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Bulletin No. 10: The Connecticut Arboretum

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Robert Fulton Logan

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THE CONNECTICUT ARBORETUM



CONNECTICUT
COLLEGE
NEW LONDON CONNECTICUT
BULLETIN NO. 10.

LOGAN.



THE CONNECTICUT ARBORETUM

BULLETIN NO. 10

OCTOBER 1958

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ARBORETUM STAFF

Director, RICHARD H. GOODWIN

Horticulturist, JOHN STENGEL

Assistant Director, WILLIAM A. NIERING

Collector, KALEB P. JANSSON

THE CONNECTICUT ARBORETUM ASSOCIATION

Association membership comprises organizations and individuals interested in supporting the Arboretum and its program. Members receive Arboretum publications and enjoy other privileges, including notices of special field trips, reduced prices on season tickets to the Nature Screen Tours, and the use of the Arboretum facilities.

Individual memberships: annual, \$5; sustaining, \$10.

Organization memberships: annual, \$10; sustaining, \$25; supporting, \$100.

Checks should be made payable to the Connecticut Arboretum and sent to the Director, Dr. Richard H. Goodwin, Connecticut College, New London, Conn.

Foreword

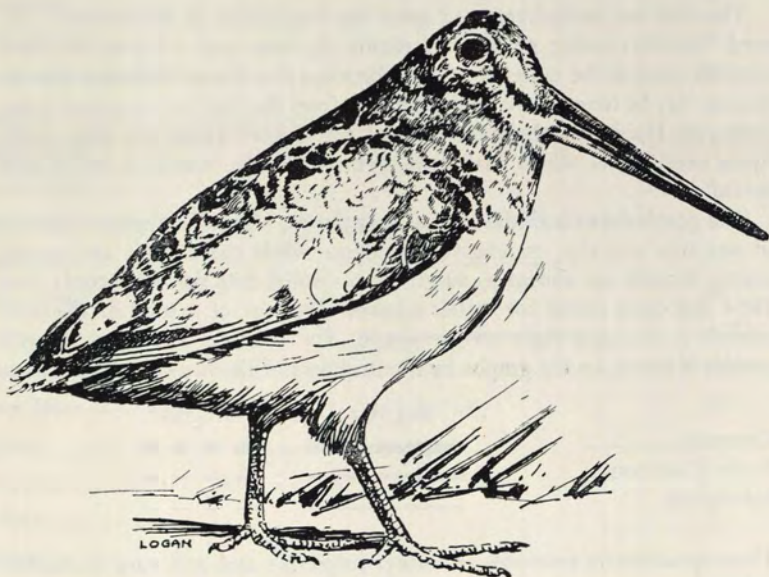
BIRDS ARE AMONG the most beautiful and, from an evolutionary point of view, among the most highly adapted creatures on our planet. For a growing proportion of our expanding population they represent a tremendous aesthetic and recreational resource. The enjoyment which people derive from the spring migration, the Christmas bird census sponsored by the National Audubon Society, the winter feeding station, field trips to sanctuaries and refuges, and observations on nesting species in the back yard can not be evaluated in a monetary sense. Figures are available, however, for the value of game birds to sportsmen. On a national basis they run into the millions.

The basic importance of birds to man, however, lies in the part which they play in maintaining the balance of nature. This is an aspect of biology inadequately understood by the public. Perhaps the primary role which birds play is in insect control. At the Connecticut Arboretum we have a large population of summer residents belonging to a wide diversity of species. We almost never find it necessary to use insecticides for pest control. The birds do this work for us.

The mass dispersal of insecticides over wide areas by airplane is becoming a matter for national concern. Such programs are bound to have an adverse effect upon all kinds of wildlife, including a reduction in the population of insectivorous birds, and the natural insect parasites of the pests we are attempting to control. Continued use of such techniques are likely not only to force us into an artificial economy increasingly dependent upon the continued use of such methods, but also to endanger the health of the human population itself, since many of these insecticides are cumulative poisons. Attention is called to the note on the fire ant eradication program printed on the back cover.

This bulletin is devoted to reporting observations on birds in the immediate vicinity of Connecticut College. We are indebted to Mr. Robert Fulton Logan, Professor of Art Emeritus, for the handsome design of the front cover and for the drawings of the woodcock, black and white warbler and hairy woodpecker. Our thanks go also to the many persons who have contributed information and assistance in the preparation of this bulletin.

Richard H. Godwin
Director



A Field List of Birds for Connecticut College





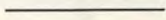
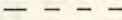
RICHARD H. GOODWIN AND FLEUR A. GRANDJOUAN

THIS LIST represents a compilation of all available records for birds seen in the immediate vicinity of the Connecticut College campus and the Connecticut Arboretum. It includes data compiled through the years by the College classes in ornithology, the two breeding bird censuses taken in the Arboretum Natural Area in 1953 and 1955, reported elsewhere in this bulletin, and especially the observations of the junior author made between the fall of 1955 and the summer of 1957, while she was a student at the College.

The following information is given for each species: the common name (as listed in the American Ornithological Union 1957 Check List), letter symbols indicating the habitats where the species is likely to be found, foot notes indicating all breeding records for our area and giving other data of especial interest, and a graph showing the relative abundance of the species at the College throughout the year.

The map on the centerspread gives the boundaries of the territory covered, the distribution of habitats within the area and a key to the letter symbols used in the table. A hyphen between two letters indicates that the species may be found in all of the habitats from the first to the second letter, inclusive. Habitat symbols are omitted for species which are seen chiefly flying overhead or which have been seen too seldom to make a designation useful.

The graph shows both the time of year during which the species is present in our area and also its relative abundance while there. Rare and out-of-season records are shown as single plots—solid dots for all records since 1954 and open circles for earlier records. The year of certain of the older records is included right on the graph. The relative abundance of each species is shown on the graphs by the thickness of the lines, as given below.

	Regular	Irregular
Common		
Fairly Common		
Infrequent		

These quantitative estimates are rather subjective and will vary in absolute values from one species to another. They are chiefly useful in indicating the relative numbers of birds at different times of year. Broken lines are used to indicate the irregular occurrence of species which may be here one year and not the next.

Although this list represents hundreds of observation-hours in the field, it is still very incomplete. It includes only 178 species, or about three-fifths of the 306 or more which have been reported from New London County. There is little doubt that numerous shore birds will be added by better coverage of the river, especially during migration, that more night trips will increase our data on the owls, that further exploration of the winter thickets and stands of evergreens will flush out stragglers such as the brown thrasher and winter visitors such as the siskins and crossbills, and that more hours in the woods during the August hush will extend our knowledge of the summer residents.

CONNECTICUT COLLEGE RECORDS

SPECIES	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	HABITAT	NOTES
Common Loon	.	o										.	A	
Red-throated Loon	.	o	.									.	A	
Red-necked (Halboell's) Grebe			.		..								A	1
Horned Grebe				.									A	
Pied-billed Grebe													A	
Great Cormorant													A	
Double-crested Cormorant													A	
Great Blue Heron										o o o		.	AC	2
Little Blue Heron													BD	3
Green Heron													ABCD	
Black-crowned Night Heron													ABCD	2
American Bittern					.		.						BD	
Mute Swan									..	.			AB	4
Canada Goose	o	o	o	o							o			
Snow Goose		.												
Blue Goose												.		
Mallard													ABCD	*5
Black Duck													ABDE	*5
American Widgeon (Baldpate)				.									A	
Green-winged Teal										o		.	AB	
Wood Duck													C	
Redhead												..	A	
Canvasback				--									A	
Greater Scaup					.								A	
Lesser Scaup													A	6
Common Golden-eye													A	
Bufflehead		.										..	A	
Hooded Merganser	--	--	--										A	5
Common Merganser					.								A	
Red-breasted Merganser	o												A	
Turkey Vulture										.				
Goshawk												.		
Cooper's Hawk		.	.		o					.		.	GH	
Red-tailed Hawk					.		.					.		
Red-shouldered Hawk		
Broad-winged Hawk		o							.					

SPECIES	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	HABITAT	NOTES	
Rough-legged Hawk									o						
Bald Eagle	.	.												7	
Marsh Hawk					oo							o			
Osprey			o		o	-	..				AC		
Pigeon Hawk				.								.			
Sparrow Hawk	o		oo	---			.		.			.			
Ruffed Grouse	_____												GH	*8	
Bobwhite	_____												FG	*9	
Ring-necked Pheasant	_____												FG	*	
Virginia Rail	_____													10	
American Coot	_____												A	5	
Semipalmated Plover	_____												C		
Killdeer	_____												CFK	*11	
American Woodcock	_____												EG	*12	
Spotted Sandpiper	_____												ABCD		
Greater Yellowlegs	_____												AC		
Least Sandpiper	_____												C		
Great Black-backed Gull	_____												A		
Herring Gull	_____												A		
Ring-billed Gull	_____												A		
Laughing Gull	_____												A		
Common Tern	_____												A		
Rock Dove	_____												K		
Mourning Dove	..		_____										.	F-K	*
Yellow-billed Cuckoo	_____												GHJ		
Black-billed Cuckoo	_____												GHJ		
Screech Owl	_____													10	
Great Horned Owl	_____												H	13	
Barred Owl	_____												HI		
Whip-poor-will	_____												H	*	
Common Nighthawk	_____														
Chimney Swift	_____												K	*	
Ruby-throated Hummingbird	_____												JK	*	
Belted Kingfisher	_____												AB	*	
Yellow-shafted Flicker	_____												HJK	*	
Pileated Woodpecker	_____														

SPECIES	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	HABITAT	NOTES
Eastern Meadowlark	o	o	oo	—	—	—	—	—	—	oo	o	o	F	*
Redwinged Blackbird	—	—	—	—	—	—	—	..	—	—	—	—	CD	*
Orchard Oriole	—	—	—	—	o	—	—	—	—	—	—	—	JK	*
Baltimore Oriole	—	—	—	o	—	—	—	—	—	—	—	—	JK	*
Rusty Blackbird	—	—	—	—	.	—	—	—	—	—	—	—	K	*
Common Grackle	—	—	—	—	—	—	—	—	—	—	o	—	FJK	*
Brown-headed Cowbird	—	—	—	—	—	—	—	—	—	.	—	—	FGHJK	*
Scarlet Tanager	—	—	—	—	—	—	—	—	—	—	—	—	HJ	*
Cardinal	—	—	—	—	—	—	—	—	—	—	—	—	K	22
Rose-breasted Grosbeak	—	—	—	o	—	—	—	—	—	—	—	—	GHJK	*
Indigo Bunting	—	—	—	—	—	—	—	—	—	—	—	—	GH	*
Dickcissel	—	—	—	..	—	—	—	—	—	—	—	—	K	*23
Evening Grosbeak	—	—	—	—	—	—	—	—	—	—	—	—	K	*
Purple Finch	—	—	—	—	—	—	—	—	—	—	—	—	GJK	*
Pine Grosbeak	.	.	.	—	—	—	—	—	—	—	—	—	K	*
Common Redpoll	—	o	.	—	—	—	—	—	—	—	—	—	K	*
Pine Siskin	o	o	—	—	o	—	—	—	—	.	o	o	GHIJ	*
American Goldfinch	—	—	—	—	—	—	—	—	—	—	—	—	CFGHJK	*
Red Crossbill	—	.	—	—	—	—	—	—	—	—	—	—	—	*
White-winged Crossbill	—	o	—	—	—	—	—	—	—	—	—	—	—	*
Rufous-sided Towhee	—	—	—	—	—	—	—	—	—	—	—	—	GHJK	*
Savannah Sparrow	—	—	o	.	.	—	—	—	—	—	—	—	C	*
Grasshopper Sparrow	—	—	—	—	—	—	—	—	—	—	—	—	—	(364)
Sharp-tailed Sparrow	—	.	.	—	—	—	—	—	—	.	—	—	C	*
Seaside Sparrow	—	—	—	—	—	—	—	—	.	—	—	—	C	*
Vesper Sparrow	—	—	—	—	—	—	—	—	—	o	(50)	—	—	*
Slate-colored Junco	—	—	—	—	—	—	—	—	—	—	—	—	FGJK	*
Tree Sparrow	—	—	—	—	—	—	—	—	—	o	—	—	FGJK	*
Chipping Sparrow	—	—	o	—	—	—	—	—	—	—	—	—	K	*
Field Sparrow	—	—	—	—	—	—	—	—	—	—	—	—	FG	*
White-crowned Sparrow	—	—	oo	—	—	—	—	—	—	..	—	—	JK	*
White-throated Sparrow	—	—	—	—	—	—	—	—	—	—	—	—	GJK	*
Fox Sparrow	—	—	—	—	—	—	—	—	—	o	—	—	GHJK	*
Swamp Sparrow	—	—	—	—	o	(39)	—	—	—	—	—	—	—	*
Song Sparrow	—	—	—	—	—	—	—	—	—	—	—	—	CGJK	*

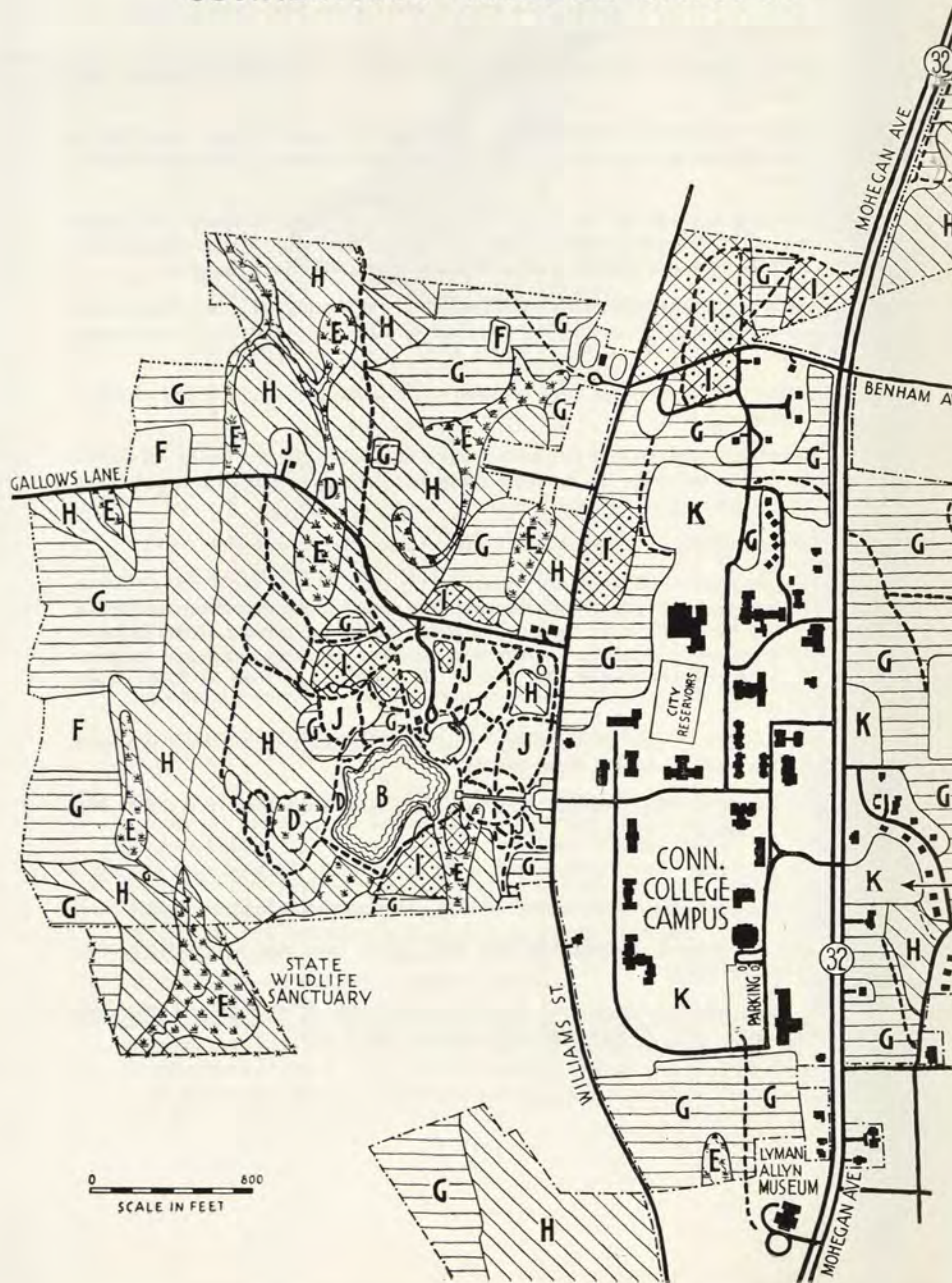


FOOTNOTES TO THE CHECK LIST

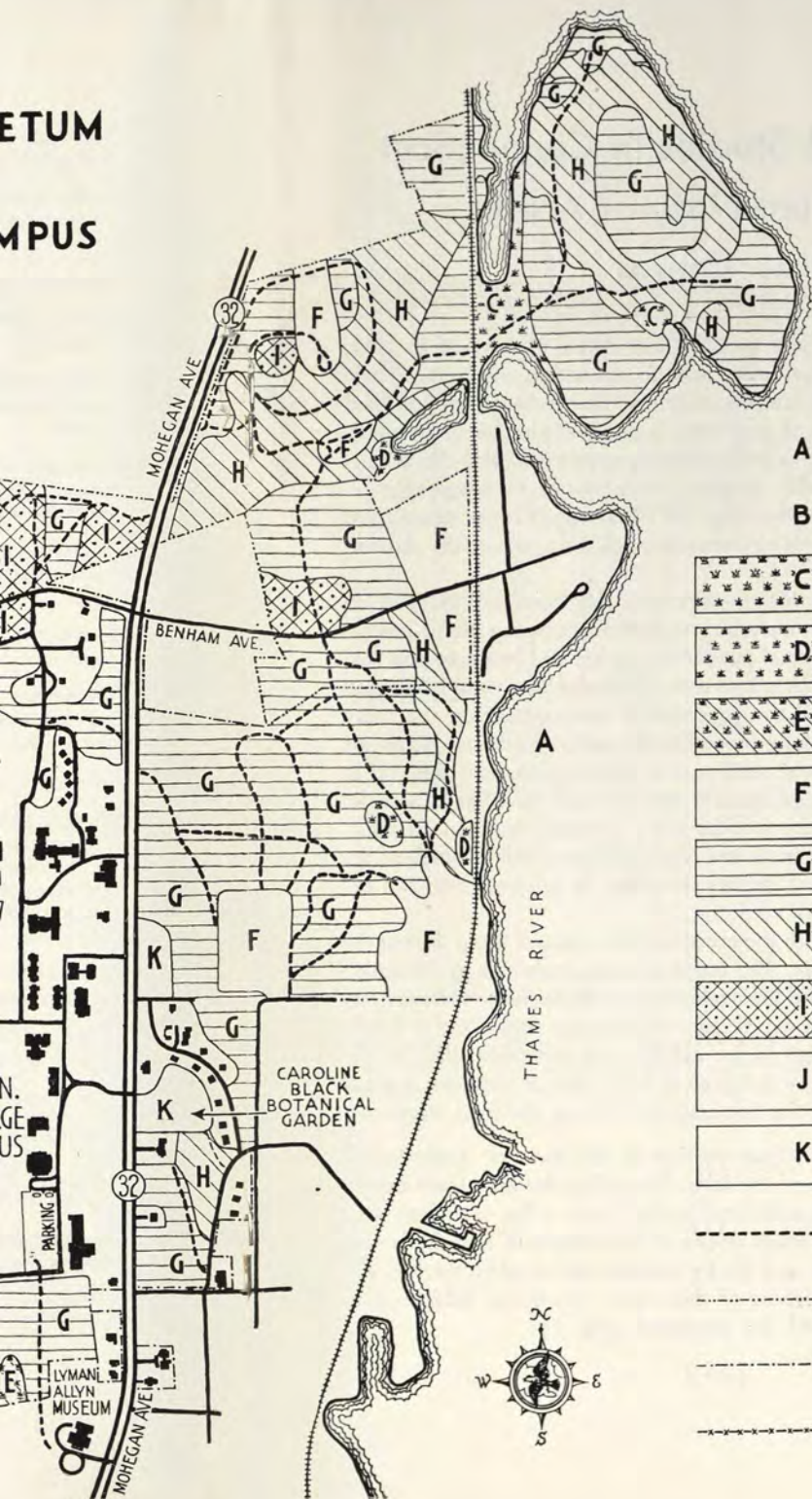
- * Breeding within the area on map, pages 12-13.
- 1 Three red-necked grebes were seen at mouth of Smith's Cove during February and March of 1956.
- 2 Great blue and black-crowned night herons winter in the marshes along the sound but are usually not seen in our area during this season.
- 3 One immature (pure white) little blue heron stayed at the Arboretum pond for a week in 1956.
- 4 Mute swans, year round residents in the New London area, occasionally visit the Arboretum pond and have been observed feeding on the lawn of the Outdoor Theater. They are frequently seen in the Thames River.
- 5 A large flock of semi-tame mallards and some black ducks are year-round residents in the bird sanctuary in Smith's Cove and are fed regularly. These ducks breed in the area and there is some evidence of hybridization. One or two coots have been regular winter members of the flock and in 1955-56 a female hooded merganser stayed there for a couple of months.
- 6 Lesser scaup are regularly reported in the New London area. They are difficult to distinguish from the greater scaup and no definite dates are being given for the occurrence of lesser scaup off of Mamacoke Island. It would be most likely to see this species during migration and during cold weather when the bodies of fresh water have frozen over.

- 7 Bald eagles have been seen around Mamacoke and Smith's Cove in 1957, as well as elsewhere in the Thames River estuary.
- 8 Ruffed grouse are often heard drumming in the Bolleswood section of the Natural Area.
- 9 Coveys of bobwhite chicks have been observed from June through September. See article by Robert F. Logan on page 23.
- 10 Species identified within our area, but dates not recorded: Virginia rail, screech owl.
- 11 Killdeer and prairie horned larks nested regularly on the campus lawns up to 1956. Human use has now apparently become too intense to permit these species to nest.
- 12 Courtship displays of the woodcock have been regularly observed on College property. One year a mother was seen leading her brood of four chicks, each about the size of a quarter, across Williams Street into the Arboretum.
- 13 Numerous owl pellets and the remains of several herring gulls have been found on the Mamacoke Marsh and a great horned owl is suspected of being responsible.
- 14 Downy woodpeckers are more common and regular than the hairy and probably breed in our area.
- 15 The spring, summer and fall horned larks are likely to be the prairie subspecies and the winter birds, the northern subspecies. The older breeding records were for prairies.
- 16 The population of Carolina wrens has been on the increase since 1955.
- 17 Two populations of robins are represented by these records, the winter residents, which migrate in from the north in the fall; and the summer robins which come up from the south in the spring. The winter robins are thinner, darker in color and more shy and secretive than their plumper, brighter, boisterous summer counterparts; they stay in the woods and thickets and feed on fleshy fruits and berries.
- 18 We have no records for the bluebird during July and August, but it is almost certainly with us during these months.
- 19 Lawrence's warbler (hybrid) reported in the Arboretum May 10, 1958 by Mr. Walter Moran.
- 20 The Louisiana water-thrush nested in the ravine of the Natural Area in 1953.
- 21 Two pairs of chats were nesting in 1957. This species sometimes winters here.
- 22 Only two records of cardinals until 1957. They have now apparently become regular residents.
- 23 A single pair of Dickcissels nested in the eaves of a house on Nameaug Avenue in 1955. A male was seen again in April, 1958.

The CONNECTICUT ARBORETUM AND CONNECTICUT COLLEGE CAMPUS



ETUM
MPUS



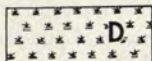
KEY TO HABITATS

A Thames River

B Arboretum Pond



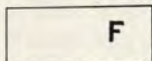
C Tidal marshes



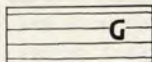
D Fresh water marshes and bogs



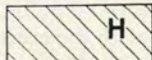
E Swamps and bogs (wooded)



F Fields



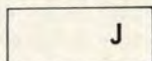
G Thickets, brushy abandoned fields



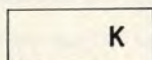
H Woods (primarily deciduous)



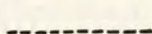
I Evergreen plantations



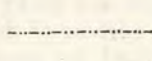
J Semi-cultivated Arboretum



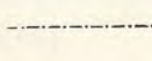
K Campus and Botanical Garden



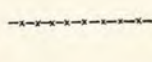
Trails



Arboretum boundaries



College boundaries



State Wildlife Sanctuary



Breeding Bird Studies in Connecticut Arboretum Natural Area

WILLIAM A. NIERING

THE CONNECTICUT ARBORETUM NATURAL AREA, established in 1952, represents one of several such areas now found within the State. These tracts have been set aside as samples of our natural heritage, where plant and animal communities will be preserved as nearly as possible in an undisturbed condition. In addition to their aesthetic, recreational and educational values, these natural areas offer excellent opportunities for long-range research. Especially is this true when they are administered by an educational institution and located adjacent to the campus, as is the one at the Arboretum.

Since the establishment of this 100-acre tract, long-term ecological investigations have been initiated including vegetation mapping along permanent transect lines, small mammal population studies and two breeding bird censuses (2, 3, 6, 7). In addition, two undergraduates have completed special projects. One investigated the vegetational development on the rocky outcrops (8) and the other study concerned the past vegetational history of the area (1). The aim of these studies is to obtain permanent data on as many aspects of the biota as possible and then, through resurveys at periodic intervals, to follow the changes over the years. Through the financial assistance of the Connecticut Geological and Natural History Survey much of the work has been done by botany majors interested in gaining first-hand experience in ecological research.

This paper is concerned with the breeding bird censuses taken during the springs of 1953 and 1955 (4). The purpose of the study was to determine which species were nesting and their relative abundance in the various habitats. It is hoped that the data will become increasingly significant as future surveys record gradual changes in the habitats and correlated shifts in the bird life. The writer is deeply indebted to Mrs. John Kashanski, a graduate of Connecticut College, for her assistance during the field work.

Description of the Area.—That portion of the Natural Area studied comprised the 70 acres west of the lake. Traversing the area from east to west, one passes through a woodland broken by a series of ledges (the Bolleswood), descends to a small stream at the bottom of a moist ravine, rises to another set of ledges, and finally emerges into shrubby thickets and semi-open fields. For the purpose of this study, two major habitats have been distinguished—woodland and shrubland (Fig. 1).

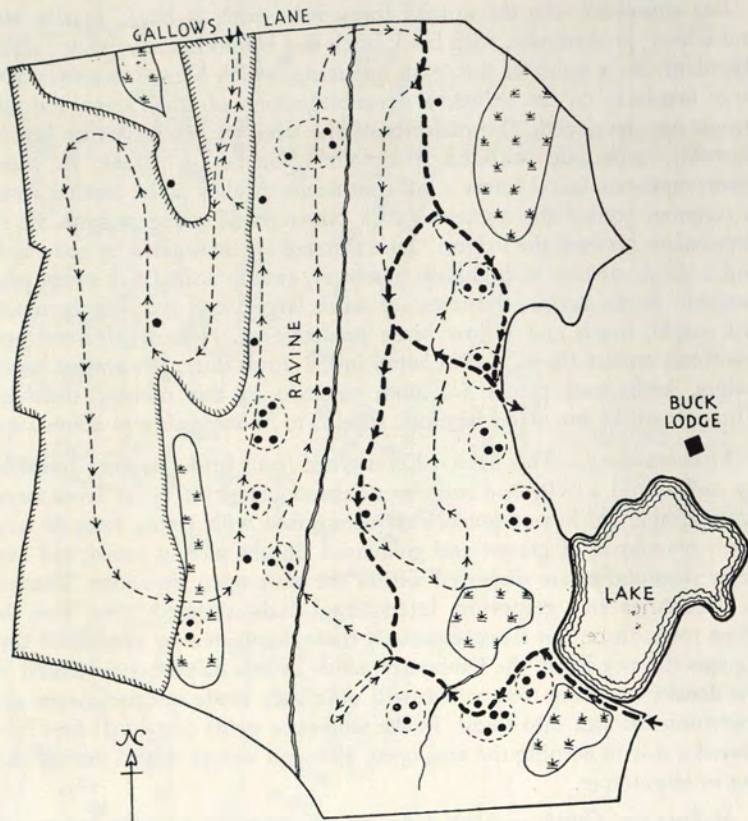


Figure 1. Generalized map of natural area showing route followed during both censuses. Heavier dashed lines represent permanent foot-trails. The sector enclosed by hatched boundary is the shrubland habitat; the remainder comprises the woodland habitat. To illustrate the technique of making the census each dot represents a single observation of a singing male hooded warbler. Each series of enclosed dots represents our interpretation of a breeding pair of hooded warblers in the 1955 census.

The woodland.—In the upland forest oaks, such as black, scarlet, red and white, predominate, with black birch and hemlock scattered or locally abundant. As a result of the 1938 hurricane, which blew down over 100 large hemlocks on the ledges, a dense vegetation of small trees and tall shrubs has developed. The majority of the trees are six inches or less in diameter, with only scattered specimens 12 inches or larger. In many places mountain laurel forms a tall continuous shrubby layer. Similar cover is common around the numerous rock out-crops. Wooded swamps lie in depressions between the ledges. Those forested are dominated by red maple and a shrub stratum of highbush blueberry, swamp azalea and sweet pepperbush. In the ravine, the trees are much larger with red oak, hemlock, red maple, beech and yellow birch predominant. Here witch-hazel and spicebush replace the mountain laurel in the shrub story. In contrast to the ledges, herbaceous plants are more common in this moister situation. Throughout the woodland hemlock appears to be increasing in abundance.

The shrubland.—This habitat has resulted from forest clearing followed by agricultural activity and subsequent abandonment. It varies from large, impenetrable patches of greenbrier interspersed with young trees to relatively open areas of grasses and goldenrod. Shrubs such as sumac and bayberry surround or are dispersed within the more open situations. Thickets of greenbrier and grapevine, interspersed with scattered trees, line the stone rows. In certain areas, especially those dominated by greenbrier contiguous the woodland, the temporary nature of this habitat is evidenced by the density of young trees which will ultimately shade out the shrubs and transform the area into forest. In the semi-open fields occasional fires have played a role in keeping the area open, although woody species are increasing in importance.

Making the Census.—After a general reconnaissance of the entire area had been made, parallel trails were established, several of which followed preexisting paths. They were located sufficiently close to one another to permit the detection and location of all birds singing in the intervening territory. The entire route, as shown in Figure 1, was traversed in the early morning, seven times in 1953 (between May 13 and June 25) and eight in 1955 (between May 4 and June 21). Night observations were also made for nocturnal species. The location of each singing male or nest was plotted on separate species maps (Fig. 1). A different symbol was used on each trip. A close grouping of symbols in a given area is indicative of a nesting pair. This technique is based on the fact that birds tend to have rather well-defined territories during the breeding period. Although not restricted to those areas, the males are usually found within them during this time. This sampling method is widely employed in studying bird populations.

Woodland nesting birds.—During both censuses, the five most charac-

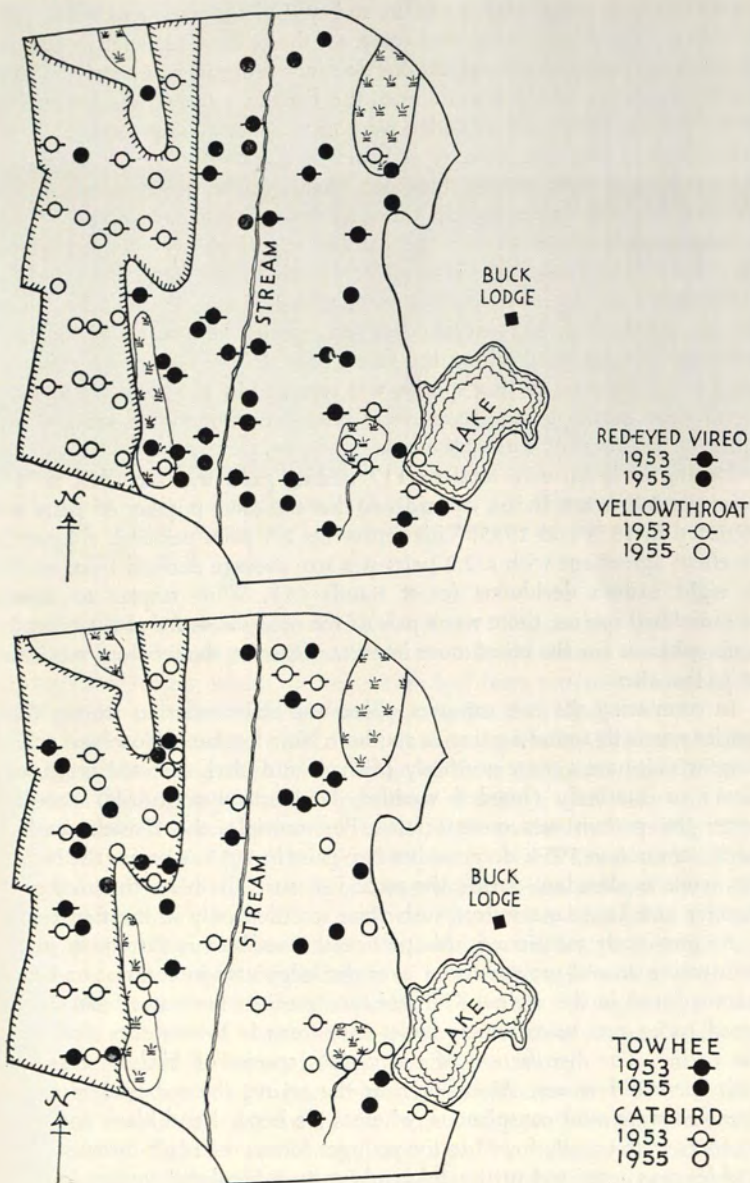


Figure 2. Maps showing distribution of four species during both censuses. Each symbol represents our interpretation of a breeding pair.

teristic birds in this habitat were the red-eyed vireo, black and white warbler, oven-bird, wood thrush and veery. Of these, the vireo, considered one of the most abundant throughout our deciduous forests, was nearly twice as numerous as the others. In addition, the Canada warbler was quite common in 1953, whereas the hooded warbler was more conspicuous in 1955. Other typical woodland species in order of dominance were the redstart, scarlet tanager, black-capped chickadee, wood peewee, black-throated green warbler, blue jay, ruffed grouse, Carolina wren, Louisiana waterthrush and whip-poor-will. Two species, the catbird and towhee—common in the shrubland habitat and usually associated with brushy areas—were also abundant in the disturbed immature woodland (Fig. 2). As indicated on the bar graph (Fig. 3), several other such species were recorded, but they occurred in openings or along the forest edge. In the 50 acres surveyed, a total of 22 different nesting species was recorded in 1953 and 24 in 1955. In addition certain other species were present during the census and may possibly be breeding within the area.

During each census a total of 117 nesting pairs was recorded, or 234 pairs per 100 acres. It is a coincidence that the same number of pairs was recorded in 1953 and 1955. This represents 2.3 pairs per acre, a figure in excellent agreement with a 2.2 pairs per acre average derived from studies in eight eastern deciduous forest stands (5). With respect to density of individual species, there was a pair of red-eyed vireos for about every 2.5 acres, whereas for the other more important species, the territory was about twice this size.

In comparing the two censuses, there was little variation among those species normally found nesting in southern New England. However, among those which have a more northerly (Canada and black-throated green warblers) or southerly (hooded warbler, Louisiana waterthrush) breeding range the pattern was more erratic. For example, the Canada warbler, fairly common in 1953, decreased to two pairs in 1955, whereas the hooded was twice as abundant during the second census. The black-throated green warbler and Louisiana waterthrush were recorded only in the first census.

As previously mentioned, this particular woodland is extremely varied, with young second-growth forest over the ledgy area in contrast to a more mature forest in the ravine. The moisture gradient fluctuates from dry exposed rocky sites to extremely moist conditions in the swamps and along the ravine. The distribution of the various species of birds is correlated with these differences. Along or near the ravine, the red-eyed vireo and ovenbird were most conspicuous, whereas the hooded and black and white warblers were usually found in the younger forest; the black-throated green warbler was restricted to the relatively mature hemlock stands along the ravine, since it prefers nesting in evergreens. The Canada warbler and yellowthroat were found in the moist situations. However, the latter was re-



Winter scene in the woodland habitat (Bolleswood) showing the relatively young open forest of hemlock and oak. Large hemlock characterized this area prior to the 1938 hurricane.

stricted to the forest edge, as was the redstart. The catbird and towhee, usually not inhabitants of mature woods, were found around the large rock outcrops and ledges, where the vegetation had been seriously disturbed by the hurricane and where a dense shrubby cover has developed.

The tendency for certain birds such as these to live in the forest, rather than elsewhere, brings into focus certain of their ecological adaptations—manner of feeding, type of food, and choice of nesting sites. Although most of the woodland species are insect feeders, their methods of feeding differ considerably. For example, the oven-bird, veery, wood thrush and towhee are primarily ground feeders, the various warblers and red-eyed vireo are foliage gleaners, while the black and white warbler is considered a trunk feeder. Among the aerial feeders are the wood peewee and, to a certain extent, the scarlet tanager. Some degree of stratification is evident with respect to the level at which certain species feed within the vegetation. Thus the Canada and hooded warblers feed mostly in the lower stratum while the red-eyed vireo and scarlet tanager glean in the tree canopy.

With regard to nesting habits, a similar diversification is evident. Species nesting on or near the ground are the oven-bird, veery, towhee, black and white warbler, Canada warbler and Louisiana waterthrush. In the open, shrubby cover, 4-8 feet above the ground, the catbird is conspicuous, while in the more shaded, sapling-tall shrub layer, the hooded warbler, wood thrush, redstart and frequently the red-eyed vireo are found nesting. Those

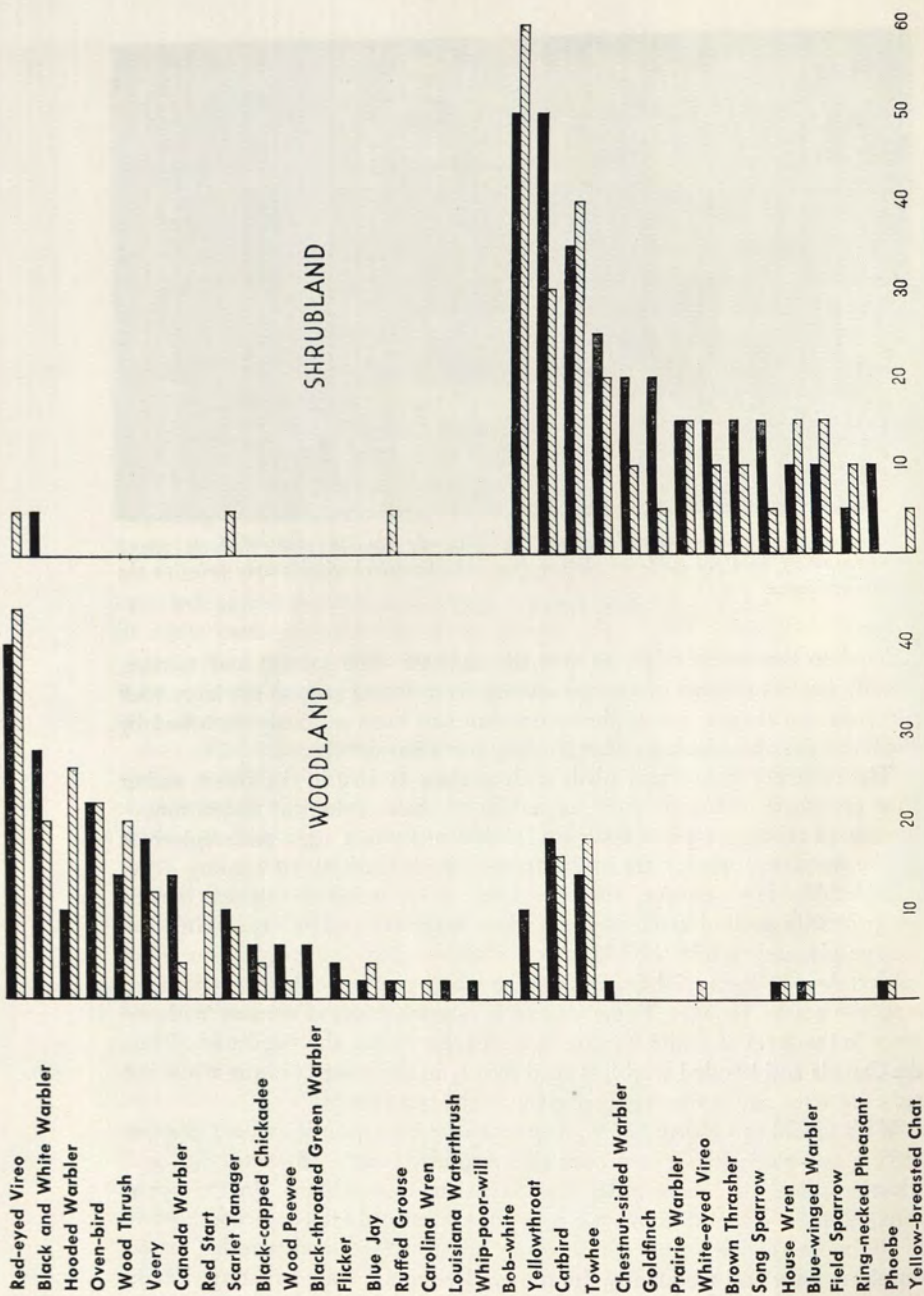


Figure 3. Estimated number of breeding pairs per 100 acres for each of the two habitats. Solid bars, 1953 census; hatched bars, 1955 census.

nesting at a higher level include the scarlet tanager, wood peewee and occasionally the red-eyed vireo.

This diversity in feeding and nesting habits plays an important role in permitting these species to exist relatively close to one another without undue competition.

Shrubland nesting birds.—In this habitat, comprising 20 acres, a total of 16 different nesting species was recorded, the three most important being the yellowthroat, catbird and towhee (Figs. 2, 3). Others, in order of their importance, include the chestnut-sided warbler, goldfinch, prairie warbler, white-eyed vireo, brown thrasher, song sparrow, house wren, blue-winged warbler, field sparrow, ring-necked pheasant, phoebe and yellow-breasted chat. The few typical woodland species recorded were associated with scattered trees occurring locally or along fence rows.

A total of 61 breeding pairs was recorded in 1953 and 52 in 1955, or 305 and 260 pairs per 100 acres respectively for the two censuses. Thus the density per acre ranged from 2.6 to 3.0 breeding pairs which was slightly higher than the 2.3 pairs found in the woodland. For the dominant nesting species, there was a pair of yellowthroats for about every two acres, whereas the acreage was slightly higher for the towhee and catbird.

In comparing the two censuses, the abundance of yellowthroats and towhees was quite similar, while the catbirds were much less conspicuous in the second survey. Similar variations were evident among the house wren, goldfinch and prairie warbler. The yellow-breasted chat, local in southern New England, was recorded nesting only in 1955.

As in the woodland, this habitat is extremely varied, with continuous areas of shrub cover interspersed with grasses and goldenrod. In general, the birds were scattered at random wherever dense shrubby vegetation occurred. However, a few exceptions were found such as the chestnut-sided warbler, which was restricted exclusively to the dense greenbrier thickets with young trees near the margin of the woods. In this instance, there may be some correlation with the abundance of "singing posts" as well as with the large continuous thicket. Another species, the blue-winged warbler, was typically found near the forest edge.

As in the woodland, diversity of feeding and nesting habits is conspicuous among the species of the more open areas. Although most of them feed to a great extent on insects, as in the case of the woodland birds, seeds and fruits also comprise an important part of the diet of such species as the catbird, field sparrow and goldfinch. The method of feeding also differs, the yellowthroat, towhee, blue-winged warbler, brown thrasher and ring-necked pheasant being primarily ground feeders; whereas the remainder are mostly foliage gleaners. The chestnut-sided warbler is also considered an aerial feeder, while the blue-winged warbler occasionally feeds on the trunks of trees, which may account in part for its affinity for the forest edge.

Those species which feed on or near the ground also tend to nest in this stratum. The others nest within the shrubbery, usually within 6 feet of the ground, although the goldfinch, house wren and catbird are frequently found at a higher level. Here as in the woodland this diversity in nesting and feeding tends to reduce competition among the various species.

Future trends.—Due to the instability of the vegetation in these two habitats, one can anticipate many changes in the future. As the tree canopy becomes more continuous in the woodland, especially in the hurricane-disturbed area, much of the shrub cover may become shaded out. As a result, the abundance of the catbird and towhee will probably decrease and the number of woodland species increase. With the trend toward more hemlock, the black-throated green warbler and other species associated with evergreens may become more important in the area.

As the shrubland habitat is eventually transformed into a woodland it will be interesting to follow the corresponding decline in the populations of birds characteristic of this open situation. The abundance of many species today is a result of man's activities. For instance, during Audubon's travels in America, when much of the land was forested, he saw only one chestnut-sided warbler, a species now very common in reverting farmland, as observed in this study.

Although the entire Natural Area at the Arboretum has been seriously disturbed by man as well as by the forces of nature, future studies will reveal those changes which occur when only local natural forces are operative in modifying the vegetation and associated birdlife. However, when one is dealing with migrating birds, factors such as destruction of winter habitat and chemical spraying for insect pests hundreds or even thousands of miles away may have pronounced effects upon the abundance of certain species.

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Quail's nest. (Photo by H. W. Fisk)

Notes on the Nesting of Some Connecticut Quail

ROBERT FULTON LOGAN

TWO UNUSUAL happenings in the bird world have been recorded in southern Connecticut. On the Connecticut College campus and on adjacent Fishers Island nests of the eastern meadowlark have been found containing eggs of the bobwhite. It is common practice for the European cuckoo to lay its eggs in the nest of a linnet, bullfinch, nightingale or merle. The European cuckoo is truly parasitic in this regard, hardly ever constructing its own nest or incubating the eggs. Similarly, there is nothing novel in finding the eggs of our brown-headed cowbird in the nests of robins and other smaller birds. Records show that cowbirds' eggs have been found in the nests of one hundred other species. How the cowbird developed this habit is a mystery, but an interesting theory has been proposed. When the first white men settled the west they found the cowbird the inseparable companion of the American bison and the settlers called it the buffalo bird. It followed the peregrina-

tions of the bison from Texas to Saskatchewan. The great herds of bison were constantly on the move, rarely remaining for more than a few days in one locality. It has been suggested that the cowbirds found it impossible to set up housekeeping anywhere and remain with the herds, and so began the convenient practice of depositing their eggs in other bird's nests which they found along the buffalo trail. The vast herds of bison have vanished, but the cowbirds have continued this practice ever since.

When the bobwhite, which has always been considered a model in its domestic habits and family relations, is found laying its eggs in a meadowlark's nest, however, it is so unusual as to deserve mention. The first case was recorded on the Connecticut College campus in 1937. In early June, the writer, strolling in the long dead grass north of the present site of Williams Memorial Institute, flushed an eastern meadowlark from its nest in which were three sparsely spotted meadowlark's eggs. Returning a few days later he found four meadowlark's eggs, and one pure white egg, pointed at the end—unmistakeably the egg of a bobwhite. Within a few days two more quail's eggs were added. Members of the Connecticut College Department of Zoology saw the nest and verified the identification. A male bobwhite frequently was heard calling from the nearby thickets, but at no time did the female bobwhite share the incubating duties with the lark.

Learning of the strange behavior of this Connecticut College bobwhite, Mr. Henry L. Ferguson of Fishers Island wrote the writer that he had made a similar discovery on an island meadow in 1938, finding the nest of a meadowlark which contained four lark's eggs and three eggs of the quail. Since Fishers Island is only seven miles from New London, as the crow flies, this second errant bobwhite could have been the mainland bird.

The writer has been unable to find any other records of the normally sedate bobwhite going beserk in this fashion. Edward Howe Forbush, in his *Birds of Massachusetts* may offer a clue to the reason for this unusual behavior. Under the breeding habits of quail he states that the eggs are "7 to 42, often 10 to 17 (the larger numbers found probably the product of at least two females.)" Since the nests of the meadowlark and bobwhite are almost identical, the irresponsible campus quail may have mistaken the lark's nest for that of another female of her species.

The Fire Ant Eradication Program

It is estimated that 27,000,000 acres of land in nine southeastern states are now infested with the fire ant. The U. S. Department of Agriculture is presently promoting an airborne insecticide program against this pest, and to date approximately 200,000 acres have been treated. We would like to quote what Mr. Allen H. Morgan, Executive Vice-President of the Massachusetts Audubon Society, writes about the situation in *Massachusetts Audubon*.

"The Department of Agriculture states that their experience in fire ant eradication gives them every reason to believe that a successful program can be carried out with only slight losses to wildlife. However, we are puzzled about some of the instructions distributed by this same department to land-owners whose property will be treated in this program, as follows:

" 'Leafy vegetables in your garden, such as lettuce, cabbage, turnips, etc., should be covered prior to application of insecticide and then washed before eating.

" 'Small fish ponds in your yards should be covered with a plastic sheet or canvas tarpaulin during application. Fish should be taken from pools prior to application and pools should be cleaned before putting fish back in them.

" 'Laundry should not be put out on lines the day applications are made in your neighborhood.

" 'Cattlemen and dairymen should keep their cattle off treated pastures for the following periods of time: Milk cows, 30 days; beef cattle, 15 days.

" 'Beehives should either be covered or moved from the area prior to treatment.

" 'Small children who play on ground should be kept out of yards for a few days after treatment.

" 'Household pets must not drink from water puddles that may form after first rain.

" '*Additional Information:* School grounds will be treated on weekends or holidays when school is not in session. Water puddles after first rain are dangerous and pets, chickens, etc., should not be allowed to drink water from them. We will attempt to contact every person living in the areas to be treated prior to the time materials are applied.'

"The Fish and Wildlife Service, in a preliminary report of the effect of this fire ant eradication program *now being carried on*, states that *immediate losses* among birds and small mammals in the areas studied have amounted to seventy-five to eighty-five per cent of the entire population. There are indications that the residual long-term effect will likewise be severe.

"Should we be concerned about the Department of Agriculture going ahead on a large scale with its fire ant program which its own instructions indicate has many aspects of immediate danger, without careful consideration of both the long and short range results? Is it in order to suggest that the Department at least look into the results of the studies made by the Fish and Wildlife Service in its sister Department of the Interior?"

We would like to add the question, what will happen to our summer song birds this winter when they move into these lethal areas?

