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CONSERVATION OF OUR WILD BIRDS

By

Bradford A. Scudder

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CONSERVATION OF OUR
WILD BIRDS

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METHODS OF ATTRACTING
AND INCREASING THE NUMBERS OF USEFUL
BIRDS AND THE
ESTABLISHMENT OF SANCTUARIES

BY
BRADFORD A. SCUDDER?

SECRETARY OF THE MASSACHUSETTS
FISH & GAME PROTECTIVE
ASSOCIATION

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INTRODUCTION

EVERYWHERE throughout this broad land of ours there exists a wholesome desire to protect the wild life about us. We of this twentieth century are living in an age when both societies and individuals are zealously striving, not only to inspire a love for this wild life, but also to instruct the people at large regarding how it may be wisely conserved. Love for the out-of-doors is strong in most of us and the call to the country is insistent. Each year the throng increases of those who respond to this summons,—many to reside there permanently, others as sojourners only during the delightful months of the year, and the charms of a country life are doubly enhanced by the presence of the wild creatures about us.

The wild life, especially the birds, contribute largely to both our welfare and our happiness. While engaged in their important work of ridding the country of injurious insect pests and the seeds of noxious weeds, they at the same time gratify our aesthetic tastes by their cheery songs, bright colors, and vivacious movements. There is also the additional charm of being able to watch the evolution of their home-building, from the gathering of the first nesting material until the young spread their wings and fly away.

Unfortunately many of those who delight in the charms of the country have been denied the opportunity of learning much about the habits of birds,—what species will nest in bird-houses, where to properly place these houses, or how to care for the birds that visit us in the bleak

weather of winter and come about our homes searching for food.

Hosts of birds may be attracted about our country homes at all seasons of the year by offering food, shelter, and suitable lodgings, and the author in following the precepts of the Massachusetts Fish and Game Protective Association, has endeavored to set forth in a manner both clear and comprehensive, methods by which this may be accomplished.

In this important work of protecting and conserving our wild life we are confronted with a situation that demands instant and careful consideration. The author refers to the antagonistic points of view held by the bird protectionist and the sportsman. The former adheres to the theory that the shooting of all birds and quadrupeds for mere sport should be absolutely abolished, while the latter argues that game birds and quadrupeds exist for the purpose of providing a source of legitimate recreation. We do not wish to criticise the exponents of these doctrines,—each has a right to his own beliefs. Therefore let us strive to create a spirit of goodwill and coöperation, such as will inspire both parties to devote their energies unceasingly to the cause of wild life protection and propagation. Our game birds afford recreation to many that delight in shooting,—a legitimate pastime when tempered with moderation, and one to be encouraged as an incentive to become better acquainted with nature, and to render the young mind keen by training the powers of observation.

Savage man however, hunted not for the mere sport of the chase, but to supply himself with the necessities of

life. So, all statements to the contrary notwithstanding, do not try to excuse your own present sporting propensity, on the ground that it is a portion of the inheritance bequeathed you by an ancestor, who armed with a flint-tipped spear followed the pre-historic mammals.

Our wild life of the present day is in numbers but a fragment of what our country contained a quarter-century ago. That vandal, commercialism, the destroyer of our natural resources, played havoc, not only with our game birds and quadrupeds, but also with our birds that contribute so largely to the welfare of the country in an economic way. Now that the market-hunter and the purveyor of plumages of wild birds are no longer allowed to ply their nefarious trade, our wild life may hope to establish itself in its former abundance, but we must all "put our shoulders to the wheel," and help repair "the years that the locusts have eaten."

By the establishing of refuges the birdlover and the sportsman may meet on common ground and be of mutual benefit. In every city and town there should be established a permanent sanctuary,—the most successful method of perpetuating our useful and interesting forms of wild life. In conserving our game birds and quadrupeds by means of protected areas, we at the same time aid in increasing the numbers of insectivorous birds, so that those who establish refuges primarily for game, become indirectly public benefactors.

Artificial propagation of certain species of our native game birds is yet in its infancy, is doubtful of success, and too costly in operation to be attempted by those possessing

only moderate means. However if denied the possibilities of a game-farm, we may at least establish sanctuaries and increase the natural supply of game, not only by protective measures, but also by creating a sincere public sentiment for this method of game conservation. Competent administration, persistent and systematic feeding and housing of the birds and rigorous enforcement of the laws, are all necessary to bring success to this enterprise.

The author wishes to thank not only the members of the Executive Committee, but also many other members of the Massachusetts Fish and Game Protective Association, who by their loyal and enthusiastic support have made the publication of this book a success. Thanks are due Mr. Edward Howe Forbush, for his kindly interest shown, both by reading the proof, and in making many valuable suggestions. Our former President of this Association, Mr. William Brewster, deserves many thanks for much excellent advice given relative to bird nesting-boxes, gleaned from his experience of many years in attracting birds.

It was for the purpose of aiding those who are interested in conserving the wild life about us that this little book was prepared, and it is the sincere hope of the author that it will be a stimulus to whoever reads its pages to join the ever-increasing ranks of those who stand for the rational protection of our WILD BIRDS.

BRADFORD ALEXANDER SCUDDER.

January, 1916.

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BIRDS THAT WE SHOULD ENCOURAGE TO NEST ABOUT OUR COUNTRY HOMES

TO aid those who have a fondness for birds, and wish to attract them about their homes, but who through lack of opportunity possess no intimate knowledge of the nesting-habits of each species, the following list of common birds is given.

All of these thus enumerated are found generally throughout our three Southern New England States, and when offered protection will nest on our farms, often in such proximity to our houses that their home-building and domestic cares may be observed from the luxury of an arm-chair on the veranda, or from a convenient window. Birds of different species vary greatly in their choice of a location for a nesting-site, and it is from our knowledge of the peculiar nesting-habit of each species that we are able to anticipate their desires and prepare a congenial environment.

Some birds nest on the ground, or in tussocks of grass; some in low bushes and thick shrubbery; others among the branches of our orchard and shade trees; some few species excavate holes in the decayed trunks, or branches of trees; and some species not able to excavate holes for themselves, will occupy these vacated apartments, and also the nesting-boxes prepared by man.

Although we may not solve the secret of the Bluebirds' preference for the nesting-box, let us welcome the little home-seekers by offering an apartment to their liking. In many sections now over-run by that exotic pest, the European House Sparrow, and where nesting-boxes intended for the use of our native birds would be immediately tenanted by this unwelcome guest, birds of other nesting-habits may be attracted by the planting of thick shrubbery and coniferous trees.

Therefore the birds in this subjoined list have been grouped in accordance with their nesting-habits.

BIRDS THAT NATURALLY NEST IN CAVITIES IN TREES—FOR THESE WE SHOULD PROVIDE NESTING-BOXES

NEARLY all of the various species of birds that have reciprocated the kindness of their human friends by accepting the nesting-boxes prepared for them, originally nested either in the abandoned homes of the woodpecker architects, or in cavities in trees formed from the combined effects of decay and the action of the elements.

In either instance, the bottom of these cavities is always padded with a soft layer of particles of wood,—chips of the woodpecker artisan, or a deposit of decayed wood. All members of the woodpecker family lay their eggs upon this layer of chips, which slightly hollowed forms a nest, no other material being used. In all nesting-boxes this natural lining of the bottom should be supplied, using for the purpose coarse sawdust, or ground cork, to the depth of two inches. This detail is most essential, and should not be overlooked. Woodpeckers will not occupy a nesting-box that lacks this floor covering,—the eggs would roll about on the bare floor, and prevent the parent bird from properly covering them during the period of incubation. It is also the opinion of the author, that birds other than woodpeckers, species that use various materials for the construction of a nest, are more readily induced to occupy a nesting-box having this layer of sawdust or cork, than one in which it is lacking.

A nesting-box, with the correct inside dimensions, and proper size of entrance for each species is given in the appended list. The mechanical construction and the placing of these nesting-boxes in position will be fully described in the chapter entitled, "Nesting-boxes."

BLUEBIRD: Nesting-box should have the following inside dimensions,—floor, 5 by 5 inches; depth, 10 inches; entrance, $1\frac{1}{2}$ inches in diameter, with its lower edge 7 inches above the floor. It may be mounted upon a pole; fastened to the side of a barn or other farm building; or to the trunk of a tree standing in the open, and at a height of from 8 to 15 feet above the ground, wherever placed.

TREE SWALLOW: Nesting-box should have the following inside dimensions,—floor, 5 by 5 inches; depth, 7 inches; entrance, $1\frac{1}{2}$ inches in diameter, with its lower edge 4 inches above the floor. It may be mounted upon a pole, and the pole may then be screwed or bolted to a post in the fence inclosing the garden, orchard, or mowing land. When fastened to the trunk of a tree, be sure that one is chosen whose branches are high enough above the nesting-box to allow the birds freedom of access to their home, after the foliage has fully matured. The nesting-box should be placed at a height of from 8 to 15 feet above the ground.

CHICKADEE: Nesting-box should have the following inside dimensions,—floor, 4 by 4 inches; depth, 10 inches; entrance, $1\frac{1}{4}$ inches in diameter, with its lower edge 7 inches above the floor. It should be placed at a height of from 6 to 12 feet above the ground, and may be mounted on a pole placed in the orchard, or open woods, or fastened to the trunk of a tree. All nesting-boxes for the Chickadee should be situated in open spots, and not in the dense forest. Possibly a nesting-box painted a dull white, simulating the color of a gray birch stub, would be more readily occupied by the Chickadee, than one stained a shade of brown or olive green. This is a suggestion of the author, and might be worth trying, from the fact that the Chickadee when excavating its home in a dead tree prefers the gray birch, the decayed wood of which is easily removed by the tiny builder.

WHITE-BREADED NUTHATCH: Nesting-box should have the following inside dimensions,—floor, 4 by 4 inches; depth, 10 inches; entrance, $1\frac{1}{4}$ inches in diameter, with its lower edge 7 inches above the floor. It should be placed at a height of from 10 to 20 feet from the ground, on the trunk of a tree in open woods or in the orchard.

HOUSE WREN: Nesting-box should have the following inside dimensions,—floor, 4 by 4 inches; depth, 8 inches; entrance, 1 inch in diameter, with its lower edge 6 inches above the floor. It may be fastened to the side of an outbuilding; to a tree in the orchard; or, mounted on a pole. In any of these situations, the height above the ground should be from 6 to 10 feet.

FLICKER: Nesting-box should have the following inside dimensions,—floor, 6 by 6 inches; depth, 18 inches; entrance, $2\frac{1}{2}$ inches in diameter, with its lower edge 14 inches above the floor. It should be fastened to a tree standing in the open, or a pole and at a height of from 8 to 20 feet above the ground. Trees bordering country highways, or near the edges of open fields should be selected for this purpose.

RED-HEADED WOODPECKER: Nesting-box should have the following inside dimensions,—floor, 6 by 6 inches; depth, 16 inches; entrance, 2 inches in diameter, with its lower edge 12 inches above the floor. It may be fastened to the trunk of a tree standing in the open, at a height of from 15 to 20 feet above the ground.

SCREECH OWL: Nesting-box should have the following inside dimensions,—floor, 8 by 8 inches; depth, 18 inches; entrance, 3 inches in diameter, with its lower edge 12 inches above the floor. It should be placed at a height of from 10 to 25 feet above the ground, on the trunk of a tree among both pine and hardwood groves of fairly open growth, or fastened to one of the large branches of an apple tree in an ancient orchard.

SPARROW HAWK: Nesting-box should have the following inside dimensions,—floor, 8 by 8 inches; depth, 18 inches; entrance, 3 inches in diameter, with its lower edge 12 inches above the floor. It should be fastened to the trunk of a tree standing in the open country, or along the borders of a highway, at a height of from ten to twenty feet.

WOOD DUCK: Nesting-box should have the following inside dimensions,—floor, 12 by 12 inches; depth, 24 inches; entrance, 6 inches in diameter, with its lower edge 16 inches above the floor. Suitable natural nesting-sites for the Wood Duck do not occur in abundance, so that by placing nesting-boxes on the trunks of large trees within a short distance of a pond or stream, and at a height of from 8 to 20 feet above the ground, we may induce one or more pairs of these beautiful waterfowl to stay in our neighborhood, and raise a brood of young.

CRESTED FLYCATCHER: Nesting-box should have the following inside dimensions,—floor, 6 by 6 inches; depth, 12 inches; entrance, 2 inches in diameter, with its lower edge 8 inches above the floor. It should be fastened on the trunk of an apple tree, or a hardwood tree standing in the open woods, about 15 feet from the ground.

DOWNY WOODPECKER: Nesting-box should have the following inside dimensions,—floor, 4 by 4 inches; depth, 12 inches; entrance, $1\frac{1}{4}$ inches in diameter, with its lower edge 8 inches above the floor. This should be fastened to the trunk, or a large perpendicular branch of an apple tree, or to a hardwood tree standing in the open forest, at a height of 15 feet. The Downy Woodpecker rarely raises a brood of young in a nesting-box, but frequently uses it as a winter sleeping apartment. However, by persisting in offering this species a suitable nesting-box of the above dimensions, we may eventually be rewarded by its being accepted.

HAIRY WOODPECKER: Nesting-box should have the following inside dimensions,—floor, 6 by 6 inches; depth, 15 inches; entrance, $1\frac{1}{2}$ inches in diameter, with its lower edge 12 inches above the floor. This species is more of a woodland bird, than others of its family, and seldom nests in close proximity to a dwelling. Nesting-box should be fastened to the trunk of a hardwood tree in fairly open woods, and placed at a height of from 10 to 20 feet above the ground. Like its cousin, the Downy, this Woodpecker does not favor ready-made apartments,—but let us persist in our efforts to secure this bird as a tenant.

BIRDS THAT NEST AMONG THE BRANCHES OF ORCHARD AND SHADE TREES

ROBIN: Nests commonly in trees of various species both broad-leaved, and coniferous, and frequently on the cornices of buildings.

KINGBIRD: Nests among the branches of apple trees, seeming to prefer this tree to that of many other species. A pair of Kingbirds near the house are a safe-guard from the depredations of both Hawks and Crows.

SCARLET TANAGER: This species is also a lover of the orchard, and frequently nests among the branches of the apple tree.

REDSTART: Nest is placed in the fork of branch of maple and oak trees, in rather swampy localities, and in small white birches.

BLACK-THROATED GREEN WARBLER: Nests among the branches of the white pine, groves of which it frequents during the breeding season, and in small upland cedars.

PINE WARBLER: Nests and spends the breeding season among the pitch-pines, but when these trees are wanting, shares the groves of white pine with its cousin, the Black-throated Green Warbler.

YELLOW-THROATED VIREO: Nest of this species is very often suspended from a fork of the trailing branches of the elm tree.

RED-EYED VIREO: The purse-shaped nest of this species is suspended from the small branches of maples, birches, and other broad-leaved trees.

CEDAR BIRD: Nest is usually placed in the fork of a small branch of an apple or other orchard tree, and sometimes in the fork of a sapling growing in open meadow land. This bird is not an early nester, and does not commence to build until about the first of July.

AMERICAN GOLDFINCH: This species delays its nest-building until July, when it constructs a nest in the fork of one of the small branches of both apple and maple trees.

PURPLE FINCH: Nest is built among the branches of cedars, firs, and other coniferous trees.

CROW BLACKBIRD: The bulky nest of this species is built among the branches of white pine and other coniferous trees. Sometimes among bushes near water holes.

BALTIMORE ORIOLE: The elm trees of our New England towns are the favorite nesting sites of this bird, from the drooping branches of which its pendulous nest is hung.

BLUE JAY: Nests among the branches of both coniferous and broad-leaved trees. In spite of its handsome attire, this species should not be encouraged to nest in numbers, for it destroys many eggs and young of our useful birds.

LEAST FLYCATCHER: Nest is placed in the fork of a branch of an apple tree, more frequently than in that of a tree of other species.

WOOD PEWEE: Nest is usually placed in a fork of the large branches of an oak tree, and sometimes saddled on a large limb. The Wood Pewee prefers open woods of hardwood growth, free from underbrush and where the oaks predominate. The nest is an exquisite piece of workmanship, and the outside is usually studded with lichens.

RUBY-THROATED HUMMINGBIRD: Nest is usually saddled on the dead limb of a hardwood tree, sometimes in the forest, often in the apple orchard. It is one of the most beautiful bits of bird architecture, and simulates a knot or excrescence on a branch so closely, that the observer would pass it by unnoticed, did not the bird by angry buzzing about, betray her secret.

BIRDS THAT NEST IN BUSHES AND THICK SHRUBBERY

WOOD THRUSH: While this species is more or less of a woodland bird, it frequently appears about country estates possessing an abundance of shrubbery, particularly that bordering a small stream or artificial pond. Among this shrubbery, or in the fork of a small sapling in moist woods, the nest is built.

CATBIRD: The nest of this species is often built in a thick clump of shrubbery near the house, such as lilac bushes, azaleas, and syringas. Clumps of high bush blueberries, and other shrubs of dense growth are also favorite nesting sites of this bird, especially about the borders of wet meadows and sluggish brooks.

BROWN THRASHER: This species is not as fond of nesting near our homes as is its cousin the Catbird, preferring to build its nest among the thick clumps of scrubby growth of huckleberry bushes, scrub oaks and other dense cover, of wild pasture land, both upland and swamp. After the young are hatched the parent birds come about our gardens and lawns searching for insect food for the young birds, and to indulge in the pleasures of the bird bath.

CHESTNUT-SIDED WARBLER: The nest of this species is placed in the fork of a small hardwood sapling. Young sprout growth of birches, and maples being frequently chosen for this purpose, as well as hazelnut, huckleberry, and other small bushes in swampy meadows.

YELLOW WARBLER: The nest of this species is placed in the fork of a small low-growing tree or bush of various hardwood species near the borders of swampy meadows, and sometimes midst the shrubbery near our homes.

FIELD SPARROW: Nests in low growth of bushy uplands and fields, and occasionally the nest is placed upon the ground.

CHIPPING SPARROW: Nest of this species is built not only in clumps of shrubbery, but also in apple trees, cedars and firs.

BIRDS THAT NEST UPON THE GROUND OR IN TUSSOCKS OF GRASS

OVENBIRD: Both this bird and the following species construct an arched nest on the ground, often beneath the protecting cover of a small pile of brush or fallen branch, in moist woods of oaks and maples. Frequently the nest is placed close by the edge of a woodland path.

BLACK AND WHITE WARBLER: As mentioned above the Black and White Warbler nests upon the ground in much the same manner as the Ovenbird. The author has found several nests of this bird that were placed under the projecting edge of a leaf-strewn depression in the oak woods, where at some former time large boulders had been removed.

SONG SPARROW: The nest of this species is frequently placed in the grassy overhanging bank of a brook, sometimes in a tussock of coarse grass, and occasionally in a low-growing bush.

VESPER SPARROW: This species builds its nest upon the ground in upland pastures.

RED-WINGED BLACKBIRD: Tussocks of coarse grass, sedge and clumps of cat's-tail are all favorite nesting sites of this bird in marshes and swampy meadows. Button-ball bushes about the borders of ponds and streams are also chosen as nesting places by this species.

MEADOW LARK: The nest of the Meadow Lark is placed upon the ground among the tall grasses of the hayfield that form an arch over it. During the operations of mowing, care should be taken to prevent the destruction of the nest by scythe or mower knives, by having your workmen locate the nests, before the operations of the hay harvest are under way. The Meadow Lark is of inestimable value to the farmer as a destroyer of insects injurious to both hay and grain crops, and strong efforts should be made to increase the numbers of this species.

BOBOLINK: The cheery Bobolink nests upon the ground in the midst of the hayfield where the nest is concealed beneath a tussock or clump of grass. This bird is another valuable friend of the farmer and the same care should be used in avoiding destruction of its nest during the haying-time, as with that of the Meadow Lark.

BOB-WHITE: While the whistle of the Quail comes up from the field, the wife of the merry piper is quietly brooding her eggs, along the borders of the grain field or mowing land, where she has placed her nest,—so kind farmer have a care when the hay or grain crop is about to be harvested. Other places are also chosen as a nesting site by this bird,—a clump of low-growing huckleberry or bayberry bushes, the edge of a brush-pile, or the protecting lower rail of the old Virginia fence, still found on some farms.

RING-NECKED PHEASANT: This bird has become very abundant in certain sections in Massachusetts, and having been given a long season of protection, comes about our estates and nests frequently in close proximity to our homes. The nest is placed upon the ground, where it is well concealed among the thick grasses or clumps of bayberry bushes and trailing blackberry vines.

RUFFED GROUSE: Nests on the ground in open hardwood growth, and the nest is sometimes placed beneath a fallen tree-top, or, the edge of a pile of brush.

SPOTTED SANDPIPER: Many nests of this little sandpiper are constructed in the strawberry beds on our farms, where the bird arranges a nest of the hay or straw used as a winter protection to the plants, and deposits her eggs.

WOODCOCK: Nests on the ground in swampy or moist woodlands. Both parents and young visit the gardens at night in search of earthworms and grubs, and cornfields of the farmer are also favorite feeding grounds.

BIRDS THAT NEST IN BUILDINGS OR ON THE BEAMS BENEATH BRIDGES

BARN SWALLOW: Nests on the beams and rafters in barns, provided there is an entrance and exit continually open. The passing of our old-fashioned New England barn with its wide open doors and windows in roof, is the cause of the disappearance of this beautiful bird from certain localities where it was formerly abundant.

CLIFF OR EAVE SWALLOW: This species is of sociable disposition, and nests in colonies, the bottle-shaped nests of mud being attached beneath the eaves or cornices of country barns and outbuildings.

CHIMNEY SWIFT: Nests commonly throughout Southern New England wherever it can find an unused chimney. It is a good plan to watch these birds and discover which particular chimney they have chosen for nesting quarters, and thus avoid destroying both nest and young by a temporary blaze in the fireplace during the months of May, June and July.

PHOEBE FLYCATCHER: Nests on the beams and top of wall beneath barns, on the timbers beneath bridges, and often on the top rail or cornice of the veranda of the house.

NESTING BOXES

SOMETIME in the long ago an American Indian made the astonishing discovery that birds of certain species could be induced to occupy homes fashioned for them by human hands, and promptly swung aloft from the tips of his lodge-poles, calabashes or gourds, the dried shells of which, with entrances properly cut, made ideal nesting-boxes. In many sections of the South, the calabash is grown in large quantities by the planters, and is still used as a nesting-box for Bluebirds, Purple Martins, and Wrens of several species, with most successful results. After the calabash has ripened and the shell has become hardened, a circular opening of a size to admit the particular species of bird for which it is intended, is cut in the side of the calabash, at a point where its diameter is the greatest. The seeds and dried meat are then extracted by means of a piece of wire bent into a hook. Holes are made in the neck, through which a piece of stout tarred marline or other cord is passed, also two small holes, two inches apart, are made in the back, opposite the entrance, through which another cord is passed. The top cord is used for suspending the gourd from a branch, and the lower one is to prevent the gourd from swaying too much in a stiff breeze. Two or three quarter-inch holes bored in the bottom will serve for drainage,—the shape of the calabash being such that more or less water runs inside during rain storms. Calabashes have been used with considerable success as nesting-boxes in one or more towns in New York State; but for New England and other sections of the country in the same latitude, a nesting-box constructed of boards will withstand the wear and tear of the elements far better, as the calabash is rather fragile, and often lasts but one season. In the South their saving grace is minimum cost and ease of production in quantities.

Nesting-boxes have run the gamut, from tomato cans to elaborate affairs, with roofs of burnished copper, and the manufacturer of bird houses has entered the field with his wares. Many manufactured commodities that are displayed in the shops come from over seas, and the first nesting-boxes constructed on scientific lines, offered for sale in this country, bore the mark "Made in Germany."

FIG. A.

FIG. B.

NESTING-BOX FOR FLICKER

FIGURE A. Vertical cross section showing construction. (A) holes bored for nails or screws used in securing box to post or tree trunk.

FIGURE B. Front view showing method of fastening top in place by pushing a round galvanized nail (B) in the hole on each side. Nails project far enough to be removed by the fingers. Type of nesting-box used by E. H. Forbush.

Baron Hans von Berlepsch, whose lifetime has been spent in the study of the nesting-habits of European birds, evolved this type of nesting-box, copying as closely as possible the works of the woodpecker architects. These boxes are made from sections of bark-covered logs, the interiors of which have been cut out with a special tool, to a form and size corresponding with the original, pear-shaped nesting-hole of the woodpecker artisans. Entrances are then cut at the proper angle, and of sizes suitable to admit whatever particular species of bird is desired as an occupant. This type of nesting-box has been used with phenomenal success in Europe, where many hundred pairs of birds of various species nested in them upon the estate of Baron von Berlepsch, in Germany. These boxes are now manufactured in this country, and we hope that our own native birds will take as kindly to them as have their European cousins. Nesting-boxes of the von Berlepsch type require the use of special tools and power machines for their manufacture, and it would be useless for the amateur to attempt to make these by hand. With the possible exception of the Downy and Hairy Woodpeckers, all our hole-nesting species will use the rectangular box of boards. Ernest Harold Baynes, Meriden, New Hampshire, manufactures the von Berlepsch boxes in quantities, and those who may wish this type of nesting-box may obtain them of him in various sizes. With the exception of the Flicker and the Red-headed Woodpecker, our native species of Woodpeckers still persist in excavating their own dwellings, and have not as yet been induced to occupy these ready-made apartments. Dead timber and decayed branches are the building sites of the Woodpeckers. Unfortunately they also harbor both insects and fungus, each a menace to the health of the forest, and the forester is forced to remove these plague spots. Woodpeckers are valuable guardians of the forest, and efforts must be made to replace the homes thus taken from them, by the offering of a nesting-box that they will accept.

It is not the intention of the author to discourage the manufacture and sale of nesting-boxes, but to aid those of moderate means who wish to attract birds, and cannot afford to pay the prices charged by the manufacturer, even though the price be but one

DROP-FRONT

NESTING-BOX

Drawings show vertical cross section and front view. Door hinged at bottom with brass screws (B).

Fastened at top with a round galvanized nail (N) pushed in from each side and easily removed when box is to be opened. (H) hole in side of door on each side to admit nails.

Entrance cut on an angle of sixty degrees.

Size given above for Flicker.

For other species consult dimensions given in the list of birds, "That Naturally Nest in Cavities in Trees," etc.

dollar per box. The motive in putting up nesting-boxes is to attract the birds and increase their numbers for economic reasons, thus the cost is an important factor in determining to what extent these boxes will be used by persons of moderate means. Often a person with a large bank account, and whose country estate is of a size to warrant the placing of fifty bird houses, will consider very carefully the advisability of investing fifty dollars in bird homes, even though he realizes the value of birds as destroyers of insect pests.

Our American birds will use a rectangular box quite as readily as one of the von Berlepsch type. Wood is the best material to use. Nesting-boxes of tin or other metal become very hot when exposed to the glare of the sun, and those made of earthenware are cold and damp.

A nesting-box that happily combines ready acceptance by the birds, is proof against the depredations of both cats and squirrels, and that can be manufactured at a reasonable cost, is the one to be used.

Boards, nails, and the few tools essential for the construction of a practical bird house that fulfills the above requirements, are to be found in every well ordered household, and with the aid of the working plans contained in this handbook, the farmer, the school boy, and the commuter, may in their leisure moments enjoy the pleasure to be derived from their own handiwork, and at the same time contribute to the happiness of the birds.

White pine boards, seven-eighths of an inch in thickness, planed on one side only, makes the best building material. When pine is not obtainable, other woods may be used. Old boards that have become weathered are first rate for this purpose,—only say what you think, “*sotto voce*” when your saw strikes a hidden nail. Use the planed surface for the outside of the box, the rough side for the interior, and as a further aid to the young birds in their ascent from the nest to the entrance, score the inside of the board forming the front with a series of horizontal saw-cuts. Begin an inch below the entrance, making them an eighth of an inch deep and a quarter of an inch apart. The entrance should be cut on an upward slant at an angle of sixty degrees, and have its

FIG. 1.

FIG. 2.

FIGURE 1. Upper half showing method of fastening nesting-box to top of wooden pole. A step of the same depth as the thickness of the board forming the back of the box, and long enough to extend well up the back and ensure stability, is cut on the side of the pole at its top. The lower edge of the box will rest upon this. Fasten firmly with wood screws, one in front, through the projecting back-board, and two in back through holes bored in pole to prevent splitting.

FIGURE 1. Lower half showing manner of fastening pole to fence post or stump of tree. Lag screws are used on account of the extra strength needed and of course must be driven by means of a wrench. Bore the holes for these large enough to allow the lag screws to go through the pole without splitting it. In the post itself, do not bore the holes too deep. Just start the hole and then set up the lag screws firmly with the wrench until all the loose play is taken up.

FIGURE 2. Left-hand drawing showing nesting-box mounted on iron pipe. Right-hand drawing showing bottom of box with the flange or plate, threaded for pipe, firmly screwed on. If preferred, the flange may be dispensed with and the end of the pipe flattened on an anvil, holes drilled for screws about six inches apart and the box fastened in the same manner as described for the wooden pole except that the step for bottom of box to rest upon is eliminated.

edge chamfered or countersunk to make a rounded surface upon which the birds alight before entering. Perches are unnecessary, and when provided are used mainly by English Sparrows. By placing the entrance high up under the projecting roof, and cutting it on an upward slant, the birds are sheltered from both sun and rain. Before cutting the entrance, stain the outside of the box a neutral tint of olive brown or gray, using an oil stain for this purpose. Not only the edges of the entrance, but also the interior of the box, should be fresh and clean, hence the care in applying the stain. Boxes for the Tree Swallow, that are to be mounted on poles and placed in the open, may be painted white,—boxes of a dark color becoming over-heated when exposed to the direct rays of the sun. For the purpose of ventilation, bore two one-quarter inch holes in each side of the box, about an inch below the top or roof. Obtain some coarse dry sawdust, or some ground cork from your Italian vender of fruit, in which come packed his Malaga and Tokay Grapes. Before fastening the boxes in permanent position, place in each a quantity of this sufficient to cover the bottom to a depth of two inches. Do not overlook this important detail, especially in the boxes designed for members of the Woodpecker family. The dimensions given for each individual nesting-box in the list of birds, are inside measurements in all instances,—unless otherwise specified, so whoever may construct bird houses from these dimensions must allow for thickness of material when cutting up his stock. When many boxes are to be made, it will expedite matters to have the stock run out by a local lumber mill to the proper width for front, back and sides of the individual boxes. It is then a very simple matter to cut off the pieces as required. A carpenter's bench and the following list of tools are all the equipment needed for this work. Two saws, one a cutting-off, the other a splitting saw; a carpenter's square; a hammer; a block plane; a bit-stock, with an extension bit for cutting the different sized entrances, and two or three small drills; a two-foot rule; a stout screw-driver; a sharp pocket-knife, and last but not least, pencil with soft lead. In addition you will need a supply of galvanized nails and brass screws, of a size best adapted to the thickness of material used. Better begin with a few wood-working

tools, and add to the list from time to time, whatever is found to be needed, than purchase at the outset an expensive outfit, many tools of which may prove later to be of no special value.

Where the nesting-boxes shall be placed is the next proposition. When the box is to be fastened to a tree, one should be chosen that stands in the open, along the borders of country highways, edges of woodland, or open spots in the forest. Birds do not like the dense cover of the forest, especially those nesting in holes in trees or bird houses.

A light pole, twelve or fifteen feet in length, may have a bird house fastened to its top, and this pole may then be bolted to a post in the fence inclosing your garden, meadow or orchard. By placing bird houses in this manner at intervals of two hundred feet along the line of fence, Bluebirds and Tree Swallows may thus be colonized, and a multitude of insects injurious to both fruit and foliage will be destroyed by these birds in the immediate vicinity. At the end of the season poles and boxes may be taken down, cleaned and stored away until the following spring. In the country these poles are to be had for the labor of cutting. Bluebirds, Wrens and Tree Swallows are the only species that readily occupy houses that are placed on barns and other farm buildings. The height above ground at which the various houses should be placed is given in the chapter entitled "Birds That We Should Encourage to Nest About Our Country Homes." A good rule to follow is to place a bird house not less than eight feet above the ground or more than twenty.

Nesting-boxes should not be placed too near one another. Birds are fickle in making a choice of apartments, and will quarrel about them. Two hundred feet is about the right distance that each box should be from its neighbor. The beginner, in his enthusiasm, is quite apt to put up too many nesting-boxes the first season. Better put out a few the first season, and, if results are favorable, increase the number the next year. Where the nesting-box is placed in the open, the entrance should face the South or West. Boxes facing the North or East are exposed to cold, driving rainstorms, that are likely to occur at any time during the nesting season, and which are fatal to both eggs and young.

The boxes should be fastened in a vertical position when possible, and if at an angle, they should tip slightly forward rather than backwards. Late in the month of February or early in March is the best time to put up bird houses. There is no particular advantage to be gained by putting them up late in the autumn, and squirrels and wood mice soon fit them up for winter quarters.

The author suggests that a plan of one's country estate be drawn, upon which the location of each nesting-box may be marked and a number assigned to it. Each nesting-box will have a number corresponding to the one upon the plan. The boxes may have the numbers marked upon the under side of each, or better have them placed at the height of one's eyes at the base of the tree or pole upon which the box is fastened. Much interesting and valuable data may be collected concerning the nesting-habits of the birds occupying the boxes,—length of time from the taking possession of the box until the young leave the nest; number of broods raised by each species during the season; list of species using the nesting-boxes; list of the various species of insects brought to the young by the parents.

After the departure of the birds, the nesting-boxes should be carefully cleaned,—the nests removed, and a search made for the egg clusters of the gypsy moth frequently deposited in bird houses. Sprinkle in each box a small quantity of powdered sulphur to free them of parasites.

When possible the nesting-boxes should be taken down and stored for the winter, replacing them again late in the month of February or during the first week in March, as before mentioned.

Cats and squirrels are enemies of birds, and if we are to have birds about our homes in numbers, we must eliminate these pests. Cats climb trees without the slightest difficulty, and being nocturnal in habit, hunt at hours when they are concealed from our watchfulness, climb to the nesting-boxes, pull out the young birds or their parents and devour them.

Both species of squirrels, the red and the gray, are destroyers of birds, their eggs, and young. The red squirrel is the more villainous of the two, and should be destroyed on sight wherever found. Gray squirrels are found in far too great numbers in our

parks and on some large private estates, and should be systematically "thinned out." On many occasions I have seen a gray squirrel racing at top speed along a wall or fence, pursued by several irate robins, furiously pecking at him, until the chase ended by the squirrel taking refuge in the stone wall or a hole in a tree. Squirrels will also enlarge the entrances to bird houses by gnawing, and render them unfit for use.

A wide flange of tin or galvanized iron placed around the tree or post on which the nesting-box is fastened, will prevent cats from climbing, and this arrangement will also keep squirrels from ascending to the nest, when the tree stands at a distance from others. On a tree whose branches mingle with its neighbor's, this would not avail, for squirrels travel with ease among the tree-tops, and would leap from an adjoining tree to the one containing the nesting-box, descend and devour its contents at their leisure.

A galvanized iron plate, threaded for an inch pipe, may be fastened to the bottom of the nesting-box. A pipe, twelve or fifteen feet in length, may then be substituted for the light wooden pole; have its top threaded and the nesting-box firmly screwed on. Two one-quarter inch holes, drilled in the lower end of the pipe about six inches apart, will allow of its being bolted to the fence post, and I guarantee that no feline claws will obtain a foothold upon this iron post of small diameter. Suitable lengths of discarded iron pipe in good condition, may frequently be obtained at a low figure. These will answer the purpose fully as well as new pipe, and any plumber will cut a thread on each to fit the bottom-plate. Another method of fastening is to flatten the end of the pipe on an anvil and drill two holes through it, six inches apart, and fasten the pipe securely to the back of the nesting-box with screws or light bolts. In this manner the box is rigidly secured.

In order to be successful in securing as tenants our native species of birds, one must keep a watchful eye upon the nesting-boxes, otherwise they will be pre-empted by English sparrows, starlings and squirrels. Nesting-boxes that are put up and left unwatched during the nesting season, will be as unproductive of results as a farmer's garden in which the weeds have been allowed to run riot.

MARTIN HOUSES

THE Purple Martin is the largest of the Swallows, beautiful in color, form and flight, and displays a fondness for man by nesting always in close proximity to our dwellings. Some tribes of North American Indians encouraged the presence of Martins about their wigwams, by suspending from the lodge poles, calabashes or gourds fashioned into nesting boxes, which these birds readily occupied. The French Creoles of Louisiana also adopted this same method in providing nesting places, the gourds in this instance being fastened to the top of a pole set in the ground. Martins are birds of a sociable disposition, and will nest in communities when provided with a nesting box containing many apartments, each family living in a state of perfect harmony with its neighbors next door. Being a bird of powerful flight, it is able to travel long distances in foraging for food, and a large colony of Martins will thus rid a wide area of winged insect pests, especially during the period following the hatching of the eggs and until the young birds have left the nest. Disastrous cold storms in the spring of 1903, and wanton shooting in the southern states during the years following, sadly decimated the ranks of the Martins. Thanks to a wise legislation, our migratory birds are now the feathered wards of the United States Government and protection at all times is afforded them within the borders of the United States. Thus, barring destruction by the elements, the Purple Martin should soon re-establish itself in its oldtime abundance throughout southern New England, provided suitable nesting sites are made ready for the birds. Let us therefore encourage the presence of these beautiful birds by erecting a Martin house, such an one as will add picturesqueness to its environment of lawns and shrubbery.

Martin Houses are really miniature reproductions of our own dwelling houses, and various styles of architecture may be used in their design, and they may contain few or many rooms, as may suit the fancy or ability of the builder. Unless one is very proficient in the use of wood-working tools and has a well-equipped carpenter's bench, it would be advisable to purchase a Martin house out-

right from a reputable builder of these houses. There are in this country at least three manufacturers who furnish houses complete with pole, and whose advertisements appear in the columns of magazines devoted to birds and the out-of-doors. However should one wish to attempt the construction of a domicile for Martins, he will find that a light (weight) oak barrel, with entrances properly cut, and compartments fitted inside, the top finished with a conical-shaped roof and the whole affair neatly painted, makes both a practical, and an artistic house. Each room should be at least six inches or more square, and seven or eight inches high, with the entrance two and one half inches in diameter. The entrance may be either circular in form, or shaped like an inverted U. The lower edge of the entrance should be made flush with the floor of the apartment, thus facilitating the removal of old nesting-material and a thorough cleaning of each apartment at the end of the season. One may use his individual taste in adding perches at the entrances, or in making a little balcony completely around the house, two inches below the edge of the entrances, on each tier of apartments. This house should be mounted on a pole twenty feet from the ground. Heavy galvanized pipe makes an ideal material for this purpose, the pipe being run through the centre of the barrel, where it may be securely bolted, and the ground end firmly imbedded in a barrel of cement sunk level with the surface of the lawn. Given a coat of enamel paint, this pole is proof against the claws of any felines who may seek to go aloft in quest of the feathered tenants or their progeny.

While the Purple Martin is courageous and will give chase to any species of Hawk venturing near its home, it seems to be unable to successfully cope with the English Sparrow. This undesirable bird will, unless rigorous methods of extermination are used, pre-empt the Martin houses and destroy both their eggs and young. There is nothing quite as exasperating to the bird-lover, as the sight of a crowd of Sparrow gamins sitting at the entrances of the Martin houses, and yelling notes of derision at the rightful owners. The English Sparrow is a canny bird, and will desert a neighborhood for several months after having been shot at a few times. Use a shot-gun of small bore persistently

during the entire year, supplemented by wire Sparrow traps baited with cracked corn during the winter, and destroy their eggs and nests wherever found. Martins arrive during the first or second week in May, and by keeping the Martin house covered with burlap or bagging until their arrival, the Sparrow will be forced to look elsewhere for quarters, for it is an early breeder, and nests before the Martin arrives.

The European Starling has now made its appearance in Massachusetts and adjoining states, is fast becoming established, and is increasing in numbers. The Starling, like the English Sparrow, was introduced by some thoughtless, but well-meaning individual, for the purpose of combating the ravages of injurious insects. The results have not been satisfactory from an economic point of view, from the fact that the Starling has shown a disposition to acquire a liking for fruits of many sorts as well as grains. While it is true that at certain seasons of the year he destroys many harmful insects, that his glossy plumage, yellow bill, his sedate saunterings about the lawn, his gurgling, whistling notes and droll antics afford both interest and amusement to the observer,—yet he can never fulfill the mission that rightfully belongs to many species of our native birds.

It is deplorable that the time and energy wasted in unsuccessful attempts along these lines, could not have been devoted in the years that have gone to increasing the numbers of our native birds.

The Starling will nest in bird houses, in cornices and crevices of buildings, and in the abandoned holes of woodpeckers, and is thus a menace to our native birds of similar nesting-habits.

The owner of a Martin house must use the same vigorous methods of elimination with this species as with the English Sparrow,—or put up nesting-boxes for the Starling.

The Martins start on their long southern journey late in August, or during the first week in September. Immediately after their departure, the house should be thoroughly cleaned,—the nests removed, and it is well to look at this time for the egg clusters of the gypsy moth that are frequently deposited in the nesting apartments. A little powdered sulphur scattered on the

floor of each apartment will free the premises of parasites. After the process of renovating is completed, and the house has been well aired for two or three days, close all the openings to the apartments. Where the openings are circular in form, large corks may be obtained to fit them snugly, the use of which will not render the appearance of the Martin house as unsightly as when swathed in burlap. The burlap or canvas covering is suggested as a material to use only when the shape of the entrances will not allow the use of corks. The saving grace of the burlap or canvas is, that it is easily obtained and quickly applied.

Professional builders of Martin houses, furnish a pole that is hinged at the ground-end. This arrangement allows the Martin house to be tipped over and placed upon the ground, or better, a carpenter's saw-horse. In this position it is readily cleaned and may then be covered from the weather during the winter, and again raised to position in the spring upon the arrival of the Martins. In this manner the English Sparrow elimination problem is solved.

The Martin house should be set up in the open and not too near one's own dwelling. The midst of a wide expanse of lawn is a suitable spot for this purpose. Martins like plenty of freedom about their homes, so do not erect the Martin house close to trees. The Martin is a bird fond of the wide expanse of farm lands and fertile, flat valleys of slow flowing rivers, and is not found abundantly in hilly or mountainous country.

Martin houses may be obtained of the following makers, all of whom are recommended as builders of thoroughly practical domiciles for the Purple Martin: The Audubon Bird-House Company, Meriden, New Hampshire; Joseph H. Dodson, 1200 Association Building, Chicago, Illinois; Jacobs Bird House Company, Waynesburg, Pennsylvania.

BIRD BATHS

WATER is as essential to birds as food, not only to quench their thirst and help assimilate their food, but also for the purpose of bathing, for birds are cleanly creatures. In hot weather and during the nesting season, birds drink often, and bathe frequently, and unless a supply is furnished near at hand, must fly long distances in its quest. Therefore bathing places should be established at intervals about one's grounds, particularly if the estate be of great extent. The selection of location is of vital importance to the welfare of the birds. However wary a bird may be at other times, it is during the pleasure of the bath that its watchfulness is relaxed, and caught off its guard, is pounced upon by some cat that has made a successful stalk from the cover of a nearby clump of shrubbery.

To make this danger as remote as possible, place the bath in the open at some distance from any cover, and also as an additional precaution have the bath mounted, when practicable, on a pedestal at least three feet in height.

A bath may be a simple one easily constructed by the amateur, or it may be an affair of exquisite design, such as would fittingly adorn an Italian garden, along with its sundial and roses, and from the centre of which a fountain may play. The possibilities of a bird bath are limited only by the purse of the owner and the skill of the craftsman.

Frequently boulders are found scattered about over an estate, the tops of which have been hollowed by the elements to a depth and shape ideal for a bath. Such a natural tub for the birds may be filled daily with water by means of a bucket, and is easily cleaned two or three times a week by using a stiff brush and sponge. Trailing or climbing vines planted about the base of the boulder will soon cover its grim sides with a mantle of green, and the moisture generated by the boulder itself, together with that supplied from the water removed from the bath during the process of cleaning, will keep the vines in a flourishing condition even during the heat of summer. A judicious use of the pruning-shears will keep the vines from over-running and covering the bath.

A boulder lacking the naturally hollowed surface, suitable for a bird bath, may by the aid of bricks, or better, rough stones and Portland cement, be transformed into an excellent bath that may be oval or rectangular in shape, or the sides may follow the contour of the boulder.

A well-proportioned bath should be three feet long and two and one-half feet wide. It should have a depth of one-half inch at the edge, and the bottom should slope gradually toward the centre, where the greatest depth should not be over three and one-half inches. Birds alight at the edge of the bath and wade in cautiously until they find the depth that suits them, before beginning their ablutions,—there is no sudden plunge into its depths.

In making a permanent bird bath in the midst of a lawn, first cut out carefully the turf, making the opening large enough to admit of a siding of bricks set on edge to be placed around as a retaining border, so that the measurements of the finished bath inside the brick edging will be two and one-half by three feet. Remove the earth to the depth of twelve or sixteen inches, placing it upon a piece of canvas spread upon the lawn near by, and thus prevent disfiguring the surroundings with earthy debris. Fill this excavation with pieces of coarse, broken stone to within four inches of the top, and then set the bricks up on edge around the borders. Mix sharp sand and Portland cement together, using only water enough to form a stiff paste that can be easily handled.

Use three parts of sand to one of cement, and stir the dry materials well together before adding the water. A shallow wooden box makes an excellent mortar-bed in which to prepare the material. After the cement has been applied and has “set” long enough so that it may be easily manipulated, take your trowel and smooth up the bath. Begin at the centre and work toward the sides, so that the bath will slope gently from the edge to the centre. Before the cement becomes too hard, a thin coating of pure cement may be rubbed over the three to one formula, and will make a more waterproof coating. By consulting a local mason, who will be glad to aid you, if only by suggestions, you will be able to successfully build the bird bath without much difficulty and in a creditable manner.

On many estates where the water supply is furnished either by the municipality, or from a private storage tank, the bird bath may be properly connected by pipes, so that an unlimited flow of water may be maintained throughout the season. Under these favorable conditions, a pipe may be run up through the centre of the bath, and form a fountain, the gentle spray from which is welcomed by the birds.

All these suggestions must be worked out by the individual in accordance with the peculiar conditions to be met in various locations. Where the water supply is furnished by pipes, a cut-off must be placed below the freezing point, so that the water may be shut off during the winter months.

During the winter season the problem of furnishing water for the birds is a difficult one, and we must fall back on our old friend, the dealer in poultry supplies, who will furnish a drinking fountain, the water of which is kept above the freezing point by means of a kerosene heater.

WINTER FEEDING OF BIRDS

BIRDS are neither mendicants nor loafers, and except under the most adverse conditions of weather, do not look to their human friends for a supply of food, but cheerfully and industriously gather the insects and seeds of weeds that are everywhere found in abundance, and thus fulfill the economic part planned for them by nature.

Insects, their larvae, and eggs form the principal diet of all young birds, from the time they emerge from the shell until they are fully grown and strong on the wing, and the quantity of insect food consumed during this period of a bird's life is beyond conception.

The eggs of leaf-devouring insects hatch soon after the unfolding of the leaves, in order that the larvae may feed on the foliage while it is young and tender. To counter-balance this state of affairs in the plant and insect world, nature has timed the hatching of the eggs in the nest to coincide with the first appearance of the larvae, which furnish the greater part of the food supply of the nestlings, whose demands for food are insistent. In this manner the insects injurious to vegetation are kept in check.

The migration of birds is regulated not only by weather conditions, but also by the scarcity or abundance of food, as the case may be. So long as a bird is well fed, low temperatures have no terrors for him.

Snow and ice cover the food supply of the ground-feeding birds, and sleet storms incase the trees in an icy mail, that locks up the insects and their eggs securely from the birds that are dependent upon them for food.

These are conditions that we must offset by providing food of various sorts for our feathered friends. All insectivorous winter birds are fond of beef suet, and this, like all fats, is a heat producing food of great value to birds during periods of intense cold. A good sized portion of suet should be placed on a piece of galvanized wire netting of one-half inch mesh, fourteen inches long and six inches wide. Fold the netting over so that it incloses the suet, and the ends meet evenly. Twist the wires on top and

SWINGING FOOD HOUSE

FOOD HOUSE FOR GAME-BIRDS

B.. brace 2 1/2 feet from bottom.

Material--cheap 7/8 ins. boards; brace and timbers, 2 ins. by 3 ins. joist.

sides together firmly, or use some short pieces of wire for this purpose. This wire sandwich with the suet filling may then be suspended from the branch of a tree, is accessible to the birds from either side, and the wire mesh prevents the larger and more greedy birds from carrying it away in large morsels. A number of these should be prepared and distributed about one's country estate, and have the supply of suet replenished when needed.

Seed-eating birds are fond of Japanese millet and hemp seed. Squash and Russian sunflower seed, and the meats of various nuts are eagerly devoured by birds of many species. Dried currants may be added to the menu, and will be appreciated. A small quantity of fine gravel or grit should be accessible to the birds at all times.

Our two species of gamebirds, the Quail and the Pheasant, should be given a mixture of grains along with a supply of gravel or grit. What is termed by dealers in poultry supplies, "Mixed Scratch Food," is excellent for this purpose, for it contains rye, wheat, buckwheat, Kaffir corn, maize, sunflower seed, and field peas. The grit may be mixed with this food, one-third grit and two-thirds of the grain mixture. This is essential to the health of the Quail and Pheasant, and almost as important as the food itself. These birds are often compelled by deep snows to go for several days without food, and when fed in this starved condition will gorge themselves at once, and without the fine gravel to grind this food, the results may be fatal to many of them. Both of these birds frequently visit the tracks of electric car lines running through suburban districts, in quest of the sand used by the motormen on the steel rails, at a time when the country is snow-bound.

All food for birds should be placed in a position where it may be easily reached, and at the same time not expose them to attacks by their enemies. A shelter and feeding station for the gamebirds is easily constructed from light boards. It should be made in the form of an open shed, six feet long and five feet deep. The front should be four feet and the back a foot and a half in height. This is then set up in position in a sheltered spot, and the roof and sides covered with brush, cornstalks, or pine boughs. The open

front should face the South or Southwest. A few flat stones piled on the covering will prevent the winter gales from sweeping it away. Place a quantity of the mixed grain and grit along the extreme back of this open shelter, where it will be away from the snow that may drift in around the front edges of this shelter. By a little extra labor a shallow trough can be constructed and placed at the back of the shelter, into which the grain may be poured. Chaff, sweepings from the barn floor, or rye straw should be scattered on the snow-covered ground in the vicinity of the shelter, for the purpose of enticing the birds to their banquet hall. This arrangement, when the food is regularly supplied, assures the birds that the pangs of hunger will not be felt, no matter how inclement the weather. When the birds have found this free lunch counter, they will resort to it daily, with unfailing regularity, as long as the country is ice and snowbound.

Should it be necessary to scatter food about on the snow, without protection, first trample the snow as hard as possible, and then spread the grain or other food on the trampled spot. Thrown upon the snow without this precaution, it sinks at once, where it cannot be found by the birds, and is simply a waste of both time and material.

For the smaller birds food houses may be built. There are two forms of these houses that have been used in this country, both of which are simply modifications of the types invented for this purpose by von Berlepsch of Germany.

One of these is so constructed that when it is set in position it swings with the force of the wind like a weather-vane, and the entrance always faces away from the wind so that the food and the bird guests are protected from the storms. The other food house is made in the form of a rectangular hood with glass sides, that project below the food shelf within, and both protect the food from snow or rain, and at the same time admit an abundance of light. Working plans with correct dimensions are given on page 39, for the swinging food house and game-bird shelter.

BERRY AND SEED BEARING TREES AND SHRUBS

THE fruits of numerous shrubs and trees, both native and exotic, are eagerly sought after by birds of many species, and at certain seasons of the year form an important source of food supply to them. Many of these retain their berries and seeds throughout the winter, and some persist even after the advent of spring. No matter how deep the snow may lie upon the ground, these trees and shrubs hold high above it their offerings of food to the birds. Wherever an abundance of food of this sort is found, birds that ordinarily migrate to southern latitudes at the first hints of cold weather, may be found in small groups throughout the entire winter. This is particularly true of the Robin and the Bluebird. An abundance of fruits and a warm retreat at night among the dense conifers, enables these birds to withstand almost any downward plunge of the mercury.

Every owner or prospective owner of a country estate should select shrubbery and trees that are attractive to the birds. It is possible to obtain the desired beauty of landscape architecture, and at the same time provide for the needs of the birds, from the fact that nearly all of the shrubs and trees mentioned in the addended list have charms of form and color at all seasons. The scarlet and orange fruits in masses supply a vivid bit of color to the fall and winter landscape. The fruits of these shrubs and trees are preferred by the birds when obtainable, to the cultivated fruits of garden and orchard. Russian mulberry, bird cherry, and Chinese crab-apple trees, planted along the borders of the garden will render the fruits of garden and orchard immune from the depredations of birds. The author has included in this list some vines and also a few species of herbaceous plants valuable from the food supply of their fruits and seeds, to many species of birds.

The time of fruiting of these various trees, shrubs, vines, and herbaceous plants, is given opposite each species, in the list on the following pages, and may be considered fairly accurate for the region embracing New York and New England.

By making a careful selection from the varieties mentioned, a

continuous repast of varied fruit diet will be afforded the birds during each month through all the round year.

Reputable nurserymen throughout the country will supply nearly all of these plants, also information to the purchaser concerning proper time, place and method of planting each variety.

In planning a new home in a section where our native juniper, upland cedar or savin, bayberry, barberry, and high bush blueberries are found, wisely conserve these. Even in planting a hedge of privet or Japanese barberry, one may at intervals include a stocky clump of the high bush blueberries, and thus gain lasting favor with the birds.

DECIDUOUS TREES

<i>Acer Negundo</i> (September to March)	Ash-leaved Maple, Box Elder
<i>Betula populifolia</i> (September to March)	American Gray Birch
<i>Celtis occidentalis</i> (Entire year)	Hackberry
<i>Cornus florida</i> (August to December)	Flowering Dogwood
<i>Crataegus Crus-Galli</i> (August to March)	Cockspur Thorn
<i>Crataegus Phaenopyrum</i> (October to April)	Washington Thorn
<i>Fraxinus americana</i> (September to January)	American White Ash
<i>Larix decidua</i> (October to March)	European Larch
<i>Morus tartarica rubra</i> (June to August)	Russian Mulberry
<i>Prunus pennsylvanica</i> (June to October)	Bird Cherry
<i>Prunus virginiana</i> (July to August)	Choke Cherry
<i>Pyrus americana</i> (July to March)	Mountain Ash
<i>Pyrus Aucuparia</i> (August to March)	European Mountain Ash

EVERGREEN TREES

<i>Juniperus virginiana</i> (Entire year)	Red Cedar
<i>Juniperus communis</i> (Entire year)	Ground Juniper
<i>Picea excelsa</i> (October to March)	Norway Spruce
<i>Pinus resinosa</i> (October to March)	Norway Pine
<i>Pinus rigida</i> (October to March)	Pitch Pine
<i>Pinus Strobus</i> (September to October)	White Pine
<i>Pseudotsuga taxifolia</i> (September to March)	Douglas Spruce
<i>Taxus cuspidata</i> (August to September)	Japanese Yew
<i>Tsuga canadensis</i> (October to March)	Hemlock

SHRUBS

<i>Amelanchier canadensis</i> (June 15 to October 15)	Shad Bush
<i>Berberis vulgaris</i> (July to June)	Common Barberry
<i>Berberis Thunbergii</i> (August to May)	Japanese Barberry
<i>Cornus alternifolia</i> (July 15 to October)	Blue Cornel

<i>Cornus sericea</i> (August to October)	Silky Cornel
<i>Cornus stolonifera</i> (June 15 to March 15)	Red Osier Cornel
<i>Gaylussacia frondosa</i> (June to September)	Dangleberry
<i>Gaylussacia baccata</i> (July 15 to October 15)	Huckleberry
<i>Ilex verticillata</i> (July 15 to June)	Black Alder
<i>Ligustrum vulgare</i> (July 15 to April 15)	Common Privet
<i>Myrica cerifera</i> (July to June)	Bayberry
<i>Pyrus arbutifolia</i> (October to March)	Chokeberry
<i>Pyrus floribunda</i> (September to May)	Chinese Crab-apple
<i>Rhamnus cathartica</i> (August 15 to April 15)	Buckthorn
<i>Rhus glabra</i> (Entire year)	Smooth Sumach
<i>Rhus typhina</i> (Entire year)	Staghorn Sumach
<i>Ribes floridum</i> (June to September)	Large-flowering Currant
<i>Ribes lacustre</i> (June to September)	Swamp Gooseberry
<i>Rosa carolina</i> (August to April)	Rose, Wild Rose
<i>Rosa lucida</i> (August to April)	Dwarf Swamp Rose
<i>Rosa nitida</i> (August to April)	Northeastern Wild Rose
<i>Rosa rubiginosa</i> (August to April)	Sweetbrier Rose
<i>Rubus canadensis</i> (August to October)	Low Blackberry
<i>Rubus occidentalis</i> (July to August)	Black Raspberry, Thimbleberry
<i>Rubus strigosus</i> (July to October)	Red Raspberry
<i>Rubus nigrobaccus</i> (July to August)	High Bush Blackberry
<i>Sambucus canadensis</i> (July 15 to October 15)	Common Elder
<i>Sambucus racemosa</i> (June to August 15)	Red-berried Elder
<i>Symphoricarpus racemosus</i> (September to March)	Snowberry
<i>Symphoricarpus vulgaris</i> (September to May)	Indian Currant
<i>Vaccinium corymbosum</i> (June 15 to September 15)	High Bush Blueberry
<i>Vaccinium pennsylvanicum</i> (June 15 to September 15)	Low Bush Blueberry
<i>Viburnum cassinoides</i> (August to January)	Withe Rod
<i>Viburnum dentatum</i> (July 15 to October)	Arrow Wood
<i>Viburnum lentago</i> (August 15 to April)	Sheepberry
<i>Viburnum Opulus</i> (July 15 to April)	High Bush Cranberry
<i>Viburnum prunifolium</i> (August to January)	Black Haw

VINES

<i>Celastrus orbiculatus</i> (October to April)	(False Bittersweet)
<i>Ampelopsis quinquefolia</i> (August 15 to February)	Virginia Creeper
<i>Vitis cordifolia</i> (July to October)	Frost Grape
<i>Vitis labrusca</i> (August to October)	Fox Grape

HERBACEOUS PLANTS

<i>Aralia nudicaulis</i> (July to September 15)	Sarsaparilla
<i>Fagopyrum esculentum</i> (August to October)	Buckwheat
<i>Fragaria virginiana</i> (June 1 to October)	Strawberry
<i>Helianthus annuus</i> (August to October)	Sunflower
<i>Panicum Crus-Galli</i> (August to October)	Japanese Millet
<i>Phytolacca decandra</i> (August to April 1)	Pokeberry

AQUATIC PLANTS

SMALL ponds containing areas of twenty acres or less, and whose number is legion, dot the surface of the states of Massachusetts, Rhode Island, and Connecticut. Many of these ponds should be set aside as sanctuaries for wildfowl, where all shooting or other forms of molestation are strictly prohibited, and where our wild ducks of many species would find a quiet resting place and food during their migrations, inducements that eventually would tempt many that now journey to the far North Country, to tarry and nest.

The northern breeding grounds of many species of wild ducks are becoming more limited in area each year. The demands of the agriculturist must be fulfilled, with the result that marshes and swamps, once the summer homes of myriads of wildfowl, have been drained; and where the sedge-grass, cat-tails, and alders held sway, now waves the wheat and corn. New England must offer a home to these evicted wildfowl, and let us set about it.

In travelling about our Southern New England country it is disheartening to note the dearth of wildfowl about the lakes and ponds. Scores of sheets of water are passed while journeying by trolley or motor car, upon whose blue surface float no groups of wild ducks. Protection on their feeding grounds and the planting of aquatic plants attractive as food, are two rational methods by which these barren wastes of water may be populated with charming wildfowl, that add so much to the beauty of the country by their presence.

There are three species of aquatic plants eagerly sought after by wildfowl as food, all of which are fairly easily grown in this section of New England. These are wild rice, wild celery and wapato, or duck potato.

Wild rice may be sown late in the autumn just before the ponds are frozen, or early in the spring soon after the ponds are free of ice. When wild rice seed is to be sown in the spring time, it should be kept moist until the time arrives for the sowing. If allowed to become dry, it will not germinate. Wild rice is naturally reproduced from the seed that shatters out from the ripe head in the

autumn, sinks to the bottom of the pond where it lies dormant in the soft mud during the winter, to sprout and grow with the advent of the vernal sunshine. Wild rice should be sown in ponds having a bottom composed of soft mud, and where the depth of water is from two to four feet. It seems to thrive best in ponds having an outlet, such ponds having more or less of a current, and will not persist in stagnant water. Wild rice is an annual, and should be sown in large quantities to insure success, for wildfowl are very fond of this plant, both seeds and tender shoots, and frequently so thoroughly glean the seeds from the bottom of the pond, that few are left to perpetuate a future harvest. When once thoroughly established it will reproduce plants each season. Sixty pounds of wild rice seed should be sown to the acre. Wild rice will also flourish along the borders of streams, the waters of which are slightly brackish and where there is an ebb and flow of the tide.

Wild celery seed should be sown in the autumn, or plants obtained and set out in the summer months. Wild celery grows best in ponds having a soft, muddy bottom, and where the depth of water is from two to eight feet. It thrives in both fresh and slightly brackish water. The seed-pods are from three to five inches in length and from one eighth, to a quarter of an inch in diameter. These pods should be cut into small pieces, soaked in water until they will sink, or imbedded in balls of mud or clay and dropped from a boat. Sow at the rate of a bushel and a half to the acre. Wild celery is a perennial and propagates itself not only by seed, but also by shoots, or runners, the new plants bearing seed about the third year.

Wapato plants should be set out during the months of June, July, and August, around the borders of ponds having a thick, muddy bottom, setting the plants in water at least six inches in depth at its lowest mean level, for while these plants will grow in marshy soil, they will not be available as food for wildfowl unless planted where water will cover them during the autumn, when wildfowl visit the ponds in large numbers. Wild ducks in feeding, either dive or tip up and dabble below the surface and pick off the young tubers of these plants of which they are very fond.

The leaves of the wapato are arrow shaped and the plant attains

an average height of about two feet, and propagates itself from both bulbs, runners and seeds. In setting out these plants, use a trowel and set them firmly in the mud, about six feet apart. Set at this distance, it will require one thousand plants to the acre.

It is important that seeds, plants, and bulbs of these and all other aquatic plants, be kept moist until the time for planting arrives. The seed of wild rice and wild celery may be carried through the winter in cold storage in barrels of water kept at a temperature slightly above the freezing point. Wild celery plants and wapato bulbs should be "heeled in" in moist earth, and kept well watered until ready to be transplanted.

Wild Millet (*Echinochloa Crus-Galli*) is also well worth consideration as a food-plant for wild ducks. This species is not like the preceding, strictly aquatic. Neither do the seeds require to be kept moist until the time of sowing. It is a rank growing grass, varying in height from one to six feet, according to the character of the soil.

It should be sown from May first to July, in moist heavy soil, along the edge of marsh, lake or pond, and is said to grow in water a foot in depth.

The seeds shatter from the large fruiting heads to the ground or water, and the plant will reseed itself. Sow at the rate of fifty pounds to the acre. Many species of wild ducks seek their food on the shore as well as in the water, and this plant is one that furnishes these waterfowl with a land food supply. In passing it might be well to mention the fact that Wood Ducks frequent the vicinity of water-oaks in the autumn, the acorns of which they are very fond.

To those who may be interested in the further study of wild duck foods, attention is called to the following bulletins issued by the United States Department of Agriculture:—"Three Important Wild Duck Foods," Bureau of Biological Survey, No. 81; "Five Important Wild Duck Foods," Bureau of Biological Survey, No. 57; "Eleven Important Wild Duck Foods," Bulletin of the United States Department of Agriculture, No. 205. These publications may be obtained by addressing the United States Bureau of Biological Survey, Washington, D. C.

THE ESTABLISHMENT OF A SANCTUARY

THE motive of establishing a sanctuary is to perpetuate our useful and interesting wild birds and quadrupeds. No movement of the present day tending toward the conservation of our wild life, is of more vital importance, or will have more far-reaching results, than the establishing and maintaining of sanctuaries. Every sanctuary created is an aid to the Federal Government in its work of protection of the migratory birds, by providing quiet nesting places, abundance of food, and freedom from molestation.

A game preserve differs from a sanctuary in this fundamental principle: that it is maintained for the specific purpose of affording sport in the form of shooting, to the owners thereof, and the gamebirds and animals are conserved within this prescribed area solely for the pleasure of the sportsmen. The owners of a game preserve have the right to protect this land from trespass, by posting notices prohibiting shooting. While theoretically a game preserve is maintained for the purposes of increasing the numbers of gamebirds and animals for the pleasure of sport, it will be found upon investigation, that in many preserves the members actually do very little shooting, and contribute to the welfare of the outlying country, by arresting poachers, by feeding the gamebirds during the severe weather of winter, and by destroying their natural enemies.

Within the boundaries of a sanctuary, however, all shooting and other methods of destruction and disturbance are strictly prohibited, and the birds and animals are encouraged to increase in numbers. Landowners who make of their properties a sanctuary, signify their desire to become public benefactors, by foregoing the pleasure of shooting on their own estates.

The natural yearly increase of gamebirds and animals would overflow the boundaries of the sanctuary and eventually re-stock the areas open to free shooting. The establishment of a sanctuary becomes a mutual benefit to both sportsman and farmer, for in conserving the gamebirds and destroying their natural enemies, the birds useful for economic reasons, are at the same time

increased in numbers, with the result that the farmer's crops are less ravaged by injurious insect pests.

The English gamekeeper in his desire to increase the numbers of gamebirds upon the estate in his charge, carried on his work of extermination of their enemies so thoroughly, that he unwittingly conserved the useful non-gamebirds. The pheasants, the grouse and the partridges were his solicitous charges, but weasels, hawks, and owls, and other "vermin" prey also upon the smaller birds, so that a decrease of "vermin" spelled an increase of useful birds, with the result that today there are more birds to the square mile in thickly-populated Great Britain than in any other civilized country. This is mentioned as an illustration of the vital importance of not relaxing for a moment the campaign of extermination that must be waged against the enemies of wild life found within the borders of a sanctuary.

It is the earnest desire of the author, that public interest in this important work be so thoroughly aroused, that a sanctuary or wild life reservation will be established and permanently maintained in every city and town, not only in the Commonwealth of Massachusetts, but also in each state in the Union. Public parks, and other municipal and state reservations, are one form of sanctuary, but too often are so overrun by a crowd of noisy pleasure-seekers as to be entirely inhospitable to our shy wild creatures. We need a place of seclusion, with thick coverts, and not the newspaper-strewn lawn or paths littered with the debris of former luncheons, conditions that unfortunately exist in most public parks.

There are two methods by which landowners may form of their holdings a sanctuary. One is to simply post the proposed area with notices forbidding shooting or trapping thereon, and calling attention to the fact that the owners of said land wish to protect the wild life within this territory, and ask the co-operation of all persons in this work. Appeal to the better nature of the individual and show him that there is no selfish motive in this restriction of shooting, but rather a wholesome desire on the part of the proprietors to increase the wild life for the benefit of the entire community. Try moral suasion first, and if that fails, use a club. The proprietors must stand firmly in their rights, and not fear to pros-

ecute all violators, who may commit depredations within the sanctuary. The following is submitted as a form of notice, that should offend no person who aspires to good citizenship:

NOTICE

THIS tract of land has been set aside as a Sanctuary for our Wild Birds and Animals, where in safety they may find food and rear their young. Will you, by refraining from Shooting, or any other means of Disturbance, help us to increase the numbers of Useful Birds and Animals.

Please do not heedlessly cut the Trees, or, uproot the Wild-flowers, and above all cause Forest Fires by the careless use of matches, cigars or cigarettes.

VIOLATORS WILL BE PROSECUTED.

(Signatures of proprietors.)

Many a person who for the sum of one dollar, procures a license to shoot, has little regard for the property rights of landowners. He tears down stone walls, leaves the pasture bars open for a ready exit of the farmer's cattle, and perpetrates many other nuisances that arouse the owner's ire to such an extent, that he posts his land against all entry thereon. This is the type of person to whom the objects of forming a sanctuary would make no appeal, and who would not hesitate to trespass within the protected area, whenever the chances of discovery by the owners would be remote enough to promise an easy escape.

The second method is the presenting to the Commissioners of a petition drawn in the following manner and signed by the various landowners whose properties adjoin:

_____1916.

To the BOARD OF COMMISSIONERS ON FISHERIES AND GAME:

The undersigned being owners of land and water in the Town, (or Towns) of _____, respectfully petition that you will order a close season for one or more periods, not exceeding five years each, on all wild birds and quadrupeds within the area of the land shown on a plan filed herewith.

The petitioners being owners of said land in question hereby consent to such a close season.

Respectfully, *(Signatures of proprietors.)*

A sanctuary is thus formed in accordance with Chapter 410, Acts of 1911, Commonwealth of Massachusetts. In this manner of procedure the Commonwealth, through the Commissioners on Fisheries and Game, instead of the individual landowner, assumes the responsibility of enforcement of law against all violators. This method is the better of the two, from the fact that persons usually have more respect for property owned by or under the jurisdiction of the state, than for that of a private citizen.

One difficulty has been experienced in petitioning the Commissioners to close certain tracts. They seem loath to grant these requests, fearing that by pre-empting the shooting areas they will lose the support of their constituents, the sportsmen. The Commissioners, however, agree that something drastic must be done to help keep up the supply of game that is annually sought after by nearly seventy thousand licensed sportsmen throughout this Commonwealth. Artificial propagation of gamebirds is an expensive proposition and we must look to the sanctuaries as a feasible solution of this perplexing problem.

The following words of Hon. Joseph Kalbfus, Secretary of the Pennsylvania Commissioners of Game, and one of the best informed and most practical men engaged in the conservation of wild life in this country today, are very apropos concerning the value of sanctuaries:

“I have also given the proposition of raising our native gamebirds, such as wild turkeys, ruffed grouse, and quail in captivity, considerable thought and attention. I have visited several game farms, some operated by public officials, some by private individuals. I have seen some few ruffed grouse that had been reared strictly in captivity. I saw some hundred or more quail reared in the same way, and have report of several hundreds of other birds of like character raised in the same way. I also know of very many instances where efforts in this direction have been rewarded by failure, and feel that at the best an undertaking of this kind is extremely precarious, the return very uncertain to say the least, and from the data I have collected I am led to believe that through the extermination of vermin, including house cats and crows, and the feeding of our wild and free grouse and turkeys and quail during severe winter weather a far greater return will be secured in every county of this State than can

be secured to the entire State through or because of the establishment of a game farm where the rearing of these birds in captivity is undertaken, *no difference how extensive that farm might be or how much money might be spent in that direction.*

“Each one of the six sanctuaries created in this Commonwealth and known as Game Preserves, the same being simply tracts of land surrounded by a single wire, a fire line and a line of notices calling the attention of the public to the purpose of the enclosure, whereon no hunting is permitted by any person at any time, and whereon no wild cat, or domestic cat, or fox, or crow, or other animals classed as vermin are permitted to live, *has produced more game of the kind peculiar to that section; turkeys where turkeys are found, grouse and quail where these birds thrive, than has been produced on any or all of the game farms in all the United States, where such game has been raised strictly in captivity; this too where the cost of maintenance and production upon the sanctuaries does not count in pennies as compared with dollars or tens of dollars expended by the game farm.* The Resident Hunter’s License will make possible one or more sanctuaries of the above-described kind in every county of this Commonwealth wherein the State owns land and from which gamebirds may be trapped for distribution to sections where the State owns no land.”

The author wishes to state for the benefit of those who may desire to establish a sanctuary in accordance with the Acts of 1911, Chapter 410, that the Commonwealth assumes no control of land thus set aside, other than the establishing of a close season within the prescribed area, and the protection of all wild birds and animals found therein. The landowners have the right to transfer their real estate, carry on farming operations or engage in any legitimate pursuit of either business or pleasure.

Whether a sanctuary be established as a private affair and under the direct supervision of the landowners, or whether it be established in accordance with the Act of the Commonwealth, is optional with the proprietors, but far more important than either is the choice of a suitable location.

In selecting a tract of country to be used as a sanctuary, choose a section that contains a diversity of physical conditions, and where a fair number of gamebirds are already established. A tract of country embracing one thousand acres, may be found that has the ideals sought,—both wild and cultivated land, small ponds and

streams, and well wooded areas, comprising both broad leaved and coniferous trees. One or more thickly planted groves of white pine, and some old apple orchards would make a most happy combination. The white pine and the apple tree are much beloved by the Ruffed Grouse, and as the establishment of sanctuaries will tend to bring back this fine bird in numbers, we hope that all owners of woodland will reforest their properties with white pines and spare the old apple trees. The pine tree offers a snug shelter to the Grouse on winter nights, and during the day the Grouse frequent the sunny, southern exposures of the grove where it finds shelter from the north wind. Whoever sets out a plantation of white pine, confers a lasting favor upon the Grouse and its admirers. What is more characteristic of the New England country, than the Ruffed Grouse, and the white pine?

Ponds having an area of *over* twenty acres should not be included within the boundaries of a private sanctuary. Such ponds are known as "Great Ponds" and the public has a right of access to them at all times for the purpose of legitimate shooting, fishing or boating. This renders them both unsuitable and ineligible for the purpose of a sanctuary. This question of size is important, from the fact that all ponds *less* than twenty acres in extent may be controlled by the riparian owners, and thus be incorporated as a sanctuary. The proprietors of a sanctuary may indulge in fishing without disturbing the wild creatures, and where a trout brook is found within its borders, it may be profitably stocked with fingerlings each season, and furnish sport to those who are fond of the "gentle art of angling." The ponds may also be stocked with bass. In this manner the element of sport may be introduced within the sanctuary, and while the angler is busy along the stream or, still-fishing on the pond, he at the same time will have the pleasure of observing the wild life about him, that takes kindly to the unobtrusive fisherman. Thus will he be amply repaid for his self-denial as a sportsman in foregoing the pleasures of shooting within this restricted area created by his fellow sportsmen and himself.

Whenever practicable it is a wise plan to have the tract of land to be used as a sanctuary definitely bounded on all sides by the public highways. This method leaves no question of doubt as to

where the boundaries begin or end, and also offers a conspicuous place for the posting of notices, where they will surely be seen, even by the casual observer. The roads or highways also act as safe-guards against the spread of forest fires, and in addition should be cleared of brush on both sides for a space of twenty-five or thirty feet, and have the brush piled and burned at the time prescribed by the local fire-warden.

Woodcock, Ruffed Grouse, Quail, Pheasants, Wild Ducks, Deer and Hares are frequently found within a tract of land embracing a thousand acres. All the briery tangles and alder swales should be left undisturbed and their growth encouraged. These retreats are needed by the Ruffed Grouse and other gamebirds when pursued by their winged enemies,—conditions that unfortunately are lacking in many state reservations, where the undergrowth has been so thoroughly removed that no gamebirds can be induced to stay. The forester should leave here and there sizable clumps of tangle, if he wishes these birds to tenant his woodlands.

Woodcock nest early in the spring season among moist, swampy, hardwood growth, and after the young birds are able to fly well, the entire family resort to the cornfields, where they probe for earthworms about the roots of the corn-stalks. They also visit the lawns and kitchen garden in search of grubs and earthworms. Early in September, the Woodcock seeks the uplands and is found among the birches and huckleberry bushes of the pasture. After the first heavy frost, Woodcock that have bred within the sanctuary move along on their southern migration. There is nothing that can be offered the Woodcock except protection, for it is mainly insectivorous in its diet, and as soon as the ground freezes is compelled to leave its summer haunts.

Of all our upland gamebirds, none is more widely known or has more sincere admirers than the Ruffed Grouse, and no other gamebird has the like robust constitution or the ability to withstand the rigor of our New England winters. Its habits are such that it is enabled to obtain a plentiful supply of food during the deep snows of winter, when the Quail and Pheasant, being ground feeders, and dependent upon the supply of seeds and nuts, would perish of starvation. After the fall of snow, Grouse feed upon the

fruits, seeds, and twigs of many trees and shrubs, in fact the list of these trees and shrubs given elsewhere in this volume, includes many species that furnish a winter food supply to the Ruffed Grouse. This bird is also fond of the buds of the birch and apple-tree, and consumes quantities of these during the winter months, especially during February and March. During the fall months Grouse are found around wild apple-trees, where they eagerly pick out and devour the seeds of apples that have fallen. So it will be seen how important a part the wild apple-tree plays in the existence of the Grouse. Except in extremely cold weather, the Grouse spends the night high among the branches of the pines or other dense coniferous trees and is safe from the attacks of predaceous quadrupeds, to which other species like the Quail, that spend the night upon the ground are subject. When the mercury drops low and the ground is deeply snow-covered, the Grouse will plunge into it, and spend the night there, warmly covered with the snow blanket. Extermination of its natural enemies and the planting of trees and shrubs that furnish winter food will surely bring back this fine species in goodly numbers. The Grouse moreover is a woodland bird, and wherever the forest is removed by the lumberman's axe, it disappears from the locality. More tracts of woodland should be conserved especially for this species of our gamebirds.

The Quail or Bob-white is a bird of the open, cultivated, farming country, persists in spite of the toll exacted from its numbers by the sportsman, and is a valuable ally of the farmer, for it destroys vast quantities of weed seeds and injurious insects. Quail will not survive the winter, in sections of the country where the snow lies deep upon the ground for any great length of time, for the food supply of seeds, grains, and the ever essential gravel, is then inaccessible. Wherever deep snowfalls are liable to occur, thick shelters of brush and boards, with the openings facing the South, should be constructed early in the season, near the feeding places of each bevy of Quail, and liberally stocked with mixed grains and fine gravel. By encouraging the birds to visit this feeding-station long before the first snowfall, you will be assured that they will resort to it regularly throughout the winter. It would be a good

plan to sow both rye and buckwheat in numerous small patches throughout the sanctuary, and let these grains mature and stand unreaped as a food supply.

The Chinese or Ring-necked Pheasant (*Phasianus torquatus*) has become firmly established throughout a large section of Massachusetts. While this bird has been very unfavorably commented upon from the standpoint of our sportsmen as a gamebird, from the fact that its habits are such that it cannot be pursued with the same success that attends our native Grouse and Quail when hunted with either pointer or setter, yet it will thrive and increase in sections where the last named species have entirely disappeared or where the environment is not congenial to them.

No conclusive evidence has been produced to show that the Pheasant is antagonistic to our Grouse and Quail or that it destroys their nests or even the birds themselves, statements that have foolishly been made by certain individuals. The Pheasant being the larger bird, might during a time of scarcity of food, drive away other birds, when it was a question of self-preservation, and a survival of the fittest. This danger could be easily overcome by putting out food in abundance for all.

The Pheasant in spite of the antipathy shown it by sportsmen and others, has many redeeming traits. It destroys large quantities of insects of many species injurious to the farmer, even though it may at times help itself to fruit and vegetables. It is valuable as a tablebird, for the flesh of the Pheasant is excellent in flavor, and the bird surpasses any of our native species of gamebirds in both size and weight. It furnishes an incentive for healthful outdoor exercise to those who are fond of legitimate shooting, and value "a sound mind in a sound body." Last but not least the Pheasant by reason of its size and showy plumage, and its adaptability to urban conditions, adds much to the attractiveness of the landscape about metropolitan estates, where owing to the abundance of thick shrubbery and other suitable cover for nesting, it takes up its abode.

The Pheasant like the Quail is not a "budder," and when the ground is snow-covered must be fed under shelters in the same manner and with the same sort of food as the Quail.

Throughout Southern New England and many of the Atlantic

states, Black Ducks, Mallards, and Wood Ducks breed in more or less abundance, and it is hoped through the establishing of many sanctuaries, to induce other species now nesting farther north to spend the summer in this locality. Wild Ducks of all species need absolute protection from disturbance on their feeding grounds, the planting of food-plants as given in the chapter devoted to "Aquatic Plants," and particularly for the Wood Duck, artificial nesting-sites. The Mallard and the Black Duck nest upon the ground, and all that can be done for them is to render their chosen nesting-sites immune from all disturbances during the period of incubation. The Wood Duck is a hole-nesting species, and the storms of winter or other causes frequently destroy nesting places that have been used annually by these birds for many seasons. Nesting-boxes should be constructed of rough boards or hollowed logs, and fastened to trees in the vicinity of ponds and streams. Place in the bottom of these nesting-boxes enough old weathered sawdust or particles of rotted wood to form a layer three inches deep, topped off with some fine, dried grasses. To this foundation the female may add other nesting-materials, before plucking the finishing lining of down from her own breast. Throughout its entire range the Wood Duck has become so reduced in numbers as to be threatened with the grave danger of becoming extinct. Of all the various species of Wild Ducks found throughout the world, none excel the Wood Duck in beauty of plumage or grace of form and movements, and strenuous efforts should be made to save this most interesting, and typically American species from extermination.

In many sections throughout Southern New England, where twenty years ago the Virginia Deer was locally unknown, it has now become plentiful, both in wild or forest lands and in the cultivated farming country. For many years Deer have been protected in Massachusetts, and also in the adjoining state of Vermont, where they increased in such numbers as to become more or less of a menace to the agriculturist. Many of these Vermont Deer drifted south into Massachusetts and from thence into the states of both Connecticut and Rhode Island.

Our Massachusetts game laws now allow an open season of one

week in which the sportsman may kill one Deer only, and in this way their numbers are kept within reasonable limit. The law also gives the owner or occupant of a farm the right to kill at any time Deer that are found injuring or feeding upon cultivated crops or fruit trees. Deer are really creatures suited only to the wild, uncultivated portions of our country, and cannot be tolerated in large numbers in farming districts.

Like other wild creatures, Deer will soon discover the protection offered by a sanctuary, and will persist and become numerous within its borders. The proprietors of a sanctuary must then decide whether these Deer should be tolerated for purely sentimental reasons, and if so, whether the pleasure derived from the touch of wildness their presence adds to the surroundings, will counter-balance, the damages they may incur upon farm and orchard.

Deer are often driven by hunger during deep snows, to browse upon the branches of young apple-trees. This destruction of young orchards could be largely overcome by placing alfalfa or red clover hay, of which Deer are very fond, in small stacks in wooded portions of the sanctuary, with a lump of rock salt nearby where it would be accessible to them in snowy weather.

Hares, or as they are commonly called "Rabbits," safeguard the gamebirds within the sanctuary from their enemies, particularly the Fox. Hares are prolific creatures, and when plenty form along with mice, the main food supply of the Fox. Foxes have become so numerous throughout Massachusetts and adjacent states, as to now be a menace to our gamebirds, the supply of Hares and mice not being sufficient to supply the demands of an ever increasing population of Foxes, Reynard pursues the gamebirds,—for a Fox must live.

Foxes as well as other predaceous animals cannot in safety be tolerated within a sanctuary, even though an abundance of Hares may somewhat modify the danger to the useful birds. Their numbers must be reduced by trapping the adults and destroying their cubs in the spring-time, when the Foxes' earth can then be discovered and the litter of young removed.

After establishing a sanctuary do not be disappointed, if dur-

ing the first year or two of its existence, the wild life does not increase in numbers as rapidly as you had hoped. Like any legitimate enterprise, its growth may be slow, but keep everlastingly at it. This is a work of coöperation and you must enlist in the cause all of your friends who have a love for the wild creatures. Among these you may be fortunate enough to find a civil engineer and possibly a landscape architect. The former will be glad to assist in the planning of roadways and the latter to suggest the planting of proper shrubbery. Some of the proprietors should be appointed as game wardens having full power to arrest and prosecute violators, and thus not be entirely dependent upon the state officers for the enforcement of law.

Establish winter feeding stations for the birds and systematically feed them. Place nesting-boxes in suitable places for the hole-nesting birds, and bird baths in numerous places, when an abundant natural supply of water is lacking. Keep the vermin reduced in numbers, for when the useful birds become numerous, their enemies likewise increase. Establish a small nursery, in which may be propagated many species of trees and shrubs, the fruits and seeds of which are attractive to both useful and gamebirds. From this community nursery, as it might properly be called, plantings could be made each year in various sections of the sanctuary.

There are a number of native species of trees and shrubs, whose berries and seeds form an important winter food supply of the birds, and many of which retain their fruits until the advent of spring. The following are indigenous to Southern New England, and if not already found within the borders of a sanctuary, may be easily transplanted, will thrive and become permanently established:— Bayberry, Ground Juniper, Barberry and Upland Cedar or Savin. These are but a few of many species, both native and exotic, a list of which is given in the chapter devoted to that subject in this volume. In many spots sheltered from the northerly winds sow rye and buckwheat, each of course by itself. Along the edges of the fields plant long rows of the large Russian sunflower and in moist land sow Japanese millet. All of these plants furnish a food supply relished by birds of many species.

Whenever time and expense will admit, a series of connecting

roads and bridle-paths should be constructed, intersecting the sanctuary. These serve not only as fire-lanes to prevent the spread of any forest fires that may unexpectedly break out, but also provide sunny places and highways for the woods creatures. Ruffed Grouse are fond of these forest roads, where dusting places and wild fruits are found in abundance along their borders. Immediately after the first snowfall a tour of inspection should be carefully made throughout the entire length and breadth of the sanctuary, not only to supply the needed food to the worthy furred and feathered guests, but also to discover what enemies of theirs are abroad and what record of their evil deeds has been written upon the tell-tale snow. Now is the time to begin the campaign of extermination of the "vermin." The lean and hungry winter renders the Fox more susceptible to the enticing bait of the trap, and the semi-wild house cat will enter the box-trap, in quest of the proffered morsel of fish. The services of a professional trapper at this season of year, would more than pay the initial cost to the owners, and when possible a man should be engaged for this purpose, especially when the sanctuary is situated in wild portions of the country.

In these closing lines the author wishes to impress upon the reader how far-reaching will be the results obtained through this establishing of Sanctuaries or Wild Life Reservations, not only in "bringing back the gamebirds," but also in protecting and increasing the numbers of our useful birds. We have reached the "danger point" where, unless something drastic is done and done without delay to protect certain areas, persistent shooting will simply spell extermination. Whether a sanctuary consists of the combined acres of a few farmers, and managed under simple methods, or whether it be a territory that embraces many square miles and is under the supervision of a trained wild life protectionist, the fundamental principles are the same in each, and the founders should be looked upon as men who have the welfare not only of their own community at heart, but also of the entire nation.

Some men will always delight in shooting as a recreation and among these there exists a feeling that chances of enjoying their sport are becoming less with each ensuing year, owing to these restricted areas. To them we would say that it is only by the estab-

lishment of sanctuaries and allowing the game to increase within their boundaries, that the sections now open to shooting can be kept supplied with animals of the chase, by the natural overflow from within the protected areas.

Many useful and interesting species of our wild birds and animals have either entirely disappeared from our country, or become in danger of extermination, all within a comparatively few years, and it is only through methods of perpetuation such as are brought about by the establishment of Sanctuaries and Game Preserves, that we shall be able to convey to future generations a part of the heritage that is due them.

Until our gamebirds and animals have been sufficiently increased in numbers through protective measures, to allow with safety the shooting of the yearly increase, we must keep certain areas closed. One season of persistent and promiscuous shooting will destroy all the good results that have been obtained through ten seasons of protection. Many tracts must be maintained as Wild Life Reservations, and forever held inviolate from destructive agents. Protection is *the* one thing that will spell success in this attempt to increase our wild life. Protection from the lawless human element; protection from starvation; protection from their natural enemies. Given these, the birds and quadrupeds will rapidly multiply without the aid of artificial means of propagation.

Time was when our wild birds and animals formed an important source of food supply to the people of this country. But with the advance of civilization and its modern methods of producing food in abundance and in a portable form, our wild life has ceased to be a commodity of this sort, except in a few remote corners of the earth peopled by savage tribes. Today our wild life in civilized communities plays a far more important part in the economic, sentimental and recreative life of the people.

Since we may thus increase our wild creatures by simple methods that put incumbrance upon none, let us assure posterity that the woods in springtime will always resound with the drumming of the Ruffed Grouse; that from the blue overhead will come down to us the "honk" of the swiftly winging platoons of the Wild Goose; and that the Deer will always feed in the wild pastures.

ENEMIES OF WILD BIRDS

WE may never hope to increase the numbers of our useful birds and quadrupeds until their natural enemies and other destructive agents are either largely removed or reduced to a minimum. Each year sees a fresh horde of illiterate immigrants landed upon our shores, off scourings from the southern countries of Europe, people to whom our wild creatures appeal only as a welcome addition to the bill-of-fare.

Every season, hundreds, yes thousands of our useful birds are both shot and snared by the Italian and Slav poacher. Our country is too wide, and the game wardens too few in number to successfully cope with this menace. A large percentage of these foreign violators of our game laws, belong to the laboring classes, and are employed by railway companies, and contractors who need wielders of the pick and shovel, and carriers of mortar. There is a remedy for this sort of violation, and one that would have lasting effect. Every employer of foreign labor, whether railway company, or building contractor, should establish a hard and fast rule, that the first man in their employ found with either a rifle or shotgun in his possession, or who destroyed any form of wild life contrary to the laws of either state or federal government, be summarily discharged. This would have a most wholesome effect, and at the same time create of the employer a powerful public benefactor. Why should not the employer of this sort of violator treat the matter so far as the public is concerned as though it was of a personal nature. Would the wealthy employer tolerate the shooting of the useful birds upon his country estate, by his own laborers? Why then should he not insist that they refrain from destroying them elsewhere.

The alien violator of our game laws, may offer as an apology for his misconduct, ignorance of our protective laws and that he has simply followed the customs of the country of his birth, where in many instances all forms of wild creatures are considered legitimate objects of pursuit for either sport or food. We have unfortunately among our young American citizens a certain class, that seem to be absolutely lawless, in spite of home influences or education, and

who not only violate the game laws, but also set forest fires, and commit other depredations simply from a spirit of maliciousness. There is no excuse to be offered by this class of violator. A heavy fine, a term of imprisonment, or both, is the only sort of punishment that produces any effect on this sort,—moral suasion is too weak.

There are a number of predatory birds and animals that should be killed on sight, or by methods of trapping.

At the head of the list stands the house cat. More birds, both useful and game birds are destroyed each year by this pest, than by any other of their winged or four-footed enemies. Hundreds of semi-wild house cats roam the woods and fields, from the borders of Long Island Sound to the Canadian boundaries of our northern New England States. Trappers engaged in the pursuit of fur-bearing animals catch many house cats, in the woods far removed from human habitations. These cats subsist upon the birds and smaller quadrupeds, and it is a wonder that a single ruffed grouse, quail, woodcock, or hare is left in our covers. In the suburban districts cats destroy large numbers of useful birds, their eggs and young, both by day and night, for the cat is largely nocturnal in its habits, and carries on its work of destruction when its movements are cloaked by darkness.

Many of the cats now roaming the woods are the victims or their descendants, of the negligence of persons from the city, who in their exodus to the country for the summer, brought along their household pet that it might be cared for by themselves, rather than leave it in charge of a neighbor during their absence.

This is no doubt humane and highly commendable, but frequently in the hurry of departure for the city at the end of the season, the cat at the last moment cannot be found. The train is about due, and time must not be consumed in a hunt for the missing animal. Consequently the cat is left without shelter or food, and soon becomes a menace to the life of woods and fields.

Unless drastic measures are speedily taken to reduce the numbers of house cats found at large throughout our country, the establishing of protected areas for useful wild creatures will fail of their purpose. The writer knows of one specific instance of the

destructiveness of the semi-wild cat, in which a bevy of fourteen quail was reduced in numbers, until two only of the original bevy were left, and this took place within a wild life refuge where all shooting had been discontinued. We are now face to face with the same problem that presented itself to the game preservers of England fifty years ago and which still continues at the present time, — how to get rid of the semi-wild house cat in an effective and humane manner. Until cat owners are compelled by law to license their pets and properly restrain them, this animal will continue to be a wild creature, without legal status and against whom the righteous bird protectionist must forever wage a war of extermination.

The writer wishes to quote a few lines from the book of that charming English author, the late Richard Jefferies, entitled "The Gamekeeper at Home," in which he sets forth the alarming destruction wrought by house cats among wild creatures in England. These are taken from the third American edition published in 1879. "All the cats were shot or caught in the traps set for vermin by her husband (the Gamekeeper) or his assistants. The majority were wild — that is, had taken up their residence in the woods, reverting to their natural state, and causing great havoc among the game."

"This gives an idea of the extraordinary number of cats which stray abroad and get their living by poaching. They invariably gravitate towards the woods. The instance in point is taken from an outlying district far from a town, where the nuisance is comparatively small; but in the preserves say from ten to twenty miles round London the cats thus killed must be counted by thousands. Families change their homes, the cat is driven away by the new comer and takes to the field. In one little copse not more than two acres in extent, and about twelve miles from Hyde Park Corner, fifteen cats were shot in six weeks, and nearly all in one spot — their favorite haunt. When two or three wild or homeless animals take up their abode in a wood, they speedily attract half a dozen hitherto tame ones; and, if they are not destroyed, it would be impossible to keep either game or rabbits."

~~Both Cooper's and Sharp-shinned Hawks are very destructive~~

of bird life, and should not be tolerated. Shooting is about the only means of riddance. Fortunately the Goshawk's visits are infrequent, but when this bird does appear it is usually in large numbers. The last large flight was during the autumn and winter of 1906-1907, at which time the writer shot several of these birds and saw many others. This species of hawk is very fond of the flesh of Ruffed Grouse, and during the above mentioned flight the writer found the remains of several Grouse that had been killed and eaten by this bird. When this hawk appears in the vicinity a systematic campaign of extermination should be waged against it with the shot-gun.

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Foxes in the last decade have become very numerous throughout Massachusetts and other states. Reynard is not however as black as he is sometimes painted. He seems to live on neighborly terms with the Ruffed Grouse, and what few birds of this species he picks up are usually those that have been wounded by and escaped from the gunner, or some weakling of the covey not strong enough to burst away on whirring wing. When mice and hares are plenty the Fox takes his toll from these. Should Foxes become a menace to the game birds, the shot-gun and hounds, and the steel-trap must be used to reduce their numbers to a safety point. Encourage the hares to increase and you will divert the Fox from preying upon the game birds.

In many metropolitan suburbs the Crow and the Blue Jay have become both too numerous and too familiar to be tolerated with safety to our more useful birds. They should be systematically "thinned out." Individual Crows develop strong likings for young birds and eggs, particularly when the Crows have a family of their own dependent upon them. During the spring of 1914, a pair of Crows built a nest within a quarter of a mile of my home, and managed to make away with between thirty-five and forty chickens about a week old, before the theft was discovered. These Crows afterwards quietly dangled from the tip of a pole on the edge of the field as a warning to others of their tribe, who might seek to carry on depredations of a like nature. This same season, while journeying by train, I saw a Crow flying along within twenty yards of the car window, with a Quail's egg impaled upon its beak. I

will wager that later trips were made by this Crow to the Quail's nest as long as the supply of eggs held out.

Blue Jays sneak quietly through the woods, and among the orchard and shade trees during the nesting season and help themselves to the eggs and young of useful birds. For a bird usually so garrulous, the Blue Jay at this season of the year is strangely silent. It is an ominous silence, the silence used by a thief in his underhanded work. Whenever the Robin discovers a Jay during the nesting season on the prowl, he immediately sounds the alarm, when Robins and other birds immediately flock to the scene and hustle the Jay out of the neighborhood. When this commotion is heard among the birds, grab the shot-gun and annihilate the Blue Jay.

The Great Horned and Barred Owl, are both very destructive to bird life and should be shot wherever found.

The Snapping Turtle destroys many young Wild Ducks of all species, and is rather difficult to capture. This Turtle not only seizes the downy young, but also ducks that are half-grown. The bird protectionist has however a valuable ally in the much maligned Skunk. The Skunk undoubtedly destroys some eggs and young of our ground-nesting birds, but endeavors to repay this loss by destroying many eggs of the Snapping Turtle. The Skunk has a decided epicurean taste in this respect, and makes a most thorough search for the eggs of the turtle that have been deposited in sandy stretches near river or pond, promptly digs them out and devours them on the spot, the broken shells scattered about giving evidence of the work.

Too many dogs roam the woods during the nesting season, and a law should be enacted compelling their owners to restrain them at home during the spring and summer months. Some bird dogs develop what is called the "self-hunting" habit, and catch gamebirds on their nest, or the young. Most of the danger however comes from the presence in the woods at night of both rabbit and fox hounds. These dogs while in chase of their quarry, frighten many ground nesting birds from their nests, with the result that the eggs are left to become chilled, and thus prevented from hatching, or the young birds die from exposure before the parent can return to them with the coming of daylight.

Rats and Weasels are very destructive, and should be trapped or shot whenever or wherever one may chance to find them.

One of the greatest difficulties that the protector of wild life experiences in his efforts to increase the numbers of useful birds and animals, is the constantly recurring numbers of predatory species that will inevitably swarm within his protected area. However we must admit, from the results of observations by reputable naturalists, covering a period of many years, that predaceous species of both birds and mammals, when not too abundant, render an important service in keeping the health of our useful species at its highest standard, by destroying the sickly and maimed individuals. This prevents disease from spreading and becoming a serious epidemic, particularly among our upland gamebirds. All the hawks, owls and foxes should not be destroyed, for then our country would soon be overrun by weasels, rats, mice and other rodents. It is only when the numbers of harmful species are out of all proportion to those of the useful species that we must by a process of extermination restore nature's balance. Unfortunately today the predaceous birds and species in many sections of our country have multiplied in numbers beyond a point of safety. There is no way of overcoming this menace except by eternal vigilance in judicious trapping and the use of firearms. Like vultures, these "pests" as Dr. Hornaday rightfully calls them, seem to intuitively gather to the good hunting grounds of the Wild Life Refuge or Sanctuary.

Present day methods of spraying trees with poisonous fluids and the use of powerful machines for the purpose, must no doubt continue, in order to destroy the myriads of leaf-eating insects that defoliate our trees. Nevertheless, nests, eggs, and young birds are destroyed by the powerful, drenching stream thrown by the power-sprayer. Birds are not found in numbers in sections where the trees have been thoroughly sprayed. Not only have their homes been destroyed, but also the insect life upon which they feed. Whether many birds die from the effects of eating insects that have been poisoned is a question that still remains unanswered.

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BIBLIOGRAPHY OF WORKS PERTAINING TO BIRDS AND THE OUT-OF-DOORS

THIS list of books was compiled as an aid to those who may wish to continue the study of bird protection and the establishment of game refuges and sanctuaries. Works on shooting, fishing and exploration have also been included, from the fact that much interesting and instructive material is often found among the pages of books on these subjects, and in many instances their authors are among our foremost advocates of wild life conservation. Many of the members of this Association are both enthusiastic sportsmen and anglers, and it is only fair that a list of books on the subjects most dear to them should be included in this compilation.

The books included in this list comprise not only the most recent publications on the various subjects, but also well known works that have stood the test of time and the critics, and which are indispensable to the student of wild life. Many of these are classics, and should always be within the reach of everyone who has a love for the out-of-doors, and religiously read at least once every season. What can more completely veil your urban surroundings of a winter's night, and transport you to the open country, than the reading of Frank Bolles's "Land of the Lingering Snow" and "At the North of Bearcamp Water," or John Burroughs' "Wake-Robin"?

Many books that have not been included in this list have great merit, but space would not admit of more. So the writer must be pardoned if he has unintentionally slighted the books of other authors by not placing them on these pages.

BIRDS

Audubon and his Journals. 2 vols.	\$7.50
Bailey, Mrs. Florence Merriam—Birds of Field and Village. Illustrated	2.00
Bailey, Mrs. Florence Merriam—Handbook of Birds of the Western United States. Illustrated	3.50
Bolles, Frank—At the North of Bearcamp Water	1.25
Bolles, Frank—Land of the Lingering Snow	1.25

Brewster, William — Birds of the Cambridge Region, Massachusetts	\$2.50
Burroughs, John — Wake-Robin. With Portrait	1.15
Chapman, Frank M. — Handbook of Birds of Eastern North America. Colored plates. 1914	3.50
Chapman, Frank M. — The Warblers of North America. Colored plates. 1914	3.00
Forbush, Edward Howe — History of the Game-Birds, Wildfowl, Shore Birds of Massachusetts and Adjacent States. Illustrated	1.00
Forbush, Edward Howe — Useful Birds and Their Protection. Illustrated	1.00
Herrick, F. H. — Home Life of Wild Birds. Illustrated	2.00
Hoffmann, Ralph — A Guide to the Birds of New England and Eastern New York. Illustrated	1.50
Minot, Henry D. — The Land-Birds and Game-Birds of New England. Edited by William Brewster. With Portrait and outline illustrations	3.50
Reed, Chester A. — Bird Book. Illustrated, colors. 1915	3.00
Sandys, E. W., and Van Dyke, T. S. — Upland Game-Birds. Illustrated	2.00
Sanford, L. C. — Waterfowl Family. Illustrated	2.00
Townsend, Charles W. — Birds of Essex County, Massachusetts	2.50
Townsend, Charles W. — Along the Labrador Coast. Illustrated	1.50
Townsend, Charles W. — A Labrador Spring. Illustrated	1.50
Townsend, Charles W. — Sand Dunes and Salt Marshes	2.00
Trafton, Gilbert H. — Methods of Attracting Birds. Illustrated	1.25
Trumbull, Gurdon — Names and Portraits of Birds Which Interest Gunners. Illustrated	2.00
Wright, Mabel Osgood — Birdcraft. Illustrated	2.00

SHOOTING, FISHING AND WOODCRAFT

Bennet, E. — Shots and Snapshots in British East Africa. Illustrated. 1914	2.00
Breck, Edward — The Way of the Woods; a Manual for Sportsmen. Illustrated	1.75
Camp, Samuel G. — Fishing Kits and Equipment	1.00
Carnegie, W. — Practical Game Preserving	3.00
Dugmore, A. Radclyffe — The Romance of the Beaver. Illustrated with photographs from life and drawings by the author. 1914	2.50
Duncan, Stanley and Thorne, Guy — Complete Wildfowler Ashore and Afloat. Illustrated	3.75
Frazer, Perry D. — Angler's Workshop	1.00

Gathorne-Hardy, A. E.—My Happy Hunting Grounds. Illustrated	\$3.00
Grinnell, George B.—Hunting in High Altitudes. Illustrated	2.50
Holder, Charles F.—Big Game at Sea. Illustrated	2.00
Holder, Charles F.—Big Game Fishes of the United States. Illustrated	2.00
Holder, Charles F.—Game Fishes of the World. Illustrated	5.00
Holder, Charles F.—Salt Water Game Fishing	.70
Hornaday, William T.—Camp Fires in the Canadian Rockies. Illustrated	3.00
Hornaday, William T.—Camp Fires on Desert and Lava. Illustrated	3.00
Hornaday, William T.—Our Vanishing Wild Life. Illustrated	1.50
Hornaday, William T.—Wild Life Conservation. Illustrated. 1914	1.50
Huntington, Dwight W.—Our Big Game. Illustrated	2.00
Huntington, Dwight W.—Our Feathered Game. Illustrated	2.00
Huntington, Dwight W.—Our Wild Fowl. Illustrated	1.50
Jefferies, John Richard—The Gamekeeper at home. New edition. Illustrated	1.20
Jones, Owen and Woodward, Marcus—Game Keeper's Note Book	2.10
Jordan and Evermann—American Food and Game Fishes	4.00
Kearton, Cherrie—Wild Life Across the World with the Camera	5.00
Kephart, Horace—Book of Camping and Woodcraft. Illustrated	1.50
LaBranche, G. M. L.—Dry Fly and Fast Waters	2.00
Marbury, Mary Orvis—Favorite Flies and Their Histories. Illustrated in colors and black and white	5.00
Martindale, Thomas—Hunting in the Upper Yukon. Illustrated	2.00
McIlhenny, Edward A.—The Wild Turkey and its Hunting. Illustrated. 1914	2.50
Rhead, Louis—Bait Angling for Common Fishes	1.25
Rogers, Sir John Godfrey—Sport in Vancouver and Newfoundland. Illustrated	2.00
Roosevelt, Theodore—African Game Trails. Illustrated	4.00
Roosevelt, Theodore—Outdoor Pastimes of an American Hunter. Illustrated	3.00
Scull, E. Marshall—Hunting in the Arctic and Alaska. Illustrated. 1914	2.50
Sears, George W. (Nessmuk)—Woodcraft. A Classic	1.00
Seton, Ernest Thompson—Life Histories of Northern Animals. 2 Vols. Complete history of North America Animals from the Field Mouse to the Moose. Illustrated	18.00
Seton, Ernest Thompson—The Arctic Prairies. Illustrated	2.50

Sheldon, Charles—The Wilderness of the Upper Yukon. Illustrated	\$3.00
Sheldon, Charles—Wilderness of the North Pacific Coast Islands. Illustrated	2.00
Singer, Daniel J.—Big Game Fields of America—North and South. Illustrated. 1914	2.25
Southard, Charles Z.—Trout Fly-Fishing in America	7.50
Thomas, W. S.—Trails and Tramps in Alaska and Newfoundland. Illustrated	2.50
White, Stewart Edward—African Camp Fires. Illustrated	1.50
White, Stewart Edward—Camp and Trail. Illustrated	1.50
White, Stewart Edward—Land of Footprints. (Hunting Adventures in Africa.) Illustrated	1.50
White, Stewart Edward—The Forest. Illustrated	1.50
White, Stewart Edward—The Mountains. Illustrated	1.50
White, Stewart Edward—The Rediscovered Country. (Africa.) Illustrated. 1915	2.00
Whitney, Harry—Hunting with the Eskimos. Illustrated	3.50

Nearly all of the books mentioned in the above list may be found on the shelves of the larger City and Town Libraries throughout our country. Many of these are desirable to own, and the price has been given opposite each.

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