birds. They lay 9 to 13 eggs in confinement, but would probably lay the second clutch if the eggs were taken from them.

The grouse has many enemies—foxes, weasels, minks, Cooper Hawks, and great horned owls. Crows destroy their eggs, and if there is a cat, it will destroy a whole brood. One cat brought in eighteen grouse in one season alone.

MOURNING DOVE

A. O. U. No. 316.

Zenaidura macroura carolinensis.



Description—*Adult male:* Forehead, sides of head and neck, clear pinkish and buff, lightest and most buffy on the forehead and sides of head; darkest and most pinkish on the breast; chin nearly pure white; sides of lower neck glossed with changeable metallic violet or reddish purple; a small but distinct blue black spot on each side of the upper neck; crown occiput clear bluish gray, becoming brownish on back, rump, upper tail-coverts, scapularies and wing-coverlets; the inner wing coverlets and scapularies with distinct rounded black spots; middle tail feathers like the back; the others are blue at base, crossed with a broad black band and tipped white. *Adult female:* Similar but duller. *Young:* Similar to female but no black spots.

Length: 11 to 13 inches.

Nest. In evergreens, apple trees, top of stumps or rail of fence, or on ground. It is composed of slender twigs and grass stalks, lined with leaves or grass, and is quite flat and meager; two or three broods are raised. *Eggs*, white, illiptical in shape.

General Range: Temperate North America, from southern Maine, sometimes Canada and British Columbia, south to Panama and the West Indies, breeding throughout its North American range.

Range in West Virginia: Common all over the state.

VERY beneficial on account of the weed seeds it destroys and should be protected and encouraged to remain with us in orchards and cities, which it will do if not molested.

The mourning dove is sometimes called Carolina dove, or turtle dove. These birds are often mistaken for the Passenger pigeon, or wild pigeon but there are none of the latter left now, they having all been destroyed

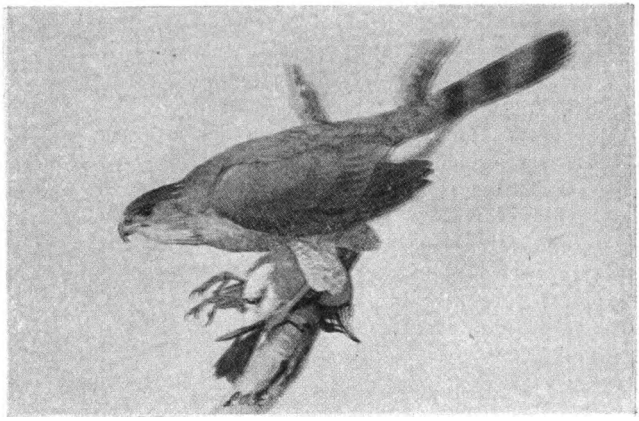
by man. In the mourning dove we have the most graceful of all our birds, built like a race horse for speed, with his full breast and long, tapering wings and graceful tail. Look at this cultured gentleman with his well-fitting suit of soft, blending colors, the real aristocrat! I do not think "mourning" dove is a good name. He should be called "Lovie Dove," for he is one of the most devoted lovers in the bird family. It is claimed that they stay mated for life. I hope they do; some day we will know for sure, because bird banding will tell the truth when our field work gets carried on in a more extensive area and we are able to trap more birds. Nothing compares with the love and attention the male shows the female when she is brooding on the nest. He feeds her until she refuses food, caresses her, kisses her in the mouth in the most effectionate manner, relieves her on the nest while she takes a dust bath and arranges her toilet, and when she returns he wants to stay and sit on the nest with her. He does not seem to want to part from her and when he does, he flies to a tree and says, "Two—two, just you and I," but in seventeen days there are another pair for the babies are hatched, and they as nest mates are devoted to each other.

When I was a boy I took a pair of young doves from a nest to raise. They became stunted because I fed them whole grain and did not understand that the parent birds regulated the food that they fed the young. It is always a strange sight to see doves drink like horses, for they hold their bills into the water until satisfied and do not have to raise their heads to swallow each mouthful. How I loved those birds! They would come to meet me; but alas! the cats got one; the other I had for several months but it went eventually by the same road; I cried, and the cat lived, for I was not permitted to kill it, since it is said to be bad luck to kill a cat. Ye Gods! What superstition has cost us;—millions of birds that we need so badly. While I write this, Texas pleads and begs that this useful and lovable bird shall be protected and taken from the game bird list; Ohio begs that they may have it replaced on their game bird list, so they can slaughter this beautiful creature that does more work than an average farm hand, and all he asks is to live and take some of the scattered grain that has been left in the fields. The stomachs of three doves when examined contained respectfully 7500, 6400, 9200, a total of 23100, weed seeds. Some claim that doves eat four times per day, but if they should eat only twice and eat 9200 weed seeds per meal, that would be a grand total of 5,716,000 seeds per bird in a year. Mr. Farmer, can you employ a farm hand who will work as faithfully as this bird? For sixty four per cent of the dove's food is weed seed.

COOPER'S HAWK

A. O. U. No. 333.

Accipiter cooperi.



Common Names—BLUE DARTER, BULLET HAWK, CHICKEN HAWK, QUAIL HAWK, OR PIGEON HAWK.

Description—*Adult male:* Top of head blackish or clear black, in strong contrast with the slate blue of the rest of the upper parts; feathers of occiput and nape of pure white below the surface, the white showing when the feathers are ruffled; under parts white or nearly so, the chin and throat lightly streaked, the breast, belly, and sides heavily barred, with reddish brown; primaries blackish on outer webs, the inner webs with broad and scanty bars of dusky white; tail rounded, similar in color to back, and with four or five broad blackish bars and a narrow terminal edging of white. Bill black; cere, feet, and legs yellow; iris reddish brown to deep red. *Adult female:* Similar to male, but duller, browner and decidedly larger.

Length: Male: 14 to 17 inches.
Female: 18 to 20 inches.

Nest: Place in trees, varying in height from 15 to 100 feet. The nest is commonly composed of sticks of various sizes and pieces of scale bark are used; it seldom has a soft lining but often pieces of bark: the *eggs* vary from 2 to 6 and are usually bluish white, or greenish white and unspotted, but occasionally a set is marked with spots of gray or brown.

General Range: North America from southern British Columbia south to southern Mexico. Breeds throughout its range.

Range in West Virginia: Tolerably common. Breeds in the state.

THIS bird should be destroyed whenever possible, but due caution should be taken not to kill the beneficial hawks.

We have only three hawks that are more destructive than beneficial.

The Goshawk is only a migratory bird and we are indeed fortunate that he is not a real resident. He is a very destructive bird to game, poultry, and other birds. He lives in the far north. The sharp-shinned is a much smaller bird. He is also destructive to game and poultry, but not so bad as the Cooper Hawk which is larger than the sharp-shinned and much more destructive. When you see a large hawk, do not make the error of calling him simply a "big old hen hawk." It is a common mistake to think that the bigger the hawk, the more deadly he will be to chickens. The hawks that sail around the fields are not looking for chickens. But the sharp-shinned and Cooper which are more bluish in color are the ones to fear. They usually keep under cover and come like "blue Blazes," an expression often used: I know of no better way of expressing the actions of these birds as they swoop down on a chicken right at your feet and carry it off. A hawk will return daily for them and you must have your gun in hand if you catch him because you do not see him as he keeps hid in the trees where he can watch without being seen.

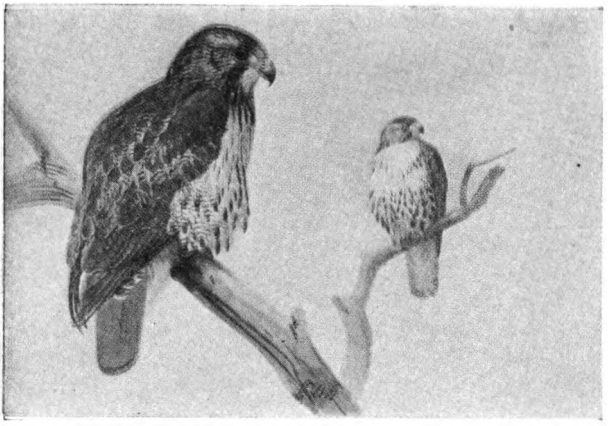
In some parts of the country the Cooper Hawk nests in all kinds of trees, usually 45 to 100 feet up. But Mr. Sidney Morgan, who is more familiar with the hawks than any man in the state, says that they prefer beech trees, particularly in Kanawha and Putnam Counties; but they often use an old crow's nest.

Out of 123 stomachs examined, 38 contained the remains of poultry and game birds, 66 the remains of other birds, and 12 the remains of mammals. Twenty-eight species of wild birds were identified in the above material. This species is, as Dr. Fisher remarks, "pre-eminently a chicken hawk." Its devastations in this direction are much greater than those of all the other hawks and owls together, with the exception of the sharp-shinned, which attacks smaller chickens. Michigan protects all the hawks except the sharp-shinned and the Cooper Hawks. These two hawks should be destroyed wherever and whenever possible, but care should be taken not to kill the beneficial hawks.

RED-TAILED HAWK

A. O. U. No. 337.

Buteo borealis.



Comon Names—HEN HAWK, RED-TAILED BUZZARD, WHITE BREASTED CHICKEN HAWK, OR BIG HEN HAWK.

Description—*Adults:* Dark brown above, more or less mottled with gray and whitish; under parts white or whitish, usually washed with buff on the sides of breast, only the belly streaked with dark brown or blackish; tail bright rust-red (rufous) above, usually with a distinct black bar near the end, the tip whitish; iris brown. **Immature:** similar, but the dark streaks on the belly so thick as to form a broad zone or band of blackish, and the tail not rusty at all, but gray, crossed by about eight narrow blackish bands.

Length: Male: 19 to 22½ inches.
Female: 23 to 25 inches.

Nest: Is placed high up in trees in the deep woods, but found sometimes in a tree in the open. The nest is a bulky affair of sticks, twigs, and some bark. The same nest is often occupied year after year. The *eggs* are two to four in number and they vary in markings. Part of the set may be dirty white and the remainder speckled or blotched with brown.

General Range: Eastern North America, west to the Great Plains, north to about latitude 60°, south to southern Mexico. Breeds throughout most of its range.

Range in West Virginia: Very common in the Ohio Valley and other portions of the state. Breeds in West Virginia.

MORE beneficial than harmful, except where individuals have formed the poultry-killing habit.

In August the Red-tailed hawks love to fly and soar to almost the

limits of the sky. It is an inspiring sight to lie on your back and watch a pair of the majestic birds fly in great spiral circles. Up and up they go, with the greatest ease. They seem just to float, for it is seldom that they give a wing beat. Sometimes they drift with the wind-currents, and pass out of sight at other times. Then they curve their wings under and come down with such a rush that you would think that they would bury themselves in the earth. You catch your breath and wait to see their finish, but as they near the earth, they swing suddenly upward and sail leisurely away to a tree or a stub, to look for game or to sleep for hours, just as fancy suits them, for they are birds of great leisure. They are often seen flying in slow measure across a field or marshland, looking for mice, snakes or rabbits, and when they find one, they sweep down and grasp it in their talons and carry it away.

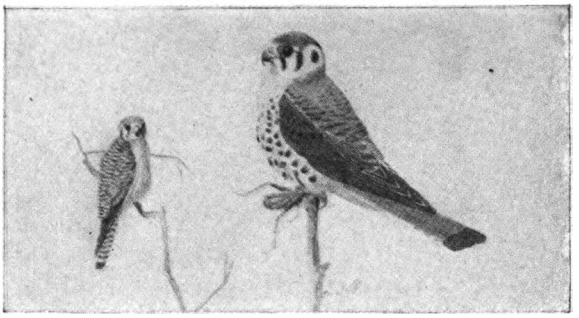
If crows or king birds attack a red-tailed hawk he does not mind just treating them with contempt and dignity by flying up in spirals, higher and higher, until the smaller birds lose their heads and are required to descend.

The notes of the hawks are "kee-aahr--r--r" but at the nest the female cries, "Ker-chirr."

The nest is occupied year after year if they are not molested. The red-tail is called hen hawk, although it seldom visits poultry yards, but if an individual does form this habit, it should be killed, for it seems to be an acquired habit rather than a general one. Out of 530 stomachs examined, 457 or eighty-five percent, contained the remains of mammals and pests such as field mice, pine mice, rabbits, several species of ground squirrels, pocket gophers, and cotton rats, and only sixty-two contained the remains of poultry or game birds.

"Dr. Warren found mice in one hundred and thirty-one of the one hundred and seventy-three stomachs he examined, while six of them contained rabbits; three, red squirrels; two, skunks; and eighteen, small birds. Poultry was found in four specimens, insects in three, snakes in three, and carrion in four. Thus, less than ten percent of the birds had eaten poultry."

SPARROW HAWK



A. O. U. No. 360.

Falco sparverius.

Description: *Adult male:* Top of head bluish gray, with or without a central patch of rusty black, rump and scapulars bright rusty, with more or less numerous black bars; each side of head with two conspicuous black bars, with three more black patches encircling the neck, seven black spots in all; chin and throat white, unspotted; rest of under parts white; either pure or rusty, and with or without streaks and circular spots of deep black; primaries black above, their inner webs with numerous white bars; remainder of upper surface of wing and coverts clear bluish-gray or bluish-slate, more or less spotted with black; tail with the basil three-fourths rich rust-red without bars (except sometimes on outer two pairs), then a broad subterminal bar of deep black and a narrow white tip. *Adult female:* Head markings precisely as in male, including the seven black spots, but entire upper parts back of neck, including upper surface of tail narrowly cross-barred with rusty and black, the subterminal black tail-band much narrower than in male and the tip rusty or buffy, not white; chin and throat white, as in male, but breast and belly thickly streaked lengthwise with rusty on a whitish ground; bill black at tip, bluish gray at base; cere and feet yellow; iris brown. *Young:* Resemble adults of the same sex.

Length: Male: 8 to 10 inches.
Female: 9 to 12 inches.

Nest: In cavities of trees, woodpecker holes, and sometimes bird houses. Take a note of this habit, to attract birds. *Eggs*, 4 to 7 in number, white, usually thickly speckled and spotted with cinnamon brown.

General Range: North America, east of the Rocky Mountains, and from the Great Slave Lake to northern South America.

Range in West Virginia: Common throughout the state. Breeds in West Virginia.

ONE of our beneficial hawks and should be protected and encouraged about the farm.

The Sparrow-hawk is the prettiest of all our hawks, as well as being the smallest. Sometimes it has been shot because it was mistaken for the sharp-shinned, also for the pigeon hawk. It is smaller than the above hawks and its rusty red color makes it easily distinguishable.

The female is larger than the male, which is usually the rule in birds of prey. The female is the "most deadly of the species." Do not kill either the male or the female in this instance, for this s one of our most beneficial hawks. They are to be found about the open fields, hovering over their victim. The hawk drops quickly to the ground and seizes the game which you will be surprised to learn is only a cricket or grass-hopper. What wonderful eyes they must have to see these insects so far away. Crickets, grasshoppers, terrestrial beetles and caterpillars constitute over half of their food. I have seen these birds feeding in Florida, Ohio, Michigan, West Virginia, and Ontario, Canada, and they were always hunting mice or insects, with one exception. One winter day I saw one chasing an English sparrow in the city of Charleston.

This bird is called-Sparrow-Hawk not because it lives on sparrows, although when insects are scarce, in the winter, it does hang about cities and kill a good many English sparrows which is more to its economic credit than against it.

When I was a boy I did not know that hawks were beneficial—while they were migrating along Lake Erie we used to shoot them until our guns got so hot we could not hold them, the hawks were so abundant. Dr. Fisher, who has made a special study of sparrow-hawks' food, says that it is almost exclusively insectivorous, except when this food is difficult to obtain. In localities where crickets and grasshoppers are abundant the hawks gather in flocks and do not take other food since it is so easily procured. When this food is not to be found they eat other insects, beetles, mice, snakes, lizards, and sometimes birds, mostly English sparrows. Sparrow-hawks nest in cavities, in trees, woodpecker holes and even bird houses. One brood is hatched.

BARN OWL

A. O. U. No. 365.

Aluco pratincola.

Common Names: GOLDEN OWL, CHURCH OWL, MONKEY-FACED OWL.

Description—*Adults*: Legs long and slender, the shank (tarsus) covered with short feathers above and with bristly, hair-like feathers toward the foot; outer toe reversible, as in all owls; the claw of the middle to pectinate (with a comb) on its inner edge (unique among our owls); facial disk narrowed and elongated, giving the bird a weird, impish expression, like that of a monkey or and old thin-faced man; none of the primaries emarginate on inner web. General color of plumage above ocher-yellow, silvered with grayish white and sprinkled with conspicuous dashes or spots, with grayish white and sprinkled with conspicuous dashes or spots, about half of each spot being black and the other pure white; under parts pure white, creamy white, or deep buff, thinly speckled with dusky; bill yellowish white; iris dark brown; primaries with four to six dusky bars on inner webs; tail with four or five narrow blackish bars, most obvious on upper surface.

Length: Both sexes are nearly the same size; unusual in birds of prey; the female is usually the larger.

Nest: None is built; the eggs are laid in a variety of situations, such as hollows in trees, holes in banks or cliffs, sides of wells, mining shafts, dovecots or barns, and church steeples. *Eggs* are pure white, 5 to 11 in number. The female begins to incubate as soon as the first egg is laid. Sometimes two broods are hatched.

General Range: Temperate North America, south to the tablelands of Mexico; breeds throughout its range.

Range in West Virginia: Quite rare.

VERY beneficial. Major Bendise said: "Looked at from an economical standpoint, it would be very difficult to find a more useful bird."

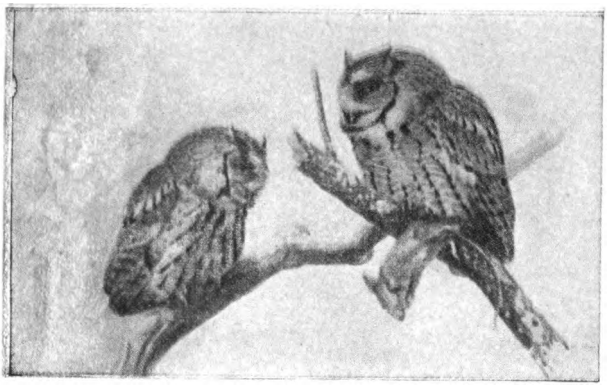
The barn owls are the most beautiful owls we have. This at first sounds ridiculous, for in form and general appearance they are anything but beautiful. It is the wonderful color of the golden yellow plumage and the fine soft texture of the featers that are admirable. All owls have soft feathers, for they must fly softly at night, for the nocturnal varmints are easily frightened, and are close to cover. The barn owl found in this country is very much like its European cousin. Its usefulness has been appreciated for a great many years, and yet we have never been far enough advanced to learn the beneficial habits of some of our owls except in a few of the western states. Canada protects all her owls. Barn owls hunt in the open and even take up their abode in the cities in old belfries. In the country he likes a barn, and if I were a farmer, I would destroy all my cats and get a pair of barn owls and encourage them to stay on my place. They are not migratory and would nest in the same place year after year. They do not build a nest but use a natural cavity in a tree, in barns, or old attics, and they are so quiet that you would not suspect their presence. Like all owls, they do not digest the bones or feathers or fur of the birds and animals they eat, but cast up little pellets, and it is easy to see just what they are feeding on.

Dr. Fisher, our greatest authority on the food of owls and hawks, says, "in a work on 'The Hawks and Owls of the United States,' published in 1893, "I recorded the results of the examination of 200 'pellets' or 'rejects' of the Barn Owl taken from one of the towers of the Smithsonian Institution, Washington, D. C., June 28, 1890. Since that time 475 more have been collected—125, September 14, 1892, and 350, January 8, 1896, making in all a total of 675 'pellets.' Thus abundant material has been carefully examined and found to contain the remains of 1,821 mammals, birds, and batrachians, as shown in the following table:

1,119 Meadow Voles	33 Short-tailed Shrews
4 Pine Voles	21 Small Short-tailed Shrews
452 House Mice	1 Star-nosed Mole
134 Common Rats	1 Brown Bat
1 White-footed Mouse	2 Sora Rails
20 Jumping Mice	4 Bobolinks
1 Rabbit	3 Red-winged Blackbirds

1 Vesper Sparrow
10 Song Sparrows
4 Swamp Sparrows
1 Warbler
6 Marsh Wrens
2 Spring Frogs

SCREECH OWL



A. O. U. No. 353.

Otus asio.

Description—*Adult in Gray Phase:* Upper parts brownish-gray, more or less mottled with blackish, many feathers of the top of head and back with black shaft-streaks; outer edge of many scapulars white or whitish, forming two conspicuous light stripes down back; facial disk gray with much dusky mottling, and bounded on its outer edge by a clear black border which is continued down the side of throat as a black stripe; under parts white or grayish white, with conspicuous black streaks and much finer and fainter wavy crossbars of dusky or black; outer webs of wing feathers with numerous white or buffy spots or patches, the inner webs barred with blackish and gray; tail gray with six to eight narrow dusky bars. *Adult in Red Phase:* Prevailing color bright rust-red, sometimes uniform above except for the white scapular stripes and an occasional blackish shaft line on forehead and scapulars; under parts mixed rust-red and white, usually with some black streaks, but sometimes all the markings very deep red; facial disk rusty gray, commonly bordered by black as in the normal phase; wing feathers and tail with same pattern as in normal bird, but the bars mainly of light and dark rusty, only partly blackish; bill reddish.

Length: 7½ to 10 inches.

Nest: In cavities and bird houses, with chips or rubbish in bottom; eggs are 4 to 7 in number, white as with all owls, and only one brood in a season.

General Range: Temperate eastern North America, south to Georgia and west to the Plains; breeds throughout its range.

Range in West Virginia: Abundant in many localities. Often breeds in West Virginia.

BENEFICIAL; should be attracted and encouraged to stay in orchards or outbuildings; will use the same nesting place year after year.

The screech owl is sometimes called mottled owl, red owl, gray owl, little horned owl, cat owl, or shivering owl. When you hear the little screech owl calling in the evening or through the night, do not think

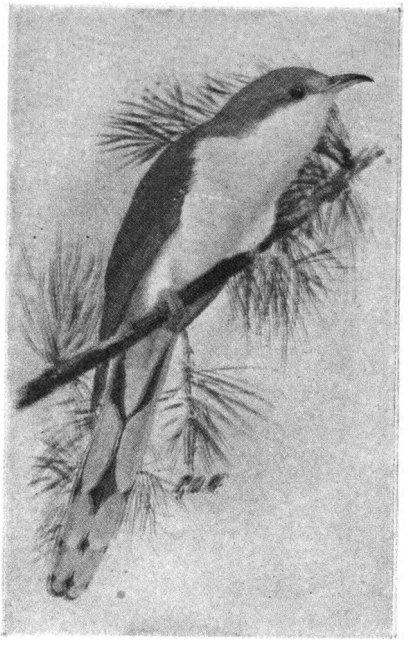
that it is out purely on mischief bent, for strange as these shivering notes sound to you, they are the love notes to his mate.

"The lark is but a bumpkin fowl,
He sleeps in his nest till morn;
But my blessings upon the jolly owl
That all night blows his horn."

You should get better acquainted with him. Just because he is nocturnal in his habits do not mistrust him. He is only a jovial little policeman and gathers in the rodents that prowl at night and the destructive moths that fly at night and deposit their eggs on trees or vegetation, that their young may sap the juices of tender vegetation or defoliate our trees and shrubbery. I have seen the little owl on several occasions when I was getting maple sap, catching moths that were attracted to the sap. The reason our Economic Ornithologists who study the food and food habits of our birds do not find a greater number of moths is that the birds are shot or taken in the day time for examination of their stomachs, and by that time the moths which digest so quickly have all passed through the birds' stomachs. We must not criticize the noble men who are doing this wonderful work in teaching the public just how essential birds are to our life; how they affect us economically. Here is one of the things that they have learned about the screech owl. Dr. Fisher says, "As many as 50 grasshoppers have been found in one stomach and 18 beetles in another. These are the adult form of the white grub. Still another had 13 cutworms." He further says that they eat scorpions, lizards, crawfish, and occasionally small birds, the majority of which are English sparrows which is a benefit. In Nebraska the examination of eight stomachs of the screech owl showed they contained 219 locusts and 247 other insects, besides two mice. One of the owls had eaten a small bird but he had eaten also 32 locusts and eight other insects. This owl is a great mouser. It prefers them to most other food when they are to be found."

If you have an owl around your barn or orchard, protect him and see that he has a place to roost and nest. He likes an abandoned flicker hole and will stay with you all the year around and hunt mice and other destructive mammals and insects for you. His family will be a mystery to you, for he and his wife may both be gray and their young may be of the red phase. All over the country they have this peculiar trait, part of the family being red, the other gray.

YELLOW BILLED CUCKOO



A. O. U. No. 387.

Coccyzus americanus.

Description — *Adults,* alike: Upper parts brownish, tinged with bronze; underparts dull white; throat and thighs tinged with pale ash; wing feathers largely rufus brown, especially on the inner webs, showing well when the wings are spread; tail feathers conspicuously tipped with white, except the central pair which are the color of the back; bill black, except the greater portion of lower mandible which is yellow; tip black. *Young:* Similar to adults, but colors and markings not so bright.

Length: 11 to 12½ inches.

Nest: A careless structure of twigs, lined with dead leaves and dried catkins; placed in trees or thickets low down; *eggs* 3 to 7 in number, pale greenish blue.

General Range: Eastern temperate North America, breeding from Florida north to New Brunswick, Canada, and Minnesota, west to the eastern border of the plains, and south in winter to Costa Rica and the West Indies.

Range in West Virginia: Common in most parts of the state. Breeds in West Virginia.

BENEFICIAL to horticulturists more particularly.

To some people the cuckoo is a bird of mystery because of his shy, retiring habits; for all they seem to know about him is that they hear and recognize his rather mournful notes and it seems to predict evil, for they call him the "rain crow." Why they call him a crow I cannot understand, for he has neither the color, the build, nor the habits of a crow. Nearly all the poetry about cuckoos was written for the European cuckoo whose habits of singing are entirely different from that of our birds. Lowell seemed to have understood our cuckoo better:

> "And, hark, the cuckoo, weatherwise,
> Still hiding farther onward, wooes you."

The European bird is more musical, but is a rogue and a parasite like our cowbird which lays its eggs in other birds' nests, shifting the responsibilities of motherhood on some other bird. Our cuckoo does not do

this that I have ever discovered, although a few records have been noted. It is a shame that such a beneficial bird should be so slandered. Even Audubon, Wilson, and Nutall accused our birds of eating the eggs and young of other birds. They surely did not learn it from observation. None of our later ornithologists seem to believe it.

Our cuckoo does sometimes use an old abandoned nest, but she usually builds her own nest on top of it. At best the cuckoo nest is a pretty poorly constructed affair, just a few sticks, almost flat, lined with grass and leaves and dry catkins; the eggs are laid very irregularly, two or four days apart. The female begins to brood as soon as the first egg is laid. Therefore sometimes you will find a fresh egg in the nest when the first bird is almost ready to fly. The young are not very pretty in the nest for they are all quills and look like porcupines until the day before they leave the nest when they seem almost to bloom. The quill bursts and they are like a little ball of silken feathers and are very pretty.

The habits of the black-billed and the yellow-billed cuckoo are very similar but the notes of the yellow-billed are "kuk--kuk, kuk--kuk," many times repeated, ending with the syllables, "Kyow, Kyow," repeated four to six times. Sometimes you hear him say, "Coo, coo, coo, coo," and to save your life you cannot tell if he is far or near. The notes of the black-billed are softer.

The cuckoo is noted for his taste for caterpillers, particularly the hairy ones that most other birds shun; even the stinging caterpillars have no terrors for him, for he eats them by the hundreds and does not bat an eye. Orchardists should have some thickets or thorn trees where the cuckoo could build their nest, for he is one of their most beneficial birds and steps should be taken to encourage and protect them.

DOWNY WOODPECKER

A. O. U. No. 394c.

Dryobates Pubescens.

Description — *Adult male:* Our smallest woodpecker; upper parts mainly black, striped with white; white stripes on sides of head and down the back; crown of head black with scarlet crest on nape of neck; under parts white, white feathers in side of tail barred, which is the only distinguishing mark between the downy and hairy woodpeckers, except the hairy is a little longer.

Adult female: A counterpart of the male except on red on nape. *Young:* Resemble the female.

Length: 6½ to 7 inches.

Nest: In holes of rotten stubs or limbs and bird houses. *Eggs*, 4 to 6, white.

General Range. Middle and northern portions of eastern North America and northward.

Range in West Virginia: Very common in most parts of the state. Breeds in West Virginia.

BENFICIAL especially to orchardists, but great benefit to all trees and forests. The Biological Department in Washington claims woodpeckers are worth twenty dollars apiece.

What an interesting little bunch of feathers the downy woodpecker is! In the winter season he is found to be the leader of a troupe of feather friends which may be found ten to twenty-five in number, composed of the folowing: chickadees, white-breasted nuthatches, tufted titmice, goldfinches and sometimes a couple of downy woodpeckers, but usually just one or not more than two, for they do not stay paired in winter. He keeps a sharp eye on what is taking place as he works his way, spiral fashion, up the tree, tapping his sounding horn or bill which is his tuning fork to see what juicy worm has tunnelled under the bark or into the wood. So acute is his sense of hearing that he can tell if the worm is at the top or at the end of the tunnel and quickly hammers a hole above or below it, and runs his tongue into the cavity to impale the worm on his long slender tongue which extends far beyond the bill and has barbs for the purpose of holding the worm when it is drawn out of the tunnel.

While the downy is busily engaged in searching for food on and under

the bark, if you should chance along and step on a stick and break it, the other members of the troupe would take to their wings, but downy, being of a curious, cautious, friendly nature, just sits tight and carefully cranes his neck around the tree to see what caused this disturbance. If it is a man who appears to be as harmless as he should be, the downy will fly, flitting from tree to tree, calling, "Pink! Pink!" as much as to say, in a confiding manner, "Hold on! This fellow is all right."

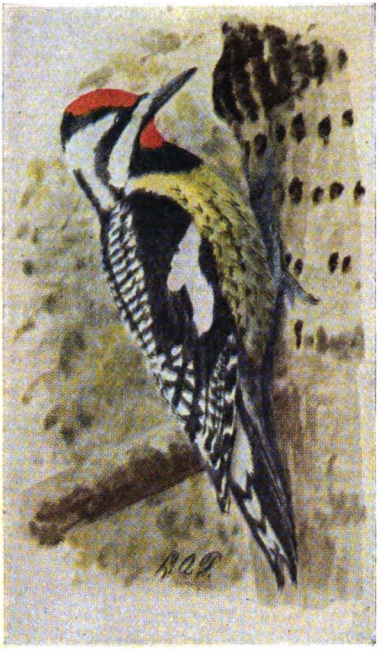
But one time a downy was almost caught asleep on the job, by two little savages (the writer and another boy) who were out hunting birds with sling shots, the example having been set by men who hunted all kinds of birds with guns in their ignorance, not knowing that mankind owed his life and prosperity to the birds. I spied a downy woodpecker asleep on a stump and decided to catch him alive. I crept stealthily in true Indian fashion and just as I was closing my hand on him, it was suddenly jerked backward by my companion who was jealous of my stalking ability, and the downy escaped with his life, minus one feather.

The downy woodpecker is almost the exact counterpart of the hairy woodpecker, except smaller; in fact, he is the smallest of our woodpeckers and will be found in our cities and orchards and would remain all the year around if the proper nesting sites were provided. He is our ideal orchard bird, for he destroys the fat-headed borer so destructive to fruit trees. Dr. D. S. Kellicott of Columbus, Ohio, claims that the downy woodpecker cleared out all the cocoons of the tussock moth that infected the elm trees in that city and destroyed many larva of the maple aegerrian, a pest of shade trees.

YELLOW BELLIED SAPSUCKER

A. O. U. No. 402.

Sphyrapicus varius.



Description: — *Adult male*: Forehead, crown, chin, and throat crimson; sides of head with two white stripes; and three black ones; the lowermost black one bordering the red throat and running into the conspicuous velvet black patch on the upper breast; the rest of underparts yellowish white; the sides and flanks spotted; streaked or barred with blackish; upper parts mixed and white; the rump and upper tail coverlets nearly white; wings spotted black and white, and a conspicuous broad white stripe on greater coverlets; two middle tail feathers mostly white on inner webs; outer tail feathers with narrow white edges or dots. *Adult female*: Similar to male but the red on chin and throat replaced by white; red on crown mixed by gray or brown. *Young*, of either sex, usually no red.

Length: 8 to 8¾ inches.

Nest: In cavities high up. *Eggs*, pure white, 5 to 7 in number.

General Range: Eastern North America north to about latitude 63½°, breeding from Massachusetts northward, south in winter to the West Indies, Mexico and Costa Rico.

Range in West Virginia: In the greater part of the state this species occurs as a common migrant in spring and fall. Earle Brookes found this species in great numbers in the Spruce Mountains in 1908, and one nest was found.

We have only one really true sapsucker and that is the yellow-bellied. Much is to be told of this bird and his destructive habit of sap-sucking, He has the habit of boring holes in the trees and eating out the cambrium, the layer just beneath the bark of trees. The loss of the cambrium is of greater importance than the loss of the sap. If he did not make the holes so close together it would not be so injurious. Some observers say that these little sap holes are mostly for the purpose of catching insects, while others swear they think that it is is entirely for the sap. The truth is that no doubt some have formed the drunken habit the same as men, for I find that all birds of the same kind do not have the exact

habits of their kind just as some lions are known as man-eaters and others are not. My belief is from observation that the sapsucker does destroy a great many insects. One observer watched one of the birds while on a house and said that the bird did not move away from his taps over three feet in seven hours, sipping the sap; and no word was mentioned about its taking insects. Elon Howard Eaton in "New York Birds" tells that in his observations he has frequently watched a sapsucker which had tapped a dozen trees in the same immediate vicinity, each one of which he visited in turn, lapping up the sap from all the holes with his bushy tongue and then passing on to the next by merely casting himself backward from the trunk of one tree to the next with not a stroke of the wing; he adds that he has seen them so gorged with fermented sap that you could pick them up in your hand. Earl Brooks noted this bird eating insects when it was drinking sap and believes that he does destroy insects that are harmful to trees; he further says that Dr. A. D. Hopkins who has made a special study of the effect of the birds' work on trees says that they are responsible for the birds' eye maple that is so much prized, and adds something to his beneficial habits. The sapsucker nests in our highest mountains in this state. I would like to know just how much damage he really does, for he surely does harm to some of our trees in this state; but I would not advise the destruction of sapsuckers except where you were sure about a particular bird's being destructive, and at the same time be careful that it was not one of our very beneficial woodpeckers. They feed the young a great many insects that are gathered in the forest where the birds nest, and do their loud drumming which is easily distinguished from that of other woodpeckers. His notes are "Cac-cac-cac" that he calls as he flits from tree to tree during the mating season.

NORTHERN FLICKER

A. O. U. No. 412a.

Colaptes auratus.

Description — *Adult Male*: Upper parts brown, barred with black; white rump; crown of head ashey-gray; bright scarlet band on back of head; black mustaches; black crescent on breast below throat; belly brownish gray with black heart-shaped polka-dots; under wings and tail except tip, golden yellow. *Female*: Much like male, except no black mustaches. *Young*: Similar to adults except markings are duller.

Length: 12 to 12¾ inches.

Nest: In a hole in a dead tree stub or telephone pole or bird houses; *eggs* seven to nine, glossy white in color.

General Range: Northern Flicker inhabits North America from the limit of the trees in Alaska, South to Texas and North Carolina. Winters in southern states.

Range in West Virginia: Abundant in all parts of the state. Breeds commonly.

BENEFICIAL, more particularly on account of the ants which he eats. The stomach of one contained 3,000 and another 5 000 ants; these ants, besides being wood borers, care for and protect the aphids which are so destructive to vegetation.

Flickers have a great number of local names; they are called the yellow-shafted flicker, golden-winged woodpecker, yellow-hammer, high-hole, high-holder, pigeon woodpecker, "Wake-Up," and many other local names. If you are just a little bit acquainted with birds you will probably know him for he does not live in trees like other woodpeckers but takes the greater part of his food from the ground and less from the trees. When you see a bird about a foot long with a black crescent below the throat, black heart-shaped polka-dots on the breast, yellow under the wings and tail, and when he flies it is with an undulating flight, displaying the white rump, you may be sure that it is a flicker.

It is in the spring time that you will know him best, when he is doing his courting; to us poor humans his antics look ludicrous, but for all that, he seems to understand what pleases the female of his kind,

for he is usually a successful wooer. If you hear his "Wick up! Wick up!" call, and his loud drumming, for he is a drummer like all woodpeckers, look him up and see his love antics. They may be even two or three males and one female in a tree. One male will start toward the female who will be on a horizontal limb for the purpose of being courted. As he edges near her, he begins to bow and scrape and gesticulate, all the time pouring out his love notes. He even lets his body swing under the limb for the purpose of exposing the beauties of his golden wings. The female pretends not to notice or becomes bored with his attentions and flies to another limb. He or some other gallant admirer renews the performance. This courtship continues for several days. When the coy damsel makes her choice, which all female birds do, she joins him in the tango or foxtrot on the limb, each vieing with the other to see who can dance the better or call each other the more endearing terms.

They then begin the home building which is in a hole on a dead tree stub or a telephone pole. and usually has seven to nine white eggs, but the female is one of the few birds that try to count or at least have what looks to be the proper number. Numbers of times people have been cruel enough to take away an egg a day after she had laid several and she would continue to lay eggs. One case is recorded that the female laid sixty-two eggs in seventy-five days. This poor bird had one satisfaction, for the male flicker keeps up his courtship until the young are hatched. Then he has to hustle to keep feeding his hungry family. Soon after they hatch they hang on the sides of the hollow and call lustily for food, until when nearly grown a nest of young flicker sounds much like a mowing machine.

The writer banded some young flickers here. One was shot in Monticello, Ga., that winter and one was reported from Alabama. This shows that our West Virginia flickers spend the winters in Georgia and Alabama. Unfortunately, he is another of our useful birds that has been shot for game; just why it is hard to tell, for his flesh is dark and muscular and without much favor, and as they are nearly always shot while sitting, it is not sport. The migratory bird law has about put an end to this butchery and waste of one of our valuable helpers in keeping down the insect pests. More than half of the flickers food consists of ants and most of the ants are the kind that are harmful to corn. I consider him very beneficial.

NIGHTHAWK

A. O. U. No. 420.

Chordeiles virginianus.

Common Names—NIGHT JAR, BULL BAT.

Description — *Adult male:* Upper parts black, mottled with buff; white spots on wing, throat, and white bar on outer tail feathers. *Female:* Much like male, except throat buffy, wing spots paler and no white bars on tail. *Young:* Similar to female except mottled above and less barred below.

Length: 9 to 10 inches.

Nest: The nighthawk does not build a nest. Lays two eggs on the ground on a rock or on the flat roof of city buildings, but never under trees or bushes. The *eggs* are eliptical in shape and the markings vary greatly. Like the birds, they depend on color to blend with surroundings. If you disturb this "nest" the birds carry the eggs away in their mouths to another place.

General Range: Northern and eastern North America, west to the Great plains and central British Columbia. Winters in South America from Brazil to Argentina.

Range in West Virginia: Common, especially in August and early September when they pass through this section on their autumn migration flights. Breeds in the state in the city of Charleston.

Few people know the correct name of the nighthawk and seem to understand its habits very little. It belongs to the "goat-sucker" family, and is related to a European family of birds that have a large, flat head, with a small bill and extra large mouth. People in their ignorance believe that the birds suck the cows; which of course is ridiculous. The common mistake made in this country is that so many people think that the nighthawk and the whippoorwill are the same bird. To use the words of an Irishman, "they are exactly the same, only entirely different." Their colors are quite similar and their heads are shaped alike, being large and flat, with a very small bill and an extremely large mouth. The whippoorwill has long, hairy bristles on the side of his mouth which the nighthawk does not have. Males of both species have a white "V" shaped mark on the throat. The nighthawk has long, tapering wings with white spots; the whippoorwill's wings are broad and have no white spots. The nighthawk's tail is slightly forked, with white bars near

the end of the feathers, except the middle feathers. The whippoorwill's tail is rounded, with outer tail feathers tipped white about half their length. Whippoorwills and nighthawks both sit on limbs or fence rails lengthwise. Their feet are so feeble that they cannot hold on in the usual manner, and they are less apt to be seen, in this position.

The whipporwill is seldom seen on wing, for he is more nocturnal in his habits. The nighthawk will often be seen flying high on clear days, but usually in the evenings, catching insects by the hundreds with his wide mouth as he hawks them in the air. The name "hawk" applied to him caused a great many to be destroyed in Pennsylvania and cost the state considerable money and the loss of many birds, for the Scalp Act for hawks did not discriminate between the two different families of hawks. "Bull" was applied to his name for the sound that he makes when entertaining his mate while she is on the nest. It is not made with his mouth, as is generally supposed, but is made when he is flying high, by descending rapidly, turning upward suddenly when he nears the nest. The wind rushing through his wings makes the bull-like sound. While on wing in spring and summer he makes a note repeated twice, "Peent! Peent!" I have never heard one make the note when migrating in August. His bat-like stunts while he is taking insects on the wing give him the name of "bat."

In 1897 the nighthawk was very abundant but sportsmen, not realizing his great economic value, began to shoot the birds for sport as well as for food. I have seen a good gunner kill fifty in one evening. Some of the gunners carried a bucket of cold water and a wiping rod to cool their guns when they became so hot they could not hold them on account of shooting so rapidly. The migratory law which protects these birds has had a wonderful effect and they are seldom shot now. To see the air filled with these graceful and beneficial birds is a great pleasure.

KINGBIRD

A. O. U. No. 444.

Tyrannus tyrannus.

Description—*Adults*, sexes alike: Upper parts slaty gray changing to black on head; crown has a few orange feathers only visible when he raises his pompadour; tail, black, tipped white; underparts white; side of breast grayish tinged. *Young:* Similar but no bright feathers in crown.

Length: 8 to 9 inches.

Nest: Most often in orchard trees but sometimes on a post; in some localities prefer to be near water; the materials used are as variable as the building site; uses weed stalks, sticks, grass, wool, and strings; occasionally all wool, and again nearly all strings. *Eggs*, 4 or 5. in rich creamy white, coarsely spotted with reddish brown, chocolate and lavender.

General Range: North America, from the British provinces, south; less common west of the Rocky Mountains. Winters in southern Mexico to South America.

Range in West Virginia: Common throughout. Breeds in the state.

BENEFICIAL to agriculturists, bee and poultry raisers; and to horticulturists.

"All hail the King!" Such is the praise sung by some of our small defenseless feathered friends; even the barnyard rooster praises the kingbird for his fearless attack on some hawk which he fears would destroy his home. Yet it may not be all for the protection of his family. I fear that he is a braggart and loves to show off. I have watched the kingbird make many a flying attack. It is never a fight, because the crow or hawk always takes to his wings to get away, hard-pressed by this brave little fellow who tweaks out a mouthful of feathers in no friendly way. He continues to pursue the fleeing enemy for a long distance, and when the conquering hero returns, he starts to brag of his wonderful fighting ability long before he gets back to his nest. The kingbird will attack hawks, owls, crows, jays and even black snakes and cats. He is like some people; he has never learned to discriminate between the hawks; if he had, he would know that some hawks rarely

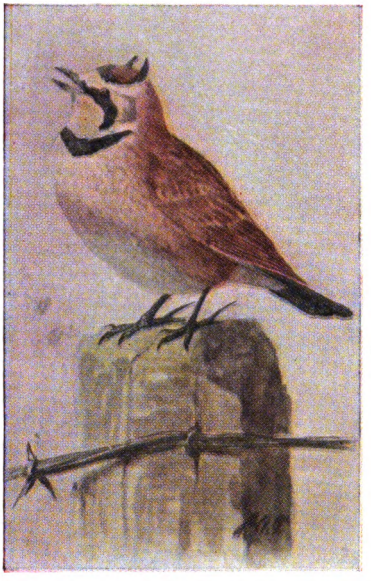
ever kill a bird or a chicken and are very beneficial, for they eat a great many insects such as grasshoppers, locusts and injurious vermin.

There are a few things that the kingbird learns that his hero-worshiping wife would not like to tell the public. He will not attack a catbird, and on numerous occasions he makes an error by starting a scrap with the western burrowing owls who stand on their dignity for being great mousers, and they never fail to put Mr. Kingbird to flight in all of his attacks. Just why he should shrink from a shrike in such mortal terror, when the shrike attacks only small, defenseless birds, it is hard to tell; it might be that the red feathers which crown his head are a birthmark that one of his ancestors received in a battle with a shrike, and he is ashamed to acknowledge this scar of defeat.

The kingbird is a faithful husband and a splendid neighbor; his nest has been found in a tree with a robin's and an oriole's, each within five feet of his own nest; Lynds Jones reports this, and Dr. Brewer also records an exactly similar case.

The Kingbird is often called the "bee martin" because he kills bees. In fact, he does kill bees; but let us look up his record. The Biological Survey examined 281 stomachs; only fourteen contained honey bees, and just fifty bees in all. Forty of these were drones, four workers, and six undetermined; but the kingbirds had eaten 19 robber flies. The taking of the drone bees was a benefit; the taking of the workers may have been accidential; but the taking of the robber flies, which are a deadly enemy to bees, is of great importance. Then we will place the kingbird where he rightly belongs, beneficial to bee-growers and horticulturists, for he usually nests in orchards where he can protect the chickens from hawks, although in some places he prefers to nest near water, and once I found a nest on a pile in Pine Lake, Michigan.

PRAIRIE HORNED LARK



A. O. U. No. 474b.

Otocoris alpestris praticola.

Description—*Adult male*: Upper parts dark pinkish brown, brightest and clearest on the nape, shoulders, rump and upper tail-coverts, the back and scapulars more grayish and heavily streaked with brown; throat sometimes decidedly yellowish and sometimes almost white, with just a perceptible tinge of yellow; front of crown, ear-tufts, lores, line under eye, cheeks and a broad crescent on the chest, black; forehead and line over eye grayish white to pure white, auriculars grayish white also; lower breast whitish, shaded at the sides with pinkish brown and usually more or less streaked with dusky; belly tail-feathers grayish like the back, the bill bluish black or horn color; iris and under tail-coverts white; primaries brownish, darker at tip; middle brown. *Adult female*: Similar, but smaller, grayer, duller and more streaked. *Young:* Birds just out of the nest lack the ear-tufts, but show the long hind claw; upper parts garyish brown, mottled with blackish, the head and neck thickly sprinkled with small white spots, and most of the wing-feathers and coverts with white edgings and narrow black submarginal lines; under parts mainly whitish, the breast with numerous dusky spots or streaks, but with little or no sign of the black crescent.

Length: Male: 7 to 7¾ inches.
Female: about 6¾ inches.

Nest: Is always placed on the ground, in a hollow scooped out by the birds; consists of vegetable fibers carefully interwoven, and sometimes quite thick and warm. *Eggs*, three to five in number, varying from olive to dirty white, and finely and thickly speckled with brown.

General Range: Upper Mississippi Valley and the region of the Great Lakes to New England, breeding eastward to northeastern New York and western Massachusetts, New Hampshire, and Vermont, and migrating south to South Caolina, Texas, etc.

Range in West Viginia: A new-comer into W. Va. Within the past ten years this bird has extended its range into nearly all parts of our state. Now breeds in many of our counties.

THIS bird should be protected and encouraged on our West Virginia farms.

Three different kinds of the horned lark are probably found in this state in the winter, but only the prairie lark breed in this state, and it is only in recent years that it has taken up a permanent residence here. At one time it was considered purely a northern and western bird, but has gradually extended its breeding ground as far east as Massachusetts. Several theories are advanced for this extension of breeding grounds, but I believe that its being a prairie bird and loving the open country, found that man had created a new field for it when he cleared the forest and made large fields.

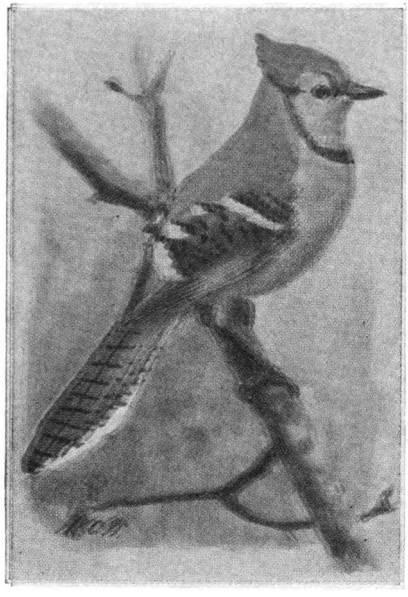
These little birds are closely related to the English skylarks. They have the flight-song similar to the English cousins but they do not sing with that flow of the spirit untamed. If you wish to enjoy a treat, locate this bird's nest and in the evening you will see him rise just as the sun is setting. He rises in easy graduations, in sweeping circles, singing low and sweetly. He pauses in mid air to sing his notes clear and full, then he continues his upward flight and further than eye or glass can follow him. You will believe that the heavens have claimed their own when his notes are heard again becoming nearer and clearer as he lets himself gradually down. Finally, with folded wings, he suddenly drops to earth, alighting almost as softly as a feather.

These pretty little fellows are to be seen walking or running about like quail. They are not hoppers, like so many of our birds, and when alarmed they raise their little ear-tufts or horns like an owl's, except that they are pointed backward. Being purely a field bird and a walker, they do not alight in trees, but will light on a post or fence rail, preferably on a clod in a plowed field.

They begin nesting very early and raise two broods. Probably the first nest in northern Michigan sometimes contains young before all the snow has left the fields. They are very secretive about their nests, and it is hard to locate one, for the female, even when carrying food to the young, alights far from the nest and runs along the ground to it.

Here is another mistake man has made: the horned larks used to be trapped and shot for game, but we have learned that they are very beneficial, for they are great weed seed eaters, besides being consumers of insects. Examination of 1154 stomachs collected in all parts of the United States and southern Canada showed that the food of the horned larks consists of insects 20.6 percent, and vegetable matter, nearly six-sevenths of which are weed-seeds, 79.4 percent.

BLUEJAY



A. O. U. No. 477.

Cyanocita cristata.

Description—*Adults* (sexes alike): Forehead, spot in front of eye, crescent on chest continued into collar encircling the neck, deep black; top of head, including conspicuous crest, back scapulars, rump and upper tail-coverts, bright blue without spots; upper surface of wings bright blue, the secondaries, tertiaries and broadly tipped with pure white; tail-feathers blue, barred narrowly with black, all except the middle pair with deep white tips; throat grayish white, with a purplish tinge; breast and sides dusky gray; belly and under tail-coverts pure white; bill and feet black; iris dark brown. *Young*: Similar, but duller, the crest shorter and markings less sharply defined.

Length: 11 to 12½ inches.

Nest: Usually placed in evergreen trees, in shade trees, or in orchards; *eggs* are 3 to 6 in number, very variable in color, the ground color being pea-green, olive-green, or even buff or cream-colored, heavily spotted with brown and lavender.

General Range: Eastern North America to the Plains, and from the fur countries to Florida and eastern Texas.

Range in West Virginia: Rare in Ohio Valley. In some places quite common, though the abundance or rarity of this species in any given place varies greatly from year to year. More common in the rougher parts of the state.

BLUEJAYS do more good than harm and should not be destroyed without being sure of each individuals cannibalistic habits.

"You beautiful creature, you are not so bad as some people would lead us to believe." How quickly people will take to gossip! It is the vile things they have heard that they prefer to listen to, what is told in whispers; they do seem to talk so little of virtues until the end has almost come; then people are more inclined to be charitable. Some writers heap all the abuse upon this handsome bluejay, in an attempt to make you think that he is wholly bad like "Peck's Bad Boy;" but why call all the boys bad because some have fallen into bad habits I do not say that all jays are sinless, not even one; but some are just like

bad boys, hard to understand. The jays are mischievous and crow-like in their habits and they are often found to be great jokers. They are also mimickers, and even more; they are ventriloquists, calling like a red-tailed hawk and sending terror into their feathered nieghbors. One writer tells about a jay that hid himself in a thicket and imitated a northern shrike (or butcherbird) so perfectly that it almost paralyzed a flock of tree sparrows with fright. Whether he did this to be cruel or for a joke it is hard to tell. More than likely he was just practicing some notes that he had heard which suited his fancy. The bluejays have a number of harsh cries, but they have some sweet warbling notes that appear to be love-notes.

Bluejays are accused of robbing other birds' nests, killing the young, and sucking the eggs; but this habit is not as universal a habit as some would lead us to believe and is usually indulged in when they are feeding their young. Many a man has robbed his fellowmen and made their children suffer in order that he might provide for his own—not that I approve of either man or bird in this butchery and robbery; I mention this to show that birds often have some of the same traits as we poor humans have.

If you should see a flock of bluejays in winter you would be charmed with their wonderful plumage of blue, with bars of black on wings and tail, and just enough white to give dash. He is a tree planter and great forests of oaks are credited to him, for he spends hours some days hiding acorns, particularly in pine woods, and in eating acorns he destroys great quantities of injurious insects that feed on the acorns. I have never heard of anyone giving him credit for these insects that he destroys; the oaks are afflicted with four hundred kinds of them. The evidence gleaned from 292 stomachs showed 24 percent animal matter and 76 percent vegetable matter. Only two showed birds' eggs and three the remains of young birds. It seemed that they always preferred acorns to corn when they were obtainable. The bluejays destroy many noxious insects, grasshoppers, caterpillars, and do more good than harm.

CROW

A. O. U. No. 488.

Corvus Brachyrhynchos.

Description—*Adults:* Feathers of the throat broad and blended at the tips, like those of the breast and back; entire plumage black, as in the raven, with similar greenish, bluish and purplish reflections; bill and feet black; iris dark brown. The sexes are nearly alike in size and color, though females may average a little smaller. The *young* just after leaving the nest are duller black than the adults, lacking the glossiness and metallic reflections.

Length: 17 to 21 inches.

Nest: Is always bulky and consists largely of sticks, twigs, grasses, roots and similar fibrous material, to which sometimes masses of sod or even mud may be added. The nest is usually placed at a considerable height above the ground, and in regions where evergreens are plentiful, these are most often selected. The *eggs* are commonly five or six in number, but may range from four to eight. They vary interminably in color and markings, but usually have a bluish or greenish white ground color heavily spotted and blotched with different shades of brown.

General Range: North America, from the Fur Countries to the southern border of the United States. Locally distributed in the West.

Range in West Virginia: Common. Along the Ohio River this species sometimes gathers in large flocks to spend the winter months. Breeds commonly.

CROWS should not be destroyed in cases where there is *very positive* evidence of the destruction of crops, or of an individual having formed the cannibal or fowl-killing habit. Corn will not be pulled up if the corn is given a treatment of tar.

"There were three crows sat on a tree,
As black as black could be."

Can you imagine when traveling through the country how much you

would miss these wise old rascals that are always seeming to study the habits of Mr. Man and anticipating just what the man is doing or trying to do? The crow has learned many of man's habits by his long association with him. I have fooled many a crow by doing things just a little differently. For instance, once I had taken my gun along when I was planning to fish off a lake dock. There was a crow sitting on one of the piles. I said to my companions, "I ll bet that crow knows the difference between a hunter and a fisherman by the way he carries his gun or his poles or rod." So I picked up my gun with my pole and carried them in the manner of a fisherman. I walked up within a few rods of the crow, threw down the pole, and then the crow saw the gun, He started to fly and call for help, but it was too late, for I was within easy gunshot. Now I feel sorry that I outwitted him, for he had done no harm to me and probably none to anyone else; for all crows are not destructive and are often beneficial. I heard of a farmer who watched his chance to kill a crow that he was sure was pulling his corn. He killed the crow one morning and examined its stomach. He found it contained just three cutworms, the very enemies that were injuring his corn. Crows are accused of doing many things and some of them really do a great amount of damage. Some individuals have the habit of killing young chickens, ducks, and other poultry, as well as young birds in their nests, also destroying both poultry and birds' eggs. Sometimes they do considerable damage to corn when there are large flocks in the fall, while migrating or in the vicinity of a large crow-roost.

There are several large roosts in this state. One was located near Charleston which Dan Cunningham, one of the game wardens, took a great interest in, but some boys or men broke it up by night-shooting. If Dan could have caught them, there would have been trouble, for he is a great lover of birds.

Investigations show that crows feed their young mostly on May beetles. The crow eats grasshoppers, clover weevils, cutworms, boll weevils, carrion, and other refuse. Crows seem to like insects that have a rather strong flavor.

BOBOLINK

A. O. U. No. 494.

Dolichonyx oryzivorus.

Common Names—RICE BIRD, MEADOW WINK, REED BIRD, SKUNK BLACKBIRD, MAY BIRD, FATTIES, BUTTER BIRD.

Description—*Adult male, breeding plumage*: Head and below, rich glossy black,—the feathers having at first a buffy edging which wears off as the season advances; a broad nuchal patch of strong buff or cream; scapulars, lower back, rump, and upper tail-coverts pale white; middle back gray; upper back, wings and tail glossy to dead black with various buffy edging; tail-feathers sharply pointed; bill dull black; feet brown. *Adult female*: Ground color of plumage olive-buff,—clearest below, and in median crown, superciliary, and inter-scapular stripes; the remainder black and brownish fuscous. *Adults in fall, and young:* Like female in spring, but buffier and with less black throughout

Length: 7 to 7½ inches.

Nest: On ground, in meadows or deserted fields; a slight, grasslined depression concealed with some art, but not definitely over-arched. *Eggs*, 4 to 7, yellowish clay or stone-gray, heavily spotted and blotched with umber, drab, or even lavender.

General Range: Eastern North America, west to edge of Great Plains, breeding in northern United States and more southern British Provinces; in winter, south to West Indies and South America to Argentine.

Range in West Virginia: No positive breeding record.

ONE of our most beneficial meadow birds on account of the insects he eats, and later the weed seed he destroys. He should be encouraged to live in our meadows on account of his wonderful musical ability, as well as food habits.

When bobolinks return to the meadows in the spring with their jingling notes, it means to the meadow-lovers just the same thrill as sleigh-bells add to a sleigh-ride, or the anticipation the reindeers bring to little children when "The Night Before Christmas" is read to them. The males come a little ahead of the females and select the courting ground, usually

a meadow. Here they try to drown each other with their jingling notes. But when a female appears in her plain sparrow-like dress, she is pursued by one or more males. Of course she is much "shocked and surprised" at this cave-man style of treatment, and hides in the grass—the shy minx, thrilled of course, and watching the mad antics of the male, for his love notes now have a sentiment like Lowell wrote:

"The Bobolink has come, and like the soul
Of a sweet season, vocal in a bird,
Gurgles in ecstasy we know not what,
Save June! Dear June! Now God be praised for June."

Never will I forget a summer day in northern Michigan. For some reason my letter had been delayed that was to have informed Father and Mother that I would arrive on a certain boat, and when there was no one to meet me, I was greatly disappointed. So I climbed the hill alone, and just as I reached the summit, here came a bobolink to meet me and explain that I was welcome; for did he not own the meadow beside the road where the dearest, sweetest lady on earth was looking after his family, and were they not too the most wonderful of babies? He would alight on a telephone wire, then follow me along with these indescribable notes that thrilled me so I was a boy again; never in my life was ever I received in such a manner by a bird.

You may tell me that the bobolink eats the rice in the South, but "Oh naughty Ninkum, leave this field to bobolinkum." Just as soon as the young are able to fly, the male sheds his wedding garments for a suit like the female's, and that of the young; he ceases his merriment, gathers in flocks, and all of them feed on weed seeds and say, "Pink, Pink," or "Dink, Dink," when they fly. They become very fat. They are fat even before they reach the rice fields, because boys used to shoot them along the lowlands beside the K. and M. tracks in Charleston, and the boys called them "fatties," not knowing what they were, only that they were extremely fat They are to be found in the latter part of July and August all along the Kanawha and Ohio bottomlands, and are destroying thousands of weed seed. They are one of the most beneficial birds we have in the meadows on account of the insects they destroy. As they pass south they do a great deal of damage to the rice fields; but can you blame them? For the wild rice was their natural food and man has tried to destroy all the wild rice and planted the white. In Jamaica the bobolink is called the "butter bird," and he is again killed for food. By the time he reaches his winter home in Argentine, if he lived in British Columbia, he has travelled eight thousand miles by the route he has taken, for he goes by an eastern route. Because he originally lived east, but followed man west; therefore, he follows the route of his forefathers.

REDWINGED BLACKBIRD

A. O. U. No. 498.

Agelaius phoeniceus.

Common Names—RED SHOULDERED BLACK-BIRD OR REDWINGED STARLING.

Description: *Adult male*, in summer: Glossy velvet black all over except shoulders (lesser wing-coverts), which are bright scarlet, and the middle wing-coverts which are buffy or creamy white, forming a broad margin for the red shoulders. In autumn all the black feathers (except primaries and tail-feathers) are margined with buff, rusty red, or even chestnut, most broadly and heavily on back, scapulars and tertiaries, more narrowly and lightly on under parts; bill and feet bluish-black; iris brown. *Adult female*, in summer: Smaller and otherwise entirely different. Upper parts brownish black, more or less streaked with ashy or whitish, with a more or less distinct medium light stripe on the crown, and a distinct whitish stripe over the eye; under parts streaked lengthwise with whitish and black in almost equal amounts, the chin and throat reddish or yellowish and fairly or not at all streaked; shoulders usually mixed red and black; iris brown. *Young*: At first resemble the female, but males soon separable by larger size and darker color pattern.

Length: Male, 9 to 10 inches. Female, 7½ to 8½ inches.

Nest: Gregarious in nesting habits, but occasionally one which mates with several females will be found distant from other breeding grounds. The nest is preferably in cat tails but sometimes during danger of high water they are placed in trees; the nest in cat tails is suspended between the stems, woven with dead grasses and is quite a work of art; the *eggs* are four to six and a pale bluish or greenish white, with pen-lines of blackish and dark brown blotchings chiefly about the larger end.

General Range: North America east of the plains from Ontario and Quebec to northern Georgia and Louisiana; winters from southern New Jersey and Ohio to Gulf coast.

Range in West Virginia: One of the most common birds along the streams in the more developed parts of the state. Abundant along the large rivers. Breeds commonly in West Virginia.

SHOULD be protected.

The corporal of the guard, you will find the redwinged blackbird as he advances with the grackles, rusties and cowbirds, showing plainly that he is an officer with his red epaulettes with golden border. It may seem strange to those who do not know the blackbird family that it is always the males that come first in the spring and take up their old haunts in the marshes or wet places where the cat tails grow. Here the males sing and chatter and wait for their many wives, for they are true Mormons and love many wives. The male is very beautiful in his rich black velvet suit and his bright scarlet epaulettes. No wonder so many of the females lose their hearts, as he sits in the swamp rushes with wings spread, displaying his beauty and calling to them "O-ka-lee!" in his most pleasing manner.

The redwing loves the water and builds his nest preferably in the cat tails. It is hung between the growing plants, woven with dead grasses and is very ingenious in its structure, the blackbird having learned the habit from his cousins, the orioles. Here he stands guard over his many wives and their families, for he does not seem to be any more fond of one than of the others, and is just as ready to defend number four as number one.

Years ago you could see flocks of the blackbirds estimated from twenty-five thousand to fifty thousand and when they struck a small field of grain they inflicted much damage; but there is more grain now and fewer birds and they are not nearly so destructive and are on the whole very beneficial. They eat grasshoppers whenever there are any to be found. In an examination of the stomachs of 725 redwinged blackbirds, the department of agriculture found that 74 per cent of the food was vegetable matter, the remainder being animal, mainly insects; weevils and snout beetles formed 10 per cent of the food for the year; grasshoppers 5 per cent. Of grain only corn, wheat and oats were found; together they constituted 13 per cent of all the food "of which a goodly part probably was scattered or left in the fields. Weed seed, mainly ragweed, barngrass and smart-weed, amounted to 67 percent." "The blackbirds are eating the boll-weevil. Mr. V. J. Hutchinson is in the city from Fitzgerald and reports that his son killed a blackbird in the craw of which were 21 boll-weevils. He thinks it a good idea to encourage the blackbirds to feed in the cotton fields."—*Palestine Herald*, Nov. 18, 1903. Different states formerly paid bounty on the redwinged blackbirds, but now it is on the protected list where it rightly belongs.

MEADOWLARK

A. O. U. No. 501.

Sturnella magna.

Description—*Adult male*: Upper parts brown, streaked with black; the head brownish, with three broad stripes of buffy white; sides of head and neck grayish white; three or four outer tail feathers white; throat, breast and belly bright yellow, with black crescent; lower belly white. *Adult female*: Smaller; duller colored.

Length: 10 to 11 inches.

Nest: In meadows, or in some neglected field, on the ground, usually arched over. *Eggs*, 4 to 6 in number, ground color white, more or less thickly speckled and spotted with brown and lavender.

General Range: Eastern United States and southern Canada to the Plains; breeds from the Gulf of Mexico northward.

Range in West Virginia: Very common in cultivated sections. Some birds spend winter here.

VERY beneficial, particularly to meadows and pasture lands.

When you stroll out in the meadow on an April morning and smell all the pungent odors, you will feel that it is spring. Hark! Who is this bold fellow that sits upon a fence post, proclaiming "Spring o' the year! Spring o' the year!" You stop and draw in a deep breath, for there is such vigor in the flute-like notes of the Meadowlark. John Burroughs said: "It is the winged embodiment of the spirit of our spring meadows."

The Meadowlark sets an example for some of our other birds, for not only is he beautiful and musical, but also he is such a beneficial bird and has no bad habits at all. He is particularly fond of grasshoppers; he would eat them every day in the year if he could get them. He eats the alfalfa weevil and probes in the grass for the wireworms and cutworms. In fact, he takes all his food from the ground.

Sometimes a few larks spend the winter north. I have seen them in Ontario, Canada, in January. At such times the Meadowlark has to change his diet to weed seeds and scattered grain, but no farmer should begrudge him a little grain. The Meadowlark in some places was considered game by some people; he was even called the "marsh quail."

In the South I used to see them sold in the markets; but gradually the people are learning to conserve our insectivorous birds.

If you ever looked for a Meadowlark's nest, you found she is a close sitter, and sometimes sneaks off some distance before flying. The nest is usually in a tuft of grass and arched over. Sometimes a little tunnel of growing grass two or three feet long leads to it, and there are four to six eggs in the nest.

The Meadowlark is also colled the "sail-bird" by some gunners. He raises from the ground much like the quail, but not so swiftly. Then he sails a short distance, when he again uses his wings to propel him. His tail is spread, showing the outer tail-feathers and thus becomes an easy mark for the average gunner.

"In the spring of 1918 the tomato growers in northern Utah were very much worried about the cutworm. It was soon noticed that in fields where there were birds, especially meadowlarks, the cutworms did not bother the plants, consequently an investigation was made as to whether the meadowlark was attacking the cutworm. The writer went out among the different fields, and found that wherever there were meadowlarks in the field the tomato plants had been left alone. I killed one meadowlark while in one of these fields, and upon examining its stomach found it contained 36 cutworms. Now the farmers look upon the meadowlarks as saviors to them, and if anyone was found shooting a meadowlark in this district it might go very hard with him."

BRONZED GRACKLE

A. O. U. No. 511b.

Quiscalus quiscala aeneus.

Description—*Adult male*: Lustrous black, exhibiting strongly three sorts of iridescence: on the head, hindneck and breast purple, peacock blue, or greenish; on the remaining under parts and back brassy; on the wings and tail a curious combination of the two, resulting in a shimmering violet, or purplish-black. *Adult female*: Somewhat similar, but a warm brown rather than black; subdued iridescence shown chiefly on head and breast.

Length: Male, 12 to 13½ inches.

Female, 11 to 11 ½ inches.

Nest: A bulky affair but compact structure of sticks and stalks, plastered inside with mud and lined with grass; placed 15 to 30 feet high in evergreen trees or in an orchard, occasionally in flicker holes: *eggs* 4 to 7 in number, from pale greenish white to light brown, heavily blotched with brown and purplish.

General Range: Eastern United States from the Allegheny Mountains west to the Rocky Mountains, north from southern New England to Newfoundland and Great Slave Lake. In migrations it invades the southeastern states, except Florida and the Atlantic sea coast south of Virginia.

Range in West Virginia: Common in all parts of the state west of the mountains. Breeds in West Virginia.

THIS bird should be protected, for it is more beneficial than destructive.

The bronzed grackle is also known as the crow blackbird. When you see a bird that resembles a crow, only much smaller, it will be either the purple or the bronzed grackle, sometimes called crow-blackbird. There is a great deal of confusion in the identification of the two birds. I saw the bronzed grackle in the Cincinnati Zoo, labeled purple grackle. It had been marked by some one who did not know the difference. In this state we have both the purple and the bronzed grackles We also have the intermediate, when the two species overlap. The purple is to be found in the eastern part of the state. Both of them have straw-colored eyes

which I have found that few beginners in bird study seem to notice at first. All of the grackles have bronze and purple on them, and that is the part that puzzles people more than anything; but the purple grackles' feathers are more iridescent and much more like a peacock's on the back. All the birds look a dull black until the sun shines on them, when it shows a beautiful sheen of bronze and purple on head, neck and breast.

The grackles are sociable and friendly to man, for they like to nest in cities, cemeteries and orchards, and are more often seen about cities than most other birds. Sometimes they cause a great deal of annoyance but they can be induced to change their roosts by burning tar where the fumes will reach them, or by clapping two boards together, making a noise something like a gun. If this is repeated for two or three nights they will not return.

These birds have been black-listed on account of their corn-eating habit, but the majority of people only look for the evil in life anyway, therefore always find it. The grackles are accused of eating young birds and sucking eggs but the examination of 2346 birds showed that only one half of one percent had this habit. They are also accused of pulling up sprouted corn, but the examinations showed little or no sign of it. They do like corn very much and no doubt a great deal of harm is done, occasionally where a large flock attacks it; but on the other hand, they do a vast amount of good by destroying injurious insects.

Forbush says that the grackles are indispensible on account of the number of insects they destroy. They will follow a plow and literally stuff themselves with insects. Farmers are likely to forget this when grain and fruits are ripe. Insects constitute 46 percent of the grackle's food for a year. They eat the destructive bool weevil. "Rice men report a grass worm eating the rice near the edge of the water whenever they can find a bit of grass to start on. They first strip the grass, then attack the blades of rice. Large blackbirds that early in the spring pulled up much of the rice and were killed by hundreds of irate planters are the natural enemies of the grass worm. When a flock of these birds settles down in a patch infested by the worms they never leave it until the patch is cleaned of the worms. Go there when the birds leave and not a worm is to be found. So said one of the most practical rice men of Orange County this afternoon."—*Galveston News, July* 7, 1904.

ENGLISH SPARROW

Passer Domesticus.

A. O. U. No. —

Description — *Male*: Upper parts ashy gray, streaked on the back and scapulars with black and bay; broad band of deep chestnut or mahogany behind the eye, spreading on the side of the neck; lesser wing coverts chestnut; a white wing bar formed by the white tips of the middle coverts. Under parts grayish white; a conspicuous black bib on the throat and upper breast; bill blackish; sides of head and bordering the black bib nearly white. *Female* and *young*: Brownish gray above streaked on the back with ocherous and black; wing bar obscure; under parts plain dingy brownish white.

Length: 6¼ inches.

General Range: Resident of the United States and Canada.

Range in West Virginia: Found in all sections of the state.

John Burroughs called the English sparrow a "feathered rat." "A street gammon" suits him equally well, for sparrows live in the streets in cities, where they fight for food and abuse their wives or some other bird's wife. When you hear a great racket and see a street fight among sparrows, it is usually a lot of males abusing a female. All of them appear to wallow her in the gutter and act very ungentlemanly.

The English sparrow does not treat any of our other birds with any courtesy whatever. He will thrust their nests out of bird houses and take possession. This does not stop with birds that nest in holes, but I once saw a pair take possession of a robin's nest and build a thached roof over it, then fill it with chicken feathers. The English sparrow has driven so very many of our birds out of the cities that our city trees and shrubbery have suffered to a great extent. Now the English sparrow has gone to the country also, where he can feed on grain and drive away our beautiful songbirds that are so essential to farmer, horticulturist and truck gardner.

Thirty English sparrows eat a bushel of grain every month. Everyone who feeds chickens, feeds sparrows. Our farmers and poultry raisers all are feeding the vagabonds. People like to live in the suburbs where they can raise chickens and English sparrows. Every little chicken

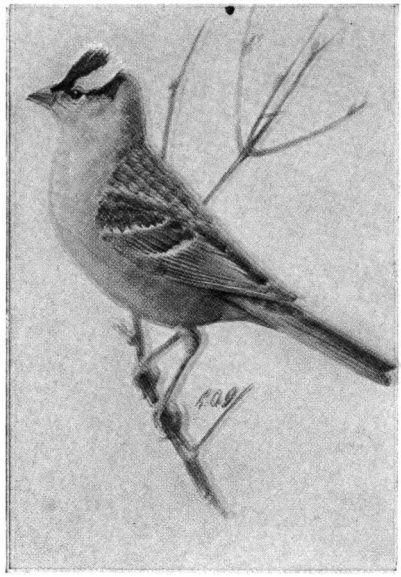
yard furnishes food for from forty to one hundred sparrows. If you could see what it is costing this nation to pay the added cost of poultry and eggs, it would startle you. Nearly every family uses eggs in some manner every day, and when they do so, they have paid an added price to help support these feathered leaches.

Great care should be taken not to destroy all kinds of sparrows, for the other kinds are some of the most useful birds we have. A great many methods of exterminating the English sparrow have been advocated. The bounty plan is not satisfactory for other useful birds are often killed in error, and poison is not safe, for other birds eat it. Trapping is often effective. Sometimes people have formed clubs for this purpose. To feed the sparrows in a trench and then shoot them is a good method. To find the nests and remove the eggs every three weeks so they can raise no young, but will continue to build and lay eggs, is also a good plan.

All places where poultry is fed should be wired with three-quarter inch wire to keep the sparrows out. One-inch mesh is too large, for it stretches and there are certain places where the sparrows can get through and they will surely find them. If you will suspend a board about eighteen inches below the roof of a three-quarter inch mesh in a wire poultry pen, put some cracked corn on the board, and then open or spread a few of the openings above the board, the sparrows will get through to feed and cannot find the way out.

The English sparrow eats some insects and destroys some weed seeds, but to offset this, he eats the following valuable products: Grape, cherries, apples, strawberries, raspberries, currants, blackberries, peaches, pears, plums, tomatoes, apricots, figs, young plants, including peas, beans, cabbage and lettuce.

WHITE CROWNED SPARROW



A. O. U. 554.

Zonotrichia leucophrys.

Description—*Adult* (sexes practically alike): Forehead and sides of crown velvet black, enclosing a broad stripe of pure white, which darkens into clear gray on the nape; a narrower white stripe starts above the eye and curves backward to the nape, being bounded below by a black line which starts just behind the eye; back ash-gray, streaked with dark brown, the rump and upper tail-coverts plain grayish brown; chin and belly white; throat, sides of head and neck, and breast clear ash-gray; sides and flanks buffy brown, without streaks; wings with two white bars; outer webs of tertiaries chestnut, tipped with white; tail-feathers brownish or dusky, unmarked; bill bright reddish-brown; iris brown. *Immature*: No clear black or white about the head, the forehead and sides of crown being rich brown, and the central stripe buff or fawn-color; a similar stripe behind the eye; gray of throat and breast duller and browner, the upper parts also much browner than in the adults.

Length: 6½ to 7½ inches.

Nest: Usually on the ground under patches of brush or bushes. The four or five *eggs* are whitish profusely spotted with brown.

General Range: North America at large, breeding chiefly in the Rocky Mountains, the Sierra Nevada and northeast to Labrador. South in winter to the Valley of Mexico.

Range in West Virginia: While it is quite rare in this state Josiah Keeley records it four years out of the last seven, from May 5 to 14th.

BENEFICIAL.

Whenever I am fortunate enough to see one of these beautiful creatures, I always think of the Irishman's expression, for it seems so fitting—"He is an illegant gintleman." I will never forget the first one I ever saw. It was when I was a boy living in Canada. I crept up close to him and feasted my eyes on his exquisite form and soft gray plumage. His head is his crowning glory—his name is accurate, for he is truly white-crowned. A milky white stripe on his crown, bordered on each side with black, makes him a very striking bird. We called him "quail-head," as we knew no name for him. His wife is almost an exact counterpart and they are indeed a handsome pair. They are the Kings and Queens of

the sparrow family. Last May I walked four extra miles on a bird hike on Cabin Creek to see a pair of these birds, but they had left for their breeding grounds in Canada. I am unable to find any authentic breeding records in this country, although some of the white-crowned sparrows pass the winter here and destroy many noxious weed seeds.

The song of the white-crowned sparrow is a varied whistle of gentle melancholy and is repeated several times. While the notes are sad, they seem to draw you to him in bonds of sympathy, yet he is so lofty and dignified that you have a hesitancy in claiming a closer acquaintance.

The white-throated sparrow is often mistaken for the white-crowned, but the former has a white throat and yellowish stripes on his head and does not have that gray on the back. Some of the old males are very pretty and you may get fooled until you see the throat. The white-crowned is fond of rose beetles which make him a desirable garden bird.

"Ninety-four stomachs of the typical white-crowned sparrow have been examined. They were collected from September to May, inclusive, in Connecticut, Michigan, Illinois, Iowa, Kansas, Texas, and the District of Columbia. Like most of our northern sparrows, this species subsists during the winter almost entirely on seeds. Its tendency to become somewhat insectivorous in warm weather is indicated by the fact that 11 percent of the food in May and September consisted of ants, caterpillars, weevils and other beetles, and spiders. If the stomachs could have been collected during the summer months, the proportion of insect food would, no doubt, have been much larger. Ragweed seed constitutes 20 per cent of the entire food."

CHIPPING SPARROW

A. O. U. No. 560.

Spizella passerina.

Description—*Adults* alike: Black, slender bill; crown chestnut; black near bill; grey line over eye; black line straight through the eye; back streaked with black and reddish and grayish brown; below grayish white; tail slightly forked. *Young*: Streaked on breast.

Length: About 5⅓ inches.

Nest: Built of rootlets and grasses, line with horse hair; in gardens and orchards, usually near to man. 3 to 4 *eggs*, streaked or spotted with black.

General Range: Eastern North America, west to the Plains; breeds from Gulf States to Newfoundland and Great Slave Lake; winters in Gulf States and Mexico.

Range in West Virginia: Very common about all farms, orchards, and even within the towns and cities.

BENEFICIAL to farmers and horticulturists.

The chipping sparrow is also called the hair bird or the sociable sparrow. He is all that the name implies, for his notes are chipping, and he always lines his nest with hair, occasionally making it entirely of hair. A boy brought me a nest that had fallen out of a tree. The nest was made entirely of grey horse hair and I immediately recognized that it was taken from Old Nell, a horse belonging to Uncle Bob Carr. Both he and the horse are well-known figures in Charleston. The sociability of the chipping sparrow is all that the name means, in regard to man, for he loves to build near a house so that he may pick up the crumbs from the door step, and the worms from the currant, gooseberry and rose bushes A home would not be quite complete that did not have a chipping sparrow to greet you in your back yard and build her nest in your rose bush or shrubbery, where she lays her dainty little speckled eggs.

Oh, the heart-breaks she must have, for while the nest is so beautifully built, and so carefully lined with horse hair, it is so seldom fastened to its moorings that a hard wind often blows it out, or the prowling cats pull it out, often catching the old bird as well as the young. Sometimes cruel and ignorant boys destroy nests. Once on my rounds to see how

it was with the birds, I found a mother bird hanging beside her nest. A boy had caught her on the nest and had taken some of the hair out of her own nest to have a private hanging. How a boy could be so barbaric I cannot understand. (Teachers and scout masters please take note.)

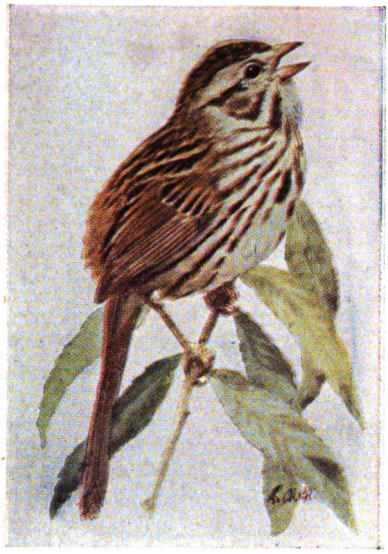
How different is the story of a neighbor! An old lady had a chipping sparrow that had lost one of its legs. Probably some naughty boy had shot it off with an air gun. Some boys think it is great sport to kill birds. This little bird used to hop into the old lady's lap and eat crumbs. In the fall it would leave for its winter home in Mexico, and the old lady would watch anxiously for its return in April. Year after year it came back, appreciating her kindness, but alas! all things must have an end, and the third April the little one-legged wanderer did not return. Some of the many bird tragedies had befallen him.

"Dr. Jud's studies of two hundred and fifty stomachs of the chipping-sparrow show that insects and spiders form thirty-eight percent of the food of the adults, the remainder being seeds. The seeds of grasses alone form forty-eight percent, more than half of it being crab-grass and pigeon grass. In our study of the feeding of the nestlings of this species we saw the parent birds come to the nest almost two hundred times in one day from daylight to dark. The young are fed with smooth caterpillars of various sorts, as well as with grasshoppers, crane-flies, spiders, and similar creatures."

SONG SPARROW

A. O. U. No. 581.

Melospiza melodia.



Description—*A d u l t s* alike: Upper parts brown, streaked with black and edged with gray; a grayish streak through the middle of the crown; tail long and brown in color; under parts white, spotted and streaked on neck and breast; they form a spot on each side of neck and a larger blotch of black, tinged with brown.

Length: About 6½ inches.

General Range: Eastern North America, west to Plains. Breeds in northern Illinois, north to Quebec and Manitoba. Winters in South Illinois and Massachusetts to Gulf States.

Range in West Virginia: Common throughout entire state.

SILVER-Tongue is the living tribute that one of our noted writers pays the song sparrow, and how well the name suits! For the song sparrows are wonderful singers and the varieties of their songs are more varied than that of any bird with which the writer has become acquainted Some song sparrows have five different songs. Every now and then you find a song sparrow that sings as if he were inspired, or had received a special training. People who have no bird knowledge are attracted by their great musical culture. John Burroughs said that the song sparrow sings as if he had great faith and trust in the goodness of all things. There is no doubt about it. About daylight one cold winter morning I was called to town to do some work that some of my "help" had neglected. I was in a very bad humor, but in passing some shrubbery beside my path, I disturbed a song sparrow which flew up into the top of a small tree. He had snow on his back that had drifted through his bedroom window; but did he complain like I? Oh, no; he taught me a good lesson of thankfulness; for he threw back his little head and sang, "Peace, peace, peace unto you, my children." Life was a real joy to him and yet he had no warm bed to sleep in and had to rustle each day for his daily food.

In the night I have heard different song sparrows sing with that same abiding faith. Their song in the nights is not like the challenging crow of a rooster, but that of sweet, inspired trustfulness.

There are seventeen different kinds of song sparrows in the United

States but only one species in the eastern states. The rest are in the west and on the Pacific Coast.

The song sparrows have been killed very often in an error for the English sparrows, which is very unfortunate. The markings are quite different, for the English sparrow has black on the breast which is more like a black necktie, while the song sparrow has a streaked breast which forms a black patch on the breast, and sometimes a black spot on each side of the throat. His tail is much the longer, and when he flies he jerks his tail.

The song sparrow usually builds his nest on the ground in a tuft of grass on the side of a bank or beside a bush, and sometimes in a tree or a shrub. It is composed of grasses, occasionally lined with hair. There are four spotted eggs. Very often one or two cowbirds' eggs are added. The song sparrow is one of the very few birds that can raise part of his brood and a cowbird at the same time. When you are in the vicinity of the nest and the song sparrow has young, she scolds you as she flits about, jerking her tail and trying to persuade you to go away, but you can always tell by the note she uses if she has young or not, if you are acquainted with the song sparrows.

In winter song sparrows feed on weed seed, principally on pigeon grass, amaranth, ragweed, and goosefoot. In this way they are of great value to agriculturists and in the summer season the insects they destroy make them of greater value.

ROSE BREASTED GROSBEAK

A. O. U. No. 595.

Zamelodia ludoviciana.

Description—*Adult male*: In spring plumage, head and neck and upper parts mostly deep black; middle coverlets and a large spot at base of primaries, white; rump white; outer tail-feathers tipped with white; breast rosy red, extending down center of breast; under wing coverlets also rosy red; balance of underparts white; bill heavy and pinkish white: *Female*: Entirely different; upper parts brownish, streaked with buff, and invisible white wing bars; a whitish line over eye to nape; bordered below by brown ear coverlets; breast and underparts buffy, streaked with brown. *Young*: Much like female except in fall, the males show a little rosy on breast and under wings.

Length: 7½ to 8 inches.

Nest: Carelessly built of twigs, roots, and weed stalks in shrubs, fruit and forest trees, usually low down. *Eggs*, 4 or 5 greenish blue, profusely spotted and blotched with reddish brown markings.

General Range: From Maine and Manitoba south to Kansas, and in the mountains to North Carolina; winters in Central and South America.

Range in West Virginia: Very common, even abundant, in the higher mountains. In most parts of the state it appears only as a rare migrant in spring and fall. Mr. Thad. Surber says. "Breeds on Cold Knob" (Greenbrier County).

ONE of our most beneficial birds to farmers, truck gardeners, horticulturists, and to our forests.

Never will I forget the thrill I experienced on seeing my first rose-breasted grosbeak. Up to that time I had never seen even a picture nor read about them. I discovered two birds flying up from a creek where they had been bathing. They were black, with very distinct white markings, and were about the size of the cardinal grosbeak. They alighted in a small tree and began to make their toilet. I crept up very close to them and as they displayed their charms I could not have been more thrilled if they had been mermaids—and yet they were both males. Their heads were black, and a greater part of the wings and back were black, with a white rump, white on wings and tail, and

breast rose-colored; when they lifted their wings they were rose-colored just like the breast; all the underparts were white.

If you have never seen one, do not rest until you have seen this cultivated southern gentleman. The tropics gave us this bird, and he became acclimated even as far north as Manitoba, but spends the winter months in Central and South America. The female has none of the black markings, neither does she have the beautiful rose color, but is streaked brown with a few white and buff markings.

The female seems just as careless and indifferent about building her nest as she is about wearing pretty clothes. The nest is a flimsy affair, made up of slender twigs, rootlets, weed stalks or anything convenient, but so loosely is it constructed that you can see the eggs through the bottom of it The male does not find fault with the nest, for he sits on the nest to relieve her, and is the only male bird that I know of that sings while on the nest.

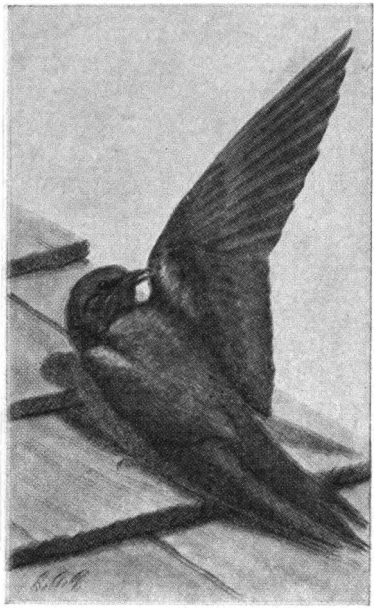
Singing with him must be a real joy for he sings on the wing as he flies from tree to tree. and will burst forth in full song when he is chasing another male. His notes are similar to those of the robin, only much more melodious and joyful. Sometimes you will find him sitting in a cherry tree, dining on the blooms, which he has a habit of doing, but not to the real detriment of the tree, for there is always an abundance of blooms.

Here is a bird with many rare qualities, for he is such a benefit to humanity. He is so fond of potato bugs that he is called the potato-bug bird. J. S. Cook, of northern Illinois, says, "I have seen them gorge themselves with these beetles till they could scarcely fly. I have investigated in the spring when the beetles first came out of the ground, and was unable to find a single one after following the birds."

Professor Beal, who watched the grosbeaks feed their young in his garden, says that after a careful inspection a few days later not a beetle, old or young, was found. The birds had swept them from the field and saved the potatoes.

Here is a small list of his other beneficial habits. He is very fond of the cucumber beetle. He eats the hickory borer, plum curculio, Rocky Mountain locust, spring and fall canker worms, orchard and forest tent caterpillars, tristok moth, and army worms.

PURPLE MARTIN



A. O. U. No. 611.

Progne subis.

Description. *Adult male:* Rich purplish black, except wings and tail which are dead black. *Adult female:* Similar but not so glossy on upper parts; forehead, hind neck and lower parts sooty gray. *Young:* Similar to female but darker; young males do not acquire full plumage until two or three years old.

Length: 7½ to 8½ inches.

Nest: In buildings in villages, in bird houses. *Eggs,* 4 to 5, glossy white.

General Range: North to Nova Scotia, west to Idaho, and south to Texas. Winters in central and South America.

Range in West Virginia: Common throughout the state. Breeds in West Virginia.

THESE birds should be protected and proper artificial nesting sites built for them, for they now depend entirely on men for a chance to perpetuate their species.

Purple martins originally nested in hollow trees and caves. When the Europeans came to America, they found that the Indians who were great nature-lovers, had attracted the martins to their villages by trimming the limbs of trees back within two or three feet of the trunk, and hanging gourds, with two inch holes in them on these shortened limbs, in which the martins quickly learned to nest.

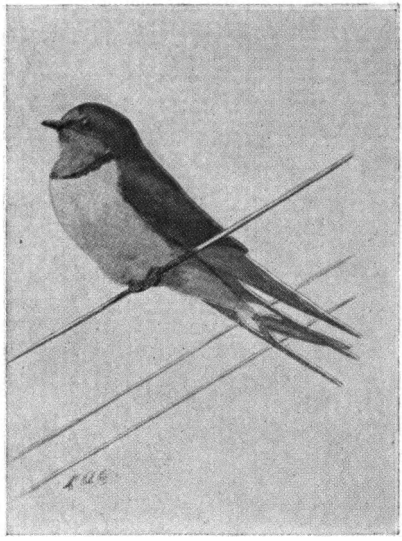
The white men quickly adopted the Indians' plan of attracting the martins, but erected poles with cross arms to hang the gourds upon, and the custom is still followed in some places in the rural south. Men began to erect beautiful bird houses with many apartments in them for the martins; and the birds began to multiply rapidly, nesting in holes and cornices of buildings about the villages Then came the invasion of the English sparrow and he drove the martins out of the buildings and from a great many of the bird homes. Not being able to find a nesting site, the martins began to disappear. Then the habit of shooting the nighthawk, commonly called "the bullbat," started, with the result that many reckless gunners also shot the martins, little realizing that both birds

are man's great benefactors, for they destroy millions of mosquitoes and house flies, which are among our most deadly enemies. Then the Migratory Bird Law was passed by Congress, which put a stop to the slaughter of our insectivorous birds, which had become a national disgrace. The rural people have continued to build martin houses, for they are wonderful guardians of the poultry yard. The purple martin attacks chicken hawks fiercely, and no hawk can successfully prey upon a flock of chickens where a colony of martins live.

The martins love company, and in August they gather into the cities to roost in the trees, and here discuss plans for their annual trip, the latter part of the month, to Central or South America, where they spend the winter. This yearly visit to our cities, where their ancestors nested when the cities were villages, has always been a custom of the martins. When these visitors come to our cities they are greeted with joy by the bird-lovers who enjoy their gurgling notes. But, unfortunately, there is a class of people who see nothing in nature to admire. On a recent occasion a lady who listened to the chatter of the English sparrows all year around at the Mercer School Building in Charleston, called the police to shoot the martins which had come to roost in the trees on the school grounds. Members of the city police force complied with her request, without stopping to consider that they were violating both the federal and the state law. When testifying on the above case, before the federal grand jury, I made this statement, which I now repeat: "The Biological Department at Washington examined the contents of two purple martins and found that they contained two thousand mosquitoes and many house flies; I consider that the killing of a purple martin is equivalent to taking a human life, for if the martin had lived, he would have eaten flies and mosquitoes that would have saved the life of one or more people." Needless to say, the policemen were indicted.

If you are annoyed by the martins, don't kill them, but take an old tar barrel and burn it where the fumes will reach the birds. They will quickly move their roosting place and thus you will preserve this wonderful bird, which is so essential to our human life.

BARN SWALLOW



A. O. U. No. 613.

Hirundo erythrogastra.

Description—*Adult male*: Upper parts dull steel blue; underparts vary from pale buff to rich chestnut, deepest on the throat and forebreast; tail feathers show a broken band of white when fully spread; tail very deeply forked, the most so of any of our swallows. *Female* and *young*: Usually paler in color below; the young have tail feathers less elongated.

Length: 6 to 7 inches.

General Range: Inhabits practically all of North America, extending to Alaska; winters in Central and South America.

Range in West Virginia: Common throughout.

A boy who lives on a farm and does not have barn swallows is missing much in life. To me a barn without swallows would be like a circus without a clown. The barn swallow comes to us a few days earlier in the spring than the tree or cliff swallows. He can easily be distinguished from the other swallows by his great forked tail. Our modern dress coat was once called a "Swallow-tailed coat." The barn swallow is the only swallow that has white spots on his tail feathers. The outside feathers are about two inches longer than the inner ones.

The barn takes on a new life when the swallows return in the spring with their gurgling notes and their graceful flight as they pursue the countless insects that fill the air. Insects are their principal diet, except for a few wild berries which they eat when migrating. They usually select a site for a nest in the barn where the rafters join in the peak of the gable, but I have found them on the upper sill of the stable when the stable had been built under the barn. I found them built in a like manner under some docks where they could be reached only by a small boat. In fact, the only time I was in a canoe was in Michigan in quest of a nest of this kind.

The type of nest which is attached to the rafters is much more difficult to build. The swallow makes a ball of mud and rolls it with his feet and bill to about the size of a marble. Numbers of these are placed against the rafters, reinforced with hay or straw. The nest is lined with feathers, usually those of a chicken. When the nest is completed,

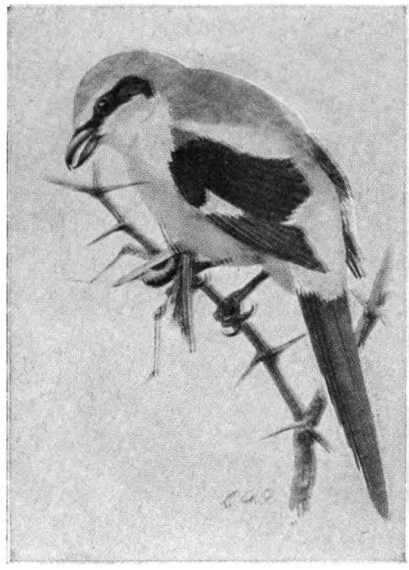
it looks like a wall bracket. We boys were always eager to get the haymow filled high enough to get a peek into the nests to see the eggs, which were three to five in number and white in color, speckled with brown and purple. The old birds would fly at us like they expected to drive a hole through us, but would turn to the right or left of us and scream, "Scat! Scat! Get out of here; this is my private nursery."

When the young were ready to leave the nest they would fly out, and clear out of the barn doors if they were open. Sometimes the old birds would fear that their youngsters would get too far from home and would push them down so they would have to alight.

A great many farmers foolishly thought that the lice that were in the swallows' nests caused the cattle to be infected with lice and nailed up the holes that always had been left for the birds to enter. The farmers made a serious mistake for the swallow is a very beautiful bird and the lice will not live on cattle or barn fowls. Gilbert White, a great naturalist who lived in England in 1776, and who had noted a great many traits in bird life, died believing that the swallow hibernated all winter in the mud.

LOGGERHEAD SHRIKE

A. O. U. No. 622c.



Ludovicianus lanius migrans.

Description—*Adult* (sexes essentially alike): Upper parts ashy-gray to blue-gray, usually paler (sometimes whitish) on rump and upper tail-coverts; forehead commonly paler than the crown; underparts mainly pale ash-gray, deeper (almost the shade of the back) on chest and sides; throat and belly nearly or quite white.

Length: 8 to 10 inches.

Nest: Preferably in thorn tree but thickets and orchard trees are also used; it is a bulky but well-put-together affair; a mass of sticks, thorn twigs, weed stalks, carefully lined with plant down, wool and feathers. *Eggs*, 4 to 6 in number, dull grayish or greenish white, thickly speckled and spotted with olive or reddish brown.

General Range: Eastern Canada and eastern United States, west to Minnesota, south to the Carolinas, Tennessee and lower Mississippi valley. Breeds chiefly in the northern parts of its range, migrating south in winter.

Range in West Virginia: Common along the Ohio and Kanawha Rivers. There is no nesting record in the state.

MORE beneficial than harmful.

Shrikes are cannibalistic in their habits. The northern shrike breeds north of the United States but spends its winters in our northern states and is a rare winter resident in West Virginia, and is more often seen on the Ohio River than elsewhere in the state. We are fortunate that he is not plentiful, considering all the bloodthirsty tales that are told about his murderous habit of killing smaller birds. The white-rumped shrike is purely a western bird. The loggerhead shrike is smaller than the northern and is a resident of our state, but is rather rare. It is one bird that does not multiply to any extent, since it is usually shot at sight because of the same false idea that all hawks and owls are wholly bad. It is the same in the shrike family. The loggerhead is more beneficial than harmful, although our blood boils when we see a beautiful song-bird killed,—but give the devil his due. It is more often English spar-

rows that are killed. I once found a song sparrow impaled on a wire fence and I also saw a shrike near by, so I promptly shot him, but he was really not hungry, since he had not eaten any of the bird. This habit of impaling his catch of grasshoppers, mice, or birds on thorn or barbed wire fences is followed by all shrikes.

Some people mistake this bird for the mocking bird, but their bills are quite different. The mocking bird's is straight while the shrike's is hooked, and he has a black stripe running from the bill through the eyes across the side of the head. When the shrike flies from post or tree or telephone pole where he sits, he pitches downward and shows black and white on wings and tail. He flies close to the ground until he nears his next stopping place, he raises up to alight. After seeing one in flight, you should always remember it. He usually builds his nest in thorn trees; it is a very bulky affair but it is warm and full of feathers.

Dr. Judd made a special study of the shrikes' food and only seven of the eighty-eight birds examined contained other birds. Mice formed fifty percent of their winter food, or sixteen percent of the whole year; beetles and their larva constituted twenty percent; caterpillars, grasshoppers, wasps and spiders were found in considerable numbers. The nestlings are fed mainly on insects, with an occasional bird or mouse Although shrikes kill a few birds, they destroy so many injurious insects and mice that they are beneficial.

MYRTLE WARBLER

A. O. U. No. 655.

Dendroica coronata.

Description—*Adult male, in spring*: Yellow patches on rump, crown, and both sides of breast; upper parts bluish gray, streaked with black; cheeks black with a white line over the eye; lower half of eye ring white; three outer tail feathers white spotted; two conspicuous wing bars; *in the fall*: Similar to female. *Adult female in spring*: Simliar to male but with bluish gray replaced by brownish; the breast not marked with so much black; the yellow patches less obscured except the rump. *Young*: Similar to male and female in fall plumage.

Length: About 5½ inches.

Nest: Usually in a low evergreen tree, only a few feet from the ground; rather bulky, built of dead twigs from spruce and hemlock, grass stems, and a few leaves; lined with rootlets, hair, and feathers. *Eggs*, 3 to 5 in number, dull creamy white in ground color and splotched with reddish brown, lavender and a few purplish marks.

General Range: Breeds from the limit of the trees in Alaska, and Labrador to Maine, northern New Hampshire, Vermont, New York, western Massachusetts, northern Michigan, Minnesota and British Columbia.

Range in West Virginia: A common migrant, usually found throughout the winter. There is no nesting record in the state, however.

BENEFICIAL to farmers, orchardists, and to all lumber lands.

The warblers are among our most beautiful and least-known birds. The reason they are not so well known as some others is that they usually frequent the tree tops and the average person dioes not take the time to look for them. Little does he realize that he is missing some of the most beautiful birds we have. The name would lead you to believe that they are wonderful singers; but in fact, with few exceptions, their voices are quite weak and that is another reason that they are often passed by. If you are to be a bird student you must look up every bird whose notes you hear, and by so doing you will experience the thrills that come by recognizing one of the most beautiful sprites of

nature that is forever on the move, chasing insects here and there, while you are vainly trying to see some of his markings.

If it is the Myrtle Warbler you are looking for, at first you may be puzzled to tell the difference between it and the Audubon Warbler. They both have yellow patches on crown, rump, and both sides of the breast. But look at the throat next; if it is white, the bird is the Myrtle Warbler. These are more common than other warblers and are to be seen in flocks of from twenty to thirty and are all males in the spring when migrating; for the males usually precede the females.

The Myrtle Warbler is the most hardy of all the warblers, being the first to come in the spring and the last to leave in the fall. Occasionally he winters as far north as Maine. He feeds largely in winter on poison oak berries. Professor Forbes tells that he once saw the Myrtle Warbler feeding on plant lice that affected the birches; and also on other plant lice that affected the wild crab. He says there have been very few plant lice found in that affected area since. On another occasion he found the Myrtle Warbler feeding on the larva of the pear tree psylla, a pest that has been very destructive to pear trees; these insects hibernate in the crevices between the twigs, and are thus exposed to the attacks of birds all winter. So when the Myrtle Warbler is found spending the winter north, he is no doubt destroying many of the pests, for warblers are mostly insectivorous and may not be living on seeds and berries as supposed.

MOCKINGBIRD

A. O. U. No. 703.

Mimus polyglottos.

Description — *Adults*: Upper parts ashy gray, sometimes with a brownish tinge; wings and tail dusky on exposed poring; with faint, grayish edging; primaries, except outer one, and secondaries broadly white at base,—the former nearly and the latter entirely, concealed by the greater coverts, which are white with narrow blackish tips; also some edging on middle coverts and tertials; the outer pair of tail-feathers almost entirely, the next largely (on the inner web), the next pair or pairs touched with white; underparts soiled white, sometimetimes dingy or brownish, especially behind; bill black, feet dark. *Young:* Similar to adult, but browner above; speckled with dusky below.

Length: 9 to 11 inches.

General Range: United States south into Mexico. Rare or irregular north of about latitude 38°. Bahamas.

Range in West Virginia: Extremely rare in northern part of the state. Occasionally seen in southern.

THE man who would kill a mocking bird because the bird ate a little fruit would rob a grave. We should do all in our power to increase this wonderful singer in our state.

Here we have the lover-bird of the South. How many times he has played Cupid we shall never know, but may he continue in his mission! On moonlight nights in the spring when he is pouring forth his exquisite tales of love to his mate, his whole being throbs with tenderness. Many lovers in the moonlight have sought each others hands, and watched this melodious singer as he raised himself in the air. His ecstacies of love and passion seem to virtually hold him in mid-air. Then with legs dangling, he descends his airy spiral staircase, step by step. At each step he sends down to his mate all the thrills that one of the fair sex craves to hear, and when this southern prince of singers pauses, our lovers who are holding hands are found in fond embrace, and in low, passionate words he is telling her that their cottage shall have not only

vines but climbing roses, so that they may enjoy the mockingbird the balance of their days.

We have all three of the mockingbirds in this state, the brown thrasher, catbird, and the real southern mockingbird, which is the prince of all the mockers. He is to the Southern people what the English nightingale is to the English. A great deal of individual difference exists among the performers; older birds are better singers and some have a greater field of mimicry but there is no bird that one cannot imitate. I have never seen a mated pair in this state but have seen seven or eight individuals in Kanawha County. One spent the winter with me several years ago and came regularly to the food table. Another spent the winter with Mr. R. S. Spillman on the South Side in the City of Charleston, and last summer I found one on Commissioner Stewart's apple farm in Putnam County.

The nest is built in shrubs, low trees, briars, vines, climbing rose bushes, corners of fences or on top of stumps, and is composed of bark, strings, sticks, feathers, or any convenient material. Four to six eggs are laid, usually four. They are pale greenish blue, with rather heavy reddish brown spots.

In its food habits the mockingbird is quite fond of fruit, but feeds its young entirely on insects. The old birds are fond of cotton worms, and are known to feed also on the chinch bug, rice weevil, and boll-weevil.

CATBIRD

A. O. U. No. 704.

Dumetella carolinensis.

Description—*Adults*, alike: Slate color, lighter below, tail and crown black; under tail coverts chestnut. *Young*: Similar but colors not so bright.

Length: 8 to 9 inches.

Nest: In hedges, or thickets; made of twigs, rootlets, and grass, lined with fine black roots; the four *eggs* are plain greenish blue.

General Range: Eastern United States and British Provinces, west regularly to and including the Rocky Mountains; irregularly to the Pacific Coast, from British Columbia to Central California. Breeds from Gulf States, northward to the Saskatchewan; winters in the southern states, Cuba, and middle America, to Panama; Bermuda resident.

Range in West Virginia: An abundant species in all parts of the state. Found along streams, even high up in the mountains.

PROFESSOR Beal says that they are more beneficial than injurious and should not be destroyed. Plant Russian Mulberry trees for their benefit and it will save some of your cultivated fruit.

Who does not know the catbird, or think he does? We have but three kinds of mocking birds in this state. The southern mocking bird, quite rare in the state, heads the list as a singer. Next is the brown thrasher which is quite common, and a very wonderful singer. The catbird is named last; he lacks the musical power possessed by either of the former birds, although he is really a great singer, and you occasionally find one that sings with true musical talent. When the catbird mounts a tree top and starts with "Plut, plut, coquillicot," you anticipate a real treat, but having finished or lost his inspiration, he suddenly drops down in the thicket and scolds and squalls like a cat until your admiration is changed to disgust. Catbirds sometimes sing at night, and they often sing for hours at a time on rainy days. In the fall he will be heard singing what is called a whispering song, which cannot be heard more than a few feet away.

The catbird is a loyal defender of his home and his cry when his young are threatened is very pathetic—almost human. John Burroughs,

the great naturalist, describing the actions of a mother catbird when a black snake was swallowing her young, says that "she sobbed and almost fainted."

Much has been said about the catbird and his fruit-eating habits, but too little has been told about the insects that he destroys. Back in 1879, Professor S. A. Forbes reported on the stomachs of 28 catbirds which he examined carefully, showing that those collected in May had eaten nothing but insects; in June, 64 percent insects, but in July, 63 percent small fruits, only ⅓ of which were cultivated fruits. The catbird prefers wild to cultivated fruits, and if man has destroyed his natural fruit and planted choice improved varieties, can you blame him for indulging a little in some of the forbidden fruit?

Nearly half of the 46 percent of the insects eaten in July were ants, but he eats striped cucumber beetles, locusts, caterpillars, spiders, crane flies, beetles and grasshoppers. And please note what he feeds his young: In 1884 the stomachs of three Michigan nestlings of this species contained 95 percent insects, of which 62 percent were cutworms. Fourteen nestlings studied by Judd had eaten but 4 percent of fruit, their diet being chiefly beetles, caterpillars, spiders and grasshoppers.

BROWN THRASHER

A. O. U. No. 705.

Toxostoma rufum.

Description — Sexes alike. Upper parts bright rufus or reddish brown; the wing coverts tipped with buffy white, forming indistinct wing bars; underparts buffy white, heavily streaked with black, except the throat and center of the abdomen.

Length: 11½ inches.

General Range: Eastern North America, from southern Alberta and Manitoba, northern Michigan, southern Ontario and southern Maine, to eastern Louisiana, Mississippi and Alabama, and northern Florida. Winters in southern Missouri and northern Texas to southern Florida.

Range in West Virginia: Very common in the less elevated parts of the state.

Early on an April morning you will be attracted by the loud, clear notes of a bird that reminds you of a bugler calling the doughboys to get up for breakfast. You will want to see what bird it is that can sing with such power and so full of joy. You will locate him high up in a tree—a large brown bird with a spotted breast, pouring out his melodious notes which he seems to literally pump out of himself with his tail. He imitates the quail and a number of other birds much more clearly and boldly than the catbird, and ranks next to the real southern mockingbird as an imitator. Thoreau said that the thrasher says to the farmer boy, "Drop it! Drop it! Cover it up! Cover it up!" Each phrase is repeated.

"That's the wise thrush;
He sings each song twice over,
Lest you think he never could recapture
The first fine careless rapture."

Why a bird that will sing with such melody should be such a shy retiring bird, skulking in the bushes and shrubbery, it is hard to tell. It may be because he is ashamed of his habit of procuring part of his meal of grain from the droppings of animals. This is one of the peculiar habits this bird has, even when other foods are abundant.

He builds his nest in brush heaps, vines, thorn trees, and thickets, near the ground and occasionally directly on the ground. The nest is composed of sticks, coarse roots, leaves and pieces of bark. It is a very bulky affair, and usually contains four eggs, which are grayish white or bluish white, in ground color, and are rather evenly speckled with minute spots of cinnamon or rufus brown.

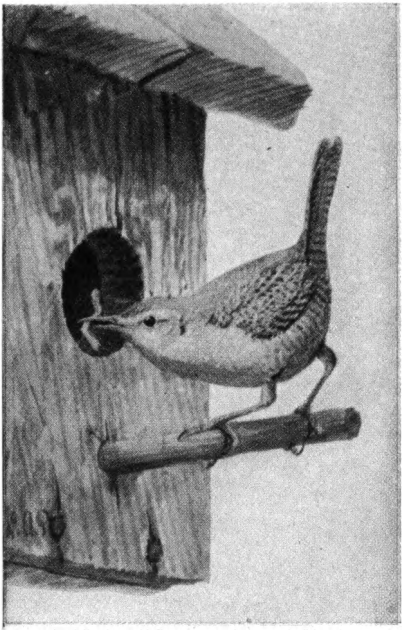
However, the brown thrasher sometimes shows his boldness, for if you molest his nest you hear a loud, "Click!" note which immediately gives you a very uncomfortable feeling, and when you see the monster with his yellow eyes and clanking notes coming at you like a bolt of lightning, striking at you with his powerful beak and wings, you will appreciate him as a home protector.

I had an experience with a thrasher one time that showed a new side to his character. The thrashers had been in the habit of nesting in some shrubbery in my yard. One year I piled up a big brush heap in the yard in the winter and neglected to burn it. So one evening in the spring I looked it over carefully to see if there might be a thrush nest in it, but could not see any. So I set fire to it and immediately a thrasher flew out, screaming in a very disturbed manner. I rushed for a bucket of water, put out the fire, and then saw the nest with four eggs in it as plain as day, but the color blended so completely with the bushes and leaves that I could not see the nest before. The bird flew up into the top of a tree and began to sing with such rapture that I have never forgotten his or her gratitude.

The thrasher likes fruit but it is mostly the wild fruits he eats. He takes his food almost entirely from the ground. Not only does he scratch the ground, but he literally spades it with his bill. I knew of one thrasher that passed the winter in Kanawha County. He remained near a barn.

This bird should be protected for his beneficial habits as well as for his wonderful musical ability.

HOUSE WREN



A. O. U. No. 721.

Troglodytes aedon.

Common Names—BROWN WREN, COMMON WREN, WOOD WREN, SHORT-TAILED WREN.

Description—*Adults:* Olive-brown above, sometimes more rusty, sometimes more grayish, always more reddish on rump and upper tail-coverts; the wings and tail always distinctly barred with brown and black, and the same pattern often showing more or less distinctly on head and back; below grayish or brownish-white, lighter on throat and belly, darkest on breast and flanks; under tail-coverts brown, heavily barred with dusky.

Length: 4½ to 5½ inches.

Nest: In posts, stumps, hats, pumps, coats on clothes lines, old kettles, tin cans, bird houses, or most anywhere, even in old hornets' nests, mail boxes, and many other unexpected places. The nest is composed of twigs, usually lined with feathers; sometimes wool or cotton is used. *Eggs*, 6 to 10 in number, commonly pinkish white, or cream colored, thickly speckled with reddish brown. Occasionally they are uniformly mahogany color.

General Range: Eastern United States and southern Ontario, west to Indiana and Louisiana. Resident from the middle districts southward.

Range in West Virginia: Not found more than a few miles west of the summit of the Alleghenies. On top of the mountains, it is quite common. West of the mountains, this species is replaced by the abundant Bewick's Wren.

VERY beneficial; ninety-eight percent of its food is insects or their allies.

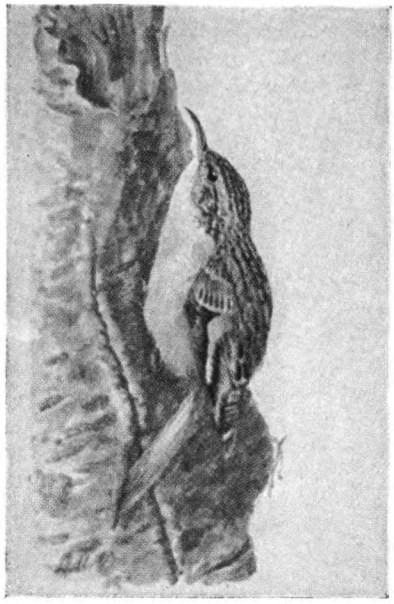
A country home without a pair of nesting wrens of some kind would be as incomplete as a farm without chickens. The Bewick and house wrens are both called "house wrens." The Bewick is more the color of the Carolina, only smaller and the tail longer. The Bewick does not stay all winter as the Carolina wren does. The house wren is smaller and grayer instead of reddish brown as the Bewick wren or the Caro-

lina. In song it does not compare with the sweet tones of the Bewick, but he makes up for that with his incessant chatter, repeating his chattering songs twenty-five to thirty times with just a few seconds between them. He keeps this up more or less all day and does not care if he sings perched on the post that contains his nest, for he has confidence in man and usually chooses his home near men's dwellings, where he can peek in and see what Mr. Man is doing in the barn, stable, chicken house, or on the porch. He may peek in the open door or even hop in a window to see if the man is idling away his time, and he usually gives his opinion freely to Mr. Man.

But when it comes to selecting a mate he is more prudent than men, for he selects the house and site and starts to build the nest, or the biggest part of it, before she is chosen, or rather before she will even consider him as a prospect. The Bewick wren had been our "house wren" until three years ago when the first real house wren appeared. It was a male and he immediately selected a bird house and began operations. He would sing awhile, carry in some twigs, then sing more, but no female appeared. He tried another bird house, sang, and built again, but no female appeared. He had the same bad luck—no mate. Then he sought another site, down near the woods below and started all over again. My heart ached for the poor little fellow. He was on a desert island so far as a mate was concerned. The next spring he induced a fair damsel to accompany him to the land where the summer houses were plentiful. They raised a fine family of five, all of which were banded. This year three pairs returned and all reared two broods each. Next year I expect to be scolded and loved and amused by the interesting little fellows who are paying their way by destroying of insects and making the world more cheerful.

BROWN CREEPER

A. O. U. No. 726.



Certhis familiaris americana.

Description: Upper parts, from bill to lower back, dark brown, streaked with white, each white streak more or less margined with black; lower back and rump bright rusty-red, obscurely streaked with brown; tail-feathers brown, unmarked; wings brown, crossed by two broad bars margined with rusty on the under tail-coverts; sides of head and neck mottled brown, black, and white, like the top of the head. The *female* is like the *male* in color but slightly smaller; there are no marked seasonal changes.

Length: 5 to 5¾ inches.

Nest: Seems to be placed invariably beneath a partly loosened sheet of bark which is still attached firmly to the tree, and which shelters it from the weather as well as from observation. In the narrow space between the bark and the tree the bird constructs a substantial but somewhat irregular nest of twigs and shreds of bark of various kinds, and lays four to six eggs, which are white or creamy white, speckled chiefly at the larger end with reddish brown.

General Range: Eastern North America, breeding from the northern and more elevated parts of the United States, northward, and casually farther south, migrating southward in winter.

Range in West Virginia: Common in all parts of the state, less so in the mountains.

BENEFICIAL to all trees; fills a place in nature that is both unique and beneficial, and has no bad habits.

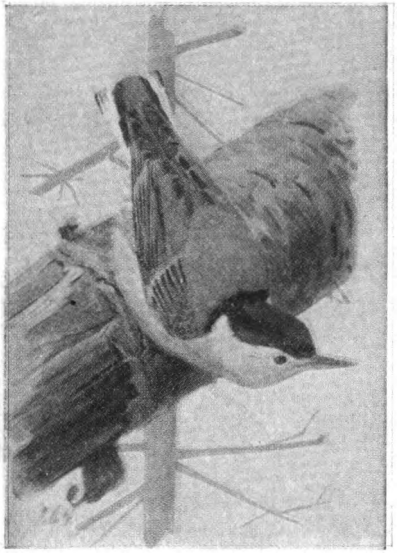
The brown creeper is unique in his make-up and habits. He is closely related to the wren and nuthatch, and his tail is much like a woodpecker's. He uses it as a brace to hold onto the tree. He is a clear case of color protection. This little fellow gets his insect food on the bark of trees and he is hardly distinguishable when he is stationary, which, however, is seldom the case. He works or "hitches" himself up the body of a tree, working in spiral fashion around and around the large limbs. When satisfied that he has made a clean job of the tree, he flies to the base of another tree. I never saw a bird have so many "ups and down"—always working. Sometimes he says "Chip!" as he works merrily along in his near-sighted way, but he is able to see under

the loose bark where the eggs of some insects have been laid, presumably safe—but Mr. Creeper has a long, curved bill just fitted for such work and makes short work of them. I never will forget the first time I saw a flock of the strange little fellows. I just stood and laughed to see thirty of them all about me, working up the trees, then letting themselves down again, just as if they had made a mistake and had to start all over again on another tree.

The Creeper is truly a bark bird, for it builds its nest under the bark. Brewster claims the love notes of this little creature are the sweetest of any bird's he ever heard, being very low and pretty.

On October 19, 1922, Governor Walter E. Clark, editor of the Charleston Daily Mail, came into my office. In his hand he had a little brown creeper that he had picked up in the street. Mr. Clark thought that the little fellow was chilled with the cold. I explained that the bird was migrating, and had probably struck a wire and was only stunned, so I took him home and placed a little aluminum band on the bird's leg that read No. 27175." On the inside of the band it read, "Notify Biological Survey." I opened my hand and the little brown creeper flew to the bottom of an oak tree and started hitching upward, spiral fashion, looking for insects, as if nothing unusual had happened; and now we are wondering who will pick him up the next time he falls. Or will he be trapped by one of our brother bird-trappers for banding purposes? I hope so.

WHITEBREASTED NUTHATCH



A. O. U. No. 727.

Sitta carolinensis.

Description—*Adult male*: Shining black on top of head, extending down the neck and across the front of back; the remainder of upper parts bluish gray, extending through the middle of the tail; outer tail-feathers black, blotched and spotted with white; black feathers in wing; white sides of head, and neck and underparts white; under tail-coverts brown. *Adult female*: Duller, back and head, washed with gray.

Length: 6 inches.

Nest: In cavities. *Eggs* vary in number, from five to sometimes eight or ten; pinkish white, speckled with brown, occasionally lavender.

General Range: South Atlantic and Gulf States, breeding north to Virginia.

Range in West Virginia: Common in all parts of the state, less so in the mountains.

BENEFICIAL to farmers and horticulturists. A health-inspector of the bark of trees. Has been known to exterminate all the pear psyllas in an orchard.

A nuthatch is very interesting on account of the acrobatic stunts he performs. In his search for food, which is principally gleaned from the larger limbs and trunks of the trees, when one sees him run down a tree trunk, one has a feeling that the blood will rush to his head and that he will get dizzy and fall off; but not so. He continues his search head down, calling cheerfully, "Hank! Hank!" or "Onk! Onk!" to his mate or his associates, for he is usually in company with chickadees, downy or hairy woodpeckers, and titmice. He stops when he hears or suspects an insect under the bark and raising his body, rains blows with his bill that would do credit to a woodpecker.

He is a very provident little fellow for he carries nuts and other food and puts it away in cracks and crevices for a "rainy day," we would call it. The habit has descended to him from his forefathers who learned by experience the bitter lesson that there are great changes in weather that can befall the nuthatch. When a sleet storm comes and covers the bark of the trees where the nuthatches gather the largest part of

their food, it is so slippery that they would need climbing spurs to climb the trees. They are very helpless when the trees are in this condition and would surely starve if they did not have something laid by.

The whitebreasted nuthatch builds his nest in a hollow tree, and the entrance is usually the knot of a limb which he clears out. I found one like this once and the female could not be induced to leave the nest, even when I had poked several feathers off her with a stick. When her eight babies were old enough to leave the nest it was a wonderful sight to see them learning to run up and down the trees like the older birds, trying to find something to eat.

Nuthatches are very fond of nuts and suet. They come freely to food stations and should be encouraged to do so, for I believe that they are very beneficial to orchards as well as forest and ornamental trees. For some reason, the nuthatches do not seem to increase, although they raise large families. They must have some natural enemy, but just what it is I have never been able to learn.

BLACK CAPPED CHICKADEE

A. O. U. No. 735.

Penthestes atricapillus.

Description—*Adults*, alike: Entire upper surface of head, from bill to nape, black; side of head and neck white; chin and throat black; back, wings and tail clear gray or ash; the wings with an indistinct white bar; wings and tail feathers margined white; breast and belly grayish white, the sides more or less tinged with brown and buff. *Young:* Like old birds.

Length: 4¾ to 5¼ inches.

Nest: In cavities, usually low down, stumps, posts or bird houses; the nest is composed of wood fiber, rabbit fur and feathers; sometimes moss; inclined to cover eggs with fur when leaving nest. *Eggs*, 5 to 8 in number, white, lightly spotted with brown.

General Range: Eastern North America; breeds from southern Illinois, and Pennsylvania, north to Labrador; and south along Alleghenies to North Carolina.

Range in West Virginia: Common throughout. Breeds in the state.

ONE of our most beneficial birds, easily attracted to the home or orchard by winter feeding with suet and by putting up bird houses with one-inch openings. You will be most sure to have one or more nest with you and they will remain in the neighborhood all the year around.

My lady's powder puff is no more dainty than this little puff of feathers. You would imagine that a blast of wind would carry it away or beat its brains out. "Black-capped chickadee!" What a name for such a little fellow, and yet he weathers the strongest gales. In the great North Country on cold winter days he cheers the woodsmen when they are suffering in the biting frost and wind and snow. Here he comes along singing "Chickadee, dee, dee." The little optimist is always cheerful and confiding. He may come and eat out of your hand in the cold snowy woods. It must be his smallness that makes him so sociable and confiding.

The chickadee is easily attracted to your home or orchard with a little suet, sun flower seed, or cracked black walnuts. I used to have a little cigar box on my window sill to feed the birds and among the many

little visitors I had was a little chickadee that evidently had to sleep in a small cavity in some limb or tree, for his little tail was always twisted and the feathers showed that he had been crowded very much. I have had them nest in a post that I prepared for them and when you removed the lid to look in, she would look at you with her little bead-like eyes and draw in her breath, then expel it like a little steam-engine, as much as to say, "Go away, or I will destroy you, you monster."

The nest was made of plant down, rabbit hair, and a few feathers, and contained eight little white eggs, spotted with brown. It seems strange that such a little bird should raise such a large family, but that is her way of doing the big things in life. First, she sets an example of cheerfulness; next she raises a big family; the amount of little insects and eggs she destroys is marvelous. Prof. E. D. Sanderson, after a careful study of the chickadees of Michigan, estimated that they destroy about eight trillion insects in Michigan in one year and the insects were mostly injurious to orchards and trees. Pretty big things for little birds!

In a canker-worm infested orchard sixty-one percent of the food of two chickadees consisted of the caterpillars, while injurious beetles constituted the remainder. A recent investigation of the winter food of the chickadees showed that in the winter months more than half of their food consisted of insects, a large portion of which were eggs of the plant lice which infect the fruit, shade and forest trees. Prof. Forbush says he has found that when suet was hung in a fruit tree, to attract the chickadees, that they destroy nearly all of the insects.

ROBIN

A. O. U. No. 761.

Planesticus migratorius.

Description—*Male in summer*: Mainly slate-colored above and brownish-red (cinnamon-rufous) below; top and sides of head black; throat white, with narrow black streaks; a white spot over the eye; wing-feathers dark slate, almost black, and tail-feathers quite black, except the outer feather on each side, which has a small white patch near the tip. *The female* is so similar as to be separated with difficulty; ordinarily the head is not quite so black and the back is rather grayer. The bill in both sexes is yellow, with black tip; iris dark brown. In fall and winter all the colors are duller and most of the feathers above and below have ashy margins. *The young* are spotted with black on back and breast, most thickly and heavily below.

Length: 10 inches.

Nest: Largely of grass, roots and mud, but an immense variety of substances may be used; few twigs are used; nest is almost invariably lined well with fine grasses, which completely cover the mud which forms such a large portion of the structure; generally placed in trees, from 3 or 4 feet to 50 or 60 feet up, though sometimes on bridges, fence-posts, rails, or convenient ledges of buildings. *Eggs*, 3 to 5, of the well-known "robin's egg blue."

General Range: Eastern United States, to the Rocky Mountains, including eastern Mexico and Alaska. Breeds from Virginia and Kansas northward to the Arctic coast; winters from southern Canada and the northern states (irregularly) southward.

..Range in West Virginia: Common throughout the state, breeding in all parts.

PLEASE protect and cherish him as a member of your family.

The robin is the best-known bird in America. I have talked to many people about their knowledge of birds and I find that every one seems to know the robin if he knows any birds at all.

Robins are the harbingers of Spring:

"The same untiring song I hear,
As old as new, as full of cheer
As ever robin sang before—
Recalling scenes forever o'er."

What a Spring tonic are the first notes of the robin when he returns in February! They come just when you are fagged from the winter's cares:

"A soft wand waves within the skies,
A seeming bond to Paradise."

You feel as if you want to plow a field, or spade the garden, just to see your old familiar feathered friend harvest the grubs and worms. Yes, he is ready for business. He will call you cheerfully very early in the morning. A few robins are to be found throughout the winter in West Virginia. In 1919 thousands of robins spent the entire winter in Raleigh County, in and around Beckley. Mr. E. J. Bibbs, of Shady Springs, in the same county, informed me that robins were so numerous during the winter of 1919 that seeing them in large flocks reminded him of the day of wild pigeons. A knowledge of bird life teaches us that some certain food was their principal attraction, and they were seen flying to the sheltering pine thickets to roost; but neither Mr. Bibbs nor any of the many other persons I inquired of, had observed what they were feeding on.

The Robins have been roundly abused for the cherries they eat in the summer. Surely every farmer could afford one cherry tree for these birds, for when the stomachs of robins have been examined, they were shown to contain 58 percent vegetable food, over 47 being wild fruits, and only approximately 4 percent being cultivated varieties. Cultivated fruits amounting to about 25 percent were found in the stomachs in June and July, and only a trfle in August. Wild fruits, on the contrary, are eaten in every month, and constitute a staple food during half the year. No less than forty-one varieties of such fruits were identified in the stomachs examined.

After making examinations of numerous lots of robins' stomachs, at different dates, Professor Forbes thus concluded his report: "We can reduce the question finally to this form: will the destruction of seventeen *quarts* of average caterpillars, including at least eight quarts of cutworms, pay for twenty-four quarts of cherries, blackberries, currants and grapes? For my own part, I do not believe that the Horticulturist can sell his small fruit anywhere in the ordinary markets of the world at so high a price as to the robin, provided of course that he uses due diligence that the little huckster doesn't cheat him in the bargain."

BLUEBIRD

A. O. U. No. 766.

Sialia sialis.

Description—*Adult male*: Upper parts deep blue; throat, breast and sides chestnut brown; belly white. *Adult female*: Decidedly paler, except rump which is deep blue; remainder of upper parts grayish blue. *Young*: Brownish blue, streaked with grayish white; underparts thinly spotted brown and white.

Length: 6½ to 7 inches.

Nest: In cavities, bird houses, stumps, fence posts, or apple trees. *Eggs*, pale blue, 4 to 6 in number.

General Range: Eastern North America, north to southeastern Manitoba and south to Texas. Resident of Bermuda. A few winter as far north as Michigan; majority in southern states.

Range in West Virginia: Common in most parts of the state. Sometimes remains all winter. Not often seen up in the mountains.

VERY beneficial to farmers and horticulturists.

The bluebird spends the winter in West Virginia, in small flocks which may be found in the Kanawha Valley any winter day if you care to look or listen for him. You may find him feeding in sumach or flying over with a little plaintive note. His home is in the far north and he is just spending the winter with us, which means the South to him. Our own bluebirds winter farther south—just how far we do not know, but will soon learn when our bird banding has been extended over a greater area. We know that they return about the middle of February; for nesting birds that were banded returned to their old nesting sites here and immediately began to make love notes and to look for a suitable home.

The male seems to be in a great hurry to get settled; he appears to be afraid that his mate will change her mind or that some other fellow will find a more fashionable bungalow; so he takes her to all the latest bird houses, goes in and comes out and tells her how nicely the house is arranged, how roomy and how airy; how wonderful the view from the front porch is; and that it faces the south, which is always so essential for the raising of the first brood when it is still very cold.

Mother bluebird loves to be able to sit on her eggs and still keep an eye on her beautiful and devoted lover; but she loves to be courted and finds some fault with the bird house, stump, hollow apple limb, or fence post.

She keeps him up in the air until the twentieth of March. I remember the Easter Rabbit who had gotten up pretty early on the twenty-seventh of March, thinking he would put an egg in the bluebird post that had a loose top on it for a peek hole; he saw that the nest was complete, however, so did not put an egg in it. A couple of hours later, when a little girl was hunting Easter eggs, she looked in the post and discovered a very small blue egg in it which mother bluebird had laid. The little girl was very much excited and called to her father to ask if it was a bluebird's egg or really an Easter egg. Three broods were hatched in that post that season, and when another little girl looked in and saw the nest full of yellow, gaping mouths of baby bluebirds, she said, "They look just like tulips."

Professor Forbes estimates than "one hundred bluebirds at thirty insects each day would eat in eight months about six hundred and seventy thousand insects. If this number of birds were destroyed, the result would be the preservation, on the area supervised by them, of about seventy thousand moths and caterpillars (many of them cutworms), twelve thousand leaf-hoppers, ten thousand curculios, and sixty-five thousand crickets, locusts, and grasshoppers. How this frightful horde of marauders would busy itself if left undisturbed no one can doubt. It would eat grass and clover, and corn and cabbage, inflicting an immense injury itself, and leaving a progeny which would multiply that injury indefinitely."

CHECK-LIST OF WEST VIRGINIA BIRDS.

Following will be found a list of the birds that have been identified in the state of West Virginia. They have been arranged in the same manner as the forty preceding birds, according to their families, and using the names and numbers employed in the Check-List of North American Birds authorized by the American Orinthologists' Union:

COLYMBIDAE—GREBES

2—Holboell's Grebe—Colymbus holbaelli.
3—Horned Grebe—Colymbus auritus
6—Pied-billed Grebe—Podilymbus podiceps

GAVIIDAE—LOONS

7—Loon—Gavia imber

LARIDAE—GULLS AND TERNS

40—Kittiwake—Rissa tridactyla
51—Herring Gull—Larus argentatus
54—Ring-billed Gull—Larus delawarensis
58—Laughing Gull—Larus atricilla
60—Bonaparte's Gull—Larus philadelphia
64—Caspian Tern—Sterna caspia
70—Common Tern—Sterna hirundo
74—Least Tern—Sterna antillarum
77—Black Tern—Hydrochelidon nigra surinamensis

PHALACROCORACIDAE—CORMORANTS

125—White Pelican—Pelecanus erythrorhynchus

ANATIDAE—DUCKS, GEESE, SWANS

129—Merganser—Merganser americanus
130—Red-breasted Merganser—Merganser serrator
131—Hooded Merganser—Lophyodytes cucullatus
132—Mallard—Anas boschas
133—Black Duck—Anas obscura
135—Gadwall—Chaulelasmus streperus
137—Baldpate—Mareca americana
139—Green-winged Teal—Nettion carolinensis
140—Blue-winged Teal—Querquedula discors
142—Shoveller—Spatula clypeata
143—Pintail—Dafila acuta
144—Wood Duck—Aix sponsa
146—Redhead—Aythya americana
147—Canvasback—Aythya vallisneria
148—Scaup Duck—Aythya marila
149—Lesser Scaup Duck—Aythya affinis
150—Ring-necked Duck—Aythya collaris

151—Golden-eye—Clangula americana
153—Buffle-head—Charitonetta albeola
154—Old Squaw—Harelda hyemalis
163—Scoter—Oidemia americana
165—White-winged Scoter—Oidemia deglandi
167—Ruddy Duck—Erismatura jamaicensis
169—Snow Goose—Chen hypeborea
169a—Blue Goose—Chen caerulescens
171a—White-fronted Goose—Anser albifrons gambeli
172—Canada Goose—Branta candensis
173a—Brant—Branta bernicla glancogastra
180—Whistling Swan—Oler columbianus
181—Trumpeter Swan—Oler bucinator

CICONIIDAE—WOOD IBIS
188—Wood Ibis—Tantalus loculator

ARDEIDAE—BITTERNS AND HERONS
190—American Bittern—Botaurus lentiginosus
191—Least Bittern—Ardetta exilis
194—Great Blue Heron—Ardea herodias
196—American Egret—Herodias egretta
200—Little Blue Heron—Florida caerulea
201—Green Heron—Butarides virescens
202—Black-crowned Night Heron—Nycticorax naevius

GRUIDAE—CRANES
206—Sandhill Crane—Grus mexicana

RALLIDAE—RAILS, COOTS, GALLINULES
208—King Rail—Rallus elegans
211—Clapper Rail—Rallus crepitans
212—Virginia Rail—Rallus virgianus
214—Sora—Porzana carolina
215—Yellow Rail—Porzana noveboracensis
218—Purple Gallinule—Ionornis martinica
219—Florida Gallinule—Gallinula galeata
221—Coot—Fulica americana

PHALAROPODIDAE—PHALAROPES
223—Northern Phalarope—Phalaropus lobatus

SCOLOPACIDAE—SNIPES AND SANDPIPERS
228—Wood Cock—Philohela minor
230—Wilson's Snipe—Gallinago delicata
233—Stilt Sandpiper—Micropalama himantopus
239—Pectoral Sandpiper—Actodromas maculata
240—White-rumped Sandpiper—Actodromas fuscicollis

242—Least Sandpiper—Actodromas minutilla
254—Greater Yellow-legs—Totanus melanoleucus
255—Yellow-legs—Totanus flavipes
265—Solitary Sandpiper—Helodromas solitarius
258—Willet—Symphemia semipalmata
261—Upland Plover—Batramia longicauda
263—Spotted Sandpiper—Actitus macularia

CHARADRIIDAE—PLOVERS
272—Golden Plover—Charadrius dominicus
273—Killdeer—Oxyechus vociferus
275—Ringed Plover—Aegialitis semipalmata
277—Piping Plover—Aegialitis meloda

ODONTOPHORIDAE—BOBWHITES
289—Bobwhite—Colinus virginianus

TETRAONIDAE—GROUSE
300—Ruffed Grouse—Bonassa umbellus

MELEAGRIDAE—WILD TURKEYS
310a—Wild Turkey—Meleagres gallopavo silvestris

COLUMBIDAE—DOVES AND PIGEONS
315—Passenger Pigeon—Ectopistes migratorius
316—Mourning Dove—Zenaidura macroura

CATHARIDAE—VULTURES
325—Turkey Vulture—Cathartes aura

BUTEONIDAE—HAWKS AND EAGLES
327—Swallow-tailed Kite—Elanoides forficatus
331—Marsh Hawk—Circus hudsonius
332—Sharp-shinned Hawk—Accipter velox
333—Cooper's Hawk—Accipter cooperi
334—Goshawk—Accipter atricapillus
337—Red-tailed Hawk—Buteo borealis
339—Red-shouldered Hawk—Buteo lineatus
342—Swainson's Hawk—Buteo swainsoni
343—Broad-winged Hawk—Buteo platypterus
347a—Rough-legged Hawk—Archihiteo logopus sancti-johannus
349—Golden Eagle—Aquila chrysactos
352—Bald Eagle—Haliaeetus leucocephalus

FALDONIDAE—FALCONS
356a—Duck Hawk—Falco peregrinus anatum
357—Pigeon Hawk—Falco columbarius
360—Sparrow Hawk—Falco sparverius

PANDIONIDAE—OSPREYS
364—Osprey—Pandion haliaetus carolinensis

ALUCONIDAE—BARN OWLS
365—Barn Owl—Strix pratincola

STRIGIDAE—HORNED OWLS
366—Long-eared Owl—Asio wilsonianus
367—Short-eared Owl—Asio accipitrinus
368—Barred Owl—Syrnium varium
372—Saw-whet Owl—Nyctala acadica
373—Screech Owl—Megascops asio
375—Great Horned Owl—Bubo virginianus
376—Snowy Owl—Nyctea nyctea

PSITTACIDAE—PARROTS, Etc.
382—Carolina Paroquet—Conurus carolinensis

CUCULIDAE—CUCKOOS
387—Yellow-billed Cuckoo—Coccyzus americanus
388—Black-billed Cuckoo—Coccyzus erythropthalmus

ALCEDINIDAE—KINGFISHERS
390—Belted Kingfisher—Ceryle alcyon

PICIDAE—WOODPECKERS
392—Ivory-billed Woodpecker—Campephilus principalis
393—Hairy Woodpecker—Dryobates villosus
394a—Downy Woodpecker—Dryobates pubescens
402—Yellow-bellied Sapsucker—Sphyrapicus varius
405a—Northern Pileated Woodpecker—Phoeotomus pileatus
406—Red-headed Woodpecker—Melanerpes erythraocephalus
409—Red-bellied Woodpecker—Centurus carolinus
412a—Northern Flicker—Colaptes auratus

CAPRIMULIGIDAE—GOATSUCKERS, Etc.
416—Chuck-Will's-Widow—Antrostomus carolinensis
417—Whip-poor-will—Antrostomus vociferus
420—Nighthawk—Chordeiles virginianus

MICRODODIDAE—SWIFTS
423—Chimney Swift—Chaetura pelagica
428—Ruby-throated Hummingbird—Archilochus colubris

TYRANNIDAE—TYRANT FLYCATCHERS
444—Kingbird—Tyrannus tyrannus
452—Crested Flycatcher—Myriarchus crinitus
456—Phoebe—Sayornis phoebe

459—Olive-sided Flycatcher—Nuttallornis borealis
461—Wood Pewee—Mylochanes virens
463—Yellow-bellied Flycatcher—Empidonax flaviventris
465—Arcadian Flycatcher—Empidonax virescens
466a—Alder Flycatcher—Empidonax trailli alnorum
467—Least Flycatcher—Empidonax minimus

ALAUDIDAE—LARKS
474—Horned Lark—Otocoris alpestris
474b—Prairie Horned Lark—Otocoris alpestris praticola

CORVIDAE—CROWS, JAYS, MAGPIES
477—Bluejay—Cyanocitta cristata
486a—Northern Raven—Corvus corax principalis
488—Crow—Corvus brachyrhynchos
490—Fish Crow—Corvus ossifragus

STUENIDAE—STARLINGS
493—Starling—Sturnus vulgaris

ICTERIDAE—BLACKBIRDS AND ORIOLES
494—Bobolink—Dolichonyx orygivorus
495—Cowbird—Molothrus ater
497—Yellow-headed Blackbird—Zanthocephalus zanthocephalus
498—Red-winged Blackbird—Agelaius phoeniceus
501—Meadowlark—Sturnella magna
506—Orchard Oriole—Icterus spurius
507—Baltimore Oriole—Icterus galbula
509—Rusty Blackbird—Euphagus carolinus
511—Purple Grackle—Quiscalus quiscula
511b—Bronzed Grackle—Quicalus quiscula aeneus

FRINGILLIDAE—SPARROWS
515—Pine Grosbeak—Pinicola enucleator leucura
517—Purple Finch—Carpodacus purpureus
521—American Crossbill—Loxia curvirostra minor
522—White-winged crossbill—Loxia leucoptera
528—Red-poll—Acanthes linaria
529—Goldfinch—Astragalinus tristis
533—Pine Siskin—Spinus pinus
534—Snow Bunting—Plectrophenax nivalis
540—Vesper Sparrow—Pooecetes gramineus
542a—Savannah Sparrow—Passerculus san wichensis savanna
546—Grasshopper Sparrow—Ammodramus savannarum austrailis
552—Lark Sparrow—Chondestes grammacus
554—White Crowned Sparrow—Zonotrichia leucophrys
558—White-throated Sparrow—Zonotrichia albicollis
559—Tree Sparrow—Spizella monticola

560—Chipping Sparrow—Spizella passerina
563—Field Sparrow—Spizella pusilla
567—Slate-colored Junco—Junco hyemalis
567a—Carolina Junco—Junco carolinensis
575a—Bachman's Sparrow—Pencaea bachmannii
581—Song Sparrow—Melospiza melodia
583—Lincoln's Sparrow—Melospiza lincoln
584—Swamp Sparrow—Melospiza georgiana
585—Fox Sparrow—Passerella iliaca
587—Towhee—Pipilo erythrophthalmus
593—Cardinal—Cardinalis cardinalis
595—Rose-breasted Grosbeak—Zamelodia ludoviciana
597—Blue Grosbeak—Guiraca caerulea
598—Indigo Bunting—Passerina cyanea
604—Dickcissel—Spiza americana
—English Sparrow—Passer domesticus

TANGARIDAE—TANAGERS
608—Scarlet Tanager—Piranga erythromelas
610—Summer Tanager—Piranga rubra

HIRUNDINDAE—SWALLOWS
611—Purple Martin—Progne subis
612—Cliff Swallow—Petrochelidon lunifrons
613—Barn Swallow—Hirundo erythrogastra
614—Tree Swallow—Iridoprocne bicolor
616—Bank Swallow—Riparia riparia
617—Rough-winged Swallow—Stelgidopteryx serripennis

BOMBYCILLIDAE—WAXWINGS
619—Cedar waxwing—Bombycilla cedrorum

LANDIIDAE—SHRIKES
621—Northern Shrike—Lanius borealis
622a—Migrant Shrike—Lanius ludovicianus excubitorides

VIREONIDAE—VIREOS
624—Red-eyed Vireo—Vireosylva olivacea
626—Philadelphia Vireo—Vireosylva philadelphica
627—Warbling Vireo—Vireo gilva
628—Yellow-throated Vireo—Lanivereo flavifrons
629—Blue-headed Vireo—Lanivereo solitarius
629c—Mountain Vireo—Lanivereo solitarius alticola
631—White-eyed Vireo—Vireo griseus

MNIOTILTIDAE—WOOD WARBLERS
636—Black and white Warbler—Mniotilta varia
637—Prothonotary Warbler—Protonoria citrea

639—Wormeating Warbler—Helmitheros vermivorus
641—Blue-winged Warbler—Vermivora pinus
642—Golden-winged Warbler—Vermivora chrysoptera
645—Nashville Warbler—Vermivora rubricapilla
647—Tennessee Warbler—Vermivora peregrina
648a—Northern Parula Warbler—Compsothlypis usnea
650—Cape May Warbler—Dendroica tigrana
652—Yellow Warbler—Dendroica aestiva
654—Black-throated Blue Warbler—Dendroica caerulescens
654a—Cairn's Warbler—Dendroica cairnsi
655—Myrtle Warbler—Dendroica coronata
657—Magnolia Warbler—Dendroica magnolia
658—Cerulean Warbler—Dendroica caerulea
659—Chestnut-sided Warbler—Dendroica pensylvanica
660—Bay-breasted Warbler—Dendroica castanea
661—Black-poll Warbler—Dendroica striata
662—Blackburnian Warbler—Dendroica fusca
663—Yellow-throated Warbler—Dendroica dominica
667—Blackthroated Green Warbler—Dendroica virens
671—Pine Warbler—Dendroica vigorsi
672a—Yellow Palm Warbler—Dendroica palmarum
673—Prairie Warbler—Dendroica discolor
674—Oven Bird—Seiurus aurocapillus
675—Water-thrush—Seiurus noveboracensis
676—Louisiana Water-thrush—Seiurus motacilla
677—Kentucky Warbler—Opororuis formosa
678—Connecticut Warbler—Opororuis agilis
679—Mourning Warbler—Opororuis philadelphia
681—Maryland Yellow-throat—Geothlypis trichas
683—Yellow-breasted Chat—Icteria virens
684—Hooded Warbler—Wilsonia citrina
685—Wilson's Warbler—Wilsonia pusilla
686—Canadian Warbler—Wilsonia canadensis
687—Redstart—Setophaga ruticilla

MOTACILLIDAE—WAGTAILS
697—Pipit—Anthus rubescens

MIMIDAE—MOCKINGBIRDS
703—Mockingbird—Mimus polyglottos
704—Catbird—Dumetta carolinensis
705—Brown Thrasher—Toxostroma rufum

TROGLODYTIDAE—WRENS
718—Carolina Wren—Thryothorus ludovicianus
719—Bewick Wren—Thryomanes bewickii
721—House Wren—Troglodytes aedon
722—Winter Wren—Nannus hiemalis
725—Long-billed Marsh Wren—Telmatodytes palustris

CERTHIDAE—CREEPERS
726—Brown Creeper—Certhia familiaris americana

SITTIDAE—NUTHATCHES
727—White-breasted Nuthatch—Sitta carolinensis
728—Red-breasted Nuthatch—Sitta canadensis

PARIDAE—TITMICE
731—Tufted Titmouse—Baeolophus bicolor
735—Chickadee—Penthestes atricapillus
736—Carolina Chickadee—Parus carolinensis

SYLVIIDAE—KINGLETS, Etc.
748—Golden-crowned Kinglet—Regulus satrapa
749—Ruby-crowned Kinglet—Regulus calendula
751—Blue-gray Gnatcatcher—Polioptila caerulea

TURDIDAE—THRUSHES
755—Wood Thrush—Hylocichla mustelina
756—Veery—Hylocichla fuscescens
758a—Olive-backed Thrush—Hylocichla ustalata swainsonii
759b—Hermit Thrush—Hylocichla guttata pallasii
761—Robin—Planesticus migratorius
766—Bluebird—Sialia sialis

WHY PEOPLE CANNOT LIVE WITHOUT BIRDS.

All of you have probably read Longfellow's "The Birds of Killingworth" and remember the lesson taught in the poem. Perhaps you were skeptical. Therefore the following article has been written to prove to you the truth of the statement that as soon as the birds, the destroyers of the insect pests, are dispensed with, the insects literally take the country until ultimately people are unable to raise food enough to sustain their lives.

In 1858 birds were unusually numerous in Brussels, Belgium. The parks were alive with birds. The people, as usual, never stopped to investigate why this sudden influx of the birds. They became so abundant that they were voted a nuisance and an order was sent forth that they be killed. Later it was found that the birds had been attracted by the gypsy moth and an abundance of other insect pests. But it was then too late because the insects had defoliated the trees and shrubbery. The people suffered to a great extent through loss of fruit and grain. The same people who had declared the birds a nuisance asked that the birds not only be protected hereafter but helped to attract them to their homes.

Frederick the Great, King of Prussia, was very fond of cherries; but the sparrows also liked them, and ate up all his cherries. He issued orders that all the sparrows should be exterminated. The fowlers and hunters, through ignorance or the lust for blood, killed and drove away the other useful birds. Two years later the trees were so badly infected with insects and caterpillars that the cherries or other fruit trees bore

no fruit. The Emperor, seeing that he had made a great error, imported birds at a great cost that he might enjoy his favorite fruit again.

In 1892 in the region about Ekaterinburg, in Russian Siberia, nearly all the birds were killed and their feathers were sent abroad by the wagon loads for the millinery trade, that the fair ladies might add to their charms. Very few of our women realize what a crime it is to purchase these feathers. Listen to what followed the killing of these beautiful and useful creatures: before another year had passed the foliage of the trees had been destroyed, also the grasses and other crops, through cutworms, locusts and other insect pests. There was no food for the people and a famine was produced. Then they realized that it was impossible to live without birds and made laws to protect them.

France was once stricken with a plague of insects and was unable to produce her usual crops. Experts were employed to find the cause of the increase of the insects that were injuring the fruit and other crops. They found that the natives were gathering birds' eggs for food. This habit had reached such a point where there were some families who gathered one hundred birds' eggs per day. Strict laws were made and enforced, prohibiting the gathering of birds' eggs. As the birds increased the insects diminished, and France was able once more to raise a full crop.

BIRDS IN THE FOREST.

While the lumber men are calling for fire protection for their forests, lest they be ruined by the ravages of fire, which is quite possible, it is well for them to consider also that insects cause an annual loss to the forests and lumber of the United States of over one hundred million dollars, and to become acquainted with the part which the birds can play in reducing this loss.

If it were not for the birds, in a few years we would not have any forests at all. This is a startling fact. There are from thirty to two hundred kinds of insects that attack each kind of tree. Over four hundred kinds feed on the oaks alone. Dr. Finch estimated that there were 12,000,000 plant lice on a small cherry tree. Imagine how many there would be on some of our large forest trees. A tree suffers a loss in timber growth when it has been defoliated by insects. This loss will show in the thinness of the wood-ring growth. It is impossible for us to spray our forests or wood lots. It is too expensive. Therefore, we must depend on the birds to destroy the insects.

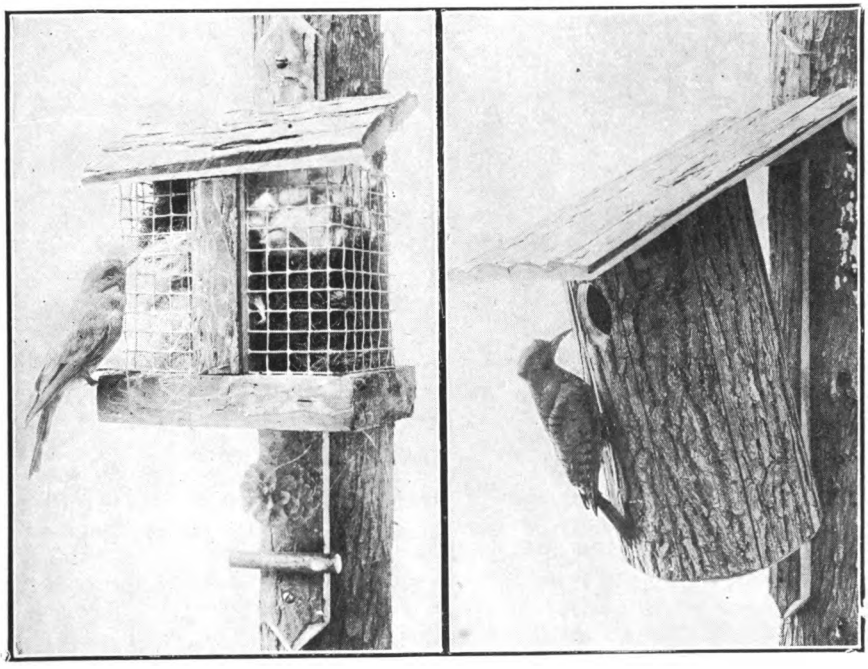
The woodpeckers, nuthatches, and creepers look after the trunks and bark of the trees, while the tufted titmice and the chickadees attend to the limbs. The tanagers, orioles, and cuckoos feed on the caterpillars. The fly catchers and gnatcatchers harvest the flying insects. Practically all the food of the vireos consists of insects that effect the leaves of trees, more particularly those of forest trees. The ground warblers and thrushes devour the insects that are on the ground. The grackles and jays busy themselves eating acorns, and in this way destroy in-

sects that are hidden in the acorns that would affect the trees in a new form of life.

The jay hides acorns in the ground and leaves them or forgets where they were hidden, and in this way thousands of acres of oakes have been planted.

There are fifty-five species of warblers in North America, of which thirty-six have been recorded in West Virginia. They are usually called wood warblers, for they confine their activities almost entirely to the forests. To one who has followed the birds in the woods to try to identify them, it is quite evident from their habits that the warblers destroy insects by the thousand. They stop to sing a few notes; then they continue the feast of insects and are rarely ever still for any length of time, which is almost exasperating to the bird-lover who wants to feast his eyes on these lovely creatures. They are claimed to be the most beautiful and least known of our birds.

Th writer could tell of more birds and their benefits to the forest, if space permitted. Lumberman should explain to their ignorant men who kill the birds about their camp, that they are robbing the Nation of one of our most valuable assets. Neither should they be permitted to take cats to their camps where they are allowed to stray in the forest and kill birds. Many of these cats become wild and breed and live in the woods, adding to the birds' enemies, of which they already have too many.



These two practical bird devices were designed and built by the Reiber Bird Reserve, West Webster, New York.

USING BIRDS TO SUPPRESS PESTS INDOOR.

When people really come to understand birds and their economic value they will be used to a great extent in greenhouses and a large amount of money spent for insecticides will be saved, as well as the labor of spraying and smoking for aphids and other pests. Then too, there would be the added pleasure of having the birds around. A little has been done in this line and has proved a success.

"In a letter to the Biological Survey, March 27, 1893, R. Bingham, of Camden, New Jersey, says: 'I am engaged in market gardening both under glass with artificial heat in winter, and in the open field in summer, and until the past two years used tobacco smoke twice each week to keep in check the aphids or plan lice in our plant houses. But as all insecticides, while killing the insects, injure the health and dwarf the growth of plants, I tried the more natural, I think the more economical, and certainly the pleasanter remedy, birds. First tried the indigo bird which although a seed-eater, prefers insects. Being small it runs under the lettuce leaves and sometimes disappears for several feet. Also have a pair of mocking birds in each place. One pair of mocking birds has taken care of the attic garden 20 by 28 feet. One pair of mocking birds, a pair of song sparrows, a snow bunting and a winter wren have kept the insects in check in the larger plant house 25 by 250 feet. Have had much less insect trouble, and healthier and better crops than when I smoked the houses twice each week taking one hour of time for each smoking.' "

It has been found that the use of owls to destroy rodents has proved a greater success than cats. "The late Dr. W. L. Ralph who was curator of birds' nests and eggs in the United States National Museum, furnished the following note regarding the barred owl: 'At the Oneida County Brewery in Utica a subcellar was used for storing large quantities of barley. The rats made serious inroads on this grain and destroyed at least $800 to $1,000 worth annually. For the purpose of lessening this damage cats were placed in the sub-cellar on several occasions with the result that when the door was opened in the morning they rushed out showing every indication of fear and desperately resisted any attempt made to take them back. At this juncture two boys brought an owl to the Doctor who purchased it with the idea of liberating it as soon as the slightly injured wing healed. In looking about for a place to keep it during convalescence he thought of the sub-cellar, which was immediately fitted up with several perches. The morning after the owl was placed in this cellar 9 headless rats were found, and for the next three months varying numbers of headless carcasses were found daily. About this time, however, the rats were becoming so scarce that the owl had to devour the entire animal to secure sufficient food, and finally had to be fed on raw meat. For nearly 10 years afterwards practically no damage was done by rats in this cellar.' "

It has been shown that owls in captivity did not care for birds but were very fond of rats and mice, which goes to prove that birds are can-

nibalistic more from necessity than choice, while cats prefer birds at all times.

The State Department of Agriculture would like to have some of our market gardners and florists try out the afore-mentioned plans which we feel sure would be paying propositions. The cost in greenhouses would be very slight. Screen doors and screens on the ventilators is all that would be required to keep the birds in. I would recommend the chipping sparrows, song sparrows, chickadees and gold-finches.

The goldfinches and chickadees are small birds and are in the habit of alighting on slender weeds in search for insects and would not break down any of the flowers. The goldfinches are great seed-eaters and save the farmer a great deal of annoyance on account of the thistle seeds that they destroy; but when they turn their attention to insects, they visit the orchards and eat the canker worms, and in the grain fields they eat the Hessian fly that is so injurious to wheat. They are great consumers of plant lice of different kinds and their eggs. One stomach when examined contained 2,200 eggs of the white birch aphis. Another reason this bird would make an ideal greenhouse bird is because if the insects should become too scarce to furnish sufficient food you could feed it the ordinary canary seed and it would eat it and thrive on it. Next, the goldfinches do not migrate very far south and would not fret when the migration season came. They winter in West Virginia.

The chickadee does not migrate and is a permanent resident in this state. Another reason it would be an ideal greenhouse bird is that it will nest in a birdhouse and would breed in captivity which some birds would not—at least I am quite sure that it would, from the knowledge I have of its habits. The chickadee's food habits are ideal for the greenhouse, because its food even in winter is half insects and their eggs, and it is particularly fond of the smaller species.

The sparrows make fine ground feeders to devour the insects underneath the plants and flowers.

Birds will very readily adapt themselves to a change of food habits when conditions require it. Can you imagine anything that would add so much to your greenhouses as the birds, furnishing you with their joyful music? All they ask is that you will permit them to eat your insect pests.

Wholesale groceries and produce merchants could rid their cellars and buildings from rats and mice if they would only get a few owls to put in their buildings. I will wager that in three months they would not take one hundred dollars per owl if they could not replace them.

BIRDS ON THE BOG.

The following clipping and picture were mailed to me five or six years ago by a friend. I was so pleased that I filed them away for further investigation, for I felt that we are entering a new era in utilizing the birds to suppress insect pests.

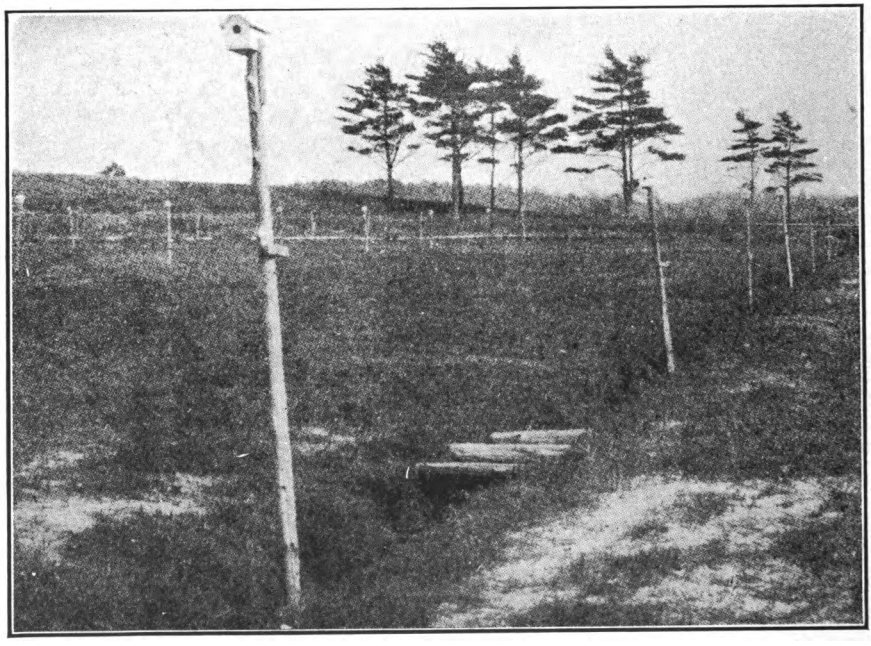
"The bane of the cranberry grower is the fruit worm, and many thousands of dollars are lost each year because of the damage done by this pest. Some growers have advocated keeping the bogs flooded all the season every three or four years, but few are willing to sacrifice a season's profits in that way. Spraying with arsenate of lead has been tried without satisfactory results.

"One cranberry grower in Massachusetts, Lysander B. Sherman, has beaten the fruit worm during the past two seasons. He relies wholly upon birds, and coaxes them to stay on the bogs by erecting comfortable little houses for them to live in. He already has 100 of these houses on one bog and expects to put an equal number on other bogs this spring.

"These boxes are homemade, painted white and mounted on posts a little higher than a man's head. There is an entrance in each end and a partition in the middle, thus making each box serve for two families of birds.

"The birds that occupy these houses are white-breasted tree swallows. They are especially well adapted to cleaning up cranberry bogs, because they can capture the winged insects which lay the eggs, as well as the worms that eat the fruit, being experts in hunting in the air. Another pest that does considerable damage is called the fireworm, and Mr. Sherman says that it, too, is destroyed by the tree swallows.

"Mr. Sherman believes that thousands of dollars can be saved to the cranberry growers of Cape Cod by the general adoption of the bird house.



"Birds on the Bog."

Certainly the plan is an easy one to try, in New Jersey and Wisconsin as well as in Massachusetts."

I wrote Mr. Forbush and enclosed the picture and clipping and asked him what he knew about this experiment and received the following reply: "Replying to your letter of November 8, I know Mr. Sherman of Marshfield and have seen his bog, but never had an opportunity to investigate the matter thoroughly. I undertook a similar experiment on a small bog of my own, but the neighbor's cats were so numerous that they kept the bird colony down to small numbers, in spite of large fish hooks placed point downward on the pole to prevent the cats climbing. I have no doubt that the birds eat a great many cranberry insects, and Mr. Sherman tells me that he has had no trouble with cranberry insects on his bog and has not had to spray it now for seven years, since he put up the nesting boxes. But I have only his word for this and cannot supplement it with any experience of my own. I know birds eat cranberry bog insects, for I have watched them do it."

THE PLAGUE OF INSECTS.

Insects are the plague of man. They are inclined to inhabit the crown of his head or live upon other parts of his body if he does not use sanitary measures. Insects attack the animals of man, causing them a great amount of annoyance, and if he does not take vigorous methods of destroying them, he will suffer a great loss. His poultry will become infected by insects if he does not use the most sanitary methods and he will lose all his fowls. It looks as if this were indeed enough to test the patience of Job, but Job did not know what trouble was, compared with the farmer of today. Man's loss and annoyance caused by insects to his personal body, his farm stock, and poultry are very insignificant compared to the tremenduous damage the insects are inflicting on the very things that add to man's prosperity, and in fact to his very existence—his farm products.

The State Department of Agriculture of West Virginia has received the following report of the annual loss by insects to crops in the United States, from the Bureau of Entomology:

1916.

Farm Crops:	
Cereals	$ 430,204,600
Hay	116,230,500
Cotton	140,631,100
Tobacco	16,900,800
Vegetables	199,412,600
Sugar crops	8,436,800
Fruit	141,264,300
Farm-forest products	22,138,900
Other crops	29,649,700
	$1,104,869,300

NATURAL FORESTS AND FOREST PRODUCTS..	$ 100,000,000
PRODUCTS IN STORAGE.....	100,000,000
INSECT-BEARING DISEASES OF MAN.....	150,000,000
DIRECT OR INDIRECT DAMAGE TO DOMESTIC ANIMALS.	100,000,000
GRAND TOTAL.....	$1,554,869,300

This was drawn up some years ago, and the total amount must be increased by a number of millions (the exact amount cannot be at all closely computed at the present moment), largely through the extraordinary developments which have occurred with regard to cotton boll weevil damage during the past year and the spread of one or more new pests such as the European corn-borer. It seems that, on the whole, the total damage must surely approximate two billions of dollars.

We can hardly grasp this startling statement of two billion dollars per year and increasing at a rapid rate. What are we to do about it? We must check the plague of insects or they will eat us out of house and home. What would you think of a business man that would say to his son, "I am getting old; my business has been running behind, but I thought it would last me as long as I live anyway"? We must not hand down to our sons a business that is failing just because we are careless.

Two billion dollars—that means that the insects are costing every man, woman and child $18.18 per year more to live, and increase of $4 per capita in six years. Do not pass this statement by without a great deal of thought. It means the plain fact that if we do not find more efficient means of checking this enemy they will devour us in their hunger. Entomologists tell us there are probably ten thousand kinds of insects in West Virginia and not only are they increasing in number, but there are more kinds coming from foreign lands. This means that if West Virginia has her quota of insects she is losing $15,971,444 per year. Think of that—almost twice as much as the value of all her sheep and swine. If the hog cholera should destroy all the swine in the state, the farmers would be terribly worried. The insects are causing a greater damage than almost twice the total value of all the sheep and swine in this state. Mr. Farmer, Horticulturist, Truck Gardener and Lumberman, you are overlooking the greatest ally that you have, and that is the birds.

It is indeed unfortunate that this Department has not had an appropriation especially for the purpose of educating the rural people to the true relation of birds to man and how essential they are to life and prosperity, also what to do to protect them from their enemies and how to care for them so they would multiply in sufficient numbers that they will be able to reduce this plague of insects, instead of permitting it to steadily increase.

Chester Reed estimates that the birds in Massachusetts consume 21,000 bushels of insects per day for the five summer months. Taking Massachusetts' estimate of five birds to the acre, we should have 76,800,400 birds in West Virginia. I have every reason to believe that our birds' appetite is as hard to satisfy, and that their capacity as great as that of the birds

of Massachusetts. So we can safely say that the birds of our state consume 64,371 bushels of insects per day, or a grand total of 9,655,650 bushels in the summer months. That does not take into consideration the insects and their eggs that the birds consume in the balance of the year, nor the weed seed and rodents consumed by other birds.

Our birds are of a greater value than most people realize. Earle Brooks in 1913 estimated their value greater than all the horses, sheep, and swine in our state. The latest report estimates that our horses are valued at $17,829,634, sheep at $5,049,727, and swine at $4,046,132, a grand total of $26,925,493—enough to pay the Virginia Debt and one-fourth of the Road Bond Issue.

The following list of the result of the examination of birds' stomachs goes to prove just how many insects certain birds consume:

Scarlet Tanager: Larvae of 630 gypsy moth caterpillars

Cedar Waxwing: 100 canker worms

Flicker: 1000 chinch bugs and 3000 to 5000 ants

Nighthawk: 60 grasshoppers; another, 500 mosquitoes

A Maryland Yellow-throat: 3,500 plant lice in 40 minutes.

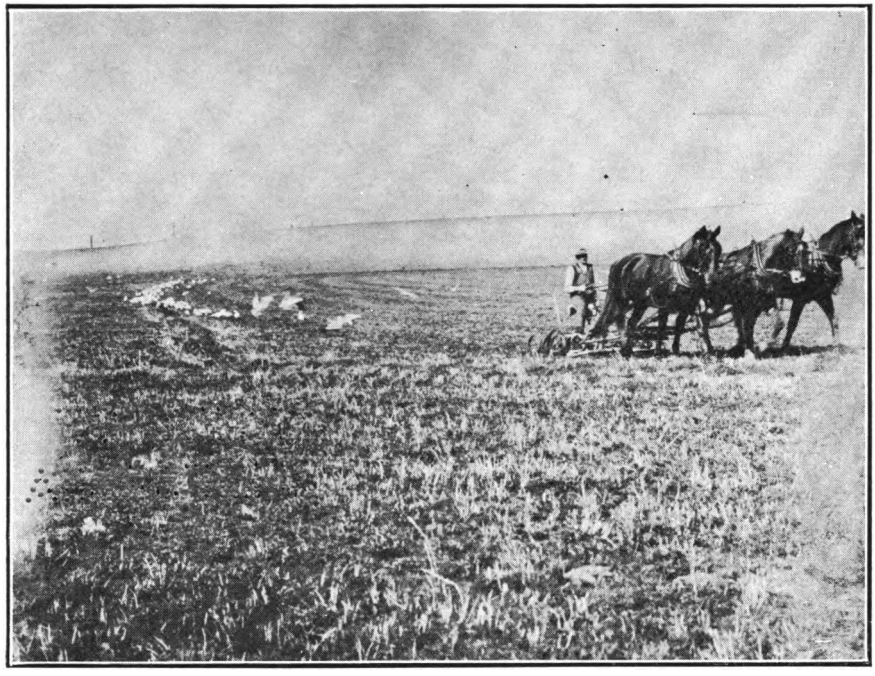
A young robin ate 165 cutworms in a day

Two martins' stomachs contained 2000 mosquistoes and many house flies.

Cuckoo: 30 grasshoppers and 250 caterpillars.

AN INSECT PLAGUE PREVENTED BY GULLS

When the Mormons settled near Salt Lake, the shortwinged grasshopper (anarbus simplex), now commonly called the black or Mormon cricket, came by the thousands and destroyed the whole crop of wheat. Entire fields were destroyed by the hungry insects in a day. The second year the crickets returned in great numbers and began the devastation of the crops which the poor, half-starved Mormons depended upon for a living. Many were the prayers that were offered. Finally the relief came from a very unexpected source. Great flocks of California gulls (larus Califorious) came and gorged themselves on the crickets to such an extent that they were almost eradicated for that season and the balance of the crop was saved. The gulls are almost sacred to the Mormons now. They have erected a monument that cost forty thousand dollars, commemorating the gulls for their aid in suppressing the crickets that destroyed the crops.



This picture, which was recently taken and furnished by the Biological Department at Washington, shows how the California gulls are continuing to keep down the injurious insect pests. Notice how they follow the plow.

Utah farmers have learned that other birds are beneficial in suppressing insects. In 1918 the cutworms were so destructive that ten-acre fields of newly-set tomato plants would be destroyed in one night. It was found that in fields where there were meadow larks, little damage was done to the plants. On examination of the stomach of one of the larks, it was learned that the bird had eaten 36 cut worms. So the farmers are protecting and encouraging the larks and they have become more plentiful, while the cut worms have greatly diminished.

BIRDS IN THE ORCHARD.

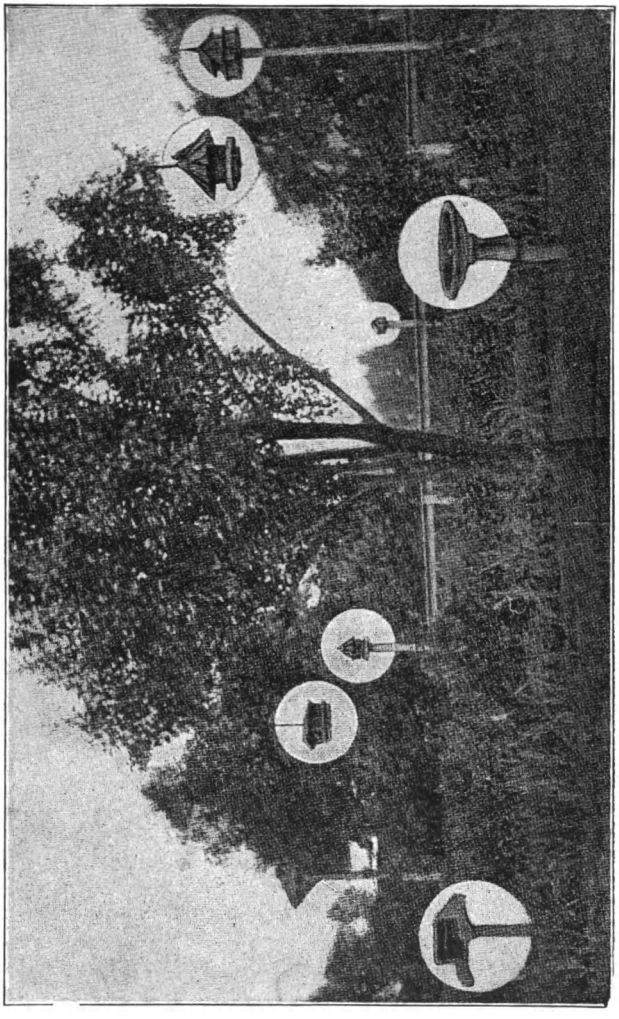
Great pleasure and profit can be had for almost the asking, if you would only attract the birds to your orchards, where you can enjoy the charm of their sweet, melodious songs, their beautiful plumage and interesting domestic life which is so facinating. While you are feasting your eyes on these spritely creatures, they will be cleaning your orchard of its insect pests that are sucking the vitality of the trees and blighting the fruit.

The horticulturalist or farmer who has a little woodland near his orchard is very fortunate, for it is the natural home of birds that feed on insects that are harmful to trees and shrubbery. The birds will naturally visit back and forth between the woodland and the orchard, but can be induced to spend the greater part of their time in the orchard by putting up suet and dried meat in the trees for them to feed upon. Bird houses should be placed in the trees or on fence posts for the birds to sleep in during the winter and to nest in during the summer.

A bird bath where they can bathe in summer would be a great attraction, for birds love to bathe and must have water to drink. You cannot imagine what the bird bath would mean in the way of keeping the birds in the orchard. Such a bath need not be expensive nor elaborate. The birds would be equally well pleased with a hollowed out stone on the ground or one made of concrete, shallow on the outer edges and three or four inches deep in the center. The bird bath should be in an opening so that prowling cats could not hide behind something and spring out and catch the birds. If you keep a cat, see that it does not go into the orchard and that it is not left out at night, more particularly in the breeding season for birds.

To prove my statements about birds and orchards, read the following extracts gleaned from the Annual Report of the Smithsonian Institute:

"My first attempt at availing myself of the services of the birds in an orchard was made in 1894-95. The winter birds were attracted to the orchard and frequented the trees during the entire winter. In the fall, winter, and spring they destroyed many thousands of the imagos and eggs of the fall and spring cankerworm moths, the eggs of the tent-caterpillar, and probably also the pupae and imagos of the codling moth, besides scales, tineids, and other enemies of the trees. When spring came, efforts were made to attract the summer birds to the orchard. These attempts met with such signal success that, although most of the eggs and young birds were destroyed by cats, boys, crows, and other agencies, the remaining injurious insects were so completely disposed of by the birds that the trees bore luxuriant foliage during the entire summer and produced a good crop of fruit. This occurred in a season when both the tent-caterpillar and the canker-worm were remarkably prevalent. The only other orchard in the neighborhood that produced any fruit whatever was that of the nearest neighbor. This had been partly protected by tarred bands and partly by the birds from my place. Elsewhere in the town most of the apple trees were defoliated, and very few produced any fruit that year."



The above picture shows what can be done in the way of making a bird sanctuary of a small plot of ground, as illustrated by Mr. Joseph H. Dodson, manufacturer of bird houses, at Kankakee, Ill.

"In one district, Dry Creek Valley, Sonoma County, there has been a threatened invasion of the prune trees by spring canker-worms several times, but each time the blackbirds (Brewer's) came to the rescue and completely cleaned them out. I have often seen bands of blackbirds working in an infected orchard. They work from tree to tree, taking them clean as they go. If a worm tries to escape by webbing down they will dive and catch him in midair. Mr. Ehrhorn tells me of an incident near San Jose where the canker-worms were badly infecting a prune orchard, and when they commenced to irrigate the land the blackbirds seemed to be attracted by the water, and inside of three days there was not a single worm left. Prof. F. E. L. Beal learned in an interview with Mr. H. Kimball of Haywards, California (June 6, 1901), that several years ago canker-worms infested his orchards and threatened their complete destruction. He banded the trees to prevent the larvae from ascending, but soon after this was done Brewer's blackbirds discovered the worms. They came in large flocks and very soon not a worm was to be found."

"Speaking to a friend to-day regarding the remarkable absence of the tent-caterpillar from our fruit trees this year, and speculating as to the cause of it, he asked if I knew what an enemy they had in the Baltimore oriole. On my replying in the negative, he related an incident in point which I thought might interest your readers, as it did me: Being out in the apple orchard, he noticed a large caterpillar's nest at the top of a tree, and, while thinking how it could be reached, an oriole flew into the tree, and spying the nest, went to it at once, tore it open with his bill, and proceeded to devour the occupants greedily. Soon, however, it flew away, but returned speedily with its mate, when the two resumed the feast until apparently not a single worm was left. The next day all that remained of the late thriving colonly or to indicate its ever having existed were the shreds and tatters of the once populous canopy."

"Few birds are of so much service to the farmer as the yellow-billed cuckoo. Especially are the fruit growers and nurserymen its debtors. In early spring they love the orchard. I have known them to destroy every tent-caterpillar in a badly infested orchard and tear up all the nests in a half day. While they may have eaten some caterpillars, out of most of them the juices were squeezed and the hairy skin dropped to the ground."

"Mr. E. W. Wood, of Newton, a well-known member of the State (Mass.) Board of Agriculture, informs me that during one season, when the spring canker-worms became quite numerous in his orchard, a pair of Baltimore orioles appeared and built a nest nearby. In the meantime they fed daily upon the canker-worms. This they continued to do so assiduously that by the time the young were hatched the numbers of the worms were considerably reduced. They then redoubled their diligence, sometimes carrying 10 or more worms to their nest at once. Soon the canker-worms in the orchard were a thing of the past. The foliage and fruitage were saved for that and many succeeding years."

"One morning in the fall of 1904 I noticed in some poplar trees near

the shore of the Musketaquid a small flock of myrtle and black-poll warblers busily feeding on a swarm of plant lice. There were not more than 15 birds. The insects were mainly imagos, and some of them were flying. The birds were pursuing these through the air, but were also seeking those that remained on the trunks and branches. I watched these birds for some time, noted their activity, and then passed on but returned and observed their movements quite closely at intervals all day. Toward night some of the insects had scattered to neighboring trees, and a few of the birds were pursuing them there; but most of the latter remained at or about the place where the aphis swarm was first seen, and they were still there at sundown. The swarm decreased rapidly all day, until just before sunset it was difficult to find even a few specimens of the insect. The birds remained until it was nearly dark, for they were still finding a few insects on the higher branches. The plant lice I had secured for identification were destroyed or liberated during the night, probably by a deer mouse which frequented the camp; so the next morning at sunrise I went to the trees to look for more specimens. The birds, however, were there before me, and I was unable to find a single aphis on the trees. The last bird to linger was more successful than I, for it was still finding a few; but it soon gave up the effort and left for more fruitful fields. Probably a few insects escaped by flight; but in examining the locality in 1905 I could not find one. The apparently complete destruction of these insects may have been due in part to the hard winter that ensued, but the effect produced by the birds was most obvious."

"A prominent grower of pears in New York reported to us that he had lost many of his pear crops, amounting to thousands of bushels, by this pest, and in the fall, as it was present in great numbers on the trunks of the trees, it appeared that it would pass the winter there and destroy his crops again next year. However, the white-breasted nuthatches came to the orchard in numbers, and he encouraged them to remain by fastening pieces of fat meat in his trees and protected them from molestation. The nuthatches remained and fed on the pest all winter and cleaned up the trees so effectively that he could scarcely find any of the insects in the spring."

BIRDS AS ENEMIES TO THE COTTON BOLL WEEVIL.

It is with pride that West Virginia can boast of the fact that sixty of the sixty-six species of birds that eat the boll weevil are to be found within the borders of her state. The remaining six are all southern or western birds. But we should not stop to brag. We should put forth a great effort to protect and encourage these birds so that they will increase in such numbers that when they are sojourning in the south they will help stem the ravages of this ever-increasing plague that threatens to deplete our cotton crop.

In 1916 the estimated damage to the cotton crop had reached the alarming figures of $140,631,100, and it is increasing rapidly. The exact figures are not available just now. Mr. L. O. Howard, chief of the Bureau of Entomology, informs me that the increase in the last few years has been extraordinary.

Not only as citizens of West Virginia, but also as citizens of the United States, should we help with our birds, for the menace of the boll weevil is a national peril. We are only the custodians of these birds; it is a **Divine trust** that was given to us to love and protect that the whole nation should profit thereby. Let us, as citizens of West Virginia, do our duty.

Here is the list that constitutes the roll of honor. Those marked * are not native birds of West Virginia:

Upland plover
Killdeer
Bob-white
Red-headed Woodpecker
Flicker
Nighthawk
Chimney swift
*Scissor-tailed flycatcher
Kingbird
Crested flycatcher
Phoebe
Olive-sided flycatcher
Wood pewee
Alder flycatcher
Least flycatcher
Blue jay
Cowbird
Red-winged blackbird
Meadowlark
*Western meadowlark
Orchard oriole
Baltimore oriole
*Bullock oriole
Rusty blackbird
*Brewer blackbird
Bronzed grackle
*Boat-tailed grackle
English sparrow
Vesper sparrow
Savannah sparrow
Lark sparrow
White-throated sparrow
Field sparrow
Chipping sparrow
Swamp sparrow
Fox sparrow
Towhee
Cardinal
*Gray grosbeak
Blue grosbeak
*Painted bunting
Indigo bunting
Dickcissel
Purple martin
Cliff swallow
Barn swallow
Tree swallow
Bank swallow
Roughwing swallow
Loggerhead shrike
White-eyed vireo
Yellow warbler
Myrtle warbler
Pine warbler
Maryland yellowthroat
Yellow-breasted chat
*American pipit
Mockingbird
Brown thrasher
Carolina wren
Bewick wren
Winter wren
Tufted titmouse
*Black-crested titmouse
Carolina chickadee
Bluebird

WEEDS.

Weeds, weeds, everywhere! They are one of the great curses of man. If we had more land we would surely have more weeds, for there seems to be no limit to their power to multiply. A single plant of foxtail grass has produced 113,000 seeds. Some other weeds are even more prolific. Millions of dollars are lost each year by the farmers through weeds. The land is robbed of its fertility and moisture, thereby reducing the size of the crops. Weeds are always hardy and vigorous and choke out the more delicate plants of cultivation. A great many weeds are breeding grounds for rusts, rots and other fungus diseases of grain and fruit. Such weeds as the mustard are well known as the primary host of rusts. Burrs cause a great deal of annoyance to animals on the farm. Wool growers lose thousands of dollars every year through the burr-bearing weeds.

At Ames, Iowa, a square rod of ground in a garden, which had been planted with potatoes the year before and cultivated with a hoe, yielded

187,884 plants of eigh common weeds. Professor Beal states that each quarter of a square inch in his garden in Maryland, when first cultivated in the spring, contained a crabgrass plant. Upon this basis, the number of plants to a square rod is 627,264. Three times they were cut off, but each time they appeared in as great a number as before.

The farmers spend thousands of dollars mowing, hoeing and cultivating, in their attempt to check this ever-increasing enemy. Too few of our farmers realize the value of our birds as weed destroyers. So we will take a look to see what the stomachs of some of our best known birds contained, when examined by some of our experts in this line of research. The principal diet of the doves is weed seed. They are eaten at all seasons of the year. They constitute 64 per cent of the annual food supply, and show very little variation during any month. In one stomach were found 7,500 seeds of the yellow wood sorrel; in another 6,400 seeds of barn grass or fox-tail; and in a third dove there was the following combination: Slender joint grass, 2,600; orange hawk weed, 4,820; hoary vervain, 950; Carolina cranebill, 120; yellow wood sorrel, 50, and other weed seeds of forty kinds, making a total of 9,200. The three doves consumed 23,100 weed seeds for one meal; just how much they would consume in a year would be hard to tell, and yet some farmers will permit the killing of doves.

The quail feeds on eighty-five different kinds of seeds and his marvelous appetite is only satisfied by his capacity. One of their stomachs when examined contained 1,000 rag weed seed; another contained 5,000 seeds of the green foxtail grass. A quail killed in Virginia on Christmas Day had eaten 10,000 pig weed seed. It is very plain that a farmer should raise plenty of quail. These are only meals, not what birds consume in a whole day. They digest their food very rapidly in order to keep their systems in first-class order.

Professor Beal says that it is his opinion that the tree sparrows, while wintering in the state of Iowa, from October to April, by the time they leave for their northern homes, will have eaten not less than 1,750,000 pounds, or 875 tons, of weed seeds, which if loaded on railroad cars, would make a train of 72 cars. He further says that he believes this could be multiplied by four with safety. Taking his figures as a basis for calculation of 10 birds to the square mile in West Virginia, we would have a train of a little over thirty-two twelve-ton cars. Not having traveled over the whole state in winter, I am not sure that the tree sparrow winters throughout the entire state, but I know that this estimate is unquestionable for Kanawha County at least. Just imagine how much labor the tree sparrows save the farmers, truck gardeners, and orchardists. Some day these men will wake up to find how essential the birds are to the cultivation of our grains, fruits and other crops, and steps will be taken to encourage the propagation and protection of our birds.

During the past five years there has been great progress made in improving the quality of seed sold on the markets in this state. This improvement is noticeable both with respect to purity and germination of the seed. As a result of legislation concerning the sale and distribution of seeds in this and other states, efficient seed cleaning machinery has been

perfected and installed in all of the reliable seed houses from which our seed supply is derived. Thoroughly equipped seed laboratories are also maintained and operated by most of the larger seed concerns. Before seed is shipped to this state it is cleaned and re-cleaned a number of times until tests made at the seedmen's laboratory show that they will meet the requirements of the state law where the seed is to be shipped. Most of the seed shipped to the market in this state is sold under brand names and each brand usually shows a minumum purity and germination. Brands of seed calling for a purity of 99.5 per cent and germination of 90 per cent are usually found to be higher in both respects when tested at the State Laboratory at Charleston. Many samples of seed are found today that have no weed content whatever and seed of low quality is the exception rather than the rule.

The table below gives the approximate percent of the number of samples of clover, timothy, alsike clover and orchard grass, examined during the past five years that contain weeds in excess of the amount allowed by law.

During the first three years given in the table, over 80% of samples examined contained weed seed to some extent but at the same time passed the requirements of the law. Today practically one-half of the samples of many kinds of seed, such as timothy, the clovers and red top, are entirely free from weed seed. Many of the samples listed, examined during the time given in the table, contained from 3% to 31% weed seeds of which many were the most troublesome weeds to be found.

	1917	1918	1919	1920	1921
Red Clover	13%	12%	10%	5%	1%
Timothy	5%	5%	5%	2%	1%
Alsike Clover	12%	10%	6%	4%	1%
Orchard Grass	8%	8%	8%	4%	1%

SUGGESTIONS FOR BIRD STUDY IN RURAL SCHOOLS.

School teachers would be doing a great service not only to their pupils but to the nation as well, if they would teach the children how essential the birds are to our very existence on this earth and that they also add much to our prosperity. Their spritely forms, beautiful plumage and melodious songs are an acquisition to rural life that cannot be filled by any other living creature. A few minutes each week should be devoted to bird study. Even if the teacher has little or no knowledge of birds you will be surprised and pleased to hear what some of the children will have to tell you, for children are usually more observing than they are sometimes given credit for, and they are hungry for animal knowledge.

Start out by asking who knows five or six kinds of birds. Let every one tell just how many he is acquainted with and something he observed the bird or birds doing. Next, take up the question of birds' nests; what kinds the children found; how many eggs or young were in the nests; were the nests or young destroyed; *who or what destroyed them.* This

is very important for at least half the nests are molested by the elements or bird enemies of some sort.

Now see if the children have taken any note of the arrival of the birds in the spring or when they leave in the fall; what birds are permanent residents; what birds they see in the winter that leave and do not spend the summer with us.

Do not give them all of this at one time but just a few minutes each time, so they will look forward for something new. Keep adding fresh subjects. Start a bird scrapbook of pictures and clippings. *Do not fail to try this plan at once.*

Ask some of the boys or girls to build a food table by nailing a shallow box on a post in the school yard. See that holes are bored in the bottom to let the rain or melted snow out. All birds seem to like the meat of the black walnut. Crack some to put in the box. Other foods may be added, such as bread crumbs, cheese, cracked corn, millet, sunflower seed, sorghum seed and any wild fruits. This will be a fine way for the children to come in close contact with the birds and they will be able to observe their markings and some of their habits. Also the birds will keep the insects and their eggs cleaned off all the trees in the vicinity.

Bird houses should be erected for the birds, and if the school is in an opening where there are no tall trees, a martin house should be put up, for if you can induce them to build in it, they will destroy thousands of house flies and mosquitoes and make the danger of contagious diseases much less. These houses should be watched to see that English sparrows do not build in them. They should be built so that the bottom or top can be removed in order to take out sparrows' nests. The martin house would be better if a hinged pole were used so that the pole could be lowered and the old nest removed. (See cut elsewhere in this bulletin.)

If you can have a bird bath for the birds it will attract them for they must have water and love a bath even in winter. A thicket is a wonderful help for the birds. If there is none near the school, it would be excellent to plant native shrubs and vines. It would protect the birds from the storms and their other enemies could not catch them within its shelter. It is essential that they have a place of this kind. Also, see to it that the boys do not have sling shots, as boys inevitably prefer a moving object to be their mark in order to demonstrate their skill.

The children will tell their parents what they are learning about the food habits of the birds at school and in this way the farmers will be taught what has been much neglected, unfortunately, in the past.

When you need further information in regard to the food or other habits of West Virginia birds, not contained in this bulletin, do not hesitate to write to this department for it. The Commissioner is anxious for the rural people of this state to become thoroughly acquainted with the economic habits of the birds and he realizes that they are the greatest allies that we have in holding in check the ravages of insects and the spreading of noxious weeds.

To encourage the building of bird houses that birds may have plenty of suitable and safe places to build and rear their young, Commissioner

Stewart of the Department of Agriculture will offer cash prizes to school children at all fairs in the state:

First, for the best built practical martin house with four or more rooms.

Second, for the best built practical one room bird house suitable for bluebirds, chickadees, or some other bird-house—nesting bird.

SOME WORTHY SOCIETIES.

Rural people are inclined to be a little skeptical about societies located in cities. It is true that some of them may not be of any benefit to the rural folk, but there are others that are very attractive and helpful when they are properly understood. A number have been formed for the purpose of studying the conditions and habits of birds and other wild life, so that our useful and beautiful creatures may have a chance to multiply for the benefit of all mankind, irrespective of where they may live.

The Girl Scouts are training young girls how to become useful, healthy women, and in order to do so they must have clean, healthful outdoor exercise and learn some of nature's wonderful methods of perpetuating and improving the species. The Girl Scouts need the assistance of the rural girls, and the day is near at hand when both the city and rural boys' and girls' clubs will work together for the common good.

The Boy Scouts' organization has extended into the country a little further than The Girl Scouts. A number of Boy Scout Troops are now being formed in the country. To show how essential the study of birds is considered by this organization, a boy scout must pass the bird test before he can win the Eagle Badge, which is the highest of scout honors. The Bird Test is as follows:

(1) Identify fifty different kinds of birds.

(2) Make a list of the greatest number of birds identified in one week

(3) Make a list of twenty species of birds which are particularly beneficial to agriculture.

(4) Furnish a list of the birds of prey, particularly noted for their value to agriculture.

(5) Name ten species of birds particularly useful in protecting the trunks of trees from borers, bark lice and scale insects.

(6) Describe at least two bird houses and food tables which you have erected. Identify some of the birds which have been attracted to them, whether they occupied them or not.

(7) State what you have done to protect the birds from wicked and unjust slaughter.

The Charleston boys who have passed this test are: Joe Hill, Dudley Morrison, Fred Prichard, Purcell Shube, Isadore Lebow, Miles Hubbard, Heisley Hager, Philip Wood, Joseph Cook, Thomas Lynn, Wayne Butler, Starcher Mitchell, Ellis Crawford, James Kuykendall, and Earnest Merrill.

The Girl Scouts have a similar test.

I believe that through the valuable knowledge gained by rural young

folks in the 4H clubs the farming industry will be revolutionized. The 4H also has in its teaching the essentials of the making of the highest type of American citizenship.

The National Association of Audubon Societies has been the pioneer in teaching bird study and preserving wild life. Thousands of dollars have been spent by the association in the protection of birds, and it has saved several species from being completely exterminated. One of the best methods of teaching school children that has been adopted by these societies in the forming of Junior Audubon Societies. To do this, a teacher can send in a list of twenty-five pupils, together with ten cents, for each pupil, a total of $2.50. The children will each receive an Audubon button, depicting a red-headed woodpecker in color also pictures, leaflets and outline drawings of the following birds: blue jay, song sparrow, robin, bluebird, flicker, and catbird. The teacher will receive "Bird Lore," the official magazine, for one year. For further particulars write to

The National Association of Audubon Societies,
1974 Broadway,
New York City.

The Wild Life League of West Virginia is quite a new society. It has been organized for the purpose of conserving wild life, to assist in the enforcement of the game laws, to see that the insectivorous birds are protected, to point out to our state officials the great need of a state nursery and fish hatchery, so that we will be able to reforest waste land and restock our depleted rivers with fish; and to teach sportsmen the great need of respecting the property rights in rural districts. It has been planned to form branch leagues throughout the rural districts so that a better understanding may be reached between the city and rural people. Further plans are to form Junior Leagues in the schools, something like the Audubon societies, but these plans have not been perfected yet.

BIRD BANDING.

The migration of birds, and particularly the question as to whether birds return year after year to the same nest sites, have proved fascinating mysteries to naturalists for ages. Some of the oldest literature on birds refers to the attempts of early students to follow the movements of individual wild birds through the medium of identification marks artificially applied. The methods resorted to in those early days, however, were too crude to prove very successful, the experimenters at that time resorting to such practices as the use of coloring matter on the wing or tail feathers and the attaching of bits of inscribed parchment, by means of glue or silken thread, to the tail quills. With the coming of the bird's next molting period, however, it is evident that all such feather markings must be lost. Aluminum, the present medium for banding birds, had not been discovered at the time of the above experiments.

The first *banded* bird of which there seems to be any record was a

heron captured in Germany in the year 1710 and discovered to be wearing metal bands, the inscriptions on which gave indication that the bird had received its "credentials" several years previously in Turkey. During the latter part of the nineteenth century European scientists devoted more and more time to the systematic marking of wild birds for future identification, and about the year 1899 the study had become so important that bird "ringing" societies began making their appearance both on the continent, and in England and Scotland.

It was not until December 8, 1909, that the bird banding movement assumed concrete form in this country. On that date, through the initiative of Dr. Leon J. Cole of Yale University, there was formed in New York City the American Bird Banding Association "for the investigation of the movements and life histories of individual wild birds." In 1912 the work of the Association was taken over by the Linnaean Society of New York and placed under the secretary-ship of Mr. Howard H. Cleaves. During the following eight years the membership increased from about a dozen to nearly four hundred; fifty thousand bands were distributed among the workers; twenty thousand birds were banded; and about four or five hundred recoveries or "return records" from banded birds secured. The movement had grown to such proportions that the means for handling it were no longer adequate. The happy outcome was that the Bureau of Biological Survey, U. S. Department of Agriculture, Washington, D. C., assumed entire charge of the operations of the American Bird Banding Association in the spring of 1920, adding these investigations to those on bird migration in general which had been conducted by the Government since 1883. By this act the United States became the first country in the world to establish as a part of its official program the study of avian problems through the banding of birds.

The questions which may be answered through bird banding are as numerous as they are varied. How old do birds live to be? Where do they spend the winter? At what speed to birds travel when migrating and how often to they stop for rest and food? In breeding time how far do birds range from the nest in quest of food? Which birds, if any, mate for life? Some interesting information on the last question has already been secured by Mr. S. Prentiss Baldwin of Cleveland, Ohio, and others, through the banding of house wrens ("Jenny wrens"). Mr. Baldwin was astonished to learn as a result of placing bands on several of these tiny feathered models of domesticity that it was not uncommon for these birds to "swap" mates after the first family of the season was raised and to rear the second brood with a new wife or husband, as the case might be.

Bird banding also makes possible the study of plumage markings, coloration and measurements from living specimens instead of from dead ones, as has been the universal practice heretofore among professional ornithologists. Then there are certain diseases, ailments, and parasites common to birds about which human being may learn more through the intimate handling entailed by banding, especially when bird traps are

employed. The author has for years fed the birds in the grounds of his home at Charleston and now regularly maintains a trapping station which is operated by means of a triggercord from the dining room of the dwelling house. In this simple device, constructed of quarter inch mesh, ordinary fish netting painted green, and measuring about four feet square and a foot high, dozens of catbirds, towhees, robins, song sparrows and others have been trapped, banded, and released, many of these birds being retaken later at the same place.

It has been learned that some of the birds there were considered permanent residents were migratory and were replaced by the same species from northern territory. Out of a number of flicker fledglings that were banded in their nest, two were reported shot during the month of February, one in Georgia and the other in Alabama, which goes to prove that the flickers which make West Virginia their breeding grounds, spend the winter in at least these two southern states, and through bird banding it will be possible to learn over how large a territory they are distributed.

Many interesting records have been obtained through the different methods of trapping and banding. "Possibly the greatest interest that attaches to any one of Mr. Osler's ducks is that of Blue-winged Teal No. 4576. This little duck was banded on September 24, in company with another of its own kind and eight or ten Black Ducks. Two months and seven days later it was killed by a hunter in the Caroni Swamp, near Port of Spain, Island of Trinidad. The flight made by this bird must have been close to 3,000 miles. For many years it has been known that some of the Blue-winged Teals and certain other ducks that breed in North America, winter in South America. The presence of this species on the Island of Trinidad has been particularly noted, but there has been no information available to show from what part of the northern continent the birds came. The record of this individual is therefore of decided interest and value. The band was returned to the U. S. Biological Survey by the American Consul through the State Department.

Some problems that can be solved by Bird Banding are as follows:

"1. How fast do the individuals of any species travel on their periodic migrations; that is, how many miles per day will any one bird average during these journeys and what is the total time consumed on a trip?

"2. Does any one flock continue in the van or is the advance made by successive flocks passing one over the other in alternate periods of rest and flight?

"3. Do individuals or any species always follow the same route, and is it identical for both spring and fall flights?

"4. Do migrating birds make the same stop-overs every year to feed?

"5. How long do birds remain in one locality during the migration, the breeding, or the winter seasons?

"6. What is the relation between the breeding and the wintering grounds of individuals; that is, do those birds that breed farthest north winter farthest south, thus jumping over those that occupy the intermedi-

ate zone, or do they merely replace the latter individuals as winter residents?

"7. Do birds adopt the same nesting area, nest site, and winter quarters during successive seasons?

"8. How many broods will one pair remain mated, and which bird, if not both, is attracted next year to the old nesting site?

"9. To what extent do males of a species assist in incubation and brooding?

"10. How far from their nests do birds forage for food, and after the young have left the nest, will the parent birds bring them to the feeding and trapping station?

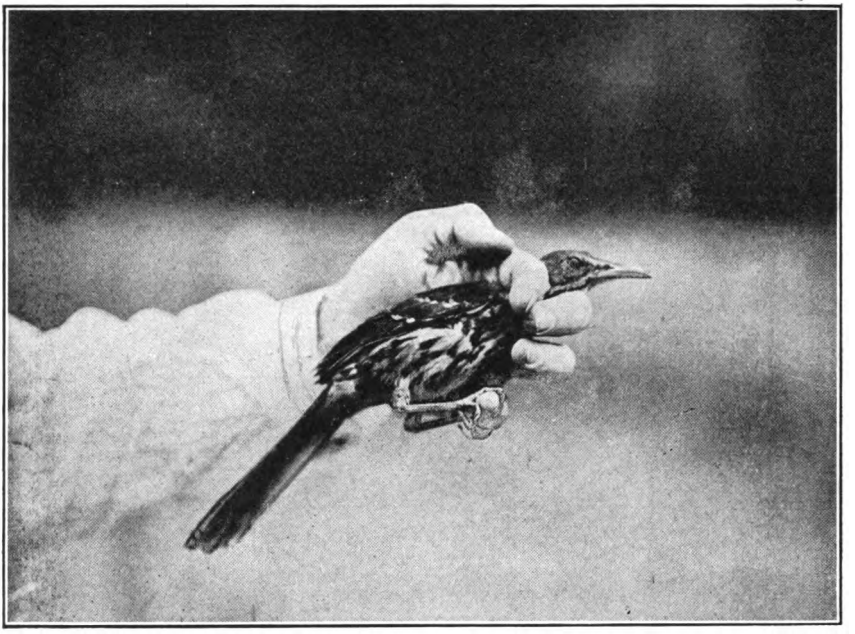
"11. To what region do the birds go, particularly the young, that do not return to the vicinity of their original nests?

"12. How long do birds live?

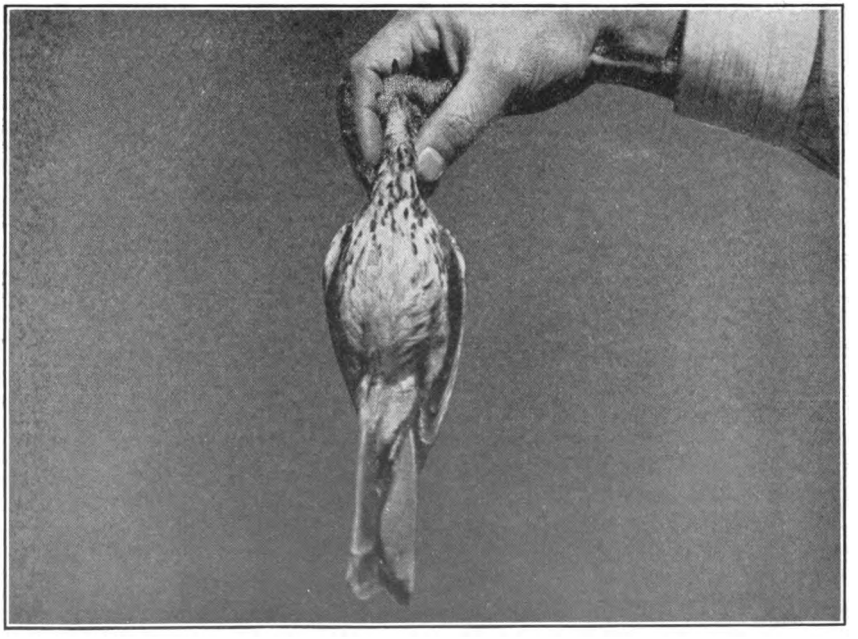
"13. What are the economic problems of the grackles, robins, song sparrows, juncos, house wrens, shorebirds, doves, herons, and waterfowl that await solution? There are life history and migrational problems connected with all of them."

"A band" is best described as a narrow strip of aluminum, varying in sizes suitable for each species of bird, numbered and lettered a little differently according to the size of the band. The larger sizes are inscribed: "No..... Notify Biol. Surv." on the outside, and "Washington, D. C.," on the inside. The smaller sizes are marked in the following manner: "No..... Biol. Surv." on the outside, and on the inside, "Wash., D. C." Some of the older bands which are still in use are marked with the number only on the outside, while inside they read: "Notify Am. N. H. N. Y.," which is the abbreviation for American Museum of Natural History, New York City. However, in all cases of the capture of a banded bird, an immediate report should be sent to the Biological Survey, at Washington, D. C. Examine every bird, dead or alive, that you should get in hand, to see if it wears a band on one of its legs, and if it should have, copy the number and report it at once, for in so doing you will aid in this important study of the birds.

The four cuts which follow show the scientific methods of handling and banding birds. They make less effort to escape and are less apt to injure themselves if the methods shown are used. While it appears to be cruel, experience has clearly proved the contrary to be true.

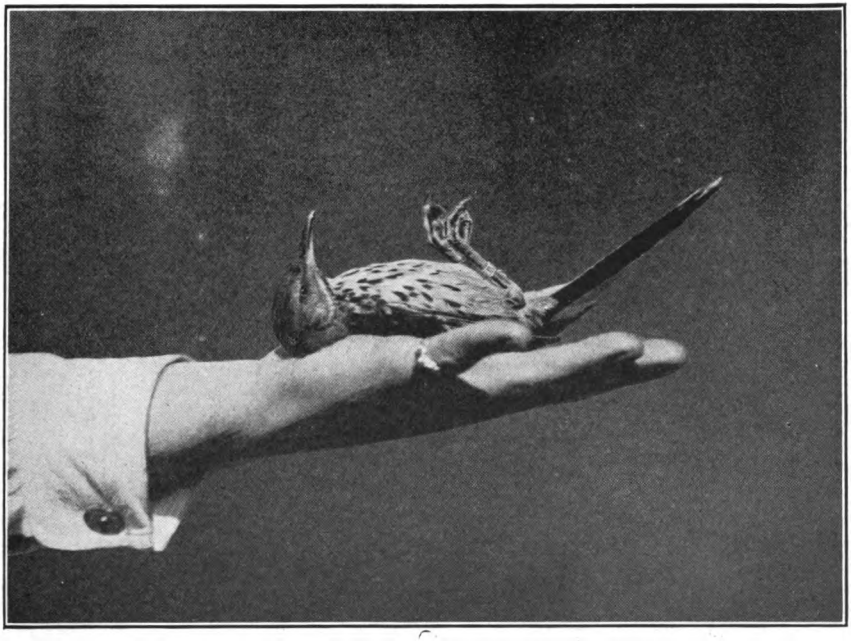


Position 1.
Showing manner of holding bird for detailed examination, determining species, coloration, etc.



Position 2.
Showing manner of holding bird in transferring it from Position 1 to Position 3.

Position 3.
Showing manner of holding bird for placing the aluminum band on right leg.



Position 4.
Same as No. 3, after banding, with the hand wide open, the bird is free to go.

Persons in West Virginia who are familiar with any of the local birds and who are willing to cooperate with the Government in its bird banding investigation are invited to communicate with the Biological Survey, Washington, D. C., or with the West Virginia Department of Agriculture at Charleston. Such persons must obtain a permit from the Biological Department and from the Game and Fish Commission at Charleston.

THE BIRD CENSUS.

It has been my pleasure to assist in taking the annual bird census for "Bird Lore" for the last seven years. This census is of great interest to bird students. Many valuable facts are gathered, most important of which is, which species are increasing and which decreasing, among the different birds spending the winter months in a given area in the state. It also gives great pleasure to identify a new bird that is very rare, or even not heretofore found in this state in the winter.

The editor of the "Bird Lore" magazine requires the persons participating in the taking of the census to spend at least four hours in gathering the data. The census must be taken on one of the six or seven days set in December, usually about the 20th, for the eastern portion of the United States.

Below will be found the census for the years, 1915, '16, '18, and '19. The reports for the three remaining years have been misplaced. These reports show that the birds in this section have increased in number from 19 species to 24, and from 295 to 527 individuals. English sparrows are never included in the census.

"Charleston, Kanawha Co., W. Va.,—Dec. 26; 11 A. M. to 2:30 P. M. Cloudy; 2 to 4 in. of fresh snow; wind west; temp. 32°. Hills and ravines south of the city; walked 5 miles. Bobwhite, 16; Screech Owl, 1; Hairy Woodpecker, 3; Red-headed Woodpecker, 1; Flicker, 8; Blue Jay, 1; Crow, 3; Goldfinch, 11; Field Sparrow, 19; Slate-colored Junco, 138; Song Sparrow, 15; Towhee, 10; Cardinal, 12; Carolina Wren, 6; White-breasted Nuthatch, 3; Red-breasted Nuthatch, 2; Tufted Titmouse, 12; Black-capped Chickadee, 13; Bluebird, 12. Total 19 species, 295 individuals.—Robert Sell, Philips Crawford, Mary Belle Johnston, and I. H. Johnston."

"Charleston, Kanawha County, W. Va.—Dec. 24; 8:30 A. M. to 12:30 P. M. Partly cloudy, ground almost clear on south side of hills, north side snow-covered; temp. 29° to 49°. Bob-white, 22; Hairy Woodpecker, 4; Downy Woodpecker, 2; Yellow-bellied Sapsucker, 1; Red-headed Woodpecker, 2; Northern Flicker, 8; American Crow, 1; Goldfinch, 4; White throated Sparrow, 3; Tree Sparrow, 16; Field Sparrow, 97; Junco, 83; Song Sparrow, 23; Towhee, 14; Cardinal, 44; Catbird, 1 (Very rare here in winter, but one stayed last year till January; the one here now came about Dec. 1); Carolina Wren, 19; White-breasted Nuthatch, 8; Tufted Titmouse, 33; Black-capped Chickadee, 12; Robin, 2; Bluebird, 4. Total, 22 species, 403 individuals.—Philip Crawford and I. H., Johnston."

"Charleston, W. Va. (Kanawha County)—Dec. 22; 1 to 5 P. M. Cloudy;

ground very wet; wind north, light; temp. 57° at start, 54° at return. Six miles on foot. Observers together. Bob-white (three coveys), 22; Downy Woodpecker, 3; Hairy Woodpecker, 2; Red-headed Woodpecker, 1; Crow, 7; Goldfinch, 13; Field Sparrow, 108; Slate-colored Junco, 106; Song Sparrow, 27; Cardinal, 69 (most we've ever seen); Carolina Wren, 24; White-breasted Nuthatch, 1; Tufted Titmouse, 6; Black-capped Chickadee, 17. Total, 14 species, 406 individuals. Same territory covered as last four years, and have never before covered it without seeing at least a dozen Towhees (last year, 88).—Ellis Crawford, Francis Rawsum, Carl and Edward McAndrews, (Miss) Mary Belle Johnston, and I. H. Johnston."

"Charleston, W. Va. (South Side hills and ravines, same territory as covered in the last four years).—Dec. 28; 8:30 A. M. to 1:30 P. M. Heavy clouds, spitting snow and rain throughout the trip; very light south wind; temp. 27° at start; 30° at return; six or seven miles on foot. Observers together. Blue Jay, 2; Bluebird, 19; Junco, 120; Carolina Wren, 24; Towhee, 99; White-throated Sparrow, 12; Red-headed Woodpecker, 18 (these birds are on the increase winter and summer. Ten years ago we had none). Sparrow Hawk, 2; Cooper's Hawk, 1; Goldfinch, 21; Downy Woodpecker, 4; Hairy Woodpecker, 2; Cardinal, 66; Song Sparrow, 22; Field Sparrow, 14; Tree Sparrow, 1; Robin, 1; Tufted Titmouse, 28; White-breasted Nuthatch, 4; Black-capped Chickadee, 11; Crow, 9; Flicker, 5; Yellow-bellied Sapsucker, 1; Bob-white, 32 (four coveys). Total, 24 species, 527 individuals—Ellis Crawford, Mary Belle Johnston, I. H. Johnston, Joe Lloyd."

The reason for the increase in this particular territory is easily accounted for. The people have learned the value of the birds and have been protecting and encouraging them by feeding when the food was not plentiful.

The State Department of Agriculture would be pleased to have a bird census of a like nature, taken any day in the winter and in any part of the state, sent to them to be filed. Any information about the increase or decrease of our state birds is of vital importance, and every known method that will increase their number or entice more birds of economic value to remain with us must be adopted.

THE MIGRATION OF BIRDS IN AND THROUGH WEST VIRGINIA.

The migration of birds has been a fascinating study for Nature lovers for years. But the economic importance of the migrating of our birds has been given little thought by the average individual. So it has been left almost entirely to experts to study new methods whereby we could more correctly understand the habits of the birds and their true relation to man. Bird banding has opened up entirely new and more positive knowledge than we have ever before had. This method is more fully explained in another article.

The following migration reports by two different observers will give you a good idea when to expect the annual return of some of our birds:

BIRD MIGRATION RECORD.

(Springtime Migrations).

These Records were taken at Morgantown, West Virginia.

(A. J. DADISMAN).

Name of Bird	Earliest Observed	Average Time of Arrival	Number of Years Record
Robin	Feb. 9	Feb. 14	4
Flicker	Feb. 4	Feb. 16	2
Bronzed Grackle	Mar. 3	Mar. 9	4
Vesper Sparrow	Mar. 8	Mar. 16	3
Red-wing Blackbird	Mar. 9	Mar. 24	4
Towhee	Mar. 11	Mar. 17	4
Red-headed Woodpecker	Mar. 1	Mar. 17	3
Field Sparrow	Mar. 13	Mar. 21	4
Phoebe	Mar. 14	Mar. 20	4
Belted Kingfisher	Mar. 8	Apr. 2	4
Golden-crowned Kinglet	Mar. 21	Apr. 3	3
Meadowlark	Mar. 3	Mar. 11	3
Cowbird	Mar. 9	Mar. 17	3
Prairie Horned Lark	Mar. 14	Mar. 20	3
Brown Creeper	Mar. 31	Apr. 13	3
White-throated Sparrow	Apr. 1	Apr. 17	4
Brown Thrasher	Apr. 9	Apr. 11	4
American Goldfinch	Apr. 13	Apr. 18	3
Woodthrush	Mar. 16	Apr. 15	4
Louisiana Water-Thrush	Apr. 7	Apr. 30	4
Black-throated Green Warbler	Apr. 28	May 3	2
Yellow Warbler	Apr. 22	Apr. 26	4
Warbling Vireo	Apr. 22	Apr. 30	4
Baltimore Oriole	Apr. 29	May 1	3
Blue-gray Gnatcatcher	Apr. 11	Apr. 22	4
Yellow-throated Vireo	May 4	May 4	1
American Redstart	May 4	May 6	3
Indigo Bunting	May 4	May 10	3
Catbird	Apr. 3	Apr. 23	4
Worm-eating Warbler	May 4	May 13	2
Kentucky Warbler	May 4	May 10	2
Grasshopper Sparrow	Apr. 19	Apr. 26	2
Chimney Swift	Apr. 15	Apr. 25	4
Barn Swallow	May 6	May 12	3
Kingbird	Apr. 23	May 1	2
Ruby-throated Hummingbird	May 10	May 15	2
Nighthawk	Apr. 15	May 2	3
Maryland Yellow-throat	May 7	May 11	3
Wood Pewee	May 11	May 13	3
White-crowned Sparrow	Apr. 22	May 3	2
Tennessee Warbler	May 8	May 12	3
Orchard Oriole	Apr. 30	May 6	2
House Wren	Mar. 14	Apr. 7	3
Herring Gull	Mar. 6	Mar. 6	1
Bewick Wren	Mar. 26	Mar. 30	2
Purple Martin	Apr. 2	Apr. 17	3
Ruby-crowned Kinglet	Apr. 22	Apr. 22	2
American Woodcock	Apr. 22	Apr. 22	1
Purple Finch	Apr. 16	May 3	3

Name of Bird	Earliest observed	Average Time of Arrival	Number of Years Record
Black and White Warbler	Apr. 17	Apr. 27	2
Yellow-breasted Chat	May 7	May 7	2
Blackburnian Warbler	May 14	May 14	2
Scarlet Tanager	May 14	May 15	2
Lark Sparrow	May 16	May 16	1
Yellow-billed Cuckoo	May 15	May 15	1
Whip-poor-will	Apr. 14	Apr. 30	2
Mallard Duck	May 2	May 2	1
Olive-backed Thrush	May 2	May 2	1
Cerulean Warbler	May 19	May 19	1
Bay-breasted Warbler	May 21	May 21	1
Crested Flycatcher	Apr. 10	May 3	3
Spotted Sandpiper	Apr. 23	May 8	3
Green Heron	May 22	May 22	1
Oven-bird	May 15	May 15	1
Red-eyed Vireo	Apr. 28	Apr. 28	1
Golden-winged Warbler	May 22	May 22	1
Hooded Warbler	May 21	May 21	2
Black-poll Warbler	May 22	May 22	1
Chestnut-sided Warbler	May 14	May 14	2
Magnolia Warbler	Apr. 30	May 7	2
Cedar Waxwing	May 22	May 22	1
Kingbird	May 13	May 18	2
Cape May Warbler	May 7	May 7	1
Black-throated Blue Warbler	May 15	May 15	1
White-eyed Vireo	Apr. 2	Apr. 2	1
Yellow-bellied Sapsucker	Apr. 7	Apr. 7	1
Hermit Thrush	Apr. 13	Apr. 13	1

SPRING RECORD.

By JOSIAH KEELEY,

Kayford, W. Va.

When First Seen	1916	1917	1918	1919	1920	1921	1922
Yellow-billed Cuckoo	.....	.....	.....	5/24	.....	.....	5/24
Belted Kingfisher	5/2	4/12	.....	.....	4/12	4/1	3/31
Pileated Woodpecker	.....	.....	.....	.....	6/30	.....	.....
Red-headed Woodpecker	3/9	3/16	.....	.....	.....	.....	.....
Whip-poor-will	4/21	4/18	4/27	4/19	Nest 5/13	.....	4/22
Flicker	.....	3/29	4/1	3/7	Nest 6/6	3/26	3/31
Ruby-throated hummingbird	5/6	5/13	.....	.....	.....	5/8	Nest 6/1
Kingbird	4/24	.....	.....	.....	.....	.....	.....
Crested Flycatcher	.....	.....	5/5	.....	5/2	Nest 5/15	5/14
Phoebe	3/19	3/10	3/3	3/12	3/4	3/2	3/4
Wood Pewee	.....	.....	.....	5/18	5/7	5/15	5/14
Acadian Flycatcher	.....	5/12	Nest 5/25	.....	5/9	Nest 6/6	5/14
Blue Jay	5/6	.....	.....	.....	.....	.....	.....
Bobolink	5/3	5/7	.....	.....	.....	.....	.....
Cowbird	5/6	.....	.....	.....	.....	.....	4/7
Baltimore Oriole	5/6	4/29	.....	5/15	.....	.....	.....
Purple Finch	3/5	.....	.....	4/20	4/25	.....	3/28
Vesper Sparrow	.....	4/7	.....	.....	.....	.....	.....
Savannah Sparrow	.....	.....	.....	4/6	.....	.....	.....
White-crowned Sparrow	.....	5/14	5/5	5/5	.....	5/8	.....
Tree Sparrow	.....	3/4	.....	3/15	3/13	2/21	.....
Chipping Sparrow	3/26	3/26	4/1	4/6	3/25	3/15	3/26
Field Sparrow	4/1	3/27	3/27	3/15	3/25	3/1	All winter
Fox Sparrow	.....	3/5	3/3	.....	3/5	.....	3/25
Rose-breasted Grosbeak	5/6	.....	5/8	5/4	5/6	5/1	.....
Indigo Bunting	5/6	5/7	5/9	5/4	Nest 6/6	5/12	5/11
Scarlet Tanager	4/23	4/27	5/9	Nest 5/24	4/28	5/15	5/14
Summer Tanager	4/29	4/29	.....	.....	.....	.....	.....
Purple Martin	4/17	4/17	.....	.....	.....	.....	.....
Barn Swallow	.....	.....	5/2	.....	.....	4/26	.....
Bank Swallow	4/29	4/29	.....	.....	4/10	.....	5/1
Cedar Waxwing	.....	9/30	9/29	.....	.....	.....	.....
Red-eyed Vireo	4/30	4/29	5/4	5/2	4/21	Nest 5/24	4/22
Yellow-throated Vireo	.....	4/19	4/19	5/4	4/25	5/15	.....
White-eyed Vireo	.....	.....	.....	5/4	4/25	4/21	4/21
Black and White Warbler	4/3	4/13	4/19	4/13	Nest 6/6	4/10	4/7
Golden-winged Warbler	.....	5/13	5/8	5/4	5/2	5/15	4/21
Parula Warbler	.....	.....	5/8	.....	4/25	5/1	.....
Cape May Warbler	.....	.....	8/29	.....	.....	9/19	9/15
Yellow Warbler	4/17	4/19	4/27	4/21	4/10	4/21	4/15
Black-throated Blue Warbler	5/12	5/13	.....	.....	10/4	.....	.....
Myrtle Warbler	4/29	.....	.....	5/4	.....	5/15	.....
Magnolia Warbler	.....	.....	5/8	.....	5/4	.....	.....

When First Seen	1916	1917	1918	1919	1920	1921	1922
Cerulean Warbler	.....	.....	.....	.....	5/9	.....	.....
Chestnut-sided Warbler	5/6	.....	5/9	.....	5/9	.....	5/14
Bay-breasted Warbler	5/13	.....	.....	.....	5/14	.....	5/14
Blackburnian Warbler	4/17	5/13	4/28	5/18	5/3	4/24	5/14
Black-Poll Warbler	.....	.....	.....	.....	.....	.....	5/14 Nest
Black-throated green Warbler	4/30	.....	4/19	4/10	4/10	4/10	5/20
Prairie Warbler	.....	.....	.....	.....	.....	.....	5/14
Ovenbird	4/29	4/21	4/28	5/24	5/3	5/15	5/14
Louisiana Water Thrush	.....	4/7	4/15	4/16	4/8 Nest	4/2	4/1
Kentucky Warbler	4/30	4/21	5/5	5/4	5/21	4/25	5/14
Maryland Yellowthroat	.....	5/13	.....	.....	4/21 Nest	4/21	5/11
Yellow-breasted Chat	5/6	5/11	4/28	5/4	5/21	4/25 Nest	5/14
American Redstart	4/28	4/21	4/28	4/20	4/20	5/8	4/10
Catbird	5/6	4/29	4/30	5/4	5/2	4/26	4/20
Brown Thrasher	.....	.....	.....	.....	4/25	.....	4/9
Worm Eating Warbler	4/23	4/19	5/8	5/4	4/25	4/24	5/11
Red-breasted Nuthatch	.....	.....	.....	.....	.....	2/13	.....
Brown Creeper	4/18	4/10	.....	2/26	4/5	.....	4/2
Golden-crowned Kinglet	.....	.....	.....	.....	.....	.....	1/12
Ruby-crowned Kinglet	.....	.....	.....	.....	4/18	.....	.....
Bluegray Gnatcatcher	4/23	4/21	4/19	5/4	4/10	5/15	4/12
Wood Thrush	4/17	4/19	4/19	4/21	4/18	4/21	4/15
Olive backed Thrush	.....	5/12	5/5	5/11	5/9	5/15	5/14
Robin	Moun	tain t	ops in	winter	.....	4/3	4/2
Bluebird	.....	3/5	3/2	All winter Nest	Scarce	all win Nest	ter

"KAYFORD, W. VA.,
"September 15, 1922.

"DEAR MR. JOHNSTON:

"Please find attached data of the spring arrivals of some sixty birds on Upper Cabin Creek near Kayford since 1916. As I was sharply on the lookout, I do not think I could have missed them over a few days. In quite a number of species, the time of arrival seems to have changed a little, some coming a little later in recent years, and some earlier, while the many blanks show the irregularity up in these mountains. Also, some that were common a few years ago seem to have stopped coming this way, as the Purple Martin, the Black-throated Blue Warbler, Blue Jay, Bobolink, Red-headed Woodpecker, Summer Tanager, etc.

"You will note one occurrence of the Pileated Woodpecker which I saw on White Oak for the first time in thirty years. Again, I am quite sure that the Black-Poll Warbler has not been here before this last year. The nesting of the Black-throated Green Warbler cannot be very common, for it has only been in recent years that I have noticed it here late in

the summer. The cedar Wax Wing, although very common in Charleston, both Spring and Fall, only shows up here occasionally in the fall. The Cape May Warbler is never seen here in the Spring, but is getting more common every year in the Fall.

"It is always dangerous to try to make deductions from a record of this kind, unless you yourself have made the record, but you will find this an accurate record of what one person has seen. In most cases, Mrs. Keeley was present to verify the record. In 1916 we made a record of the Prothonotary Warbler, but as the years went by and no other one was seen, I am of the opinion that we were mistaken, but Mrs. Keeley insists that we saw the bird and that it could not have been any other.

"I have kept no record of the common permanent residents, only some nesting data that any one can get. You will find that most of the migrants appear at Charleston several days before they are seen on Cabin Creek, and remain later before leaving. Already many have left here that can be seen in numbers around Charleston. Perhaps the food or the difference in flora, although the difference in elevation is not over seven hundred feet.

"Instead of attempting to generalize from the records of an individual, it might be of interest to simply present the record so that any one having kept a like record can draw their own deductions. However, aside from giving the Bulletin an air of research, perhaps such figures are of more interest to the one keeping them than to any one else. If you find them of any value in your work, use what you want as of your own gleaning, as it is more accurate than much of the stuff you find in books.

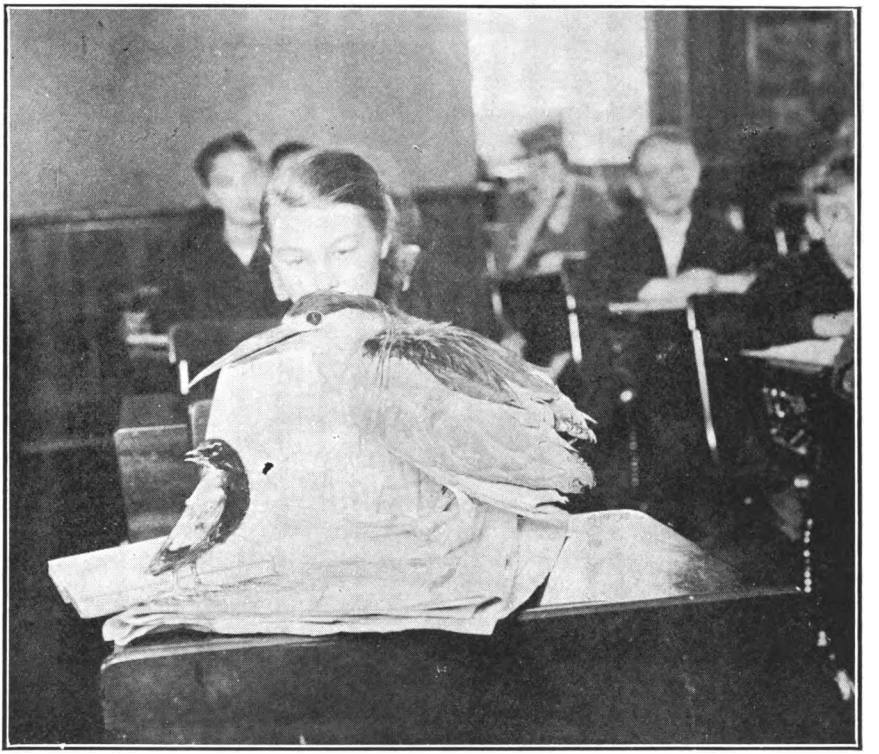
"Sincerely,

"JOSIAH KEELEY."

A BIRD HOSPITAL.

Two school teachers—Miss M. E. Colburn and Miss I. B. Ingraham—have instituted a new method of conserving and teaching about bird life. They are conducting a bird hospital in connection with a school, on a sixteen-acre tract, near Springfield, Mass. A room is maintained at this residence where the birds receive medical and surgical aid. When the birds are convalescing, they are taken to the school house in cages each day. There the children feed them and enjoy their songs and study their habits. An automobile is used as an ambulance to call for birds that have been injured or orphaned, as the case may be, for the tragedies of birds are far more numerous than those of men. Wings and legs are broken by flying against telephone wires. Other birds are shot. Cats cripple and kill the adult birds and the young are left motherless, and sometimes fatherless, as well. Needless to say, this is a catless hospital.

Sometimes there are over fifty birds in the hospital at one time. Over two thousand have been saved and released in the years that this hospital has been maintained. Some very interesting birds have enjoyed the hospitality of the school. The robin in the picture has been taken care



of for nine years. His affliction makes it impossible for him to ever fly well. His feathers are too brittle and break off like a person's finger nails sometimes do. However, this robin is a grandfather for many young robins that the children carry to school. The night heron shown in the picture is a great favorite. A Girl Scout found him with an injured leg.

An attachment is formed by the children for these interesting creatures that are so essential to our economic problems affecting our fruit and grain. The benefit the children will reiceive from this close contact with the birds will have a wonderful effect on their lives and the future protection of birds and other wild life.

Through the efforts of these two patriotic teachers and their pupils, thirty thousand acres of land have been made bird sanctuaries. What a noble achievement! The idea is expanding and several other hospitals have been started elsewhere. Surgeons have been installed and render valuable aid.

SANCTUARIES FOR BIRDS.

There are several large sanctuaries in West Virginia, but they are more particularly game sanctuaries. That is splendid, so far as it goes,

but the writer wishes that they were larger, so that our game would have a better chance to increase more rapidly. The overflow from the game preserves would restock the adjacent territories, which cannot be accomplish in any other manner.

The insectivorous birds receive protection in the sanctuaries by the game wardens. Some people are much opposed to game wardens. All good American citizens should appreciate an officer who enforces the laws of the Nation or State. If it were not for the game wardens our insectivorous birds would have no protection.

The State Department of Agriculture would like to have some farmers make bird sanctuaries of their lands. If several farmers would form a community sanctuary, so much the better.

Governor W. A. MacCorkle has made a bird sanctuary of his grounds at Charleston, and it has proved a great success. He feeds the birds, has several natural water basins, as well as an artificial one, where the birds can drink and bathe, puts out some nesting material, and does not permit sling shots, air-rifles, or cats on his property. The birds have become more abundant and tame. Even a couple of coveys of quail are to be seen dusting themselves on his private driveway and making themselves as much at home on his magnificent grounds as if they were his barnyard fowls. In fact, he has made his place so attractive for the birds that a catbird spent two winters on the grounds. Many happy hours I have spent there, commuing with the birds and Nature. Here in this vast, wooded cathedral will be heard the wood thrush chant his evening anthem. I have bared my head and thanked God for Governor MacCorkle, for what he has done to preserve the wonderful wooded lands within the corporate limits of this city, the Capital of the State.

Another great need in this state is for two large sanctuaries for water fowls, where they will be permitted to rest and not be molested by gunners when migrating in Spring and Fall. Some streams that empty into large rivers could be dammed, so that large ponds of water would be formed. If a few pionioned wild ducks were placed in the ponds it would attract other ducks, and if they were fed, they would remain for a much longer period, and some would stay all winter. In the shallow water the rushes would grow up, and the herons and rails and a few of the ducks would breed there. One of the sanctuaries should be on the Kanawha River, and another in the northern part of the state. Will some of our public-spirited citizens of the state establish these sanctuaries? This Department would be glad to assist them in carrying out this much-needed project.

BIRD HOUSES.

In building bird houses there are a few essential points; the size of the hole, or entrance, and where it is located is important, while the depth of the box from the entrance is a deciding factor for certain kinds of birds. There must be sufficient room for the bird to build the nest and be comfortable without being too crowded, although some birds do not

seem to mind being in crowded quarters. The top or roof should be weatherproof to keep out the rain, and it is an advantage to have the roof project some distance over the entrance to keep off the rain. The plan of some houses does not include the projecting roof, but one can be used just as readily as not. A couple of small holes bored in the sides of the house beneath the roof will insure better air, particularly if the bird house is to be placed in the hot sun, for the heat sometimes kills young birds. Do not use smooth lumber in the inside or deep bird houses. Let it be quite rough, in order that the young birds can climb up to the entrance when they are ready to leave the nest. Use a saw to roughen it up if the lumber has been planed.

Here will be found some practical directions for building bird houses, taken from Farmers' Bulletin No. 69:

Species	Floor of cavity	Depth of cavity	Entrance above floor	Diameter of entrance	Height above ground
	Inches	Inches	Inches	Inches	Feet
Bluebird	5 by 5	8	6	1 ½	5 to 10
Chickadee	4 by 4	8 to 10	8	1 1/8	6 to 15
Tufted Titmouse	4 by 4	8 to 10	8	1 ¼	6 to 15
Whitebreasted Nuthatch	4 by 4	8 to 10	8	1 ¼	12 to 20
House Wren	4 by 4	6 to 8	1 to 6	7/8	6 to 10
Bewick Wren	4 by 4	6 to 8	1 to 6	1	6 to 10
Carolina Wren	4 by 4	6 to 8	1 to 6	1 1/8	6 to 10
Dipper	6 by 6	6	1	3	1 to 3
Violet-green swallow	5 by 5	6	1 to 6	1 ½	10 to 15
Tree Swallow	5 by 5	6	1 to 5	1 ½	10 to 15
Barn Swallow	6 by 6	6	-1-	-1-	8 to 12
Martin	6 by 6	6	1	2 ½	15 to 20
House Finch	6 by 6	6	4	2	8 to 12
Crested Flycatcher	6 by 6	8 to 10	8	2	8 to 20
Flicker	7 by 7	16 to 18	16	2 ½	6 to 20
Red-headed Woodpecker	6 by 6	12 to 15	12	2	12 to 20
Golden-fronted Woodpecker	6 by 6	12 to 15	12	2	12 to 20
Hairy Woodpecker	6 by 6	12 to 15	12	1 ¼	12 to 20
Downy Woodpecker	4 by 4	8 to 10	8	1 ½	6 to 20
Screech Owl	8 by 8	12 to 15	12	3	10 to 30
Sparrow Hawk	8 by 8	12 to 15	12	3	10 to 30
Saw-whet Owl	6 by 6	10 to 12	10	2 ¼	12 to 20
Barn Owl	10 by 18	15 to 18	4	6	12 to 18
Wood Duck	10 by 18	10 to 15	3	6	4 to 20

-1- One or more sides open.

You will find these very helpful as a guide. But you can make them just as fancy as you care to. As a further guide for fancy and plainly constructed houses, see the two pictures on last pages in this bulletin.

If you do not want to make your own houses, there are a number of bird house manufacturers who make very beautiful and practical bird houses and other bird devices that will add charm to your ground and attract many very useful and beautiful birds. Two of the leaders in

this line are The Reiber Bird Reserve, West Webster, N. Y., and Joseph H. Dodson, Kankakee, Ill. You will find pictures of some of their houses and devices elsewhere in this bulletin.

In placing bird houses, it is more satisfactory to put them on posts or poles, than on the trunks of trees, where the squirrels and cats are more apt to bother them. In find that flying squirrels bother the birds at night. Place guards on all trees or posts to keep off cats. Put the tin up high enough so the cats cannot jump above it. Notice in one of the pictures the guard of wire over the bird house to keep out cats and owls.

The picture of a martin pole shows how you can lower the house to remove the old nest or to take out sparrows' nests. All you have to do is to take out the upper bolt and leave the other in, to act as a hinge. You will find that thiis plan is a good one to save your pole from rotting off at the ground. The post can be renewed very easily and is much cheaper than a new pole. If you cannot get bolts long enough, use wooden pins.

The house should be constructed so that you can remove the top, bottom, or sides, so that you can take out nests of previous seasons, or those of the English sparrow which is almost sure to annoy you.

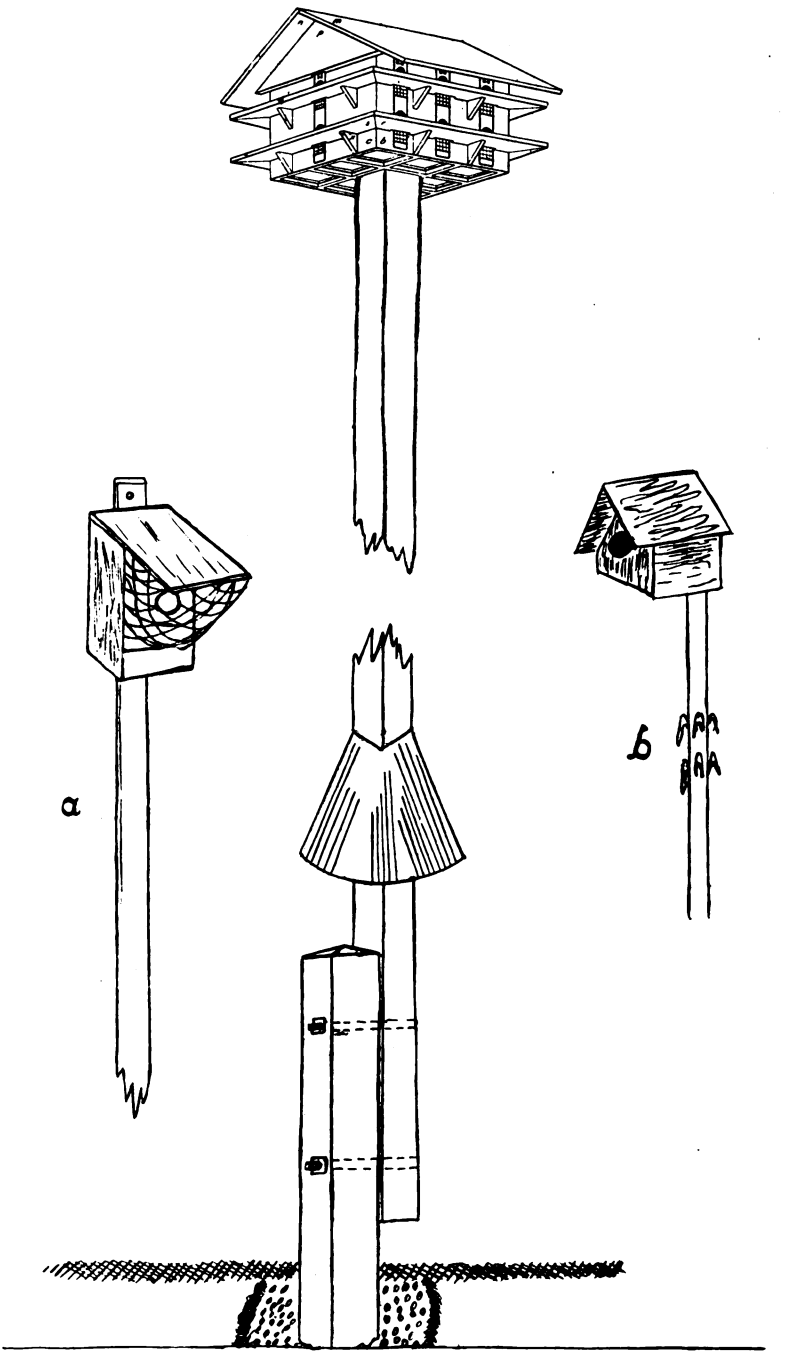
On the martin pole is also illustrated a tin protector to prevent cats climbing the pole. The illustration indicated by the letter A shows a wire screen or netting over the front of the bird house to prevent the cat from molesting the nest. The illustration marked B shows large fish hooks fastened to the pole to prevent cats from reaching the bird house. (See illustration on page 129).

SOME TRUTHS ABOUT CATS.

Man used to head the list as the most destructive of all bird enemies, but he has been surpassed by his ally the cat, which he brought to this country as a companion. Man brough the dog here also, and when he found that some of the dogs destroyed a few sheep, he passed laws to license the dogs. The birds of West Virginia are worth five times as much as all the sheep in the state. When you finish reading this article you will see that it will pay the state to help destroy the stray cats at least, for it will show that we have at least one stray cat for each thousand birds in the state. I will show what a terribly destructive animal the cat is, and in so doing, I will use a number of cuts and extracts from Edward Howe Forbush's bulletin, "The Domestic Cat."

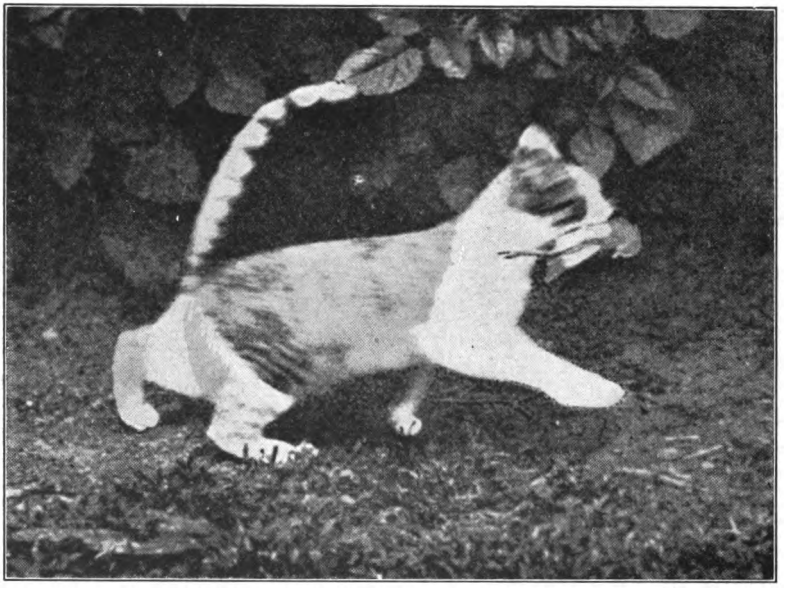
Mr. Forbush is the state ornithologist of Massachusetts, has spent a life time in the study of bird life, and is one of the foremost authorities on the subject today. He spent a great deal of time and money in gathering data on this very important subject. Mr. Forbush is very conservative, not a radical, in his line and his most valued service is sought by every state in the Union.

The following are reports from some of his correspondents: "Mr. Charles Crawford Gorst, of Boston, says that a friend told him that his cat had 14 birds laid out for its young one morning before breakfast. Mr. Samuel Hoar, of Concord, has known a cat to kill 10 birds in a day. Mr. H. Linwood White, of Maynard, tells me that a cat owned by one of his neighbors recently brought in six adult birds to her young in one day.



Mr. Walter P. Henderson, of Dover, has seen a cat with three different birds in two hours. Mr. J. M. Van Huyck, of Lee, has seen cats hunting in the meadows for ground birds, getting both old and young, and striking down swallows as they flew over the grass. Mr. A. K. Learned, of Gardner, has known a cat to kill nine tree swallows in one day. Mr. E. Colfax Johnson, of Shutesbury, says it is a common sight to see a cat eating a bird. Mr. D. T. Cowing, of Russell, asserts that his cat lived ten years and killed about 170 birds of which he knew, and believes that more were killed. Mr. Edward T. Hartman, secretary of the Massachusetts Civil Service League, says that where he lives he commonly sees cats hunting birds and he has known them to catch a great many. Mr. Frank E. Watson has no doubt that he has taken 100 birds away from his cat. Mr. George H. Hastings, of Fitchburg, had a cat that killed at least one bird a day in summer, and was known to kill 31 in one season. Mrs. Charles L. Goldthwait, of Peabody, called the attention of the owner of a cat to the fact that it had just killed a goldfinch; the owner said that the cat had killed several birds daily, and that it could not be prevented. Mr. A. M. Otterson, of Hall, N. Y., has known a cat to kill 13 birds in a day and to strike down swallows in flight."

"Two hundred and twenty-six correspondents report the maximum number of birds they have known to be killed by one cat in a day, and the day's work for these 226 cats is 624 birds, or 2.7 birds per cat per day. Only 33 of my correspondents have kept any record of the number of



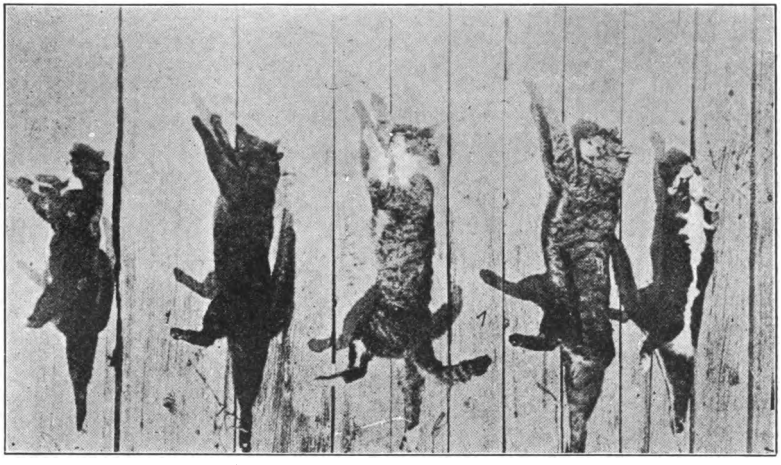
This well-fed cat was known to kill 58 birds in one year, including the young in five nests.

birds killed by a cat in a week, but these 33 cats killed 239 birds in a week, or 7.9 birds per cat."

"The most painstaking and careful report that I have was made by Mr. A. C. Dike which was that of the family pet. It was watched for one season and it was know to kill 58 birds."

"Mr. John M. Crampton, superintendent for the Connecticut State Board of Fisheries and Game, writes that last fall (1914) a farmer requested that a special protector be sent to look after the bob whites on his land. When the warden arrived he found that the farmer had 15 cats, some of which had brought in three bob whites already that morning. Mr. B. S. Blake, of Webster, tells of a cat that took home three bob whites in one week. Mr. Edward L. Parker tells of a servant who saw a cat break up two bob white's nests."

"Mr. William Brewster tells of a day's hunt by four sportsmen with their dogs, in which they killed but one game bird—a bob white. On their return at night to the farm house where they were staying they found that the farm cat had beaten their score, having brought in during the day two bob whites and one grouse. Mr. Cassius Tirrell, of South Weymouth, asserts that a cat living not far from this home has brought in so many bob whites and grouse that the family has 'lost track' of the number."



Five cats which, it is estimated, cost New York $1,000 by destroying game birds at the State Game Farm.

Expensive Cats

I will use only one of the many reports on the trouble with cats encountered in starting a game preserve: (Massachusetts)

"I have followed the history of several undertakings of this character. In one instance the keeper of a game farm fully one mile from any village, and with very few neighbors, was obliged to destroy 200 cats the first year, as the cats got all the young birds. Mr. Charles M. Field, of Shrewsbury, has known a cat to kill 18 chicks in a day. Mr. Frederick W. Goodwin, of East Boston, gives a record of 24 killed by a cat in one day. Miss Mabel McRae, Boylston, has a record of 25. Mr. A. B. Brundage, of Danbury, Conn., tells of 34 as a day's work for one lusty cat. Mr. Wilbur F. Smith, of South Norwalk, Conn., says that one of his neighbors lost over 40 chicks before he began to shoot. He got four cats and the chicken killing ended.'

I have known many people who owned cats which they took from home and dropped by the roadside where the cats were forced to rely upon hunting for food; this is not a cure for a chicken-killing habit in a cat, for it only makes it necessary for the cat to continue the custom. I consider it a case of grand larceny. I have known more than one "poor devil" who was sent to jail and even the penitentiary for stealing a few chickens. Yet the man who keeps a cat that kills his neighbors' chickens or, worst still, takes it out and drops it where it will continue this habit of chicken- and bird-killing, is considered a law abiding citizen.

"Mr. Warren H. Manning, of Boston, has known a cat to kill between 60 and 90 chickens in a week. Mr. William H. Learned, of East Foxborough, has known one to kill 64 within a month. Mr. Clayton F. Stone, of Lunenburg, says that one of his neighbors lost over 75 in one season, and that one stray tomcat destroyed over 100 chickens in his neighborhood in one summer, some of which were nearly half grown."

"Mr. E. G. Russell, of Lynnfield, says that he has killed cats that stole chicks. Many people keeping from one to four cats each report the killing of from 20 to 75 chicks in a season by rats that the cats failed to catch."

An Illustration of the Inefficiency of the Cat as a Rat Catcher

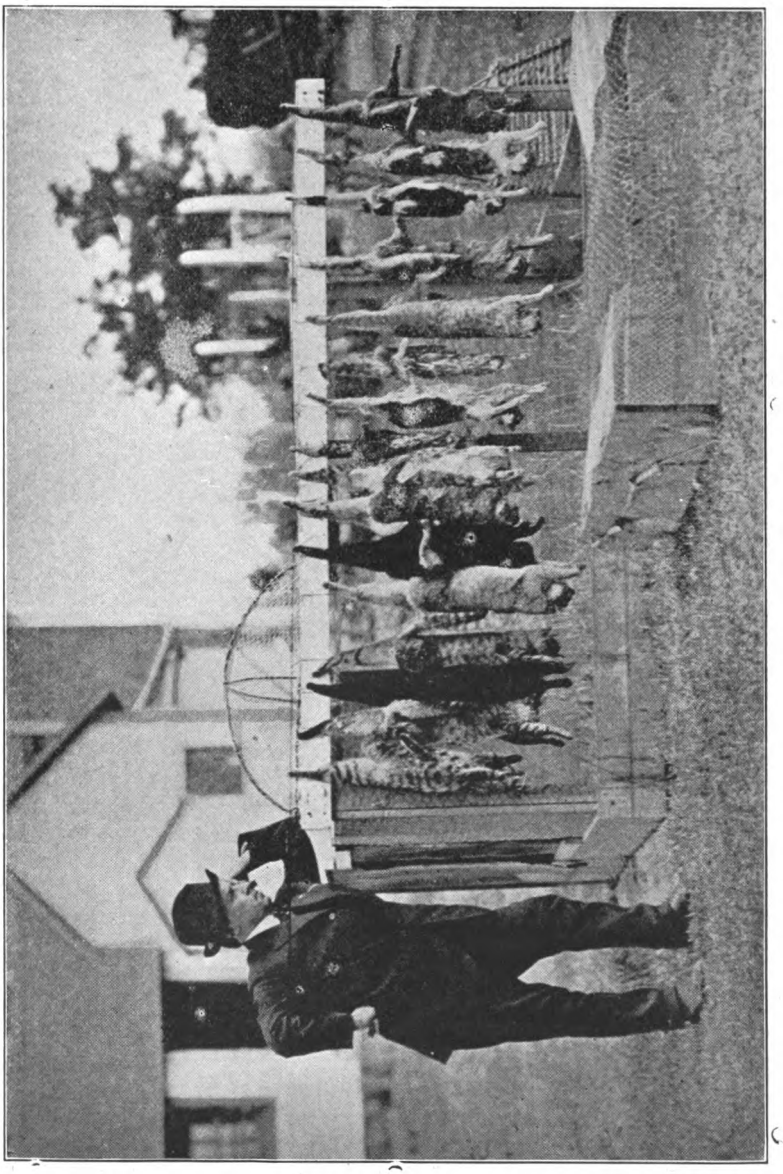
One cat and 24 rats, the result of fumigating cabin of steamship. This cat, an exceptionally good ratter, was supposed to have kept the cabin free from rats. In fumigation she was overlooked.

To prove that cats are not adequate rat-killers, take note of the following result of interview with cat owners:

89 keeping 184 cats use traps also.
45 keeping 90 cats use poisons.
36 keeping 70 cats use both traps and poison.

Wild House Cats Killed by Massachusetts State Authorities to Protect the Heath Hen.

Mr. T. Gilbert Pearson examining evidence of numerous wild or stray cats in an uninhabited region. Cats killed on the heath hen reservation on Matha's Vineyard, to preserve this nearly extinct game bird. The region is a wilderness, the nearest villages 3½ and 4 miles away. The only beast of prey on the island is the cat. (See picture on next page).



Reports from all over the world show that islands that were teeming with bird life have been denuded now because of the introduction of cats. On other islands some species are now extinct and still others are fast disappearing. Space will not allow many details of the cat's destruction of birds on islands, but there is room for a sequel to the story told by Mr. G. H. Noble in the "Warbler" of September, 1913. He asserted that on the south end of Maskerget Island a great colony of sea birds, protected by the town of Nantucket, the breeding place of gulls and terns, had been nearly extirpated by cats. Mr. Howard H. Cleaves wrote me in 1914 that the warden in charge said that if the cats continued to increase they would exterminate the entire colony of some 45,000 birds within five years. On some islands cats are the only fur bearing animal.

In the Maine woods, 30 and 40 miles from a house, trappers catch as many cats as they do all the other fur-bearing animals. People take cats to summer resorts and camping parties, then leave the cats to shift for themselves. People move in the city and the country and abandon their cats. It is a dangerous practice and a violation of the law, for it is cruelty to dumb animals.

Mr. Forbush estimated that each farm in Massachusetts had at least two cats and that they destroy at least 10 birds per year, making a total of 700,000 birds destroyed by farm cats each year. A late canvass reveals three cats per farm. Dr. George W. Field, chairman of the Massachusetts Game and Fisheries Commission, estimates that there is at least one stray cat to every 100 acres in that state, and that each cat kills, on an average, one bird in ten days through the season, making an annual destruction of birds by stray cats in the state approximately 2,000,000.

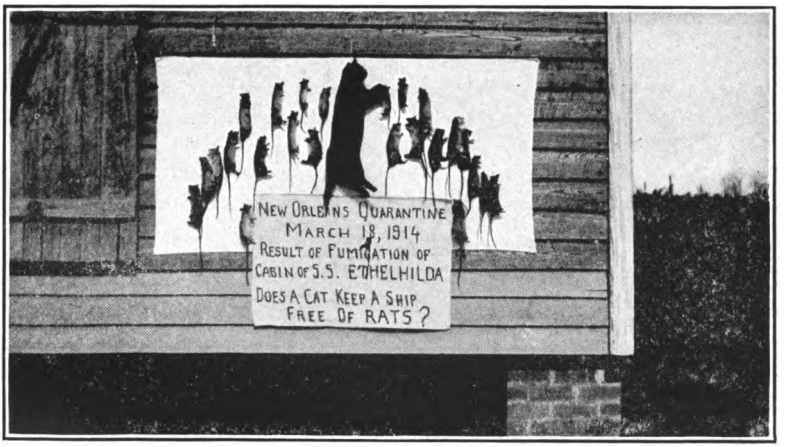
I wrote Mr. A. B. Brooks, Chief Game Protector of the State of West Virginia, and received the following reply:

"Replying to your letter of the 21st, I have to admit that I have never made a very careful study of the number of stray cats abroad in our forests, but I have noticed that one cannot go far in them when there is snow on the ground without finding cats' tracks. In fact, one cannot find a spot that is not periodically visited by one or more of these night-prowlers. I recall that I once spent half a day in a cave in Pocahontas County and when far beyond every other sign of life I found the tracks of a house cat. I know you will emphasize the destruction caused by town cats, also. I am glad to know you are preparing something on this subject, which is very important to our wild life. As to the number of cats per hundred acres in our State, I hardly believe it would run as high as that claimed for Massachusetts, but believe it would be half that number, anyhow, at a rough guess."

I interviewed Capt. Dan Cunningham, a deputy game warden who has spent his whole life in West Virginia chasing moonshiners and game violators; and he believes that one cat to fifty acres would be a fair estimate for this state, and adds that the cat is the greatest enemy to bird life.

I have tried to find out how many cats we have in this state and have come to the conclusion that there is an average of three cats to each of the 87,289 farms, making a total of 261,867 cats. Taking the basis of one stray cat for each 50 acres in the state, one half of Massachusetts' estimate, would make 76,879 stray cats, a total of 338,737 farm and stray cats in the state.

Many people believe that each cat kills 50 birds per year. I believe some kill more, while a few do not kill any, so I will make a low estimate of seven birds for farm and stray cats in field and woods. This would be 2,371,159 birds per year. In other words, $1,400,000 worth of birds are destroyed by farm and stray, field and woods cats, not native wild cats, but domestic cats. This does not take into consideration the city, village or suburban cats, and they are just as plentiful. This destruction of our birds is frightful. I know, for I have neighbors who sometimes have as many as 17 cats. Don't you think it is time for us to use some measure to curtail this deadly enemy to bird life? The State of West Virginia should pay a bounty on stray cats. Cats should be licensed like dogs. Traps or poisons are the cheapest and most efficient "mousers" and "ratters" that I know of, and no birds are destroyed by their use.



An Illustration of the Inefficiency of the Cat as a Ratcatcher.

One cat and twenty-four rats, the result of fumigating cabin of steamship. This cat, an exceptionally good ratter, was supposed to have kept the cabin free from rats. In fumigating she was overlooked. (From Public Health Reports, Vol. 29, No. 16).

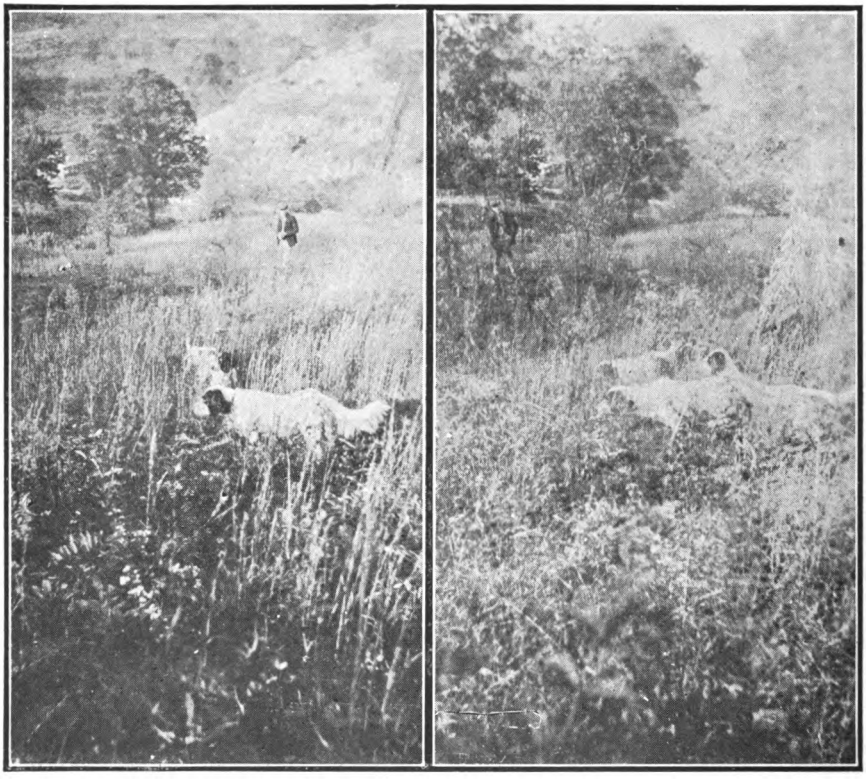
DOUBLE STUDY IN BIRDS.

Note in the accompanying illustration the graceful birddogs making a "stand," displaying their valuable instinct that has been utilized for the benefit of man. It adds charm to the picture that cannot fail to quicken the blood of any true sportsman.

Many pipes and flasks have been emptied by sportsmen while discussing the merits of different breeds of dogs; but if you can find a dog that is easily controlled, a good retriever, and has what is called "bird sense," it matters little whether your dog is a pointer or a setter. You will have a fine compānion that will assure you good sport.

West Virginia is noted for her beautiful scenery and excellent hunting grounds. Hunting quail in an open field may enable the hunter to bag the daily limit with ease, but it does not afford the birds the protection they should have. In this state we have the rocky, wooded hills and ravines that are so pleasing to the eye of a nature lover and that gives a zest to sportsmanship. The birds have a natural protection that they require in order to be able to multiply.

Old sportsmen do not care to kill quail as they did in former years, but they love to follow the dogs afield and watch the quail as the dogs race across the fields with their noses trained to catch the first scent of game which they communicate to the hunters by their actions almost as quickly as if by wireless. It is then that man and dog become real partners in this fascinating sport that cannot be understood by one who has never followed a bird-dog on a quail hunt.



GOVERNMENT BULLETINS.

Below will be found a list of the publications of the Bureau of Biological Survey, United States Department of Agriculture, especially in the study of West Virginia birds:

Bulletin 13—Food of the Bobolink, Blackbirds and Grackles.
" 15—The Relation of Sparrows to Agriculture.
" 18—Distribution and Migration of North American Warblers.
" 21—The Bobwhite and Other Quails of the United States in Their Economic Relations.
" 23—The Horned Larks and Their Relation to Agriculture.
" 24—The Grouse and Wild Turkeys of the United States and Their Economic Value.
" 26—Distribution and Migration of North American Ducks, Geese, and Swans.
" 27—The North American Eagles and Their Economic Relations.
" 32—Food Habits of the Grosebeaks.
" 35—Distribution and Migration of North American Shore Birds.
" 37—Food of the Woodpeckers of the United States.
" 39—Woodpeckers in Relation to Trees and Wood Products.
" 44—Food of Our More Important Flycatchers.

Farmers' Bulletins, U. S. Bureau of Biological Survey:

F. B. 54—Some Common Birds.
" 383—Bird Day in the Schools.
" 456—Our Grosbeaks and Their Relation to Agriculture.
" 493—The English Sparrow as a Pest.
" "497—Some Common Game, Aquatic and Rapacious Birds in Relation to Man.
" 506—Food of Some Well-Known Birds of Forest, Farm and Garden.

Circulars, U. S. Bureau of Biological Survey:

Circular 17—Bird Day in the Schools.
" 56—Value of Swallows as Insect Destroyers.
" 61—Hawks and Owls from the Standpoint of the Farmer.
" 72—Private Game Preserves and Their Future in the United States.
" 79—Our Vanishing Shorebirds.
" 81—Three Important Wild Duck Foods.

Separate Reprints from the Yearbook. Apply for Yearbook Separate, giving number.

Y. bk. Sep. 37—Part 2—The Meadowlark and Baltimore Oriole.
" " 133—Birds as Weed Destroyers.
" " 364—Some Benefits the Farmer May Derive from Game Protection.
" " 443—Does It Pay Farmers to Protect Birds?
" " 474—The Economic Value of Predaceous Birds and Mammals.
" " 486—The Relations Between Birds and Insects.
" " 504—Plants Useful to Attract Birds and Protect Fruit.

" " 545—The Migratory Movements of Birds in Relation to the Weather.

" " 564—Bird Enemies of the Codling Moth.

NOTE—Application for publications in this list should be made to the Editor and Chief of the Division of Publications, United States Department of Agriculture, Washington, D. C. The editions of some of the publications are necessarily limited, and when the supply is exhausted and no funds are available for procuring additional copies, applicants are referred to the Superintendent of Documents, Government Printing Office, who has them for sale at a nominal price, under the law of January 12, 1895. Many of these publications may be obtained as "Package Libraries" from the Agricultural College.

In applying give name and number of the bulletin and the name of the Bureau of Biological Survey.

LIST OF ~~BIRDS~~ Books USEFUL IN BIRD STUDY.

"Bird Guide, Land Birds East of the Rockies," by Chester A. Reed.
"Bird Guide, Water Birds East of the Rockies," by Chester A. Reed.
"Camera Studies of Wild Birds," by Chester A. Reed.
"Handbook of Birds of Eastern North America," by Frank M. Chapman.
"Color Key to North American Birds," by Chapman and Reed.
"Warblers of North America," by Frank M. Chapman.
"What Bird Is That?" by Frank M. Chapman.
"Bird Gossip," by Harriet Wilbur.
"The Sport of Bird Study," by Herbert K. Job.
"Propagation of Wild Birds," by Herbert K. Job.