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A Year's Program for Bird Protection in Pennsylvania



FIG. 1. CARDINAL

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COMMONWEALTH OF PENNSYLVANIA

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George Mich Schell

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INTENTIONAL SECOND EXPOSURE

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Drawing from life by George Miksch Sutton.

SCREECH OWL

The almost human face of this beneficial little owl varies greatly with the bird's moods.

A YEAR'S PROGRAM FOR BIRD PROTECTION IN PENNSYLVANIA

BY GEORGE MIKSCH SUTTON

(Illustrated with photographs by several Pennsylvania ornithologists and
with drawings by the author)

INTRODUCTION

There is a widespread belief that sportsmen are interested in the preservation of wild-life only insofar as this interest makes possible a supply of game sufficient to maintain itself and at the same time permit the taking of a bag which will satisfy every hunter. While sportsmen doubtless are thus materialistically interested in the game which they kill annually, it is evident to the writer that their interests are not by any means entirely selfish, and that the average huntsman has a genuine sympathy for and interest in wild-life, not alone in the species which he hunts, but also in those which he sees, or those which he recognizes as valuable. Thus do the hunters of Pennsylvania constantly make possible all the actual protection of song and insectivorous birds which is afforded in Pennsylvania; and thus have they maintained, since November, 1924, a bureau of Research and Information which strives, employing such methods as the present bulletin, to increase interest in and knowledge of our valuable wild life, whether it be game or not.

WIDESPREAD INTEREST IN PENNSYLVANIA BIRD-LIFE

In glancing at newspapers and other periodicals of the present day and in talking with citizens of our Commonwealth who represent widely differing professions, it is evident to any careful observer that interest in nature-lore is widespread. Nature study is more universally considered a subject worthy of attention in public schools, training schools for teachers, and colleges, than ever before. In such nature-study courses bird-life usually receives a good share of attention.

Numerous popular books on birds are being published and used, and a large number of successful magazines on outdoor subjects have wide circulation. Sportsmen, who have always had great interest in wild-life, are finding birds other than game birds worthy of their study and protection. Winter feeding-counters for birds and baths for their summer use are in such demand that landscape architects employ these features in their treatment of our modern lawns. The erecting of bird-houses is so common a custom that almost every manual-training course includes a study of the making of them. Bird-house contests, in which boys of the community take part, are in vogue. Farmers, almost without exception, now recognize most species of birds as their valued allies and protect them to the best of their ability.

There is a better general understanding of the problems of the bird's existence, a better knowledge of the bird's enemies, and a greater desire to help these feathered friends than ever before. So general is the interest that nearly every State has a list of its birds for reference, and bulletins informing the people of the value of bird-life. Many States have monumental volumes or sets of volumes on their birds which are not only scientifically accurate but artistically beautiful. Bird and game sanctuaries and refuges, either private, State, or National are being created constantly. Legislation is enacted every year in favor of birds. At the present time our laws and law-enforcing officials are admirably protecting our wild-life.

All in all, it would seem that the people of Pennsylvania, along with the residents of other States, have awakened from their careless lethargy of the past century, to a full sense of the value of their heritage of wild-life, and are employing all possible means not only to keep intact what is left of that noble assemblage of creatures which formerly ranged our fields and woods, but to encourage them to increase, and even, when advisable, to reinstate species whose numbers have so diminished that they have become virtually extinct.

All this widespread interest has resulted in a fair knowledge of the value of bird-life. For those who are already aware of this value

there is no need of any array of facts and arguments such as is presented in this bulletin, unless these statements be simply a means of keeping alive an interest which is instinctive.

In spite of this interest, however, there is an amazing lack of accurate knowledge concerning bird-life. Everywhere are there people who know only about ten of the species which occur in their vicinity. Most people do not see more than two or three kinds of birds in winter. In the city there are even now children whose bird acquaintances are limited to but one or two species, and who quite naturally think that other kinds are to be found only in circuses or zoos. And the fact that each species of bird has a definite place in the plan of Nature, with particular food-habits, well-defined geographical range, average dates and known routes of migration, specific moults, and innumerable habits which are characteristic and as unchanging as the course of the seasons, is utterly unknown to most people. The average person knows about thirty kinds of birds fairly well, at least so that he can describe them to an extent, but the birds he names are not always local species in which he should



Photograph by Frank Pagan, Wellboro.

Fig. 3. PRAIRIE HORNED LARK FEEDING YOUNG

The flight song of this species rivals that of the Skylark.

be most interested. They are often exotic forms such as the Ostrich, Penguin, Albatross, Pelican, or Swan. To such an average layman the many beautiful species of our large families of common birds such as the warblers and finches usually pass as "wild canaries"

or "sparrows" in a general way, just as wading birds are all "snipes" and unknown grebes and ducks "dippers." At the present time we cannot present material which will help the bird student to identify all of our birds, since our chief aim here is to create a correct sense of the value of birds, and to foster a desire to protect them. If we create this desire to protect birds we have practically won our cause, for the protection of birds is certain to lead to a closer study, more careful identification, and eventual understanding of them.

Fortunately, because of their humanitarian instincts, most people who do not know our birds very well, or are not aware of their value, have an innate desire to protect them. There are those who seem to have no sense of conservation however, who would kill any wild creature without concern in the effect of such killing. There is also a locally increasing foreign-born element in our population which has a perverted sense of the value of birds, and which must learn either gracefully or by rigid enforcement of law that our wild-life is a valued possession of the people at large.

For use in dealing with these, and such as these, then; for the encouragement of all organizations which will welcome any recent word on conservation of natural resources; for use of schools where developing citizens will benefit by any up-to-date discussion of a subject of vital importance to them;—for such uses as these is this bulletin written with the hope that its sincerity will be understood and appreciated. No attempt has been made to plead the cause of birds more urgently than their good qualities honestly warrant. To some readers it may seem that our defense of bird-life is not strong enough; but these will surely sense our desire to be as just to every living creature as is possible in a consideration of the problems of wild life conservation.

THE AESTHETIC VALUE OF PENNSYLVANIA BIRD-LIFE

Americans are known throughout the world as successful business-men. Our practical knowledge of values has spread into every field of endeavor, and our wealth is everywhere apparent. Our desire for wealth has had bad effect at times, since it has blindly sought immediate gain, forgetful of consequences. Thus have forests been carelessly felled without a thought of using any but the readily salable products, and with no consideration of replanting or careful selection of trees. Wholesale destruction of life in many of our streams has come about as a direct result of carelessness in disposal of waste products from factories, mines, and such industrial plants.

Our wild birds and mammals during the past century received so little protection that almost before we were conscious of our neglect, certain species were on the verge of extermination. Some of these creatures are gone forever; some have been saved. But when we



Photograph by Miss Esther Heacock, Wyncote.

Fig. 4. ROBIN FEEDING YOUNG

Robins frequently nest in such situations and appreciate boxes put out for them.

fully realized that some of our native birds were being wiped out, a crusade of protection was inaugurated which has gained yearly in power and influence. In order to show this practically minded public the mistake it was making, the most arresting, powerful argument for conservation was produced, namely, that birds were saving us, throughout the year, actual dollars and cents, by their destruction of insect-life. Such an argument was about the only one to which the people at large would have listened. When the farmers found that their yearly profits depended to a recognizable degree on the feathered tenants of their land, their attitude changed from that of indifferent on-lookers to that of interested guardians.

But after a painstaking and fair-minded survey of bird-life, and a sympathetic study of the papers which have been published regarding their value and conservation, it seems wise to state that the greatest value of birds is their aesthetic value. Anyone bold enough to make this statement in view of our practical instincts, at once runs the risk of being branded a sentimentalist, but it should be understood that there is no false note in such a sentiment as the writer has in mind. Furthermore, far-seeing students of the situation everywhere are likely of the same opinion, and when every citizen comes to realize fully the aesthetic value of our natural

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resources Pennsylvania will have perceptibly advanced as a civilized commonwealth. In the very nature of the case it is impossible to precisely estimate aesthetic values, nor do we need to. We do not seem to demand any estimation of the value in leaves, stems or roots of any harmless and beautiful flower in order to wish its protection, and as a rule we do not need any computation of profits and losses when we seek to prevent the destruction of a graceful water-fall. Our desire for the perpetuation of these beautiful things is nothing but the result of a tremendous aesthetic valuation of them.

Nothing is more distasteful to the scientist than a half-hearted or ignorant sentimentality such as sometimes exists among amateur students. A careful study of Biology leads the scientist to believe that grief plays very little part in the lives of birds and mammals. The wholesale destruction of life by the elements and other natural causes is wisely balanced by a tremendous over-production which will assure the perpetuation of all species unless there are overwhelming factors, such as human machines of destruction, which intervene.

False sentimentality has no place in genuine bird-study. Such sentimentality regards a hawk which captures smaller birds as wicked, and forgets that the smaller birds cause just as much death, if not actually more, when they capture numerous small insects. The pursuit of food is a killing process, direct or indirect, among all living creatures of the earth. False sentimentality is the sort of thing which brands a boy morally bad because he wants to collect a bird's egg. The truly broad-minded bird-lover realizes that it is a normal predatory instinct in the boy which attends a period of his growth that leads him into the field to kill and plunder. His desire to collect specimens should not be thought bad or even undesirable. It should simply be directed into the channels which bring about a desire to protect wild life and afford the greatest real satisfaction to the boy. We are aware that some boys with guns become ruthless in their killing. Laws exist for the regulation of such boys; but I am heartily in sympathy with the young chap who wants to assemble some sort of a nature-study collection, and if properly advised and encouraged, the boy's experience with natural history objects may be among the most valuable developing factors in his life.

Our particular consideration at present is directed, however, toward the aesthetic value of birds. When we rate so highly these intangible qualities of our birds let it not be thought that we are forgetting their pronounced economic value. The splendid work of the staff of the Biological Survey of the United States Department of Agriculture, and other scientists, in amassing facts from a detailed study of life histories of birds, and the most scholarly in-



Photograph by Frank Pagan, Wellsboro.

Fig. 5. A FEMALE RUBY-THROATED HUMMINGBIRD

These dainty visitors from the tropics capture only the smallest insects, which they eat with the nectar from flowers.

vestigation of their stomach contents is not to be overlooked or under-rated in this connection. The splendid measures thus far achieved for conservation of our bird-life have been brought about largely through the influence of this work. But I am compelled to ask: Are we never to realize and admit that our most sincere reason for protecting birds is simply that we want them as they are about us, whether they are each saving our State so many cents apiece annually or not? The sooner we come to admit this the more whole-hearted will our protective instincts be, and the more sympathetic we will be toward birds whose food habits may not have been favorably regarded.

It is true that the really interested have always felt this. For the genuine naturalist no arguments for protection of wild life need be offered. But we believe the time has come when birds are valued by the people at large as well as by naturalists. As has been previously suggested, there are and always will be people to whom even the most beautiful wild creatures will mean nothing more than so many commercially usable feathers, or so much meat; but such as these we believe are now far in the minority.

The aesthetic qualities of birds influence the lives of human beings. Spirited and many colored creatures that they are, birds have somehow become part of the experience of all of us. Birds of unusual song or brilliant plumage have attracted us. Game birds have lured

sportsmen to the open air and its health and charms since the days of our Pilgrim Fathers. Even the little city urchin has a place in his daily life for English Sparrows of the street,—drab little urchins themselves, that must somehow stand for and take the place of the woods and fields which the "newsy" is ever denied.

Bird-song in its varied forms is the most beautiful and musical sound of the outdoors. True, as the poets have said, there is music in water-falls, in wind blowing through trees, and even more literally speaking, in the strange and often tuneful sounds produced by insects and other animals of higher development. But in bird-song chiefly is there music. The harsh caw of a Crow, together with all the queer calls which many species are known to give, do not merit



Photograph by Frank Pagan, Wellsboro.

Fig. 6. CEDAR WAXWINGS EATING APPLES
This attractive type of food-counter may be used as a bird-bath during summer.

being called song, but if anyone questions the ability of some birds to produce music, we ask him to journey to the deep woods where Hermit Thrushes are chanting in that damp realm of ferns, mosses and old trunks, or to a wind-swept promontory where a Horned Lark sings his shy hymn to the sun, or to a sunny slope where a

flock of Purple Finches, after a meal of weed-seeds, suddenly break forth into a rollocking chorus—each singing his own version of the Song of Life, and making the very twig upon which he is sitting beat a sprightly, irregular time to the music. And, to refer to more common bird-neighbors, is there a person in Pennsylvania who has not responded to the cheerful if modest medley of the Song Sparrow early in April, the hesitant warblings of a Robin at evening, or even the moonlit quavering of a Screech Owl? Famous composers of music the world over have acknowledged the charm of bird melody; and there is said to be a direct connection between certain well known strains of our best music and portions of wild bird-song.

Color of bird plumage too has charmed us. The spirited flash of a male Cardinal always commands admiration; and we pause in wonder at the lazy flame of a Scarlet Tanager moving through the leaves. Red is always thrilling. And who has not sensed his inability to believe the subtle iridescence of an Indigo Bunting's blue—or the vibrant turquoise on a common Blue Jay's wing?

But birds mean much to us for their attractive ways alone, and for their confidence in us. Thus are House Wrens, Chipping Sparrows, Purple Martins, and other species almost members of our human families; and it is surprising to note how often these birds actually seem to depend on us for neighborly protection. Rarely are Chipping Sparrows seen anywhere but near human habitations,



Photograph by Refuge Keeper Ralph Ewing, Lykens.

Fig. 7. YOUNG MARSH HAWKS IN THEIR NEST
The food habits of the Marsh Hawk are variable; at certain seasons they are decidedly beneficial.

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The food habits of the Marsh Hawk are variable; at certain seasons they are decidedly beneficial.

and Purple Martins have so come to rely upon man-made nesting boxes that it is almost impossible to find them rearing their young in hollow trees. Chimney Swifts and Barn Swallows, while not so intimate, nest almost exclusively about man's buildings.

Thus, whether we have sensed it or not, the songs of birds, the color of their plumage, and their grace of flight and interesting ways have meant a great deal to us.

All Nature is an illimitable source of poise and happiness to every human being. Not all schools of philosophers agree that happiness is a worthy aim of existence, but we somehow sense that anything which makes us really happier is valuable to us.



Photograph by Frank Pagan, Wellsboro.

Fig. 8. BLUEBIRD AT NEST

Illustrating a well built and well placed rustic nesting box.

THE ECONOMIC VALUE OF PENNSYLVANIA BIRD-LIFE

Since birds are to be so highly valued for their aesthetic qualities it is gratifying to find that most of them are also economical assets with an important share in making the earth a habitable place for mankind. The most uninformed layman if queried as to the food of any small bird would probably answer, "Bugs". And careful investigation has shown that insects form an overwhelmingly large proportion of bird-food.

That the destruction of injurious insects by any agent whatever is an economic benefit is only too evident to every farmer, gardener, horticulturist or orchardist. To such men the insect problem is one of the ever unsolved problems of existence. A brief consideration of insects is not out of place here, for a better understanding of their place in nature, and a clearer estimation of the value of birds in aiding in their control.

Of the million known species of insects many are such devastating agents of destruction of plant life that they have threatened nations with starvation. It is not, however, the number of injurious species of insects which causes this so much as the appalling ability of any single harmful kind to reproduce to numbers almost beyond comprehension. When we know the capacity of each individual insect to eat, and therefore destroy, plant food, we begin to glimpse the possible destructive force of any one species of insect in the world. And when it is borne in mind that some of these injurious forms live upon certain plants exclusively we can see that the very existence of grains, orchard-trees, and other food plants definitely depends upon a constant regulation of the insects which feed upon them. It has been determined that certain caterpillars consume twice their own weight in leaves daily throughout their whole larval existence. Some caterpillars, in the course of their thirty-day development increase in size ten thousand times, as a result only of leaf-eating. When it is learned that it is possible for a female insect to be the ancestor of sixty million of its kind in a single season we can see that regulating destructive forces must be everlastingly at work, or the very earth would soon be an impenetrable mass of insect life. The United States Department of Agriculture at Washington has determined that agricultural losses through insects each year amount to, if they do not exceed, ten per cent of the entire production. In some States this loss is even higher, and during some years this is true in Pennsylvania.

DESTROYERS OF INSECTS

It is evident then, that in view of our dependence upon vegetable food, injurious insects are among the most serious enemies of man. Birds are a powerful factor in the regulation of insects. The

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rearing of the young birds occurs usually during early summer, at the time of the greatest abundance of insects. Young birds require, like the caterpillars, a tremendous amount of food, and sometimes eat considerably over their own weight each day. The food of young birds is, as a rule, insects. Therefore the increase of birds, by the production of their young in the spring, parallels the increase of insects, and definitely prevents the development of an insect scourge. During winter millions of eggs and dormant forms of insects are eaten by birds. This winter-consumption is an important part of the insect-regulating program of bird-life.

Without the least desire to under-rate the value of birds as insect regulators it is only fair to call attention, however, to other factors of control of which bird students in particular, are too often unaware. It is correct for us to value birds as indispensable to human existence, but for us to form the notion that the life of our field and forests, and indirectly that of man, depends entirely upon birds, is failing to acknowledge the importance of one of the greatest insect-regulating factors there are—namely the insects themselves. It is so easy for us to value these birds which we like, and so easy to class as undesirable all insects (whether we know them or not) because we do not like them, that we take no account of the insects whose existence depends wholly upon and whose ceaseless efforts are expended in devouring other insects—predatory beetles which attack the ground-inhabiting species; dragon flies and their relatives which patrol the air; wasps, some of them microscopic in size, whose perpetuation of species depends upon the parasitism of caterpillars, and a host of other forms. Spiders are not especially enjoyed by us; and yet a little thought will bring to mind their countless webs which have been woven for a principal purpose—the capture of insects. The average ornithologist can easily forget in his zeal for defense of birds; that bats are wholly insectivorous, as are many other mammals—even some which are occasionally rated as carnivorous “vermin”. Fish also eat insects. Any friend of the common garden toad will ceaselessly praise him for his insect-killing propensities, and there are numerous reptiles which live on practically nothing but insects. When we consider, therefore, first that all insects are not, as so many suppose, undesirable, and second that there are many other forces which are regulating insect life aside from birds, we can see that statements which lead us to regard birds as our only saviors from starvation, are wrong. And yet not for an instant do we less highly regard our bird-life at learning this; we simply understand the situation better, and are more magnanimous in our decisions.

Nevertheless a more detailed account of the part birds play in regulating insects may well be considered here. Birds, like most

animal forms, are adapted to particular habitats. Some are equipped with long muscular wings, bodies built on speed lines for the least air resistance possible, and small feet,—all adaptations for an aerial existence; others have stiff tails which are to be used as props, strong feet for clinging, and chisel-like bills and barbed tongues, for an existence on tree trunks; others have large and strong feet for terrestrial life; others have very long necks and legs, for searching food in the water; and the feet of others are webbed for swimming. Whatever this adaptation to environment may be, it is concerned chiefly with the matter of procuring food, since upon food depends existence.

Insects too are adapted to these different environments. Thus we find various types of birds preying upon, almost exclusively too, the kinds of insects that are found in their environment. Swallows, Swifts, and Nighthawks prey almost altogether on insects which they find in the air. Woodpeckers, Creepers, and Nuthatches, which are adapted to a tree-trunk existence are ceaseless in their search for eggs of various insects which are hidden in the crevices, and for



Photograph by Robert J. Sim, Riverton, N. J.

Fig. 9. NIGHTHAWK OR BULL-BAT BROODING YOUNG
A beneficial bird which captures insects on the wing.

larvae and other forms of various woodborers, for which they sometimes have to work considerably. Fly-catchers capture insects principally on the wing, but they capture the species which inhabit woodlands which the Swallows and Swifts would likely never see. Warblers, Vireos, Tanagers and other arboreal birds search the

leaves and outer twigs for small insects; Cuckoos plunder the webs of caterpillars; Thrushes and some Sparrows and Warblers patrol the forest floor; Meadowlarks, Blackbirds and similarly built species are more or less confined to the open fields, and there are particular species which as a rule are to be found in our yards, or the orchard, or the truck garden.

Thus the farmer, forester, or gardener who is interested in particular problems of insect control may learn to depend on the aid of certain species of birds. The potato-grower learns that Rose-breasted Grosbeaks, Bobwhites, Ring-necked Pheasants and Wild Turkeys eat potato beetles; the orchardist, that Black-billed and Yellow-billed Cuckoos, Baltimore Orioles, and others may be depended upon to destroy caterpillars; the farmer, that Meadowlarks, Robins and even the oft-maligned Bronzed and Purple Grackles, destroy a great many cut-worms, and that some Hawks and Owls are almost confined in their food habits to capturing mice or grasshoppers!

Our study of the vast and intricate relationships in nature is still in its infancy. But we have gone far enough to know that food habits of birds are variable not only throughout the year but also in different sections, and that the truly wide-awake farmer must himself determine to what extent his birds are helping or hindering him. But his finding Bronzed or Purple Grackles in a young corn field, or even seeing them pull up the blades, should not without careful investigation be proof to him that the birds are eating his corn. Only too often are such blackbirds searching cut-worms, and their only reason for pulling out the corn is that the stalk has already been cut off by the grub and the way must be cleared for capturing the insect!

Even the Crow, whose reputation is usually very black, has been found to destroy the large tomato and tobacco worms, which, partly on account of their size, are not eaten by most birds.

WEED-SEED CONSUMERS

Not only are birds a powerful factor in the regulation of insects, but many species are of value in eating weed-seed. In all fairness we must again make an admission, however, in our consideration of the bird's value as a weed-seed eater. As has been stated before there is a tremendous overproduction in Nature which insures the perpetuation of species of plants and animals in spite of all the normal agencies that are arrayed against them. Seeds of plants are exposed to so many adverse circumstances that biologically an overproduction is necessary to their very existence. Again we must remember that birds are only one of the many factors which regulate weeds. In all fairness it must be admitted too that certain hard-

shelled seeds of some small fruits, when eaten by birds are not destroyed by the digestive process, but are simply carried about by the birds and deposited favorably for subsequent germination and growth. Some birds, however, are almost restricted, particularly at certain seasons, to a diet of weed-seeds, which are destroyed when eaten. Many Sparrows eat almost nothing else during the winter. Bobwhites, Mourning Doves, and various smaller birds of the open fields and brushy fence rows, depend on weed-seeds for a portion, and sometimes most of their food. Therefore the farmer is not to forget that his winter bird visitors are helping him in his problem of weed control to a recognizable degree.

REGULATORS OF OTHER PESTS

Many hawks and owls capture field mice and other small mammals which are enemies of the farmer. While the food of such birds of prey is not often strictly limited to these creatures, it is safe to state that whenever field mice are especially abundant the food of all predatory species at once consists chiefly of them, and at such times some birds, like the Crow, which do not ordinarily figure prominently in such matters also include mice in their diet. In a biological understanding of the regulation of field mice and similar pests we should not forget, however, that snakes and certain carnivorous mammals also have a share.

GAME BIRDS

We can hardly overestimate the importance of game birds and mammals to our forefathers. In early days the food problems of the settlers were sometimes difficult to solve, and there is no doubt that Wild Turkeys, Ruffed Grouse, and other splendid game birds at times actually saved the frontiersman from starvation. Today we do not depend upon our game birds for food, for we have an abundance of meat of other varieties; but the presence of game birds, and their luring of sportsmen to the open air and its valuable life-giving qualities, means a good deal more to Pennsylvania's citizens than is ordinarily supposed. Our State's 600,000 hunters are better men because they make contacts with the out-of-doors annually; and it is because we have succeeded in maintaining an adequate supply of game that these men are interested so deeply in the protection and increase of game bird-life.

The foregoing discussion, as we stated at the outset, does not award our birds unqualified praise. In our remarks we have attempted to be fair to all wild-life. Such a conception of Nature is slowly dawning upon us, and anything we can do to aid in such an understanding of our wild creatures is worthwhile. We have learned



Photograph by Ralph B. Simpson, Warren.

Fig. 10. NEST OF RUFFED GROUSE

One reason game birds are able to persist in spite of their many enemies is that they lay large sets of eggs.

that birds are a welcome part of the existence we are enjoying in the world; that they are constantly helping us in our problems of living, and that we therefore wish to protect them. May we not then deem it worthwhile to study the needs of birds that we may better know how to protect and attract them?

THE ENEMIES OF PENNSYLVANIA BIRD-LIFE

If we are to understand birds and help them we must acquaint ourselves with their problem of existence. The foregoing discussion has stressed heavily the food-supply of birds, for finding of food is the principal problem in the life of all living creatures. Of but slightly lesser importance however, is the problem of evading or overcoming enemies—and every living thing is faced with this problem also.

Disease of birds is sometimes serious; but our regulation of such disease is in the nature of the case almost impossible. Abrupt changes of the weather such as freezes just after rains may cause great loss of bird-life, just as tornadoes, hail-storms, and hurricanes sometimes do; but these factors are largely beyond our control. Forest fires are terrific scourge, and every possible means should be used to prevent them. Although we cannot regulate temperature, we may save our bird-life from actual starvation at times when ice or deep snow has covered their food-supply, or where for some reason or other their normal food is scarce.

Predatory mammals including man, rapacious birds, and reptiles are the most serious direct enemies of bird-life. In regions where Wildcats, Raccoons, Foxes, Skunks, Weasels, Red Squirrels, Oppossums, Rats, certain snakes and Snapping Turtles, some hawks and owls, Crows, and occasionally other carnivorous birds are abundant, any of these creatures may be a great menace. Often the ground-nesting birds are particularly preyed upon. If there is an over-abundance of these predatory animals a carefully managed campaign of reduction seems to be our only means of improving conditions. Care should be used, however, that blame be laid upon the proper animals. Great injustice may be meted out to certain creatures unless it is certain that these creatures are doing the damage; and too often a wholesale slaughter brings nothing but worse conditions in its wake because the situation was not fully understood in the first place.

FEATHERED ENEMIES OF BIRDS

Not all birds of prey are enemies of birds. Among the hawks the large Goshawk, somewhat smaller Cooper's Hawk and Duck Hawk, and the small Sharp-shinned Hawk and Pigeon Hawk are the principal enemies of birds. The Goshawk is usually not common, but if it does occur is a particular enemy of the Ruffed Grouse. During some winters there is a southward movement of Goshawks which is a serious menace to Pennsylvania bird-life. The Duck Hawk and Pigeon Hawk are also comparatively rare. The Cooper's Hawk and Sharp-shinned Hawk are quite common locally and are great destroyers of small birds. The Marsh Hawk, particularly dur-



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Drawing from life by George Miksch Sutton.

Fig. 11. GOSHAWK ABOUT TO ATTACK

The Goshawk is one of our most ferocious birds of prey; it is the arch enemy of all small game birds and animals.

ing its nesting season, may be an enemy of swamp-loving and meadow-inhabiting birds, but is usually not a serious offender. Other hawks take birds only occasionally.

The Great Horned Owl is the chief killer of birds among his tribe. He is a particular enemy of the Ruffed Grouse and when numerous may be a terrific marauder. He is not usually abundant however. The Screech Owl sometimes kills smaller birds but this habit is largely restricted to the nesting season and is not serious otherwise. The other owls which occur commonly in Pennsylvania are not to be considered harmful. The Barn, Long-eared, Short-eared, and Saw-whet Owls may be rated as beneficial birds. The big Barred Owl is variable in food habits, and sometimes does damage.



Photograph by Samuel S. Dickey, Cambridge Springs.

Fig. 12. GREAT HORNED OWL

A serious enemy of all game birds, including the Wild Turkey.

The Crow is destructive during the nesting season. There is no doubt that he eats eggs and young birds. When Crows are too abundant a certain amount of killing, regulated properly, has good effect since there is little danger of exterminating Crows. This statement is not to be construed, however, as sanctioning State or Nation-wide Crow-killing contests, which may have very ill effects.

The Blue Jay, like the Crow, is occasionally a serious enemy of smaller birds, in that he eats eggs and captures young birds. But these atrocities do not seriously reduce the small-bird population as a rule.

English Sparrows are chiefly to be censured for their domineering traits. At the winter feeding-counter they combine in such a way as to benefit themselves at the expense of other birds. In the spring they are a constant menace at nesting-houses. I have watched male sparrows at a wren or bluebird house for hours. Their intrusion appeared to be purely arrogant. There were about six male sparrows which took turn all day annoying the wrens. The English Sparrow does not deserve much praise or protection. It were better had he never been introduced in America. If he can by any means

be exterminated without endangering our native birds, we will benefit by it. Perhaps, however, the status of this introduced species will change.

The Starling is relentless in stealing and occupying nesting sites which should be the property of our native birds. Particularly are the species which nest in cavities molested. I once saw a pair of Starlings drive Flickers from their recently drilled nest, by carrying straws in so fast that the Flickers were apparently bewildered and left. Were the Starling removed our native bird population would benefit thereby. The Starlings are, it must be admitted, beautiful and interesting birds, but they have not yet proved themselves worthy of protection in Pennsylvania.

The Bronzed Grackle, Red-headed Woodpecker, and even the House Wren may be accused of some damage to eggs or young of other desirable birds. Grackles develop individualistic egg-eating habits which are culpable. House Wrens sometimes puncture the eggs of their feathered neighbors in a purely malicious way!*

But viewed from the standpoint of the smaller birds of our State one of the most serious enemies is the Cowbird. As is well known, this bird makes no nest. When the female Cowbird has found the nest of a smaller bird where she intends to lay her own eggs, she may remove one or two or all the eggs of the owner before depositing her own. Nor is this the whole story. Even if she does not remove the other eggs, the young Cowbird after hatching is so much larger than he is likely to crowd the rightful owners out of the nest, or cause their starvation by claiming all the food. If the Cowbird were especially beautiful or beneficial we might overlook this habit, but as it is, he seems to be only a means of reducing the numbers of other birds more desirable than himself. Nevertheless it must be admitted that the presence of the Cowbird has not noticeably affected the abundance of the small birds into whose home life it intrudes.

THE DOMESTIC CAT

Among all the enemies of birds—be it bird, beast, reptile, or even man himself—there is no more cunning or promiscuous a killer than the half-wild, half-fed (and even occasionally well-fed) house cat. Their attacks on birds are often little short of fiendish. More than once I have seen a well-fed house cat deliberately corner a fledgling Robin to toy with it in a cruel way as long as permitted. Once I rescued a screaming young cat-bird from a cat, only to find that both wings had been torn off, and that the bird was nearly dead from loss

*This habit may be an effort on the part of the Wrens to so decrease the number of young birds in their community that their own young may be more easily fed and reared. See *Bird-Lore*, March-April, 1925, Volume XXVII, No. 2, for remarks on habits of the House Wren, by Miss Althea R. Sherman.



Photograph by W. Gard Conklin, Harrisburg.

Fig. 13. CAT WITH WARBLER

The house cat is a terrific foe of bird-life.

of blood. Cats are unusually serious because they are not only naturally cunning, but have learned much from their association with human beings. If such cats were especially beautiful creatures, or in their half-wild state compensated in some way for the damage done in eating birds, the case against them might not be so certain. But observations have determined that the food of such cats is at certain seasons almost restricted to young birds whenever such food is available. Farmers value cats about their premises as rat and mouse killers, and cats do to a varying degree help in this respect. As a rule, really well cared for cats which are house pets, do not do serious damage to bird-life. But there can be but one solution to the feral cat problem: Shoot the cat, or kill him somehow; and compel owners of cats to control them or pay for their neglect to do so. Perhaps it is because the cat is not a native creature, and often lives upon our wild-life without contributing economic benefit, beauty, or sportmanlike methods to his environment, that we dislike him so. The only safe cat is one absolutely under control at all times, particularly during the nesting season.*

MAN

We who are interested in birds consider ourselves their greatest protectors. But it must be admitted that Man has been and unfortunately still is in some regions a terribly destructive enemy of bird-life. The gun is a dread weapon in the hands of the unscrupu-

*See bulletin on "The Domestic Cat" by E. H. Forbush, State House, Boston, Massachusetts.

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*See bulletin on "The Domestic Cat" by E. H. Forbush, State House, Boston, Massachusetts.

pulous. One has only to study the history of bird protection in America to see what Man has done. The slaughter of game for the market was, until only recently, unbelievably great, and sometimes carried on with great cannon-like guns which killed at a single shot whole flocks of ducks or shore birds. Man's part in the destruction of the extinct Passenger Pigeon stands as evidence of his potency as an enemy of birds. Every device conceivable was used for the capture of these pigeons.



Photograph by Game Protector Miles Reeder, Mifflinburg.

Fig. 14. SPORTSMEN REGARD CROWS AS THE ENEMY OF GAME

State-wide Crow-killing contests are not to be encouraged, however, because innocent birds too often suffer along with the guilty species. Moreover, Crows are not altogether bad.

Man's destruction of birds has been concerned not only with his food supply, but also with what seems a most useless cause for destruction—the millinery trade. The story of the development and curbing of this amazing traffic, which has not by any means been stopped, is one of the most shameful tales connected with human affairs. The destruction has been utterly vain. Our most beautiful birds, only because they were beautiful, have suffered most severely of all, and some of them have virtually been exterminated.

The craze for feather adornment led to the development of huge slaughtering enterprises as part of the millinery trade. Entire colonies of herons, gulls, terns, and other birds of America were wiped out sometimes for only a small portion of the plumage of each bird. Thus were only the nuptial plumes of American Egrets and Snowy Herons stripped from their backs, the bodies thrown

aside to decay, and the motherless nestlings left to starve. Breasts of Western Grebes were used, and only the wings of terns and gulls. This millinery traffic has largely been stopped in North America, but only sentiment against the wearing of bird plumage will banish it completely.

Man has been an enemy of birds not only in his direct killing, but he has caused their inevitable disappearance by invading and dominating their normal range, by cutting or burning the forests where they lived, by killing their food in the streams, and by draining and cultivating the places where they lived. Man cannot be blamed too severely for this, for some of it is the most normal outcome of civilization. But had care been used, when it was possible, some of our vanished birds might still be with us.

We do not always realize that in killing certain birds and mammals we thereby proportionately increase their destruction by natural enemies, since these enemies, when permitted to live, have a smaller supply of their normal food to depend upon and must therefore draw more heavily on what is left. Thus when we find Great Horned Owls killing Ruffed Grouse to the point of extermination we sometimes forget that through our efforts skunks, rabbits, and other normal foods may have been so reduced that the owls are forced to live almost altogether on the grouse. This is, however, no justification for permitting the owls to cause an extermination of grouse.



Fig. 15. VALUABLE BIRDS KILLED BY A FOREIGNER

4 Robins (1 to 4); 1 Flicker (5); 2 Hairy Woodpeckers (6 and 7); 13 Cedar Waxwings (8 to 20); 1 Purple Finch (21); 1 Phoebe (22).

The foreign element in our population is a serious enemy of bird-life. Chief among these offenders are the Italians. The people of that classically esteemed nation have so long regarded their smallest

and most beautiful birds as desirable only for food that the whole Italian peninsula is almost devoid of birds—a condition which is painfully evident to the traveller there. This is the result not so much of a perverted or undeveloped sense of justice as it is of laziness. The food problem is an important one with peasants everywhere, and the Italians have chosen to make their song-birds directly valuable as a food item. These Italians in America are sometimes difficult to deal with, since they are temperamental in nature, and resent interference. Until they learn that our birds are regarded as more valuable alive in the woods than as food in the pot, they will have to be handled by the law until the truth dawns upon them—namely that our valuation of wild-life is more than a mere matter of sentiment.

The small boy who goes about with stones, sling-shot, or other weapon, is not *always* a serious enemy of bird-life, and he often later becomes a splendid bird student and ardent conservationist when shown that marvelous things can be learned about wild creatures if they are closely observed rather than killed. The boy who does chase about flinging stones here and there may eventually become one of Pennsylvania's best citizens if his efforts are directed into proper channels. We would prefer to see a thousand hearty lovers of the outdoors developing in Pennsylvania—even sportsmen who take their recreation outdoors—than half as many men who have no interest in Nature. For our real sportsmen, far from the ruthless killers they are often supposed to be, are among the most sincerely interested nature-lovers and conservators we have. They are interested not only in their own pursuits of pleasure, but are truly in sympathy with the lives of the woods-creatures and are doing a great deal for their protection.

After all, sportsmen are the men who for the past ten years have been paying for the enforcement of laws which protect our wild-life. If all bird-lovers each year paid for a license they might be in a better position to criticize methods of enforcement and demand that their views on protection of wild-life be heard. As it is now, too many bird-lovers complain about the killing of game-birds and are apparently not willing to do more than severely criticize the sportsman for shooting the birds. Why should not all bird-students join the sportsmen in defraying the expenses of law enforcement, winter feeding, and maintenance of State refuges? Co-operation of this kind might unite the forces of conservation in our State in a powerful way and lead to the realization of the very things which bird-lovers most ardently desire.

A word concerning the collector of bird-skins is not out of place here. As a rule the scientific collector is sincere and is worthy of

all the help we can give him, because he, more than anyone else, knows the value of birds, and is their ardent defender.

However, there is nothing more despicable than taking advantage of a collecting permit to satisfy personal ends. Purely private collections are not to be encouraged; and if large series of specimens, be they cared for ever so well, are not available to any student who needs to use them, there is no justification for such a collection.



Fig. 16.



Fig. 17.



Fig. 18.



Fig. 19.

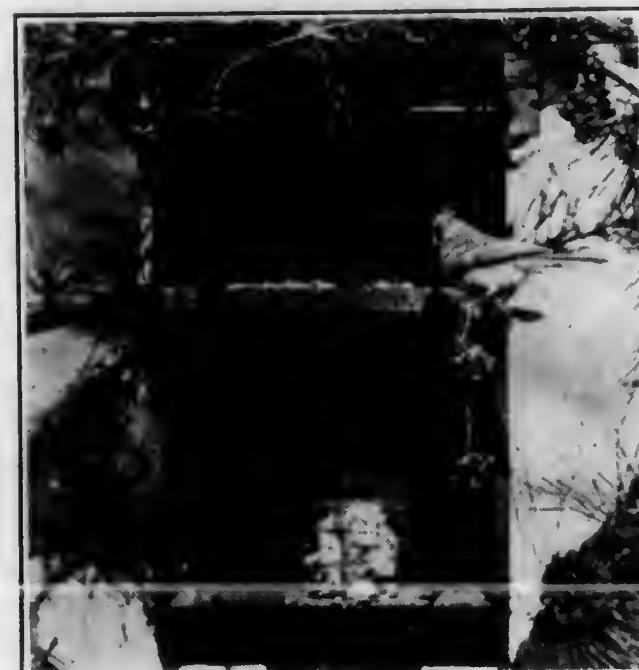
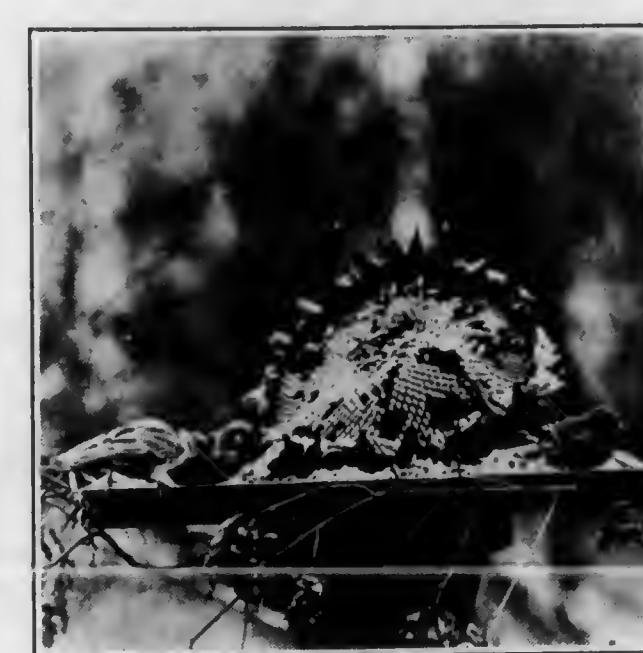


Fig. 20.

Fig. 21.
Photographs by Frank Pagan, Wellsboro.

WINTER BIRD GUESTS AT THE HOME OF MR. FRANK PAGAN OF WELLSBORO,
SHOWING DIFFERENT METHODS OF ATTRACTING BIRDS

Fig. 16. Red Crossbills and a White-breasted Nuthatch (right). Fig. 17. Evening Grosbeak.
Fig. 18. Purple Finches. Fig. 19. White-breasted Nuthatch. Fig. 20. Tufted Tit. Fig. 21.
White-breasted Nuthatch, Red Crossbill, and Pine Siskin.

PROTECTING AND ATTRACTING PENNSYLVANIA BIRD-LIFE

A study and regulation of the enemies of birds is essential if we are to help our feathered friends; but the killing of any hawk or fox, or the imprisonment of any law-violator, seems a negative part of our work. How much more positive is the development of a wholesome sentiment which will make violations of the law infrequent because people have come to see that they themselves should preserve wild-life rather than waste it.

REFUGES

One of the greatest factors in the growth of such a sentiment has been the game refuge movement. The establishment of game refuges is, in a way, part of the fight against the enemies of birds since these refuges afford a place where men cannot hunt, and where all possible help is given the wild creatures in their feeding and nesting problems. The refuge idea is a splendid one since more than any other it is giving bird-life a chance to exist without molestation. There are thirty-five State game refuges in Pennsylvania, which total 77,817 acres. On each of these is a refuge-keeper whose interest in the wild-life of the area is his paramount concern. There are also sixty-eight auxiliary State game refuges, where similar protection is afforded. These refuges are directly the result of efforts of the Game Commission, supported by the sportsmen of Pennsylvania, and they are doing a great deal of good.

The refuge idea has taken several forms. Federal and State parks are automatically closed to all hunting. There is a popular movement toward making cemeteries and similar plots of ground into bird sanctuaries, and there are numerous instances of the forming of sanctuaries in widespread areas, where the people have united in an effort to protect bird-life. Such an admirable item has been part of the program of the Audubon Society of the Sewickley Valley in Southwestern Pennsylvania, where courses of lectures were given through all the country schools, educational signs posted, and real effort put forth in the execution of their plan. A slogan "The Sewickley Valley a Bird Sanctuary" was adopted. Hearty work such as this will bring about the desired protection of birds. Education of all the people on the subject is a crying need.

WINTER FEEDING

Setting aside plots of ground wherein bird-life is always protected is a step in the right direction. But the feeding of birds, and their care in other respects should be carried on more vigorously. Some-



Fig. 16.



Fig. 17.



Fig. 18.



Fig. 19.

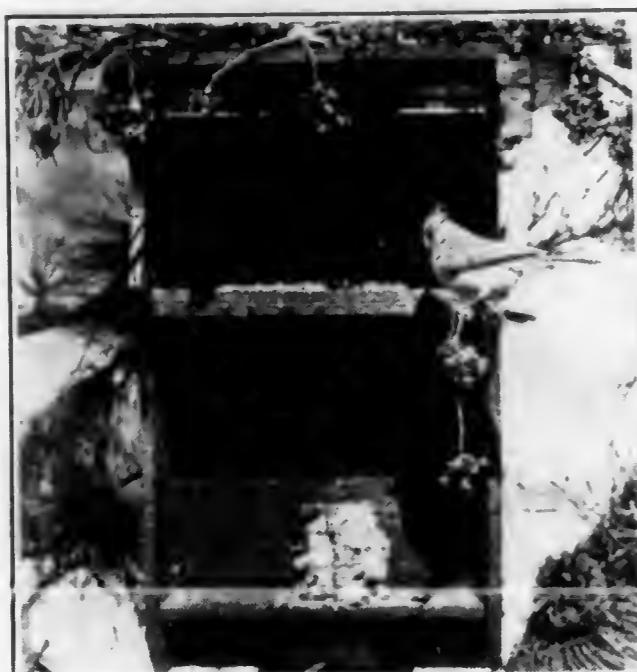
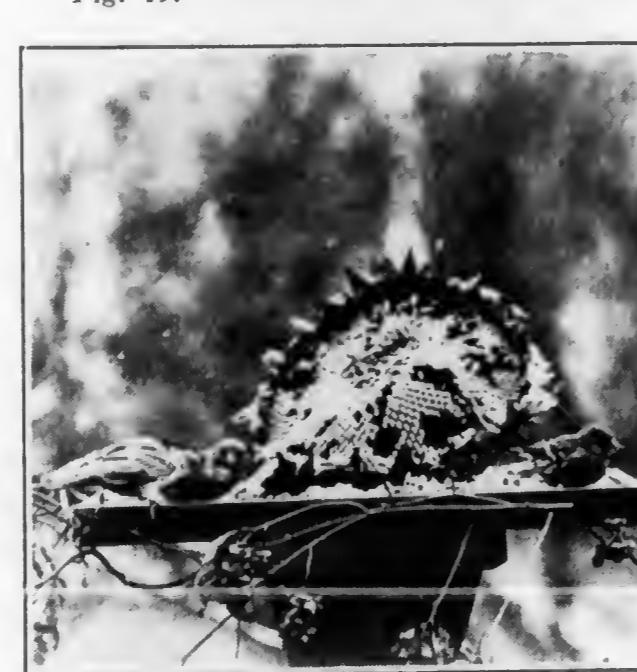


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SHOWING DIFFERENT METHODS OF ATTRACTING BIRDS

Fig. 16. Red Crossbills and a White-breasted Nuthatch (right). Fig. 17. Evening Grosbeak.
Fig. 18. Purple Finches. Fig. 19. White-breasted Nuthatch. Fig. 20. Tufted Tit. Fig. 21.
White-breasted Nuthatch, Red Crossbill, and Pine Siskin.

PROTECTING AND ATTRACTING PENNSYLVANIA BIRD-LIFE

A study and regulation of the enemies of birds is essential if we are to help our feathered friends; but the killing of any hawk or fox, or the imprisonment of any law-violator, seems a negative part of our work. How much more positive is the development of a wholesome sentiment which will make violations of the law infrequent because people have come to see that they themselves should preserve wild-life rather than waste it.

REFUGES

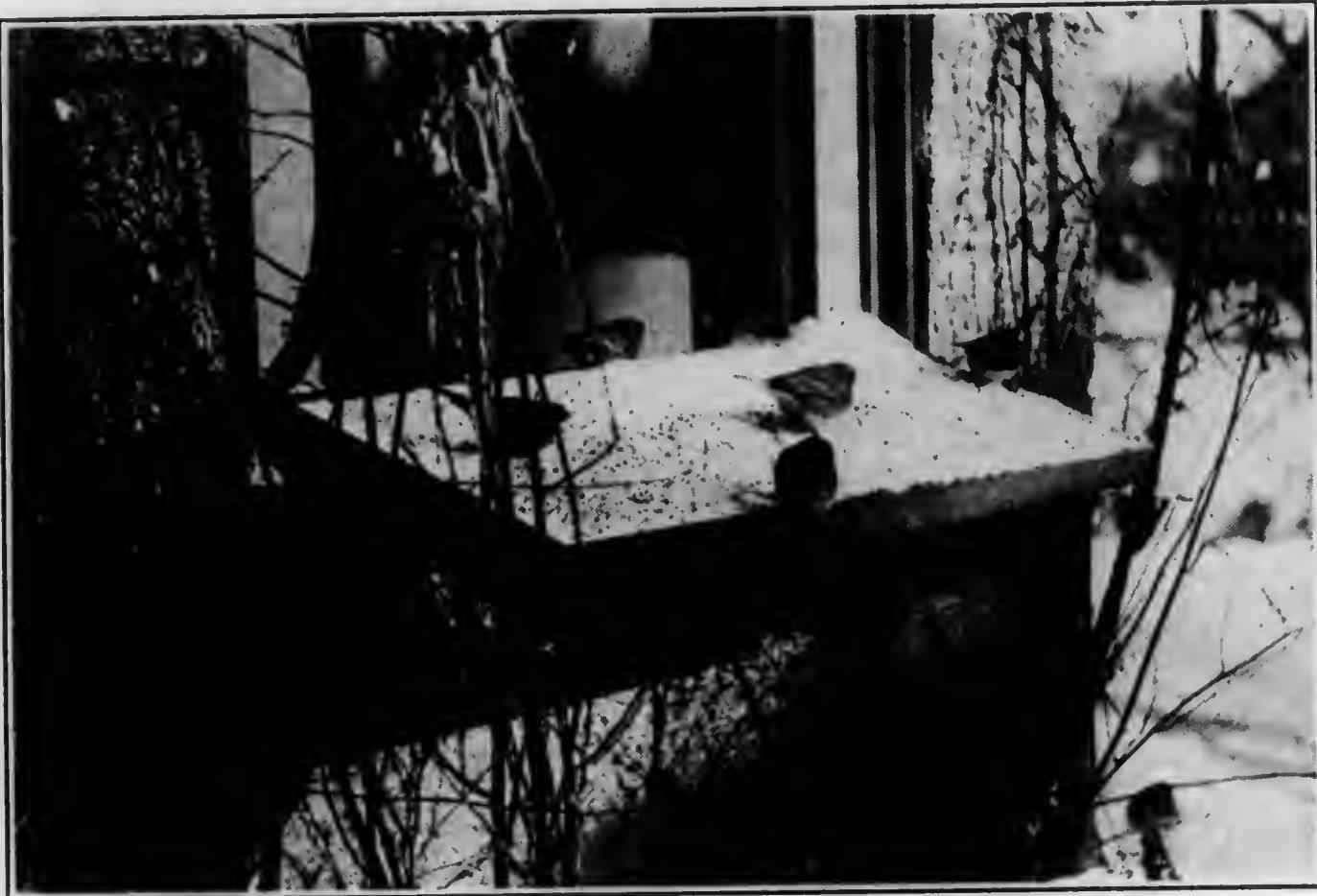
One of the greatest factors in the growth of such a sentiment has been the game refuge movement. The establishment of game refuges is, in a way, part of the fight against the enemies of birds since these refuges afford a place where men cannot hunt, and where all possible help is given the wild creatures in their feeding and nesting problems. The refuge idea is a splendid one since more than any other it is giving bird-life a chance to exist without molestation. There are thirty-five State game refuges in Pennsylvania, which total 77,817 acres. On each of these is a refuge-keeper whose interest in the wild-life of the area is his paramount concern. There are also sixty-eight auxiliary State game refuges, where similar protection is afforded. These refuges are directly the result of efforts of the Game Commission, supported by the sportsmen of Pennsylvania, and they are doing a great deal of good.

The refuge idea has taken several forms. Federal and State parks are automatically closed to all hunting. There is a popular movement toward making cemeteries and similar plots of ground into bird sanctuaries, and there are numerous instances of the forming of sanctuaries in widespread areas, where the people have united in an effort to protect bird-life. Such an admirable item has been part of the program of the Audubon Society of the Sewickley Valley in Southwestern Pennsylvania, where courses of lectures were given through all the country schools, educational signs posted, and real effort put forth in the execution of their plan. A slogan "The Sewickley Valley a Bird Sanctuary" was adopted. Hearty work such as this will bring about the desired protection of birds. Education of all the people on the subject is a crying need.

WINTER FEEDING

Setting aside plots of ground wherein bird-life is always protected is a step in the right direction. But the feeding of birds, and their care in other respects should be carried on more vigorously. Some-

how it seems natural to think of aiding birds particularly in the winter. What is suggested here as regards feeding devices may apply to refuge or sanctuary, farm, garden, or city yard, wherever there may be birds.



Photograph by Miss Esther Heacock, Wyncote.

Fig. 22. JUNCOS AT WINDOW FEEDING-SHELF

This photograph admirably illustrates a delightful method of feeding birds in winter.

All manner of clever feeding devices have been made by interested students, bird-lovers, and game protectors. But it is preferable to suggest here only the general principles which should guide one in one's winter feeding. A natural feeding place seems preferable in many ways to a built counter, although birds do not seem to object to artificial devices. Birds may be lured to a feeding place more readily when there is a great deal of snow, because most of their natural food is covered. Therefore it is suggested that special efforts to feed the birds be made when a snow has fallen. A desirable place for feeding should be sheltered well, and should be open to sunlight if possible. It is advisable to watch the natural movements of the birds in determining where they will most likely occur.

During seasons when snow is constantly falling it is wise to place the food in a cleared space on the ground below a rudely built roof which catches the snow. Such a roof may be made by fastening several slender stiff cross pieces of brush horizontally to a sapling about four or five feet from the ground and thickly piling upon this

framework all sorts of available material such as brush, corn stalks, or weeds. If these are not heavy enough to withstand the wind, they may be bound together with wire or cord.

This type of shelter has many advantages. It affords a convenient roosting place for small birds. There is almost always an open space below the shelter where the snows do not drift in. The sapling trunk affords a place where suet may be attached for woodpeckers and other birds, and the ground features appeal to game birds such as Bobwhites which are too often neglected by us in winter. Such a device may be employed almost anywhere, and, on a small scale will be found effective in a sheltered spot in the yard, although a simpler station is desirable in town.

If a large fallen log is available, and brush is piled over the windward side leaving a sheltered space on the opposite side, the haven thus formed is often successful as a feeding ground. And the most promiscuous throwing of grain or other food even though not to be encouraged, will possibly have its good effects.

In the yard in town where birds are to be fed, a simple shelf on a tree trunk, a table with a single central leg, or even a widened windowsill may be very effective, but it should always be remembered that a sheltered, sunny spot is desirable.

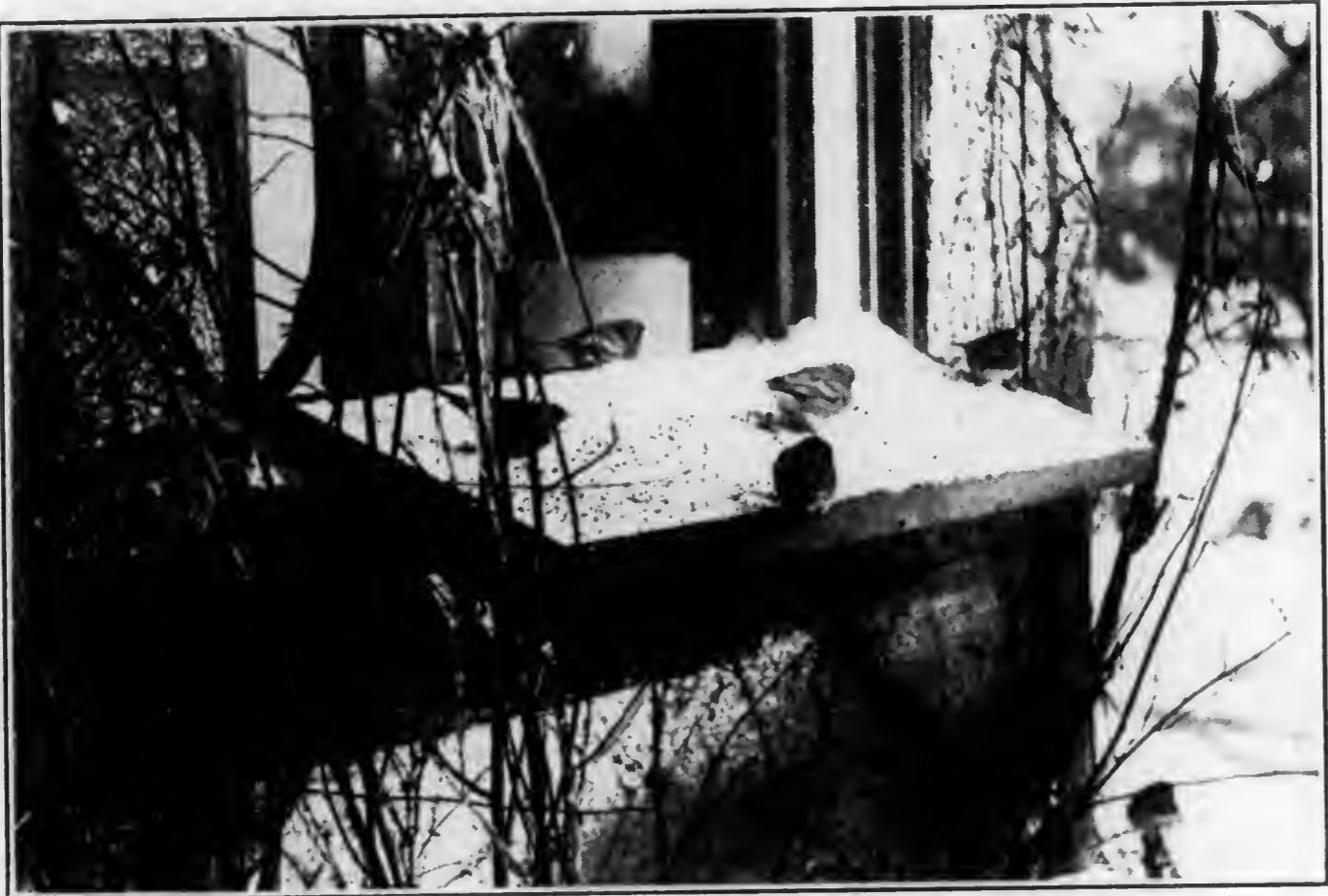
If a tree with a few shrubs at its base is chosen as a likely feeding-station, the snow should be cleared away before food is placed on the ground for Juncos, Tree Sparrows, and other ground-feeders; a neat shelf on the lee side of the trunk may be erected for birds which prefer to feed there, such as Cardinals, Chickadees, and Tufted Titmice. To the trunk or limbs various devices for holding suet and other desirable winter foods may be attached. At the feeding counter during winter the following items will be appreciated by the birds:

Grit: Grit is an important item which is too often omitted. It is needed more by game birds than by smaller species, but should be present at all feeding places. It may take the form of broken shell, coarse sand, or other hard material, and should be mixed with the grain or other food used.

Grains: Cracked corn, wheat, buckwheat, millet, and other native grains are desirable both on the shelf and on the ground. Most winter birds will find this food very acceptable. Field corn on the cob is appreciated by Ruffed Grouse, Wild Turkeys, and Ring-necked Pheasants, and a simple upright stick into which the cob may be thrust is an effective means of keeping the corn above the snow during winter.

Seeds: Sunflower seed is greatly enjoyed by Goldfinches, Purple Finches, and members of the Sparrow tribe. This seed may be put out loosely, with other grains, but it is especially acceptable if left

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in the head, which may be nailed or wired to a trunk, branch or shelf. Canary-bird seed is enjoyed by some species but it is not necessary to go to the trouble of getting it if the other suggested foods are available.



Photograph by Frank Pagan, Wellsboro.

Fig. 23. A ROBIN TAMED BY MR. AND MRS. PAGAN
Birds respond quickly to kind treatment.

Nut Meats: Cracked black walnuts, hickory nuts, and others are highly prized by Woodpeckers, Chickadees, Carolina Wrens, and Tufted Titmice. Do not extract the meats of the nuts, because the birds like to do this themselves. Peanuts (unsalted and preferably unroasted), may be fed either shelled or not; it is sometimes amusing to watch a chickadee at work on a peanut that has been suspended from a bough by a wire or string. Mr. and Mrs. Francis H. Coffin of Scranton have a string of whole peanuts fastened about the roof of their window feeding-station. Fresh cocoanut is a good winter food. Half a cocoanut shell, suspended by wires from a fairly high branch may make a very good feeding receptacle. And a fresh cocoanut with part of the shell removed may prove a valuable addition to the feeding-counter if the nut is suspended by wire or firmly fastened to the shelf (see figure 22).

Suet: Beef suet is a wonderful winter food, appreciated by many species of birds. A piece of this may be nailed direct to the trunk, or placed in a secure open-meshed wire container and then either

suspended from or attached direct to the trunk or branch. The birds will pick at the food through the large meshes. Woodpeckers and Nuthatches are particularly fond of suet. The so-called "bird-stone" which is made of melted suet with which has been mixed seeds, grit, nuts, and bits of bone is good. This mixture is poured on twigs or on the shelf, or may be painted on the bark of trees.



Photograph by Miss Esther Heacock, Wyncote.

Fig. 24. CHICKADEE AT COCOANUT FEEDING-STATION
A novel and attractive arrangement.

Many other winter foods have been suggested and employed successfully, such as portions of various green vegetables, apples, hard-boiled eggs, broken up sweet cookies, fresh boiled potatoes, bread, and specially made meal cakes, but the above listed foods will be found sufficient for most uses.

Certain bird-lovers have devised clever rotating weather-vane feeding stations, in which three sides of the box are closed with or without glass, and the open side is so weighted by windcatching flanges that they always swing the whole box around with the covered sides exposed to the wind, thus affording the birds and food perpetual shelter (see figure 25).

A Christmas tree for the birds is an attractive and appealing way of remembering our feathered friends during the cold season. This may be a specially arranged tree, or it may be the one discarded by the children after the holiday festivities, but if garlanded with various foods and placed in a suitable situation it should attract the birds.

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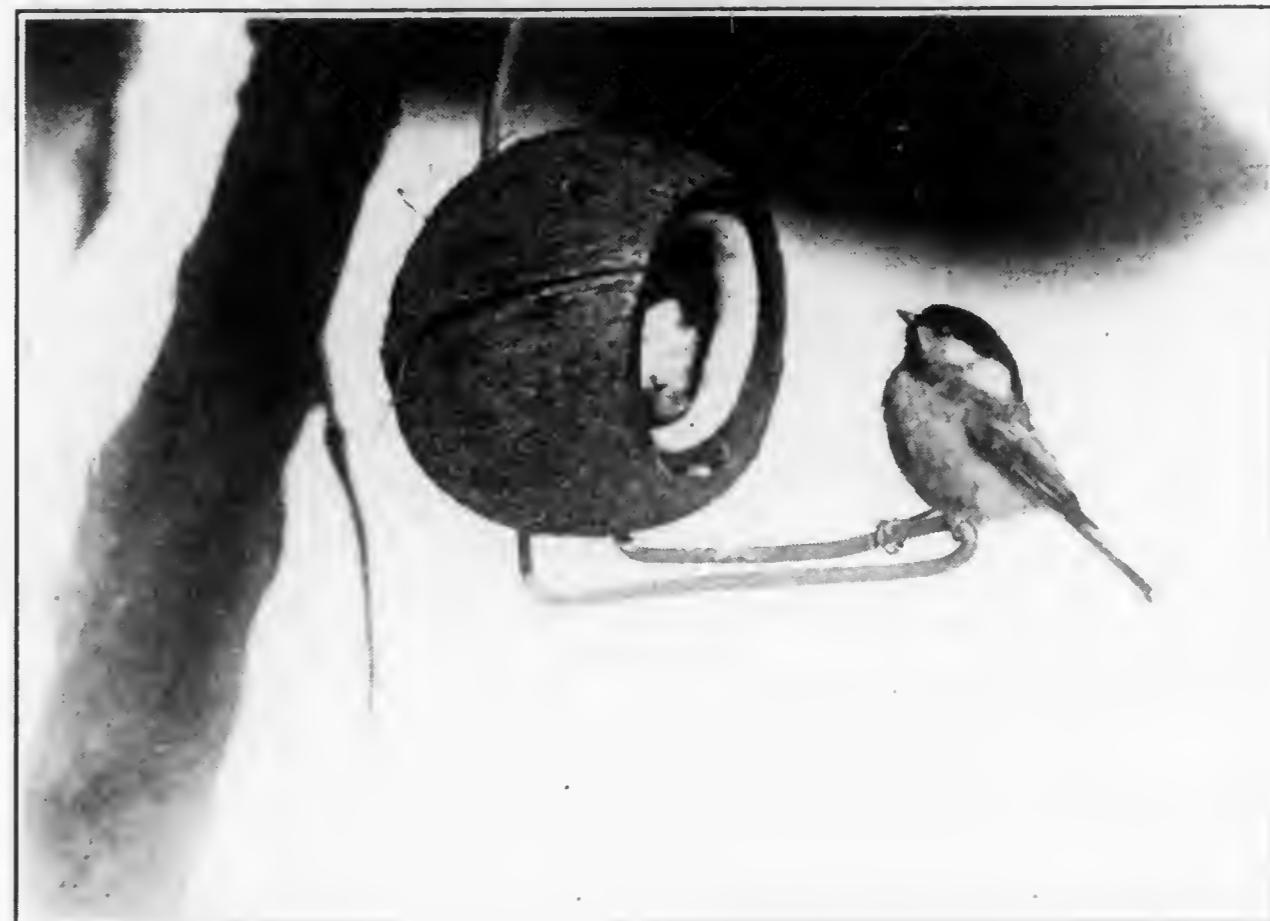
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By all means care should be used to situate the feeding-station in a place which will not be specially advantageous to a cat, for cats will watch the winter movements of birds very closely.

English Sparrows are sometimes so numerous at the winter feeding-station that they are a nuisance. Although a shelf on springs has been suggested as sparrow-proof, I have not had pronounced success with my own experiments in thus keeping them away. If English Sparrows are too numerous they should be shot or captured in a trap.

If the weather is especially cold it will do no harm to give some water to the birds occasionally although they can eat snow if they need water.

SHELTER FOR WINTER BIRDS

During the winter the bird-student will see the advisability of allowing hedge rows, fences and thickets to remain uncut, for the birds find in them the most perfect natural shelter. Therefore he will see that care is used in the spring or autumn burning and clearing so that some natural shelters may be preserved for the winter birds. He will also see that some birds prefer grape-vine tangles, and others coniferous trees, so that when he considers planting in the future he may bear the winter birds in mind.

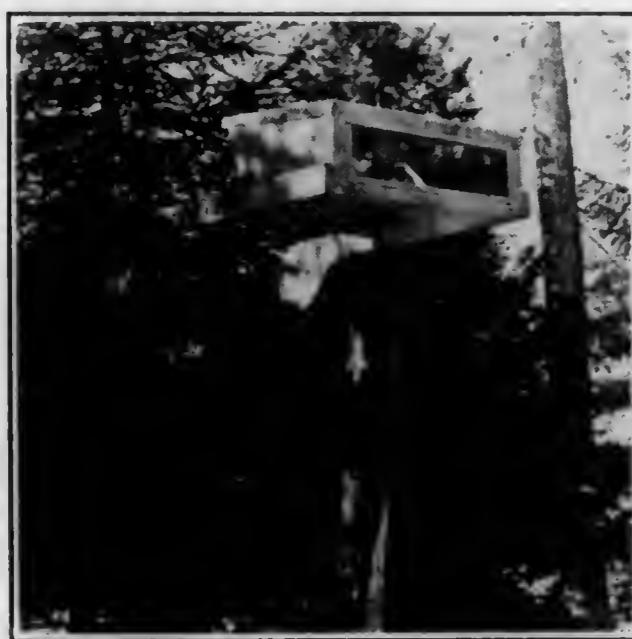


Fig. 25

Photograph by Stoffer Photo Co., Altoona. Photograph by Miss Florence L. Griscom, Roslyn.

Fig. 25. A WEATHER VANE FOOD COUNTER WHICH SWINGS ABOUT SO AS TO PROTECT THE BIRDS WHICH ARE FEEDING

Erected by the Blair County Game, Fish and Forestry Association.



Fig. 26

Fig. 26. CATBIRD AT FEEDING-SHELF

Even the insectivorous species may be attracted to food counters.

NESTING HOUSES

As spring comes on, and the winter bird-visitors begin to return to their northern nesting grounds, our familiar birds gradually appear, and we are faced with the problem of helping them in their nesting.

The preservation of as many natural nesting places as possible is urged most vigorously. If a large dead tree happens to stand nearby, do not, unless unavoidable, cut it down. There are many species of birds which prefer to use dead trees as nesting sites.

While some of us prefer natural nesting sites to man-made boxes, the birds quickly adopt these houses even when many natural sites are available. We think that we have trained our birds to nest in the houses which we have put out for them. But my friend Dr. Alfred Emerson quickly dispelled this notion when he told me of a bird-house which he erected in the wilderness of British Guiana. This house was immediately claimed by a pair of South American Wrens who had doubtless never heard of bird houses! Rustic boxes are chosen by most birds in preference to others, however. Successful houses for Purple Martins may be very ornate, and any degree of refinement and decoration does not seem to displease them at all. On the other hand Martins often accept the most humble sort of house if the environment satisfies them. Boxes for Robins are often put up at the present time, but Robins do not seem to have any difficulty in finding nesting sites. Also it seems doubtfully kind to

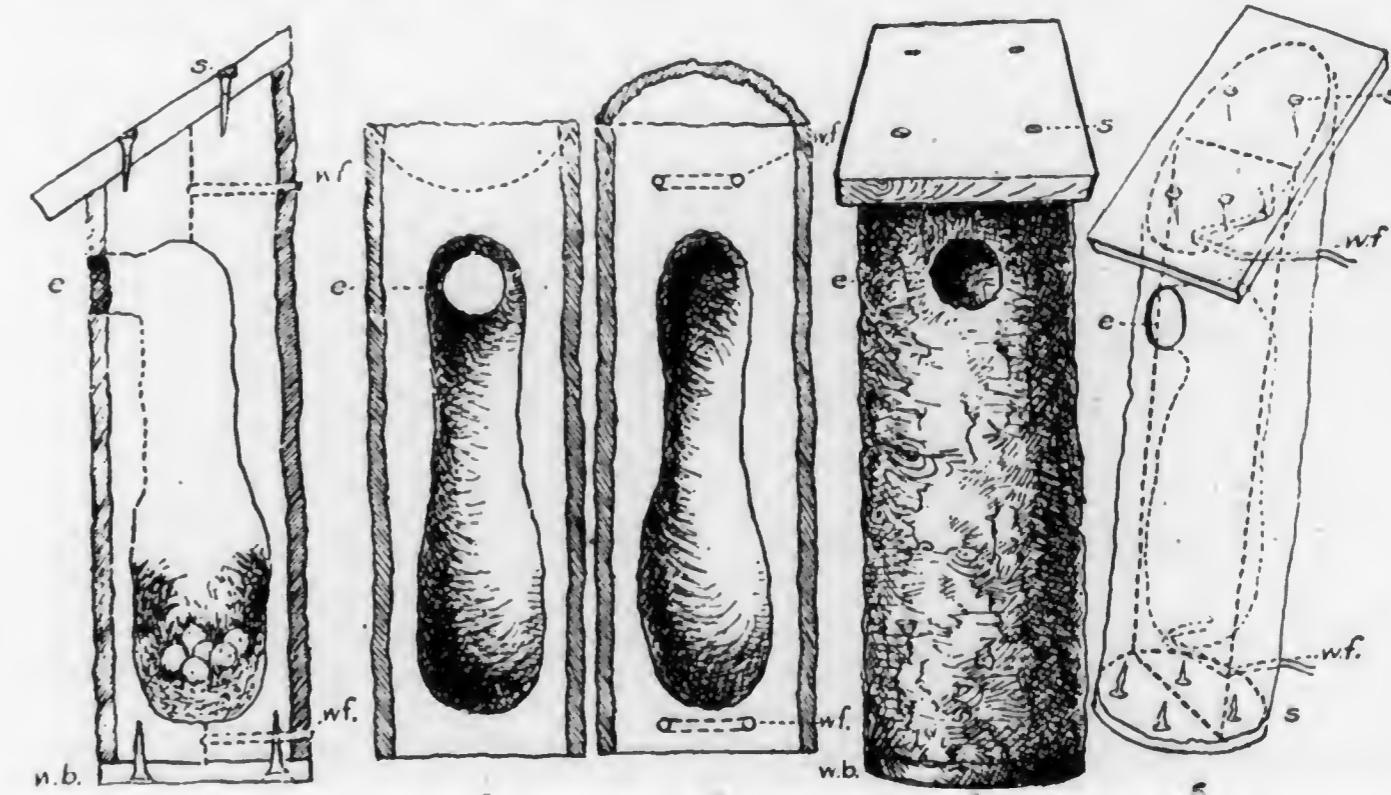


Fig. 27. DIAGRAM OF BIRD BOX MADE FROM SECTION OF TREE

1. Diagram of box showing position of nest. 2. Front half of log hollowed out, showing entrance. 3. Back half of log hollowed out, showing groove and holes for wire fasteners. 4. Finished house, showing sloping roof and added base. 5. Complete plan. e, Entrance. s, Screws. wf, Wire fasteners.

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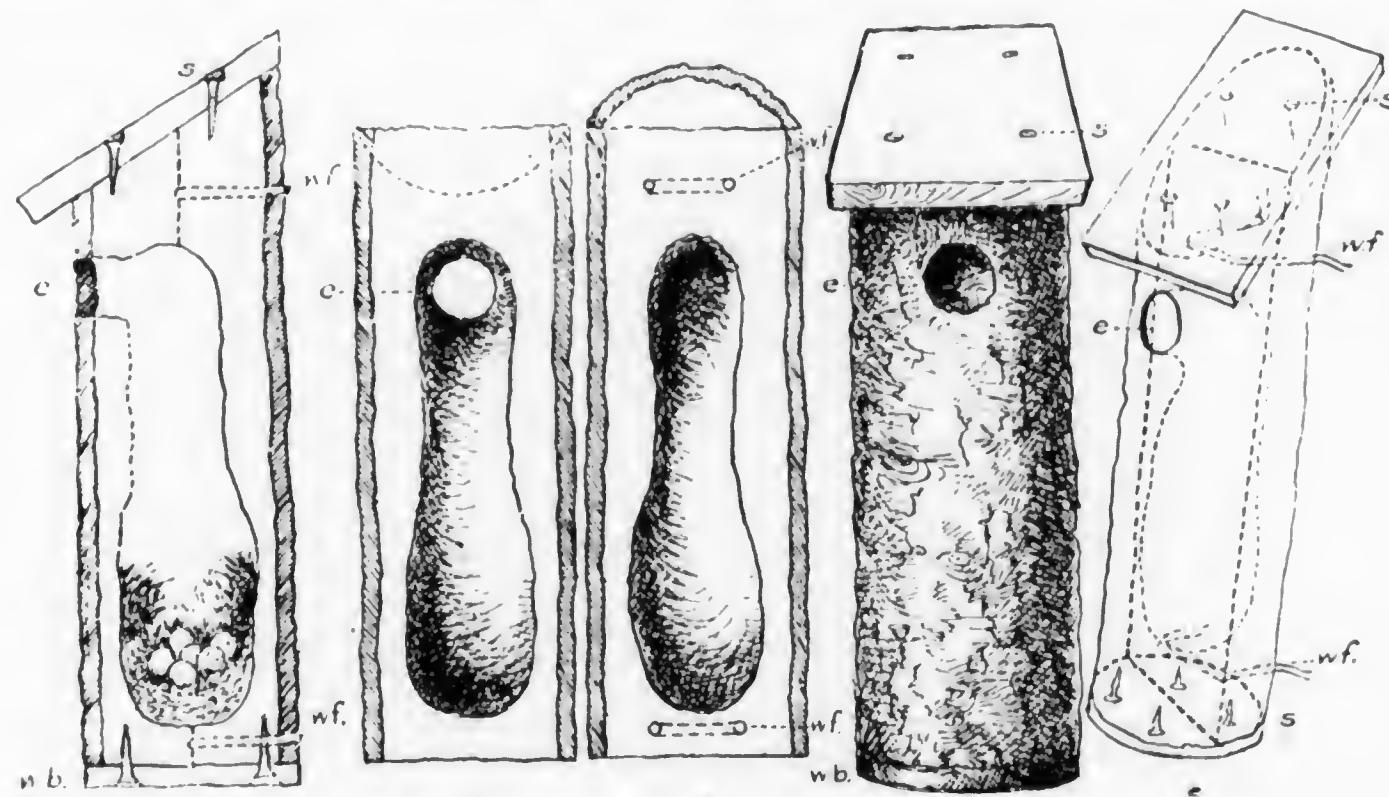


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furnish woodpeckers with finished boxes where old trees are available. It is no hardship for a woodpecker to make its own nesting cavity, and perhaps it is wiser to allow them to build their own cavity than to provide it for them.

A few general rules should govern the making and placing of bird-houses. For Bluebirds, Chickadees, House Wrens, and other species, old nesting cavities of Downy, Hairy or Red-headed Woodpeckers, with a rain-proof roof and securely fastened to a tree or post, will often be successful.

A section of tree trunk sawed lengthwise, hollowed out, drilled with proper entrance hole, and then fitted together securely and placed in a suitable situation will admirably meet the needs of woodpeckers, Bluebirds and other species which use cavities. All boxes should be roofed carefully to prevent the entering of rain, and if possible the edges of the roof should protrude as eaves, under which ventilating holes should be drilled to make the nest cooler in summer. The interior of boxes should not be planed off, but should be roughened so as to allow the young birds to clamber about with ease. For Bluebirds, House Wrens, and others it may be wiser to place the box on a pole or iron pipe in the open in a more or less sheltered place rather than on a tree trunk; but in any event a belt of tin should be placed about the post or trunk to prevent cats from climbing up. This tin should be wide enough and at a sufficient distance from the ground to prevent cats from reaching or jumping over it.

If many bird-houses are to be erected care should be used not to place them too near each other, since this will keep some birds from using the boxes, or will cause altercations of one sort or another during the nesting season.

Although houses of one kind or another have been used and may be selected by many species of birds for nesting sites, the species listed below seem to appreciate and use boxes most extensively.

SPECIFICATIONS FOR BIRD-HOUSES

Robin: Boxes with two, three, or all sides open, with a rain-proof roof may promptly be chosen by Robins as a nesting site. The Robin box should be seven inches square and six or seven inches high, and may be placed almost anywhere about the house or barn, or on a tree trunk, from ten to twenty feet from the ground. The rain-shedding roof of such a house may be carefully covered with bark, or the whole box may be rustic. Robins often build their nests on window-sills or on the frames above doors, about eave-spouting in sheltered places, or under the roofs of porches. Bearing these likely situations (which are not always satisfactory) in mind, boxes may be placed for Robins to good effect.

It is advisable to put out string, pieces of cloth or paper and similar materials which the Robins may use in their nests. Robin boxes should be in place by the last of March.



Photograph by Miss Esther Heacock, Wyncote.

Fig. 28. BLUEBIRD AT NEST

The Bluebird is beautiful, friendly, beneficial and musical.

Bluebird: A simple rectangular or round box about five inches in diameter, and eight inches deep (inside measurements), with an inch and a half round entrance well toward the top of the box, with or without a convenient perch attached, will meet the requirements of Bluebirds, if the box is placed well in the open from six to ten feet from the ground on a fence-post, pole, or iron pipe erected for it, or attached to a tree trunk, or the corner of a building. Bluebirds may begin nesting quite early—even late in March, so the box should be ready for them by the middle of March. Ventilating holes just under the roof are important, since Bluebirds may raise as many as three broods in a season, and the last brood may suffer with heat if the sun strikes the box strongly and there is no means of good ventilation.

The old nesting-cavity of a Downy or Hairy Woodpecker, if carefully removed, provided with a weather proof top, and securely fastened to a branch, trunk or post, will often attract Bluebirds. Remember the tin band about the post or tree to keep the cats out.

Tufted Titmouse: A square or round box nine or ten inches in diameter (inside measurements), with entrance one and one-fourth inches in diameter well toward the top of the box will meet the demands of Tufted Titmice, if placed from eight to ten feet from the ground, in a rather isolated or well sheltered place. Titmice do not always accept boxes placed in the open. Titmice are often

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Tufted Titmouse: A square or round box nine or ten inches in diameter (inside measurements), with entrance one and one-fourth inches in diameter well toward the top of the box will meet the demands of Tufted Titmice, if placed from eight to ten feet from the ground, in a rather isolated or well sheltered place. Titmice do not always accept boxes placed in the open. Titmice are often

surprisingly early nesters. Sometimes boxes put up for larger birds will be used by them. They will often bring a great deal of rough material such as leaves with which to fill a large space.

Chickadee: If an old Downy Woodpecker nest is not available, a box eight or ten inches deep, and about four inches in diameter (inside measurements) with round entrance hole one and one-eighth inches in diameter placed well toward the top of the box, will attract Chickadees. This box may be placed on the side of a house, or on a tree trunk from eight to ten feet from the ground, in almost any sort of place. Chickadees will use plant fibre, thread or bits of cotton in the construction of their nest. More than once I have located a Chickadee's nest by dropping cotton about which the birds took while I waited.

White-breasted Nuthatch: Nuthatches often use natural cavities as nesting sites. A box eight inches deep and four inches in diameter (inside measurements) with one and one-fourth inch round entrance toward the top of the box will suffice, if it is placed on a tree trunk from ten to forty feet from the ground. Nuthatches often nest much higher than either Chickadees or Titmice. They appreciate bits of soft material that they may use in their nests. They sometimes start nest building late in March.



Photograph by Miss Esther Heacock, Wyncote.

Fig. 29. HOUSE WREN AT NEST-BOX

A familiar dooryard bird whose habits bear watching.

House Wren: House Wrens may use almost anything as a nesting site. They build in tin cans, pockets of old coats, gourds, jugs, old woodpecker cavities, natural cavities, or boxes which are placed for them. In making a House Wren box the size of the entrance hole is rather important. This should be seven-eights of an inch or a trifle more in diameter. Unless the entrance hole is made small English Sparrows will enter and cause the wrens to desert. The box which may be four by four inches and six or eight inches deep (inside measurements), may be hung on a branch, fastened to a wall or trunk, or placed at the top of a pole or iron pipe. The entrance to the box may be at almost any distance from the floor of the cavity, but is preferable toward the top. It is well to provide wren houses with perches on which the birds may stand.

More than once I have helped wrens in the building of their nests by breaking twigs off for them. I broke about a bushel basket full for a pair once, and was amazed on returning next day to find the twigs all gone. The nest was complete; only a comparatively small number had been used there. But the male bird had almost filled a gallon paint can, several strawberry boxes, and other cavities with the twigs!

House Wrens may cause much trouble if their nesting boxes are placed near nests of other birds.

Bewick's Wren: If you are fortunate enough to have this little known relative of the House Wren as a summer resident, by all means cultivate its acquaintance. The bird is about the size of the House Wren, but has a longer more loosely hinged tail which is marked with light gray areas on the outer feathers. There is a prominent whitish line above the eye also; but the principal difference in the species occurs in their songs. The Bewick's song may remind you of a lightly given, somewhat abbreviated Song Sparrow's outburst.

Bewick's Wrens will use about the same sort of box as the House Wren; but they occupy situations in wood piles, under porches, and other sites very near the ground which House Wrens practically never choose. For some reason or other Bewick's and House Wrens never occur at the same place as nesting species. They are apparently antagonistic in some way.* In certain sections the wren population varies; the usual number of House Wrens may be replaced by Bewick's Wrens the following year, and *vice versa*. The Carolina Wren is also to an extent variable. Bewick's Wren is somewhat local in distribution but occurs sparingly in the southwestern part of the State, and rather regularly in the valleys of the central mountain district as far north as Huntingdon County.

*Very likely the House Wrens cause the Bewick's Wrens to desert by breaking their eggs or driving the birds from their nests.

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Photograph by Samuel S. Dickey, Cambridge Springs.

Fig. 30. NEST OF BEWICK'S WREN IN CORNER OF OIL DERRICK

This photograph, which was taken in Greene County, shows the strange situation in which this wren often builds.

Carolina Wren: This large handsome wren is restricted to the southern and southwestern counties of the State. It is a brilliant songster and is worthy of much attention. I have not had the best results personally, in attracting these birds with nesting boxes. Houses recommended by various authorities are virtually the same as for House Wrens as regards size, although the opening should be one and one-fourth or one and one-half inches in diameter. After some study and experience with these birds the following surprising suggestions are offered.

The box most often used was fastened three feet from the ground to a post in a thickly weeded area at the border of a woods. This box was entirely open on one side save for small strips at the top and bottom an inch in width. The box was well shaded. The large dome-shaped nest was built in the box but the materials stuck out in all directions, and the cup of the nest proper was neatly hidden deep in a lower corner. When I found the birds using this box I carelessly tacked up a large soap box at a sloping angle on the back of a shed and was surprised to see another pair of Carolina Wrens

instantly take possession; they nearly filled that box (which was about two feet by three feet by one foot) with weed stalks, and other nesting material and seemed to regard it an exceptionally good find. And nesting boxes, the acme of neatness, apparently were not preferable to such ramshackle abodes as these! It should be remembered, however, that Carolina Wrens like dark, sheltered places in which to nest.

Tree Swallow: In some parts of Pennsylvania, notably in the northern and more mountainous counties (and usually near lakes or water-courses) the Tree Swallow occurs as a nester. These Swallows will occupy a box whose inside measurements are five by five inches, by five or six inches deep, placed from ten to twenty feet from the ground, either on a dead tree or open pole not among leafy branches. The entrance to the box may be drilled almost any distance from the floor of the cavity, but is perhaps best three inches or more above so that the nest may be built below the entrance.



Photograph by Miss Esther Heacock, Wyncote.

Fig. 31. PURPLE MARTINS AT HOME

Most of the birds shown in this photograph are immature; the young birds wander about the house a good deal before learning to fly.



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Most of the birds shown in this photograph are immature; the young birds wander about the house a good deal before learning to fly.

Feathers are used extensively as a lining in the nest of a Tree Swallow, and with a little care you may have delightful experience in giving feathers directly to the birds. The birds soon seem to realize what you are about, will learn to wait for your appearance, and may almost take the downy bits from your hands.

Purple Martin: These much sought-for birds may nest in separate pairs at times, but seem to prefer associating in communities. Therefore large houses with many compartments are often most successful. Whether a single compartment or many are provided, however, the inside measurements of these should be about six by six by six inches, with a two and one-quarter inch entrance not more than an inch above the floor. The house may be fastened to a human dwelling or dead tree, but is more sightly and perhaps occupied more readily if placed on a stout pole from fifteen to twenty-five feet from the ground.

Martin houses should be cleaned yearly; therefore some device which will easily allow taking down and putting up the box is

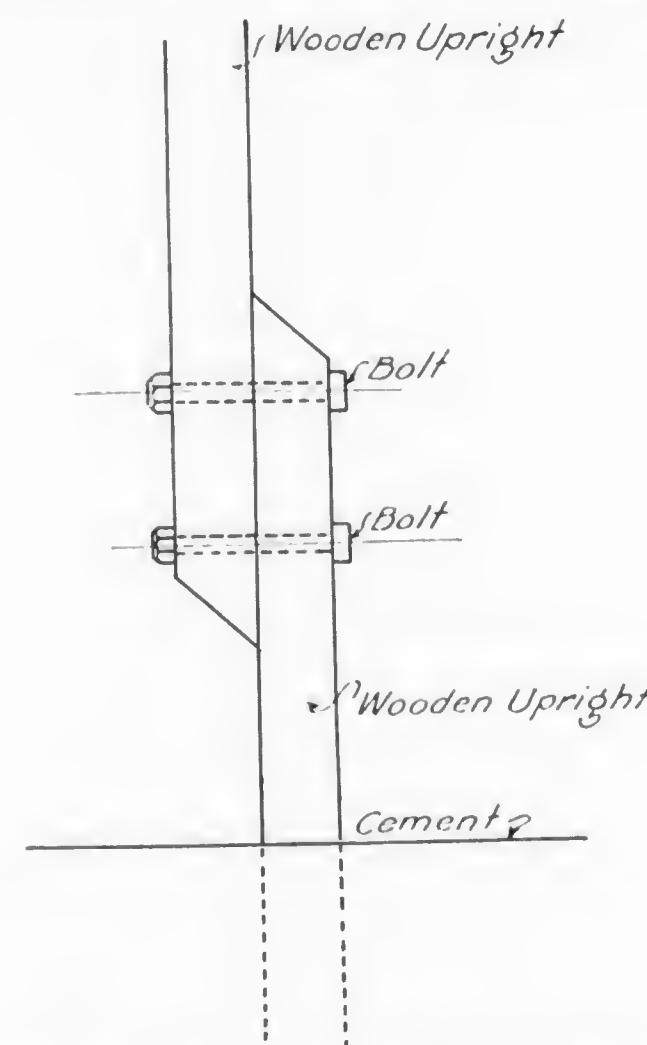


Fig. 32. DIAGRAM OF SUPPORT FOR MARTIN HOUSE

This will allow easy lowering of the house by the removal of one of the bolts.

desirable. A cement holder for the base of the pole should be used to prevent rotting of the wood from contact with the damp soil. A clever device for lowering and raising the Martin house is shown in the accompanying cut. The upper or lower bolt may be re-

moved. This will allow the upper and loose part of the pole to swing over on the fastened bolt as a hinge, and permit lowering and raising of the house with ease.

Martins are unquestionably partial to some communities; if they do not like a certain environment for any reason it is virtually impossible to lure them; but if they find a location favorable they will nest in anything available.*



Photograph by Miss Esther Heacock, Wyncote.

Fig. 33. FLICKER AT NEST

Flickers feed their young by regurgitation.

Flicker: A box with inside measurements six by six by twelve to eighteen inches deep, with an entrance two and one-half inches in diameter placed near the top may be used by Flickers even though it be placed only four or five feet from the ground. It may well be placed higher, however. Flickers should be given such a box if they show indications of drilling in the gable region of a dwelling, to avoid damage to the weather-boarding. Such a box should be placed directly at the site they have chosen. The wood used in a Flicker house should be quite thick since the birds may wish to peck at the inside themselves.

*For further instruction concerning the making and placing of Martin houses Mr. J. Warren Jacobs, of Waynesburg, should be consulted.

Crested Flycatcher: This characterful species is partial to a well wooded nesting ground, but with an attractive box may come to comparatively open situations. The box with inside measurements six by six by eight inches deep should be placed from ten to twenty-five feet from the ground, either in the open or fairly well hidden among foliage. The entrance to the box, which should be well toward the top, should be about two inches in diameter. These assertive birds will use a great deal of soft material in their nests and may take everything of that nature which is put out for them. If Crested Flycatchers nest near a chicken yard there is almost no chance for a hawk to do any damage, for the Flycatchers sound a warning note which the fowls soon learn to heed.

Phoebe: It is scarcely necessary to put up a special box for Phoebes (erroneously called **Pewee**, locally) since a convenient rock ledge, cool spring house, old well, or shaded porch is almost certain to be used as a nesting site. However if there is a sheltered porch or open portion of a shed where Phoebes might nest, a simple little shelf, or mere piece of board about two by four inches placed about six inches from the ceiling will give them something to which they may fasten their mossy structure. Phoebes become attached to certain nesting places and will leave only when driven away or when they can find no projection to which they can fasten their nest.

Red-headed Woodpecker: The box for this species should be six by six by twelve to fifteen inches in inside measurements, and should have a two-inch entrance near the top. The box for best results should be placed rather high, and preferably along the open trunk of a tree.

Red-bellied Woodpecker: The Red-bellied Woodpecker occurs chiefly in the southern, southwestern, and locally in extreme western Pennsylvania. Boxes for this species should be the same size as for the Red-headed; the Red-bellied often nests higher, however. The box for this species may be fairly well hidden by foliage and branches.

Hairy Woodpecker: A box six by six by twelve inches deep (inside measurements), placed rather high and with an entrance one and one-half inches in diameter drilled well toward the top of the box should meet the requirements of this species. Hairy Woodpeckers are locally rather wild, however, and may not be very amenable to boxes. They sometimes nest very early, and may drill their holes as early as the latter part of March.

Downy Woodpecker: A box with inside measurements four by four by twelve inches deep, with an entrance one and one-half inches in diameter well toward the top of the box will do for the Downy. The box should be placed from ten to twenty feet from the ground.

Screech Owl: A natural cavity is often used by these little owls; but a box with inside measurements eight by eight by twelve to fifteen inches deep with a three inch entrance well toward the top of the box, if placed fifteen to forty feet from the ground may be used by them. Such a box should be placed in the fall since the birds may select their future nesting site during the winter. The box should be placed in a situation where it will not often be struck by direct rays of the sun, and it is well to place ventilating holes under the roof.

Sparrow Hawk: The same sort of a house as is built for a Screech Owl will be used by Sparrow Hawks. In placing a house for use of these harmless little hawks, however, an open situation should be chosen, such as the top of a telephone pole. In putting up a house in the open be sure of proper means of ventilation.

Barn Owl: While we do not often have opportunity to furnish these beautiful and beneficial owls with houses, we may do so if we learn that they live in the vicinity. The box should be ten by ten by eighteen inches deep in inside measurements and should have a six inch entrance about five inches from the floor of the cavity. Such a box may be placed high in a large tree, near the trunk, but may also be used if placed in the sheltered gable of a barn or in a similar situation. Barn Owl nesting boxes should always be placed at considerable distance from the ground.

Wood Duck: Occasionally this beautiful bird nests with us. A box similar to that for a Barn Owl (ten by ten by eighteen inches deep), if placed in a wooded situation from four to twenty feet from the ground and near the water may be used by this or a rarer species of duck, the Hooded Merganser, which may nest with us rarely. These birds of course demand a certain isolation and we cannot expect to lure them to civilized sections.

BIRD-BATHS

Birds bathe more than the unobservant person might suppose. This contact with water doubtless aids in the actual cleanliness of the bird's body, but also helps to regulate the body-temperature in mid-summer when the heat is often excessive. Sometimes the supply of drinking water is so scant that this, too, is a real problem of the bird's existence. Therefore a well made, regularly cleaned and filled bird-bath will serve both ends—drinking fountain and bathing pool.

The designing of bird pools is subject entirely to the individual's own tastes, means, and implements, but useful and beautiful pools may be made at little expense.

If it is possible to erect a bird-fountain or some such bit of real art on your premises, well and good; and the birds will show their appreciation of it. But most of us must be content with other devices not so elaborate.



Photograph by Frank Pagan, Wellsboro.

Fig. 34. A ROBIN AT HIS BATH

A comfortably shallow, well-placed bath will attract many birds.

A few general principles should guide us in the making and situation of a bird pool. If possible the pool should be near enough to easy water supply to allow frequent changing. If the slope of the land will allow adequate drainage for a very small overflow, and it is possible to feed the pool by direct faucet, pipe or hose, this is ideal. Otherwise the pool should be filled periodically, and occasionally cleaned. The pool should, if possible, be in the shade, and yet not so near dense shrubbery as to allow the convenient approach of a cat.

The simplest pans, bowls filled with stones, and other such receptacles if firmly set on or actually sunk into the ground are very good. But the construction of a cement pool is neither expensive nor difficult. Such a pool should slope in gently from all sides, and should not be more than two and one-half to three inches deep in the middle if the diameter of the water surface is not more than three or four feet. It is desirable to have the cement surface set with stones not only for a rustic effect but to give the birds particular points at which to bathe, where the depth of the water may suit

them. Some birds will not bathe if they think they are going to slip in. An inverted garbage-can lid carefully sunk in the sod has been known to make an admirable pool, and a porcelain wash-bowl filled with rocks so as to allow a sloping edge all around is usable.

A little observation of birds at the bathing pool will reward us with an intimate knowledge of their characteristics. Robins are among the most constant bathers, and when they have finished may be completely drenched. Other birds are more dainty and restrained. If the bathing pool happens to be near a year-around feeding-counter in a favorable situation, such a combination is very likely to increase the local bird population considerably.



Photograph by Game Protector W. L. Wright, Trauger.

Fig. 35. WILD TURKEYS FEEDING ON A STATE GAME REFUGE

Refuges mean food, shelter and safety for game birds.

PLANTING OF FOOD-BEARING PLANTS

In the spring a row of sunflowers may be planted somewhere at the edge of the garden or along a building. These plants after going to seed are certain to attract Goldfinches, and in winter will furnish a valuable addition to the feeding-counter. Goldfinches also like lettuce and cosmos seed very well; perhaps some lettuce plants may be left to develop seeds for them.

But planting for the birds should include various trees, shrubs, and vines whose fruit the birds like in summer, fall or winter. Some of these plants may not be particularly desirable about the premises, but will do no great harm, and at times are largely responsible for

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the attracting of unusual bird visitors. Often the presence of such fruits will keep the birds away from cultivated cherries, and other fruits which we prefer they leave untouched.

Coniferous trees furnish a direct food supply to only a few birds, and the species which eat such cones are rare and irregular in appearance—such as the beautiful White-winged and Red Crossbills, and Pine Grosbeak. Cedar berries are much appreciated by waxwings and occasionally other species, and the presence of Goldfinches and Pine Siskins about hemlocks and tamaracks indicate they may be finding special food there.

The principal value of evergreens to the birds, however, is that they form excellent shelter. Always are evergreen clumps a favorite rendezvous, and numerous winter birds prefer such places to almost any other situation.

Trees which attract birds on account of their fruit which is desirable as food include the various cultivated small fruits, Russian Mulberry, Red-Haw, Mountain Ash, Dogwood, Wild-Cherry, Box Elder, Beech, White Ash, and others. Birds may seriously damage certain small fruits in yard or orchard occasionally, but if such trees as mulberries are available most birds will flock to them for food in preference to all others.

Among shrubs which furnish food for birds may be mentioned Elder-Berry, Black-Haw, Spice-Bush, Sumac, Shad Bush, Japanese Barberry, Wild Rose, High-climbing Cranberry, Privet, Wild Raspberry, Snowberry, and others. Vines such as Wild Grape, Bittersweet, Virginia Creeper, Honeysuckle and others are sought. And certain annual berries, such as the Poke Berry, are highly prized.

CLEARING OF LAND

The occasional weed patch or clump of briars along the fence means more to the local bird population than most of us realize. While we all enjoy the appearance of lands which are well cared for, we should remember that the birds must have places of refuge if we expect them to live near us. Therefore, in burning or clearing areas it is well to leave all the hedges or fences well upgrown with the weeds, briars, sumac, grapevines and shrubs that have naturally grown there, and even in some cases to plant food-bearing plants which we know the birds will appreciate. Some of these fruit-bearing plants are appetizing to human beings, and thus they will serve a two-fold purpose. If the best protection for birds is sought, evergreens or such hedge plants as bois d' arc (osage orange) and other thorn trees are admirably suited as shelters since hawks and owls are not usually able to penetrate such havens with ease.

Certain species of birds, such as the Towhee, practically depend on wood lots or such brushy areas as nesting grounds. Therefore if birds are sincerely desired such little plots of ground where Nature is allowed to develop according to her own moods, are indispensable.

OBSERVATION OF PENNSYLVANIA BIRD-LIFE

Those who know birds best are their most ardent protectors. Therefore an educational campaign for accurate bird observation is a wholesome protective measure.

Some of us are well enough acquainted with birds to know that they have many different call notes and songs; that the dates of their arrival and departure are amazingly constant throughout the years; that their habits vary with food supply or season; that there



Photograph by W. W. Wilt, Franklin.

Fig. 36. YOUNG TURKEY VULTURES

As an eater of carrion the Vulture is of great value.

are dramatic incidents in every day of the bird's life; that much interest centers about the building of the nest and the rearing of young. And most of us know just enough about these things to have a keen craving to find out more. Therefore, in a brief way may we not recommend and encourage the widest possible observation of birds?

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As an eater of carrion the Vulture is of great value.

are dramatic incidents in every day of the bird's life; that much interest centers about the building of the nest and the rearing of young. And most of us know just enough about these things to have a keen craving to find out more. Therefore, in a brief way may we not recommend and encourage the widest possible observation of birds?

There are innumerable facts about our commonest birds which are not yet known. This should be encouraging to the student who feels that he cannot accomplish anything worthwhile unless he travels far to swamp, mountain, or seashore! Only by continued effort of observers in widely separated localities will the facts of the seasonal movements of birds be fully ascertained. In this matter the popular bird-banding movement under the auspices of the United States Biological Survey is accomplishing much that is worthwhile. Organizations among the school children, such as Junior Bird Clubs, are doing much good, as are too the groups made up of older people. The Yearbook of the Scranton Bird Club, which is at hand, shows clearly what wideawake, thorough work such an organization may do; a recent bulletin of the Audubon Society of Western Pennsylvania evinces the interest that organization has in its work, and such well manned and progressive groups as the Audubon Club of Norristown, the Audubon Society of the Sewickley Valley, Buck Hill Nature Club, Doylestown Nature Club, North East Nature Club, West Chester Bird Club, Wyncote Bird Club, Baird Bird Club, Ulster Nature Club, and others are excellent examples of organizations which exist for a real purpose. The development and possible unification of such organizations throughout Pennsylvania is strongly to be recommended, for the cooperation of such observers and workers is certain to result in increased protection of the birds.

It is urged that whatever notes taken in bird observation be as accurate as possible. There exists among some observers such a mania for large lists that birds which are very rare or unknown to the region will be listed without positive identification. The good bird student soon learns that it is just as important, we might even say, *not* to have some birds in this list, as it is to have others. But the problems of bird-study are manifold and had better be left for further treatment elsewhere.

In our brief study of certain phases of Pennsylvania bird-life we have found that these feathered creatures are valuable to us aesthetically and economically, and are worthy of our encouragement and protection. It is hoped that the pages of this bulletin may have stimulated a desire not only to protect and care for the birds in the ways suggested, but to develop further means of increasing the numbers of our feathered friends.

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