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THE WILSON BULLETIN

A Quarterly Magazine
of
Ornithology

JOSSELYN VAN TYNE
Editor

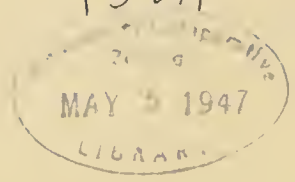
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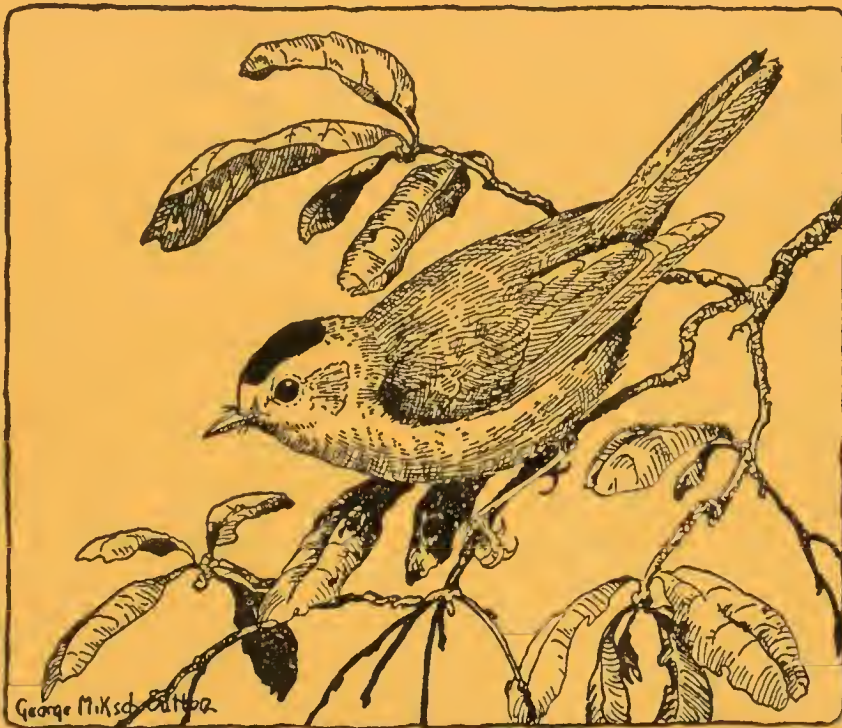
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THE WILSON BULLETIN

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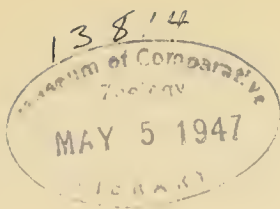


WANDERING TATTLERS

Heteroscelus incanus

Two downy young females, collected at the edge of a small mountain pool at the headwaters of the Alsek River (altitude, about 4,000 feet), British Columbia, on July 11, 1944. The parent more closely attending the young was collected and proved to be the female; the male was more shy. The downies, when discovered at the edge of the pool, readily took to the water and swam out a short distance but soon returned to the shore.

From a painting by T. M. Shortt.



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MIGRATION AND NESTING OF FLORIDA BALD EAGLES

BY CHARLES L. BROLEY

PREVIOUS to January 1939 few Bald Eagles (*Haliaeetus l. leucocephalus*) had been banded in Florida. The Florida Bald Eagle was considered non-migratory and was regularly recorded as a permanent resident of the State. In 1938, Richard H. Pough, of the National Audubon Society, suggested that I band a few eagles as an experiment, and during the eight years, 1939 to April 1946, I banded 814 Bald Eagles along the Gulf Coast of Florida—practically all in January and February, a few in March. Meanwhile, I kept a year-by-year record of most of the nests in the banding area, which extended from Hernando County south to Lee County.

MIGRATION DATA

In 1939 I banded 44 eagles. To my surprise, one of the first recoveries (May 8, 1939) was made at Columbiaville, New York, more than 1,100 miles from the place of banding. During the following years (up to April 1946), reports of recoveries, numbering in all 48, came in rapidly from 17 States and Provinces (Map 1; Tables 1 and 2). Seven of these birds were recovered at the nest or within a mile of the place of banding; but more than a third were recovered at least a thousand miles away; and one, more than 1,600 miles away (Kings County, Prince Edward Island, June 1, 1941).

As can be seen in Table 2, there were no recoveries north of Florida in the months of January, February, or March, and none in Florida between June and October in any year—indicating that at least immature Florida Bald Eagles spend late summer and early fall in the north. It seems reasonable to assume that the Georgia recovery in November and the South Carolina recovery in December were birds taken while on their way back to the south.

A comparison of the dates of banding with dates of recovery in Table 1 shows that some young eagles reach Canada within a few weeks of learning to fly. For example, a bird from Nest 35 was banded at MacDill Field Army Air Base, Tampa, on February 25, 1942. Since it

TABLE 1
RECOVERIES * OF FLORIDA BALD EAGLES, 1939-APRIL 1946

†	RECOVERED		PARTICULARS		BANDED (FLORIDA)	
26	FLORIDA	Bradenton	16 Feb 43	Fd. dead	Bradenton	8 Feb 43
46		Bradenton	17 Feb 45	Shot	Bradenton	23 Mch 44
1		near Largo	29 Mch 39	Fd. dead	Largo	28 Jan 39
14		Palma Sola	1 Apr 42	Fd. wounded	Bradenton	26 Jan 42
4		Newberry	8 May 39	Shot	Largo	4 Mch 39
3		Summer	15 May 39	Fd. injured	Largo	27 Feb 39
34		Tampa	19 May 44	Fd. dead	Tampa	11 Feb 44
6		Tampa	20 May 39	Killed	Gibsonton	12 Feb 39
39		Lakeland	1 Nov 44	Fd. dying	Osprey	3 Feb 44
23		Sarasota	26 Dec 43	Shot	Sarasota	2 Feb 42
31	GEORGIA	Statesboro	20 Apr 44	Shot	Ruskin	29 Jan 44
40		Moniac	26 Apr 45	Shot	Aripeka	23 Feb 45
9		Swainsboro	22 May 40	Fd. dead	Crystal Beach	22 Feb 40
15		Hilltonia	7 May 41	Shot	Placida	18 Feb 41
41		Alma	1 Jne 44	Captured	Placida	15 Feb 44
20	Rentz	26 Nov 42	Shot	Gibsonton	6 Feb 42	
44	MISSISSIPPI	Meridian	21 Jly 45	?	Fort Myers	13 Feb 45
38	S. CAROLINA	White Pond	23 May 44	Shot	Bradenton	23 Mch 44
24		Moncks Corner	29 Jly 43	Fd. dead	St. Petersburg	19 Jan 43
27		Whitehall	7 Dec 43	Fd. dead	Bradenton	10 Feb 43
17	N. CAROLINA	Roxboro	8 May 41	Captured	Placida	18 Feb 41
10		Fremont	11 May 43	Captured	Englewood	17 Feb 41
11		Catawba	27 May 40	Killed	New Port Richey	9 Mch 40
8		Creswell	29 Jly 40	Killed	Largo	3 Feb 40
48	VIRGINIA	Widewater	Apr 46	Band found	Placida	20 Jan 46
5		Walnut Point	30 May 39	Shot	Largo	4 Mch 39
33	PENNSYLVANIA	Ringtown	3 Jne 44	Fd. dead	Sarasota	2 Feb 44
35		N. Springfield	29 Jly 44	Fd. dead	Venice	18 Feb 44
30		Shawnee-on-Delaware	18 Aug 44	Fd. wounded	St. Petersburg	29 Jan 44
32	INDIANA	New Castle	27 Apr 44	Shot	Largo	1 Feb 44
45	ILLINOIS	Homer	16 May 45	Shot	Bocagrande	15 Feb 45
47		Mendota	30 Aug 43	Shot	Englewood	16 Feb 43
16	CONNECTICUT	Stonington	15 Apr 41	Shot	Placida	18 Feb 41
25	NEW YORK	Fort Terry	4 May 43	Fd. dead	Ruskin	27 Jan 43
2		Columbiaville	8 May 39	Shot	St. Petersburg	28 Jan 39
43		Pine City	21 May 45	Shot	Largo	2 Feb 45
42	MICHIGAN	Grass Lake	14 May 45	Shot	Crystal Beach	24 Feb 45
22	MAINE	Burnham	20 Aug 42	Fd. dead	St. Petersburg	21 Jan 42
7	QUEBEC	St. Germaine	6 May 40	Fd. wounded	Indian Rocks	6 Feb 40
12		Lac St. Jean Co.	11 May 42	Shot	Indian Rocks	22 Jan 42
18	N. BRUNSWICK	Leger Brook	23 May 42	Shot	Tampa	25 Feb 42
21		Millbank	15 Jly 42	Fd. dead	Bradenton	12 Jan 42
28		Chipman	20 Aug 44	Shot	St. Petersburg	23 Feb 43
37	NOVA SCOTIA	Halifax	10 Jne 44	Fd. dead	Ruskin	25 Feb 44
36		E. Jeddore	24 Jne 44	Shot	Tampa	21 Feb 44
19		Yarmouth Co.	19 Sep 42	Shot	Ruskin	7 Mch 42
29		Halifax Co.	18 Oct 43	Shot	St. Petersburg	5 Mch 43
13	PRINCE EDW. ID.	Kings Co.	1 Jne 41	Shot	Largo	8 Feb 41

* Arranged from south to north by State and Province.

† Figures in column 1 represent band numbers.

was then four weeks old, it would first have been able to fly about April 15. Observers at the Base last saw it on April 21. It was found shot at Leger Brook, New Brunswick, nearly 1,600 miles away, 32 days later (May 23).

A study of Table 1 also shows that with only two exceptions the birds were recovered within a year of banding, one of the exceptions being a bird banded February 17, 1941 (at Englewood, Florida), and captured May 11, 1943 (at Fremont, North Carolina), when more than two years old. Table 3 shows the number banded each year and the number of these recovered up to April 1946.

Since I have been able to band but one adult eagle, and have not been in Florida between May and September, I can make no definite statement concerning the possible migration of adult birds. However, for five years I have had the assistance of 20 or more reliable observers who live near or even within sight of nests in my banding territory.

Raymond Conway, of Placida, who patrols a 28,000-acre tract twice a week, kept the following record of adult eagles seen during July and August between 1941 and 1945: 1941—0; 1942—2; 1943—1; 1944—0; 1945—0. Early on the morning of September 7, 1944, he saw 27 adult eagles sitting about in dead trees on an island not far from his house—the first eagles he had seen that year since June. Mrs. Reagle, at Nest 69, one mile south of Sarasota, reports that the birds, absent during late summer, returned on September 12 in 1942, September 5 in 1943, October 1 in 1944, September 3 in 1945. Mr. and Mrs. G. W. Marett, of Sarasota, live 400 feet from an eagle's nest. They report that

TABLE 2

RECOVERIES OF FLORIDA EAGLES BY LOCALITY AND MONTH, 1939 TO APRIL 1946

	Jan.	Feb.	Mch.	Apr.	May	Jnc.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.	Totals
Florida	..	2	1	1	4	..	..	..	..	..	1	1	10
Georgia	2	2	1	..	..	..	..	1	..	6
Mississippi	1	..	..	..	..	..	1
South Carolina	1	..	1	..	..	..	..	1	3
North Carolina	3	..	1	..	..	..	..	..	4
Virginia	1	1	..	..	..	..	..	..	..	2
Pennsylvania	1	1	1	..	..	..	..	3
Indiana	1	..	..	..	..	..	..	..	..	1
Illinois	1	..	..	1	..	..	..	..	2
Connecticut	1	..	..	..	..	..	..	..	..	1
New York	3	..	..	..	..	..	..	..	3
Michigan	1	..	..	..	..	..	..	..	1
Maine	1	..	..	..	..	1
Quebec	2	..	..	..	..	..	..	..	2
New Brunswick	1	..	1	1	..	..	..	..	3
Nova Scotia	2	..	..	1	1	..	..	4
Prince Edw. Id.	1	..	..	..	..	..	..	1
Totals	..	2	1	6	19	5	5	4	1	1	2	2	48

on May 14, 1944, 45 or 50 eagles came soaring over their house and took "their" eagles away in a northerly direction; they did not see the eagles again until September 18. On August 1, 1945, Roger Tory Peterson and Frank McCamey visited Merritt Island on the east coast and were unable to find a single eagle in a whole day's search. Reports from others similarly indicate absence of eagles during July and August, with some time in September as the average date of return. Several concentrations of birds in September (presumably returning migrants) have been reported to me.

A study of the Hawk Mountain Sanctuary Association reports of Bald Eagles moving south shows that the great majority of the birds go over in September. The counts* for 1941, for example, were: September—41, October—6, November—3; for 1942: September—60, October—5, November—6. September is too early for northern Bald Eagles to migrate south. The eagles of Leeds County, Ontario (north of the St. Lawrence River, across from New York State), remain there through November and December until the freeze-up of the lakes. Three recoveries from the 29 eagles I banded in Leeds County indicate a late migration: Kent County, Maryland, December 22, 1941; Bridgeport, Tennessee, December 12, 1943; Mehoopany, Pennsylvania, October 17, 1946. It seems probable, then, that the eagles seen over Hawk Mountain in September are not northern birds but southern birds returning to the south.

Near Largo, Florida, I have noticed a definite concentration of eagles about the last week of March each year. Some 40 or 50 birds then frequent a large field, chasing each other around on the ground and among the trees. In 1943, I counted 29 immatures and 5 adults. Of the 29 young birds, only one wore a band. Since I had combed the area thoroughly for nests, 28 of these birds probably came from districts outside my banding territory, and this, taken in connection with the dates of the northern recoveries (Table 1) suggests that the regular movement north begins by April.

With the exception of two recoveries made in Indiana and Illinois, the recoveries up to 1945 indicated a coastwise migration, through Georgia, the Carolinas, and Virginia. But in 1945 there were four inland recoveries (Mississippi, Illinois, Michigan, and Pine City, N. Y.). A possible explanation for this is a change that year in the prevailing winds. W. W. Talbot, of the Tampa Weather Bureau, was kind enough to provide me with a series of charts showing that from 1939 to 1944 the prevailing winds at Tampa during April and May were from the south, moving up the Atlantic coast, but that in April 1945 a decided change occurred, the surface winds coming across Florida from the Atlantic and then swinging north into the Mississippi valley.

* "Hawk Mountain Sanctuary Association News Letter," 1942, 1943.

TABLE 3
RECOVERIES OF FLORIDA BALD EAGLES, 1939-APRIL 1946

	Number banded	Recovered by Apr.'46
1939.....	44.....	6 (13.6%)
1940.....	73.....	4 (5.4%)
1941.....	79.....	5 (6.3%)
1942.....	110.....	8 (7.2%)
1943.....	124.....	7 (5.6%)
1944.....	128.....	12 (9.3%)
1945.....	106.....	5 (4.7%)
Totals*.....	664.....	47 (7.0%)

* In 1946, 150 eagles were banded, one of which had been recovered by April 1946.



Map 1. Recoveries of Bald Eagles banded in Florida, 1939-April 1946.

NESTING

Distribution of nests. The Gulf coast area of Florida from Hernando County south 164 miles to Bocagrande, Lee County, is probably the most densely populated eagle nesting area in Florida; * it holds at least 140 active nests. The majority (about 80 per cent of the total) are in coastal areas, close to the Gulf or at least within two miles of the coast, and commonly within a mile or less of each other. The others are distributed through the interior; they are usually near small lakes and are 8 to 15 miles apart. Many old, unused nests are scattered through the State, but these disintegrate in 7 or 8 years, owing to high winds, or are torn apart for sticks to build new nests or to repair active ones.

I was able to follow in some detail the history of 101 nests, which were distributed by counties as follows: Hernando—2; Pasco—3; Pinellas—31; Hillsborough—21; Manatee—14; Sarasota—19; Charlotte—9; Lee—2. On 49 nests my data are fairly complete for the full eight-year period, and their history is summarized in Table 4.

Nest sites. Of the 140 nests under observation, 134 were in Florida long leaf pines, 4 in cypress, and 2 in black mangroves. However, during the past four years, Army demands for lumber have taken a tremendous toll of the pine all through the State, leaving many areas without any trees large enough for eagles' nests, and a number of eagles are moving inland into the dense cypress swamps, building their nests among the heavy masses of Spanish moss, where they are almost impossible to find.

Of the four nests known in the cypress, I have banded the young in only three. The fourth can be seen from a hill half a mile away, but once I enter the swamp, I have been unable to find the nest because of deep water, tangled undergrowth, and the abundance of cottonmouth snakes. Nest sites in these cypress trees are always very high—the three nests in which I banded the young are 90 to 125 feet from the ground.

The two nests in the black mangroves are situated on Bocagrande Island, which is five miles from the mainland. One nest is 15 feet from the ground, the other somewhat higher.

Three or four nests are built in trees within a town or city; one nest, in Sarasota, is no more than 100 feet from residences.

Nesting territory. A pair of nesting eagles appear to require, as a rule, a territory extending about half a mile on all sides of the nest, and they chase off all intruders (which, very frequently, are immature

* On March 1 and 2, 1946, I made a survey of a portion of the east coast, investigating Merritt Island and Brevard County with particular care, since reports from various sources had led me to believe that I would find a concentrated nesting area in this district. In "Florida Bird Life" (1932, p. 182), for example, Arthur H. Howell states that 37 occupied nests were found there in December 1930, "most of them being on Merritt Island." I could find only 6 nests on the island and none on the mainland of Brevard County. There is reason to think that heavy collecting of eagle eggs is the cause of this great decrease in the population.



Photo by Roger T. Peterson, courtesy of *Life*

Adult Bald Eagle leaving the nest. Sarasota, Florida. February 9, 1946.



Photo by Roger T. Peterson, courtesy of *Life*

Young Bald Eagle at the time of leaving the nest (eleven weeks old).
Placida, Charlotte County, Florida. February 8, 1946.

eagles—possibly offspring of former years attracted back to their birthplace). However, in a few congested nesting areas, the territories are smaller. There are two localities where three active nests are placed within a thousand feet of one another. A curious exception to territorial exclusiveness (recorded below under "Factors Affecting Survival") occurred in 1946 when a pair of eagles shared a nest with a pair of Great Horned Owls (*Bubo virginianus*).

Eagles show very strong attachment to a chosen territory. When a pair lose their nest or desert it after a disaster, they nearly always choose a tree close by for their new nest. Even if they move a mile or so away, they usually continue to feed on the old hunting grounds adjacent to their former nest site. Frequently I have seen eagles, rather than leave their territory, take a tree quite unsuited to their purpose, either a very weak tree or one with a very poor crotch; they sometimes build the nest right on top of a tree, on branches too weak to support it, but such nests seldom last more than a year—they go down in the first heavy wind. A pair may remain in their territory after loss of their nest tree even if it is impossible to nest. The tree holding Nest 41, at Gibsonton, was cut in 1943, and no other tree near by was at all suitable for an eagle's nest. The pair remained in the vicinity without nesting for two years. This also happened at Nest 52 (Ruskin).

It is remarkable how much disturbance may occur around a nest without causing the eagles to desert. Nest 35 is near Tampa on Gadsdens Point, which was taken over by the Army Air Forces in 1941. In 1942 a bombing target was located close to the nest, and planes cut in from all sides to drop their bombs, but the eagles remained. In 1944 all the trees around the nest tree were cut; bulldozers and tractors created a constant disturbance near by; and daily target practice continued. Still the eagles remained, although they did not nest after 1943. Nest 21A was five miles from St. Petersburg, overlooking the Gulf, in what is known as the "Jungle." Construction of a house within 120 feet of the nest tree was in progress in 1941 when the eagles reclaimed their nest for the season. They came to the nest every morning at dawn but left when the workmen arrived and did not lay that season. The following season, at my suggestion, the house owner suspended work during most of October, and the eagles became established again, nesting successfully every year through 1944; then their nest was destroyed by the hurricane, and they did not rebuild that season. In 1946 they nested a half mile away.

Eagles usually desert a nest after a disaster. For example, in 1941, the young in Nest 8 (near Clearwater) were killed by an owl, the young in Nest 40 (Gibsonton) were taken by men, and I found a dead young below Nest 81 (Englewood); in 1943, the eggs were taken from Nest 13A (Belleair); all of these nests were deserted. At Nest 22 (St. Petersburg), on the other hand, the eggs were taken by boys in 1944, and the eagles did not nest at all in 1945, but used the same nest again

in 1946. Occasionally a pair will move back to a nest they have deserted. The eagles at Nest 65A (Bradenton), disturbed by army activities in 1943, moved to Nest B in 1944. The tree in which Nest B had been built was cut after the one nesting season, and in 1945 the eagles moved back to Nest A.

Very rarely a nest is deserted without apparent reason. Nest 80A (Englewood) was deserted in 1944 after at least five years of successful nesting, and as far as I was aware the eagles had in no way been disturbed.

Sometimes a nest will not be used for a year, or even several years, the eagles remaining about the nest and using it as a feeding place, but apparently making no attempt to nest. Nest 1 (near Aripeka) was vacant from 1941 through 1944, Nest 2 (New Port Richey) in 1942, and Nest 5 (near Tarpon Springs) from 1942 through 1944. I was quite sure these eagles were not nesting elsewhere.

Nest building. When the birds return to their nesting trees, the last weeks of September or early in October, they immediately look over their eyrie and begin to repair it—or, frequently, to make substantial additions (one to two feet in a season). Nest 2, at New Port Richey, was in use from 1904 to 1943; then the tree was cut. Nest 23, at St. Petersburg, has been in use since 1910. Nest 13A (Belleair), 10 feet high in 1939, was 14 feet high by 1943 when it was deserted because the eggs were taken.

The nests of Florida eagles are in general much deeper than northern nests; the largest nest I know of in Ontario is 8 feet wide and 8 feet high; the largest nest in Florida (Nest 23, at St. Petersburg—perhaps the largest in America) is 20 feet deep and 9½ feet wide. The size and shape of a nest depends to a large extent on the kind of tree in which it rests. In many of the Florida pines, the crotches are very deep, giving good support to the nest, which can be built higher and higher each year. Most of the Ontario nests are in elms, which have outspreading crotches, and the nests tend to be wide rather than deep. This is also true of nests built in the outspreading crotches of Florida cypress trees. My widest Florida nest is in such a cypress, an immense tree with a girth of 22 feet. The nest, placed 115 feet from the ground, is 10 feet across, 5 feet deep. From the ground, it is very difficult to determine what a wide nest such as this contains. In most nests when the eagle is incubating, the white head can be seen over the top of the nest; when the eagle is brooding, its raised wings are visible; thus the nest's history can be followed even from the ground. But if the parent bird is in the middle of a very wide nest nothing at all can be seen.

In 1945, I found a very unusual nest, a new one built after the 1944 hurricane had destroyed the pair's regular nest. Halfway up a pine tree the branches spread out in all directions from the 14-inch trunk, and the nest was built around the trunk like the circular seats one sees

in hotels and railway stations. It was a large and well-secured nest, extending three or four feet out from the trunk on all sides.

The eggs are laid in a small well-formed cup, of Spanish moss or grasses, usually placed toward the center of the main nest-structure. This cup measures, on the average, 20 inches in diameter. In Florida, eagles sometimes cover the eggs with lining material in the period before they begin incubating or during absences from the nest after incubation begins. More lining is used in Florida nests than in those of the north, owing, perhaps, to the abundance of Spanish moss, which hangs everywhere in tremendous masses. During all stages of incubation and care of the young, the adults continue to bring in liberal quantities of this moss, which helps to keep the nest clean and sanitary, burying dead fish and other refuse. In 1944, at Nest 65 (Bradenton), 14 inches of moss was deposited in four weeks. In the nest was one young bird, four weeks old. Fourteen inches down in the moss was an addled egg. Since it was a new nest that season, the bad egg could not have been one left over from the previous year.

The nesting season. In Florida, certain eagles, "early nesters," begin laying the first week in November; others, "late nesters," in mid-December. During my years of banding I have found that individual birds are usually consistent in nesting either early or late. Some nests I must visit early in January or the young will have left; others I do not visit until late in February because the young are never large enough to band before the end of that month. The eagles at Nest 91 (Myakka) are extremely late nesters, the young being still too small to band even in April.

Generally speaking, my banding period begins about January 5 and ends March 5. Defining birds with young large enough to band before February 10 as early nesters, and others as late nesters, I found that early nesters produced two young much more frequently than late nesters did. I have found many addled eggs in late nests, but my data are insufficient to determine whether late nesters lay fewer eggs or merely fewer eggs that are fertile—or whether other factors operate to reduce the number of young in late nests.

In 1945, in a tree near the sand flats south of Punta Gorda, I found a nest with an unusual lining. Quantities of shredded colored paper, of the type used in packing dishes, had drifted or blown ashore and lay in piles four to five feet deep. The eagles had used it liberally as lining material for the nest, which, with the long streamers of all colors hanging down from it, had a most bizarre appearance.*

* In Florida, eagles are in the habit of picking up odd articles and carrying them to their nests. Among the objects we have found in eagles' nests are the following: electric light bulb, Clorox bottle, snap clothes pin, rubber shoe, child's dress, gunny sack, sugar bag, ear of corn, many shells, white rubber ball (which an eagle was "incubating" six weeks after its young had hatched), a fish plug, and a 70-foot fish line with hook attached (the last-named object perhaps brought to the nest with fish).

TABLE 4
NESTS OF FLORIDA BALD EAGLES, 1939-1946

	1939	1940	1941	1942	1943	1944	1945	1946	yg
HERNANDO CO. 1, nr. Aripeka	2 yg	2 yg	—	—	—	—	2 yg	2 yg	8
PASCO CO. 2, New Pt. Richey	A)2 yg	2 yg	2 yg	—	2 yg Tree cut	B)1 yg	2 yg Tree burned	C)1 yg	12
PINELLAS CO. 4, Crystal Beach	—	2 yg	Owl	1 yg	2 yg	2 yg	2 yg	2 yg	11
5, nr. Tarpon Springs	1 yg	2 yg	1 yg	—	—	—	2 yg	1 yg	7
7, Dunedin	2 yg	2 yg	2 yg	1 yg 1[e]	[e]	1 yg	2 yg	Owl	10
9, Oldsmar	A)2 yg	2 yg	Owl	1 yg 1[e]	2 yg Tree cut	B)1 yg	1 yg	1 yg	10
13, Belleair	A)1 yg	2 yg	2 yg	2 yg	Eggs taken	B)2 yg	2 yg	2 yg	13
14, Largo	2 yg	1 yg	1 yg	—	1 yg	2 yg	1 yg 1[e]	1 yg 1[yg]	9
15, “	A)1 yg	2 yg	2 yg	2 yg	Tree cut	B)1 yg	—	2 yg	10
16, “	A)2 yg	Owl	B)2 yg	2 yg	1 yg 1[e]	1 yg Nest fell	C)—	Owl	8
101, “	A)2 yg	1 yg	2 yg Tree cut	B)2 yg	2 yg	2 yg Nest fell	C)Nest & eggs fell	No nest	11
21, St. Petersburg	A)2 yg	1 yg 1[yg]	—	2 yg	2 yg	2 yg	Nest fell	B)2 yg	11
22, “	1 yg	1 yg	1 yg	1 yg	1 yg	Eggs taken	—	[e]	5
23, “	2 yg	2 yg	2 yg	3 yg	2 yg	3 yg	3 yg	2 yg	19
26, “	A)2 yg	2 yg	2 yg	2 yg	2 yg	Owl	B)—	—	10
33, “	A)2 yg	Tree cut	B)—	2 yg	2 yg	1 yg	1 yg	1 yg	9
29, nr. Largo	1 yg	2 yg	1 yg	2 yg	1 yg 1[e]	2 yg	2 yg	1 yg	12
HILLSBOROUGH CO. 34, Tampa	—	A)2 yg	2 yg	2 yg	2 yg	—	B)—	—	8
35, “	—	2 yg	2 yg	2 yg	2 yg	—	—	—	8
36, “	2 yg	2 yg	2 yg	2 yg	2 yg	2 yg	2 yg	Adult shot	14
37, “	[e]	[e]	[e]	[e]	[e]	—	—	—	0
40, Gibsonton	A)2 yg	2 yg	2 yg taken	B)2 yg	2 yg	2 yg	[e]	1 yg	13
46, Ruskin	A)—	—	—	1 yg	2 yg Tree cut	B)2 yg	3 yg	2 yg 1[e]	10
47, “	[e]	[e]	[e]	[e]	[e]	Tree cut	—	—	0
48, “	A)2 yg	1 yg	2 yg	1 yg	2 yg	Owl	B)1 yg	1[yg] fell	9
49, “	A)—	2 yg	Tree fell	B)— Nest fell	—	C)2 yg	[e]	1 yg	5
51, “	1 yg	1 yg	1 yg 1[yg]	2 yg	2 yg	—	—	1 yg	8

TABLE 4—Continued
NESTS OF FLORIDA BALD EAGLES, 1939-1946

	1939	1940	1941	1942	1943	1944	1945	1946	yg
MANATEE CO. 54, nr. Ruskin	A)1 yg Tree cut	—	—	B)2 yg	[e]	2 yg	—	2 yg	7
55, Bradenton	A)2 yg	1 yg	1 yg	Tree fell	B)2 yg	2 yg	—	2 yg	10
60, “	1 yg	2 yg	—	2 yg	2 yg	1 yg	1 yg	2 yg	11
62, “	1 yg	2 yg	2 yg	2 yg	—	1 yg	[e]	—	8
63, “	A)2 yg	1 yg	1 yg	A)Owl B)2 yg	2 yg	2 yg	—	2 yg	12
64, “	1 yg	2 yg	2 yg	2 yg	—	2 yg	1 yg	2 yg	12
SARASOTA CO. 66, Sarasota	A)2 yg	1 yg	Nest fell	B)2 yg	[e]	2 yg Tree cut	C)2 yg	1 yg	10
67, “	2 yg	2 yg	Adult killed	1 yg	1 yg	2 yg	—	1 yg	9
68, “	2 yg	1 yg	2 yg	2 yg	Adult killed	2 yg	2 yg	2 yg	13
69, “	2 yg	2 yg	1 yg	2 yg	2 yg	1 yg	1 yg	—	11
70, “	A)2 yg	Nest fell	B)2 yg	1 yg 1[yg]	1 yg 1[e]	2 yg	2 yg	2 yg	12
72, Osprey	A)1 yg	2 yg	A)Owl B)1 yg	2 yg	2 yg	2 yg	[e]	2 yg	12
75, “	1 yg	2 yg	1 yg	2 yg Tree cut	B)1 yg	2 yg	2 yg	1 yg	12
76, Englewood	—	2 yg	—	2 yg	1 yg	2 yg	[e]	[e]	7
77, “	1 yg	1 yg	2 yg	2 yg (weak)	1 yg	2 yg	1 yg	2 yg	12
78, “	A)2 yg	Owl	Owl	Owl	Owl	2 yg Tree fell	B)2 yg	Tree cut	6
79, “	1 yg	2 yg	2 yg	2 yg	2 yg	2 yg	2 yg	[e] (?Adult shot)	13
80, “	A)2 yg	2 yg	2 yg	1 yg	2 yg	B)2 yg	[e]	—	11
CHARLOTTE CO. 82, Placida	A)1 yg	2 yg	2 yg	1 yg	B)2 yg	2 yg Tree fell	C)1 yg 1[e]	1 yg 1[yg]	12
83, “	—	A)1 yg	Owl	B)1 yg	2 yg	[e]	1 yg 1[e]	1 yg	6
86, “	—	1 yg	1 yg	1 yg	1 yg	1 yg	2 yg	1 yg 1[e]	8
97, “	—	2 yg	1 yg	2 yg	1 yg 1[e]	—	[e]	1 yg	7
TOTAL YOUNG	61 yg	69 yg	54 yg	69 yg	59 yg	65 yg	46 yg	48 yg	471

A dash indicates that the owners did not use the nest that year; “Owl,” that the nest was taken over by Great Horned Owls.

An *e* in brackets indicates eggs that failed to hatch; *yg* in brackets, young found dead in nest.

A), B), and C) indicate successive nests of the same pair; a dash after such letter indicates that the nest was built but not used that year.

TABLE 5
NUMBER OF YOUNG PRODUCED PER NEST IN FLORIDA, 1939-1946

	19	14	13	12	11	10	9	8	7	6	5	0	Totals
Number of young per nest	19	14	13	12	11	10	9	8	7	6	5	0	471
Number of instances	1	1	4	9	6	7	4	7	4	2	2	2	49

Apparently it sometimes occurs that one egg is laid some weeks before the other. At Nest 34 (Tampa) there seems to be each year two or three weeks' difference between the ages of the two young. Also, at Nest 78 (Englewood), one young was much larger than the other, both in 1944 and 1945.

Table 4 shows the number of young produced by each of 49 nests in the 8-year period; Table 5 shows the productivity distribution. Nest 23, near St. Petersburg, produced three young in 1942, 1944, and 1945; Nest 46, at Ruskin, produced three young in 1945, two young and one bad egg in 1946; these are the only nests in which I have found three young. The 49 nests produced an average of 1.2 young per nest per year. Nest 23 produced 19 young in the eight years, and there were no returns. By contrast, at Nests 37 (Tampa) and 47 (Ruskin), eggs were laid yearly from 1939 through 1943, but none hatched, and the history of Nest 14 shows an extremely low survival for the young. This nest is in a high pine overlooking an orange grove near Largo in Pinellas County. It is a mile away from any water. In 1939, two young were raised. They were banded on March 4 and both shot the following May (one, May 8, in Florida; the other, May 30, in Virginia). In 1940, one young was raised, banded February 3, and killed July 29 (in North Carolina). In 1942, the pair did not nest (reason unknown). One young was raised in 1943, two in 1944. In 1945, one young and one addled egg were in the nest on February 2, the young only four days old. When I returned to band the bird on March 2, the nest was empty. In 1946, the nest contained one living, and one dead, young.

Table 6 lists the number of nests observed in detail each year with the number of nesting failures and their causes.

FACTORS AFFECTING SURVIVAL

Availability of suitable nest sites. In my eight-year survey of the area, active nests have shown little change in numbers except where timber has been cut, forcing the birds to move elsewhere. When these birds remain in the pine woods area, the new nests can be found without much trouble, but sometimes the eagles move 5 to 20 miles inland to the cypress swamps where it is almost impossible to find them, and thus the population may show a decrease in one area without showing a corresponding increase in another where a nest census is more difficult. If lumbering activities should continue in the same volume as from 1941 to 1945, large areas of many thousands of acres will be stripped

MIGRATION OF BALD EAGLES

TABLE 6
EAGLE NEST FAILURES IN FLORIDA, 1941-1946

<i>Cause of failure</i>	<i>Number of nest failures</i>						Totals (619 nests)
	1941 (83 nests)	1942 (84 nests)	1943 (107 nests)	1944 (106 nests)	1945 (115 nests)	1946 (124 nests)	
Nests taken by owls	11	4	6	5	0	5	31
Eggs taken	0	0	1	1	0	0	2
Yg taken by men	3	0	0	0	0	0	3
Yg killed by wildcats	0	0	1	0	0	0	1
Yg shot	0	1	0	0	0	2	3
Yg died (late nests)	0	0	0	0	0	3	3
Adult shot	0	1	2	0	0	6	9
Adult killed by lightning	1	0	0	0	0	0	1
Eggs failed to hatch	5	5	7	2	0	6	25
Disturbance during incubation	0	0	3	5	0	0	8
Nest blown down	1	3	1	3	0	0	8
Nest trees cut	0	0	7	4	0	0	11
Hurricane (in the fall of 1944)	0	0	0	0	45	0	45
Lumbering	0	0	0	0	2	0	2
Undetermined	4	4	5	6	0	0	19
Totals	25 (30.1%)	18 (21.4%)	33 (30.8%)	26 (24.5%)	47 (40.8%)	22 (17.6%)	171 (27.6%)

of all trees suitable for eagles' nests, which require a strong crotch to hold them. Further details on this problem are given above in the section, "Nesting Territory."

Food. There is an abundance of many kinds of food for eagles in Florida the year round. The Gulf waters teem with fish, and I have at times found the nests full of fish, most of them of coarse varieties. One day I counted 19 fresh fish in one nest, 20 in another. When the tide goes out quickly ahead of a strong wind, it frequently leaves thousands of fish of all sizes trapped in shallow water-holes scattered over the sand flats, and then there is practically no limit to the number of fish an eagle may carry to its nest. Nest 2 (near New Port Richey) is in timber owned by Mr. Odell Osteen, a commercial fisherman. The eagles frequently await his arrival from the Gulf and swoop in at close range to retrieve the fish he throws them.

Mullets and catfish are the kinds most frequently found in nests, though trout, jackfish, needlefish, eels, and other species are also found. Catfish furnish most of the food, and since they are not a table fish, the economic loss is negligible. Turtles are also a common food.

Only twice, in banding 814 young, have I found remains of hens or other poultry. On one occasion I tethered a half-grown chicken at the foot of one nest tree and, after an interval, at the foot of another. I hid in blinds previously constructed, hoping to get a photo of the adult birds taking the chicken. I could distinctly see the eagles watching the fowl, but they made no effort to take it. However, certain eagles are apparently partial to wild ducks and other birds. I found a notable amount of bird remains at Nests 35 and 86 though not at other nests, and I list the following, not as typical, but as very exceptional, examples of nest contents:

Nest 17 (Largo), 1945—1 Brown Pelican (*Pelecanus occidentalis*),
1 Cormorant (*Phalacrocorax auritus*).

Nest 35 (Tampa), 1940—42 wings of Scaup Duck (*Aythya* sp.);
remains of Scaups every year.

Nest 86 (Placida), 1940—3 Scaups

1941—1 Scaup, 1 Great Blue Heron (*Ardea
herodias*)

1942—2 Great Blue Herons, 2 Brown Pelicans

1943—2 Great Blue Herons

1944—2 Great Blue Herons

1945—1 Great Blue Heron, 1 Cormorant

Nest 93 (Lutz), 1945—1 small pig, 1 soft-shelled turtle, 1 domestic fowl, 1 catfish.

It has been generally thought that eagles take young pigs, but Nest 19 (Largo) was close to a large piggery, and the owner never lost any pigs to the eagles. It is near this piggery, too, that early in April, 30 or 40 eagles, mostly immatures, gather before the northward movement



Bald Eagle bringing food to the nest. Gibsonton, Florida. February 7, 1946.



Photos by Roger T. Peterson, courtesy of *Life*

Bald Eagle four and a half weeks old. Ruskin, Florida. February 12, 1946.

The only pig I have ever found in a nest was the one in Nest 93, which is close to a highway. The pig may have been killed by a car and retrieved by the eagles.

Each year several raccoons are found in the nests. In 1945, four out of the first seven nests examined contained the remains of half-grown raccoons, which apparently had been taken alive by the eagles. (Since the hides were there, the animals had not been killed by trappers.)

I made no attempt to keep a complete record of all the remains of mammals and birds found in the nests, but the following were noted: raccoon, opossum, skunk (one only), shoat (one only), rat, rabbit, Pied-billed Grebe (*Podilymbus podiceps*), Brown Pelican, Cormorant, Anhinga (*Anhinga anhinga*), Great Blue Heron, Snowy Egret (*Leucophoyx thula*), Louisiana Heron (*Hydranassa tricolor*), Little Blue Heron (*Florida caerulea*), Scaup Duck, Red-breasted Merganser (*Mergus serrator*), Florida Gallinule (*Gallinula chloropus*), American Coot (*Fulica americana*), gulls (spp.), Flicker (*Colaptes auratus*), domestic fowl (2 only).

In nearly every nest there are epiphytes, about the size of an average pineapple. Often they look as if the birds had been eating them—the long leaves, especially at the base where they are tender, being ragged and torn.

The abundance of food found in Florida nests is in marked contrast with my findings in Ontario nests, limited to one large calico bass.

Great Horned Owls. Great Horned Owls are very plentiful in Florida and cause considerable disturbance among nesting eagles. They are very aggressive and take over many eagle nests about the time the eagles are ready to lay. The owls sometimes become established in the nests during the eagles' absence in late summer, and they may even have eggs by the time the eagles return. Once the owls are established it is difficult for the eagles to reclaim their nests, and I doubt if many eagles make a really serious effort to do so. In 1946, Great Horned Owls took Nest 7 (Dunedin) and raised young. The eagles frequently visited the nest and inspected the young owls, but they made no attempt to regain possession. If they built a new nest I failed to find it. Usually when displaced by owls, eagles do build another nest, but they seldom lay the same season. By the time they "decide" to build, find a suitable tree, and finish the nest, it is past their regular nesting time, and they do not lay. In one instance (Nest 16C in 1946), Great Horned Owls took over the nest after the eagles had been incubating 10 days. It is interesting that owls had taken over Nest A of this same pair in 1940 and Nest B in 1944 (although Nest B had been partly blown down).

In 1939, near Tampa, I found a Great Horned Owl incubating one of its own eggs and one of a Bald Eagle. The eagle egg was in good condition, but unfortunately the tree was cut before the eggs hatched.

On January 21, 1946, as I approached a nest, I saw the eagle leave the eggs and fly away. I climbed the tree, and as my head came level

with the top of the nest, a Great Horned Owl whisked off close to my face. It had been sitting on its one egg not more than three feet from where the eagle had been incubating. The nest was on a slight slant, and the owl occupied the lower side of it. Developments might have been interesting, but heavy rains made the trails impassable, and I did not see the nest again that season. J. Warren Jacobs (1908, *Wils. Bull.*, 20: 103-104) recorded a Great Horned Owl nesting in a cavity in the side of an occupied Bald Eagle nest. However, since the nest was 15 feet high and the cavity 4 feet from the bottom, this seems a case of sharing a nesting tree rather than of sharing a nest.

Man. Egg collectors were gathering eagle eggs in Florida up to 1939, but since that date no permits have been granted by the State. To my knowledge, boys have robbed the nests of eggs only twice in the eight years of my study, and men have taken young from the nest twice. My returns from banded birds show only 10 eagles killed in Florida in the eight-year period. In the belief that eagles took young pigs for food, hog-raisers formerly rode the country, shooting all the young eagles they found, but I have not heard of this being done since 1939. On the whole, man seriously endangers the eagle population only through extensive lumbering and casual shooting.

THE FLORIDA HURRICANE OF 1944

The hurricane of October 17 to 18, 1944, caused considerable havoc among the eagle nests and was disastrous to nesting although it occurred four to six weeks before the usual laying period.

I made my first survey of nests in 1944 about the end of November and found that all the nests had been more or less damaged; 18 nest trees had been blown down, and many nests had been blown out of trees. However, with one exception, every nest was rebuilt. (In most cases, the birds used the sticks from the nest that had been blown down.) The new nests were built in plenty of time for normal nesting, and I thought that nesting would be normal, but this was not the case.

In 24 of the rebuilt nests no eggs were laid.

In 21 nests where eggs *were* laid, they did not hatch although the birds incubated for two months. It was interesting to watch the birds toward the end of this 60 days of incubation. One bird would go to the nest, adjust itself carefully on the eggs, incubate about 15 minutes, then leave the nest. The other bird would then spend 10 or 15 minutes on the eggs and join its mate on an adjacent limb. They would remain perched there for half an hour before resuming sporadic sessions on the nest.

These 45 nests under normal conditions would have produced about 54 young birds. Thus, one hurricane caused more loss through non-production than the mortality caused by man in six years (cf. the table of nest failures).

Poultry men in the district reported to me that their hens did not lay for three weeks after the hurricane, and that the hens appeared to

have lost their desire to incubate. It was noted that no owls took over eagle nests that season; apparently the hurricane upset their schedule also.

I am indebted to F. B. Hutt, Professor of Animal Genetics at Cornell University, for the following comments:

"I know of no data on the effects of hurricane upon egg production, or upon fertility of eggs in domestic fowl. However, it is common knowledge among poultry men that some disturbances, particularly the transfer of birds to new quarters, may cause a noticeable drop in egg production over a period of two or three weeks after the disturbance. . . . It is known that in hens which have ceased laying under the influence of unfavorable changes in the environment, the larger ova still attached to the ovary degenerate and are eventually resorbed. Is it possible that at the time of the hurricane, Oct. 17-18, 1944, the eagles might have had ova well advanced toward maturity? If so, their resorption and the development of new ova might have upset the normal reproductive cycle.

"While such a disturbance of the normal physiological processes usually does not affect the egg laying in fowl for more than a couple of weeks, it might very well do so in a species like the eagle that normally lays only two eggs in a clutch. An egg a day is nothing much in the life of a good domestic fowl, *but egg laying is a real event in the life of an eagle*, and the chain of physiological processes leading up to it *may be a long one*.

"The role of bird psychology in these processes must not be underestimated. It has been clearly proven by Benoit and others that reproductive activity of the avian ovary and testis results from stimulation by a gonadotropic hormone produced by the pituitary gland. While the pituitary may be activated by light, it is not improbable that other factors, such as courtship and nest-building, may play a part. One might venture to suggest that the rebuilding of the nests, particularly of such large nests as the eagle's, took so much time that the usual sequence of psychological states, and associated sequence of activation of endocrine glands were retarded. This could lower both the number of eggs produced and their fertility. The problem undoubtedly needs considerable study."

REACTIONS OF EAGLES TO BANDING OPERATIONS

The proper time to band the young is when they are between three and six weeks of age. If they are banded before the age of three weeks, the bands slip off. Up to 7 or 8 weeks of age the young do not offer strenuous resistance to being handled, but from 9 to 11 weeks, it requires careful and experienced handling to avoid injuring the bird or being injured oneself by its talons. The young eagle seldom uses its beak when fighting, but will make use of it when both feet are held. The average Florida bird is much more aggressive and difficult to band than individuals of the northern subspecies.

The most troublesome birds are those almost large enough to fly, which, on my approach, jump out of the nest and fly or glide to the ground. Since they cannot take off from the ground, they must be returned to the nest to save them from predators and from starvation, for the parents may not feed them on the ground. I have been obliged to replace more than 30 of these large birds. I once found an 8-week-old bird at the foot of a nest tree. It appeared weak and underweight. I returned it to the nest, and it immediately began to devour a fresh fish that was there, paying no attention whatever to me. But as I reached the nest with this bird, its nest fellow jumped out and flew a considerable distance. I had some difficulty finding it and restoring it to the nest. On another occasion a young bird jumped from the nest and became entangled in a grapevine on a near-by tree. It required an hour to release it and return it to the nest. It immediately hopped out on a dead stub where its nest mate was perched, knocking its nest mate off the stub and losing its own balance, so that they both fell into the lake below. They quickly flapped ashore and were well hidden in the underbrush by the time I had descended the tree. When they were finally restored to the nest I had spent a total of seven hours there.

The reactions of the parents while I am banding the young are varied. Certain individuals keep about 200 feet away, flying around and uttering disturbed cries. Others dive to within 10 feet of me. Still others sit on a high stub some distance away, watching proceedings, but apparently little disturbed. (These are often birds whose young I have banded for six or seven years.) Sometimes the adult pair have flown away as I approached the nest and not reappeared during my banding. Sometimes I band the young in a nest without seeing the adults at all. The eagles scream very rarely; I have never heard them scream while I was climbing the tree or banding the young.

ACKNOWLEDGEMENTS

I gratefully acknowledge the kindness of friends who have assisted me in the field and in compiling this report. I first undertook the study at the suggestion of Mr. Richard H. Pough, and his help and encouragement during the eight years of field work have been invaluable. With the entrance of the United States into the War, permission to leave Canada with United States funds was severely restricted by the Foreign Exchange Control Board; each fall for four years, permission was granted me through Mr. Frederick C. Lincoln's solicitations to the Board, and I greatly appreciate his efforts, which made continuation of my study possible. Mr. Raymond Conway, of Placida, Florida, took me to many new nests in a 28,000-acre timber area he patrolled daily, and Mr. Guy Van Dyne drove me to several nests each year in the Myakka State Park. Many others made annual observations for me and were most helpful and hospitable on my weekly banding trips.

DELTA, ONTARIO, CANADA

HABITS OF MALE HUMMINGBIRDS NEAR THEIR NESTS¹

BY ROBERT T. MOORE

I N the literature on the nesting habits of hummingbirds, it is frequently recorded that the male takes little interest during nesting, does not assist in nest building, and never shares in incubation. There are a few records of individuals standing guard at a discreet distance and occasionally darting at an intruder, but there are many recorded observations of hummingbirds in the United States claiming that the female is infuriated by a male's interest in her nest and drives him away. A few quotations will be sufficient.

Referring to *Archilochus colubris*, Ridgway (1892:272) writes: "The male frequently appeared in the vicinity, but neither offered food nor even deigned to alight on the same tree, yet birds which had a good claim in the neighborhood dared not approach very close. . . ." Torrey (in Chapman, 1896:241) remarks concerning the same species: "The male . . ., forgetful, to all appearance, of his conjugal and parental duties, may be found at home day after day on a dead twig in some tall tree. . . ." William Kobbé (1900:12) states that during the nesting season the male Rufous Hummingbirds (*Selasphorus rufus*) "frequently, but not always, sit near the tree in which their home is placed and attempt to drive all birds from the vicinity of the nest. . . . I have good reasons to believe that they do this more from a love of fighting than from parental instinct or devotion, since the male birds rarely appear upon the scene when their nest is being taken." In the field notes of Hamilton and Goodfellow (Oberholser, 1902:320) a long account appears of the nesting of Gould's Violet-ear [*Colibri c. coruscans*] in the courtyard of the British Consulate at Quito, Ecuador. The notes give the impression that both birds may take part in nest building, but "when the first egg is laid, the male bird entirely disappears from the garden and never comes near it again until the young have flown." (This observation is contrary to my own experience with the same species, which is recorded below.) Concerning the Calliope Hummingbird (*Stellula calliope*), Joseph Grinnell (1908:73) writes: "I saw not the least evidence that the male has anything whatever to do with nestbuilding or caring for the young. And on only one or two occasions did I ever see a male invade the cañon-bottom where the females were nesting, and then he was routed out by an irate mother." My experience with this species has led me to no contrary belief. Regarding the Anna Hummingbird (*Calypte anna*), Dawson (1923:940) is more positive, saying: "As to the male bird, he has no part in these festivities. Not only is he forbidden to assist in the building of the home, but he is banished forever from

¹ Contribution from the California Institute of Technology, Pasadena, California.

its sacred precincts." Wheelock (1916:419, 423), however, remarks concerning the Black-chinned Hummingbird (*Archilochus alexandri*): "The father, . . . contrary to hummingbird etiquette, sat within two feet of the brooding mother," and of the Anna male: "One thing I know, he was 'on guard,' for whenever I ventured near the rose tree, he flew at me with a harsh little screech, sometimes right into my face." My search of the literature has not been exhaustive, and I may have missed some pertinent references, but it seems worth while to put on record the following observations.

On April 21, 1927, at Cruz Loma, on the northern slopes of Mt. Pichincha, Ecuador, I wandered through a grove of trees known to the Indians as "guantos." Possessing an enormous flower of pinkish orange color 14 inches in length, the tree is related to our trumpet flowering vines and is known as the *Datura sanguinea*. The Sword-billed Hummingbird (*Ensifera ensifera*) is inordinately fond of the insects that infest the handsome corollas and probes them constantly with its bill four inches long and its tongue nearly twice that length. When I passed under a tree, a female darted at me, making me suspect the presence of a nesting site. For two hours I climbed over the various branches in a desperate effort to find the nest, which apparently is unknown to science. Throughout this period both male and female, the former easily recognized by his black throat and more glittering green underparts, persisted in attacking me with extraordinary ferocity. On one occasion the male struck my cap and nearly dislodged me from the tree by forcing me to defend my head. The indefatigable onslaughts of these two birds, persisting for more than two hours, convinced me this tree had been chosen as a nesting-site, although the only evidence of a nest—a spot on one of the branches where lichens appeared to have been artificially attached—was not conclusive. No other bird of the species was observed, so that it would seem safe to conclude these two were mates.

A less bold species is *Lesbia victoriae aequatorialis*, the famous long tailed Train-bearer. I discovered a nest of this species on April 3, 1927, on the eastern slopes of Mt. Pichincha that contained one young bird. The nest was built on dead plants that depended from a bank of earth not 15 feet from the hovel of a Quichua Indian. In spite of her familiarity with the noises of the children and the dog, the female was extremely cautious in her approach to the nest. Only on one occasion did the male show concern. He then flew with the female to a tree about 50 feet to the right of the nest. There was, of course, not the least difficulty in distinguishing him, since his tail is approximately six and a half inches long, whereas that of the female is but two and a half.

At Panigulli, not far from the active volcano, Mt. Tungurahua, in southeast Ecuador, on May 9, 1927, I discovered a nest of the Tyrian-tail (*Metallura t. tyrianthina*). I observed only one bird, and it was building. Extremely tame, it persisted in nesting operations in spite of my presence, even carrying materials to the nest when I was within 10

feet of it. The bird was secured and was sexed by our collector, Carlos Olalla, *as a male*. Unfortunately, I was not at the camp site when the skin was prepared. On my return, I noted that this specimen, No. 2546, Moore Collection, has the chin and throat feathers damaged, but the green of the male sex shows on the sides of the chin. The rest of the coloration is normal, precisely like male, Moore Collection No. 2541, sexed by myself and collected at Baños de Papallacta, Ecuador. I have found Carlos Olalla, who has collected birds for more than 40 years, generally, but not infallibly, accurate in his sexing.

On March 29, 1927, in a small park of Quito, Ecuador, I discovered a nest of the Gould's Violet-ear containing two eggs. Not more than eight feet above the ground, it was swung on a sharply descending branch of a large tree, which resembled a Casuarina. As the nest was close to a park bench and only a hundred yards from my hotel, I was able to observe it with comfort at close range for six days, using an 8 x binocular. I recorded extensive notes on the habits of both the male and female. The two sexes are practically indistinguishable in the field, but the female is generally more golden bronze above and below. However, both birds were seen repeatedly at the same moment on the same tree during the six days the nest was under observation and, although it was impossible always to tell which of the birds was incubating, it seemed a safe assumption that the one that had a permanent guard-site, on a dead branch 60 feet up in the same tree, was the male. Whether he ever incubated the eggs or not, I was unable to say. During the six days, this bird was repeatedly found "on guard" at the watch-site. Occasionally he sat on other dead twigs of the same tree 30 feet up and sometimes on the electric light wires. Once he perched on a branch closer to the nest. At no time did the incubating bird drive the guarding bird away. On April 2, rain fell heavily during the entire period of observation. The female could not be persuaded to leave the eggs, even by throwing particles of mud at her. Meanwhile the male continued to stand guard at his exposed post. He stretched out his wings and ruffled his body feathers. He plainly classed me as interloper. On several occasions he dove at me furiously, generally when I was close to the nest; but on one occasion there were several Ecuadorians between me and the nest, and yet he singled me out for an exhibition of his antipathy. Not once did I observe him dart at the Ecuadorians that thronged the park, even though they frequently sat on the bench within 10 feet of the nest. I hesitate to say he *remembered* that I was the one he had observed moving off regulation paths and examining the nest at close range.

I also repeatedly observed him give an interesting variation of the "tower and dive" performance near the nest. He whirred from his perch perpendicularly into the air, very much after the manner of the Anna Hummingbird. The tail was not spread fully until near the top of the perpendicular ascent, at which point it spread so wide that every rectrix

separated from the adjoining ones and the spaces between the rectrices were plainly visible through a binocular as they were silhouetted against the sky. At the peak of the ascent the rectrices were suddenly bent upwards at right angles to the bird's body, and at the same moment the body turned over backwards, causing the bird to drop like a plummet. The bird generally finished by volplaning downwards to its accustomed guard-site above the nest. The tail feathers were kept expanded for the first 50 feet of the drop, but from there on they were drawn in, and the bird approached the tree with tail practically closed, until immediately before alighting, when the feathers were again spread to extreme capacity and pointed sharply downwards at an angle of almost 90 degrees, thus slowing down the terrific speed of the descent and making a graceful landing possible. My notes record: "The tail when spread was always held convexly—rounded at the top."

On April 28, 1927, at Nono Pungo, on the road to Gualaia from Quito, I discovered another nest of Gould's Violet-ear. It was placed in a large bush near the highway four feet from the ground and could easily be held under close observation. At the time of discovery, a Violet-ear was sitting on it. The bird flushed and, alighting only a few feet away in plain sight, was shot and collected. I proceeded to put up my tripod and camera in order to take a photograph of the nest and surroundings. Looking up, I discovered to my utter astonishment, another Violet-ear, less golden bronze above, sitting on the nest. Realizing that a *male humming-bird appeared to be incubating*, I flushed it after a full five minutes of observation within eight feet of it, watched it carefully in its short flight of five feet to a dead twig, and collected it. Dissection proved that the first bird collected was a female (No. 1052, Moore Collection) and the second a male (No. 1030, Moore Collection). During the time I watched the male on the nest, it made the swaying motion characteristic of an incubating bird adjusting its feathers to the eggs and nest. This female is conspicuously more golden above and below than the male, a contrast often, but not always, differentiating the sexes. The nest, as well as the two eggs (which were fresh), was also collected (Moore Collection, No. E 16). In my judgment, no mistake could have been made in this identification. The bush was thick, but the nest was in plain sight near the periphery of the bush. In the case of each bird, neither limb nor twig intervened to obscure the flight from the nest to a twig of the same bush, where it was killed. I personally collected both birds and kept them carefully in my pocket until dissection began, and I supervised that throughout, checking the sexing, because I was aware of the importance of this observation. I made full notes in my small pocket notebook on the spot. At no time did I observe both birds at the same instant; in fact, I did not realize that the male was near the nesting site until the female was killed. Perhaps the male was aware of his mate's death and, flying to the nest at the sound of the shot, found the eggs were not covered and unhesitatingly took his turn.

In a recent article by Helmuth O. Wagner (1945:172) this Violet-ear was incorrectly identified as *Colibri cyanotus*. My earlier article (1939:315) gave no Latin name and stated only: "In Ecuador I have observed the male and female Violet-ear take turns incubating at the same nest and collected both sexes to substantiate this observation." (It might have been better for me to employ the singular "turn," since the male was observed sitting on the nest just once.) The Violet-ear I referred to was *Colibri c. coruscans*, formerly known as *Petasphora iolata*.

Perhaps I should caution the reader not to jump to the conclusion that it is a common thing for male hummingbirds of Ecuadorian species to take part in nesting activities. Approximately 50 nests of hummingbirds were found by our party in Ecuador, and with the exception of the incidents noted above and a few less convincing ones, the males either were not observed near the nest or else maintained a guard-site some distance away. Nevertheless, regarding some species, such as *Colibri coruscans*, I am inclined to believe that more extensive observations will prove that the male quite frequently takes part in nest-building and, at least under some circumstances, assists in incubation.

LITERATURE CITED

- CHAPMAN, FRANK M.
1896 The birds of eastern North America. 3rd ed. D. Appleton and Co., N.Y.
- DAWSON, WILLIAM
1923 The birds of California (vol. 2). South Moulton Co., San Diego, Calif.
- GRINNELL, JOSEPH
1908 The biota of the San Bernardino Mountains. *Univ. Calif. Publ. Zool.*, 5:1-170.
- KOBBÉ, WILLIAM H.
1900 The Rufous Hummingbirds of Cape Disappointment. *Auk*, 17:8-15.
- MOORE, ROBERT T.
1939 The Arizona Broad-billed Hummingbird. *Auk*, 56:313-319.
- OBERHOLSER, HARRY C.
1902 Catalogue of a collection of hummingbirds from Ecuador and Colombia. *Proc. U. S. Natl. Mus.*, 24:309-342.
- RIDGWAY, ROBERT
1892 The hummingbirds. *Rept. U. S. Natl. Mus.*, 1890:253-383.
- WAGNER, HELMUTH O.
1945 Notes on the life history of the Mexican Violet-ear. *Wils. Bull.*, 57: 165-187.
- WHEELLOCK, IRENE GROSVENOR
1916 The birds of California. 4th ed. A. C. McClurg and Co., Chicago.
- BORESTONE MOUNTAIN, MONSON, MAINE

COURTSHIP BEHAVIOR OF THE BLACK DUCK

BY MILTON B. TRAUTMAN

REFERENCES in the literature concerning courtship behavior of the Black Duck (*Anas fulvigula rubripes* Brewster)* in autumn and winter are few and are usually confined to a brief statement that courtship does occur (Townsend, 1916:9). There is a larger literature relative to courtship in spring (Sawyer, 1909:195-196; Townsend, 1916:13-15; Phillips, 1923:80; Bent, 1923:51). These descriptions emphasize the spectacular courtship flight rather than courtship behavior on water or land.

My observations on courtship of the Black Duck in autumn were made chiefly after 1939; on courtship in winter, 1925 to 1933 and 1941 to 1945; on courtship in spring, 1929 to 1933 and 1939 to 1945. Observations previous to 1933 were made in central Ohio (principally Buckeye Lake) and on marshes bordering Lake Erie from Sandusky to Toledo, Ohio. Most of the observations after 1939 were made about South Bass and Starve islands, Ottawa County, Ohio.

METHODS OF DETERMINING SEX AND AGE

Sexual dimorphism is slight in the Black Duck. The sex of the live bird is recognized chiefly by slight differences in color of the upper bill, in shape and size of head and body, in actions, and in voice.† The bright yellow bill of the adult male, with darker mottling confined largely to the culmen, is quite distinctive. In the adult female the upper bill is a duller, more greenish, yellow and more mottled with olive, especially on the sides. The color of the bills of some adult females is rather similar to the color of the bills of some young birds, particularly young males in October and young females in November or December. It is therefore not possible to determine the age or sex of these birds by bill color alone. Many adult males appear to be notably more thick-set in profile. In some males the bulky head seems a full fourth larger than the heads of their accompanying females. The apparent size of the head is increased at times by fluffing out the feathers, especially about the crown and cheeks. The neck in males often appears to be considerably thicker than in females. The larger over-all size of the males is often evident. Weights of 14 adult males taken between September 27 and December 8, ranged from 2 lbs. 8 oz. (1,034 grams) to 4 lbs. 1 oz. (1,843 grams); weights of 12 adult females ranged from 2 lbs. 0 oz. (807 grams) to 3 lbs. 1 oz. (1,289 grams). With few exceptions adult males in autumn weighed more than 2 lbs. 10 oz. (1,572 grams), the females less.

* The nomenclature followed in this paper is that which was proposed recently by Delacour and Mayr (1945).

† I was surprised, however, at the degree of certainty and the rapidity with which I could accurately identify the sex of adults and at what great distances. I was forced to presume, then, that the birds themselves had little difficulty in recognizing the sex of one another. I concluded that marked sexual dimorphism in ducks, as a means of rapid sex identification, may have little significance.

The courting actions of the birds, either flying or on water or land, are indicative of their sex, if observed for any length of time. Sex identification is greatly aided by differences in voice. The male grunts softly, rather than quacks, or more rarely gives a whistled note, whereas the female distinctly quacks in varying degrees of loudness.

The sex of the young of the year can be recognized less readily and with less certainty. The color difference in the bills of the sexes is less pronounced, although bills of males usually contain more and brighter yellow and less olive-green at any period of autumn than do those of the females. There is less difference in size between sexes. Ten young of the year, taken in autumn, averaged about 10 oz. (284 grams) less than the adults, with considerable overlapping in weight between young males and young females.

The color of the foot was a reliable character only in adult males in the hand. I have found that the adult male foot as portrayed by Shortt (1943: plate) is correct for fall and winter, except that in some males the red is more orange. The adult female foot in fall and winter contains considerably more reddish-orange on the average than does the adult female foot as portrayed by Shortt. I have never seen a juvenile male's foot in autumn so uniformly orange-yellow as that shown by Shortt; usually there is more olive-green in early autumn, and more reddish-orange after October, with the olive-green restricted mostly to the tarsal ridges and the joints. The foot of the juvenile female was never so uniformly and palely flesh-colored as that figured by Shortt, but contained a large amount of olive-green with a flush of orange-yellow, especially in cold weather.

The autumn adults, particularly males, are locally known as Big Winter Blacks (or Mallards), Red-legged Blacks (or Mallards), or Hudson Bay Mallards. These adults fit Brewster's description (1902: 184-185) of *rubripes*. The autumn juveniles, particularly females, are locally known as Little Black Mallards, Gray-legged or Green-legged Black Mallards. They fit Brewster's description (1909:176) of *tristis*. The sportsmen of northern Ohio use the same criteria for separation of the two supposed kinds as do the sportsmen at Buckeye Lake (Trautman, 1940:178-179).

At various times between 1943 and 1945 I shot seven adult males, three juvenile males and eight adult females after first identifying them as such; of three birds I identified as juvenile females and collected, two were juvenile females, the other a juvenile male (Oct. 3, 1945).

Sex and age determinations of birds collected from September 27 to December 8 were verified through examination of the gonads, the bursa of Fabricius, presence and size of penis, condition of tail feathers (all as outlined by Kortright, 1943:31-36), and feathers from the sides of the chest (Kortright, 1943:161-162). The size of the testes of juvenile and adult males overlapped considerably, as did the size of ovaries of juvenile and adult females. The testes of adult and young

males ranged from 4 to 10 mm. in length, were smallest in late September and October, and began to increase in size after December 1. The ovaries of adult and young females ranged from 3 to 11 mm. in length, and the largest were recorded in December.

METHODS OF OBSERVATION IN AUTUMN

My observations were made from the windows of our house on South Bass Island, at other places on the island, and from Starve Island. A blind, with or without wooden decoys, was used upon many occasions. At Starve Island I usually squeezed into a crevice in the limestone bedrock, with a limestone-colored tarpaulin in front of me. Observations were made at every period of the day, but chiefly during the first few hours of daylight, and in the evening. Usually the birds were unaware of my presence.

During August, adult and young Black Ducks begin to gather into smaller groups at such undisturbed localities as Starve Island. By late September as many as 100 Black Ducks may be seen about Starve or Ballast islands, and particularly in their lee during high winds and seas. Their numbers increase during early October, and on some days of that month as many as 800 may be seen in the vicinity of Starve Island. In late November and early December, coincident with the first freezing over of the extensive marshes along the shores of the mainland, there occurs a sharp rise in numbers, and as many as 1,200 have been counted as they sat upon the water. These birds disappear with the first freezing over of the waters surrounding the islands. After that, only an occasional straggler is seen until the first prolonged thaw in late winter or early spring, and the resultant appearance of open leads or holes in the ice.

Black Ducks often comprise over 90 per cent of the river, or surface-feeding, ducks in the flocks about the island. Occasionally as much as 30 per cent of the larger flocks in September and October may consist of Baldpates (*Anas americana*) and Pintails (*Anas acuta*); in November and December, of Pintails and of Mallards (*Anas platyrhynchos*). Invariably the Black Duck has been in the majority in the larger flocks. Red-breasted Mergansers (*Mergus serrator*) and Common Golden-eyes (*Bucephala clangula*) are very numerous at times in autumn, occurring in flocks of 6 to 800 individuals, but they do not habitually associate with the river, or surface-feeding, ducks.

Throughout autumn, but especially in late autumn, solitary pairs of Black Ducks were found about isolated sections of South Bass Island, including the bay in front of our house. Their daily routine usually followed the same general pattern. A pair would alight several hundred feet out and cautiously swim shoreward, taking as much as an hour to reach shore. Then they usually began feeding upon *Cladophora* and other algae which grew profusely upon the limestone bedrock and larger glacial boulders at or slightly below water level. The birds pulled large mouthfuls of algae and ate with seeming greediness for about 15 min-

utes, after which they stood on the beach, sat on large boulders protruding above the water, or swam about near shore. Courtship behavior began sometimes during this routine and became more marked after the birds had eaten, if it was not very cold or windy.

If not molested, a pair of birds, recognizable with fair certainty by differences in size, color, and behavior, visited the same area daily, appearing at about the same time of day and following the same routine. Many pairs of birds were observed at several localities during the autumns of 1944 and 1945.

I also watched pairs of Black Ducks which were with flocks, the flocks ranging in size from 6 to 800 individuals. In the larger flocks, 10 to 31 pairs have been observed courting at some time during a three hour period. A pair could be recognized readily because they flew and alighted close together, and almost invariably remained together. In these flocks were also many adults that gave no indication of courting.

AUTUMN COURTSHIP

Courtship, both of solitary pairs and of pairs with flocks, first became apparent by the increased speed in swimming of the male, or of both male and female. The bird or birds swam rapidly a short distance, then changed direction. Frequently they partly opened their wings and splashed the water, and rarely one or both dove. If the pair was with a flock, these actions sometimes greatly excited the other members so that several males pursued the female for short periods, or other pairs began courting. Usually the courting pairs swam to the edge of the flock where there was less interference from the other birds, particularly males. At the beginning of courtship the heads of both males and females were held close to the body, but shortly thereafter, first one (usually the male), then the other began to raise and lower its head in a rapid and jerky fashion, bobbing at intervals during as much as two hours. When the neck was fully extended the bill would be held horizontally, but often when the head was lowered, the bill tip was submerged. Frequently the bill was rapidly flipped upward from the water, throwing up or outward small drops or jets of water. This bobbing of heads, particularly of the males, was the most frequent action of autumn courtship behavior, and with many of the pairs under observation courtship went no further. When courtship progressed further the male became more active; in addition to head bobbing he would swim rapidly toward the female and attempt to bump her side, or peck at the feathers of her neck, back, or rump. Both sexes occasionally flapped their wings vigorously, often treading water and assuming an almost vertical position.

When the female was hard pressed by the male she arose and flew a short distance, less than 300 feet. The male followed; then overtaking and flying over and in front of her, he would stretch his neck downward and at the same time widely spread his tail. As he flew over her the

whitish under-wings were very conspicuous. Occasionally a spirited chase occurred, the female appearing to attempt escape by vigorous use of wings and feet upon the water's surface, similar to the action of a Coot (*Fulica americana*) in rising from the water. Such a chase was conducted with great splashing of water and many abrupt turnings.

Sometimes, after courting for a few minutes to as much as three hours, the female began to swim rapidly with head and neck outstretched on the surface of the water and with body partly submerged, whereupon the male pursued her, his neck outstretched. When the male came close to the female she generally submerged until only the crown of her head and dorsal ridge of her bill was above water, whereupon the male swam over her and copulation seemed to take place. After emerging, the female shook herself vigorously, flapped her wings, twitched her tail from side to side, and began to preen. Generally the male flapped his wings, twitched his tail from side to side, and sometimes bobbed his head and uttered his whistle-like note.

Autumn courtships were much less noisy than those of spring. The male infrequently uttered a soft, low grunt, usually accompanied by head bobbing. He rarely gave the whistled note, and only when seemingly greatly excited. The female would sometimes make a grunt-like quack, but seldom loudly. This subdued use of voice in autumn may have been part of the extreme wariness of the birds during the hunting season.

The entire courtship performance, followed by the copulation behavior, was observed upon 9 occasions: 1 in late September, 2 in October, 4 in November, and 2 in December. The copulation behavior occurred on rather warm days, where there was comparatively little wave action.

Until 1945 I considered fall courtship as a chance occurrence between two birds. But especially after observing solitary pairs of presumably the same individuals visit the same area daily for as long as two weeks, and my surprising experiences on December 8, 1945, I have begun to wonder if actual pairing may not sometimes take place in late fall or early winter rather than in early spring. On December 8, I was in my blind on Starve Island with 15 wooden decoys in the water in front of me. An estimated 1,200 Black Ducks were scattered in flocks about the island. Eventually many birds, including several courting pairs, swam in among the decoys. Presently I observed a pair in copulation behavior. Without exposing myself, I shot the female after the birds had separated. All of the ducks immediately rose into the air except the male that had courted and copulated with the female. He first swam toward the dead duck, then when almost touching her he turned and swam away. I left the blind and walked toward the male, which to my astonishment first swam away about 30 feet then returned to the dead female. I shot the male to verify my identification of them as adult male and female. Later, another pair began to court; I shot the male, and the female remained in the water, whereas all of the other

ducks flew away. She swam away only when I left the blind and walked to the shore.

These experiences brought to mind the discussions I have heard among duck hunters as to why one or more birds from a flock of ducks as cautious as Blacks, Mallards, or Pintails, will return to swing around the decoys or even alight among them after one or more of the ducks has been shot. The opinion of the duck hunters was that the birds were greatly confused ("rattled," they called it) and instinctively returned to the supposed safety of the wooden decoys. Can it be that the returning and supposedly confused duck is the remaining member of a pair from which one has been shot?

Pair formation among unpaired swans and geese apparently occurs in fall or early winter (Delacour and Mayr, 1945:8-9), and geese presumably pair for life (Witherby, *et al.*, 1939:182; Bent, 1925:205). Phillips (1916:24-27) discusses the habits of Canada Geese (*Branta canadensis*) during migration over favorite flight lanes in Massachusetts. These geese are tolled within gunshot through an elaborate system of live and wooden decoys. The geese are exceedingly wary so long as none of their number has been wounded or killed. After being shot at, if one or more of their number remains on the water, one or more members of the flock usually returns to alight upon the water. They have lost their former caution and can be approached in a boat and shot. Their reaction is surprisingly similar to that of the survivors of the two pairs of Black Ducks of December 8.

Many of the Black Ducks in the flocks were obviously young of the year. Courtship among these juveniles was less frequent and less sustained than among adults, and young birds seldom attempted copulation. Courtship among the young of the year appeared to consist principally of splashing and dashing about, first toward one bird and then another. They only occasionally indulged in repeated head bobbing. My observations are not entirely in agreement with those of Hochbaum (1944:21) who, in discussing the habits of other species of ducks, relates that "in fully-grown young birds the full repertoire of displays is offered" and that he has seen "captive young Canvasback [*Aythya valisineria*] and Redhead drakes [*Aythya americana*], still wearing the juvenal plumage, repeat one action after another without pause. A captive Baldpate male began to display in mid-November, when he was little more than four-months old."

WINTER COURTSHIP

I watched winter courtship chiefly when the birds were congregated in the open holes of ice-covered lakes and streams. At that season any courtship display that was observed consisted chiefly of groups of birds chasing each other, splashing and swimming rapidly about, with some head bobbing and short display flights. Townsend (1916:13-14) and Phillips (1923:80) describe this chasing and milling about which seems to be so common in winter. I have repeatedly noted that several

birds, presumably all males, pursued a single female, and sometimes one male in the group appeared to be chiefly concerned with driving off other males rather than pursuing the female. Upon a few occasions I have seen a female and guarding male fly away from the group together, giving the impression that the two were paired. Sometimes the milling birds seemed to be chasing whichever bird came nearest to them, regardless of sex, and then the milling and chasing seemed to be play rather than courtship. During the winter, no attempts at copulation were observed. Courtship behavior was most frequent on warm sunny days.

SPRING COURTSHIP

Between 1941 and 1944, the pair of Black Ducks (probably the pair which remained to nest near our house on South Bass Island) first appeared between March 8 and 23 (average date March 16). They always appeared during the first prolonged thaw in which open leads were present in the ice-cover of the lake. In 1945, during a phenomenal warm period in February, a pair was noted on February 16 in water that had collected in a depression in the ice-cover. They remained a few days until a cold snap froze the pool in the depression; then they disappeared. Thereafter and until March 16, a pair, presumably the same birds, visited the bay daily, remaining only a short time if the bay was ice-covered, or staying all day when there was open water.

When open water became permanent the pair of birds remained on the lake throughout the day, going at dusk to the neighboring lawns and meadows to feed. From the time of their arrival until the disappearance of the ice-cover in the last half of March, the male was very attentive, almost constantly following the female. There was rapid swimming, chasing, and considerable bobbing and swaying of heads. As the season advanced, the flight display became more elaborate and prolonged, and both birds became more vociferous, the female quacking loudly and persistently. If other males appeared, an animated chase of the female ensued, and obviously her mate attempted to keep other males from associating with her. If other females appeared, she would quack persistently and loudly.

By early April the courting actions of the pair began to change. The female disappeared daily for periods that steadily lengthened until finally she was present on the water only at dusk in the morning and evening. When she was absent the male remained on the water or sat upon a boulder near shore. Toward evening he showed considerable excitement, swimming back and forth and frequently grunting. When she appeared (always from the direction in which I believed or knew her nest to be), she alighted upon the water near the male and almost invariably drank. The male displayed great excitement, bobbed his head, grunted, and swam toward her, bumping her in the side, or trod water while he stood vertically and flapped his wings. He sometimes gave a whistled note as described for the Black Duck by Phillips

(1923:80), for the Mallard by Witherby *et al.* (1939:232–233). Shortly after drinking, the female began to quack; then both birds sprang into the air, and the spectacular spring courtship flight began. By mid-April, courtship displays upon the water had become less frequent, whereas the length and intensity of the courtship flights had notably increased. The longest flights, of 5 to 25 minutes in duration, occurred between sunset and dark. If the flights took place over water, the grunting male pursued the loudly quacking female, displaying before and above her, nipping at her back and tail with his bill, and always attempting to force her down upon the water. When forced down she usually tried to escape by splashing, dodging, diving, and again rising into the air. When she finally remained on the water, she would partly dive or submerge with neck outstretched and only the upper half of her head and bill exposed; the male then swam over her, and copulation took place. After copulation both birds usually bobbed or swayed their heads, the male whistled, and both began to preen and flap their wings, after which they flew to the meadows to feed.

Some of their most elaborate flights occurred over land and were best developed in late April or May. In 1942 these flights continued after April 29, when the clutch of 9 eggs had been completed, and they continued during most of the incubation period until May 15. In these flights the female, often closely followed by the male, flew from a few feet to 30 feet above the ground, sometimes having to rise to clear a fence, often quacking loudly and persistently, and seemingly attempting to see how closely she could come to some object without a collision. Our backyard had many electric and telephone wires crisscrossing above it, several Norway maple trees, a garage, and shed. The female, either with or without the male, would fly among the wires, trees, and buildings, and sometimes between two wires, one of which was a foot above the other. Probably this flight, when conducted late in the season, has no courtship significance. I have seen both female Black Ducks and female Carolina Wood Ducks (*Aix sponsa*) performing without a consort. After the flight the female, and male if present, would alight in the neighboring meadows. There I observed them eating insects and grazing upon the new vegetation; then the female flew away in the direction of the nest. During the latter part of the incubation period the female appeared to resent the presence of the male. At such times she rose high in the air and, if he followed her, continued flying on a straight course until he left her and returned to his loafing area. Thereupon she descended below tree top level, returned, and continued exercising over land, but not in sight of the male. The male left the area when incubation was far advanced.

Black Ducks in spring became surprisingly noisy and fearless, and flew within a few feet of me when I was in the garden or even when I was cutting grass with a noisy lawn-mower. When I was in a boat they conducted their courtship within 30 feet of me, or the male remained standing upon a boulder even when I cast a fly within a few feet of him.

There was little competition between males or pairs in spring on South Bass Island, and one seldom saw more than one male pursuing a female. This lack of competition may have been caused by isolation of the pairs, for the Black Duck nesting population on the island was small and scattered. This condition did not hold in the marshes of the adjacent mainland where the nesting population was denser. During the spring of 1932 I observed the courtship behavior and nesting of Black Ducks in those marshes, and then repeatedly saw more than one male in pursuit of a female. There also I saw males of other species, such as Mallards and Baldpates, in pursuit of female Black Ducks (Trautman, 1940:128-129).

SUMMARY

Autumn courtship was principally confined to displays upon the water, such as head bobbing and short display flights. Both sexes, but particularly the females, were rather silent. They were exceedingly wary and ceased to court if alarmed. Occasional pairs were observed copulating.

Winter courtship in open holes in otherwise ice-covered bodies of water consisted primarily of splashing, milling, and dashing about, sometimes with many males in pursuit of a female, or in a sort of play where every bird seemed to chase his neighbor.

With the appearance of open water in spring, pairs of Black Ducks appeared near their nesting sites. Early spring courtship was similar to autumn courtship until the time the female began to leave the male for portions of each day. After that, courtship was primarily confined to flight displays over water, sometimes ending in copulation. After egg laying had presumably begun and in the earlier days of incubation, courtship flights were confined to dusk and were principally over land; these flights were later continued by the female without the male. Throughout spring the pairs were quite fearless and were very vociferous when courting.

About South Bass Island, many adult Black Ducks were in pairs throughout autumn and until they left the region. The male of a pair courted persistently; sometimes courtship ended in copulation. Observations in winter, made chiefly in central Ohio, indicated that pairing was at a minimum during the coldest weather. But most of the ducks were in pairs, even when in flocks, upon returning to South Bass Island in late winter and early spring. The pairs that remained about the island to nest chose a territory and spent as much time in it as climatic or other conditions permitted. The male left the female and territory after incubation was well advanced.

LITERATURE CITED

BENT, ARTHUR CLEVELAND

- 1923 Life histories of North American wild fowl. *U.S. Nat. Mus. Bull.* 126.
1925 Life histories of North American wild fowl. *U.S. Nat. Mus. Bull.* 130.

BREWSTER, WILLIAM

1902 An undescribed form of the Black Duck (*Anas obscura*). *Auk*, 19:183-188.

1909 Something more about Black Ducks. *Auk*, 26:175-179.

DELACOUR, JEAN, and ERNST MAYR

1945 The family Anatidae. *Wils. Bull.*, 57:3-55.

HOCHBAUM, H. ALBERT

1944 The Canvasback on a prairie marsh. Amer. Wildl. Inst., Washington, D.C.

KORTRIGHT, FRANCIS H.

1943 The ducks, geese and swans of North America. Amer. Wildl. Inst., Washington, D.C.

PHILLIPS, JOHN C.

1916 Two problems in the migration of water fowl. *Auk*, 33:22-27.

1923 A natural history of the ducks (vol. 2). Houghton-Mifflin Co., Boston and New York.

SAWYER, EDMUND J.

1909 The courtship of Black Ducks. *Bird-Lore*, 11:195-196.

SHORTT, TERENCE M.

1943 Correlation of bill and foot coloring with age and season in the Black Duck. *Wils Bull.*, 55:3-7, 1 pl.

TOWNSEND, CHARLES W.

1916 The courtship of the Merganser, Mallard, Black Duck, Baldpate, Wood Duck, and Bufflehead. *Auk*, 33:9-17.

TRAUTMAN, MILTON B.

1940 The birds of Buckeye Lake, Ohio. *Univ. Mich. Mus. Zool. Misc. Publ.* No. 44.

WITHERBY, H. F., F. C. R. JOURDAIN, N. F. TICEHURST, and B. W. TUCKER

1939 A handbook of British Birds (vol. 3). H. F. and G. Witherby, London.

F. T. STONE LABORATORY, OHIO STATE UNIVERSITY, PUT-IN-BAY, OHIO.

GENERAL NOTES

An attack on Ring-necked Pheasants by a Goshawk.—During the winter of 1945-46, a study of the overwintering ability of Ring-necked Pheasants (*Phasianus colchicus*) was conducted in a typical river valley of Connecticut, where the birds were more or less concentrated in the vicinity of several feeding stations. On January 23, 1946, between 9:10 and 1:00 p.m., I was in a car parked 40 feet away from one of these stations, observing the activities of 13 Pheasants that were at or near the station. The ground was covered with three inches of crusted snow. At 10:53 a.m. a Goshawk (*Accipiter gentilis*) sailed low over the station. The Pheasants "froze," about 50 sparrows that were in the vicinity flew into a grapevine tangle some 30 feet from the feeder, and 2 Crows in the treetops started to call. The Goshawk continued its flight and disappeared. About two minutes later the Pheasants resumed their activity about the feeder. At 11:00 a.m. sparrows put up a loud cry from the grapevine, and the Pheasants froze again. At 11:07 a.m. the hawk appeared and alighted about three feet above the ground on a wind-thrown willow tree beside the feeding station shelter. There were but three Pheasants in the open at the moment, and one cock was at the feeder. These three birds started moving slowly away, but the hawk appeared not to notice. When the cock neared the grapevine tangle, the Goshawk dived after him. The cock escaped into the tangle. The Goshawk circled and, compressing its wings, plunged into the opposite side of the tangle with a crash. Confused sounds of Pheasants and sparrows came from the thicket. Soon the cock reappeared and flew a short distance into the marsh; he was apparently not seriously harmed. A hen Pheasant also ran out of the grapevine and into a clump of berry bushes about two feet from the car. The Goshawk was close behind but could not follow her into the bushes. It passed about four feet in front of the car and flew to a dead tree overlooking the area, where it sat and arranged its feathers. At 11:30 a.m., a Sparrow Hawk (*Falco sparverius*) appeared and made three dives at the Goshawk (which appeared not to notice) and then flew away. The Goshawk flew from its perch at 12:10 p.m. and disappeared. The following day the remains of a cock and a hen Pheasant were found in the vicinity of this station with evidence of having been killed by an avian predator.—MAURICE M. ALEXANDER, *Connecticut State Board of Fisheries and Game, Hartford, Connecticut.*

Red Phalarope in eastern Ohio.—On the morning of September 15, 1945, a bird was brought to me that had been found lying dead upon the sidewalk in Amsterdam, Jefferson County, Ohio. William C. Baker and I identified it as a Red Phalarope (*Phalaropus fulicarius*), and this identification was later substantiated by Milton B. Trautman. The bird, a male in winter plumage, weighed 23.7 grams. It had probably flown against a wire or other obstruction, for the front of its skull was fractured.

This specimen appears to be the only record of a Red Phalarope for the extreme eastern portion of Ohio, although the species has been recorded several times for other portions of the State. Hine (1928. *Auk*, 45:94-95) records a specimen collected along the Scioto River, Delaware County, September 29, 1927. Campbell (1940. "Birds of Lucas County," *Bull. Toledo Mus. Sci.*, 1:82-83) records two seen on October 12, 1932, one on November 7, 1936, and one on October 10, 1937, in Lucas County, near Toledo. Trautman (1940. "Birds of Buckeye Lake, Ohio," *Univ. Mich. Mus. Zool. Misc. Publ. No.* 44:258) collected two specimens at Buckeye Lake, one on November 2, 1929, the other October 28, 1933.—FOREST W. BUCHANAN, *Amsterdam, Ohio.*

Sora rail at sea.—Shortly before 8:00 a.m. on March 25, 1945, a Sora (*Porzana carolina*) flew aboard our ship about 190 miles northeast of Great Abaco Island of the Bahamas. The bird showed no sign of exhaustion and escaped within a few minutes. Wind and sea were unusually calm, and the air temperature at noon was 91° F. This is still further evidence that the Sora flies over long stretches of open water during migration.—WILLIAM C. STARRETT, *Ames, Iowa*, and KEITH L. DIXON, *La Mesa, California*.

A catastrophic decrease in a starling population.—In a recent number of *L'Oiseau* (1944, vol. 14, p. 41), Georges Olivier reported a catastrophic decline in the Starling (*Sturnus vulgaris*) population in Normandy, France. The species had shown a continuous and rapid increase there in the years 1910 to 1939, chasing all other hole-nesting species from their nesting holes. After the severe winter of 1939–40, Starlings had almost completely disappeared. Only a few were seen in the summers of 1941 and 1942. There were some minor fluctuations in the years 1942 and 1943, but in the spring of 1944 the species was practically absent from the district of Haute-Normandie. Olivier reports (*in litt.*) that in 1945 and the spring of 1946 the species was increasing again but remained scarce in some places where it was abundant before 1940.

Nothing is stated in the notes about probable causes of the precipitous decline. Even though the severe winter of 1939–40 may have been the reason for the original decrease, it would not account for the complete lack of recovery in the subsequent four years. North American bird students should gather accurate census data on local Starling populations in case a similar change of status should occur in some section of the United States. In addition, an attempt should be made to collaborate with studies of animal parasites to determine whether any such sudden decline is due to a parasite or disease.—ERNST MAYR, *The American Museum of Natural History, Central Park West at 79th Street, New York 24, New York*.

The Florida form of the Brown-headed Nuthatch in southwestern Georgia.—On February 25, 1943, I collected an apparently mated pair of nuthatches 12 miles north of Bainbridge, Decatur County, Georgia (26 miles north of the Florida line); the birds were in southern pines near the Flint River. They appeared distinctly lighter on the crown and back than specimens of the Brown-headed Nuthatch from more northern parts of Georgia (*Sitta pusilla pusilla*), but corresponded closely with specimens from Florida (*S. p. caniceps*). Accordingly I requested Dr. Alexander Wetmore to identify them. He considers the female typical of *Sitta pusilla caniceps* and the male as intermediate, similar to *caniceps* in color, but nearer *pusilla* in size. Wetmore (1941, *Proc. U.S. Natl. Mus.*, 90:506) points out that the northern form, *S. p. pusilla*, in addition to averaging slightly larger than *caniceps* "has the gray of the back slightly darker, and the brown of the head darker, with the paler edgings on the crown feathers, where present, distinctly darker."

Wetmore states that birds from St. Mary's, in extreme southeastern Georgia, are of the Florida race (*caniceps*); it is possible, then, that the range of this race extends completely across the southern edge of the State. The pair I collected are the only Brown-headed Nuthatches I have seen in the Bainbridge region during approximately one week of observation in each of five winters (February, 1943–December, 1946).—MAX MINOR PEET, *2030 Hill Street, Ann Arbor, Michigan*.

A nest of the Sun-bittern in Costa Rica.—On March 26, 1945, an old man who lives near me showed me a nest of the Sun-bittern (*Eurypyga helias major*) in the Terraba Valley, Costa Rica. Between a 30-foot cliff and the boulder-strewn channel of the clear impetuous Río San Pedro, lay a narrow belt of rocky land wooded with trees of small and medium size. One of these trees, a *Gilibertia arborea*, held the nest about 20 feet above the ground and about 10 yards back from the margin of the torrent. The dark, roughly globular structure, some 12 inches in diameter, was saddled over an obliquely ascending branch about 2 inches in diameter. The great bulky nest seemed to be most precariously balanced on the slender branch at a point where there was no visible lateral twig to prevent its turning sideways. It was composed of decaying leaves, stems, and other vegetation, a small amount of green moss, and apparently also some mud. In the top was a shallow depression lined with green leaves. The altitude at this point was about 3,000 feet above sea-level.

From the top of the cliff we looked down upon the Sun-bittern, half sitting, half standing on the nest. Facing the cliff-top, the bird gazed intently on its visitors with its big red eyes. It was raised high enough on its yellow legs to reveal portions of the two big, buffy eggs on their bed of green leaves. I examined it through a binocular from several positions, one at the very edge of the precipice, but at length it jumped from the nest, spread its wings, glided down toward the river, and disappeared amid the foliage. The glorious bright chestnut shields on the spread wings left no doubt that the bird was indeed a Sun-bittern. Because of the thinness of the trunk and the weakness of the wood, the nest tree could not be climbed. I sat on a log in a neighboring clearing and waited half an hour for the bird's return to the nest, but in vain.

In the basin of El General, from 2,000 to 3,000 feet above sea level, the Sun-bittern is a very rare bird, and aside from the owner of the nest described above, I have seen only a single individual. Carriker (1910. *Ann. Carnegie Mus.*, 6:425) says that the Sun-bittern in Costa Rica is "distributed sparingly over the lowlands of both the Atlantic and Pacific slopes, up to not more than 2,000 feet above sea-level," and that he was "never able to learn anything of their breeding habits." I have been able to find but one definite Central American breeding record for the Sun-bittern. H. G. Deignan (1936. *Auk*, 53:188) collected a male and female in Honduras on April 23, 1933, the male with right testis greatly enlarged, the female with a fully developed egg.—ALEXANDER F. SKUTCH, *San Isidro del General, Costa Rica*.

The Dakota Song Sparrow in Arizona.—In the Dickey Collection, University of California at Los Angeles, there is a typical example of *Melospiza melodia juddi*, an adult female (No. 11486) taken at Tucson, Arizona, on December 20, 1915, by A. Brazier Howell. Howell's notes make no special mention of this bird, but evidently it was taken "in the river bottom to the northeast [of Tucson]."

Both in bill size and plumage characters, this individual is definitely outside the extremes of variation known for *Melospiza melodia montana* (which winters commonly in that locality); it is in no way distinguishable from a small North Dakota series of typical *juddi* in the University of California collections. However, the specimen was submitted for an additional check to Josselyn Van Tyne at the University of Michigan, and he has verified my identification of the specimen as *juddi*.—A. J. VAN ROSSEM, *University of California at Los Angeles*.

EDITORIAL

The Officers of the Club, particularly the Treasurer and the Editor, wish to thank the Members for their prompt payment of 1947 dues and for the many changes upward in class of membership. Members are again reminded that they may be saved the nuisance of an annual cheque for dues: a Life Membership (\$100.00, payable in four installments if preferred) includes a lifetime subscription to the *Bulletin*.

We are greatly indebted to W. J. Breckenridge and Roger T. Peterson of our Illustrations Committee for providing important assistance in the preparation of this issue of the *Bulletin*. We are especially pleased to be able to reproduce in color T. M. Shortt's fine watercolor of the hitherto unfigured downy Tattler.

We hope that many Members will answer the request of the Illustrations Committee (published on another page of this issue) for assistance in their search for photographs. Please remember that, for the *Bulletin*, only unpublished pictures are acceptable.

In view of the greatly increased cost of reprints, we are forced to consider carefully whether the *Bulletin* should continue its policy of providing inexpensive reprints of the Bibliography section. Unless more Members wish to subscribe for the section, this service will probably be discontinued. Interested Members are asked to send their opinions or suggestions to the Editor.

OBITUARY

ERNEST INGERSOLL, naturalist and writer, born in Monroe, Michigan, died November 13, 1946, at Brattleboro, Vermont, at the age of ninety-four. He had studied at Oberlin and then at Harvard, where he worked under J. A. Allen at the Museum of Comparative Zoology and under Louis Agassiz at Penikese. Ingersoll was one of the founders (1873) of the Nuttall Ornithological Club, the oldest ornithological society in America. He served as naturalist on the F. V. Hayden Survey in 1874. His early writing included an important scientific report on the oyster industry and an excellent but now extremely rare work, "Nests and Eggs of American Birds," illustrated with colored plates; later he wrote many books and articles of a more popular type, dealing with a variety of natural history subjects.

ORNITHOLOGICAL NEWS

It was found necessary to change the time of the 1947 meeting of the American Ornithologists' Union from the October date announced earlier. The meeting will be held September 8-12 in Toronto.

Behaviour, a new international journal of comparative animal behavior, is announced by the publisher, E. J. Brill, of Leiden. There is an editorial board of four: H. Hediger (Switzerland), P. Palmgren (Finland), W. H. Thorpe (England), and N. Tinbergen (The Netherlands).

Charles F. Batchelder, who has edited the *Proceedings of the New England Zoological Club* for forty-seven years, has just issued in that series a bibliography, beautifully printed, prepared by Barbara Lawrence, of the scientific papers of Glover M. Allen.

"Audubon Field Notes," which has hitherto appeared as Section 2 of *Audubon Magazine*, is now published by the National Audubon Society as a separate magazine. The January 1947 issue, designated Volume 1, Number 1, has a new cover design and is illustrated with two striking full-page photographs by Roger Tory Peterson. Margaret Brooks Hickey continues as Editor.

Frans Verdoorn has founded a monthly scientific newsletter, *Biologia*, published by *Chronica Botanica* (Waltham 54, Massachusetts). The first issue appeared in January 1947.

Charles Scribner's Sons have issued an "unrevised reprint" of Herbert L. Stoddard's "The Bobwhite Quail," which was first published in 1931 and was awarded the Brewster Medal in 1935.

The bird research station that was formerly at Rossitten, Germany, has been transferred to Radolfzell on Lake Constance. Dr. E. Schuz continues as Director.

Early in February Mr. and Mrs. William H. Phelps, Jr., of Caracas, Venezuela, and Charles Hitchcock, of the American Geographical Society, left Caracas for the headwaters of the Manapiare River, which flows southward into the upper Ventuari River. There they intend to ascend the virtually unknown Mt. Yaví, making a collection of the subtropical birds and mapping the region. William H. Phelps, Sr., heard from the party by radio on February 21. They were 15 days up the Ventuari at that time.

To the Members of the Wilson Ornithological Club:

The Illustrations Committee is still searching for outstanding photographs (not retouched) of rarely photographed birds and particularly interesting shots of better known birds. These should be of sufficient interest to stand alone, with a minimum of caption, as genuine contributions to scientific knowledge. Persons knowing of such pictures would materially aid the editorial staff of *The Wilson Bulletin* by passing on the information to the Illustrations Committee.

In addition, the Committee is trying to build up a complete collection of good photographs of North American birds, and a complete reference file of sources of authoritative color notes on the soft parts of birds in life for the use of authors, artists, and editors. The Committee will be grateful for any help in collecting these materials, which will be made available to Club members as aids in individual research problems. Please write to the Chairman, W. J. Breckenridge (Museum of Natural History, University of Minnesota, Minneapolis, Minnesota).

THE ILLUSTRATIONS COMMITTEE
W. J. Breckenridge, *Chairman*

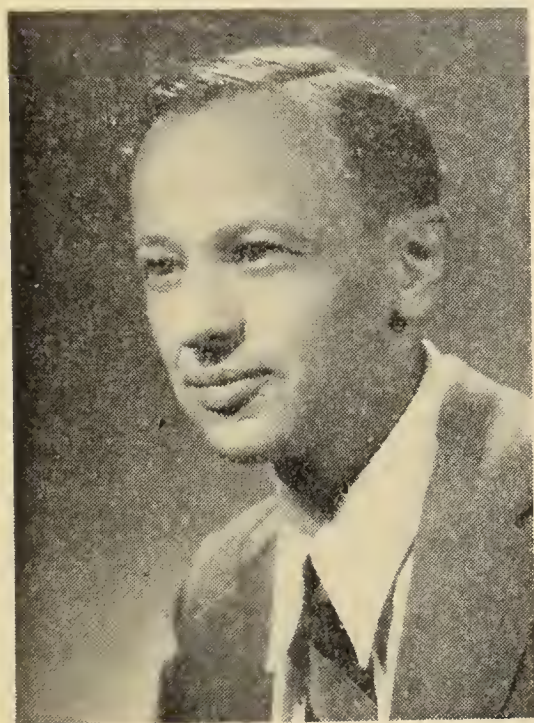
THE LOUIS AGASSIZ FUERTES RESEARCH GRANT

The sum of five hundred dollars has just been given the Wilson Ornithological Club by an admirer and former pupil of the distinguished artist-naturalist, Louis Agassiz Fuertes, with the understanding that the money is to be divided into five equal annual grants for ornithological research. The grants will be assigned annually to selected individuals by the newly appointed Research Committee. Announcement of the annual selections will be made at Annual Meetings of the Club and in the pages of the *Bulletin*. Any member of the Club or of one of the Affiliated Societies will be eligible for this financial aid. In assigning the grants, the Committee will consider not only the qualifications of the person (or persons) to whom the money is to be given, but also the importance of the work to be started or advanced; the need for accomplishing field-work in certain parts of North

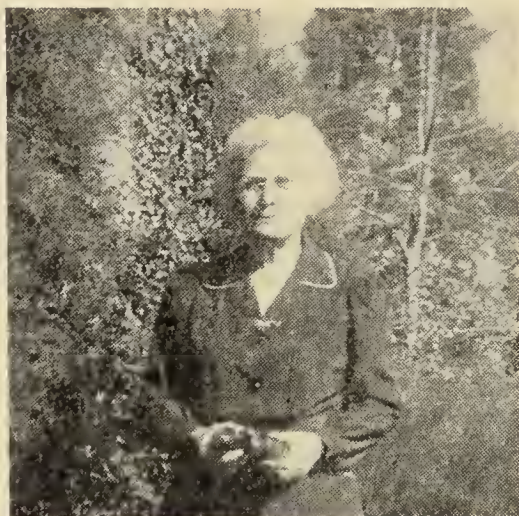
America; and the desirability of collaborating in international projects, such as the comparative study of nest-building habits in the Ploceidae and Icteridae, proposed by a French member of the Club, F. Bourlière, or that concerning clutch-size, proposed by the English ornithologist, David Lack. Persons who desire this help should make a point of writing the Research Committee Chairman (John T. Emlen, Department of Zoology, University of Wisconsin, Madison 6, Wisconsin) about their work, the equipment and library facilities needed, and their publication plans. It is hoped that the first grant will be assigned before the Annual Meeting in November 1947.

The following have agreed to act as the Fuertes Research Grant Committee: John T. Emlen, Jr., *Chairman*; George H. Lowery, Jr.; Ernst Mayr; Margaret Morse Nice; Frank A. Pitelka; Josselyn Van Tyne.

NEW LIFE MEMBERS



ALLAN R. PHILLIPS received his A.B. from Cornell and his M.S. from the University of Arizona. After further graduate work and three and a half years in the Army, he returned to Cornell and received the Ph.D. in 1946. During the war he was stationed for a time on Okinawa and made a valuable collection of birds there. He has published a number of notes and articles, mainly on the taxonomy and distribution of the birds of southwestern United States and northwestern Mexico. He has been connected with the Museum of Northern Arizona since 1933 and is now Curator of Ornithology there.



MABEL T. ROGERS received her Ph.B. from Alfred University (New York) and her M.A. from Teachers College (Columbia). She has worked during summer sessions at Harvard, Duke University, University of Colorado, and Cornell. For twenty-seven years she has taught ornithology and other natural science courses at Georgia State College for Women. She was an organizer and charter member of the Milledgeville [Georgia] Bird Club, and was one of those instrumental in making that city a bird sanctuary. She was a charter member and is now President of the Georgia Ornithological Society. The Life Membership in the Wilson Ornithological Club is a tribute from a former student, in appreciation of the contributions Miss Rogers has made to ornithology and to the lives of her many students.

ORNITHOLOGICAL LITERATURE

AUDUBON BIRD GUIDE: EASTERN LAND BIRDS. By Richard H. Pough. Illustrated by Don Eckelberry. Doubleday and Company, Inc., New York, 1946: $4\frac{1}{2} \times 7\frac{1}{4}$ in., xl + 312 pp., 48 color plates. \$3.00.

This book is the National Audubon Society's contribution to the rapidly growing list of bird guides. It opens with an elaborate foreword; then the land birds found in eastern North America (275 species—the hawks, gallinaceous birds, and doves being omitted) are covered individually. The book follows the order of the current A.O.U. Check-List and includes the last eight orders of birds, from the Carolina Parakeet to the Snow Bunting. In the middle of the book are 48 color plates from paintings by Don Eckelberry, illustrating all of the species treated. The section on birds is followed by a bibliography, and the volume closes with an index of the English, the scientific, and some colloquial names. There is no identification key: "The color plates in this book are a key to the birds." "Eastern North America north of Mexico, excluding East Greenland," indicated on a frontispiece map of the "Ornithological Regions of North America," is the area covered in the Guide.

Since many will receive their first introduction to ornithology from this volume, it is gratifying to note that the author in the foreword has started them on a sound basis. In addition to a description of the area covered and an outline of the scope of the book, there are sections on song, on psychology and behavior, on habitat, territorial needs, seasonal movements, economic relations, conservation, and other topics. Pough has done a splendid job of summarizing the fundamentals of modern bird study in a few pages.

Treatment of individual species is more thorough than that in the usual handbook. Subheads cover identification, habits (including food preferences), voice, nest, and range. All distribution data are taken from the A.O.U. Check-List. Much up-to-date information on ecology, predation, and bird behavior has been smoothly woven into an exceptionally readable text.

Probably the most important innovation in this guide is the omission of all subspecies names. Even forms that differ considerably in appearance, such as the sapsuckers, are treated as one species. Obviously there was difficulty in following this procedure because of English names: how could several subspecies, all bearing different names, be grouped under one head? To solve this problem the author has introduced many new names. The various subspecies of nighthawks *Chordeiles minor* are combined under "Common Nighthawk"; the sapsuckers *Sphyrapicus varius* under "Common Sapsucker." The Northern and Southern Flickers become the "Yellow-shafted Flicker." Other changes are more radical: the American Pipit is renamed "Water Pipit"; the Arkansas Kingbird (a full species), the "Western Kingbird." The Arctic Three-toed Woodpecker, also a full species, becomes the "Black-backed Woodpecker," although the text admits that it is "often called the Arctic three-toed woodpecker."

This change in and creation of English names is, in my opinion, very bad practice but is perhaps inescapable since the A.O.U. Check-List Committee has not yet issued its report on the vernacular names it proposes for North American bird species. Authors of many post-war bird books and articles show a very commendable tendency to emphasize the species rather than the subspecies unit, but they must either create new vernacular names or revive old ones for many species. The longer this situation continues the more confused ornithological literature will become.

A few of Pough's statements about certain species are somewhat misleading. For instance, the absence of trees cannot be said to determine the Flicker's choice of telegraph poles for nesting sites, since in northern Ohio, where trees are com-

mon, this habit is of frequent occurrence. The statement that Alder Flycatchers (*Empidonax traillii*) of the Middle West nest in "dry upland pastures" should be qualified: Alder Flycatchers *normally* nest in swampy areas in the Middle West though they are sometimes found there in upland situations. Concerning Bell's Vireo, the author writes, "Its most surprising habit is singing on the nest"; he neglects to state that both the Yellow-throated and the Warbling Vireo have the same habit. There is an important omission from the Golden-winged Warbler "voice" section: no mention is made there of the second, 8- to 10-syllable song of this species, which is almost indistinguishable from the second song of the Blue-winged Warbler. Both these warblers sing this second, longer, song more frequently as the season progresses.

Don Eckelberry's paintings will earn him a place among the better bird artists of the day. Most of his figures are accurate and well reproduced. This is especially true of the sparrows: with the exception of the Vesper Sparrow, all of this difficult group is done remarkably well.

Because of poor color printing, however, some of the species would scarcely be recognized by the novice in bird study. The Warbling and Philadelphia Vireos and the immature Bay-breasted and Black-poll Warblers, in particular, are poorly printed. In a number of the plates, olive-green and greenish-yellow colors have registered badly. From the standpoint of draughtsmanship, it is my impression that most of the warblers are shown with slightly over-large heads.

In titling the Purple and Bronzed Grackles pictured on Plate 33, the author refers to them as the "brassy-green phase" and the "bronze-purple phase." The use of the word "phase" (which on another plate the author applies to the red and gray Screech Owls) is confusing, since the variation in the grackles is geographical, whereas that in the owls is individual.

Comparison of the "Audubon Bird Guide" with Peterson's "Field Guide to the Birds" is, of course, inevitable, but in my opinion the two books fill different needs. Peterson's "Field Guide" is primarily a book for identification of birds (its other points are incidental) and, as such, it is superior to Pough's volume, especially in its treatment of subspecies. The "Audubon Bird Guide" is a very condensed general book on birds—a pocket manual to take the place of the usual cumbersome reference volume. If a novice in bird study could have but one book, he would probably receive a better all-round understanding of the birds covered and of their place in the biological scheme from the "Audubon Bird Guide" than from any other book of its size.—Louis W. Campbell.

WOODCOCK WAYS. By Henry Marion Hall. Illustrations by Ralph Ray. Oxford University Press, New York, 1946: 8½ × 11 in., xii + 84 pp., 8 col. pls., 10 figs. \$6.50.

The best that can be said of this latest popular book on the American Woodcock (*Philohela minor*) is that it is attractively published and sumptuously illustrated with sketches both in color and in black and white. There are twenty-three titled chapters purporting to describe the species' habits, to evaluate its qualities as game, to tell how, when, and where it may be hunted, and to plead for its conservation. Although Mr. Hall speaks authoritatively of hunting procedures, he fails to demonstrate any intimate knowledge of the Woodcock's habits or familiarity with recent researches, management practices, or protective measures. The text is a curious jumble of indifferent field observations, personal anecdotes, indecisive comments, and vague references to "authorities" whose names he seldom divulges. The book neither adequately informs nor satisfactorily entertains. The illustrations are incredibly poor, both from the artistic and the ornithological point of view.—Olin Sewall Pettingill, Jr.

LAS AVES DE CHILE. By J. D. Goodall, A. W. Johnson, and R. A. Philippi B. Platt Establecimientos Gráficos S. A., Buenos Aires, 1946: 6 × 9 in., 358 pp., 50 col. pls., many text figs. Paper, \$5.00; cloth, \$6.00.*

The appearance of this volume marks the beginning of a new epoch in the ornithological history of Chile. This does not mean that the study of birds in that republic has been neglected—since ornithological literature for nearly 150 years has contained many references to Chilean birds. In general the avifauna of Chile is well known from the systematic viewpoint, a knowledge that culminated in Hellmayr's "Birds of Chile" (*Field Mus. Nat. Hist. Publ. Zool.*, 19, 1932).

"Las Aves de Chile" is a "handbook" written in Spanish, by three men who have a good working knowledge of Chilean birds, gained from thirty years' experience in the field. The authors state in the preface that knowledge of and interest in Chilean birds has been handicapped by the lack of a suitable manual in Spanish, and that this ignorance is responsible for the progressive destruction of numerous species, and they express the hope that this book will explain the need for additional conservation measures as well as for better observation of those now in force.

This first volume, which follows the sequence employed by Hellmayr, includes all the passerine families, the hummingbirds, swifts, goatsuckers, woodpeckers, cuckoos, kingfishers, parrots, and pigeons. A second volume is planned to deal with the remaining families, but the authors estimate that about three years will be required to prepare the manuscript and plates for publication.

The book opens with an eloquent foreword in Spanish by William Vogt, followed by an English translation; then the authors' preface, also with an English translation. The remainder is entirely in Spanish. The work begins with acknowledgments and brief chapters on physiography and climate, zonal distribution, nomenclature, geographic variation, migration, topography and measurements of birds, and classification of Chilean birds.

The species-by-species account starts with the thrushes. First a page or less is given to a brief characterization of the family under consideration. Then each species and subspecies is given, with its Chilean and English vernacular names, the current scientific name, reference to the original description, other local names, general distribution, description, and a table of measurements. Remarks on habits, identification, zonal and altitudinal distribution, and habitat requirements follow. Considerable life history data are given.

Perhaps a better idea of the authors' treatment of distribution and life history may be gathered from a rather free translation of the account of the Diuca (*Diuca diuca diuca*).

"If we conceive abundance in terms of the number of individuals that inhabit a given space or territory, then the Diuca is without doubt the most abundant species throughout the extensive zone included between southern Coquimbo and Aysen, excepting only the mountain regions above 1,500 meters, being met with literally everywhere and at all seasons. It also inhabits the eastern side of the Andes from the Argentine province of Mendoza to Patagonia.

"The Diuca is such a well known bird that a description is hardly necessary; suffice it to say that it has the typical fringilline bill and that it is entirely gray with the exception of the throat and abdomen which are white but separated by a gray band that crosses the breast. In flight it generally, though not always, shows a white border at the edges of the tail.

"The Diuca is equally at home in the country and towns, mountains and valleys, open or wooded regions, in gardens and in city parks and in the most distant solitude of the forest where man rarely penetrates. During the winter it

* Orders for copies, accompanied by remittance, may be addressed to A. W. Johnson, Casilla 327, Santiago, Chile.

gathers in large flocks, sometimes alone, at others in company with other birds such as Cowbirds, Red-breasted Starlings and Yellow-shouldered Blackbirds. As a rule beneficial to agriculture, but on occasion eating the young plants and seeds of the gardeners, it is the object of an unjustified persecution on the part of hunters, in spite of which it maintains itself without any difficulty.

"Laying begins in September, reaches its maximum in October and November, and ends in February. The nest, made of grasses and root fiber and lined with wool or soft vegetable material, is similar to that of the Chilean Song Sparrow [*Zonotrichia capensis chilensis*] but considerably larger, placed in any handy bush, shrub, or small tree, but never on the ground as is the Chilean Song Sparrow's. The clutch is almost always three eggs but sometimes only two, at other times four. The ground color is light Niagara green, and the eggs are profusely spotted and blotched with brownish green and brownish olive, without a hint of the reddish tint which characterizes Song Sparrow eggs.

"This species is a favorite victim of the parasitic Argentine Cowbird (*Molothrus bonariensis*)."

The volume is illustrated with forty-eight plates of birds and two plates of eggs, all in color. The birds are by Goodall, and while some are better than others, the average is good; in some the color registration is a little off, but they are a useful adjunct to the book, and will undoubtedly be of great help in visualizing the species which they represent.

Surprisingly enough, four new races are described; the authorship, however, is not to be credited to all three authors jointly but only to those whose names appear after each. The new forms are:

Xolmis pyrope fortis Philippi and Johnson, Chiloe Id. (p. 152)

Tachuris rubrigastra loaensis Philippi and Johnson, Province of Antofagasta (p. 183)

Phleocryptes melanops loaensis Philippi and Goodall, Province of Antofagasta (p. 261)

Pteroptochos megapodius atacamae Philippi, Province of Atacama (p. 274)
The types of all four races are in the Museo Nacional de Historia Natural de Santiago.

It is a great pleasure to recommend this work to all interested in Chilean birds and to wish the authors all speed in their progress with the second volume.—
J. L. Peters.

LAS AVES DE CHILE. By P. Rafael Housse. Ediciones de la Universidad de Chile, 1945: 390 pp., 15 pls.

Parts of this most astonishing book, in somewhat abridged form, have previously appeared in French in *Annales des Sciences Naturelles, Zoologie* [Paris]—written by the same author, but published under the name of M. l'Abbé Emile Housse. These previous installments and the volumes in which they appeared are:

"Les Oiseaux du Chile." 1937, ser. 10, vol. 20, pp. 93-107.

"Les Oiseaux de Proie du Chile." 1939, ser. 11, vol. 2, pp. 123-233; 1941, ser. 11, vol. 3, pp. 1-96.

"Les Oiseaux des Andes." 1941, ser. 11, vol. 3, pp. 97-161; 1942, ser. 11, vol. 4, pp. 137-238.

These earlier accounts, however, do not include even all the non-passerine groups, and they leave the passerines entirely untouched; hence this volume, in Spanish, may be looked upon as the final and complete product. The author, a Redemptionist Father, has made the study of Chilean birds an absorbing interest for many years, but his contacts with ornithologists appear to have been few and his ideas of writing on birds are entirely original.

No effort is made in the book to give any means of identification. Each species heading begins with the Chilean vernacular name, the scientific name, and a Spanish translation of the latter. The amount of space devoted to any species varies from a few lines to several pages and may cover any or all of the following subjects: distribution, nest, eggs, incubation, early stages, other breeding habits, food, plumages, temperament, susceptibility to domestication, pursuit and capture, enemies, economic value, and diseases—to name only the subjects most frequently dealt with. There are many valuable original observations, but there also seems to be included a certain amount of hearsay and it is not always simple to tell where the original part ends and the hearsay begins.

Fr. Housse seems to have been particularly intrigued by the Condor, the Black Vulture, and the Turkey Vulture, and he devotes ten or more pages to each. He performed experiments to determine whether Black Vultures find their food by sight or by smell—using dead cats for the purpose (a good use for a cat by an ornithologist)—and concluded that it was by sight alone. The most stinking carrion was undetected even when only lightly covered.

There is no question but that Fr. Housse's work contains many important contributions to life history (perhaps in the old sense rather than from the point of view of the modern "behaviorist"), but there is some chaff that must be winnowed out.

The author is not interested in the systematic side of ornithology, which doubtless accounts for his peculiar arrangement of families and genera. Although he indicates in the subtitle that a modern classification is employed, he explains in the preface that he has not observed a strict sequence because "there is neither an international nor a zoological rule which fixes the sequence of orders or families" and that a departure from the usual classification makes the work less monotonous! The non-passeres, headed by the rheas, start the volume, but some of the subsequent families occupy rather strange positions. The tracheophone groups and the Tyrannidae follow the bulk of the true oscines, and the hummingbirds conclude the volume. Scientific names are frequently misspelled; patronymics are often terminated with *y* instead of *i* (*bullery* and *granty*, for instance). The authority's name after a species is invariably enclosed in parentheses, whether these are required or not. The derivations given for the scientific names are not always fortunate—*himantopus* is believed to mean "bloody-footed" (*Sangriento Pié*).

The bibliography is very sketchy, consisting of some thirty defective citations of works published either in Chile or Argentina. The author does not mention either Hellmayr's "Birds of Chile" or Wetmore's "Observations on the Birds of Argentina, Paraguay, Uruguay, and Chile," although he is aware of the existence of at least the former, since he mentions it in his 1937 paper.

Housse lists 373 forms of birds for Chile as against Hellmayr's 335, but the latter omitted oceanic birds, which accounts for a large part of the discrepancy.—
J. L. Peters.

LIFE HISTORIES OF NORTH AMERICAN DIVING BIRDS: ORDER PYGOPODES. By Arthur Cleveland Bent. Reprinted. Dodd, Mead & Co., New York, 1946: 6¼ × 9¼ in., xiii + 237 pp., 32 pls. \$5.00.

Probably no other American bird book in recent times has been so sought after as Bent's "Life Histories of North American Diving Birds." Published by the National Museum in a strangely small edition, it went out of print in a short time, and with the publication of more and more volumes of this very successful series, the "Diving Birds" has become practically unobtainable, even at forty times the original price. It is, therefore, very good news that the book has been reprinted.

The book was first published 18 years ago, and its merits are well known; therefore the task of a reviewer is simply to report how well, especially how faithfully, the reprinting has been done.

The publishers advertise this volume as "the unrevised reprint of Bulletin 107" of the National Museum and state that it is "the complete text reproduced exactly as the author originally prepared it." However, the book is by no means a facsimile of the first edition. The reader will note immediately the absence of the 12 colored plates of eggs, which added so much to the value of the original publication. It is understandable that the publishers might have felt that color plates would add too much to the cost of printing a new edition, but they should have mentioned this omission in their advertising. Less understandable is the series of substitutions and omissions of half-tone plates. Of the 43 half-tone plates in the original volume, only 22 are reprinted unchanged; other plates have at least one photograph substituted, and 11 plates, including the frontispiece, are omitted entirely. The half-tone plates in the new volume are published as a single group (following page 206), and the plate numbers and part of the information in the legends are omitted. Pages 233-239, which gave the full scientific data to accompany the pictures, are left out of the new edition, and thus the pagination of the index, which follows them, is changed.

For the most part, the text is reprinted unchanged and with the same page numbers, but even this has not been carried out completely and exactly. There are many cases in which a few lines from one page are carried over to the top of the next page (or the reverse change made), and in at least one case (the nine lines quoted from Dr. Roberts on page 32) a paragraph has been omitted entirely.

The nomenclature has been modernized in the case of the American Eared Grebe (which becomes the "Eared Grebe"), the Murre, *Uria troille troille* (which becomes "Atlantic Murre, *Uria aalge aalge*"), and the Puffin (which becomes "Atlantic Puffin"), but, strangely, the corresponding changes have not been made in the index. The publishers have not, however, been consistent in modernizing the nomenclature, and other changes to be found in the current A.O.U. Check-List have been ignored.

One change which the publishers of the new volume have made is perhaps justifiable. The name of the species treated is given in the running head on every odd-numbered page—a very useful aid to the reader which the editor of the original series did not employ until he came to the seventh volume.

This new edition is cloth bound and is well printed on good paper. The half-tones are reproduced rather better than in the original edition.

The publishers announce their intention of producing a series of these early out-of-print volumes of the Bent "Life Histories," but if they are not willing to make them exact reprints which can be safely used and quoted from, they would do ornithologists a great service by resigning the task in favor of a publisher that is able to meet the needs of scholars and students.—Josselyn Van Tyne.

LONDON'S NATURAL HISTORY. By R. S. R. Fitter. The New Naturalist Series. Collins, London, 1945: $5\frac{7}{8} \times 8\frac{1}{2}$ in., xii + 282 pp., 72 pls. (40 col.), 2 diagrams, 11 maps. 16 s.

We have in Mr. Fitter's work (as well as in Ford's extraordinarily intelligent and scientifically satisfactory volume on butterflies in the same series) a model for the popularization of science that most urgently needs to be called to the attention of the leaders in American science, American education, and American publishing. I so heartily concur with the introductory editorial remarks that no better review is needed than to quote and comment on them.

The editors write: "The aim of this series is to interest the general reader in the wild life of Britain by recapturing the inquiring spirit of the old naturalist. The Editors believe that the natural pride of the British public in the native fauna and flora, to which must be added concern for their conservation, are best fostered by maintaining a high standard of accuracy combined with clarity of exposition in presenting the results of modern scientific research. The plants and animals are described in relation to their homes and habitats and are portrayed in the full beauty of their natural colors, by the latest methods of colour photography and reproduction." (How pleasant it would be to read *America and American* for Britain and British in this paragraph!) To this, the editors add about the author ". . . a young social scientist and writer who has been a naturalist all his life . . . Mr. Fitter has always lived in London, as have his father, grandfather and great-grandfather; and he has made a special study of London's natural history—and the history of its natural history—for over ten years. He has, clearly, the material qualifications for the work he has chosen to do; and the reader will soon agree that he has done it well. And it is time that it was done—high time that this book was written. For up to now there has been no real attempt, in any biological literature we are familiar with, to write the history of a great human community, in terms of the animals and plants it has displaced, changed, moved and removed, introduced, dispersed, conserved, lost or forgotten. In certain ways Mr. Fitter's book makes gloomy reading, for the progressive biological sterilisation of London is a sad history. But the discerning reader will soon notice that the sterilisation is not complete. Indeed, in this remarkable history not all is on the debit side. There is the fascinating story of the adaptation of wild life to an environment which is almost wholly man-made. There is also the fact that London natural history to-day has its special compensations, even its new and particular treasures."

As a regional natural history, Mr. Fitter's book has the merit of accepting the existence of man and his culture as a *fait accompli* and of writing his book about the natural history of London as it is and not as it was. The tracing of London's natural history through its origins, its changes, and its human history forms a fascinating story, the lesson of which is the acceptance of the result as a "state of nature" in the best ecological sense.

No comparable account of the natural history of any urban region exists for America. Buenos Aires, Mexico City, New York, and Chicago are candidates for such intelligent treatment. Alas, we need books in order to stimulate the intelligent interest that would make the books possible. Universities have for two generations robbed us of prospective naturalists in order to make geneticists or physiologists, shortsightedly failing to note how few of these carried their interest beyond the Ph.D. degree as compared with the life-long cultural values of the "old-fashioned" natural history.—Karl P. Schmidt.

PRAIRIE WINGS. By Edgar M. Queeny. Photographs by the author; frontispiece and sketches by Richard E. Bishop. Ducks Unlimited (342 Madison Avenue), New York, 1946: 9 × 12 in., xiv + 256 pp., col. frontispiece, 276 photographs, 140 drawings. \$15.00.

This obscurely titled book proves to be a handsomely printed and superbly illustrated popular account, which might better have been called 'The Flight of Ducks.' Five chapters are essays on duck hunting written for duck hunters, but the most important part of the book treats duck flight as revealed by the high-speed camera. The pictures are certainly the finest yet made of ducks in flight, and the engravers and printers have done them full justice. The effectiveness of many of the pictures is increased by parallel series of excellent drawings by Richard Bishop, analyzing, labeling, and explaining the photographs. Mr. Queeny is to be com-

mended highly for the honest, scientific attitude he has taken toward his photographs: although in producing four of the prints that appear in the book he used "photographic artifices," he is careful to tell us which pictures these are and what was done to them.

Glenn Martin has contributed a brief section on flight from the point of view of the aviation engineer, and quotations from C. Townsend Ludington, of the Franklin Institute, further clarify this difficult subject.

There is an annotated "bibliography" of sixteen works which includes some titles whose pertinence is difficult to see, omits such books as Horton-Smith's "Flight of Birds," and is arranged, not by authors, but (*almost* alphabetically) by title. Not all the references are accurately copied.

Even though his discussion is restricted to ducks, Mr. Queeny has produced a book that must be recognized as the best single account of bird flight yet published.—Josselyn Van Tyne.

A BIBLIOGRAPHY OF BIRDS. WITH SPECIAL REFERENCE TO ANATOMY, BEHAVIOR, BIO-CHEMISTRY, EMBRYOLOGY, PATHOLOGY, PHYSIOLOGY, GENETICS, ECOLOGY, AVICULTURE, ECONOMIC ORNITHOLOGY, POULTRY CULTURE, EVOLUTION, AND RELATED SUBJECTS. By Reuben Myron Strong. Publications of Field Museum of Natural History [now Chicago Natural History Museum], Zoological Series, Vol. 25, Parts 1-2, pp. 1-937, 1939 (Author Catalogue); Part 3, pp. 1-528, 1946 (Subject Index).

It is almost incredible that one man could have achieved this monumental bibliography. For many years Dr. Strong has labored faithfully on this work of prime usefulness to investigators, which lists some 25,000 articles and books on birds. Some idea of the comprehensiveness of the work may be gained by looking at the 56 pages in Volume 1 devoted to the "Key List of Abbreviations for Periodicals Cited" (about 2,000) and the 10 pages of more than 450 periodicals not cited, many of which "have little value to the investigator, but which have the spirit of the true naturalist or may be useful in aviculture."

The bibliography is world-wide in scope, and Dr. Strong was tireless in verifying each reference, making for this purpose many trips to libraries in this country and abroad. "The comprehensive search ended with literature for 1926" largely because *Biological Abstracts* started then, but "other references were added as they came to attention, even as late as 1938." Dr. Strong very helpfully indicates the libraries in which he found the rarer publications. The inclusion of articles dealing with "habits" depended to a certain degree on "the scientific reputation of the periodical publishing them"—which points to the heavy responsibility of editors to pass upon the worth of articles they bring out.

In Parts 1 and 2 authors are arranged alphabetically and their titles "chronologically as to years and alphabetically as to publications within the same year." In the Subject Index there are 6½ pages devoted to bibliographies and 2½ to periodicals containing abstracts or reviews of publications referring to birds. The main part of the volume is concerned with 120 main topics, such as (alphabetically) Distribution, Ear, Ecology, Economic Ornithology, Education, Embryology, Endocrinology, Evolution, and a vast number of sub-topics. Text references give a brief note on content, the author, and year; the complete citation is given in the Author Catalogue. The Subject Index is an amazing storehouse of information. For instance, take the 12 pages under "Migrations": after 1½ columns of citations of books (in five languages) and general articles, the sub-titles are: Areas (by continents, then countries); Different Birds (cited with scientific names); a page of miscellaneous articles; Altitude in Flight; Banding Observations; Halts and Retardations; Irregular Migrations; Length or Distance of Migration; Lighthouse

and Tower Observations; Lightship Observations; Nocturnal Migrations; Physiology of Migrations (with 5 sub-titles); Routes; Seasonal Migrations; Sex Differences in Migrations; Speed or Rate of Migrations; Weather, Effects on Migration (with 5 sub-titles). In the 21 pages devoted to "Habits" there are 39 sub-titles. Indeed, the Subject Index boasts such a wealth of material that it requires an index of its own: Volume 4, the Finding Index, in which each topic is arranged alphabetically, is in preparation.

Universities, libraries, and serious students will find this bibliography a basic tool. The Chicago Natural History Museum may well be proud of its part in the undertaking. Ornithologists and other zoologists owe a great debt to Dr. Strong for his erudition, his determination, and his endless patience in carrying to completion such a work as this.—Margaret Morse Nice.

THE SYMBOLIC GOLDFINCH: ITS HISTORY AND SIGNIFICANCE IN EUROPEAN DEVOTIONAL ART. By Herbert Friedmann. The Bollingen Series VII. Pantheon Books, New York, 1946: 7½ × 10 in., xxxii + 254 pp., 157 pls. (Nos. 1-141). \$7.50.

"The Symbolic Goldfinch," by Herbert Friedmann, Curator of Birds at the National Museum, Washington, D.C., is a beautiful book—beautiful in form and craftsmanship, beautiful as a product of high scholarship and intellectual power. Mr. Friedmann became interested in devotional art as an avocation, especially in the forms which showed birds in their design, and his analysis of 486 paintings attributed to 254 artists of the late medieval and baroque periods led him to explore many paths of learning. The conclusions, as contained in this volume, are thoughtful and thought-provoking and provide the reader interested in art and medieval symbolism with a convenient and valuable reference.

"The goldfinch, one of the brightest plumaged of the small, common, widely distributed birds of Europe, obviously lent itself readily as a symbol because it was as well known to the town dwellers as to the country folk, for it had long been a favorite household pet. Its role in the household was not exactly that of a common cage bird such as the canary is today, but more of that of an animate plaything for the children. Children were often given a live bird on a long string, and would amuse themselves by letting it fly about." Mr. Friedmann carefully traces the transmission of the representation of the goldfinch as a symbol, from its probable origin in France to other countries of Europe, including Russia. The various attributes, such as the Soul, the Resurrection, Sacrifice, the Passion, and augur of disease, which the bird is presumed to have symbolized, are ferreted out and developed with skill and ingenuity (though the reader who comes fresh to the allegorical and symbolic ideas of the medieval mind may feel that Mr. Friedmann's reasoning is somewhat attenuated and finespun). Consideration is also given to the significance of the size, position, and posture of the bird and of its juxtaposition to the Christ Child, all of which contribute to the exact symbolic meaning.

The careful documentation of the text, the well-selected bibliography, and the acknowledgments given in the long list of names of persons high in their special fields of learning attest Mr. Friedmann's intellectual integrity and his amazing industry and skill in a field outside his profession. His selection of the 157 half-tone illustrations is interesting and discriminating.

The publishers are to be congratulated upon the beautiful design of the book. The selection of type, the form of the text, and the excellent printing of both text and illustrations contribute to the pleasure one has in returning to the book again and again.—Helen B. Van Tyne.

BIBLIOGRAPHY *

PHYSIOLOGY (including weights)

See *Life History and Behavior*: Kelso.

PARASITES, ABNORMALITIES, AND DISEASE

DAVIS, MALCOLM. A curious deformity of a pigeon's bill. *Auk* 64 (1), Jan. 1947:133.

GOSLIN, ROBERT. A Robin with one lung destroyed. *Auk* 64 (1), Jan. 1947:132.

LASKEY, AMELIA R. Further Data on a One-eyed Robin. *Bird-Band*. 18 (1), Jan. 1947:31.

ORR, ROBERT T. The Recovery of a Wounded Swan. *Condor* 48 (6), Nov. 1946:280.

ANATOMY (including plumage and molt)

DANFORTH, CHARLES G. Color Correlations in North American Warblers. *Turtlox News* 24 (12), Dec. 1946:194-195.

GROSKIN, HORACE. Variations in Color of the Shoulders of the Male Goldfinch. *Auk* 64 (1), Jan. 1947:70-78.

MICHENER, HAROLD, and JOSEPHINE R. MICHENER. Loss of Feathers at Times Other Than the Normal Molt. *Condor* 48 (6), Nov. 1946:283-284.

MILLER, ALDEN H. The structural basis of the voice of the Flammulated Owl. *Auk* 64 (1), Jan. 1947:133-135.

DISTRIBUTION AND TAXONOMY

COURSEN, C. BLAIR. Birds of the Orland Wildlife Refuge. *Turtlox News*, 25 (Suppl.), 1947:1-30, maps 1-2.

EISENMANN, EUGENE, and HUSTACE H. POOR. Suggested Principles for Vernacular Nomenclature. *Wils. Bull.* 58 (4), Dec. 1946:210-215.

FRIEDMANN, HERBERT. A new wren from Chiapas, México. *Auk* 64 (1), Jan. 1947:128. (*Thryothorus rufalbus transfinis*, new subsp.)

GRAF, WILLIAM. Notes on the Distribution and Habits of Anthony Green Heron. *Murrelet* 27 (3), Sept. 1946:50-51.

GREENE, EARLE R. Birds of the Lower Florida Keys. *Quar. Jour. Fla. Acad. Sci.* 8 (3), Sept. 1945 [1946]:199-265, col. frontisp., figs. 1-11.

LEOPOLD, A. STARKER. Clark Nutcracker in Nuevo Leon, Mexico. *Condor* 48 (6), Nov. 1946:278.

MOWAT, FARLEY. Occurrence of the White-eyed Vireo in Canada. *Auk* 64 (1), Jan. 1947:138-139.

MUNRO, J. A. Observations of Birds and Mammals in Central British Columbia. *Occ. Pap. Brit. Columbia Prov. Mus. No. 6*, Jan. 1947:1-165, figs. 1-50. \$.50.

MURIE, ADOLPH. Observations on the Birds of Mount McKinley National Park, Alaska. *Condor* 48 (6), Nov. 1946:253-261, figs. 56-59.

O'REILLY, R. A. JR. Northern water birds summering on the Gulf Coast of Texas. *Wils. Bull.* 58 (4), Dec. 1946:216-217.

O'REILLY, R. A. JR., and MRS. ALLEN S. BEARD (editors). Bird Survey of the Detroit Region, 1945. Detroit Aud. Club. [1946]. 32 pp., map.

SAUNDERS, ARETAS A. The Ruff in Connecticut. *Auk* 64 (1), Jan. 1947:137-138.

SIBLEY, CHARLES G., and JOHN DAVIS. Real de Arriba, Mexico, as a Deppe Locality. *Condor* 48 (6), Nov. 1946:279.

* Titles of papers published in the last number of *The Wilson Bulletin* are included for the convenience of members who clip titles from reprints of this section for their own bibliographic files. Reprints of this section are available at a small cost.

- SNYDER, L. L., and T. M. SHORTT. Variation in *Bonasa umbellus*, with Particular Reference to the Species in Canada East of the Rockies. *Canad. Jour. Res. D*, 24, Aug. 1946:118-133.
- STARRETT, WILLIAM C., and KEITH L. DIXON. The Scarcity of the Black-footed Albatross in Parts of Its Known Range. *Condor* 48 (6), Nov. 1946:268-271, map.
- TABER, RICHARD D. The Winter Birds of Adak, Alaska. *Condor* 48 (6), Nov. 1946:272-277, map.
- TODD, W. E. CLYDE. Critical Notes on the Woodpeckers. *Ann. Carnegie Mus.* 30 (art. 17), Dec. 16, 1946:297-317. (*Centurus aurifrons incanescens*, new subsp. from Brewster County, Texas.)
- VAN ROSSEM, A. J. The California Quail of Central Baja California. *Condor* 48 (6), Nov. 1946:265-267, map. (*Lophortyx californica decolorata*, new subsp.)
See also *Population*: Moseley.

EVOLUTION AND SPECIATION

- GREGORY, WILLIAM K. Some Critical Phylogenetic Stages Leading to the Flight of Birds. *Proc. Linn. Soc. N.Y. Nos.* 54-57, Sept. 1946:1-15, figs. 1-7.
- LANHAM, URLESS N. Notes on the Phylogeny of the Pelecaniformes. *Auk* 64 (1), Jan. 1947:65-70.

See also *Ecology*: Friedmann.

MIGRATION AND FLIGHT

- DUFRESNE, FRANK. Bobolink on the Gulf of Mexico. *Auk* 64 (1), Jan. 1947:138.
- PACKARD, FRED MALLERY. Notes on the occurrence of birds in the Gulf of Mexico. *Auk* 64 (1), Jan. 1947:130-131.
- POOR, HUSTACE H. The Chickadee Flight of 1941-42. *Proc. Linn. Soc. N.Y. Nos.* 54-57, Sept. 1946:16-27.
- SNYDER, L. L. "Tunnel Fliers" and Window Fatalities. *Condor* 48 (6), Nov. 1946:278.
- SPRUNT, ALEXANDER JR. Early fall migration of the Purple Martin. *Auk* 64 (1), Jan. 1947:140-141.

See also *Distribution and Taxonomy*: O'Reilly.

ECOLOGY

- DAMON, DAVID. Seasonal Relationships of Bobwhite Quail to Woody Vegetation in Nebraska. *Nebr. Bird Rev.* 14 (2), July 1946:34-36.
- FRIEDMANN, HERBERT. Ecological Counterparts in Birds. *Sci. Monthly* 63 (5), Nov. 1946:395-398.

LIFE HISTORY AND BEHAVIOR

- AUSTIN, OLIVER L. A Study of the Mating of the Common Tern (*Sterna h. hirundo*). *Bird-Band.* 18 (1), Jan. 1947:1-16.
- BRECHER, LEONARD C. Notes on the Nesting of the Scarlet Tanager. *Kentucky Warbler* 22 (4), Fall 1946:46-50.
- EDWARDS, GEORGE, ERIC HOSKING, and STUART SMITH. Aggressive Display of the Ringed Plover. *Brit. Birds* 40 (1), Jan. 1947:12-19, pls. 1-8. (*Charadrius h. hiaticula*. Illus. with remarkable photographs.)
- EISENMANN, EUGENE. Interchange of Song between Blue-winged and Golden-winged Warblers. *Proc. Linn. Soc. N.Y. Nos.* 54-57, Sept. 1946:53-54.
- ELLIOTT, JOHN J. Observations on Birds Relative to the Predatory New York Weasel. *Proc. Linn. Soc. N.Y. Nos.* 54-57, Sept. 1946:56-57.
- EVENDEN, FRED G. JR. Nesting of the Marsh Hawk at Mountain Home, Southern Idaho. *Murrelet* 27 (3), Sept. 1946:52.
- HAVERSCHMIDT, FR. Observations on the breeding habits of the Little Owl. *Ardea* 34 (1-3), Oct. 1946:214-246. (*Athene noctua vidalii*.)

- HAVERSCHMIDT, FR. Notes on nest-sites of the Oyster-catcher, and the Long-eared Owl as a hole breeder. *Brit. Birds* 39 (11), Nov. 1946:334-336, pls. 44-46.
- HOUGHTON, A. S. A late [=early] nest of the Ruby-throated Hummingbird. *Auk* 64 (1), Jan. 1947:133.
- HOWELL, A. BRAZIER. The foot action of swimming ducks. *Auk* 64 (1), Jan. 1947:135-136.
- HUMPHREY, PHILIP S. Observations at the Nest of a Pileated Woodpecker. *Migrant* 17 (3), Sept. 1946:43-46.
- JACOBS, ELDEEN, and DON JACOBS. A Nesting of the Red-shouldered Hawk. *Flicker* 18 (4), Dec. 1946:76-78, 2 photos.
- KELSO, LEON. Bioelectronic Observations (V). Irradiation, Vitamin D, Preening, and Anting. *Biological Leaflet No. 35*, Dec. 1946:1-2.
- KIMSEY, J. BRUCE. Reactions of Cliff Swallows to a Buteonid Hawk. *Condor* 48 (6), Nov. 1946:281.
- KUTZ, H. L., and DAVID G. ALLEN. Double-crested Cormorant nesting in New York. *Auk* 64 (1), Jan. 1947:137.
- LASKEY, AMELIA R. Some Bewick Wren Nesting Data. *Migrant* 17 (3), Sept. 1946:39-43.
- MCATEE, W. L. Wild Turkey anting. *Auk* 64 (1), Jan. 1947:130.
- MOHLER, LEVI L. Notes on the breeding and nesting of the Long-billed Curlew. *Nebr. Bird Rev.* 14 (2), July 1946:31-33, 1 photo.
- MONROE, BURT L. Nest of Cedar Waxwing at Louisville. *Kentucky Warbler* 22 (4), Fall 1946:45-46.
- MONSON, GALE. Botteri's Sparrow in Arizona. *Auk* 64 (1), Jan. 1947:139-140.
- NICHOLSON, DONALD J. Smyrna Seaside Sparrow. *Fla. Nat.* 19 (3), April 1946:39-42. (Nesting habits of *Ammospiza maritima pelonota*.)
- PEARSE, THEED. Nesting of Western Gull off the Coast of Vancouver Island, British Columbia, and possible Hybridization with Glaucous-winged Gull. *Murrelet* 27 (3), Sept. 1946:39-40.
- PEARSE, THEED. The Nesting of the Red-throated Loon on Vancouver Island, British Columbia. *Condor* 48 (6), Nov. 1946:262-264, fig. 60.
- PETERSON, ROGER TORY. Nesting Sites of the Parula Warbler in the Potomac Valley. *Wils. Bull.* 58 (4), Dec. 1946:197, pl. 7.
- PICKWELL, GAYLE. The American Pipit in Its Arctic-Alpine Home. *Auk* 64 (1), Jan. 1947:1-14, pls. 1-4.
- RUTTLEDGE, ROBERT F. Roosting Habits of the Irish Coal-Tit, with some Observations on other Habits. *Brit. Birds* 39 (11), Nov. 1946:326-333, pl. 43. (*Parus ater hibernicus*.)
- SAUNDERS, ARETAS A. The Seasons of Bird Song. The Beginning of Song in Spring. *Auk* 64 (1), Jan. 1947:97-107, fig. 1.
- SAWYER, DOROTHY. Nesting of Chestnut-sided Warbler. *Auk* 64 (1), Jan. 1947:136-137.
- SKUTCH, ALEXANDER F. The Hummingbirds' Brook. *Sci. Monthly* 63 (6), Dec. 1946:447-457. (Habits of Costa Rican birds.)
- STEVENSON, JAMES O., and LOGAN H. MEITZEN. Behavior and Food Habits of Sennett's White-tailed Hawk in Texas. *Wils. Bull.* 58 (4), Dec. 1946:198-205, figs. 1-3.
- STONER, EMERSON A. Nest stealing by Black-headed Grosbeak. *Auk* 64 (1), Jan. 1947:129-130.
- SUTTON, GEORGE MIKSCH. Wing-flashing in the Mockingbird. *Wils. Bull.* 58 (4), Dec. 1946:206-209, pl. 8.
- THOM, ALEX. S. Display of Sand-Martin. *Brit. Birds* 40 (1), Jan. 1947:20-21. (*Riparia r. riparia*.)

- THOMAS, RUTH HARRIS. An Orchard Oriole Colony in Arkansas. *Bird-Band*. 17 (4), Oct. 1946:161-167.
- TOMKINS, IVAN R. Nesting of the Barn Owl on the Lower Savannah River. *Oriole* 11 (4), Oct. 1946:59-63, 1 photo.
- WAGNER, HELMUTH O. Observaciones sobre la Vida de *Calothorax lucifer*. *Anales Inst. Biol. Mexico* 17 (1-2), 1946:283-299, figs. 1-6.
- WOOD, R. L. Proximity of Occupied Kingfisher Nests. *Proc. Linn. Soc. N.Y. Nos.* 54-57, Sept. 1946:51-52.

See also *Distribution and Taxonomy*: Coursen, Graf, Greene, Munro, Murie, Taber; *Population*: Lack.

FOOD AND FEEDING HABITS

- ELLIOTT, JOHN J. A Feeding Incident of the Black-billed Cuckoo. *Proc. Linn. Soc. N.Y. Nos.* 54-57, Sept. 1946:49-50.
- HAGOPIAN, RALPH V. Black Vultures and live prey. *Auk* 64 (1), Jan. 1947:132.
- LONGLEY, WILLIAM H. Marsh Hawk Captures Sick Yellow-legs. *Flicker* 18 (4), Dec. 1946:107.
- LOVELL, HARVEY B. Black Vultures kill young pigs in Kentucky. *Auk* 64 (1), Jan. 1947:131-132.
- POOR, HUSTACE H. Predation by Grackles. *Proc. Linn. Soc. N.Y. Nos.* 54-57, Sept. 1946:54-55.
- REEDER, WILLIAM G. Occurrence of Mastiff Bat Remains in a Pellet of the Barn Owl. *Condor* 48 (6), Nov. 1946:282.
- SCOTT, WALTER E. Red-bellied snake in Ruffed Grouse crop. *Auk* 64 (1), Jan. 1947:140.

See also *Life History and Behavior*: Stevenson and Meitzen; *Population*: Stophlet.

POPULATION (including age, and mortality rates)

- AUSTIN, OLIVER L. Age record for the Arctic Tern. *Bird-Band*. 17 (4), Oct. 1946:168.
- AUSTIN, O. L. Longevity record for the Common Tern. *Bird-Band*. 18 (1), Jan. 1947:30.
- ERRINGTON, PAUL L. Predation and Vertebrate Populations. *Quar. Rev. Biol.* 21 (2, 3), June, Sept. 1946:144-177; 221-245.
- LACK, DAVID. The Eggs of the Red-backed Shrike. Part 2. *Oologists' Rec.* 20 (4), Dec. 1946:49-54. (Repeat layings, clutch size, etc. of *Lanius collurio*.)
- LASKEY, AMELIA R. Snake depredations at bird nests. *Wils. Bull.* 58 (4), Dec. 1946:217-218.
- MOSELEY, EDWIN L. Variations in the Bird Population of Ohio and Nearby States. *Ohio Jour. Sci.* 46 (6), Nov. 1946:308-322. [Also published under title, "Variations in the Bird Population of the North-Central States Due to Climatic and Other Changes." *Auk* 64 (1), Jan. 1947:15-35.]
- STOPHLET, JOHN J. Crow killed by a Duck Hawk. *Wils. Bull.* 58 (4), Dec. 1946:217.
- TINBERGEN, L. De Sperwer als roofvijand van zangvogels. *Ardea* 34 (1-3), Oct. 1946:1-213. (*Accipiter nisus* as a predator of passerine birds. 24-page abstract in English.)
- PARKHURST, R., and DAVID LACK. The Clutch-size of the Yellowhammer. *Brit. Birds* 39 (12), Dec. 1946:358-364. (*Emberiza citrinella*.)

See also *Parasites, Abnormalities, and Disease*: Laskey; *Food and Feeding Habits*: Longley, Poor.

TECHNIQUES (*including banding*)

- FARNER, D. S. An Interesting Recovery of a Banded Gray Jay. *Bird-Band*. 18 (1), Jan. 1947:31-32.
- PACKARD, FRED MALLERY. The Return of Young Robins to their Birthplaces. *Bird-Band*. 18 (1), Jan. 1947:30-31.
- SHREVE, BENJAMIN. A White-throated Sparrow Return. *Bird-Band*. 18 (1), Jan. 1947:32.
- SOUTHERN, H. N., J. S. WATSON, and DENNIS CHITTY. Watching Nocturnal Animals by Infra-red Radiation. *Jour. Anim. Ecol.* 15 (2), Nov. 1946:198-201, pls. 9, 10.
- TAKOS, MICHAEL J. Two Native Bird Traps of Panama. *Bird-Band*. 18 (1), Jan. 1947:26-30, figs. 1-3.
- WHITCOMB, LAWRENCE. On Filing Reprints. *Sci.* 104 (2711), Dec. 1946:577-578.
- See also *Life History and Behavior*: Austin.

HISTORY, BIOGRAPHY, BIBLIOGRAPHY, AND INSTITUTIONS

- FISHER, HARVEY I. Bibliography of Hawaiian Birds Since 1890. *Auk* 64 (1), Jan. 1947:78-97.
- FLAHAUT, MARTHA REEKIE. Samuel Frederick Rathbun. *Murrelet* 27 (3), Sept. 1946:41-46, photo.
- HARRIS, HARRY. George Willett (1879-1945). *Auk* 64 (1), Jan. 1947:107-113, pl. 5.
- LAWRENCE, BARBARA. Bibliography of Publications by Glover Morrill Allen. *Proc. New. Eng. Zool. Club*, 24, Feb. 4, 1947:1-81. (\$1.00. Address: Editor, 7 Kirkland St., Cambridge, Mass.)
- STRESEMANN, ERWIN. Baron Von Pernau, Pioneer Student of Bird Behavior. *Auk* 64 (1), Jan. 1947:35-52.
- ZIMMER, JOHN T. Obituary: Frank Michler Chapman. *Amer. Nat.* 80 (793), July 1946:476-481, photo.

PALEONTOLOGY

See *Evolution and Speciation*: Gregory, Lanham.

WILSON ORNITHOLOGICAL CLUB LIBRARY

The following gifts have been recently received. From:

Elizabeth B. Beard—1 bulletin	G. F. Makkink—4 reprints
Maurice Brooks—4 reprints	Margaret M. Nice—1 book, 21 reprints
G. Reeves Butchart—1 book	William H. Phelps—2 reprints
Mildred F. Campbell—1 bulletin	Allan R. Phillips—5 reprints
Raymond Cayouette—5 reprints	Frank A. Pitelka—9 books, 2 journals, 67 reprints
Richard B. Fischer—3 reprints	Hustace H. Poor—1 bulletin, 1 reprint
F. N. Hamerstrom, Jr.—19 bulletins	O. A. Stevens—1 bulletin
Fr. Haverschmidt—8 reprints	Wendell Taber—1 book
Leon Kelso—2 bulletins	Josselyn Van Tyne—1 book
Haven Kolb—7 bulletins	Helmuth O. Wagner—2 reprints
H. L. Kutz—2 reprints	Lawrence H. Walkinshaw—3 reprints
George H. Lowery, Jr.—4 reprints	

Of particular interest among the recent gifts are: "Birds of the Ocean," by W. B. Alexander, 1928; "The Book of Bird Life," by A. A. Allen, 1930; "Hummingbirds," by William Jardine, 1833; "A Laboratory and Field Manual of Ornithology," by Olin Sewall Pettingill, Jr., 1946; "Eskimo Year," by George Miksch Sutton, 1934; "An Objectivistic Study of the Innate Behavior of Animals," by N. Tinbergen, 1942.

WILDLIFE CONSERVATION

Water Pollution—Conservation's Most Urgent Problem

Life cannot exist without water; all plants and all animals, including man himself, depend upon water. Water made our industrial system possible—water is used in the processes of manufacture, and as a means of carrying off industrial wastes. An important part of our food supply comes directly from oceans, rivers, and lakes. Water holds for us tremendous aesthetic, social, and recreational values.

We have taken poor care of our waters. Where the greatest number of people live, where the need for water is greatest, we have all but destroyed its usefulness. In 1944 the Surgeon General of the United States estimated that in this country pollution from sewage and industrial wastes together approximated the raw sewage of at least 100 million people. We take the water that we use every day from these same streams and lakes. The effects are plain to see. The Surgeon General also said: "Modern processes of water purification are less and less effective in coping with this ever-increasing burden of pollution." The direct economic loss from pollution has been estimated at from 100 to 500 million dollars a year. The figure does not include such things as the thousands of lost swimming holes, the water-birds dead of oil-soaked feathers, and the blighted resting and feeding grounds of wildfowl. It includes costs which are charged to the maintenance of public health and to losses to the fisheries industries, but to that extent only does it indicate the violent disruption of the whole aquatic biota.

And there lies the naturalists' special interest in the problem. No matter what their particular fields may be, there is one underlying principle which ties them all together: the dependence of both animals and plants upon water and soil—not upon water and soil as two separate systems, but as one. In the long view, no one animal or group of animals can be considered apart from the rest. Through food chains—food circuits—all organisms draw upon a common store of nutrients which are borrowed for a time, and eventually returned. In nature, this system of borrow-and-return is a fairly orderly one, but civilized man has not yet learned to fit himself into the basic "pattern." As Leopold has said: "Civilization shortens food chains, and routes them into lakes and rivers instead of fields and pastures." And in doing so, it has drastically unbalanced the biological pattern of our waters, all too often to the extent of destroying that pattern entirely.

Except in the case of a very few pollutants, the techniques for cleaning up our waters are already well known and in use; they need only to be applied more widely. However, most rivers cross State lines, and we have spent our time haggling over "States' rights" as opposed to Federal control. Anti-pollution laws must somehow be coordinated, but we have not agreed on how to do it.

There is hope that agreement is now in sight. The leaders of the two opposing groups have again introduced bills in the Federal Congress, four in January of this year: H. R. 123, 315, and 470, and S. 418. All four agree on the following points: The States are primarily responsible for pollution-abatement programs. The Surgeon General of the U.S. Public Health Service is made responsible for the control of water-pollution; in cooperation with other public and private agencies, he shall prepare pollution-control plans; he shall encourage interstate cooperation; he may bring suit to abate pollution within a stated time after having given notice; he shall conduct investigations and publish reports thereon; he shall review reports and applications for Federal assistance, and shall establish priorities. An Advisory Board is to be established, consisting of the Surgeon General as Chairman, and representatives of the Departments of War, the Interior, and Agriculture, with five additional members not in Federal employ; the Board will review poli-

cies and programs on pollution control and make recommendations thereon to the Surgeon General; \$100,000,000 is authorized for grants-in-aid and loans in each year and \$1,500,000 for State aid in studies and programs.

Anti-pollution bills have been introduced in Congress regularly since 1936. One of the earliest passed both Houses but was vetoed by the President in June 1938 because it did not provide for review by the Executive branch. Another, in 1940, passed both Houses but died in conference over an amendment similar to the provision which differentiates the present Mundt bill from the other three. During the war, although new sources of pollution appeared at a much greater rate than before, anti-pollution legislation was out of the question on practical grounds. That excuse no longer exists.

The most significant thing about the four current bills is that their proposers have shelved the old jurisdictional dispute. An encouraging sign is that S. 418 was introduced as a joint bill sponsored by the leaders of the two major political parties, Senators Barkley and Taft. Public opinion is unquestionably in favor of pollution control. The chance to get it seems better than it has been for many years. There is no excuse for more delay.—F.N.H.

Conservation of Renewable Natural Resources: Some Fundamental Aspects of the Problem. By Raphael Zon, William S. Cooper, Gustaf A. Pearson, Homer L. Shantz, A. E. Douglass, Charles G. Abbot, Paul B. Sears, Ellsworth Huntington, Morris L. Cooke, Samuel T. Dana, Milton S. Eisenhower, and Julian F. McGowin. University of Pennsylvania Press, Philadelphia, 1941:6 × 9 in., vi + 200 pp., 31 figs. \$2.50.

This book appears to be a collection of twelve papers which were read at the University of Pennsylvania Bicentennial Conference. The table of contents divides them into three groups: natural vegetation as a guide to farm and forest practice; climatic cycles in relation to conservation; and the administrative task of conservation, public and private. There is no introduction to explain either the basic plan or its objectives.

The nature of the first section is indicated by its individual titles: "Natural Vegetation as a Key to Conservation Practices" (Raphael Zon), "Man's Use and Abuse of Native Vegetation: The Lessons of the Past and the Prospects for the Future" (William S. Cooper), "What Forest Trees Tell about Climate and Soil" (Gustaf A. Pearson), and "The Original Grassland and Desert Shrub Vegetation . . . as a Guide to Present Day Agricultural Practice" (Homer L. Shantz). This is useful and interesting information of a kind that has too often been ignored in the past.

The section on climatic cycles is the longest but, except for Paul B. Sears' excellent account of "Conservation and Changing Environment" (10 pp.), has been related only slightly, if at all, to the main subject of the book. Two of these papers—"Dendrochronology and Studies in 'Cyclics'" (A. E. Douglass) and "Periodicities in Solar Variation Reflected in Weather" (Charles G. Abbot)—explain some of the research methods and findings of these two authorities. "Climatic Pulsations and an Ozone Hypothesis of Libraries and History" (Ellsworth Huntington; 49 pp.) re-states some of the author's well known theories concerning climatic cycles and their influence upon human history, and adds the "Ozone Hypothesis"—a suggestion that minute changes in the amount of atmospheric ozone, associated with fluctuations of weather and climate, affect human well-being and mental activity. This is fascinating to read, but seems singularly out of place.

The final section has for its keynote "On Total Conservation" (Morris L. Cooke), stressing the need for planning. "Natural Resources and the States" (Samuel T. Dana) and "The Forest Problem Can Be Solved by Increased Production and Use"

(Julian F. McGowin) deal mainly with forestry, the first from the standpoint of state, the second of private, responsibility. "Federal Responsibilities in Total Conservation" (Milton S. Eisenhower), like the whole first section, draws its examples mainly from soil conservation, agriculture, and forestry. Even in this section, as throughout the book, other renewable resources—such as waters, fish and wildlife, and recreational values—get scant attention.

Altogether, like so many other symposia, this one is a group of essays, some good, some excellent, no one of which can cover the whole subject; they fail to do so collectively through the lack, apparently, of planned integration.—F.N.H.

WILDLIFE CONSERVATION COMMITTEE
Frederick N. Hamerstrom, Jr., *Chairman*

WILSON ORNITHOLOGICAL CLUB APPOINTMENTS FOR 1947

The President has appointed the following to serve during 1947:

Committees—

Membership Committee. Walter E. Scott, *Chairman*. Names of members will appear in a later issue of the *Bulletin*.

Affiliated Societies Committee. Gordon M. Meade, *Chairman*. Theodora Nelson, Member-at-large; Russell DeGarmo (Brooks Bird Club); Eugene P. Odum (Georgia Ornithological Society); O. A. Stevens (Inland Bird Banding Association); Harvey B. Lovell (Kentucky Ornithological Society); Edson H. Fichter (Nebraska Ornithologists' Union); George R. Mayfield (Tennessee Ornithological Society); N. R. Barger (Wisconsin Society for Ornithology); J. J. Murray (Virginia Society of Ornithology).

Wildlife Conservation Committee. Frederick N. Hamerstrom, Jr., *Chairman*. Rudolf Bennitt, George H. Breiding, Charles A. Dambach, Paul L. Errington, Ludlow Griscom, H. Albert Hochbaum, Harrison F. Lewis, Robert A. McCabe, Richard H. Pough, Herbert L. Stoddard, Gustav A. Swanson, Milton B. Trautman.

Illustrations Committee. Walter J. Breckenridge, *Chairman*. Richard P. Grossenheider, Hal H. Harrison, Karl Maslowski, Roger Tory Peterson, T. M. Shortt.

Endowment Fund Committee. Harold F. Wing, *Chairman*. Mrs. Herbert E. Carnes, William W. Griffin, Fred W. Haecker, Fred T. Hall.

Library Committee. Harold R. Mayfield, *Chairman*. Edward F. Dana, Arthur E. Staebler, Rowland S. Wilson.

Trustees—

James Henry Bruns, three-year term

Allyn R. Moser, two-year term

William G. Fargo, one-year term.

Representative of the Wilson Club on the American Ornithologists' Union Council—Maurice G. Brooks.

PROCEEDINGS OF THE TWENTY-EIGHTH ANNUAL MEETING

BY MAURICE BROOKS, SECRETARY

The Twenty-eighth Annual Meeting of the Wilson Ornithological Club was held November 28-30, 1946, at Omaha, Nebraska, at the invitation of the Nebraska Ornithologists' Union. Business and social sessions were held in the Joslyn Memorial, and the Annual Dinner was given in the Hotel Fontenelle.

The Executive Council met on Thursday evening, November 28, at the Omaha Club. On Friday and Saturday there were two business sessions, three sessions devoted to the presentation of papers, and one session to the showing of color films of birds and other wildlife. A bird and mammal art exhibit, arranged by Walter J. Breckenridge, was held at the Joslyn Memorial. The artists whose works were shown had been members of the armed services of the United States during World War II and had had, therefore, opportunity to visit many parts of the world seldom reached by the zoologist. There was also an exhibit of Nebraska bird skins.

Following the Annual Dinner, the Nebraska Ornithologists' Union was host to members and guests of the Wilson Ornithological Club.

MEETING OF THE EXECUTIVE COUNCIL

Present at the Executive Council meeting on Thursday evening were the following officers, members of the Council, and committee chairmen: George M. Sutton, Olin Sewall Pettingill, Jr., Maurice Brooks, Burt L. Monroe, Josselyn Van Tyne, Milton B. Trautman, George H. Lowery, Jr., Lawrence E. Hicks, George B. Thorp, Walter J. Breckenridge, R. Allyn Moser, and Harold F. Wing. President Sutton presided.

A summary of the Club's business and activities during the years 1942-45 was read and approved.

Reports were given by the Secretary, the Treasurer, and the Editor.

Josselyn Van Tyne was unanimously re-elected Editor for 1947.

It was voted that the Treasurer be responsible for maintaining the master membership list of the Club; that the Treasurer furnish the Editor with the corrected mailing list for each issue of *The Wilson Bulletin*; that the Treasurer furnish the Secretary with the official membership roll; and that membership application cards be printed with instructions for return to the Treasurer.

Affiliation with the Brooks Bird Club, of West Virginia, was approved.

Reports were received from the Affiliated Societies Committee, the Illustrations Committee, the Endowment Fund Committee, and the Library Committee.

An invitation to hold the 1947 Annual Meeting of the Club at Columbus, Ohio, was received from Edward S. Thomas, representing The Ohio State University, the Wheaton Club, and other organizations. It was voted to accept the invitation, and to hold the meeting on the week end following Thanksgiving.

The President announced the gift to the Club of five hundred dollars for the encouragement of research and the promotion of closer relations between the Club and the affiliated societies.

BUSINESS SESSIONS

The first business session was called to order by President George M. Sutton at 9:45 a.m. on November 29. The minutes of the 1941 meeting (published in *The Wilson Bulletin* for March 1942) were approved. The condensed minutes of

meetings and actions of the Council for the years 1942-45 (during which no general meetings of the Club were held) were read and approved.

Reports of the Secretary, the Treasurer, and the Editor were read and approved.

The President appointed the following temporary committees: *on Nominations*, Lawrence H. Walkinshaw, Margaret M. Nice, S. Charles Kendeigh; *on Auditing*, Harold Wing and Bernard Baker; *on Resolutions*, Milton B. Trautman, F. W. Haecker, and Donald S. Farner.

The report of the Executive Council was read and approved.

Reports were received and approved from the Program Committee, the Endowment Fund Committee, the Affiliated Societies Committee, the Illustrations Committee, and the Committee on Local Arrangements.

The Secretary announced that the names of 172 proposed new members for 1946 were at the registration desk and that these names would be voted on at the final business session.

The final business session was called to order by President Sutton at 4:45 p.m. on November 30.

One hundred and seventy-two persons named by the Secretary and six additional persons named at the Annual Meeting were unanimously elected members.

The revised constitution for the Wilson Ornithological Club, published in *The Wilson Bulletin* for June 1946 was accepted.

Under the terms of the new constitution, President Sutton named the following persons to serve as Trustees for the Club: William G. Fargo, to serve for one year; R. Allyn Moser, to serve for two years; James H. Bruns, to serve for three years.

The report of the Auditing Committee was read and accepted.

The Resolutions Committee presented the following resolution, which was then adopted:

Resolved, that the Wilson Ornithological Club, at its Twenty-eighth Annual Meeting on November 28-30, 1946, in Omaha, Nebraska, wishes to express its sincere thanks to those who have made this meeting a memorable one; to the Omaha Society of Fine Arts for making available the facilities of the Joslyn Memorial, and to Eugene Kingman for arranging the art exhibit; to the members of the Nebraska Ornithologists' Union, and to Dr. R. Allyn Moser in particular; to the artists who contributed paintings, drawings, and photographs of birds exhibited during this meeting, and particularly to Dr. Walter J. Breckenridge for assembling this display; and to William Dilger, who contributed the drawing for the Annual Dinner menu.

Presentation and adoption of other resolutions followed.

The Nominating Committee proposed the following officers for the Club, who were then elected: *President*, George Miksch Sutton; *First Vice-President*, Olin Sewall Pettingill, Jr.; *Second Vice-President*, Maurice Brooks; *Secretary*, James B. Young; *Treasurer*, Burt L. Monroe; *Elective Members of the Executive Council*, Rudolf Bennitt, George H. Lowery, Jr., Milton B. Trautman.

The thanks of the Club were voted to William Ferguson for the use of his projector during the meetings.

The session adjourned at 5:05 p.m.

PAPERS AND MOTION PICTURES SESSIONS

The opening session began on Friday morning, November 29, with an address of welcome by Dr. R. Allyn Moser, President of the Nebraska Ornithologists' Union, and a response by President George M. Sutton of the Wilson Ornithological Club.

During the four sessions on Friday and Saturday a total of 22 papers and 8 motion picture films, all in color, were presented. The papers covered the following subjects: bird distribution (7); life history (4); wildlife management (2); conservation and education (3); bird behavior (1); bird photography (1); bird populations (1); techniques in studying bird migration (1); ornithological history (1); methods of publishing scientific information (1). The program of papers and films, together with brief abstracts, is given below.

OPENING SESSION, FRIDAY MORNING, NOVEMBER 29

1. WILSON TOUT, North Platte, Nebraska. *Founders of the Nebraska Ornithologists' Union* (10 minutes).

A paper of particular interest because the speaker is the only Charter Member of the Nebraska Ornithologists' Union still on the roll of that organization. The Union, now 47 years old, has just re-affiliated with the Wilson Ornithological Club.

2. LAWRENCE E. HICKS, Ohio State University. *The 1945-46 Snowy Owl and Evening Grosbeak Invasion of the Ohio Area*. Illustrated by slides (20 minutes).

A summary of data on Snowy Owls and Evening Grosbeaks that moved southward beyond their normal range into Ohio, the latter species in three separate waves.

3. FRED T. HALL, Ward's Natural Science Establishment, Rochester, New York. *Observations on the Yellow-billed Tropic-bird*. Illustrated by colored slides (20 minutes).

A report covering three years' observations of the nesting habits, feeding habits, and natural enemies of *Phaethon lepturus* on the Bermuda Islands. Rats, which drove the birds away from certain otherwise favorable breeding areas, may, in the speaker's opinion, have extirpated also the local nesting populations of Bermuda Petrel (*Pterodroma cahow*) and Audubon's Shearwater (*Puffinus lherminieri*).

4. BURT L. MONROE, Anchorage, Kentucky. *Observations of Water and Wading Birds at the Falls of the Ohio*. Illustrated by slides (20 minutes).

A summary of observations of waterfowl and shorebirds from 1930 to 1946, including comments on 87 species, 24 of which were new for the Kentucky State list. The study area extended from the western edge of the city of Louisville, in Jefferson County, to a point 14 miles upstream, in Oldham County. The speaker emphasized the need for confirmation of numerous early records.

5. F. W. HAECKER, Kemmerer, Wyoming. *Birds of La Barge Creek Basin, Lincoln and Sublette Counties, Wyoming* (15 minutes).

A discussion of the climate, flora, and fauna of a 200-square-mile montane tract (elevation 7,000 to 10,000 feet) in southwestern Wyoming, with emphasis on the birdlife, especially the Corvidae. The paper was based on observations made during 31 consecutive months (May 1944 to the fall of 1946). Especially notable were the speaker's comments on a feeding-counter maintained throughout the year at 8,000 feet elevation.

FRIDAY AFTERNOON

6. BERT HARWELL, National Audubon Society, New York. *The Bonaventure Island Refuge*. Colored motion pictures (30 minutes).

Among the photographs of the various seabirds which inhabit Bonaventure Island, Gaspé County, Quebec, were unusual shots showing Gannets plunging headlong into the water from considerable height.

7. R. ALLYN MOSER, Omaha, Nebraska. *Biotic Concept with It's Relation to Nebraska* (20 minutes).

Discussion of the biotic provinces of Nebraska and of the birdlife characteristic of each province.

8. MILTON B. TRAUTMAN, F. T. Stone Laboratory, The Ohio State University, Put-in-Bay, Ohio. *Diurnal Movements of the Common Golden-eye about South Bass Island, Ohio, during the Autumn Migration*. Illustrated by slides (15 minutes).

Golden-eyes observed about South Bass Island in November and December (until the freeze-up) appeared to roost about a mile offshore even in rough weather. About sunrise they flew directly toward the island, turned when 100 to 300 yards offshore, moved parallel to the shore, and alighted in small groups at reefs which they usually could see without difficulty because of the clearness of the water. Here they remained all day, feeding actively until noon, resting between noon and 4 p.m., and feeding again from 4 o'clock until sunset. At sunset they became restless. Presently one of them rose, and, followed by the others, flew out to the roost.

About 5 per cent of the water area was "reef," that is, Golden-eye feeding ground. The birds fed on crawfishes principally, but also on large aquatic insects, mollusks, and algae. Other species of ducks, notably Black Ducks, Red-breasted Mergansers, and Old-squaws at South Bass Island, and shoal-water ducks at baited ponds, quickly formed regular feeding habits, some of which involved restricted feeding areas.

9. NIKOLAAS TINBERGEN, University of Leiden, Netherlands. *The Study of Bird Behavior*. Illustrated by slides (20 minutes).

A discussion of some of the stimuli employed by birds, fishes, insects, and other animals in eliciting certain responses. Illustrations showed color pattern and posture stimuli of the Stickleback, English Robin, etc.

10. OLIN SEWALL PETTINGILL, JR., Carleton College, Northfield, Minnesota. *Progress Report on the Whooping Crane Project* (15 minutes).

During the spring and summer of 1946 Pettingill travelled widely in attempting to ascertain where the few surviving pairs of Whooping Cranes were breeding. On the Texas coast he saw a small number of wintering birds, among them adults feeding parti-colored young. In the Athabasca Lake district he flew over considerable areas of tundra vainly looking for the rare birds. The work was sponsored jointly by the National Audubon Society and the U. S. Fish and Wildlife Service.

11. JOHN H. BAKER, National Audubon Society, New York. *The Program of the Audubon Society* (15 minutes).

A discussion of the aims of the National Audubon Society, with emphasis on recently organized parts of the Society's work.

12. JOHN WILLARD BAECHELE, St. Joseph's College. *Bird Portraits*. Illustrated by slides (20 minutes).

A series of close-up portraits of captive birds, with comments on the way in which the birds were held while being photographed.

13. JOSSELYN VAN TYNE, University of Michigan. *Methods of Publishing Scientific Information* (10 minutes).

The organization and writing of scientific papers and notes, with remarks on titling, choice of the place of publication, and ways of safeguarding scientific accuracy through the whole editorial and publication process.

14. DAVID DAMON, Nebraska Game, Forestation and Parks Commission, Lincoln, Nebraska. *Seasonal Relationship of Bobwhite Quail to Woody Cover*. Illustrated by slides (20 minutes).

A summary of data (based on flushing of over 150 coveys) pertaining to the dependence of the Bob-white on woodlots and osage orange hedges in southeastern Nebraska, particularly in winter. (Now published: *Nebr. Bird Rev.*, 14, No. 2:34-36.)

SATURDAY MORNING, NOVEMBER 30

15. GEORGE J. WALLACE, Michigan State College. *Food Habits of Michigan Barn Owls* (15 minutes).

An analysis of one year's pellets (805) and prey (2,266 vertebrate individuals) from a pair of Barn Owls and their two broods of young.

16. JOHN H. WAMPOLE, Nebraska Game, Forestation and Parks Commission, Lincoln, Nebraska. *Hawk Populations in Nebraska* (10 minutes).

In more than 40,000 miles of driving through central Nebraska in 1945 (all year) and 1946 (January 1 to September 1) the speaker obtained 2,257 sight records of 18 species of hawks—the rarest, the Duck Hawk (seen once); the commonest, the Sparrow Hawk (seen 800 times). He saw Sparrow Hawks and Marsh Hawks every month during the 20-month period. He saw two brown Marsh Hawks (adult females and immature birds) to one gray (adult male).

17. WAYNE SHORT, National Audubon Society, New York. *The Audubon Screen Tours Program*. Illustrated by slides (20 minutes).

A brief history of the Audubon Screen Tours movement, with emphasis on the opportunities this program offers for conservation education.

18. EDSON FICHTER, University of Nebraska State Museum, Lincoln, Nebraska. *Sight Record of Eastern Glossy Ibis in Nebraska* (5 minutes).

Published under title, "Possible Sight Record of Eastern Glossy Ibis in Nebraska." *Nebr. Bird Rev.*, 14, No. 2:44.

- 19-20. JOHN W. SCOTT, University of Wyoming. *Changing Environment and the Sage Grouse*. A colored motion picture, *The Sage Grouse*. (30 minutes)

A report on the possible causes of the steady decrease in numbers of the Sage Grouse, once an abundant and important upland game bird in the western United States. In 1934 it was found in only 9 states. In the speaker's opinion changes in environment are largely responsible. These changes result principally from over-grazing (which has forced cattle into the sage-brush); topsoil erosion; drying up of the soil, seeps, water-holes and lakes. Young Sage Grouse depend on insect food obtainable in low-lying meadowlands. Where this moist habitat disappears, the Sage Grouse disappears too.

21. ADRIAN C. FOX, Soil Conservation Service, Lincoln, Nebraska. *Soil and Water Conservation Education in Public Schools* (15 minutes).

A discussion of the importance of soil and water to all forms of life and a plea for teaching conservation of these resources.

22. LEVI L. MOHLER, Nebraska Game, Forestation and Parks Commission, Lincoln, Nebraska. *Concerning Roost Flights of Prairie Chickens* (15 minutes).

Having learned through repeated observation that all Prairie Chickens of a given flock ceased feeding and flew to their roost more or less simultaneously, Mohler simplified the problem of counting birds by flushing and counting one flock before the usual time for roost-flight, then driving to a place at which he could count a second flock flying to roost at the usual time.

23. GEORGE H. LOWERY, JR., Louisiana State University. *The Use of the Telescope in Studies of Bird Migration*. Illustrated by slides (30 minutes).

A plea for widespread collaboration in studying bird migration, using low-power telescopes, with a discussion of the direction, frequency, and time of night at which birds have been seen flying across the face of the moon.

24. SETH H. LOW, U.S. Fish and Wildlife Service, Jet, Oklahoma. *Observations on Shorebirds, Jaegers, Gulls, and Terns on the Salt Plains National Wildlife Refuge, Alfalfa County, Oklahoma* (20 minutes).

In the fall of 1941 a flood-control reservoir of 11,000 surface acres was created on the Salt Plains National Wildlife Refuge. About this artificial lake and the near-by salt plains, Low observed numerous charadriiform birds from 1941 to 1944, among them many species new for Oklahoma. The abundance of some species may indicate that a new line of flight has been established because of this feeding and resting place.

SATURDAY AFTERNOON

25. EDWIN R. KALMBACH, Fish and Wildlife Service, Denver, Colorado. *Birds, Beasts, and the Rainbow* (45 minutes).

Presentation through colored motion pictures of experiments with colored grains, showing that Mourning Doves and other birds either failed to see or discriminated against green-colored grain, but that various mammals ate grain without apparent regard for its color.

26. WILLIAM FERGUSON, Omaha, Nebraska. *This Curious World of Nature* (30 minutes).

Colored motion pictures taken in Colorado of such montane birds as the Dipper, Williamson's Sapsucker, Mountain Bluebird, and Violet-green Swallow.

27. JOHN H. BAKER, National Audubon Society, New York. *Southern Refuges of the Audubon Society* (30 minutes).

Colored motion pictures of water birds on their Texas coast nesting grounds, with running comment on the relationships between bird colonies, economically important fish, and other elements of the biotic community.

28. BERNARD BAKER, Marne, Michigan. *Mexican and West Indian Birds in Color*. Presented by title.

29. WALTER J. BRECKENRIDGE, Minnesota Museum of Natural History. *Northward Migration of Sandhill Cranes in the Platte River Area of Western Nebraska* (30 minutes).

Colored motion pictures of large flocks of Sandhill Cranes, most of which were feeding in stubble fields not far from farm buildings. Dancing of the birds seemed to be of a communal nature.

30. OLIN SEWALL PETTINGILL, JR., Carleton College. *Athabasca Sojourn* (45 minutes).

Colored motion pictures taken during a summer reconnaissance of the supposed breeding ground of the Whooping Crane. Among the birds photographed were Horned Grebes, Long-billed Marsh Wrens, and Coots.

THE ANNUAL DINNER

The Annual Wilson Ornithological Club Dinner was held at the Hotel Fontenelle on Friday, November 29, with President George M. Sutton as Toastmaster. President Sutton introduced Dr. Nikolaas Tinbergen, of the University of Leiden, Mr. Wilson Tout, a founder of the Nebraska Ornithologists' Union, Mr. John H. Baker, Executive Director of the National Audubon Society, Dr. R. Allyn Moser, Chairman of the Committee on Local Arrangements, and Mr. and Mrs. F. L. Jaques.

The principal speaker was Mr. Roy N. Towl, engineer for the Omaha city parks system; his subject was "The Missouri River." Music was furnished by Mr. Arthur Randall, of Omaha.

Following the Annual Dinner, the Nebraska Ornithologists' Union was host to Wilson Ornithological Club members and guests at an informal reception in the Joslyn Memorial. Part of the time was spent viewing the exhibit of bird and mammal portraiture in the galleries of the Memorial.

MINUTES OF THE WILSON ORNITHOLOGICAL CLUB, 1941-45

Since the Wilson Ornithological Club has held no regular meeting since the Champaign-Urbana meeting, November 20-23, 1941, the Secretary has prepared the following summary of the Club's business and activities during the past five years.

The minutes and proceedings of the 1941 meeting were published in detail in *The Wilson Bulletin* for March 1942. To summarize them briefly: 1. The following officers were elected: *President*, George Miksch Sutton; *First Vice-President*, S. Charles Kendeigh; *Second Vice-President*, Olin Sewall Pettingill, Jr.; *Secretary*, Maurice Brooks; *Treasurer*, Gustav Swanson; *Elective Members of the Executive Council*, Burt L. Monroe, Eugene P. Odum, and Lawrence H. Walkinshaw. 2. Josselyn Van Tyne was re-elected Editor. 3. It was proposed to hold the 1942 meeting at Cornell University. 4. Affiliations with the Inland Bird Banding Association, the Virginia Society of Ornithology, and the Georgia Ornithological Society were approved. 5. Dues for Active Members were raised from \$2.50 to \$3.00, and for Associate Members from \$1.50 to \$2.00.

During the summer of 1942 it was decided that, because of wartime conditions, the proposed Ithaca meeting could not be held. President Sutton announced plans for an election of officers by mail ballot, the slate to be drawn up by a nominating committee and published in the *Bulletin*. The election resulted in the naming of the same officers for 1943 as had served during 1942, save that Milton B. Trautman was named as Treasurer to succeed Gustav Swanson, who had resigned. The Council re-elected Josselyn Van Tyne as Editor.

The March 1943 *Bulletin* carried full reports of the officers and committee chairmen, showing the Club to be active and in sound financial condition.

In the course of 1943 the Club's President, George M. Sutton, entered military service, the First Vice-President, S. Charles Kendeigh, serving the remainder of the year as Acting President; a meeting of the Club was again impossible, and another mail election of officers was held. The following officers were named: *President*, S. Charles Kendeigh; *First Vice-President*, Olin S. Pettingill, Jr.; *Second Vice-President*, Harrison F. Lewis; *Secretary*, Maurice Brooks; *Treasurer*,

Milton B. Trautman; *Elective Members of the Executive Council*, Burt L. Monroe, Eugene P. Odum, and Lawrence H. Walkinshaw. By vote of the Council, Josselyn Van Tyne was re-elected Editor for 1944.

By the summer of 1944 a large amount of Club business had accumulated, some of which could not be carried on by mail. President Kendeigh called a meeting of the Executive Council at the Franz Theodore Stone Laboratory of Ohio State University, at Put-in-Bay, Ohio, August 11-12, 1944. Despite difficulties of travel, there was a good attendance of officers and committee chairmen. One important item of business was the re-incorporation of the Club; the Corporate Certificate was issued by the State of Illinois on October 16, 1944.

Officers for 1945 were again elected by mail ballot, the entire slate which served in 1944 being re-elected. Josselyn Van Tyne was re-elected Editor for 1945. A revision of the Club's constitution was outlined.

Travel conditions in 1945 did not permit a full meeting, but a meeting of the Executive Council and committee chairmen was held at Columbus, Ohio, on October 13, 1945. Work continued on a revision of the Constitution. It was announced that the Wisconsin Ornithological Society had expressed a desire to affiliate with the Wilson Ornithological Club, and favorable action on this matter was taken by the Council.

Another mail ballot was used to elect officers for 1946. The election resulted as follows: *President*, George Miksch Sutton; *First Vice-President*, Olin S. Pettigill, Jr.; *Second Vice-President*, Harrison F. Lewis; *Secretary*, Maurice Brooks; *Treasurer*, Burt L. Monroe; *Elective Members of the Executive Council*, Milton B. Trautman, Rudolf Bennitt, and George H. Lowery, Jr. Josselyn Van Tyne was re-elected Editor by the Council.

The five-year period covered by this report is noteworthy for the steady growth of the Club, and for the improvement of its financial position. Despite sharply rising costs, the increased membership of the Club and the fact that many members have raised the class of their membership have permitted our Treasurer to show a safe balance in the current fund each year.

Through the outstanding work of the Endowment Committee, the number of Life Members has shown a steady increase. This also contributes to our financial security.

Respectfully submitted,
MAURICE BROOKS, *Secretary*

REPORT OF THE SECRETARY, 1946

The last full meeting of the Wilson Ornithological Club was held at Champaign-Urbana, Illinois, November 20-23, 1941, five years ago. At that time the effect of World War II was already being felt. We closed the year with 1,181 members, and it was freely predicted that in the event of protracted war, our membership would fall to seven or eight hundred. It is a tribute to the vitality of the Club that, despite the war and the necessary suspension of full meetings, the membership grew steadily during the entire five years. Much of the credit for this growth in membership is due to the two persons who served successively as chairman of the membership committee, Richard L. Weaver and Frederick M. Baumgartner. Credit is also due to many members of the Club who suggested new prospects, and who made special efforts to maintain, or to raise, the class of their own membership.

We now have 1,301 members on our rolls, the highest number which the Club has ever attained. During 1946 we have made a net gain of 101 members. At the close of 1945 our membership totalled 1,200, and during 1946 we lost, from all causes, 71 members, and gained 172.

Membership in the Club by classes (with the corresponding figures for 1945 in parentheses) is as follows: Founders, 2 (3); Life Members, 44 (34); Sustaining Members, 72 (67); Active Members, 449 (412); Associate Members, 734 (684). During 1946 the 172 new members were divided as follows: Sustaining Members, 3; Active Members, 44; Associate Members, 125.

From an ornithological society of somewhat local scope, our Club has grown to be an international organization. We now have members resident in every state in the Union, in most of the provinces of Canada, and in many foreign countries. Without attempting to give a complete summary we have at present members as follows:

California	60	Maryland	21	North Dakota	10
Colorado	11	Massachusetts	43	Ohio	125
Connecticut	19	Michigan	92	Pennsylvania	63
Florida	17	Minnesota	45	Tennessee	20
Georgia	19	Missouri	25	Texas	25
Illinois	84	Montana	12	Virginia	18
Indiana	30	Nebraska	11	West Virginia	20
Iowa	32	New Hampshire	15	Wisconsin	50
Kansas	13	New Jersey	22	Canada	54
Kentucky	22	New York	114	Foreign	25

In the past year the Club has lost one of its Founders, Franklin Lorenzo Burns, of Berwyn, Pennsylvania. His death leaves but two living Founders, Dr. Lynds Jones and Dr. R. M. Strong.

Your Secretary, with this meeting, completes five years in the office. It has been a pleasure and an inspiration to work with the Club and its members. He bespeaks the same fine cooperation for his successor.

MAURICE BROOKS, *Secretary*

The report of the Treasurer will be published in the June issue of the *Bulletin*.

THE WILSON BULLETIN PUBLICATION DATES

The actual dates of publication of the four numbers in 1946 were: May 21, August 2, October 2, December 21.

OFFICERS OF THE WILSON ORNITHOLOGICAL CLUB

PRESIDENT

J. B. Richards, 1888-1889.	Thos. L. Hankinson, 1922-1923.
Lynds Jones, 1890-1893.	Albert F. Ganier, 1924-1926.
Willard N. Clute, 1894.	Lynds Jones, 1927-1929.
R. M. Strong, 1894-1901.	J. W. Stack, 1930-1931.
Lynds Jones, 1902-1908.	J. M. Shaver, 1932-1934.
F. L. Burns, 1909-1911.	Josselyn Van Tyne, 1935-1937.
W. E. Saunders, 1912-1913.	Mrs. Margaret Morse Nice, 1938-1939.
T. C. Stephens, 1914-1916.	Lawrence E. Hicks, 1940-1941.
W. F. Henninger, 1917.	George Miksch Sutton, 1942-1943.
Myron H. Swenk, 1918-1919.	S. Charles Kendeigh, 1943-1945.
R. M. Strong, 1920-1921.	George Miksch Sutton, 1946-

FIRST VICE-PRESIDENT

C. C. Maxfield, 1893.	Wm. I. Lyon, 1924.
R. M. Strong, 1894.	Thos. H. Whitney, 1925-1928.
Ned Hollister, 1895-1903.	George Miksch Sutton, 1929-1931.
W. L. Dawson, 1904-1905.	Edwin L. Moseley, 1932.
R. L. Baird, 1906-1908.	Josselyn Van Tyne, 1933-1934.
W. E. Saunders, 1909-1911.	Alfred M. Bailey, 1935-1936.
B. H. Swales, 1912-1913.	Mrs. Margaret M. Nice, 1937.
Geo. L. Fordyce, 1914-1919.	Lawrence E. Hicks, 1938-1939.
H. C. Oberholser, 1920-1921.	George Miksch Sutton, 1940-1941.
Dayton Stoner, 1922-1923.	S. Charles Kendeigh, 1942-1943.

Olin S. Pettingill, Jr., 1944-

SECOND VICE-PRESIDENT

Josselyn Van Tyne, 1932.	George Miksch Sutton, 1938-1939.
Alfred M. Bailey, 1933-1934.	S. Charles Kendeigh, 1940-1941.
Mrs. Margaret M. Nice, 1935-1936.	Olin S. Pettingill, Jr., 1942-1943.
Lawrence E. Hicks, 1937.	Harrison F. Lewis, 1944-1946.

Maurice Brooks, 1947-

SECRETARY

Lynds Jones, 1888-1889.	Orpheus M. Schantz, 1914.
J. Warren Jacobs, 1890-1891.	Thos. L. Hankinson, 1915-1916.
Willard N. Clute, 1892.	G. A. Abbott, 1917.
J. Warren Jacobs, 1893.	Albert F. Ganier, 1918-1922.
Wm. B. Caulk, 1894.	Gordon Wilson, 1923-1925.
J. E. Dickinson, 1895-1897.	Howard K. Gloyd, 1926-1928.
W. L. Dawson, 1898-1901.	Jesse M. Shaver, 1929-1931.
John W. Daniel, Jr., 1902-1905.	Lawrence E. Hicks, 1932-1936.
Frank L. Burns, 1906.	Olin S. Pettingill, Jr., 1937-1941.
Benj. T. Gault, 1907-1911.	Maurice Brooks, 1942-1946.
C. W. G. Eifrig, 1912-1913.	James B. Young, 1947-

TREASURER

R. M. Strong, 1892-1893.	Wm. I. Lyon, 1923.
Lynds Jones, 1894-1901.	Ben J. Blincoe, 1924-1926.
F. L. Burns, 1902-1905.	J. W. Stack, 1927-1929.
B. H. Swales, 1906-1908.	W. M. Rosene, 1930-1935.
W. F. Henninger, 1909-1913.	S. E. Perkins, III, 1936-1938.
P. B. Coffin, 1914-1916.	Gustav Swanson, 1939-1942.
Frank M. Phelps, 1917-1919.	Milton B. Trautman, 1943-1945.
Geo. L. Fordyce, 1920-1922.	Burt L. Monroe, 1946-

EDITOR

Lynds Jones, 1888-1900.	Lynds Jones, 1902-1924.
Frank L. Burns, 1901.	T. C. Stephens, 1925-1938.
	Josselyn Van Tyne, 1939-

TO OUR CONTRIBUTORS

Our members are asked to submit articles for publication in the *Bulletin*. Manuscripts will be accepted only with the understanding that they have not previously been published or accepted for publication elsewhere.

MANUSCRIPT. Manuscripts should be typed, with double-spacing and wide margins, on one side of white paper of good quality and of standard size (8½ x 11). The title should be brief and should indicate the subject clearly. Ordinarily the scientific names of the birds treated should be given and should appear early in the article. Most articles should conclude with a brief summary.

BIBLIOGRAPHY. Literature referred to in the text should be cited by author's name, year of publication, and exact page of the particular reference. Such literature should ordinarily be listed in full at the end of the paper.

ILLUSTRATIONS. Photographic prints, to reproduce well as half-tones, should have good contrast and detail. Please send prints unmounted, and attach to each print a brief but adequate legend. Do not write heavily on the backs of photographs.

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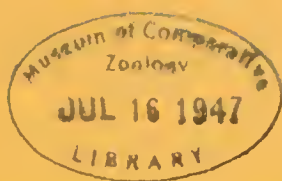
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THE WILSON BULLETIN

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All articles and communications for publication, books and publications for review, exchanges, and claims for lost or undelivered copies of the magazine, should be addressed to the Editor.

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THE WILSON ORNITHOLOGICAL CLUB

Founded December 3, 1888

Named after ALEXANDER WILSON, the first American ornithologist.

President—George M. Sutton, University of Michigan, Ann Arbor, Mich.

First Vice-President—O. S. Pettingill, Jr., Carleton College, Northfield, Minn.

Second Vice-President—Maurice Brooks, West Virginia University, Morgantown.

Treasurer—Burt L. Monroe, Ridge Road, Anchorage, Ky.

Secretary—J. B. Young, 514 Dover Rd., Louisville, Ky.

Editor of *The Wilson Bulletin*—Josselyn Van Tyne.

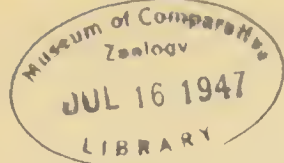
Associate Editors—Margaret M. Nice and F. N. Hamerstrom, Jr.

Assistant Editor—G. Reeves Butchart.

Membership dues per calendar year are: Sustaining, \$5.00; Active, \$3.00; Associate, \$2.00. *The Wilson Bulletin* is sent to all members not in arrears for dues.

WILSON ORNITHOLOGICAL CLUB LIBRARY

The Wilson Ornithological Club Library, housed in the University of Michigan Museum of Zoology, was established in concurrence with the University of Michigan in 1930. Until 1947 the Library was maintained entirely by gifts and bequests of books, pamphlets, reprints, and ornithological magazines from members and friends of the Wilson Ornithological Club. Now two members have generously established a fund for the purchase of new books; members and friends are invited to maintain the fund by regular contributions, thus making available to all Club members the more important new books on ornithology and related subjects. The fund will be administered by the Library Committee, who will be glad of suggestions from members on the choice of new books to be added to the Library. Harold F. Mayfield (2557 Portsmouth Avenue, Toledo, Ohio) is Chairman of the Committee. The Library currently receives 65 periodicals, as gifts, and in exchange for *The Wilson Bulletin*. With the usual exception of rare books in the collection, any item in the Library may be borrowed by members of the Club and will be sent prepaid (by the University of Michigan) to any address in the United States, its possessions, or Canada. Return postage is paid by the borrower. Inquiries and requests by borrowers, as well as gifts of books, pamphlets, reprints, and magazines, should be addressed to "The Wilson Club Library, University of Michigan Museum of Zoology, Ann Arbor, Michigan." Contributions to the New Book Fund should be sent to the Treasurer, Burt L. Monroe, Ridge Road, Anchorage, Kentucky (small sums in stamps are acceptable). A preliminary index of the Library's holdings was printed in the September 1943 issue of *The Wilson Bulletin*, and each September number lists the book titles in the accessions of the current year. A brief report on the recent gifts to the Library is published in every issue of the *Bulletin*.



THE WILSON BULLETIN

A QUARTERLY MAGAZINE OF ORNITHOLOGY

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Mockingbird (Mimus polyglottos) flashing its wings. Photographed by Ralph E. Lawrence at Arlington, Virginia, March 22, 1947.

THE MOCKINGBIRD'S WING-FLASHING *

BY FRANCIS H. ALLEN

A RECENT paper by Dr. Sutton (1946) on wing-flashing in the Mockingbird (*Mimus polyglottos*) interested me especially because I lived on rather intimate terms with a pair of Mockingbirds here in West Roxbury, near Boston, in the season of 1909 and then first witnessed the wing-flashing on my lawn. A male Mockingbird spent the winter of 1908-1909 on and about our place and was joined by a female about April 1. From then on the pair were constantly seen in the neighborhood and frequently fed on our lawn, but it was not till June 6, when they had young in the nest, that I saw the behavior in question. To quote from my notes (June 6, 1909): "I saw for the first time today the curious spreading of the wings by the bird as he hunts his food—or food for his young—on the lawn. The wings are lifted rather deliberately and thrust out from the shoulder, I should say, but are kept at an angle of about 90 degrees. It is a deliberate, not at all a nervous, motion, and I think it may well be for the purpose of flushing insects in the grass by a show of the white areas, as a correspondent of Mrs. Miller's suggests (*In Nesting Time*). My wife had seen the act three or four days ago. This is undoubtedly since the hatching of the young, and the habit may be correlated with the necessity of increased activity in hunting insects."

The four young left the nest June 12, and on June 22 I saw three of them running about on the lawn and feeding. They jetted their tails and acted like full-grown birds, though their tails were still short. The parents were still feeding them. On June 23 I "saw one of the young opening its wings and closing them as it stood on the lawn, after the fashion of the parent bird as described under date of June 6."

The passage from Mrs. Miller ** referred to in my notes reads as follows: "At the end of a run he lifts his wings, opening them wide, displaying their whole breadth, which makes him look like a gigantic butterfly, then instantly lowers his head and runs again, generally picking up something as he stops. A correspondent in South Carolina, familiar with the ways of the bird, suggests that his object is to startle

* We are particularly pleased to publish in connection with this article by Mr. Allen what is, we believe, the first published photograph of a Mockingbird flashing its wings. It is interesting to compare the photograph with the painting by George M. Sutton reproduced in the December 1946 *Bulletin* (Plate 8) and with the painting, apparently the first representation of the wing-flashing behavior, by Roger Tory Peterson, published in *Life* for April 8, 1946, page 74.—Ed.

** Mrs. Harriet Mann Miller, who wrote under the pen name of Olive Thorne Miller, is not so well known to the younger generation of ornithologists as she ought to be, but she was a careful observer and a conscientious recorder of her observations of the intimate life of many American birds.—F.H.A.

the grasshoppers, or, as he expresses it, to 'flush his game.' I watched very closely and could not fix upon any theory more plausible, though it seemed to be weakened by the fact that the nestlings, as mentioned above, did the same thing before they thought of looking for food. The custom is not invariable; sometimes it is done, and sometimes not" (Olive Thorne Miller, 1888:60). The reference to the "nestlings" is explained by an earlier description (p. 52) of the first movement of a young bird on the ground after fluttering out of the nest: "I saw his first movement, which was a hop, and, what surprised and delighted me, accompanied by a peculiar lifting of the wings. . . ." And again (p. 54), of another fledgling: "He raised himself upon his shaky little legs, cried out, and started off exactly as number one had done,—westward, hopping, and lifting his wings at every step."

Dr. Sutton's suggested explanation of the wing-flashing behavior of the Mockingbird is an interesting one and has some good evidence to back it. Perhaps my own observation of a single pair and their young, far beyond the species' normal range, does not justify the doubts I own to, but nevertheless I have them—and for these reasons: (a) The behavior, as I noted at the time, appeared to be a deliberate, not a nervous, motion, such as would be expected if it indicated "wariness, suspicion, distrust." (b) I noticed nothing at the time to suggest that there was any ground for suspicion on the bird's part. (c) Though the pair had haunted our lawn ever since it became a good feeding ground in the spring, it was not till the young were hatched in June that this behavior was seen. (d) The necessity for increased insect-gathering activity after the hatching of the young might well have prompted a change of behavior.

This brings us back to the theory that this behavior is of use in getting food, but I have another suggestion to make on how it may operate. Dr. Joseph Grinnell (1924) showed how the white of the under parts of birds might be useful in lighting up the crevices where food was to be found. And everyone knows how the reflection of light from a sheet of white paper or even the open hand can help to illuminate a dark spot. Why could not the flash of white from the Mockingbird's wings serve that purpose in the grass of a lawn or field? In that way, sluggish prey could be detected and captured, while the more active prey would be startled into betraying themselves by motion. Some of Mrs. Laskey's observations, as reported by Dr. Sutton, seem to show that the wing-flashing was used especially in dark situations and when the bird was scrutinizing its surroundings carefully—that is, in circumstances where additional light would be of service.

The young bird that I saw flashing was of an age to feed itself and may have acquired the habit through imitation of its parents, but the behavior, whatever end it may serve, is more probably instinctive.

LITERATURE CITED

GRINNELL, J.

1924 A possible function of the whiteness of the breast in crevice-searching birds. *Condor*, 26:32-33.

MILLER, OLIVE THORNE

1888 In nesting time. Houghton, Mifflin and Co., Cambridge.

SUTTON, GEORGE MIKSCH

1946 Wing-flashing in the Mockingbird. *Wils. Bull.*, 58:206-209, pl. 8.

215 LA GRANGE STREET, WEST ROXBURY 32, MASSACHUSETTS

THE SNOWY OWL MIGRATION OF 1945-46

SECOND REPORT OF THE SNOWY OWL COMMITTEE

PREPARED BY L. L. SNYDER

THE Committee's procedure in gathering data on the flight of Snowy Owls (*Nyctea scandiaca*) in the winter of 1945-46 has been essentially the same as that described in its first report, *The Snowy Owl Migration of 1941-42* (1943. *Wils. Bull.*, 55:8-10). The Committee submitted the following questions to cooperators: *When were Snowy Owls first noted in your area during the current autumn and winter? At what period were they most plentiful? What was the total number of owls noted? How many were known to have been killed?* Literally thousands of people, directly or indirectly, contributed to this report, and the Committee takes this opportunity to thank them for their interest and aid. Certain changes in the Committee's personnel have taken place since our first report. The list of members is as follows: *British Columbia*, J. A. Munro, Okanagan, B. C.; *Prairie Provinces*, B. W. Cartwright, 201 Bank of Commerce Chambers, Winnipeg, Manitoba; J. D. Soper; *Ontario*, L. L. Snyder (Chairman), Royal Ontario Museum, Toronto; T. M. Shortt; O. H. Hewitt; *Quebec*, V. C. Wynne-Edwards (now resigned); *Maritime Provinces*, R. W. Tufts, Wolfville, N. S.; *Newfoundland*, H. S. Peters, 54 Folly Rd., Charleston, S. C.; *New England States* (and, tentatively, *Pennsylvania*), A. O. Gross, Bowdoin College, Brunswick, Maine; *Washington, D. C., region*, F. C. Lincoln, Fish and Wildlife Service, Washington, D. C.; *New York State*, G. M. Meade, Trudeau Sanatorium, Trudeau, N. Y.; *Ohio*, L. E. Hicks, Ohio State University, Columbus, Ohio; *Michigan*, C. T. Black, Dept. of Conservation, Lansing; J. Van Tyne; *Central, Western and Northwestern States*, O. S. Pettingill, Jr., Carleton College, Northfield, Minn.

Observers are invited to assist in future surveys by forwarding records to the geographically appropriate committee member. It will be apparent from the list that some sections of the continent are unrepresented or inadequately represented on the Committee; volunteers to organize future surveys in each of several political areas are needed, for example, in Quebec, New Jersey, Pennsylvania, Indiana, Illinois, Wisconsin, the Dakotas, and States of the Northwest.

It is the Committee's object to report briefly on periodic major flights of Snowy Owls from the Arctic to southern, settled parts of the continent. Following the major flight of 1941-42, there was a small flight in the east in the fall and winter of 1942-43; as during the 1941-42 flight, occurrence in the west seemed to be the normal invasion by the species of the Prairie Provinces which takes place prac-

tically every fall and winter. (These facts were determined through routine channels, the Committee taking no collective action that year to gather data through questionnaires.)

Presumably the basic condition for any flight in the east, or a major influx in the west, is an unbalance in the Arctic between the Snowy Owl population and its food supply. It is to be expected that a second migration will occur in the succeeding year if unbalance still exists. The second flight of two in annual sequence would involve fewer owls if their population had suffered depletion, or if a partial correction of unbalance in the owl-food relationship had occurred in the Arctic.

TIMING AND VELOCITY OF THE 1945-46 FLIGHT

It became evident early in the autumn of 1945 that Snowy Owls were invading settled parts of eastern North America and that a heavy influx was a probability in the west. Consequently, the Committee began gathering data on the flight. Records were sought throughout the transcontinental area over which previous flights were known to have spread. Our organization is obviously imperfect and the results of its work correspondingly so. We can be sure that proportionately more owls are observed in areas where there are more observers, and that some areas are inadequately surveyed. But general knowledge makes possible an approach to correct evaluation of regional reports.

The earliest reported occurrence of a migrant Snowy Owl in the autumn of 1945 came from the eastern part of the continent, namely Kezar Falls, Maine, on September 15. Incidentally, this appears to be the earliest (seasonal) occurrence in the history of Snowy Owl flights in New England. The next record was for September 20, at Stratton, Maine. Additional September records (without exact dates) came from Clova, southern Quebec; Biscotasing, central Ontario; and Thesalon (on the North Channel of Lake Huron), Algoma District, Ontario. Other first occurrences in the east that demonstrate the progressive spread of forerunners of the flight are: Manitou Island (in Lake Superior, off Keweenaw Point), Michigan, October 1; East Saugatuck, southwestern Michigan, "early October"; Sioux Lookout, western Ontario, October 9; Winthrop, Massachusetts, October 10; Two Creeks, Wisconsin, "early October"; northern counties of New York, October 20; Monroe County, southeastern Michigan, October 23; northern Ohio, October 30.

Forerunners of the flight in settled parts of the west were recorded on later dates than in the east. First occurrences reported are as follows: Lenore, southern Manitoba, October 4; Weyburn, southeastern Saskatchewan, October 4; Calgary, southern Alberta, October 9; Bottineau, North Dakota, October 14.

Over a period, varying with the district, from six weeks to more than two months, there was a gradual increase in the number of re-



Map 1. Snowy Owl flight of 1945-46.

gional first-appearance reports and in the number of owls observed within each of the several sub-regions, both eastern and western. Estimates of peak periods in the sub-regions are as follows: Maine, last week of November; Massachusetts, first week of December; southern Quebec, late November; New York State, first week of December; central Ontario, mid-November; southern Ontario, late November to early December; northern Michigan, mid-November; southern Michigan, early December; Minnesota, latter half of November; southern Manitoba, late December; southern Saskatchewan, late December; southern Alberta, late December.

The limits of the flight of 1945-46, reached in the form of spurs, or outlying "islands," were as follows: one, Charleston, South Carolina, January 24; one, Lawrence County, Ohio (no date); one, Ripley County, Indiana (no date); one, Clay County, Illinois (January?); one, near Springfield, Illinois, January 27; one, Hancock County, Illinois, December 16; one, Ottumwa, Iowa, February 22; one, 18 miles southwest of Hastings, Nebraska, February 17; and occurrences (particulars unknown) in southwestern Montana (mid-November), southeastern Washington (November 30), and northwestern Oregon (mid-

November). A number of reports of Snowy Owls boarding ships at sea were received; one such occurrence was "320 miles off Newfoundland."

NUMBERS AND MORTALITY

The migration of 1945-46 may have involved more owls than any flight on record. Gross (1927. *Auk* 44:479-493) reported a total of 2,363 owls for 21 States during the great flight of 1926-27. The Committee's total for the same 21 States during the 1945-46 flight is 7,280. However, we cannot be certain that the 1945-46 flight actually involved approximately three times as many owls as the 1926-27 flight, since the compilation of records for the earlier flight was a one-man effort.

The grand total of Snowy Owl occurrences compiled by the Committee for the 1945-46 flight is 14,409, of which 4,475 were reported killed. In all probability the mortality would be considerably higher than the approximate one-out-of-three ratio indicated, since an owl killed is automatically removed from further tallying, but a live owl may be counted more than once. The highest mortality record came from New York State, where 839 owls were killed out of 1,104 reported, or approximately three out of four. But here again no great stress should be placed on the figures, since the compilation of records in New York State rested largely on reports from taxidermists. Further, it appeared from the reports to the Committee that a smaller proportion of owls are killed in the west than in the east.

Perhaps the most that can be said on the basis of our statistics is that the destruction of Snowy Owls on this flight, as in previous flights, was heavy. Since the history of Snowy Owl flights suggests that the species has been repeatedly subjected to heavy destruction while wintering in southern latitudes, and yet the last flight appears to be the largest on record, it is obvious that the Snowy Owl population can withstand such treatment.

DIRECTION OF FLIGHT AND DISTRIBUTION

The main source of the migrating owls was again apparently the eastern Arctic, from the Boothia Peninsula through Baffin Island and the northern portion of Ungava. Practically all of the Hudson's Bay Company representatives at posts in this region noted an increase in Snowy Owls in their 1944-45 reports and a reduction (an exodus) in their November 1945 reports. There was but slight indication of increase in numbers at this period in the western Arctic, on western Victoria Island, and at the western end of Coronation Gulf.

In general, the flight fanned out from its source in the Arctic but moved progressively southward and westward. Reports from local

observers in eastern North America concerning the direction of flight add detail to the picture. Owls entered Newfoundland at the extreme north; their point of entry into the Maritime Provinces was at Tignish, Prince County, Prince Edward Island; they appeared to move from the east southwestward in Quebec along the St. Lawrence, though obviously some moved south through the interior of that Province; a line of flight seemed apparent from James Bay southward in Ontario; the major points of entry into Michigan appeared to be Chippewa County in the north, Saginaw Bay and the Port Huron-Detroit region in the east; the invasion entered Ohio from the north, west of Lake Erie, and New York State from the St. Lawrence River region (Jefferson, St. Lawrence, and Clinton counties).

In the west, no such clear lines of flight were apparent. A single report from Baker Lake in Northwest Territories states that large numbers of Snowy Owls passed through there "early in November" (indicated by a single arrow on the accompanying map). The invasion of the northern prairies was apparently on a wide front. The Committee's data do not suggest either source or direction of the flight in British Columbia or the northwestern States.

The 1945-46 pattern of concentration-areas in the east is essentially the same as that in 1941-42 though salients will be evident if the maps of the two flights are compared. The limits of dispersal of the 1945-46 flight are considerably farther south than in 1941-42, and the flight involved the west. (Since only the normal influx was evident in the west during the fall and winter of 1941-42, that region was omitted from the Committee's first report and map.) The map for 1945-46 shows a true scattering of the flight on the northern prairies in contrast with the concentration in the east between the great forested areas and along inland shores, valleys, the Great Lakes, and the sea coast. Since Snowy Owls frequent open cultivated farmland, forest clearings, barrens, and shore areas, the concentration and scatter areas shown on the map are probably real, not a reflection of the distribution of observers.

Since the numerically larger flight of 1945-46 produced occurrences much farther from the source than any reported in 1941-42 and since the flight involved the west as well as the east, there would appear to be a correlation between the number of owls, the distance they will travel, and the geographical area over which they will spread.

ROYAL ONTARIO MUSEUM OF ZOOLOGY, TORONTO

THE REARING OF A COWBIRD BY ACADIAN FLYCATCHERS¹

BY ALFRED E. BRANDT

WHILE assisting Dr. George M. Sutton with his study of the nesting birds of the Edwin S. George Reserve (a 1,300-acre tract near Pinckney, Livingston County, southeastern Michigan), I discovered on June 22, 1946, the newly finished nest of a pair of Acadian Flycatchers (*Empidonax virescens*). I visited the nest repeatedly from June 22 to July 22, and observed the rearing of the brood, a single Cowbird (*Molothrus ater*).

Despite Bendire's (1895:304) statement that the Cowbird "imposes occasionally" on the Acadian Flycatcher; Evermann's (1889:23) statement that the Acadian Flycatcher is "one of the most frequent victims of the Cowbird" in Carroll County, Indiana; and Jacobs' (1924:53) record of 12 parasitized Acadian Flycatcher nests in southwestern Pennsylvania, I find no published account of the history of a parasitized Acadian Flycatcher nest and no definite record of the fledging of a young Cowbird by Acadian Flycatcher parents. Friedmann (1929:209) stated that he knew "but few definite" records of parasitism of the Acadian Flycatcher by the Cowbird.

The Flycatchers' nest-territory was in the Reserve's most extensive woodland—a uniform 130-acre stretch of oak-hickory forest known as the Big Woods. My attention was first attracted to the birds while Dr. Sutton and I were watching Cerulean Warblers at their nest from about 3:30 to 4:30 p.m. on June 22. During that hour, the Flycatchers called almost constantly, their cries coming from a dry kettle hole near us with a low ridge and open leatherleaf bog ("Buck Hollow") beyond it. Stationing myself in a well concealed spot, I watched the birds with my binocular, hoping that they would lead me to their nest.

The territory was much like three other Acadian Flycatcher territories that Dr. Sutton and I had found elsewhere in the Big Woods. Tall oaks and hickories darkly shaded the heavy under-story of witch hazel (*Hamamelis virginiana*) and sassafras (*Sassafras albidum*). The ground was thickly covered with dry leaves, and where the shadows were deepest, luxuriant stands of maiden-hair fern (*Adiantum pedatum*) grew. The area in general was shared by several pairs of nesting birds—Cerulean Warblers (*Dendroica cerulea*), Red-eyed Vireos (*Vireo olivaceus*), and Eastern Wood Pewees (*Myiochanes virens*). In the distance I could hear Scarlet Tanagers, Oven-birds, and Yellow-throated Vireos singing; from the other side of the kettle, a Yellow-billed Cuckoo continually clucked. Occasionally a Ruby-throated Hummingbird buzzed through the small openings in the woods, and I saw a female

¹ I wish to thank Dr. F. N. Hamerstrom, Jr., Curator of the Edwin S. George Reserve, for reading and criticizing this manuscript.

Cowbird accompanied by several males moving through the taller trees. Mosquitoes were abundant and caused me much discomfort as I tried to maintain a motionless position on the ground. The Acadian Flycatchers continued to call as they moved among the shadows from one low tree to another. Their call was usually a *peet*, with an occasional explosive *kit-a-rup*. Suddenly one of them darted onto what appeared to be a bit of hanging debris, but which proved to be a nest.

The body of the nest was composed of dried plant stems, held together by cobwebs. It was swung across an 80-degree fork at the end of one of the longer horizontal branches of a witch hazel. An eight-inch strand of entwined cobwebs with entangled flowers of oak or hickory hung from the rim. So flimsy and so loosely woven was the structure that I could easily see the tree-tops as I looked upward through the bottom. It appeared to be completed and ready for eggs. As I left the spot, one of the Flycatchers returned to the nest.

When Dr. Sutton visited the nest at 5:25 a.m., June 25, there was one egg. One egg was in the nest when he examined it an hour later.

On June 27, Dr. Sutton found two eggs in the nest at 6:10 a.m. When I went to the kettle hole at 11:20 the same morning, a Flycatcher (presumably the female) was on the nest. When I came within 30 feet it flew to a near-by sassafras sapling, whence it called excitedly. Its mate was near by, also calling. There were then three eggs. The third had been laid in the four-hour interval.

When I approached on June 29, at 6:30 a.m., a Flycatcher was on the nest. When it left, I found one Cowbird egg and one Flycatcher egg. Searching the ground below the nest, I found the two missing Flycatcher eggs—one broken in half, the other intact. There was no indication that either had been punctured by the Cowbird's bill (see Hann, 1941: 219). Both were heavily wreathed at the larger end with reddish brown splotches and dots; that remaining in the nest, curiously enough, was almost immaculate. The two eggs in the nest offered a striking contrast—the large Cowbird egg heavily spotted, the much smaller and differently shaped Flycatcher egg virtually unmarked. Both Flycatchers were nearby. As I withdrew, one of them flew to the nest.

Dr. Sutton visited the kettle hole on July 1, finding one Cowbird egg and one Flycatcher egg in the nest.

On July 12 I found both eggs hatched. Presumably they had hatched two days or so previously, the incubation period, as reported by Harold M. Holland, being 13 days (see Bent, 1942:190). The young Flycatcher was covered above with whitish-gray down. The Cowbird, which appeared to be three times as large as its fellow, was covered with blackish-gray down. The eyes of both birds were closed. The mouth lining of the Flycatcher was straw yellow, that of the Cowbird, dull pinkish-red. The Cowbird occupied far more than half of the nest space. With head resting on the rim, and bill pointed upward, it was able to lift its head for food far higher than its companion could. The



Figure 1. Acadian Flycatcher brooding young Cowbird.



Figure 2. Acadian Flycatcher nest after the young Cowbird had fallen through. (Photographed from directly above.)

Flycatcher, crowded as it was against the nest wall, squirmed constantly, raising its head and opening its mouth from time to time. I was careful not to touch the nest or supporting branch, but the Flycatcher's behavior may have been in response to sounds I had made in approaching, or perhaps to my shadow falling over the nest. In any event, it seemed to indicate that the bird was hungry.

On the morning of July 13, the Cowbird was the sole occupant of the nest. It appeared to have doubled in size and now almost filled the nest. Though I made careful search among the leaves on the ground below the nest, I could find no trace of the young Flycatcher. I concealed myself in a blind four feet from the nest and watched the feeding and brooding of the young Cowbird for about two hours.

I noted that only one of the Flycatchers brought food to the nestling; its mate was near by but never approached the nest. The one Flycatcher, presumably the female, made trips to the nest every three or four minutes, carrying what appeared to be mosquitoes and other tiny insects in its bill. Each time after feeding the Cowbird, it stood on the edge a few seconds, uttering soft peeping noises and spreading its belly feathers, then moved forward to brood. The Cowbird invariably struggled, forcing the Flycatcher up and down in the nest until it freed its head. When its head lay on the rim of the nest, it ceased struggling (Figure 1). After brooding for one or two minutes, the Flycatcher left.

On July 19, I found a gaping ragged hole in the nest bottom (Figure 2). The Cowbird was on the ground directly below. Presumably the big heavy-footed nestling, then about nine days old, had caused the bottom of the nest to give way and had fallen to the ground. As far as I could determine, it was not injured by the fall, and when I touched it, it fluttered rather helplessly, moving about eight inches. Both Flycatchers were calling excitedly, but neither of them approached the Cowbird closer than 15 feet during the time I was at the nest.

On July 20 I could not at first find the Cowbird. After a careful search I found it almost completely hidden among the dry leaves and other litter. So well did the depression conform to the size of the bird and so closely did the leaves form around it, that it appeared to be sitting in a nest. So well concealed was it that I could not see it from a greater distance than five feet.

On the following day, July 21, the Cowbird occupied the same spot. When I touched its back with a twig, it fluttered over the ground a distance of 10 feet, finally dropping among the leaves. I caught it and placed it back in the depression, where it nestled down and remained motionless. It seemed in good health, and its more vigorous attempt to escape indicated that it was much stronger than it had been the day before. Obviously it had been fed by one or both of the Flycatchers, which had adapted themselves to feeding it on the ground. I watched the Cowbird from a short distance in the hope that I might see it fed. Though I did see one of the Flycatchers approach it within four feet,

and I could hear the Cowbird calling, I did not see any actual feeding taking place. Possibly I was too close, for at the slightest movement of the canvas which I had wrapped around me, the Flycatcher would withdraw immediately, fly to the witch hazel and call excitedly.

When I returned in mid-afternoon on July 22, the Cowbird was gone from the depression. The Flycatchers were calling from the eastern lower edge of the kettle hole about 75 yards away. I searched the area about the nest but could not find the Cowbird. Since neither of the Flycatchers returned to the nest, I walked toward them, believing that the young Cowbird might be there. The Flycatchers did not move about much, but they continued to call; I did not during the hour I was there see food in the mouth of either bird, nor did I see one of them go to the ground. I did not see the Cowbird again. The Flycatchers continued to inhabit the kettle hole. Dr. Sutton saw them there as late as August 16.

SUMMARY

On or about June 22, 1946, a pair of Acadian Flycatchers (*Empidonax virescens*) completed their nest at the Edwin S. George Reserve, southeastern Michigan.

On June 27 the nest contained three Flycatcher eggs; on June 29, one Flycatcher egg and one Cowbird (*Molothrus ater*) egg; on July 12, a young Flycatcher and a young Cowbird; on July 13, only the young Cowbird.

The young Cowbird was fed and brooded by one of the Flycatchers on July 13.

On July 19 the Cowbird was on the ground below the nest, having apparently fallen through the bottom of the nest.

The Cowbird remained on the ground, nestled in a depression in the leaves for two and a half days. It was apparently fed by the Flycatchers, since it remained in excellent condition.

On July 22 the Cowbird had disappeared, and the Flycatchers were calling about 75 yards away from the nest.

LITERATURE CITED

- BENDIRE, CHARLES
1895 Life histories of North American birds, from the parrots to the grackles. *U.S. Natl. Mus. Spec. Bull.* 3.
- BENT, ARTHUR CLEVELAND
1942 Life histories of North American flycatchers, larks, swallows, and their allies. *U.S. Natl. Mus. Bull.* 179.
- EVERMANN, BARTON WARREN
1889 Birds of Carroll County, Indiana. *Auk*, 6:22-30.
- FRIEDMANN, HERBERT
1929 The cowbirds. Charles C. Thomas, Springfield, Ill.
- HANN, HARRY W.
1941 The Cowbird at the nest. *Wils. Bull.*, 53:211-221.
- JACOBS, JOSEPH WARREN
1924 The other egg in the nest. *Ool.*, 41:52-54.
- FOREST HOME, ITHACA, NEW YORK

THE COWBIRDS OF PRESTON FRITH

BY RUSSELL T. NORRIS

THE Preston Laboratory Grounds, comprising about 90 acres, and lying three miles due west of the city of Butler, Pennsylvania, are surrounded by a high fence intended to keep out dogs, grazing animals, and the like, for which reason the area is referred to briefly as "the Frith" or "Preston Frith."*

The bird population has been under observation, so far as wartime conditions permitted, for some years past, but information prior to 1943 is fragmentary and—so far as Cowbirds are concerned—negligible before 1944. Our principal interest in the bird population as a whole concerned the effects of encroaching civilization on a rural environment (Norris and Preston, MSS), and the effects of protecting the area by the fence. Although there was originally no intention to study in detail any particular species, it seemed desirable to take especial note of the Cowbird, since it stands in a category of its own by reason of its parasitic habits and may thereby affect other species in a particularly direct and determinable manner.

Nearly all the observations before sunrise I made jointly with Hal H. Harrison; most of the other field observations I made alone, though some nests with Cowbird eggs were found by Harrison, Dr. F. W. Preston, and Miss Janet Mathison. The investigation was supervised and financed by Dr. Preston of the Preston Laboratories. His suggestions and criticisms, both in the field work and in preparing the manuscript, were most helpful. Most of the observations were made in the Frith itself, only a few outside it.

About half (43 acres) of the Frith is wooded, a large part of the forest area being second-growth oak-hickory. There are smaller areas of recent cuttings, bottomland hardwoods, and aspen. There are 27 acres of old fields rapidly going back to bush, and 12 acres of grassland, all planted to rye grass. The remaining acreage is made up of fencerows, roads, parking areas, lawns, and water areas. A stream divides the Frith into two unequal portions, and a spring run has been dammed to create a small pond of about one half acre. There is a great deal of edge created by the many roads and pathways through the Frith (Figure 1).

Most of the area is part of a farm which has been very little cultivated since 1900. Since 1939 the Frith has been surrounded by a nine-foot fence which excludes dogs, domestic stock, and deer, but

* *Frith*—"Peace, freedom from molestation, protection. . . . A game preserve, deer park. . . . A wood of some kind, or wooded country collectively. . . . A piece of land grown sparsely with trees or with underwood only. . . . A space between woods; unused pasture land."—Oxford English Dictionary.

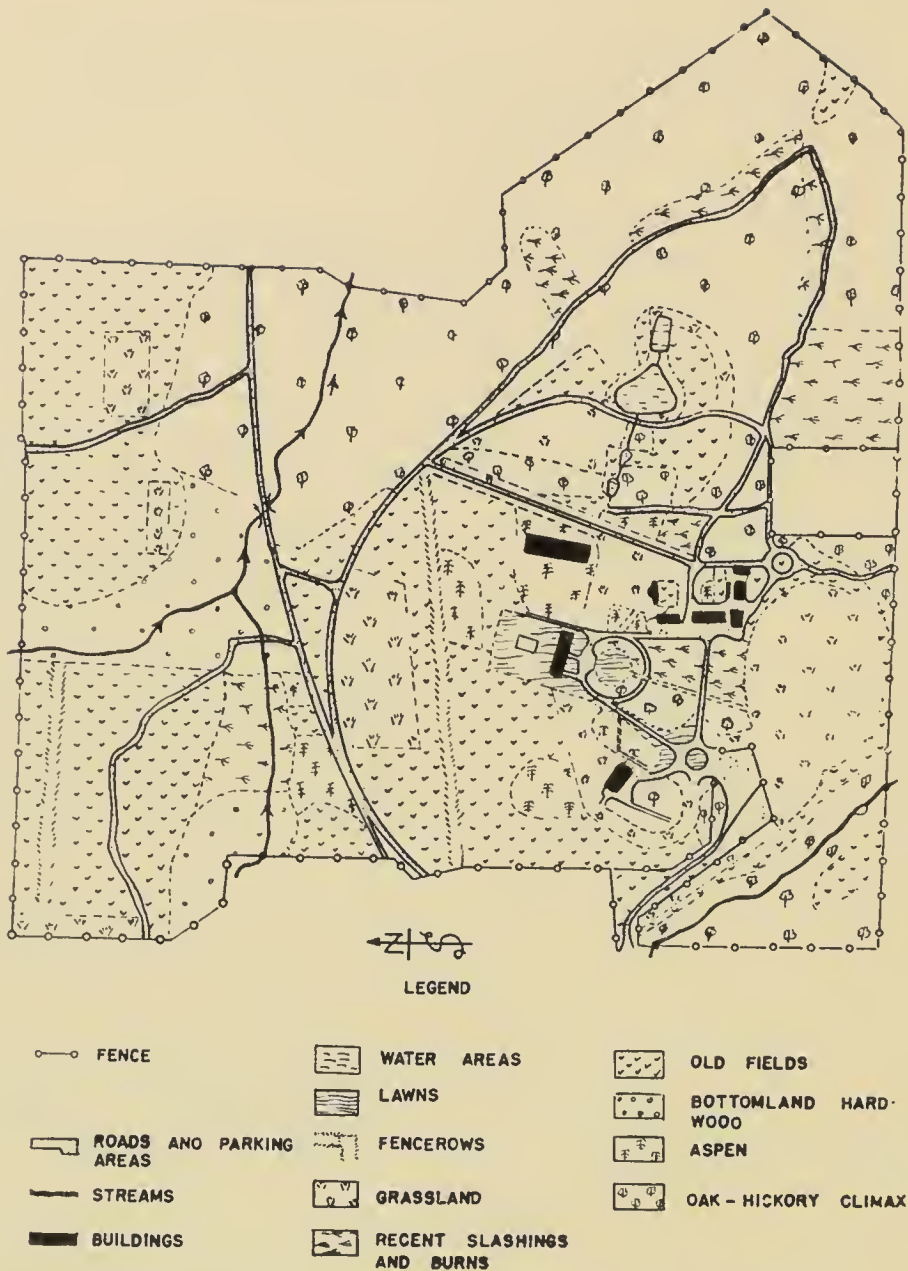


Figure 1. Cover-type map of Preston Frith. Type-boundaries are indicated with dotted lines.

does not exclude feral house cats or wild predators such as raccoons and skunks; house cats were eliminated when possible, but no effort was made to control the natural predators of bird life.

COWBIRD POPULATION

The breeding bird population of the Frith, which will be discussed more fully in another paper, was very high—probably greater than that of any similar area reported in the literature, and certainly denser than that of the surrounding countryside. The population of Cowbirds (*Molothrus ater*) also seemed definitely higher than in most of western Pennsylvania.

The Cowbirds usually arrived at the Frith during the last week of March, the males preceding the females by a few days. The month of March 1945 was unseasonably warm, and most of the migrants arrived early; male Cowbirds arrived March 15, females March 24. The following week, Cowbirds were conspicuous everywhere. The males were chasing and courting the females continually.

During the breeding season in the Frith the male Cowbirds probably outnumbered the females but not by a large margin. On June 14, 1944, at 7:00 p.m., I noticed a flock of Cowbirds feeding in a newly harrowed and sown buckwheat field about a mile from the Frith, and I counted them with the aid of field glasses. There were slightly more than 100 adult birds in the flock, of which only 4 were females. This is the only time I have seen a flock in the breeding season composed largely of one sex. At the Frith, a mile away, egg-laying was still going on, and the birds were in small groups. Since Cowbirds have not readily entered my banding traps, no exact indication of their numbers in the Frith is available. In 1944 three females were banded, two on April 28, one on May 3. (Their weights were 36.6, 39.6, and 40.6 grams respectively.) In 1945 one male (April 24) and two females (April 28) were trapped, one of which was a return. (Their weights were 45.8, 39.0, and 38.4 grams respectively.) None of these banded individuals was ever observed in the field. From the egg-laying dates and continual observation it appears that there were about 6 female Cowbirds active in the Frith in 1944 and about 10 in 1945. These estimates are conservative, and more definite data might raise them slightly.

During March, April, and the early part of May, Cowbirds were never seen in the wooded areas of the Frith. They confined their activities to the fields and open country, where they became a serious factor in the economy of the Song Sparrow (*Melospiza melodia*), Red-eyed Towhee (*Pipilo erythrophthalmus*), Cardinal (*Richmondia cardinalis*) and (to a lesser extent) of the Field Sparrow (*Spizella pusilla*). About May 15, when the Oven-bird (*Seiurus aurocapillus*), Red-eyed Vireo (*Vireo olivaceus*), Veery (*Hylocichla fuscescens*), Scarlet Tanager (*Piranga olivacea*), and Wood Thrush (*Hylocichla mustelina*) began to build their nests, the Cowbirds seemed to move into the wooded areas. They continued to parasitize some nests in the fields, but most of the late eggs, from May 15 to the end of the laying season, were deposited in nests of woodland birds. In addition to the birds just mentioned, the following were also parasitized in the Frith: Brown Thrasher (*Toxostoma rufum*), Catbird (*Dumetella carolinensis*), Yellow-throat (*Geothlypis trichas*), Chestnut-sided Warbler (*Dendroica pensylvanica*), Indigo Bunting (*Passerina cyanea*), and Chipping Sparrow (*Spizella passerina*).

Cowbirds were seen frequently from the time of their vernal appearance until June 15. During the latter half of June their number

gradually dwindled, but they were observed in the Frith for another month; in fact, egg-laying continued, though at a reduced rate, until almost mid-July. After July 10, Cowbirds were not seen in the Frith until the last half of September or early October; nor did they become common even then. On October 6, 1944, a lone female was observed in the Frith, and on September 24, 1945, I noticed a small flock of Cowbirds near the Frith. There were about a dozen birds, roughly two-thirds males. The males seemed to be chasing the females much as they do shortly after they arrive in spring. They would fly from one tree-top to another, the males giving the flight whistle and the females rattling as they do while courting. I have not observed this in the fall on any other occasion.

TABLE 1

COWBIRD EGG-LAYING AND HATCHING DATES, PRESTON FRITH

Laying		Hatching		Laying		Hatching	
1944	1945	1944	1945	1944	1945	1944	1945
April 10	1			May 26	3		
11	1			27	2		
16	1			28	1		
17	1			29	1		
18	1			30	2		
19	1			31	2		
20	1			June 1	3	1	1
21	3			2	4		1
22	1			3	2		1
24			1	4	1		4
27	1			6		1	
May 1	2		1	7		1	1
2	1		1	8	2		3
4	1		1	9	2	1	2
5	1			10	3		1
7	2	1		11	2		
8	1			12	1		
9	2	1		14	1		
10	1			17		1	1
11	1			18	1		
12	1			21			1
13	1	1		23			1
14	2			24	1		
15			3	25	1		
17	1			26	2		1
18	1	1		27			1
19	1	2		28	1		
20	1	2	1	29	1		
21	1	1		30	2		
22	2	2	2	July 1	1		
23	1	2		11	1	1	1
24	3		2	12	1		
25	1	2	1				

Totals: Eggs laid in 1944, 21*; in 1945, 81. Eggs hatched in 1944, 12; in 1945, 30.

* Six 1944 egg-laying dates unknown.

EGG-LAYING HABITS OF THE COWBIRD

The laying season of the Cowbird in the Frith extended from the middle of April to the middle of July, about three months. Table 1 lists the egg-laying dates, and Figure 2 shows graphically their distribution. The crest of the laying season comes late in May.

The exceptionally long laying season suggests that Cowbird eggs are laid in clutches. Friedmann (1929:182) had some evidence that clutches consist of four or five eggs laid on successive days, but Rand's observation (Friedmann, 1929:184) of the captive female that laid 13 eggs in 14 successive days does not agree with this. Nice (1937:155, 163) believed that the Cowbirds in her study area in Columbus, Ohio, laid three or four "sets" of eggs with intervals of 6 to perhaps 12 days between them. She also made a guess that Cowbirds and Song Sparrows laid about the same number of eggs each. In a recent letter she expressed a belief that Cowbirds probably lay 16 eggs in a season.

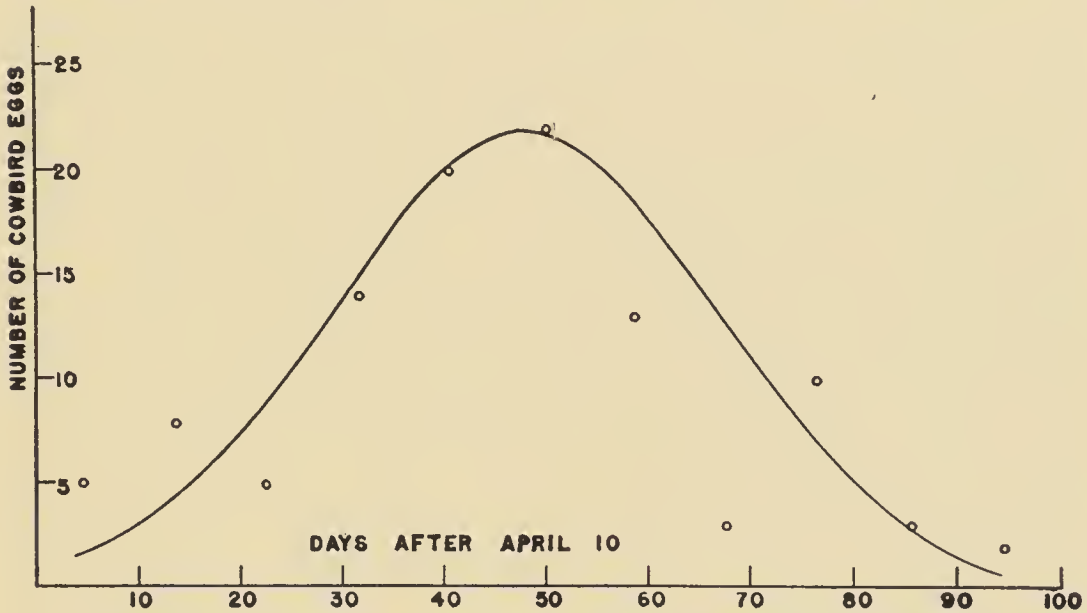


Figure 2. The Cowbird's laying season, Preston Frith, 1944-1945.

Hann (1937:207) believed from his studies of Cowbird parasitism at Oven-bird nests in Michigan that each female laid about 8 eggs, but he reported Hicks' opinion that the female Cowbird lays as many as 16 eggs in a season. Very rough estimates based on our observations in the Frith during 1944 and 1945 led me to believe that the Cowbird lays at least 14 eggs in a season.

Hann (1937:201) stated that the female Cowbird finds Oven-birds' nests by watching the females build. On several occasions I have seen female Cowbirds perched motionless and watching nest-building intently, but I did not later find Cowbird eggs in the nests which I thought were being observed. (It is possible that the bird in each instance was watching another nest near by.) Apparently Cowbirds

spend considerable time inspecting and visiting nests for reasons difficult or impossible to determine. While watching a Robin (*Turdus migratorius*) building on April 13, 1945, I saw a female Cowbird alight in the nest tree, hop down to within six inches of the nest and peer into it. Then the female Robin returned, and the Cowbird flew away. The Robin did not seem perturbed at the presence of the parasite. This occurred at 6:00 a.m.; about a half hour later, three female Cowbirds alighted in the nest tree while the female Robin was moulding the nest. The Robin paid no attention to them. At 8:10 a.m., a female Cowbird again alighted in the nest tree. The female Robin was away from the nest gathering material. The Cowbird deliberately walked to the nest, hopped in, and settled down. She turned her head in every direction, and then the female Robin arrived. The Cowbird left hurriedly, but the Robin did not chase her or seem disturbed at her presence. The nest was well formed at this time, but the inside was not lined and the mud was very wet.

This same nest was the scene of another Cowbird observation on May 2. On May 1, I had noticed that three of the four Robin eggs, which had been incubated about a week, had tiny holes in the shell resembling pin pricks. They would not have been noticed except for a whitish area around them. The holes occurred in irregular numbers and positions on the eggs and hence did not look like claw marks. Under a hand lens, the holes appeared to be crescent-shaped; they could have been caused by taps of a bird's mandibles. Within a few days of this date, holes of this type appeared in the eggs of three near-by Robin's nests. Early on May 2 the three eggs that had been punctured in the first-mentioned nest were gone, but the Robin continued to incubate the remaining egg. At 9:00 a.m., while the Robin was off the nest feeding, a pair of Cowbirds flew into the nest tree. The male perched about 20 feet from the nest while the female walked directly down a limb to the nest and looked inside. At that moment both birds were accidentally frightened off by a workman. On May 3 the last egg was gone from the nest. House Wrens (*Troglodytes aëdon*) had not yet arrived in the Frith, so the tiny holes cannot be blamed on this species. When Blue Jays (*Cyanocitta cristata*) destroy Robin's nests, they leave large holes in the eggs or carry them away completely. Two female Cowbirds that were held captive in the Frith were each given on the second day a Robin's nest containing two eggs. On the third day all four eggs had been punctured, but the holes were large (the eggs were left in the nests and the contents not eaten). The interest that Cowbirds showed in the Robin's nest mentioned above suggests that they may have been responsible for the tiny holes in the Robins' eggs in that vicinity, but there seems no good reason for this type of destruction. The eggs were not eaten, and the nests were not parasitized (so far as we know) after the damage was done.

On June 14, 1945, I watched the nest of a Cerulean Warbler (*Dendroica cerulea*) for more than 10 minutes, and the female, who had been incubating for about 10 days and rarely left the nest for more than a few minutes, did not return. The male was singing near the nest, which was 45 feet above the ground near the end of a limb. At 9:55 a.m., a female Cowbird flew swiftly down the valley and went directly to the nest tree. She immediately walked up the limb to the nest as if she had been there before. She hopped onto the rim of the nest, stepped in, and settled down. In a few seconds she flew away sputtering. Neither male nor female Warbler seemed perturbed at this, and I decided to investigate. Upon climbing the tree, I found that only one egg of the Warblers remained, and this had been punctured, apparently by a bird's mandibles.

During 1944 and 1945 in the Frith, 45 parasitized nests contained but a single Cowbird egg each, 21 contained two Cowbird eggs, and 7 contained three (Table 2). Hann (1941:220) believed that the Cowbird laid but one egg in a nest unless nests were scarce. However, certainly nests were not scarce in the Frith, and 38 per cent of the parasitized nests contained more than one Cowbird egg (for an extreme example, see Figure 3). When nests were found that contained two or three Cowbird eggs, an effort was made to determine whether they were the product of one or several females. If we may judge from egg type, two nests that each contained three Cowbird eggs were each parasitized by three females; one nest that contained three Cowbird eggs was parasitized by two; three nests that each contained two Cowbird eggs were each parasitized by two females.

The measurements of 17 Cowbird eggs in the Frith ranged from 24.5 x 17.3 mm. and 23.2 x 18.3 mm. to 21.1 x 16.0 mm., averaging 22.5 x 17.1 mm. Weights of the 17 eggs ranged from 3.50 to 2.00 grams, averaging 2.95 grams.

THE COWBIRD AT THE NEST

In attempting to photograph the Cowbird at the nest, we found it necessary to acquaint ourselves with the routine of Cowbird egg-laying. Hann (1941:220) found that Cowbirds usually lay their eggs at dawn; that they usually lay during the egg-laying period of the host; and that parasitized nests regularly have one or more eggs removed by the Cowbird; but we found that the behavior of the female Cowbird was different at the nests of different species.

Our five observations of the Cowbird at the nest for the purpose of laying were all at dawn, or at any rate before sunrise. They are given in Table 3 with the times of sunrise, weather conditions, and the dates. The times given in each case are in Eastern Standard Time, and they refer to the exact moment the Cowbird was first seen about the nest.

From the figures in Table 3, the differences in time of arrival at the nests in open fields and at those in the woodland appear to be

TABLE 2
THE COWBIRD IN RELATION TO ITS HOSTS, PRESTON FRITH, 1944-45

Species	Total nests	Parasitized nests	Nests with			Cowbird eggs laid	Cowbird eggs hatched	Cowbird young fledged
			1	2	3			
Catbird	47	1(2.1%)	1	—	—	1	0	—
Brown Thrasher	14	1(7.1%)	—	1	—	2	0	—
Wood Thrush	11	2(18.2%)	2	—	—	2	1(50.0%)	1(50.0%)
Veery	11	7(63.6%)	6	1	—	8	8(100.0%)	4(50.0%)
Red-eyed Vireo	14	12(85.8%)	7	4	1	18	2(11.1%)	0
Chestnut-sided Warbler	2	1(50.0%)	—	—	1	3	0	—
Oven-bird	7	6(85.7%)	2	2	2	12	7(58.3%)	3(25.0%)
Yellow-throat	2	2(100.0%)	1	—	1	4	0	—
Scarlet Tanager	4	4(100.0%)	3	1	—	5	2(40.0%)	2(40.0%)
Cardinal	8	3(37.5%)	2	1	—	4	2(50.0%)	2(50.0%)
Red-eyed Towhee	24	13(54.2%)	6	5	2	22	15(68.2%)	12(54.5%)
Chipping Sparrow	9	1(11.1%)	1	—	—	1	0	—
Field Sparrow	57	9(15.8%)	5	4	—	13	2(15.4%)	1(7.7%)
Song Sparrow	27	11(40.7%)	9	2	—	13	7(53.8%)	4(30.8%)
Totals	237	73(30.8%)*	45	21	7	108	46(42.6%)	29(26.8%)

* Excluding the Brown Thrasher, Catbird, and Chipping Sparrow, this figure is 41.9%.

significant. On the two clear mornings in the fields the Cowbird came to the nest much earlier than on the three mornings in the woods, so that the time of laying seems to be correlated with light intensity. The observation on June 1 lends strength to this theory. It was a cloudy morning and very dark in the deep woods; we had nearly given up our vigil when the Cowbird appeared. It began to rain a few minutes later. The observations on June 9 and 11 were made in the woods but near a clearing.

The laying of the Cowbird at dawn seems strange in view of the fact that this species is one of the last birds to be heard in the morning. Nice (letter) has expressed her belief that the Cowbird is a late riser. At the Song Sparrow nest in 1944 (Norris, 1944), we heard a female Cowbird call just before she alighted on the camera at the nest, but at other nests no Cowbird note was heard until after the egg-laying. In April 1945, the average time of Cowbird notes was about six minutes before sunrise. It seems probable that Cowbirds are quiet until the eggs are laid,—when they become noisy, as they do each morning, the eggs are already deposited.

TABLE 3

TIMES OF COWBIRD LAYING IN RELATION TO SUNRISE

Date	Cowbird's arrival (a.m.)	Sunrise	Minutes before sunrise	Weather	Host	Location of nest
1944						
May 29	4:30	4:52	22	Clear	Song Sparrow	Field
1945						
May 30	4:30	4:53	23	Clear	Indigo Bunting	Field
June 1	4:50	4:53	3	Heavily overcast	Oven-bird	Woods
June 9	4:42	4:51	9	Clear	Red-eyed Vireo	Woods
June 11	4:36	4:50	14	Overcast	Red-eyed Vireo	Woods

In Hann's (1937:204) study, the loss of 34 Oven-bird eggs (85 per cent of the number of Cowbird eggs laid) was attributed to the female Cowbird; 10 eggs disappeared on the day before the Cowbird's egg was laid, 10 on the same day, and 3 on the following day. Nice (1937:158) found that eggs of the host disappeared 37.2 per cent of the times Cowbird eggs were laid in Song Sparrow nests.

My data on egg removal are quite fragmentary, but in 11 instances I am quite sure the loss of eggs from nests was caused by Cowbirds. Once a single egg was removed (from a Field Sparrow's nest), seven times an egg was removed when two were in the nest, once when the nest contained three eggs, once when the nest contained three eggs of

the host and one of the Cowbird; once two eggs were removed from a nest containing three eggs that had been incubated for five days. Burroughs (1887:24) and Hann (1941:212) noted that the removal of eggs was confined to nests with two or more eggs.

I have notes on the exact conditions under which 32 eggs were laid. In only seven instances did the Cowbird lay the day after she had removed an egg from a nest of two eggs—which was the pattern we had been depending on. It soon became evident that the Cowbird usually laid in Red-eyed Vireo's nests *before* the Vireo began to lay. This may be due to the coordination of the Cowbird's egg-laying with nest building; Hann (1941: 220) believed that the sight of a bird building its nest served as a stimulus to the Cowbird and that an egg would be laid four or five days later. The Red-eyed Vireo takes several days to complete its nest and then sometimes waits several more before laying its first egg. When a female Cowbird is stimulated by the sight of the Vireo's building, her egg is ready to be laid before the Vireo has started to lay. In 6 of the 10 Vireo nests in 1945 the Cowbird laid prematurely; in 2 she laid after removing an egg the day before, and in one nest she laid when one Vireo egg was there and none had been removed. In the remaining nest, the Cowbird laid five days after incubation started. In one of the 6 nests where the Cowbird laid prematurely, the egg appeared eight days after the nest was started. The Vireo then deserted. This lack of synchronization seems to occur occasionally in nests of other species; I have found several nests containing one Cowbird egg and none of the host species.

After our success in photographing the female Cowbird laying her egg in the nest of a Song Sparrow (Norris, 1944), Harrison and I hoped to photograph the Cowbird on many nests and anxiously awaited the laying season in 1945. Early in the season our efforts were without result. To give one example: An Indigo Bunting (*Passerina cyanea*) nest had been under observation, and when the nest was completed on May 27 we decided to check it several times daily for signs of Cowbird activity. One Bunting egg was laid on May 28 and a second on May 29, before 8:00 a.m. By 11:00 a.m. on that day, only one egg remained. The nest was intact, and no sign of predation could be seen. We decided to attempt a photograph the next morning. We arrived at the nest at 3:45 a.m. and prepared the equipment. Our truck was used as a blind about 25 feet from the nest, and we were ready to go inside at 4:00 a.m. We watched the nest intently but saw nothing until 4:30 a.m., just 23 minutes before sunrise. We then heard a whir of wings and saw a female Cowbird speeding away from the nest. We then found a warm Cowbird egg beside the single egg of the Bunting. The nest was surrounded by tall grass, with only the front in clear view. The Cowbird had apparently entered the nest from the dense cover behind and deposited her egg without making a sound.

On May 26, I had found an Oven-bird's nest nearly complete in the Frith. I watched it closely because we knew that this was a favored host of the Cowbird. Hann (1941) had already twice photographed a Cowbird at an Oven-bird nest in black and white, but we wanted to try it in color. On May 29, the first Oven-bird egg was laid, and the second was there on May 30. I was unable to check the nest until late in the day on May 31, and to my surprise I found it still contained only two eggs. Since the Oven-bird usually lays an egg a day until her clutch is complete, we assumed that the Oven-bird had laid her third egg and that the Cowbird had removed one sometime before I checked the nest. This was only a guess, but we decided to attempt the picture.

We were in the blind ready for the Cowbird at 4:05 a.m. on June 1. It was a heavily overcast morning, and occasionally a drop of rain would hit the blind. At 4:50 a.m., just three minutes before sunrise, we heard a rustle in the leaves beside the blind. Finally, at 4:58 a.m., a female Cowbird appeared at the edge of the nest and entered. Harrison pressed the button on the batteries, and the color picture was taken (shown in black and white, Figure 4). The Cowbird immediately flew from the nest and did not lay her egg. We waited until 5:15 a.m., when the Oven-bird arrived to lay, but the Cowbird did not return.

We watched two Red-eyed Vireo nests, waiting for the Vireo to begin to lay, but in both nests the Cowbird laid first. Then on June 5 Harrison found a Red-eyed Vireo building about eight feet up in a maple tree. The nest progressed rapidly, and on June 6 it was complete except for the lining. We decided to set up our equipment at this nest every morning; since this Vireo is one of the favored hosts, we felt that sooner or later a Cowbird would attempt to lay her egg in the nest.

The previous photographs had been taken at ground nests, and Harrison had merely placed his camera on a tripod in front of the nest. This nest was eight feet from the ground on the end of a maple limb. Harrison carried with him a series of ladders of several heights, and these were fitted for an extension on the top step with a tripod screw on the end which can be locked at any desired height. On the evening of June 6 we went to the nest just before dusk to arrange the equipment. The camera was temporarily placed on top of the ladder to focus for distance, and then it occurred to us that if a Cowbird should walk out on this frail limb, the nest would dip completely out of sight. By placing a 40-gram weight in the nest and watching it dip about a foot, we realized that it would be necessary to secure the branch both vertically and horizontally. I cut a forked stick about eight feet long, pushed it into the ground and placed the fork against the branch that supported the nest. Then with fine copper wire I lashed the two together, making it impossible for the Cowbird to move

the nest vertically. This forked stick was held in position and horizontal movement prevented by taut wires strung from it to trunks of near-by trees. After placing our blind a few feet away, we were ready for the Cowbird. We left the nest wondering if all our paraphernalia would frighten the Cowbird away if she should come to deposit an egg.

The next morning (June 7) we were at the nest long before day-break, but saw nothing of the Cowbird or the Vireo. The nest was lined during the day, however, and the fact that our apparatus, which we did not remove, did not keep the Vireo from completing her nest encouraged us greatly. We were at the nest on June 8, but the Cowbird did not appear. On the morning of June 9 we again set up the camera, and at 4:15 a.m. were in the blind watching the nest intently. It was dark enough to make vision quite difficult, especially from our tiny peepholes in the blind. At 4:42 a.m., 9 minutes before sunrise, a female Cowbird alighted on the top step of the ladder about two feet from the nest. For a few seconds she seemed poised to fly away, but at 4:43 a.m. she flew to the limb supporting the nest and alighted about 5 inches from the nest rim. One minute later she hopped to the rim, looked in, then settled on the nest. She looked away from the camera, then turned in profile. Harrison pressed the button, and our long-awaited picture was taken in natural color. The Cowbird remained motionless after the flash went off but did not lay her egg. At 4:45 a. m. Harrison left the blind, and she flew from the nest. From the photograph it is easy to see that the Cowbird made no attempt to get into the tiny nest; she merely stretched out along the limb and across the top of the nest.

The Vireo laid her first egg before 9:30 a.m. June 9, and her second was in the nest by 9:30 a.m. June 10. When I checked the nest at 1:00 p.m. that day, only one egg remained. On June 11 we were in the blind at 4:15 a.m., and the sky was heavily overcast. At 4:36 a.m., 14 minutes before sunrise, a female Cowbird flew rapidly down the valley toward the blind. She headed directly for the nest tree, but when a short distance away, she apparently noticed the camera and other equipment. She veered from her course and alighted in the nest tree about three feet from the nest. In a series of hops she began to approach the nest, and 57 seconds later, as she hesitated on the limb near the nest, Harrison pressed the button (Figure 5). She immediately flew away, and Harrison went out to change the film from color to black-and-white. In a short while he was back in the blind. At 4:41 a.m. the Cowbird appeared in the nest tree again, this time six feet above and five feet at the side of the nest. She very cautiously approached the nest, one hop at a time. Two minutes and 28 seconds later she finally settled herself on the nest. Harrison again pressed the button (Figure 6), and she flew from the nest after the flash went off. She did not lay her egg and did not return.



Figure 3. Chestnut-sided Warbler nest with three eggs of the host and three of the Cowbird, June 21, 1945. Photo by Hal H. Harrison.



Figure 4. Cowbird on Oven-bird's nest, 4:58 a.m., June 1, 1945. Photo by Hal H. Harrison.



Figure 5. Cowbird approaching Red-eyed Vireo's nest, 4:37 a.m., June 11, 1945.
Photo by Hal H. Harrison.



Figure 6. Cowbird on Red-eyed Vireo's nest, 4:43 a.m., June 11, 1945. Photo
by Hal H. Harrison.

THE YOUNG COWBIRD

The hatching dates of young Cowbirds for 1944 and 1945 in the Frith are given in Table 1. Friedmann (1929:187) gave the incubation period as 10 days, and it has long been a common belief that the young Cowbird always hatched two or three days before the host young. Nice (1937:153) found that with the Song Sparrow as host the Cowbird egg never hatched two or three days early, and sometimes hatched after the host young; normally it hatched in 11 or 12 days. Hann (1937:204) found the incubation period of the Cowbird averaged 11.6 days. I have recorded the incubation period accurately for only 10 eggs, but none of these hatched in 10 days. Five hatched in 11 days, one in 11.5 days, one in 12 days, two in 12.5 days, and one in 13 days. This gives an average of 11.6 days, exactly Hann's figure. I have recorded the hatching of 19 Cowbird eggs in relation to the hatching of the host's eggs. One Cowbird hatched four days before the host; 4 hatched one day before; 10 hatched the same day as the host; 3 hatched one day later than the host; and one hatched five days later than the host. The Cowbird egg that hatched four days early

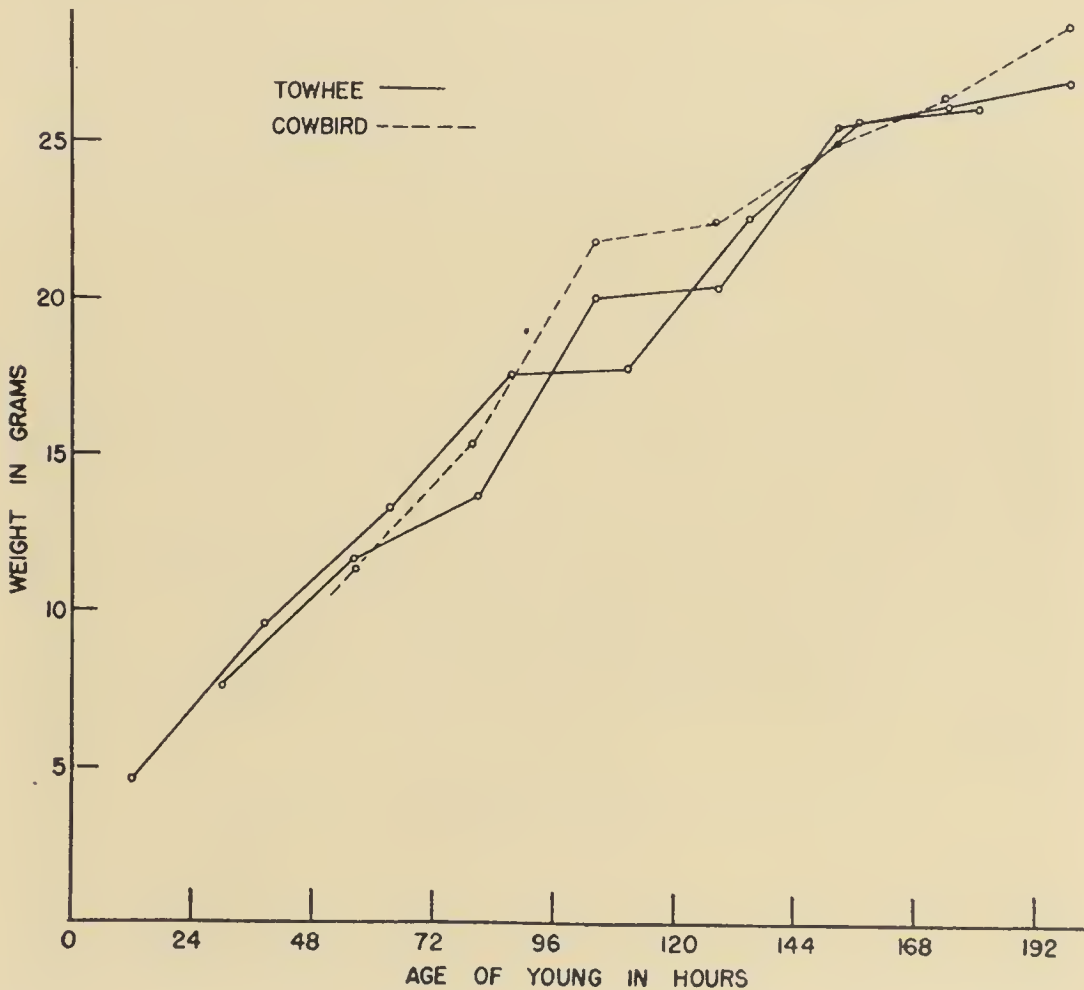


Figure 7. Daily growth rate of young Cowbird and two young of Towhee host.

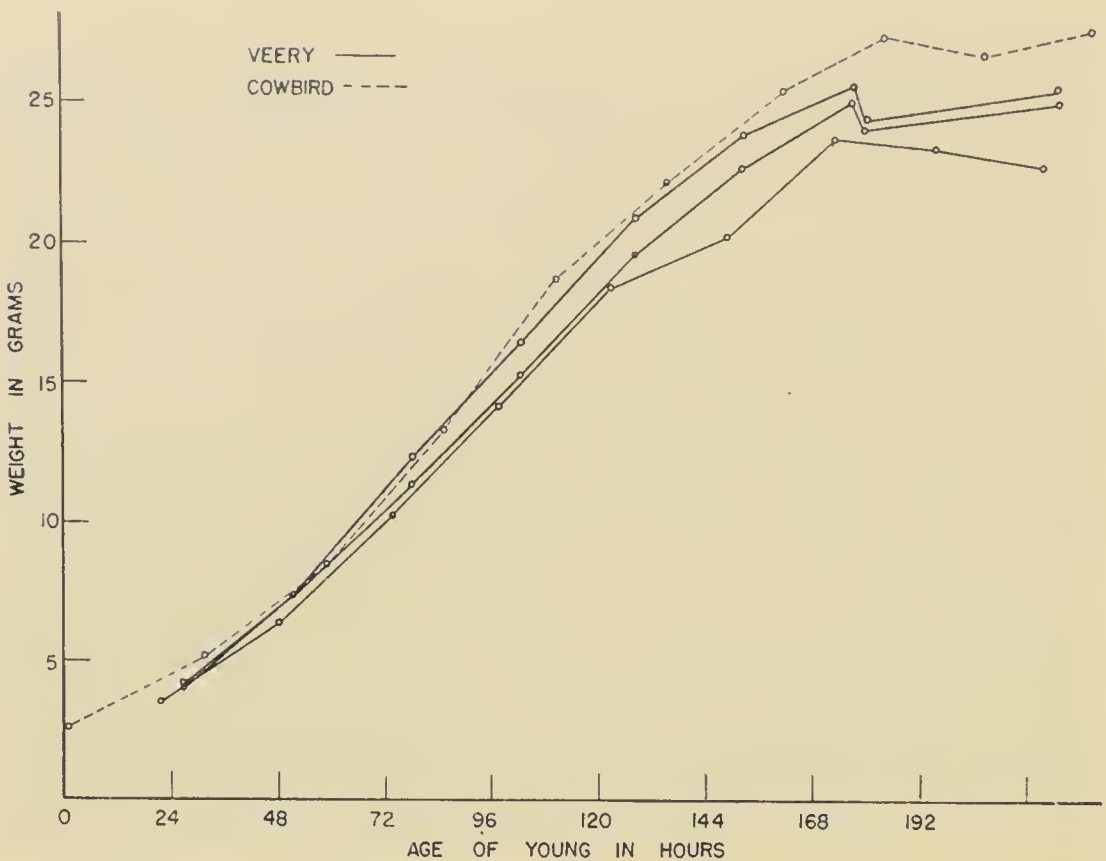


Figure 8. Daily growth rate of young Cowbird and three young of Veery host.

was in an Alder Flycatcher's (*Empidonax traillii*) nest. The egg that hatched five days after the host's egg hatched was in the nest of a Red-eyed Vireo. (Four days after incubation started on the three Vireo eggs, two of them disappeared; the next day the Cowbird egg was in the nest.)

The weights of three young Cowbirds at hatching were 2.33, 1.77, 2.70 grams respectively. Another weighed 2.60 grams when it was 6 hours old. The daily rate of growth of the young Cowbird and the host young is shown graphically for the nests of the Oven-bird, Veery, Wood Thrush, Cardinal, and Towhee in Figures 7 to 11. A daily photographic record was kept of the Cowbird and host young at several nests. The records for the Wood Thrush and Oven-bird accompany this paper (Figures 12 and 13; Tables 4 and 5).

Young Cowbirds in the Frith usually left the nests of their hosts at 8 to 10 days of age. Eleven records of the exact age of nest-leaving averaged 8.7 days.

THE SUCCESS OF THE COWBIRD IN THE FRITH

Most host species would accept a single Cowbird egg when it was not laid prematurely with reference to the host's clutch. But nests in which a Cowbird egg was laid before the host's clutch was begun and nests in which more than one Cowbird egg was laid were usually deserted.

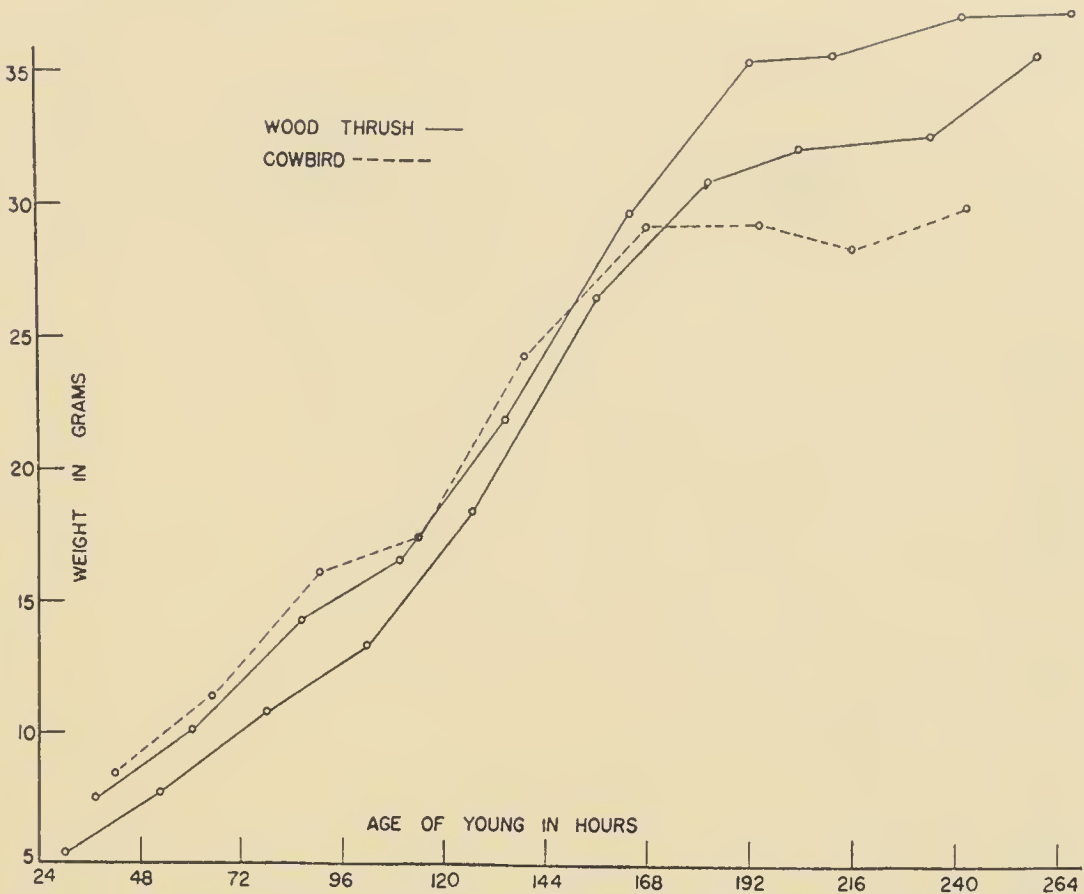


Figure 9. Daily growth rate of young Cowbird and two young of Wood Thrush host.

Of the 45 nests in which one Cowbird egg was laid, 8 were deserted apparently because the Cowbird laid prematurely; 1 was deserted even though the Cowbird's laying synchronized with the host's; 17 were destroyed; 19 produced fledglings. Of the 21 nests in which two Cowbird eggs were found, 9 were deserted; 6 were destroyed; 6 produced fledglings. Of the 8 nests in which three Cowbird eggs were deposited, 4 were deserted and 4 were destroyed; one (not included in the table) was a Chestnut-sided Warbler's (*Dendroica pensylvanica*), containing three eggs of the host as well as the three Cowbird eggs (Figure 3). Because we were anxious to obtain a series of weights of the young Warblers and a Cowbird, we removed two of the Cowbird eggs. But, as we later discovered, incubation had started a week before, and the embryos in the three Warbler eggs were dead. The one young Cowbird hatched, however, and left the nest weighing 29 grams (as compared with the weight of the adult male Warbler—9 grams). (This is the only instance in which we deliberately interfered with the natural outcome of a nest.) One Red-eyed Vireo's nest contained three Cowbird eggs and none of its own. The Cowbird eggs completely filled the nest, but the Vireo incubated them until the nest was destroyed (by unknown agency). In 1945, we found two Oven-bird nests in which three Cowbird eggs had been deposited. In one, there were three host eggs as well; it also was destroyed by unknown agency. The

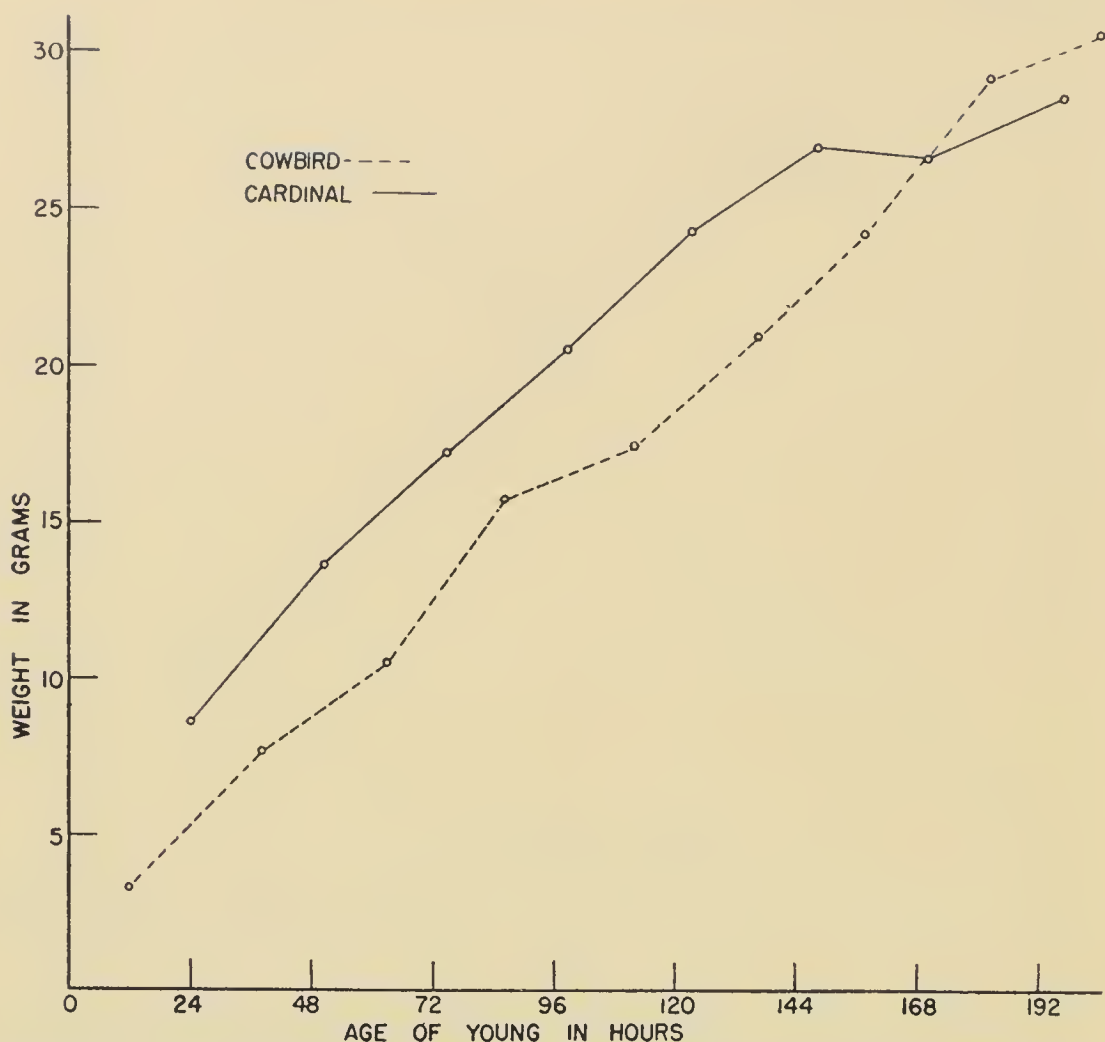


Figure 10. Daily growth rate of young Cowbird and one young of Cardinal host.

other contained three Cowbird young, two Oven-bird young, and two Oven-bird eggs (Figure 14). The birds were between one and two days old. One Oven-bird was able to maintain normal growth, but the other lost weight steadily and died two days later.

In the Alder Flycatcher nest mentioned above, in which the Cowbird hatched four days before the host young, one host young died when one day old. The remaining host young then weighed 1.59 grams, as compared with the 14.6 grams of the five-day-old Cowbird. Figure 15 shows the young Cowbird with the young Red-eyed Vireo in the nest mentioned above in which the Cowbird hatched five days after the host young. When the young Cowbird was 6 hours old, it weighed 2.60 grams, as compared with the Vireo's weight of 11.8 grams. The Vireo was 130 hours old at this time. (This nest was later destroyed.)

During 1944 and 1945, in the 237 observed nests, the hosts laid 668 eggs, of which 383 (57.3 per cent) hatched. Only 46 (42.6 per cent) of the 108 Cowbird eggs hatched. Nice (1937:163) had a much higher hatching percentage for Cowbirds (63.7 per cent, as compared with 60.7 per cent hatching in her Song Sparrow population). In the Frith, 29 (26.8 per cent) of the Cowbird eggs produced fledglings, as compared with 252 (37.7 per cent) of the eggs of the host population.

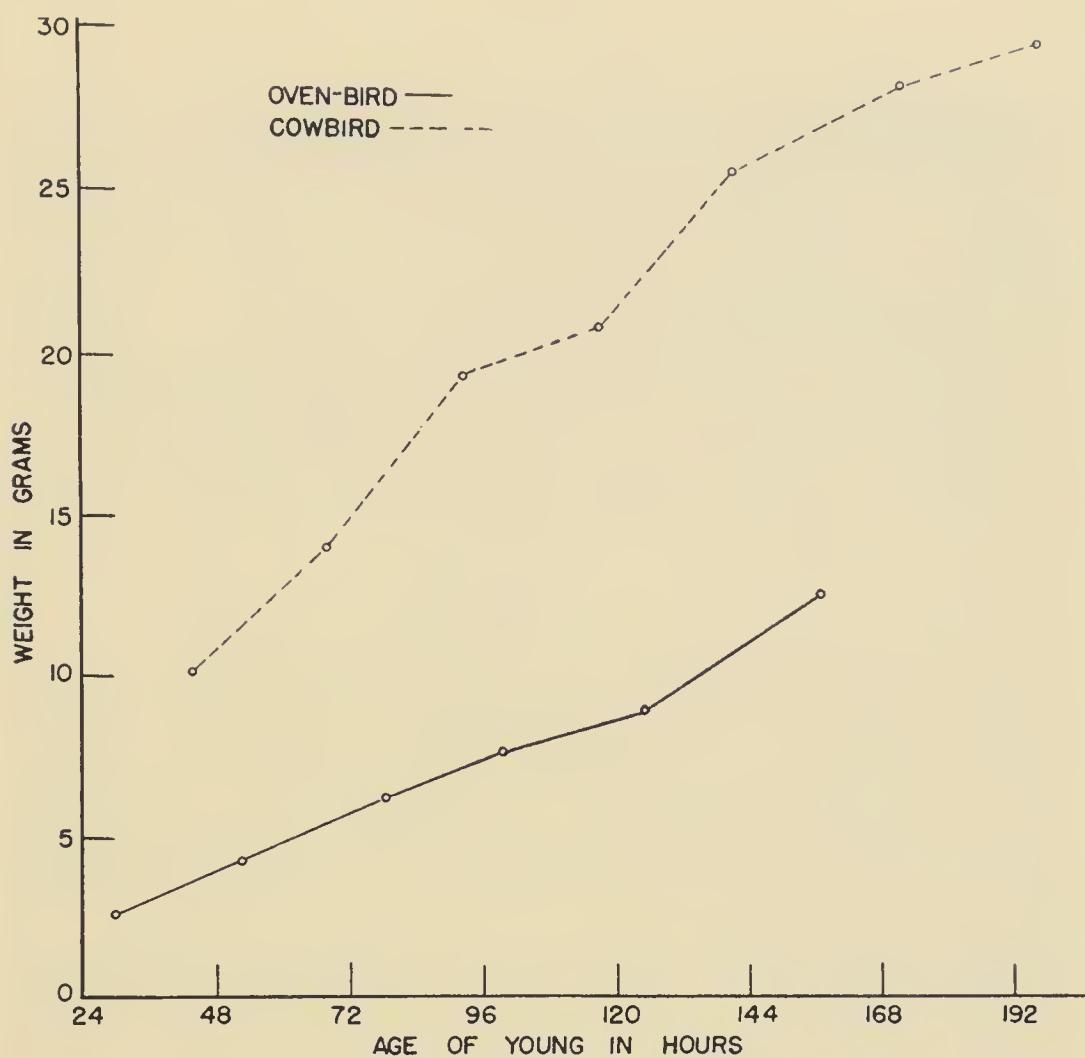


Figure 11. Daily growth rate of young Cowbird and one young of Oven-bird host.

TABLE 4

DAILY GROWTH OF YOUNG OVEN-BIRD AND COWBIRD

Date (1945)	Age and weight	
	Oven-bird	Cowbird
June 3	30 hrs (2.67 grams)	44 hrs (10.01 grams)
June 4	53 hrs (4.10 grams)	67 hrs (13.99 grams)
June 5	78 hrs (6.07 grams)	92 hrs (19.37 grams)
June 6	101 hrs (7.70 grams)	115 hrs (21.98 grams)
June 7	125 hrs (8.98 grams)	139 hrs (25.77 grams)
June 8	156 hrs (12.83 grams)	170 hrs (28.14 grams)
June 9	[Gone]	195 hrs (29.31 grams)

TABLE 5

DAILY GROWTH OF YOUNG WOOD THRUSH AND COWBIRD

Date (1945)	Age and weight	
	Wood Thrush	Cowbird
June 3	38 hrs (7.30 grams)	42 hrs (8.44 grams)
June 4	60 hrs (10.00 grams)	64 hrs (11.39 grams)
June 5	86 hrs (14.09 grams)	90 hrs (16.08 grams)
June 6	109 hrs (16.53 grams)	113 hrs (17.39 grams)
June 7	134 hrs (22.00 grams)	138 hrs (24.27 grams)
June 8	163 hrs (29.91 grams)	167 hrs (29.12 grams)
June 9	190 hrs (35.59 grams)	194 hrs (29.38 grams)
June 10	210 hrs (35.73 grams)	214 hrs (28.54 grams)
June 11	240 hrs (37.40 grams)	244 hrs (30.00 grams)
June 12	265 hrs (37.79 grams)	[Gone]

Since many Cowbird eggs are never incubated at all or are laid too long after the host's incubation period has begun, the low percentage of eggs that hatch and produce fledglings, as compared with the figures for the hosts, is not surprising. But when Cowbirds were once successfully hatched, the rates of success were more comparable. Of the Cowbird eggs hatched in the Frith, 63 per cent produced fledglings; of the hosts' eggs hatched, 64 per cent produced fledglings.

I have complete records on 21 nests that fledged at least one Cowbird young. No more than two Cowbirds were fledged in a single nest, and this occurred only five times. Twice in Towhee nests, two young Cowbirds were fledged and none of the host's young. In one instance, a young Cowbird was the sole fledgling of a pair of Song Sparrows and once of an Alder Flycatcher. In every other case, at least one host young survived. In Table 6, I have shown the comparative success of parasitized and non-parasitized nests that raised at least one host young in the Frith in 1944 and 1945. Nice (1937:160) found that each Cowbird seemed to be raised at the expense of one Song Sparrow; non-parasitized (successful) nests fledged an average of 3.4 young per nest, while parasitized (successful) nests fledged an average of 2.4 young per nest. My figures for the Frith, while less extensive, show a similar situation in relation to a group of host species. In the 35 non-parasitized (successful) nests, there were 2.94 fledglings per nest; the 19 parasitized (successful) nests fledged 2.05 host young per nest.

SUMMARY

In 1944 and 1945 Cowbird parasitism was studied in "Preston Frith," a 90-acre protected area near Butler, Pennsylvania.

By estimate, 6 female Cowbirds were active in the Frith in 1944, 10 in 1945.

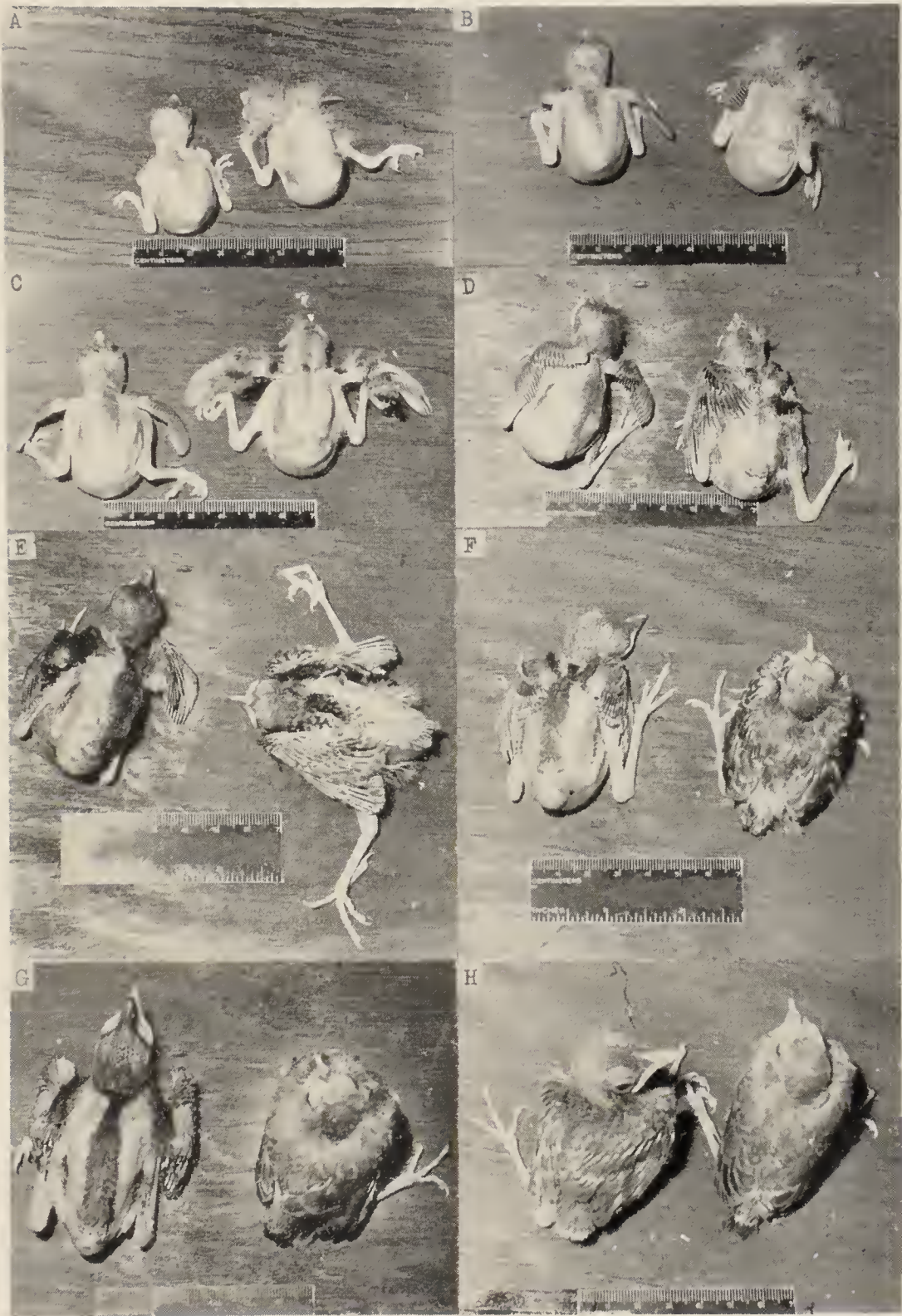


Figure 12. Daily growth of Cowbird (at right in each photo from A to H) and Wood Thrush (at left), June 4-11, 1945. See Table 5 for weights.
 Photos by Hal H. Harrison.



Figure 13. Daily growth of Cowbird (at right in each photo from A to F) and Oven-bird (at left), June 3-8, 1945. See Table 4 for weights.
 Photos by Hal H. Harrison.



Figure 14. Two Oven-bird eggs; two young Oven-birds (left), aged 24 hours (2.11 grams) and 30 hours (3.10 grams); three young Cowbirds (right), aged 42 hours (7.48 grams), 30 hours (5.20 grams), and 30 hours (5.00 grams). Age and weight given from left to right, June 9, 1945. Photo by Hal H. Harrison.



Figure 15. Young Red-eyed Vireo on left, aged 130 hours (11.8 grams); young Cowbird on right, aged 6 hours (2.60 grams), July 11, 1945. Photo by Hal H. Harrison.

TABLE 6
SUCCESS OF NESTS WITH AND WITHOUT COWBIRD EGGS, 1944-45

Species	Non-parasitized nests			Parasitized nests		
	No. nests	No. young fledged	Av. fledged per nest	No. nests	No. young fledged*	Av. fledged per nest
Catbird	25	73	2.92	0	—	—
Brown Thrasher	4	10	2.5	0	—	—
Wood Thrush	3	10	3.33	1	2	2.0
Veery	2	5	2.5	4	8	2.0
Red-eyed Vireo	1	4	4.0	0	—	—
Chestnut-sided Warbler	1	2	2.0	0	—	—
Oven-bird	0	—	—	2	3	1.5
Yellow-throat	0	—	—	0	—	—
Scarlet Tanager	0	—	—	1	1	1.0
Cardinal	1	3	3.0	2	3	1.5
Red-eyed Towhee	2	7	3.5	7	15	2.14
Chipping Sparrow	2	5	2.5	0	—	—
Field Sparrow	21	58	2.76	2	5	2.5
Song Sparrow	6	20	3.33	3	6	2.0
Totals†	35	103	2.94	19	39	2.05

* Host young only.

† For comparison, all species parasitized in the Frith are included in the table, but only nests of species that raised at least one Cowbird young and one host young are included in the totals.

The Cowbird laying season extended from mid April to mid July, with its peak in May. Until mid May most Cowbird eggs were laid in the nests of birds of field and open country, after mid May in nests of woodland birds.

A total of 73 parasitized nests were found, each of 45 containing one Cowbird egg, of 21 containing two, of 7 containing three.

Judged by egg type, two nests that each contained three Cowbird eggs were each parasitized by three females; one nest that contained three Cowbird eggs was parasitized by two; three nests that contained two Cowbird eggs were each parasitized by two females.

The time of egg laying seemed to be correlated with light intensity.

In 11 instances, Cowbirds removed eggs from hosts' nests, 7 times when two host eggs were in the nest, once when a single egg was there, once when the nest contained three host eggs, and once when the nest contained three eggs of the host and one of the Cowbird; once two eggs were removed from a nest of three, five days after incubation started.

For 32 Cowbird eggs, exact conditions of laying were known. In only 7 instances did the Cowbird lay in a nest on the day after she had removed an egg.

The Cowbird was photographed at the nests of the Oven-bird and Red-eyed Vireo.

The Cowbirds, though early risers, were usually quiet until after the eggs were laid.

The incubation period (10 eggs) ranged from 11 to 13 days and averaged 11.6 days.

Of 19 Cowbird eggs, one hatched four days before the host; 4 hatched one day before; 10 hatched the same day as the host; 3 hatched one day later than the host; and one hatched five days later than the host.

The weights of three young Cowbirds at hatching were 2.33, 1.77, and 2.70 grams respectively.

The daily rate of growth of the young Cowbird and the host young was recorded for the nest of the Oven-bird, Veery, Wood Thrush, Cardinal, and Towhee.

Records (11) of the Cowbird's age at nest-leaving averaged 8.7 days (extremes: 8 and 10 days).

Of the 45 nests in which one Cowbird egg was laid, 8 were deserted, apparently because the Cowbird laid prematurely; one was deserted even though the Cowbird's laying synchronized with the host's; 17 were destroyed; 19 produced fledglings. Of the 21 nests in which two Cowbird eggs were found, 9 were deserted, 6 were destroyed, 6 produced fledglings. Of the 8 nests in which three Cowbird eggs were found, 4 were deserted and 4 destroyed.

One Oven-bird nest was found containing three Cowbird young, two Oven-bird young, and two Oven-bird eggs.

In the 237 observed nests, the hosts laid 668 eggs, of which 383 (57.3 per cent) hatched; the Cowbirds laid 108 eggs, of which 46 (42.6 per cent) hatched; 37.7 per cent of the host eggs, 26.8 per cent of the Cowbird eggs produced fledglings. Of the host eggs that hatched, 64 per cent produced fledglings; of the Cowbird eggs that hatched, 63 per cent produced fledglings.

With four exceptions all parasitized nests that produced young produced at least one host young.

The 35 non-parasitized (successful) nests produced 2.94 fledglings per nest; 19 parasitized (successful) nests fledged 2.05 host young per nest, indicating that each parasite was raised at the expense of about one host young.

LITERATURE CITED

BURROUGHS, JOHN

1887 Birds and bees. Riverside Press, Cambridge, Mass.

FRIEDMANN, HERBERT

1929. The cowbirds. Charles C. Thomas, Springfield, Ill.

HANN, HARRY W.

1937 Life history of the Oven-bird in southern Michigan. *Wils. Bull.*, 49:145-237.1941 The Cowbird at the nest. *Wils. Bull.*, 53:211-221.

NICE, MARGARET M.

1937 Studies in the life history of the Song Sparrow I. *Trans. Linn. Soc. N. Y.*, 4.1944 The Robins of Interpont. *Ill. Aud. Soc. Bull.*, 50:1-5.

NORRIS, RUSSELL T.

1944 Notes on a Cowbird parasitizing a Song Sparrow. *Wils. Bull.*, 56:129-132.

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THE HOMING OF TRANSPLANTED YOUNG WOOD DUCKS¹

BY ROBERT A. MCCABE

MANY areas in Wisconsin that were once the breeding grounds for Wood Ducks (*Aix sponsa*) have for the past several decades contained no breeding birds of the species. Lake Wingra and vicinity, including part of the northern city limits of Madison, was one of these areas. The last known breeding of Wood Ducks in the vicinity was in 1890, when Dr. S. H. Chase of Madison saw a brood in the "middle spring" (Wingra Springs, Figure 1) on the south shore of the lake. Other ornithologists, namely Cahn (1915), Schorger (1929), and Anderson *et al.* (1942), working in the same locality, failed to find Wood Ducks breeding. Spring and fall migrants are not uncommon; especially noticeable are the spring arrivals when they frequent the south shore. It appears, however, that for over 50 years no Wood Ducks have bred in the Lake Wingra area.

There is a record, by J. H. H. Alexander, of several pairs nesting on an oak-grown island in Mud Lake eight miles southeast of Lake

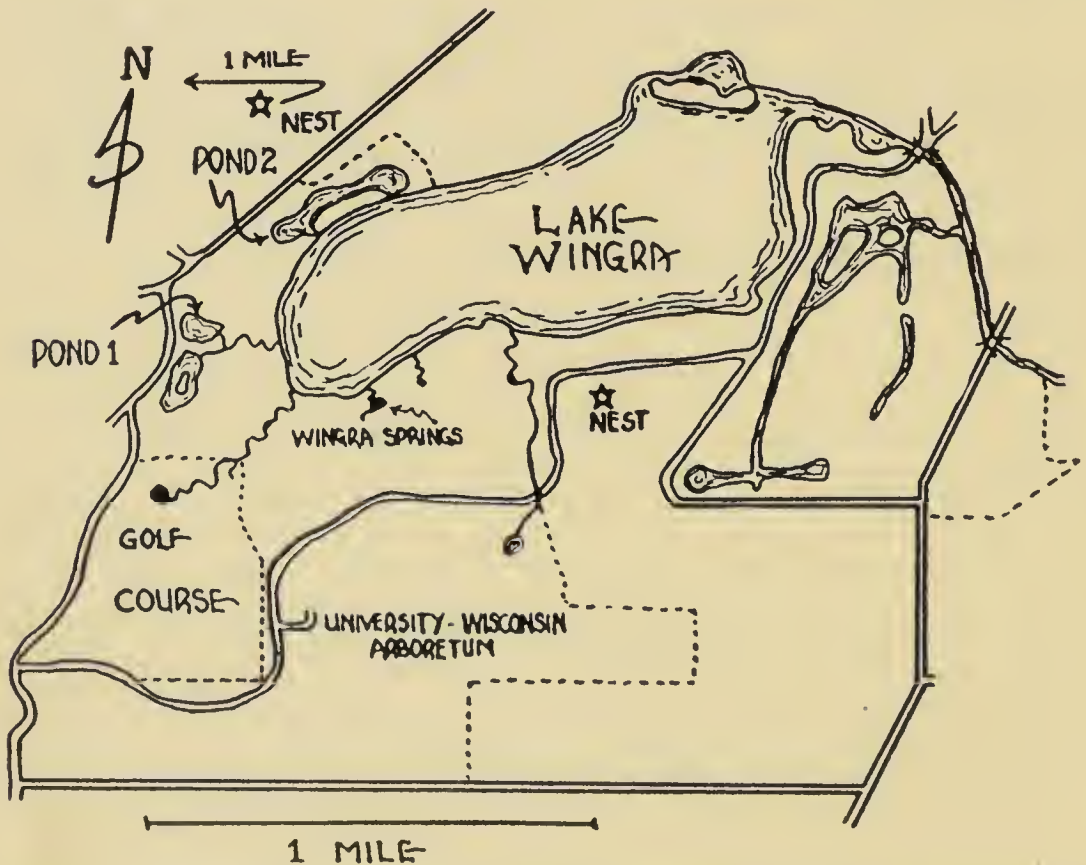


Figure 1. Lake Wingra and vicinity. Arrows indicate points at which Wood Ducks were released.

¹ Journal Paper No. 11, University of Wisconsin Arboretum.

Wingra. One of the birds observed was a female with a small brood, seen in 1915. Wood Ducks were also seen occasionally in this area by the same observer during the two decades that followed.

The University of Wisconsin Arboretum is a thousand-acre tract on the south side of Lake Wingra. On the Arboretum a series of ponds have been dug to augment the breeding grounds and refuge area for waterfowl and to add beauty to the natural springs that furnish water for the ponds. Pond 1 (Figure 1) has been the breeding area for a flock of about 100 semi-wild Mallards (*Anas platyrhynchos*) during the past 10 years. These Mallards build their nests along the walks and in the shrub beds that surround the ponds. They are very tolerant of people, noise, and activity, and the nests, if reasonably well hidden, are usually successful.

An experiment to establish a Wood Duck colony in the area was begun in 1943 with the cooperation of Frank C. Bellrose and Arthur S. Hawkins of the Illinois Natural History Survey. Two attempts (made in 1943 and 1944) to hatch Wood Duck eggs shipped by rail were unsuccessful. On August 4, 1944, the Survey sent us 100 ducklings (49 males and 51 females), all between three and five weeks of age, which had been hatched at Havana, Illinois, 200 miles from Madison. These were kept in captivity at Madison, and all but three survived.

On August 14, 25 of the largest birds (then about seven weeks old), were given red celluloid bands and released at Pond 2 (Figure 1) on the west shore of Lake Wingra. They had been banded with Fish and Wildlife Service bands before leaving Illinois. All the ducks took wing, some flying short distances, others making long flights along the shore of the lake. On August 15, 25 more birds (banded yellow) were released as follows: A large pen was placed in the shallow water of Pond 2 and the ducks placed in it. They were kept there about five hours, during which time the vicinity was kept cleared of people and dogs and the pen-door opener remained out of sight. A pull string opened the door gradually, allowing the birds to swim out undisturbed. By 3:00 p.m. the door was completely open, but the ducks did not leave until 3:40, and then they *flew* as soon as they were clear of the pen.

On August 18, 10 birds, and on August 22, 15 birds were liberated, all banded blue. The crates were opened under a fallen cottonwood in a thicket of red osier dogwood at Wingra Springs on the south shore of the lake (Figure 1). This inhibited flying, and all but one duck (which flew) walked the 10 yards to the spring creek and swam out into the lake. The remaining 22 birds were banded green and released September 3 on the north edge of Pond 2.

Most of the birds (the first 50 and the last 22) were released at Pond 2 because it is large, close to the lake, and less frequented by people. But within three days after the first release, most of the birds

were seen in Pond 1, apparently decoyed there by the resident semi-wild Mallards. The last release went immediately to Pond 1, and no Wood Ducks were seen on Pond 2 after August 30. Birds from all the releases were observed at Pond 1, and many of them became very tame. A few remained for the winter, apparently influenced by the wintering Mallards, but most of the Wood Ducks had left by November 3.

During the two and a half months of their stay in the Lake Wingra area, 17 counts were made at the regular loafing spots. As many as 33 birds were counted in a single day (Table 1).

During the winter, a female was seen on December 12, a pair on December 17, and a female on March 8, all on one of the Arboretum creeks. A pair was seen on the spring creek that drains the Nevin Fish Hatchery ponds, three miles south of the Arboretum ponds, on December 30 and on February 6.

The first Wood Ducks (eight) were seen back on Lake Wingra on April 1, 1945, and were then seen regularly until May 1. Although 25 nest boxes, built according to a special design sent us by the Illinois Natural History Survey, had been set out, none was used, perhaps because we did not put sawdust in the boxes until May 14. Wood Duck boxes were set out because (1) during the CWA days most of the dead trees were cleaned out of the Arboretum woodlots, thereby eliminating most of the potential nesting cavities; and (2) it would be easier to capture nesting females in boxes to determine whether or not they were birds of the release.

On May 21, a nest was found in the Lake Forest residential section adjoining the Arboretum. The nest tree, in a yard adjacent to a house, was a dead white oak with only two large forks remaining, in one of which was a cavity that the Wood Ducks were using as a nest. The male of the pair was seen only once, and then in flight, but the female was from the blue release of 1944. This was the first breeding Wood Duck recorded at Lake Wingra in 50 years. The female incubated at least three weeks, but the ultimate fate of the nest was not determined.

On May 22 a second nest was found, at the Forest Hill cemetery midway between Lake Wingra and Lake Mendota (about a mile from

TABLE 1
COUNTS OF WOOD DUCKS, FALL, 1944

Date	August						September					October			November		
	19	21	22	25	27	30	5	8	12	15	21	4	6	20	31	1	3
Pond 1	6	7	19	29	13	27	22	9	26	18	10	6	7	11	6	9	0
Pond 2	3	12	0	2	0	0	—	—	0	0	0	0	0	—	—	—	0
Lake Wingra	19	4	0	0	0	0	—	—	1	0	0	—	—	—	—	—	0
Spring Creeks	—	—	—	—	—	6	—	—	2	0	—	—	—	—	—	—	—

(—) indicates that the location was not visited on the date in question.

each). The cavity, about 15 feet from the ground and opening to the north, was in a large live soft maple. Since its floor was only an inch below the opening, the incubating bird could be seen from the ground. The female proved to be one of the red release. I opened one egg, which showed that the clutch had been incubated about 11 days, and the nest was kept under observation. When the eggs hatched, on June 12, there was water in the nest from a heavy rain, and I removed the adult and the 10 ducklings to a holding pen in the Arboretum. One duckling escaped and died during the night. The adult and the other 9 ducklings were released on Pond 2, June 13.

It is interesting (though perhaps a mere coincidence) that the duck found nesting south of Lake Wingra had been released on the south side of the lake (blue release), and the bird found nesting to the west had been released on that side of the lake (red release).

During the summer, three broods, which were thought not to be from either of the nests described above, were seen; the total of nesting pairs, therefore, was probably five. Only one male duck was seen during the nesting season.

On December 30, 1945, a flock of six or eight Wood Ducks was seen on one of the Arboretum creeks; on January 31, a male of this flock was trapped and proved to belong to the blue release; the same bird was retrapped two weeks later at the Nevin Fish Hatchery, where Wood Ducks had been seen the first winter after the releases.

In the spring of 1946, the first Wood Ducks were seen on Lake Wingra on April 6. During the next month, many flocks and pairs were seen on all parts of the lake shore and in the Arboretum creeks and ponds. On April 11, 20 new nest boxes were set out and the old boxes reopened. A week later, four boxes contained breast feathers of female Wood Ducks, but none of the boxes was actually used for nesting that season. The nest cavity in the dead white oak used the previous year was used again, but a wind storm broke the snag, and the bird deserted. Two pairs of Wood Ducks were seen almost daily on the Arboretum ponds until about July 10, but no broods were seen in the vicinity.

Two Wood Duck broods (probably young of our released birds) were seen during the summer of 1946 on University Bay, of Lake Mendota, about two and a half miles from the original release site. Nesting Wood Ducks had been absent from this bay for as long as they had from Lake Wingra. One of the broods (12 to 14 ducklings) stayed about three weeks; the other brood (11 ducklings) dwindled to 5, which presumably flew south.

None of the birds released at Lake Wingra was found in Havana, Illinois, 200 miles away, where they had hatched and had their first three to six weeks of rearing. The area surrounding the hatching place is a thoroughly studied Wood Duck nesting area, and any ducks

that returned there would have undoubtedly been found in the nest boxes of the colony, which were periodically checked. Thus it appears that the point to which a duck returns is the place from which it leaves in autumn—the place where it learns to fly. With our ducks it was a matter of two to two and a half months between the start of learning to fly and the departure for the south. There remains to be determined the minimum time required at a release point for the birds to fix the locality in their “minds” so that they will return there the following spring.

A similar experiment was performed in Finland by Välikangas (1933). Here Mallard (*Anas platyrhynchos*) eggs from Britain were hatched and the young subsequently banded and released. All migratory and breeding recoveries were en route to or in Finland.

In 1944, 95 young Wood Ducks were sent from the Illinois Natural History Survey to Indiana, where they were released by O. D. McKeever in the Jasper-Pulaski State Game Preserve (near Wallace Lake, 180 miles from the place of hatching), where there was already a small colony of Wood Ducks established. Of 15 nests on the area the following spring, 4 (and perhaps 5) belonged to females from the experimental release (*Pittman-Robertson Quarterly*, Oct. 1945). (The eggs for both the Indiana and the Wisconsin experiments were collected from clutches laid by wild Wood Ducks at Havana, Illinois.)

As a game management practice, the transplanting procedures here described appear to be an effective means of establishing a Wood Duck colony in areas now devoid of breeders. Transferring Wood Duck eggs into nests of locally nesting semi-wild Mallards is in my opinion another method of starting a colony, despite the fact that the eggs we shipped by rail from Illinois for this purpose were damaged en route in two consecutive years, 1943 and 1944. Shipping by air or automobile might eliminate such damage.

SUMMARY

In August 1944, 97 young Wood Ducks, hatched and partially reared in Illinois, were raised to about seven weeks of age and released at Madison, Wisconsin, 200 miles from the hatching site.

A few wintered in the area of the release.

Ducks of both sexes from the release returned to Madison to breed, both in 1945 and 1946.

None of the ducks of the release was found in the area of hatching.

A similar release of young Wood Ducks, hatched in Illinois, was made in 1944 in Indiana. At least four females returned to Indiana to breed.

ACKNOWLEDGEMENTS

Grateful appreciation is expressed to the Illinois Natural History Survey, especially to Frank Bellrose, Arthur Hawkins, and Harold Hanson, for allowing us to participate in the homing experiment and for furnishing the ducklings; to Mrs. Arthur Koehler, Mrs. A. F. Gallistel and Mr. D. W. Pahl of Madison for calling my attention to Wood Duck nests or broods; to Arnold Jackson, Jr., and Allen W. Stokes, research assistants who helped in all phases of the project; to Professor Aldo Leopold, research director, for guidance and for checking the manuscript.

LITERATURE CITED

- ANDERSON, HARRY G., WILLIAM S. FEENEY, THEODORE M. SPERRY, and JOHN CATENHUSEN
1942 Birds of the University of Wisconsin Arboretum. *Trans. Wis. Acad. Sci., Arts and Letters*, 34:5-22.
- CAHN, A. R.
1915 An ecological survey of the Wingra springs region. *Bull. Wis. Nat. Hist. Soc.*, 13:123-177.
- SCHORGER, A. W.
1929 The Birds of Dane County, Wisconsin (Part 1). *Trans. Wis. Acad. Sci., Arts and Letters*, 24:457-499.
- VÄLIKANGAS, I.
1933 Finnische Zugvögel aus englischen Vogeleiern. *Vogelzug*, 4:159-166.

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GENERAL NOTES

An Ohio record for the Wood Ibis.—On May 5, 1946, I observed a stork-like bird wading in a small tributary of Todd's Fork near the city of Wilmington, Ohio. Study at close range showed the bird to be an immature Wood Ibis (*Mycteria americana*). It appeared to be in a weakened condition, although on my approach it was able to execute short flights of approximately one hundred yards along the stream.

Returning to the spot later that evening I was able, in the semi-darkness, to approach the Wood Ibis quite closely and capture it. Special attention was given to proper feeding of the bird, and it ate heartily but failed to survive. The skin of this specimen, a female, is in the bird collection of the Ohio State Museum.

There is one other record of a Wood Ibis in Ohio, that of H. E. Chubb, who collected a specimen near Cleveland in 1879 (J. M. Wheaton, 1882. Report on the Birds of Ohio, p. 497).—FRANK O. HAZARD, *Wilmington College, Wilmington, Ohio*.

Survival of a brood of Cooper's Hawks.—On June 24, 1942, we banded five nestling Cooper's Hawks (*Accipiter cooperii*) four miles east of Ann Arbor, in Section 30, Superior Township, Washtenaw County, Michigan.

Four of the five nestlings have been recovered as follows:

1. November 11, 1942 (about 5 months after banding). Shot at Decatur, Indiana.

2. March 3, 1944 (20 months after banding). Caught in a mink trap at Salt Lick, Kentucky.

3. November 30, 1946 (5 years and 5 months after banding). Found dead, "probably shot," at Trilby, Lucas County, Ohio.

4. February 12, 1947 (5 years and 7 months after banding). Shot while feeding on a pheasant at Brookpark Village, Cuyahoga County, Ohio.—F. C. and J. J. CRAIGHEAD and WILLIAM H. LAWRENCE, *University of Michigan, Ann Arbor*.

The Mangrove Cuckoo in interior Tamaulipas, Mexico.—During the summer of 1946 we camped for two days on the southern edge of the Mesa de Llera, sometimes known as the Mesa de la Angostura, approximately 35 miles south of Victoria, Tamaulipas. The Mesa is near the town of Llera, which is close to the Pan-American Highway crossing of the Rio Guayalejo.

On June 17 we heard and later collected a strange-sounding cuckoo in a mesquite-cactus association on top of the Mesa. It proved to be an adult male Mangrove Cuckoo, *Coccyzus minor continentalis* (testes 9 mm. \times 4 mm.). Later in the day the same call was heard again, coming from a small valley below the Mesa.

Only a few records of the occurrence of this species in northeastern Mexico have been published, and these are restricted to a very few localities in the coastal lowlands. The Mesa de Llera, however, rises approximately 1,400 feet above sea level and is somewhat more than 70 miles from the Gulf Coast. The area on the Mesa where we collected the Cuckoo was covered with a thick growth of mesquite and cactus reaching a maximum height of 10 feet, interspersed with smaller shrubs and heavy grass. The edge of the Mesa dropped away sharply about 200 feet to a small valley, whence the call of the second Mangrove Cuckoo was heard. There the conditions seemed more evenly humid than on top of the Mesa or on the lower slopes leading down to the Rio Guayalejo.

In the crop of the Cuckoo we found a large grasshopper of a kind that was very abundant on the Mesa. This suggested a possible explanation for the occurrence of the Mangrove Cuckoo in such an unusual habitat, namely, that the birds had moved up from the coast along the moist valley of the Rio Guayalejo and then had found on the near-by mesa an abundant supply of food.—STEPHEN W. EATON and ERNEST P. EDWARDS, *Laboratory of Ornithology, Cornell University, Ithaca, New York.*

Barred Owl thirty miles from land.—I am indebted to John B. Metzberg, of Chicago, for the following report of a Barred Owl (*Strix varia*) observed over Lake Michigan during daylight hours.

On August 22, 1946, while sailing his 46-foot schooner northward on Lake Michigan, Mr. Metzberg and a crew of four associates sighted a Barred Owl flying just above the waves in the vicinity of their boat. When first noticed at 8:00 a.m., the owl was near mid-lake, approximately 30 miles west of Pentwater, Michigan, and about 35 miles east of Sheboygan, Wisconsin. A moderate northwesterly breeze, estimated at 8 to 10 miles per hour, was blowing at the time and had not varied during the previous 36 hours. Visibility was good, although a light overcast somewhat obscured the sun.

The owl made repeated attempts to perch on the swaying 49-foot mainmast before finally succeeding. Later it perched, more comfortably, on the "spreader," only 20 feet above the deck, and on the shrouds. The proximity and activity of several men on deck held the owl's attention, but apparently caused the bird no great anxiety. At intervals of 10 to 15 minutes it left the boat briefly and flew aimlessly over the lake, occasionally disappearing in the distance. The owl returned to the boat repeatedly over a two hour period to resume one of its earlier perches, but finally disappeared to the eastward at 10:00 a.m. and was not seen again.—EMMET R. BLAKE, *Chicago Natural History Museum, Chicago, Illinois.*

Status of the Anna Hummingbird in southern Arizona.—In 1941, Gale Monson and I reported briefly (*Condor*, 43:108-112) on the principal findings of several short trips in southern Arizona. We considered an Anna Hummingbird (*Calypte anna*) taken at Patagonia, Arizona, December 3, 1939, "a late fall transient," and stated that there were no published winter records for southern Arizona. Later, Godfrey (1944. *Auk*, 61:149-150) reported a December 24 specimen from Yuma as a "winter" record; and van Rossem (1945. *Condor*, 47:79-80), summarizing data available to him, implied that we had overlooked Willett's records for Roosevelt Lake (though this is a *central* Arizona locality). It seems desirable, therefore, to present a full account of our views on the migration of this hummingbird.

Since 1938, Mr. and Mrs. William X. Foerster and I have kept records of birds seen about Tucson. Tree tobacco (*Nicotiana glauca*) and other shrubs were planted in our yard late in 1937; the tobacco blossomed well until 1942, and it proved a definite attraction to hummingbirds. Among these, the Anna proved to be a regular visitor in fall, often remaining until late December. Our records were as follows:

	No. of records	Last record
1938	3-4	Nov. 25
1939	8	Dec. 20
1940	2-3	?Dec. 28
1941	26	Jan. 8, 1942
1942	9	?Jan. 21, 1943
1943	4	?Dec. 15
1944	1 (Dec. 27)	

By 1945 Annas had been found to occur so regularly that, although six or eight were seen, only one (November 21) was recorded in our notes. Our earliest seasonal record (of a female) was September 24 (1941), and as shown above the species lingers regularly to late December and occasionally into January, at least to January 8. There is no question, however, that most of the birds depart by the end of December.

To what extent visits to our yard by the same bird on different days may have increased our totals above the actual number of birds present, I cannot tell. The maximum seen in the yard at one time was two birds. The large total in the fall of 1941 was probably due in considerable part to a female that roosted in the hedge up to October 25 and which attracted at least one male at times, "courtship" flight being observed in October. On the other hand, collecting of three adult females in the first half of November 1939 did not end the visits of the species that fall. These three specimens were judged, from the appearance of their ovaries, to be more than a year old. Though adult males also constitute a part of the Anna Hummingbird population of southern Arizona, females and young seem to be in the majority.

In addition to those seen in our yard, Anna Hummingbirds have been seen in other parts of the Tucson Valley and on the south slope of the Santa Catalina Mountains. Further observation may show the species to be more common in the oaks of the mountains than in the valleys, and to remain in small numbers in warm, south-facing canyons in the foothills through the winter. But I regard two facts as well established: 1. The Anna Hummingbird is the latest of all the transient hummingbirds to appear in Arizona and is the only hummingbird occurring regularly in the Tucson Valley after early October. 2. The bulk of the Annas leave the valley by the end of December. Their departure may be correlated with the cold mid-winter nights, when the tree tobacco finally ceases to bloom (in this valley, it usually blooms from late February or early March to late December).

Where, then, do the bulk of the Anna Hummingbirds of southeastern Arizona go in December? There is no evidence that they continue farther east or south; the one record for Texas (Brewster County) is in October (Van Tyne and Sutton, 1937. *Univ. Mich. Mus. Zool. Misc. Publ.*, 37:44). Willett (1915. *Condor*, 17:102) has shown that Annas winter farther north, in the low valleys of central Arizona, but I suspect that they will prove to be just as common there in October as in January. If so, the southeastern Arizona birds must go west. But in the deserts of southwestern Arizona and southeastern California, the common winter hummingbird seems to be the Costa (*Calypte costae*). My belief is that the bulk of the Anna Hummingbirds of southern Arizona return in December to their breeding grounds, which are relatively warm and moist in winter. The height of the nesting season is in February and March, but incubated eggs have been taken by late December (Willett, 1933. *Pac. Coast Avif.*, 21:97). Comments on its abundance in southwestern California cover nearly every month except October and November, when the Arizona population is at its maximum; it would be interesting to know whether a measurable decrease occurs at that time in California.

It is also noteworthy that there is no evidence of a return flight in spring in southern Arizona. As to fall arrival, the earliest authentic record seems to be September 4 (Sacaton, Arizona), all alleged August specimens I have examined being either immature *Archilochus alexandri* or of questionable date. Normal occurrence in southern Arizona seems definitely to be from late September to late December only.

Seasonally, then, we cannot term the Anna Hummingbird a "winter" bird in southern Arizona; yet biologically it certainly is a winter resident, migrating here

from its breeding grounds, spending some time, and then returning. The best term for such an unorthodox migrant would seem to be "autumn visitant."

For the privilege of examining specimens and notes, I am indebted to L. C. Sanford, Gale Monson, E. C. Jacot, Randolph Jenks, Mr. and Mrs. Hugh P. Dearing, Mr. and Mrs. William X. Foerster, Mr. and Mrs. Ross J. Thornburg, and the authorities of the American Museum of Natural History, the United States National Museum, and the U. S. Fish and Wildlife Service.—ALLAN R. PHILLIPS, *Museum of Northern Arizona, Flagstaff, Arizona.*

Air speed of Belted Kingfisher.—In the spring of 1946 while travelling in central Colorado, a companion and I recorded the speed of a Belted Kingfisher (*Ceryle alcyon*) as it flew for a distance along U. S. Route 50 in the Arkansas River Canyon between Canon City and Salida. For several miles the canyon walls are very precipitous, rising a thousand feet or more from the stream bed. Passing through this, the deepest part of the canyon, where the road is separated by only a few feet from the river, we noticed a Belted Kingfisher flying upstream in a course parallel to our car. We were travelling at 30 miles per hour when the bird, flying with apparent ease, came in range of our vision from behind. To keep pace with the bird we increased our speed to 35 and then to 40 miles per hour. At this speed we stayed abreast of the bird for 1.8 miles before it again drew ahead of the car. We increased our speed to 45 miles per hour and were thus able to follow it 0.4 mile farther, when we were forced to reduce speed because of a rock slide partially blocking the highway, and the Kingfisher was lost to view. I estimated that the Kingfisher had been flying with a wind velocity of one to three miles per hour to assist him.

In all, we had successfully followed this bird for a total distance of 2.2 miles from the point of first observation. At no time had the distance between us and the bird been greater than 10 or 12 yards. In order to maintain this distance it had been necessary for us to increase our speed from 30 to 40 and finally to 45 miles per hour. D. D. McLean (1930. *Gull*, 12, No. 3: [p. 2]) recorded "steady level flight" of 36 miles per hour for the Belted Kingfisher (in California). All during our observation the Kingfisher flew with apparent ease and remained between 10 and 15 feet above the water's surface, following each curve and bend of the river consistently. It showed no alarm or anxiety because of the nearness of the automobile. Observation and alertness, however, were evident in the continual turning of its head from side to side during the flight.—LEE J. BURLAND, *138½ River Street, Oneonta, New York.*

Purple Martins feeding on emerging may-flies.—On the evening of August 2, 1946, I observed at Shafer Lake, White County, Indiana, what I at first supposed was a large feeding school of white bass (*Lepibema chrysops*) about a third of a mile from my boat. (These bass travel about open water in schools and in the summer months feed at the surface, making splashes that can be seen from a considerable distance.) On closer approach, however, I found that the splashes I had observed were being made by Purple Martins (*Progne subis*) and a smaller species of swallow (either Bank or Rough-winged) which were feeding on may-flies (Ephemeroptera) that were coming to the surface to molt. This emergence was taking place along the east shore of the lake for about 1,000 yards and out into the lake for perhaps 400 yards. Often the birds picked the insects from the water, making hardly a splash. Almost as often, however, they made a large splash, sometimes almost disappearing beneath the water. The flies actually on

the surface were so abundant that it does not seem likely that the birds were attempting to capture those still under water, but I can offer no other explanation for the splashing. This feeding activity continued for the remaining half-hour of daylight.—CARL D. RIGGS, *University of Michigan, Ann Arbor.*

House Wren feeding a Cowbird.—Three times during one period of observation on July 20, 1946, I saw a House Wren (*Troglodytes aëdon*) feed a large (40.5 grams) Cowbird (*Molothrus ater*) near our house on the Edwin S. George Reserve, Pinckney, southeastern Michigan. Friedmann (1929, "The Cowbirds," p. 255) states that the House Wren is a "rarely imposed upon species. It is merely mentioned as a molothrine victim by Bendire and also by Davie, while Kells, (Auk 1885, p. 106), in Ontario, writes that during 1884 he found young Cowbirds in the nests of several species among which he lists the present one."

The only Wren family near our house had four young Wrens two or three days old in a nest box eight paces from where the Wren was feeding the Cowbird. It seems possible that the male Wren was caring for a Cowbird from an earlier Wren brood while the female was looking after the newly hatched young; on the other hand, he may have adopted a young Cowbird that had been reared by other foster parents.—FRANCES HAMERSTROM, *Edwin S. George Reserve, Pinckney, Michigan.*

Birds eating blossoms.—Search of a considerable number of publications discloses only a few records of the eating of blossoms by birds other than the gallinaceous browsers. In Baltimore in 1945 and 1946 I occasionally found English Sparrows (*Passer domesticus*) feeding on the petals and stamens of apple, pear, and cherry blossoms, and once saw a Mockingbird (*Mimus polyglottos*) feed similarly between phrases of song in an apple tree. Mention of this to fellow-members of the Lancaster County, Pennsylvania, Bird Club produced in the club's *Bulletin* (No. 9, 1946:10-11) notes by Louise F. A. Tanger on a Cardinal (*Richmondia cardinalis*) eating forsythia blossoms and by Mary Grebinger on Cedar Waxwings (*Bombycilla cedrorum*) in an apple tree "tearing the petals off, holding them in their beaks for a moment, and then letting them fall." I have found records of English Sparrows eating pea and bean flowers (*U.S. Dept. Agric. Tech. Bull.* 711, 1940:30), Galapagos Finches (*Geospiza* spp.) eating various flowers (*Condor* 47, 1945:179, 188), and (in England) the Marsh-Tit (*Parus palustris dresseri*) and Wood-Pigeon (*Columba p. palumbus*) feeding on plum blossoms (*Brit. Birds*, 36, 1942:141).—HERVEY BRACKBILL, *4608 Springdale Avenue, Baltimore 7, Maryland.*

Period of dependency in the American Robin.—Observations on five American Robins (*Turdus migratorius*) color-banded as nestlings in Baltimore, Maryland, make it possible to elaborate on the following statement by Howell (1942. *Amer. Midl. Nat.*, 28:583): "It appears that the young are dependent on the parents, and the male in particular, for less than four weeks. While young that are four weeks old do beg from their parents, they receive little assistance." Of the five birds I watched, two were from first broods, and three from a second brood. Attempts at self-feeding began at about the age of 20 days; most of the fledglings remained partly dependent through the age of 28 to 31 days; and they remained in the home territories through the age of 30 to 38 days. The observations on each bird are as follows:

O-RA: Hatched night of April 21-22, 1945; left nest May 6, aged 14 days; next seen May 12, aged 20 days, picking at ground ineffectively; first seen to obtain food (inanimate) May 16, aged 24 days; last seen fed by parent May 23,

aged 31 days; last seen in territory May 30, aged 38 days. (This bird, the only one raised from its nest, was cared for entirely by the female parent both in the nest and out. May 23, on the evening of which it was still being fed, was the day on which the female completed her second set of 4 eggs; both daytime incubation and night-roosting on the nest began on this day.)

O-WA: Hatched May 2 or 3, 1945; left nest May 16, aged 13 or 14 days; next seen May 20, dependent; first seen to pick at ground, apparently effectively at times, May 23, aged 20 or 21 days; last seen fed by parent May 23, but still in close company of one parent and probably fed May 31, aged 28 or 29 days; apparently independent June 1, aged 29 or 30 days; last seen in territory June 5, aged 33 or 34 days.

A-RG: Hatched June 4, 1945; left nest June 17, aged 13 days; partly independent by June 24, aged 20 days; last seen fed by parent June 28, aged 24 days; definitely independent July 9, aged 35 days; last seen in territory July 11, aged 37 days.

AR: Hatched June 4, 1945; left nest June 17, aged 13 days; partly independent by June 24, aged 20 days; last seen fed by parent June 27, aged 23 days; last seen in territory July 4, aged 30 days.

AW-O: Hatched June 4, 1945; left nest June 17, aged 13 days; partly independent by July 1, aged 27 days; fed by parent as late as July 4, aged 30 days, and probably July 7, aged 33 days; last seen in territory July 8, aged 34 days.

Observations of fledgling O-RA throw some light on the development of self-feeding ability. As stated above, this bird at the age of 20 days sometimes pecked sharply at the ground in a way that looked purposeful but was entirely ineffective: watched at close range as it stood on bare ground, no targets of the pecks could be discerned, and no swallowing was apparent afterward. At 24 days, however, O-RA was successfully picking cherries from a tree.

At 28 days, O-RA was having a little success with animate food. Foraging over lawns, it ran and paused, and gazed intently, like an adult. But it was usually too slow in snatching at its quarry, and I repeatedly saw the insects it struck at fly safely away. It was also making erroneous food choices, as shown when it once picked up some object and then promptly dropped it.

At 30 days, O-RA spent more of its time than before in quest of live food, but still seemed to stab too slowly to catch many insects, still erred in its choices, and learned only slowly from its mistakes. Once, for instance, it picked up some rotted leaves—and this with a quick pounce, as if they were moving prey—but immediately dropped them with a shake of the head that seemed to mean that they were distasteful; nevertheless, it almost at once picked up another piece of rotted leaf, discarding it in the same way.

An incident that seems to show a parent influencing its offspring to feed itself occurred during my observation of fledgling O-WA. Occasionally picking up some food itself, but chiefly being fed by its male parent, this bird when 20 or 21 days old once flew up onto my pull-string banding trap. Shortly the male parent appeared with a billful of bread. He did not fly directly to the fledgling and feed it, however; he alighted on the ground a few yards away, walked a little nearer, then flew up and past the young bird, landing on the ground a couple of yards beyond; he repeated this several times. Then, a few times, he walked toward O-WA and retreated again. Once he put his whole load of bread down on the ground, and then picked it up again, piece by piece. During all of this time the fledgling had been begging on the top of the trap, and now it finally flew down to the male on the ground and was fed, following which, the male flew away. The male's behavior was not caused by fear of the trap; he had been feeding there regularly himself, and just before this occurrence, he had got food there and fed O-WA beside it.—HERVEY BRACKBILL, 4608 Springdale Avenue, Baltimore 7, Maryland.

Aberrant sexual behavior in the American Robin.—At Baltimore, Maryland, on May 31, 1946, an adult American Robin (*Turdus migratorius*) copulated four times in about half a minute with a fledgling that was less than 24 hours out of the nest.

The fledgling was squatting upon my lawn, and the adult was already copulating when I first noticed the birds from a window 20 yards away. The adult dismounted, moved a few yards in front of the fledgling, then flew back and copulated again. Twice more, at intervals of several seconds, this behavior was repeated, the young bird remaining all the while in its original squatting position. When the adult moved away again, I left the window for a matter of seconds to get a binocular; upon returning, I found only the fledgling on the lawn, but on the roof of a garage a couple of yards away was the color-banded male of a pair that had nested next door, and when shortly the fledgling flew into a bush, I saw by its color band that it was one of this male's own offspring. Since my lawn was a jealously-defended part of the male's territory, and there had been no sound of conflict while I was getting my binocular, there is little doubt that he himself was the bird I had seen copulating with his fledgling.

The incident occurred at 6 a.m. The young bird had left the nest the day before (May 30), some time between 6 a.m. and 4:15 p.m., at the normal nest-leaving age of 13 to 14 days.—HERVEY BRACKBILL, 4608 Springdale Avenue, Baltimore 7, Maryland.

Choice of nest-site in the American Robin.—Assuming that the female American Robin (*Turdus migratorius*) generally selects the site of the nest she builds, successive nestings of color-banded females at Baltimore, Maryland, indicate that some birds show a limited amount of preference for a particular type of nest site but others show none.

Three nests of one female were all about 8½ feet above the ground, but otherwise the locations differed. The first nest in 1945 was in a 10-foot spruce, the second in a rose vine on a trellis against a house. The second in 1946 (the first was not found) was on a grape arbor. I believe this bird's mates (unbanded) in the two years were different ones.

Five successive nestings of a second female have been observed, and, except for the re-use of one nest, there were no similarities. The first nest in 1945 was 11 feet up in a climber rose on a porch; this nest was re-used but collapsed with the nestlings; the third nesting was 15 feet up in a 20-foot apple tree. The first nest in 1946 was 9½ feet up in a 12-foot lilac, and the second 22½ feet up in a tall pin oak. This bird had different mates in the two years.

Two successive nests of a third female were found. The first was on the top edge of a second-floor window shutter and was destroyed during the incubation period; the second nesting was 6 feet up in a 6½-foot bush.—HERVEY BRACKBILL, 4608 Springdale Avenue, Baltimore 7, Maryland.

EDITORIAL

Under present conditions it seems to be impossible to prevent the mailing of a few *Bulletins* that are in some way defective. We can only express our regret and ask that Members let us replace them with perfect copies. If Members will return the defective copies to the Editor, it will help him to learn just what errors have been made and to take steps to prevent their repetition.

We are glad to have Members send in duplicate copies or copies of the *Bulletin* that they no longer need. We can usually put such copies to good use, especially now that we need to replace sets of the *Bulletin* in war-damaged European libraries. However, only in the case of rare numbers is the Club justified in buying copies or exchanging others for them. The only rare numbers among those published in the last twenty years are those for March 1930 and for March 1941. Members will do the Club a great service by sending in any spare copies of these two issues.

A "Book Purchase Fund" has been started by Members interested in providing for the purchase of books, especially new books, for the Wilson Ornithological Club Library. The money already received makes possible the purchase of several of the books in greatest demand. Members who wish to make contributions, however small, to this Fund should send their gifts to the Club's Treasurer.

OBITUARY

PERCY A. TAVERNER, dean of Canadian ornithologists, died in Ottawa on May 9, 1947, aged seventy-one. He was a British Empire Member of the British Ornithologists' Union and a Fellow and former Council member of the American Ornithologists' Union. He had been the curator of the bird collection of the National Museum of Canada for many years and was made Honorary Curator of Birds when he retired in 1942. His publications included many papers on the classification, distribution, and conservation of Canadian birds and several excellent manuals: "Birds of Eastern Canada" (1919), "Birds of Western Canada" (1926), and "Birds of Canada" (1934).

J. WARREN JACOBS, student of the eggs and nesting habits of birds, died February 27, 1947, at Waynesburg, Pennsylvania, at the age of seventy-eight. The value of his work was recognized by his election to Membership in the American Ornithologists' Union in 1904.

ORNITHOLOGICAL NEWS

Theodora Nelson has been appointed Editor of the Transactions and Proceedings of the Linnaean Society of New York.

Albert F. Ganier has retired from the editorship of the *Migrant*, official publication of the Tennessee Ornithological Society. He had been Editor of the *Migrant* for several years and had been on its editorial staff since its founding seventeen years ago. His successor is James T. Tanner, Assistant Professor of Zoology at the University of Tennessee and the author of "The Ivory-billed Woodpecker" (1942).

Frederick C. Lincoln, who is now Assistant to the Director of the United States Fish and Wildlife Service, has announced a reorganization of the Section of which he was formerly chief:

"The Section of Distribution and Migration of Birds is now divided into two units. The first, which continues the name of the old Section, will be under the leadership of Dr. John W. Aldrich as Chief. For the past year he has served as Assistant Chief. Dr. Aldrich has his headquarters in the U.S. National Museum in Washington, from which point he will direct the work on bird banding and bird migration, including the work at the Patuxent Research Refuge. He also is in charge of the Service collections of birds, most of which are incorporated in those of the National Museum.

"The second unit, Waterfowl Management Investigations, will be under the direction of Mr. Cecil S. Williams as Chief. His headquarters will be at the central offices of the Service in the Merchandise Mart, Chicago, Illinois. The flyway biologists will operate under his direction."

Richard L. Weaver, who was Educational Director of the Audubon Nature Center at Greenwich, Connecticut, has been appointed Program Director of the North Carolina Resource-Use Education Commission at Chapel Hill.

Austin L. Rand, of Ottawa, Ontario, has been appointed Curator of Birds of the Chicago Natural History Museum, with Emmet R. Blake as Associate Curator.

Alexander Sprunt, Jr., has been awarded a Guggenheim Fellowship for the preparation of a book on the birds of South Carolina.

NEW LIFE MEMBER



LILLIAN C. STONER finished her collegiate work at the State University of Iowa, and later acted as assistant ornithologist on the Barbados-Antigua and the Fiji-New Zealand expeditions which were sponsored by the University. Her interest in birds increased with the years as she assisted her late husband, Dayton Stoner, in his bird banding and his studies of temperature and growth in Bank, Barn, and Cliff Swallows. At present, Mrs. Stoner is associated with the New York State Museum and is completing for publication a regional study, "Birds of Washington Park" (Albany, New York), which was made jointly with Dayton Stoner. Mrs. Stoner

is a Patron of the American Ornithologists' Union and an active member of a number of other scientific societies.

NEW LIFE MEMBER



MARGARET MORSE NICE received the A.B. degree from Mount Holyoke College and the A.M. from Clark University. She is best known for her great study of the Song Sparrow, for which the American Ornithologists' Union awarded her the Brewster Medal, but she is also the author of the "Birds of Oklahoma" and of many papers on the life history and behavior of birds. She is an Associate Editor of *Bird Banding* and of *The Wilson Bulletin* and has always devoted much time and energy to helping fellow ornithologists perfect their manuscripts. Mrs. Nice is a past President of the Wilson Ornithological Club, a Fellow of the American Orni-

thologists Union, and has been given honorary membership in the leading ornithological societies of Europe.

REPORT OF THE TREASURER FOR 1946

Balance as shown by last report, dated Dec. 31, 1945. \$ 541.60

Receipts, Jan. 1 to Dec. 31, 1946

Dues:

Associate	1558.05
Active	1411.70
Sustaining	379.75
Subscriptions to <i>The Wilson Bulletin</i>	189.75
Sale of back issues of <i>The Wilson Bulletin</i> and of reprints	173.81
Interest from Endowment Fund	141.81
Contributions for printing of insert plates	25.00
Gifts: miscellaneous receipts	6.68

Total receipts\$4428.15

Disbursements

<i>The Wilson Bulletin</i> : printing, engraving, mailing ...	\$3501.17
President's expense: printing, postage	5.00
Editor's expense: reprints, postage, secretarial aid ...	375.50
Secretary's expense: stationery, postage, clerical aid ..	236.04
Treasurer's expense: stationery, postage, clerical aid .	140.19
Membership Committee's expense: postage, printing .	54.53
Bank charges; foreign exchange; corporation papers .	5.44
Annual Meeting expense	72.93

Total disbursements\$4390.80

Balance on hand in Citizens Fidelity Bank and Trust

. Co., Louisville, Kentucky 37.35

\$4428.15

Louis Agassiz Fuertes Research Grant Fund (special gift)\$ 500.00

ENDOWMENT FUND

Cash balance in savings account, Dec. 31, 1945\$ 390.38

*Received during year*Interest on U.S. bonds and on savings account 143.05
Life Membership payments 947.00

Total	\$1480.43
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Transferred to checking account (interest) 141.81
Bank charge (State tax) 1.24

Total	143.05
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Balance\$1337.38

Bonds:

U.S. Postal Savings Coupon Bonds, dated July 1, 1935	\$ 780.00
U.S. Savings Bonds, Series C, dated Aug. 1, 1938 (maturity value, \$1075.00)	989.00
U.S. Savings Bonds, Series G, dated Sept. 1, 1943 (maturity value, \$1000.00)	951.00
U.S. Savings Bonds, Series G, dated Dec. 20, 1944 (maturity value, \$1500.00)	1443.00
U.S. Savings Bonds, Series G, dated July 1, 1945 (maturity value, \$900.00)	880.20
U.S. Savings Bonds, Series G, dated Oct. 1, 1945 (maturity value, \$1400.00)	1369.20

Total Endowment Fund	\$7749.78
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Note: Bonds are now carried in our Endowment Fund at their present redeemable value rather than at their maturity value as heretofore.

Respectfully submitted,

BURT L. MONROE, *Treasurer*

December 31, 1946

Approved by Auditing Committee

Harold Wing

George H. Lowery, Jr.

ORNITHOLOGICAL LITERATURE

THE RUFFED GROUSE: ITS LIFE STORY, ECOLOGY AND MANAGEMENT. By Frank C. Edminster. The Macmillan Company, New York, 1947: 6 × 9¼ in., xxvi + 385 pp., 56 plates and 17 figures. \$5.00.

Deservedly one of the most popular of American game birds, the Ruffed Grouse has been the subject of an extensive literature. Its life history, ecology, and management involve problems which have challenged investigators. In no volume previous to this one, however, has the species been treated so fully.

Mr. Edminster's preparation for writing this book includes seven years of intensive grouse study, much of it in the vicinity of Ithaca, New York, and a wider experience with the bird gained in his occupation as biologist with the Soil Conservation Service. His approach is broadly ecological, with special emphasis on food and cover requirements, inter-specific relationships, and management problems. Life history receives proper attention; techniques of grouse propagation are passed over lightly.

The core of the book concerns the ecology of the Ruffed Grouse—its shelter, food, and water requirements; its reactions to weather conditions; its relationships with other species, particularly those which are predatory upon it; its diseases and parasites; its productivity and the factors which influence populations; and finally its relations with man. Other chapters deal with classification, nomenclature, and description; an account of the history of the species in eastern United States; a "biography" of the bird; and a presentation of management problems.

The volume might well have been titled, or subtitled, differently, since virtually all the data and observations presented relate to the northeastern portion of the United States. There is no attempt to make the life history a definitive one, since the study does not apply directly to the species in other portions of its extensive range. Within the limits which the author himself sets, however, the treatment is comprehensive.

Data from many food habits studies are presented in tabular form and are discussed in the text. A list of the twenty-five most important plant foods of the grouse in eastern North America is given. In his discussion of cover requirements Edminster follows the sound principle of treating separately each of the northeastern forest types, and of discussing the grouse's adaptability to each, as well as to the changes which man has brought about.

In considering the puzzling problems of grouse "cycles," Edminster has drawn heavily upon the studies and publications of other investigators, upon Allen, Stoddard, Gross, King, Stoddart, Bump, and many more. He presents evidence of a significant correlation between periods of grouse decline and periods of unfavorable weather. From his study of weather data and of known "lows" in past grouse populations he concludes (page 193):

"If there is any certain connection between adverse weather and grouse decimations, it apparently is tied in with excessive snow in February and March, usually linked with extremely low temperatures, or with low temperatures in June . . . All of the notable grouse declines in New York since 1890, when the weather records began, can be explained by these conditions . . ."

Concerning predation, Edminster writes (page 215): "From all the data on hand, we must conclude that intensive predator control of any type, while it may be markedly effective in reducing nesting loss, will not produce a higher shootable fall population of grouse during years of high abundance. During years of low grouse numbers, the evidence shows that predator control may increase appreciably the fall grouse population. But even under these conditions, with the grouse population increasing anyway, the justification for deliberate predator control is very doubtful."

I confess to a distaste for interpretation of a wild animal's emotions, reactions, and behavior in human terms. Thus in Chapter 3, the author relates the biography of a grouse family in a highly anthropomorphic manner. On page 28, in an account of a young hen grouse's approach to a drumming male, the story runs: "The hen bird's heart was in her throat as she came closer. Then suddenly, as she peered around the end of an old windfall, she beheld the object of her search. It was the grandest grouse she had ever seen. She froze in her tracks." On page 34, the hen's emotions and reactions following mating are described: "As she walked easily along, no doubt daydreaming of the wonderful new world unfolding to her, she would pick up dead leaves and toss them over her shoulder in careless abandon." Interspersed in this fanciful account are the factual discussions of drumming, sex rhythm, incubation, and other important matters.

As is too frequently the case with present-day books, errors in makeup and faulty proof-reading are apparent. Many of the subheads are set in type identical with that of the body of the book though others are in boldface. On pages 88-89 some of the subheads are punctuated with colons, others with periods. On page 36 the scream of the Red-tailed Hawk is spoken of as "renting the soft air." Further, in my copy at least, there are many pages with imperfections or holes in the paper.

To voice another petty prejudice, if an author must use foreign words or phrases (e.g., *lebensraum* on page 44), I would be happy if he did not feel it necessary to translate them for me.

There is constant danger, however, that over-emphasis by a reviewer on matters of style and typographical imperfections will blind the reader to the real merits of a book. Mr. Edminster has produced an excellent volume, the most complete treatment available of this important game species. He has rendered real service to the science of ornithology and to the wildlife management profession. —Maurice Brooks.

BIBLIOGRAPHY *

PHYSIOLOGY (including weights)

- BERNARD, RICHARD, RAYMOND CAYOUILLE, and J.-A. BRASSARD. Mesure de la Température Normale des Oiseaux au Moyen de Thermomètres à Mercure. *Rev. Can. de Biol.* 3 (2), Apr. 1944:251-277, 5 figs.
- WILLIAMS, RALPH B. Infestation of Raptorial by *Ornithodoros aquilae*. *Auk* 64 (2), Apr. 1947:185-188, pls. 7-8.

PARASITES, ABNORMALITIES, AND DISEASE

- HILL, HAROLD M., and TELFORD H. WORK. Protocalliphora Larvae Infesting Nestling Birds of Prey. *Condor* 49 (2), March-Apr. 1947:74-75, fig. 14.

ANATOMY (including plumage and molt)

- CALHOUN, JOHN B. Variations in the plumage of the English Sparrow. *Auk* 64 (2), Apr. 1947:305-306.
- SHORTT, T. M. Wandering Tattlers, *Heteroscelus incanus*. *Wils. Bull.* 59 (1), March 1947: pl. 1. (Downy young figured in color.)

DISTRIBUTION AND TAXONOMY

- BAKER, ROLLIN H. Observations on the Birds of the North Atlantic. *Auk* 64 (2), Apr. 1947:245-259, 5 figs.
- BUECHNER, HELMUT K. Birds of Kerr County, Texas. *Trans. Kans. Acad. Sci.* 49 (3), Dec. 1946:357-364, map.
- GANIER, ALBERT F., and ALFRED CLEBSCH. Breeding Birds of the Unicoi Mountains. *Migrant* 17 (4), Dec. 1946:53-59.

* Titles of papers published in the last number of *The Wilson Bulletin* are included for the convenience of members who clip titles from reprints of this section for their own bibliographic files. Reprints of this section are available at a small cost.

- GOODRICH, ARTHUR L. Species of Birds Added to the Kansas Faunal List Since 1900, With Reference to the First Record. *Trans. Kans. Acad. Sci.* 49 (4), March 1947:420-432.
- GRAYCE, ROBERT. Birds of the MacMillan Labrador Expedition, 1946. *Auk* 64 (2), Apr. 1947: 275-280.
- HOWARD, HILDEGARDE. An Ancestral Golden Eagle Raises a Question in Taxonomy. *Auk* 64 (2), Apr. 1947:287-291.
- LINCOLN, FREDERICK C. Bullock's Oriole in Arkansas. *Auk* 64 (2), Apr. 1947: 318-320.
- MANNING, T. H. Bird and mammal notes from the east side of Hudson Bay. *Can. Field-Nat.* 60 (4), July-Aug. 1946 [1947]:71-85, 4 photos.
- MILLER, ALDEN H. A New Genus of Icterid from Rancho La Brea. *Condor* 49 (1), Jan.-Feb. 1947:22-24, fig. 4. (*Pandanaris convexa*, new genus and species.)
- MOORE, ROBERT T. New Species of Parrot and Race of Quail from Mexico. *Proc. Biol. Soc. Wash.* 60, Apr. 3, 1947:27-28. (*Rhynchopsitta terrisi* new sp. and *Lophortyx gambelii friedmanni* new subspp.)
- MOORE, ROBERT T. New Owls of the Genera *Otus* and *Glaucidium*. *Proc. Biol. Soc. Wash.* 60, Apr. 3, 1947:31-35. (*Otus cooperi chiapensis* and *Glaucidium minutissimum griscomi* new subspp.)
- NEFF, JOHNSON A. Notes on Some Birds of Sonora, Mexico. *Condor* 49 (1), Jan.-Feb. 1947: 32-34, fig. 5.
- PHILLIPS, ALLAN R. The Races of MacGillivray's Warbler. *Auk* 64 (2), Apr. 1947:296-300. (*Oporornis tolmiei monticola*, *O.t. austinsmithi*, and *O.t. intermedia* new subspp.)
- RAND, A. L. List of Yukon Birds and Those of the Canol Road. *Natl. Mus. Can. Bull. No. 105 (Biol. Ser. No. 33)*, 1946:1-76, map.
- RAND, A. L. A new race of the purple finch, *Carpodacus purpureus* (Gmelin). *Can. Field-Nat.* 60 (5), Sept.-Oct. 1946 [1947]:95-96. (*Carpodacus purpureus taverneri* new subspp.)
- SOPER, J. DEWEY. Supplementary data concerning the blue goose. *Can. Field-Nat.* 60 (5), Sept.-Oct. 1946 [1947]:110-113. (*Chen caerulescens*.)
- STARRETT, WILLIAM C., and KEITH L. DIXON. Notes on the Pomarine Jaeger in the Atlantic and Caribbean. *Auk* 64 (2), Apr. 1947:320.
- STEWART, ROBERT E., and CHANDLER S. ROBBINS. Recent Observations on Maryland Birds. *Auk* 64 (2), Apr. 1947:266-274.
- STUPKA, ARTHUR. Occurrence of the Saw-whet Owl in the Great Smoky Mountains during the Breeding Season. *Migrant* 17 (4), Dec. 1946:60-62.
- SUTTON, GEORGE MIKSCH. Greenland Wheatear in southern Baffin Island. *Auk* 64 (2), Apr. 1947:324-325.
- TODD, W. E. CLYDE. The case of the Yellow Warbler. *Auk* 64 (2), Apr. 1947: 325-326.
- TODD, W. E. CLYDE. A new name for *Bonasa umbellus canescens* Todd. *Auk* 64 (2), Apr. 1947:326.
- VAN ROSSEM, A. J. The Dakota Song Sparrow in Arizona. *Wils. Bull.* 59 (1), March 1947:38.
- WILSON, BRUCE V. The Western Meadowlark in Michigan. *Jack-Pine Warbler* 25 (1), Jan. 1947:3-12, map, pl. 1.
- YOUNG, HOWARD. Further Studies on the Cardinal. *Passenger Pigeon* 8 (4), Oct. 1946:104-109, 2 maps.
See also *Ecology*: Johnston.

EVOLUTION AND SPECIATION

- HOWARD, HILDEGARDE. A Preliminary Survey of Trends in Avian Evolution from Pleistocene to Recent Time. *Condor* 49 (1), Jan.-Feb. 1947: 10-13.

MIGRATION AND FLIGHT

- BAUGHMAN, J. L. A very early notice of hawk migration. *Auk* 64 (2), Apr. 1947:304.
- BEAMER, L. H. Migration of the American rough-legged hawk, *Buteo lagopus*, at Meaford, Ontario. *Can. Field-Nat.* 60 (5), Sept.-Oct. 1946 [1947]:117.
- BROLEY, CHARLES L. Migration and Nesting of Florida Bald Eagles. *Wils. Bull.* 59 (1), March 1947:3-20, pls. 2-4, map.
- CURRAN, C. H. Speed of a Great Blue Heron. *Auk* 64 (2), Apr. 1947:309.
- HARDY, ROSS. Utah's Book Cliffs and Bird Migration. *Auk* 64 (2), Apr. 1947:284-287.
- ODUM, HOWARD T. The possible effect of cloud cover on bird migration in Central America. *Auk* 64 (2), Apr. 1947: 316-317, 1 fig.
- STARRETT, WILLIAM C., and KEITH L. DIXON. Sora rail at sea. *Wils. Bull.* 59 (1), March 1947:37.
- WILLIAMS, GEORGE G. Lowery on Trans-Gulf Migrations. *Auk* 64 (2), Apr. 1947: 217-238.

See also *Distribution and Taxonomy*: Soper; *Population*: Hawkins *et al.*

ECOLOGY

- BROOKS, MAURICE. Breeding Habitats of Certain Wood Warblers in the Unglaciated Appalachian Region. *Auk* 64 (2), Apr. 1947: 291-295.
- EVANS, FRANCIS C., and JOHN T. EMLÉN, JR. Ecological Notes on the Prey Selected by a Barn Owl. *Condor* 49 (1), Jan.-Feb. 1947:3-9, figs. 1-2.
- JOHNSTON, VERNA R. Breeding Birds of the Forest Edge in Illinois. *Condor* 49 (2), March-Apr. 1947:45-53, figs. 7-9.

See also *Population*: Kendeigh.

LIFE HISTORY AND BEHAVIOR

- ALEXANDER, MAURICE M. An attack on Ring-necked Pheasants by a Goshawk. *Wils. Bull.* 59 (1), March 1947:36.
- BALDWIN, PAUL H. The Life History of the Laysan Rail. *Condor* 49 (1), Jan.-Feb. 1947:14-21, fig. 3.
- BRAEY, L. DE. Au près du Nid de L'Hirondelle de Cheminée, *Hirundo rustica rustica* Linné. *Gerfaut* 36 (3), 1946:133-193, 20 figs.
- BROUN, MAURICE. Golden Eagle captures Red-shouldered Hawk. *Auk* 64 (2), Apr. 1947:317-318.
- CHAPMAN, H. H. Some Observations on the Carolina Wren in La Salle Parish, Louisiana. *Auk* 64 (2), Apr. 1947:199-201.
- COMMON, MINNA ANTHONY. The Robin Nests. *Auk* 64 (2), Apr. 1947:238-245, 1 fig.
- EVENDEN, FRED G., JR. Nesting Studies of the Black-billed Magpie in Southern Idaho. *Auk* 64 (2), Apr. 1947:260-266.
- GROSKIN, HORACE. Duck Hawks breeding in the business center of Philadelphia, Pennsylvania. *Auk* 64 (2), Apr. 1947:312-314.
- LASKEY, AMELIA R. Evidence of polyandry at a Bluebird nest. *Auk* 64 (2), Apr. 1947:314-315.
- MASON, A. G. Territory in the Ringed Plover. *Brit. Birds* 40 (3), March 1947: 66-70. (*Charadrius h. hiaticula*.)
- MASON, C. R. Robin fighting its reflection in a hub cap. *Auk* 64 (2), Apr. 1947: 310-311, pl. 11.
- MOORE, ROBERT T. Habits of Male Hummingbirds Near Their Nests. *Wils. Bull.* 59 (1), March 1947:21-25.
- MOORE, TILFORD, Unusual Cowbird victims. *Auk* 64 (2), Apr. 1947: 308.
- RIGGS, AUSTEN FOX II. Unusual nest of Wood Thrush. *Auk* 64 (2), Apr. 1947: 310.

- RODECK, HUGO G. Incubation in the Western Flycatcher. *Condor* 49 (2), March-Apr. 1947:86.
- SCHMID, FREDERICK C. Unusual behavior of a Cooper's Hawk. *Auk* 64 (2), Apr. 1947:307-308.
- SETZER, HENRY W., and R. L. MONTELL. Nesting of the Yellow-headed Blackbird in Douglas County, Kansas. *Trans. Kans. Acad. Sci.* 49 (2), Sept. 1946:208-209.
- SKUTCH, ALEXANDER F. A Nesting of the Plumbeous Kite in Ecuador. *Condor* 49 (1), Jan.-Feb. 1947:25-31.
- SKUTCH, ALEXANDER F. A nest of the Sun-bittern in Costa Rica. *Wils. Bull.* 59 (1), March 1947:38.
- SKUTCH, ALEXANDER F. Life History of the Turquoise-browed Motmot. *Auk* 64 (2), Apr. 1947: 201-217, pl. 9, 1 fig.
- SMITH, WINNIFRED. Orchard Orioles. *Passenger Pigeon* 9 (1), Jan. 1947:8-16, 2 photos.
- TRAUTMAN, MILTON B. Courtship Behavior of the Black Duck. *Wils. Bull.* 59 (1), March 1947:26-35.
- VAN SOMEREN, V. G. L. Onset of Sexual Activity. *Ibis* 89, Jan. 1947:51-56.
- VAURIE, CHARLES. Chimney Swifts bathing. *Auk* 64 (2), Apr. 1947:308-309.
- WESTON, HENRY G., JR. Breeding Behavior of the Black-headed Grosbeak. *Condor* 49 (2), March-Apr. 1947:54-73, figs. 10-13.
- YOUNGORTH, WILLIAM. The Sprague's Pipit at Home. *Iowa Bird Life* 17 (1), March 1947:3-4, 1 fig.
See also *Anatomy*: Shortt; *Distribution and Taxonomy*: Neff; *Migration and Flight*: Broley.

FOOD AND FEEDING HABITS

- BUNKER, ALF. Gulls taking fish from mergansers. *Can. Field-Nat.* 60 (5), Sept.-Oct. 1946 [1947]:115.
- DICKINSON, J. C. JR. Unusual feeding habits of certain herons. *Auk* 64 (2) Apr. 1947:306-307.
- HUBBARD, DOUGLASS H. Red-tailed Hawk Feeding on Coot. *Condor* 49 (2), March-Apr. 1947:83-84.
- KNOWLTON, G. F., and P. E. TELFORD. Insect food of the Eastern Sparrow Hawk in Cache Valley, Utah. *Auk* 64 (2), Apr. 1947:311.
- RUSSELL, WARD C. Mountain Chickadees Feeding Young Williamson Sapsuckers. *Condor* 49 (2), March-Apr. 1947:83, fig. 16.
- SCHOFFMAN, ROBERT J. Food of Game Ducks at Reelfoot Lake, Tennessee. *Jour. Tenn. Acad. Sci.* 22 (1), Jan. 1947:4-8.
See also *Ecology*: Evans and Emlen.

POPULATION (including age, and mortality rates)

- FRANK, WILLIAM JOHN. Ruffed Grouse Censusing in West-central Connecticut. *Trans. 11th N. Amer. Wildl. Conf.* 1946:287-296.
- HAWKINS, ARTHUR S., FRANK C. BELLROSE, JR., and ROBERT H. SMITH. A Waterfowl Reconnaissance in the Grand Prairie Region of Arkansas. *Trans. 11th N. Amer. Wildl. Conf.* 1946:394-403.
- KENDEIGH, S. CHARLES. Bird Population Studies in the Coniferous Forest Biome during a Spruce Budworm Outbreak. *Dept. Lands and Forests, Ont. Can. Div. Res. Biol. Bull. No. 1*, 1947:1-100, 32 figs.
- LASKEY, AMELIA R. Snapping turtles apparently preying upon passerine birds. *Auk* 64 (2), Apr. 1947:315-316.
- MARSHALL, HUBERT. Longevity of the American Herring Gull. *Auk* 64 (2), Apr. 1947: 188-198.
- MAYR, ERNST. A catastrophic decrease in a starling population. *Wils. Bull.* 59 (1), March 1947:37.

TECHNIQUES (*including banding*)

See *Physiology*: Bernard *et al.*

HISTORY, BIOGRAPHY, BIBLIOGRAPHY, AND INSTITUTIONS

MILLER, ROBERT C. Joseph Mailliard, 1857-1945. *Auk* 64 (2), Apr. 1947:300-302, pl. 10.

See also *Distribution and Taxonomy*: Goodrich; *Migration and Flight*: Baughman.

PALEONTOLOGY

HOWARD, HILDEGARDE. Wing Elements Assigned to Chendytes. *Condor* 49 (2), March-Apr. 1947: 76-77, fig. 15.

LANE, H. H. A Survey of the Fossil Vertebrates of Kansas, Part IV: Birds. *Trans. Kans. Acad. Sci.* 49 (4), March 1947:390-400, 1 fig.

See also *Distribution and Taxonomy*: Howard, Miller; *Evolution*: Howard.

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Of particular interest among the recent gifts are: "General Ornithology Laboratory Notebook," by A. A. Allen, L. A. Fuertes, and M. D. Pirnie, 1927; "Elementary Ornithology," by W. J. Baerg (revised edition), 1941; "Life Histories of North American Diving Birds. Order Pygopodes," by Arthur Cleveland Bent (reprinting), 1946; "The Birds of Illinois and Wisconsin," by Charles B. Cory, 1909; "The Birds of Oklahoma," by Margaret Morse Nice (revised edition), 1931; and "über die Vogelfauna der Binnengewässer Ålands," by Pontus Palmgren, 1936.

WILDLIFE CONSERVATION

Status of the Whooping Crane

Thirty-five years ago E. H. Forbush stated that "the Whooping Crane is doomed to extinction." According to Myron H. Swenk, who compiled so much valuable migration data in Nebraska, the most rapid decrease in the species in that State took place between 1890 and 1910. The year 1910 also seems to approximate the beginning of serious decline on the wintering grounds in Louisiana, but there was an earlier period of decline. By about 1800, for example, the Whooping Crane evidently was no longer observed on the Atlantic seaboard, and by the end of the nineteenth century it was gone from wintering areas east of the Mississippi.

We can find less than thirty of these magnificent birds alive today. Before discussing the status of this small remnant and our present efforts to prevent the long-threatened extinction of *Grus americana*, let us consider briefly some of the major reasons for its decline. They are fairly obvious. In a wild state, the Whooping Crane is a bird of vast open country. Its primitive breeding range appears to have included considerable portions of the central prairie region—northern Iowa, much of Minnesota, most of North Dakota, eastern Montana, and large areas in the prairie provinces of Manitoba, Saskatchewan, and Alberta. After the Civil War, as railroads were extended into much of this region, as lumbering became "big business" in Minnesota, as settlers moved rapidly into all the southern half of the area, great changes gradually took place in the environment. Drainage was soon intensive. Heavy cultivation of corn and grain crops followed. Vast breeding grounds of many of our waterfowl—and the best of the Whooping Crane nesting area—were soon gone. Prairie swales, marshes, and potholes that had produced a crop of young birds annually for countless years were suddenly destroyed.

Not only the breeding areas were affected by the Nation's expansion. In the heart of the Whooping Crane's wintering grounds, southwest Louisiana, and elsewhere on the Gulf Coast, there was a similar march of events. During the 1850's the first settlers had come to the interior prairie country of Louisiana. Cattle replaced bison; the wintering cranes and waterfowl provided a source of regular food for the pioneers. In the 'eighties came the railroad and more people. In the next decade the prairies were diked and plowed and became the country's new "rice bowl." The decline of many wildlife species, particularly the Whooping Crane, was rapid. In the 'nineties the only wintering range left to the cranes was the coastal marsh, where fur trapping had not yet become a general occupation. But the coastal strip was not sanctuary for long. When muskrat pelts went to one dollar and more in the 1920's the Whooping Cranes that wintered there were doomed. They lasted until about 1935.

Renewed interest in the fate of the Whooping Crane and more intensive coverage of the Gulf Coast by U.S. Fish and Wildlife Service and National Audubon Society personnel resulted in the "discovery" of only two wintering groups. In the winter of 1935-36 George B. Saunders reported fourteen Whooping Cranes on the St. Charles Ranch, Refugio County, Texas. The following winter this isolated coastal area was established as the Aransas Waterfowl Refuge by the (then)

U.S. Biological Survey. A second group of Whooping Cranes was found near White Lake, Vermilion Parish, Louisiana. The largest count here was made by John J. Lynch, U.S. Fish and Wildlife Service, who on May 15, 1939, saw eleven adults and two immatures.

In the spring of 1939 the known population consisted of eighteen birds in Texas (including four young-of-the-year) and thirteen in Louisiana (including two young-of-the-year). The Louisiana flock was resident. The continental total was then thirty-one Whooping Cranes.

There were two important welfare factors present on the Texas wintering grounds that were lacking in Louisiana: in Texas the Whooping Crane had literally thousands of acres of safe, adequate range that provided both protection and isolation. (An extension of the Intracoastal Waterway in 1940 threatened to cut through the best of this range, but the U.S. Engineers were persuaded to move the route so as to affect only six miles on the rim of the area instead of twelve miles right through the heart.)

In Louisiana a segment of the same waterway had been dredged in 1934 over a new route that crossed the deep marsh north of White Lake, destroying its isolation. Then, in the period from August 6 to 10, 1940, there was a rainfall which averaged twenty-two inches over that portion of the State. The water elevation at White Lake reached five feet above normal Gulf level. The flock of Whooping Cranes fled to the high ground near Gueydan or to near-by cheniers. When the flood subsided to normal (September 15), only three Whooping Cranes returned. It is likely that all ten missing birds had been shot. Within less than one month, possibly in a period of a few days, approximately thirty-three per cent of the known continental Whooping Crane population had been wiped out.

Today, with one or two birds left in Louisiana and twenty-five in Texas, the National Audubon Society and the U.S. Fish and Wildlife Service are cooperating in an effort to find some means of saving this splendid North American species from extinction. Conditions on the wintering grounds are being studied and welfare factors increased, possible destructive factors controlled. Migration routes are under scrutiny, and search is being continued for the unknown nesting grounds.
—Robert P. Allen.

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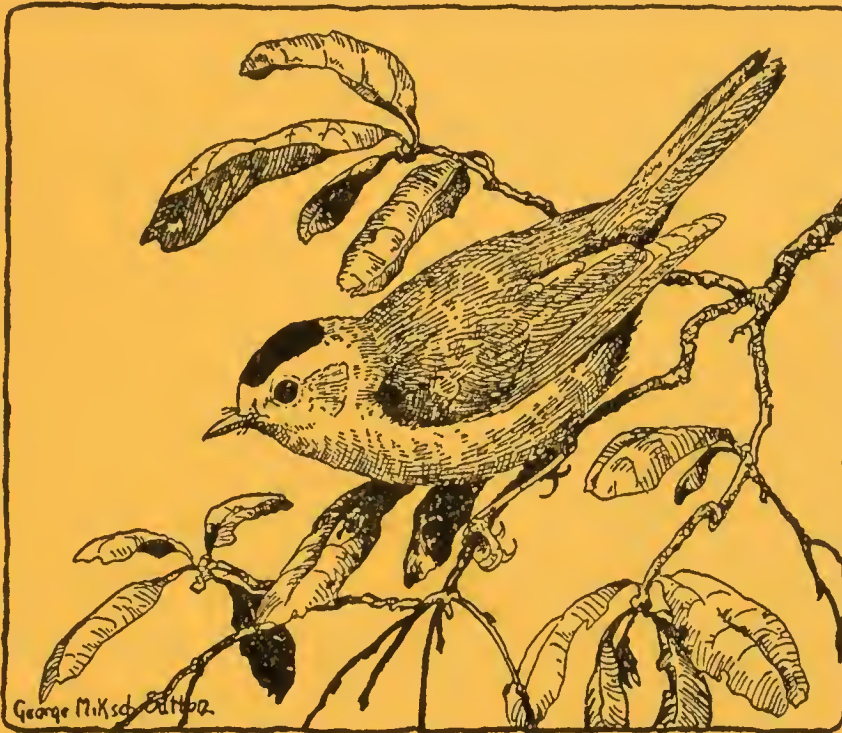
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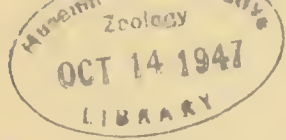
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Yellow-headed Blackbird (Xanthocephalus xanthocephalus) in phragmites, photographed by W. H. Carrick at Delta, Manitoba, May 16, 1946.

COMMON SENSE IN COMMON NAMES

BY LUDLOW GRISCOM

THERE is now quite an extensive literature on the subject of vernacular names; the most recent, by Eisenmann and Poor (1946. *Wilson Bulletin*, 58:210–215), attempts to suggest some “principles” of vernacular nomenclature. I have read all these papers with much interest, and reflected on the subject for years. If I might sum up the approach of the various authors, their premises, implied or expressed, would appear to be as follows: 1) “common” names are of great use in popular bird study, and they must be invented if necessary; 2) unfortunately, many have proved to be too local, inappropriate, misleading, or otherwise absurd; 3) some “simple and logical principles” should be formulated, by which appropriate and associative names can be selected; 4) the A.O.U. Check-List Committee are earnestly begged to do so, and are politely taken to task for having done badly in inventing subspecific names in the past, and having let everything else slide; 5) we learn that appropriate and associative names should not: a) give a false impression of taxonomic relationship, b) employ geographic or political divisions, c) use names of persons, or d) use incorrect descriptive names like “Palm” Warbler.

It seems to me high time that amateur bird students should realize that there is another side to the picture. Not being a member of the Check-List Committee, I am free to say that they are neither a group of moss-back conservatives, nor are they uninterested pedants, living at ease in a rarefied atmosphere of technical names. Actually premises one and three are fallacious and the Committee probably know it !

1. Common or vernacular names are *not* necessary for the amateur naturalist, and it is a psychosis to think so. The only mistake earlier A.O.U. Committees made was to *start* inventing vernacular names. The poor men have been sunk ever since !

2. The growth of knowledge of natural history inevitably makes older vernacular names too local, incorrect, or absurd on one count or another. The same fate is in store for a certain proportion of those invented today for recently described or little-known birds.

3. No “simple and logical principles” for vernacular nomenclature can be formulated. There are far too many birds; their variations, relationships, and ranges are not simple or logical. Their habits and habitats change from season to season, from one section of the continent to another, from century to century. Which season, which habitat, which section of the country is to be the basis for the “appropriate or associative” name?

Discussion. The only real origin of common names in history is a matter of degree of interest and observation of native peoples. The English and Germans were pretty good, the Hawaiians were astonishingly observant, the ancient Greeks and Romans were atrocious, as are most Latin Americans. In English the words crow, finch, swallow, wren, etc. go back to prehistoric times, and only scholars might tell us what these words originally meant. Our forefathers applied some of these old names to American birds on fancied resemblances. Totally different American birds were given descriptive names, for example: hummingbird, sapsucker, and road-runner. Native names were adopted and anglicized for others: ani, caracara, jacana, chachalaca. Others were onomatopoeic: pewee, bobolink, whip-poor-will.

It was more than a century ago that ornithologists discovered that the variety of species was great, and more and more old English names became group or family names. Species names were invented here and there; Wilson and Audubon were by no means happy in some of their choices. But when all is said and done, most birds of the world have no vernacular names in any language, and the question arises, why should they? What is the matter with the technical or scientific names?

Amateur bird students' reactions to technical names are curious and inconsistent. They refuse to learn *Uria lomvia* (which means nothing), and are perfectly content with the "common" name Brunnich's Murre, which also means nothing! Who can show that the latter is easier to remember than the former? A startling contrast in attitude is discovered the moment one turns to other branches of natural history. There are numerous students of beetles, butterflies, shells, ferns and wild flowers, shrubs and trees—the number of competent women in garden clubs alone puts the membership lists of the leading bird clubs to shame—and in these groups of living forms an enormous and staggering welter of species, genera, and families are known; yet no one has ever suggested that common or vernacular names for them should be invented out of whole cloth. There are nothing but the scientific or technical names, and in no time at all the interested amateurs rattle off these "Latin" names as readily as ornithologists do those of birds. Many of my readers will have some spiraea, cyclamen, Forsythia, crocus, scilla, Wistaria, or delphinium in their gardens, and know perfectly well what flowers these names represent. They are all technical generic names, freely used in default of a vernacular name. What of it that nobody now cares or knows who Wistar or Forsyth were?

There are just enough cases of the popular use of technical names of birds to prove my point. The critics of vernacular names have never objected to cotinga, trogon, or junco. They have never suggested dropping vireo, and reverting to the old vernacular name "greenlet." No Californian boggles over Phainopepla. Students on a holiday go to the Rio Grande Valley, hoping to add the Texas Pyrrhuloxia to their life list, their fun not in the least spoiled because

of its lack of a common name! Other vernacular names are minor corruptions of the technical name, like tanager and gallinule, possibly fulmar and pelican. Bird students freely talk nowadays about Accipiters and Buteos, they work over the difficult Empidonax flycatchers; they learn the difficult warblers in part by learning the characters for the Vermivoras and the Dendroicas, two recognizable genera completely lost in the numerous inappropriate "common" names. In recent decades other students have begun to travel in the tropics; they wish to identify birds in Mexico, Guatemala, and the Canal Zone belonging to families and genera utterly different from anything in the United States. But after the first spasm of regret that there were no "common" names, they got down to work and became perfectly at home in handling and using the technical names.

The welter of vernacular names in many languages, the absurdity or inappropriateness of many, and the great variety of species or types, led to the invention of the Linnaean system of technical nomenclature. The "simple or logical" system broke down, by sheer weight of numbers, the hopeless complexity of relationships and degrees of difference. A code of nomenclature had to be drawn up, and with a little study it was seen that the only hope for stabilization in the future was to invoke the principle of priority, the earliest name, and in certain cases to conserve a long used and well known name. The code *has* to be complex and difficult, special experts now sit on permanent commissions and arbitrate as many difficult cases per annum as possible. Many early names, absurd, barbaric, inappropriate, incorrect, or "Rabelaisian" had to be retained.

Exactly the same fate awaits those who would reform or invent vernacular names. There would first of all have to be a code of nomenclature, and the principles would not be simple or logical. It sounds fine to select "appropriate and associative" names, but the only people who think it can be done are those *who are aware of very few birds in a small fraction of their total ranges only*. The fact is that the great majority of birds *can't possibly have* an "appropriate and associative" name, and the better known they are the more obvious this becomes. It makes no difference whether these names are good English words or are based on Greek and Latin roots.

Illustration must be limited to a few examples only. All American authors agree that *the* Chickadee (*Parus atricapillus*) should be called the Black-capped Chickadee to distinguish it from the Brown-capped or Hudsonian Chickadee. This name is most inappropriate. Actually there are four species with black caps in the New World, and at least as many more in the Old. Moreover, there is a chance that our particular Chickadee may prove to be conspecific with one of them. Imagine the absurdity of calling one subspecies *the* Black-capped Chickadee, when every other subspecies is also black-capped. Moreover, there are several brown-capped chickadees, two species in North America. Finally

should "chickadee" be conserved? They are all *Parus*, the English name for which is "titmouse," and we are supposed to show relationships!

All agree that Blackburnian Warbler is a dreadful name; Hemlock or Orange-throated Warbler have been suggested. But it breeds in hemlock only in the southern parts of its breeding range, several other warblers nest in the same hemlock grove; it occurs in migration over an enormous area where there are no hemlocks; it winters in tropical rain forests in eastern Panama. Another "orange-throated" warbler occurs in Panama! I can see the active Canal Zone Bird Club of the future petitioning the Committee to invent a more appropriate name!

The points in the last paragraph may be expanded to the whole warbler family. I agree heartily with Messrs. Poor and Eisenmann that, ideally speaking, appropriate and associative names should *not* be open to criticism on the four grounds given in item 4 of the first paragraph. It works out as follows: Out must go Prairie, Palm, Worm-eating, Magnolia, Myrtle, Sycamore, Connecticut, Kentucky, Nashville, Cape May, Tennessee, Calaveras, Colima, Canada, Blackburnian, Audubon's, Wilson's, Swainson's, Bachman's, Virginia, Lucy's, Sennett's, Townsend's, Grace's, Kirtland's, Macgillivray's. Moreover, Chat and Redstart are names of Old World genera in other families; water-thrush is utterly misleading in family relationships, oven-bird is the name of a family in another suborder. The Blue-winged does not possess a blue feather, the Orange-crowned does not have an orange crown, the Cerulean is not cerulean, and the Black-throated Green is one of four closely related black-throated green species! No less than 40 out of 57 vernacular species names would have to go, plus 6 additional subspecies.

Even worse, none of them could be called warbler, a name properly belonging to the Old World Sylviidae. We have no sparrows, or flycatchers, and we must eliminate Robin, Blackbird, and Oriole. Murres are really Guillemots; the Pigeon Hawk can't catch pigeons and is a subspecies of the Merlin. The Duck Hawk is really one of three American subspecies of the Peregrine Falcon. The Marsh Hawk is a harrier, very distinct from *the* Marsh Harrier of Europe; actually it is a subspecies of *Circus cyaneus*, the Hen Harrier, a specific name which is absurd and must go also, as *Circus cyaneus* very rarely catches hens, and no more often than other species of harriers! Our buteos are really buzzards; the name, Sparrow Hawk, properly applies to a small accipiter; our Sparrow Hawk is a kestrel; our vultures are not vultures, an Old World group. And so I could go on and on. I estimate that 80 per cent of the current vernacular species names of North American birds would get thrown out, on the basis of the criticisms of Messrs. Poor, Eisenmann, Peterson, Pough, and others. Readers will please note that, on the same grounds, just about 80 per cent of the

technical or *scientific* names are objectionable also. Actually this sense of inadequacy or inaccuracy of both scientific and vernacular names is an excellent measure of a century's increase in knowledge of North American birds.

Let us now suppose that a Committee really does start work on a system of "vernacular nomenclature." Where do they start, and above all *where do they stop?* What "simple and logical" guiding principles will they use in deciding what proportion of the 80 per cent criticizable names will be thrown out or emended? They will discover that there are none; the rules of vernacular nomenclature will prove to be just as complicated and just as arbitrary as those for the technical names. The Committee will probably end by adopting the same principle of priority and conserving all well known names in general use a whole century.

If they junk all 80 per cent of the inappropriate names, they will have to invent several thousand "appropriate and associative" names. Mostly, none can be found for family, genus, species, and subspecies. What is an appropriate family name to replace the inaccurate "warbler," a generic name for chat, oven-bird, water-thrush, and redstart? A much discussed species without a good vernacular name is *Vermivora ruficapilla* Wilson, going back to 1811. The eastern subspecies bears the absurd name, Nashville Warbler, and the western race bears the equally absurd name, Calaveras Warbler. Actually, the technical name is also absurd and inaccurate. Translated it means "rufous-haired worm-eater." Now the members of the genus *Vermivora* don't eat worms any more than other warblers. The species also has very few rufous hairs. Virginia's and Lucy's Warblers are the two species of the genus which *are* rufous-capped, but they were not discovered until 50 years after Wilson shot his warbler at Nashville, Tennessee. Perhaps I am a pedant when I see no reason to reform vernacular names, any more than the technical. To those who have frequently argued that most amateurs can't translate Latin and Greek roots, I point out that the names, Nashville and Calaveras Warbler, are absurd, inaccurate, meaningless, and therefore no easier to memorize than *Vermivora ruficapilla*, actually the only species designation the poor little bird has at the moment.

Let's waive all this, and pass to the invention of the four necessary vernacular names. Surely it is more important to have the family name taxonomically correct than the specific name. The family name, "Wood Warbler," will scarcely do for chats, yellow-throats, prairie "warblers," water-thrushes, and other ground and thicket-inhabiting birds. The subspecific names for *Vermivora ruficapilla* are easy: "eastern" and "western," but eastern what? I feel I know this warbler very well, and not only its technical or specific characters, for I have had field experience with both subspecies on their breeding grounds, migration routes,

and winter ranges. For many years I have been quite unable to think of a "simple, appropriate or associative" name that would be valid in all sections of the country, or a descriptive adjective that would apply to this species of "warbler" only. There are too many warblers, and the diagnosis of this species cannot be boiled down to one or two English adjectives. All the vernacular names suggested are too local, only partially true, or not sufficiently restrictive.

If we had a Gallup poll, and a thousand bird students of proper geographic distribution sent in a name on a postcard, it would be very surprising if a hundred of them picked the same one. Meanwhile the A.O.U. Committee has agreed to provide a species name; whatever one they dig up, my guess is that they will be soundly denounced by a certain percentage of students.

I hope I have succeeded in showing to unprejudiced readers that all is not as easy as it sounds. Vernacular English nomenclature *must* be just as complicated as scientific nomenclature. Naturalists abandoned seven decades ago, as a result of bitter experience, all efforts to reform technical species and group names by throwing out inappropriate and inaccurate ones, because: 1) unanimous agreement could never be reached and 2) the apparently more appropriate name turned out to be inappropriate in another decade or two with increased knowledge.

Those who wish for a reform of vernacular names must be prepared to jump four tough hurdles: 1) Complete or partial reform; if the latter, what dividing line? 2) Either way, a code of nomenclature must be drawn up, it must be administered by a commission, and it will be a five or more years' job to reach general agreement on the improved vernacular names. 3) The improved new vernacular names will automatically *create a synonymy* of English names, as well as the already existing synonymy of technical names, a burden and a handicap to scientific work. Every text-book, guide, State, and local list of the present will be out of date. A new generation of amateur bird students, brought up on the new names, will have to have the names in Chapman's books, Forbush, Ridgway, and several hundred others, translated for them by "technical" experts. Perhaps Mr. Peterson's publishers will go to the expense of getting out a new edition of his guides, with the necessary synonymy of vernacular names. 4) The new names having been invented and officially published, what happens next? Are they *to be conserved*, or is every new A.O.U. Check-List Committee to be allowed to change some, the moment they think another name a real improvement? What is to prevent each Committee from expressing themselves by playing ducks and drakes (with special reference to *Tadorna* and *Casarca*) with the common names? What is to prevent a "reactionary" committee from reverting to the "good old" names, warbler, robin, oriole, and flycatcher?

A primary article of the code will, therefore, have to be an arbitrary rule that the new names in the new A.O.U. Check-List of 195—

will be conserved. Its protagonists had better make sure in advance that unanimous approval, consent and obedience have been obtained. In the meantime, I formally propose that the names in the 1931 A.O.U. Check-List be conserved.

The protagonists of reform in vernacular names must pass from destructive to constructive criticism. Their criticisms are perfectly valid; they have merely discovered for themselves what ornithologists have known for a century: vernacular names in every language, and scientific and technical names as well, are replete with absurdities, inaccuracies, and false taxonomic implications; there are not enough descriptive adjectives in any language to replace geographic names and names of persons, and there are too many birds with too complex degrees of relationship. In the sense that English words like crow, wren, and warbler are nouns, there simply are not enough bird nouns for the hundreds of families and major groups known today. So far, the best proof of this is the few suggestions thrown out, by way of illustration, of improved names in articles otherwise purely critical. Any competent ornithologist can find fault with any one of them *extempore*, as not satisfying the criteria for good vernacular names agreed to by the critics themselves!

I consequently respectfully offer the following suggestions to those friends of mine interested in the reform of vernacular names.

1. The failure of the A.O.U. Committee to act is because they believe, or know, that simple, logical, appropriate, associative, and taxonomically correct vernacular names cannot be invented for the families, genera, species, and subspecies of North American birds.

2. Those who think it can be done might at least produce such a revised list and secure agreement *throughout the country* among amateurs interested in vernacular names.

3. Reform should begin with the names of families and major groups, the names of species and subspecies should come last. To return to the Nashville Warbler, why get excited about "Nashville" and not about "Warbler"? At least the species passes through Tennessee every spring and fall, but it positively is not a warbler!

4. Coining names for subspecies is a waste of time. This is one thing the critics of vernacular names have indirectly proved. All of them agree that the main reason for discussion is because vernacular names are of so much use in the development of popular ornithology. But there is no such thing as popular study of the finely drawn subspecies of the day, so there is no need for vernacular names. The subspecies of the moment is dropped tomorrow, or it will become two subspecies, or a revision of the races of some species results in a completely different arrangement. The newly invented vernacular name disappears. Or to which one of the two new subspecies shall it apply? It

might prove inappropriate for both. A "western" junco was collected in Massachusetts in 1874. It has already appeared in literature under *four* different vernacular names. It will undoubtedly appear under a fifth as a result of Dr. Miller's recent monograph. Those who invented the first four vernacular names wasted their time. Why should there be any better luck with the fifth?

5. In those few cases where subspecies are distinguishable in life and are, therefore, subjects for popular study and observation, well known vernacular names are already available and should be used. This in itself would be an expert guide to beginners, as to which subspecies could be identified in life.

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a
A STUDY OF THE GYRFALCONS WITH PARTICULAR
REFERENCE TO NORTH AMERICA ¹

BY W. E. CLYDE TODD AND HERBERT FRIEDMANN

THIS paper is in essence a combination of two papers written independently by the two authors a dozen years ago which they refrained from publishing, each in deference to the other. The results, which were from the start in close agreement, have here been brought together as a contribution to our understanding of one of the most puzzling of North American birds.

The gyrfalcons have probably given more trouble to taxonomists than any other group of arctic birds. The confusion centers around the question of the number of recognizable forms and the name properly applicable to each. Some writers have indeed declined to commit themselves one way or the other. To review the work of all the students who have attempted to deal with this subject would require much space and would not be particularly profitable. We shall confine our comments, therefore, mainly to a discussion of the remarks of more recent writers insofar as their conclusions seem to have a bearing on our own studies of this group. With an incomparable series of 190 specimens brought together by Friedmann for use in his continuation of Ridgway's "Birds of North and Middle America," we have been able to examine and compare ample material from various parts of Arctic America, as well as a smaller amount from the Old World.

L. Stejneger (1885:184-188) presented his views on the gyrfalcon question after a study of the series (then 75 skins) in the U. S. National Museum and an examination of the literature. He decided that there were two distinct species, the white and the brown, the latter divisible into three geographic races, all of which were represented in Arctic America. His arrangement was forthwith adopted by the American Ornithologists' Union, and so appears in the first three editions of the A.O.U. Check-List. The fourth (1931) edition, however, presents an arrangement entirely different, although with reservations and critical comments which, in a measure, seem to support Stejneger's views.

The main stumbling block to an understanding of the gyrfalcons is the occurrence in the same geographical area of both light and dark birds. So different are these two types at first glance that the impression is that two perfectly distinct species are concerned—just as Stejne-

¹ Published by permission of the Secretary of the Smithsonian Institution. The following institutions kindly lent specimens to us for study to supplement the combined series of the Carnegie Museum and the U. S. National Museum, and to their officials we hereby express our appreciation and thanks: American Museum of Natural History, Academy of Natural Sciences of Philadelphia, Chicago Natural History Museum, Museum of Comparative Zoology, University of Michigan Museum of Zoology, National Museum of Canada, and the Royal Ontario Museum of Zoology.

ger claimed. Moreover, the variation exhibited within both types—to whatever cause attributed—is striking, and comparable to that shown by certain species of *Buteo*. The real significance of these variations is the key to the whole situation, but many authors have been forced by lack of material to content themselves with simply describing them.

The gyrfalcon of Greenland has been the subject of sundry dissertations by various authors, and probably more specimens are now available from that country than from any other part of the Arctic. It thus affords a convenient starting-point. For the purposes of the present study we have examined 70 Greenland specimens—mostly from the west coast, from Etah on the north to Frederikshaab on the south. Among these are a number of the important key specimens discussed and figured by Walter Koelz (1929). Koelz, like Hartert (1913:1064) states that the gyrfalcons of Greenland are of three types; unlike Hartert he tries to distinguish these three types as subspecies. He is not successful, however, in assigning a separate range to each of the three forms and even suggests that this is not necessary for their recognition as subspecies! He restricts the name *candicans* to the white birds from farthest north and from the east coast but refers to a “dark phase” of *candicans* which we find indistinguishable from individuals he assigns to other races.

There is, of course, a possibility that a large enough series of *breeding specimens* might show geographical differences between the birds of north Greenland and those of south Greenland, as Koelz claims. Not enough is known about the migrations of these birds to justify a positive statement on this point. However, the table of distribution he gives (page 215) is certainly suggestive. If the several types are segregated during the breeding season it is astonishing how soon they become intermingled. Examination of our own series seems to bear out the impression that we are dealing here with one extremely variable form rather than with several races. Every character upon which reliance might be placed for the discrimination of geographic races breaks down when tested by this series. In general, there are two phases, a light and a dark. Some of the light birds are pure white below, and from this condition there is a gradual transition to birds that are heavily spotted below with dusky or brown (the spots being drop- or tear-shaped, as a rule). The upper parts, including wings and tail, are even more variable than the under parts in light birds, ranging from heavy barring above to dark markings that are clearly lengthwise; in a few specimens the upper parts are nearly immaculate. The head is pure white in some light individuals, conspicuously streaked in others. The tail varies from pure white to heavily barred. The point to be emphasized is that none of these variations can be shown to be correlated with others or with the locality of capture.

The dark birds, considered as a group, are equally variable in color characters. In general size and proportions they are like the light birds. Koelz has shown (page 209) that some young birds taken from the nest are as white as any adult. This point is important, because it definitely disposes of the idea that the dark birds might be the young of the light ones. In other words, light birds are light from the first, and dark birds dark from the first. (*Cf.* in this connection Hancock, 1854, and Newton, 1862:45.) Koelz's statement that light birds are confined to north Greenland directly contradicts Hartert (1915:184), who says: "It is, however, not true that the darker birds alone breed in Southern Greenland, where white ones nest also, nor that the dark form is restricted to the southern parts of Greenland, because it ranges as far north as any Falcons have been shot, and that during the breeding season. There is therefore no question of there being two subspecies, but the light and dark birds from Greenland can only be either two species or one and the same." To us, Hartert's argument appears conclusive, and it is borne out by the series we have examined. But if any further evidence were needed, it is supplied by the statement of R. Luff Meredith (in a letter to Friedmann) that two young (from a brood of three) were taken from a nest in Tissaluk Fjord, north of Ivigtut, and raised by hand. One of these is light, the other dark. The parents were "rather dark." The case suggests the need of further scientific field observations.

Coming now to the Labrador bird, of which we have examined 40 specimens—an incomparable series—we find a similar situation, but with this difference, that dark birds greatly outnumber the light ones. Todd's field party secured 21 specimens at and near Fort Chimo in September 1917. All but three of these were dark birds. As a special effort was made to secure light birds, the actual proportion was probably smaller still. The concentration of these birds in that area in 1917 was evidently due to the extraordinary abundance that year of the Hudsonian lemming (*Dicrostonyx hudsonius*). The chances greatly favor their having been birds reared in northern Labrador. It was at first supposed that the Labrador form of the gyrfalcon was *always* dark, like the bird figured by Audubon in his "Birds of America" (1831:pl.196) under the name *Falco labradora*. Later, Audubon himself, in the "Ornithological Biography" (1834:552), put the name in synonymy, but it was reinstated by Dresser (1876). Dresser acknowledged the presence of light birds in the Labrador Peninsula, but thought that they were stragglers (migrants) and that the dark birds were resident.

The fact is that both light and dark birds breed on the Labrador Peninsula (in Ungava), as we learn from L. M. Turner's notes reproduced by Bendire (1892:282, 286). The U. S. National Museum collection contains a specimen taken by Turner at Fort Chimo, April 1,

1884, and the Carnegie Museum another, shot at Red Bay, Labrador, April 9, 1934. Both of these are white birds, without any spotting below. The dates are a little too early to postulate breeding, but it is highly improbable that these birds were far from their breeding grounds. How far south this form breeds is problematical. Audubon's circumstantial account would indicate a breeding range extending to the Gulf of St. Lawrence, but his record has not been confirmed by any other observer. It may have represented an outlying pair of gyrfalcons which for some reason remained far south of their usual summer home. That the gyrfalcon is a regular breeding species on the north shore of the Gulf of St. Lawrence we do not for a moment believe.

At first sight, it would seem that a fairly good case can be made out for the racial distinctness of the Labrador birds as compared with those of Greenland. However, the differences are obvious only in the dark phase; birds in the light phase are indistinguishable. Breeding specimens in the dark phase average somewhat darker (both above and below) than Greenland birds. In this phase the relationship of these birds to *Falco rusticolus rusticolus* of northern Europe and *F. r. islandus* is obvious. (Apparently neither of these forms has a light phase.) It is in the immature stage of plumage, however, that the differences stand out best. The bird at this stage tends to be dark—a dark brownish black. The extreme is well represented by Dresser's first figure in his article above cited. U. S. National Museum No. 94312, Fort Chimo, September 3, 1883, closely approaches this plate. Our series of September specimens from Fort Chimo show every possible gradation between this particular type of plumage, in which the upper parts, tail, and wings are uniform brownish black, and the under parts similar, with only a few buffy spots and streakings, to the type in which the upper parts are dusky brown with buffy edgings, particularly in evidence on the crown, while the under parts are streaked dusky brown and buffy white, the latter predominating. We regard all these birds as birds of the year; their variations are extraordinary, it is true, but no more so than those shown by birds from Greenland. Dresser, on the contrary, figured and described the darkest birds as adults and the lighter colored ones as immature. His error in this respect was first pointed out by Menzbier and Sushkin (1903).

None of the dark-phase Greenland specimens in the collection of the U. S. National Museum shows any approach to the darkest Labrador birds, but in other plumage phases Greenland and Labrador birds are indistinguishable. In other words, if we were to keep "*candicans*" (Greenland) and "*obsoletus*" (Labrador) as separate races, we would have to admit that only one plumage out of six of "*obsoletus*" would be identifiable and none of "*candicans*." It seems to us, therefore, better to consider them as one form (for which the name *obsoletus* must be

used), explaining that there is a geographical variation in the frequency of white and dark phases and that the darkest immature birds occur only in Labrador.

Some authors attribute considerable taxonomic significance to the variation in color of the bill and feet. But this is apparently an age character (see Witherby *et al.*, 1939, vol. 3, p. 4), the bill and feet of the immature being bluish gray, those of the adult yellow. Carnegie Museum specimens Nos. 57511 and 57512 (both light birds) shot two days apart (September 12, 14) were compared in the flesh. In 57511 the dark markings were streaks (as in immatures) and the bill and feet bluish gray; in 57512 the dark markings were bars (as in adults) and the bill and feet yellow. There are scattered references in the literature to the color of the soft parts as a clue to age (*cf.* Gurney, 1882: 593), but more information is sadly needed.

Swann (1929) tries to show that five plumages of the Greenland bird can be recognized, according to age. He claims that the bird gains its fully adult plumage (the *holbölli* of Sharpe) very slowly. We do not agree. The indications are that the first four stages he describes are merely individual variations of the juvenal plumage. The adult plumage is gained at the first full molt (as in *Falco peregrinus* and other allied species), whether the bird happens to be dark or light. While there may be a tendency toward more decided barring in older birds, Witherby's statement (1921:102, 104, 106) that the adult plumage comes in with the postjuvenal molt seems to us correct.

With Swann's recognition of the European race (*rusticolus*) and Iceland race (*islandus*) we are in full accord. On the other hand, he argues that the Greenland and Arctic American race should be called *sacer*, based on Forster's bird from Severn River, Hudson Bay. In this we do not agree. Forster's bird is not certainly identifiable; very possibly it was *Accipiter atricapillus*, as suggested by Newton—see the preface to the Willughby Society reprint (1882) of Forster's "Animals of Hudson Bay" (1772), p. iv—particularly in view of the bird's breeding at Severn River. It is highly improbable that any gyrfalcon breeds as far south as this point. Swann groups the Labrador birds with those of Arctic America in general, and here we agree.

DISCUSSION

The gyrfalcons are a conspecific group of arctic and subarctic distribution. Inasmuch as the genus *Falco* is cosmopolitan in its distribution, it would seem that the peripheral members of the group probably originated in less peripheral areas than they now occupy. This would imply that the gyrfalcons may well have been originally birds of the north temperate regions. Furthermore, inasmuch as the dark coloration is more widespread in the genus than is extreme whiteness,

it would seem reasonable to assume that the "original stock form" of the gyrfalcons was a dark-colored bird, and that its spread towards the north has been correlated with a tendency towards whitening which reaches its maximum in Greenland and Arctic America. Here there are two color phases, a light and a dark, the relative abundance of which is geographically variable. Inasmuch as the white phase is less developed in Eurasia than in America and Greenland, it seems likely that the ancestral homeland of the gyrfalcons was in temperate Eurasia.

The gyrfalcons of all of North America except for the Bering Sea coast of Alaska are but a single, highly variable subspecies, the picture being complicated by geographical variation, not in the color phases themselves, but in their relative frequency. On the Bering Sea coast a slightly marked, but recognizably distinct race, *uralensis*, occurs. It wanders southward in winter to Washington. It differs from *obsoletus* only in having the seventh primary (fourth from the outside) longer than the tenth (outermost one) whereas in *obsoletus* the seventh is shorter than the tenth.

In Scandinavia (and northern Europe generally) and in Iceland the dark phase only is known as a breeding bird. In Greenland (and Arctic America generally) both light and dark phases occur, the former predominating (except in Labrador). Both phases are highly variable in pattern of plumage. Since they are known to breed in the same area, they must belong to the same race. In Labrador the dark phase predominates, and Labrador birds may be "on the way" to becoming a distinct racial entity.

The evidence that more than one molt is required for the change from immature to adult plumage is not satisfactory. In general, adult birds of both phases tend to be barred crosswise, while the immatures are streaked lengthwise.

Since we consider the name *sacer* of Forster to be doubtfully identifiable, we accept *obsoletus* of Gmelin as the earliest valid name for the race inhabiting Greenland, Labrador, and Arctic America in general. A detailed description of *Falco rusticolus obsoletus* (in the sense here used) is given below. It shows the great complexity and variability of the plumages of this highly interesting bird, and may serve to emphasize the fact that lone specimens or small series are hopelessly inadequate as a basis for judgment of its taxonomic problems.²

FALCO RUSTICOLUS OBSOLETUS

Adult, white phase: Sexes alike. Plumages extremely variable, but generally fall into one or the other of two types. While these two types are well marked, individual birds may combine the characters of the two. Thus, some specimens have some bars on the rectrices but only

² The capitalized color terms used in the description are taken from Ridgway's "Color Standards and Color Nomenclature" (1912).

longitudinal streaks on the back and upper wing coverts, and others have some bars on the upper parts and few or none on the tail. Hartert (1913:1065) has suggested that the bar-tailed birds with transverse markings on the back are the older adults, but this not necessarily the case. We have seen nestlings of both the bar-tailed and the plain-tailed types, which, except for the color of the bill and feet, were very similar to adult birds. On the other hand, we have also seen plain-tailed young molting into bar-tailed plumage. The two types may be described as follows:

a. bar-tailed: Entire head, body, wings, and tail white, usually with a faint creamy tinge, the top of the head with narrow Chætura-Black shaft stripes which, on the feathers of the nape, broaden into tear-shaped subterminal spots; interscapulars, scapulars, upper wing coverts, back, rump, upper tail coverts, remiges, and rectrices broadly barred with dark Sepia to Chætura Drab, or even Chætura Black, with only the subterminal band, often somewhat broadly crescentic in shape, visible on the scapulars, interscapulars, and upper wing coverts; the rump and upper tail coverts more narrowly barred; the primaries with broad Chætura-Black apical areas very narrowly edged with white, the dark bars disappearing on the inner webs, which are largely white; the seventh primary (fourth from the outside) shorter than the tenth (outermost); 9 to 11 dark bars, about 10 mm. broad, crossing both webs of the median pair of rectrices, reducing to spots on the other pairs of feathers (where they appear chiefly on the outer webs), and (on the outermost pairs) decreasing in number; lores, cheeks, and auriculars with some fine dusky shaft streaks; chin and throat immaculate white; breast, middle of abdomen, sides, and flanks immaculate white or with a few small tear-shaped spots of Chætura Drab; thighs either flecked or immaculate white; under tail coverts usually unmarked; under wing coverts white with a few tear-shaped Chætura-Drab spots; iris dark brown; eyelid pale flesh; cere light yellow; bill pale yellowish gray, more yellowish at base, and dusky at the tip; tarsi and toes light yellowish gray, claws pale horn color.

b. plain-tailed: Similar to the preceding but with tail immaculate white, the remiges unbarred but with Chætura-Drab shaft stripes broadening into a wide dark apical area as in the barred variety; scapulars, interscapulars, upper wing and tail coverts, back, and rump unbarred but with broad terminally spatulate shaft stripes of Chætura Drab; under parts as in the barred variety.

Adult, gray phase: Sexes alike. Entire upper parts of head, body, wings, and tail Deep Neutral Gray, with or without a dark Sepia tinge, the head feathers with darker gray shaft stripes and often whitish edges, producing a white-streaked appearance; scapulars, interscapulars, back,

rump, and upper coverts of wing and tail with dark shafts and edged narrowly with grayish white to pale buffy white and barred with the same, the light bars widely spaced and variable in their extent, some being reduced to mere spots on the two webs of individual feathers; remiges dark Sepia with a grayish wash, the primaries indistinctly barred or mottled with grayish white on the outer webs and crossed by 15 or more broad white bars on the inner webs, the dark, narrower interspaces becoming incomplete dark bars not always quite reaching the margin of the web, but confluent along the shaft; the ninth primary (second from the outside) the longest, then the eighth, tenth, and seventh; the primaries, with a long terminal unbarred Sepia area on both webs, narrowly tipped with whitish; secondaries incompletely barred with pale grayish to buffy white on both webs, the pale bars not always reaching the shaft; rectrices crossed by 10 to 12 whitish or grayish bands about equal in width to the dark interspaces, the pale bands freckled with Slate-Gray to grayish Sepia; rectrices tipped with white; lores, cheeks, and auriculars whitish, with a creamy wash in some cases, the feathers with Chætura-Drab shaft streaks of variable width (in some cases a pronounced malar stripe results from the widening of the shaft streaks, in others no well-defined malar stripe is present); chin, throat, breast, abdomen, sides, flanks, thighs, and under tail coverts white, generally with a wash of Cartridge Buff or Cream Color, the chin and upper throat usually immaculate, sometimes with dusky shaft streaks; lower throat, breast, and abdomen with dark Sepia shafts widening apically into tear-shaped spots; sides, flanks, and thighs usually with the shaft streaks more pronounced and apical broadening more extensive, even forming transverse bars in some instances; under tail coverts immaculate or marked like abdomen; under wing coverts white, barred broadly with dark Sepia to Fuscous; unfeathered parts as in white phase.

Juvenal, white phase: Sexes alike. As mentioned earlier in this paper, it has been suggested by Swann and other writers that the gyrfalcons pass through a number of plumages between the juvenal and adult stages, but we have seen no slightest evidence of this in a very long series of skins or in the literature or in accounts of birds raised in captivity. To attempt to correlate plumage phases with age is purely arbitrary and pointless.

a. bar-tailed: Variable; similar to the adult but with the Chætura-Black to dark Sepia subterminal crescentic marks on the feathers of the upper surface of the body and wings enlarged to deep wedge-shaped areas covering most of the exposed portions of the feathers, especially of the scapulars, interscapulars, and upper back, producing almost a scalloped effect on these feathers; the shaft streaks on the crown and cheeks generally heavier than in the adult and the tear-

shaped streaks on the under parts heavier and more numerous; the under wing coverts more streaked (with dark Sepia to Chætura Black) than in adults; cere and bill pale Plumbeous; tarsi and toes pale bluish, claws black; orbital skin pale Plumbeous.

b. plain-tailed: Similar to adults but with the brown markings on the scapulars, interscapulars, and upper wing coverts broader; cere and bill pale bluish Plumbeous; tarsi and toes pale bluish.

Juvenal, gray phase: Sexes alike.

a. pale: Variable; entire top of head dark Sepia to Chætura Drab, the feathers with white to pale Avellaneous edgings, sometimes so broad as to reduce the dark color to a mere shaft stripe, in other cases narrow and relatively indistinct (the pale areas usually wider and more noticeable on the nape than on the crown); entire upper parts of body and the upper wing coverts Sepia to dark Sepia, edged narrowly with Drab on dirty white (in some birds these feathers are unmarked, in others they are transversely spotted, or incompletely banded, with buffy white to pale Avellaneous, thus producing two quite different types of coloration—a uniform and a spotted one); primaries with outer webs and tips dark Sepia (the outer webs sometimes faintly mottled with buffy white) and extreme tip whitish, the inner webs whitish except for the tip, the white area taking the form of a series of (about 15) incomplete white bars, which merge at the edge of the web but do not extend inwards as far as the shaft; secondaries plain dark Sepia in uniform-backed birds, marginally crossed by transverse spots of pale Avellaneous to buffy white in the case of spotted-backed birds; rectrices as in gray phase adults but more brownish—Sepia or Chætura Drab to Dark Olive Brown with the pale bars almost Hair Brown on the median pair of feathers and progressively lighter on the inner webs of the lateral feathers; in the case of uniform-backed birds the median pair of rectrices may be almost unbarred; sides of head and neck whitish to pale buff, heavily streaked with dark Sepia, the streaks narrower—merely pronounced shaft streaks—on the cheeks and auriculars, which are sometimes heavily tinged with Drab or Hair Brown; a more or less distinct malar stripe of dark Sepia usually present; chin and upper throat whitish with a cream or buff tinge and with fine dusky shaft streaks which become broader on the throat; rest of under parts whitish like the chin and upper throat but very broadly and abundantly streaked with dark Sepia to Fuscous, the markings usually darkest on the sides and flanks, narrower and paler on the thighs and under tail coverts; under wing coverts whitish, irregularly and incompletely barred or spotted with dark Sepia and usually with dark Sepia shaft streaks; iris dark brown; cere and bill pale Plumbeous; feet pale bluish or pale bluish green; claws black.

b. dark (only females examined): Markings similar to the pale type but much darker; entire upper parts Fuscous, the crown, occiput, and nape often streaked with buffy white; the feathers of the back and upper surfaces of wings edged with dull Sepia but not otherwise marked; primaries with the pale color on the inner webs much reduced, in some cases to a slight freckling, in others to marginal bars not extending more than halfway to the shaft; secondaries uniform Fuscous, unmarked; rectrices dull Fuscous, tipped narrowly with dirty white, the pale bars reduced to transverse spots and often absent save for one or more small subterminal spots on each feather; lores, cheeks, and auriculars dark Fuscous; entire under parts very dark Fuscous to Fuscous Black, the feathers edged with pale buffy white, the edgings often narrow, producing an appearance of narrow pale streaks on the dark background; in other cases much broader, usually broad on the chin and upper throat; the thighs and under tail coverts spotted or barred with buffy white; under wing coverts Fuscous Black or dark Fuscous, the distal median and lesser coverts and all the greater coverts spotted with buffy white. (This plumage phase appears to be confined to Labrador birds, not all of which, however, are of this type.)

Natal down: Said to be white with pale fulvous wash, becoming grayer with age.

Measurements. The average and extreme measurements of 42 adult males and 63 adult females from Alaska, northwest Canada, Baffin Island, Greenland, Southampton Island, and Labrador are shown in Table 1. It should be noted, however, that all the figures probably include a number of young birds in the white plumage in which the ages are indistinguishable.

Breeds from high arctic latitudes in Greenland (both coasts—Angmagsalik; Egedesminde; Etah; Godthaab; Jacobshavn; Kangamint; Nanortalik; Nordletd; Novasak; Oju; Sukkertoppen; Ymer Island); Ellesmere Island (East Bay) and Grinnell Land (Cape Hayes, Cape Frazer, Cape Napoleon—79° 47' N. Lat.); Baffin Island (Magee Lake; Blacklead Island; Markham Bay; Cape Dorset; Lady Franklin Bay); Digges Island, Hudson Strait; Southampton Island; Victoria Island (Taylor Island); Northwest Territory (Franklin Bay; Cape Bathurst; Bernard Harbor; Coronation Gulf); northeastern and northern Alaska (Point Barrow; Ugashik; Nulato; Collinson Point; Yukon); south to northern Labrador (Fort Chimo; Fort Nascopie; Ungava Bay; Cape Chidley); and northern Newfoundland Labrador (Okak; Nain; Hopedale; Ramah) in the east and to the Atlin region of British Columbia in the west.

Winters more or less throughout its range but wanders very irregularly southward across Canada; Straits of Belle Isle; Nova Scotia; Quebec; Montreal; Ontario; Manitoba (Aweme); British Columbia

TABLE 1
EXTREME AND AVERAGE MEASUREMENTS (IN MM.) OF 105 ADULT *
NORTH AMERICAN GYRFALCONS

Locality; number of specimens	Wing	Tail	Culmen from cere	Tarsus	Middle toe without claw
♂					
Alaska (4)	340-349 (346.0)	203-215 (210.8)	21.6-23.3 (22.6)	53-58 (57.1)	45-48 (47.6)
n. w. Canada (5)	357-365 (360.2)	192-229 (205.6)	20.0-23.0 (21.2)	60-70 (64.0)	47-50 (48.3)
Baffin Id. (2)	361-365	195-240	23.0-23.0	52-56	50-54
Greenland (15)	355-378 (372.3)	215-241 (224.3)	22.8-24.1 (23.3)	58-68 (62.9)	47-53 (49.7)
Southampton Id. (3)	355-370 (365.3)	215-235 (224.3)	24.0-25.0 (24.3)	60-64 (62.0)	48-49 (48.3)
Labrador (13)	342-370 (360.5)	203-244 (221.1)	20.2-23.0 (21.9)	59-66 (62.5)	47-51 (49.4)
Series average (42 ♂ ♂)	364.3	221.5	22.8	62.0	49.2
♀					
Alaska (4)	368-400 (389.6)	220-259 (243.8)	23.3-26.6 (25.2)	61-64 (63.4)	48-53 (52.0)
n. w. Canada (4)	385-405 (395.2)	235-239 (237.2)	23.0-25.5 (24.0)	68-73 (70.7)	52-54 (53.4)
Baffin Id. (2)	395-413	217-253	23.0-25.5	65-70	55-57
Greenland (23)	368-423 (410.5)	215-266 (227.8)	23.0-27.9 (25.7)	58-71 (62.4)	50-54 (52.7)
Southampton Id. (4)	398-408 (404.0)	240-251 (244.4)	25.0-26.0 (25.4)	64-72 (68.5)	52-55 (53.8)
Labrador (26)	370-412 (393.6)	228-266 (248.8)	23.0-26.0 (25.1)	63-68 (65.6)	51-54 (52.9)
Series average (63 ♀ ♀)	400.5	239.3	25.2	64.7	52.9

* All figures probably include a number of young birds in the white plumage in which the ages are indistinguishable.

The absolute extremes of the male and female series are given in boldface for each measurement.

(Fraser River; Sumas Prairie; Kelowna); and Vancouver Island (Comox) to Newfoundland and the northern United States from Maine (Eagle Island, East Waterford; South Winn; Cape Elizabeth; Katahdin Iron Works; North Deering; Rockland; Brunswick; Spruce Head); New Hampshire (Milford; Exeter); Massachusetts (Northampton; Boston; Breel's Island; Essex; Stowe; Wayland; Melrose; Newton; Ipswich); Rhode Island (Providence; Narragansett; Conanicut Island); Connecticut (Durham); New York (Auburn; Aurora; Bellport, Long Island; Canandaigua; Flushing, Long Island; Monroe Co.; New York City; Pond Quogue, Long Island; Rochester; Rome; Schenectady; Troy; Westchester Co.); and Pennsylvania (Lancaster Co.)

to Michigan (Sault Ste Marie); Wisconsin (Prairie du Sac; Skunk Island); Minnesota (Minneapolis; Madison); North Dakota (Red River Valley; Mandan); South Dakota (Vermillion); Nebraska (Elk Creek); Kansas (Manhattan); Montana (Collins, Teton Co.); Washington (Spokane; Chelan); Oregon (Scio); and the Queen Charlotte Islands, British Columbia. Also to Iceland; the Faeroes; England; Ireland; northern France; and Germany (rarely).

Type locality: Hudson Bay (ex Thomas Pennant, "Arctic Zool.," vol. 2, 1875, p. 208).

LITERATURE CITED

- BENDIRE, CHARLES
1892 Life histories of North American birds. *U.S.Natl.Mus.Spec.Bull.No.* 1.
- DRESSER, H. E.
1876 *Falco labradorius* (in Rowley's *Ornithological Miscellany*, 1, pp. 185-191, 2 col. pls.).
- GURNEY, J. H.
1882 Notes on a 'Catalogue of the Accipitres in the British Museum' by R. Bowdler Sharpe (1874). *Ibis* (4th ser.), 6:593.
- HANCOCK, JOHN
1854 Note on the Greenland and Iceland falcons. *Ann. and Mag. Nat. Hist.* (2nd ser.), 13:110-112.
- HARTERT, ERNST
1913 Die Vögel der paläarktischen Fauna (Band 2, Heft 2). R. Friedländer & Sohn, Berlin.
1915 Notes on falcons. *Novit. Zool.*, 22:167-185.
- KOELZ, WALTER
1929 On a collection of gyrfalcons from Greenland. *Wils. Bull.*, 41:207-219.
- MENZBIER, M., and P. SUSHKIN
1903 On the adult dress of the Labrador Falcon. *Ibis* (8th ser.), 3:242-245.
- [NEWTON, ALFRED]
1862 *Review of Drs. Blasius's and Baldamus's Continuation of Naumann's 'Vögel Deutschlands.'* *Ibis* (1st ser.), 4:40-58.
- STEJNEGER, LEONHARD
1885 *Analecta ornithologica*. Fifth series. *Auk*, 2:178-188.
- SWANN, H. KIRKE
1929 A review of the gyrfalcons of the Palaearctic and Nearctic Region. *Verh. VI. Internat. Ornith.-Kongr.* (Kopenhagen, 1926), pp. 556-575.
- WITHERBY, H. F. (ed.)
1921 *A Practical Handbook of British Birds* (vol. 2, part 10). H. F. & G. Witherby, London.
- WITHERBY, H. F., F. C. R. JOURDAIN, NORMAN F. TICEHURST, and BERNARD W. TUCKER
1939 *The Handbook of British Birds*. H. F. & G. Witherby, London.

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THE DEEP DIVING OF THE LOON AND OLD-SQUAW AND ITS MECHANISM

BY A. W. SCHORGER

THE depths to which loons (at least the Common Loon, *Gavia immer*) and Old-squaw (*Clangula hyemalis*) can dive are impressive. On August 27, 1934, I asked Hagen Brothers, commercial fishermen on Madeline Island, Lake Superior; if they ever caught Old-squaws in their nets. They replied that "winter ducks" were taken in 12 fathoms (72 feet) of water, rarely at 15 fathoms; that the real diver was the Loon (presumably *Gavia immer*), since they had taken it at a depth of 30 fathoms (180 feet). There is no definite information on the prey that is sought by the Loon at this depth.

Recently a Common Loon was caught in a net set in Lake Mendota at a depth of about 20 feet. During a discussion of the incident, I mentioned that the Loon had been taken at a depth of 180 feet. The statement was so received as to indicate that the diving ability of the Loon and of the Old-squaw was not common knowledge.

The Common Loon, according to Forbush,¹ is reported to have been taken in fish-nets at a depth of 60 feet. Scott² mentions the taking of a loon off the Door Peninsula, Wisconsin, at a depth of 90 feet. Jourdain³ cites a case of a Common Loon ("Great Northern Diver") caught in a trammel net in 30 fathoms of water. The greatest depth is recorded by Roberts:⁴ a fisherman living at the mouth of the Cascade River, Minnesota, stated that he had netted loons at a depth of 200 feet in Lake Superior.

The Old-squaw is taken frequently in the Great Lakes in gill-nets set at depths of 15 to 27 fathoms (90 to 162 feet).⁵ A fisherman at St. Joseph, Michigan, told Barrows⁶ positively that he had taken Old-squaws repeatedly at a depth of 30 fathoms (180 feet); and Butler⁷ reported that they were taken frequently at Michigan City, Indiana, at the same depth.

Ex-Governor Hoard of Wisconsin informed Forbush¹ that this duck is taken frequently in nets set at depths of 50 to 100 feet. Forbush comments: "Probably few species of diving birds reach such depths in pursuit of food." The depths reached, according to Kortright,⁸ would be unbelievable were it not for the many well-substantiated records. Apparently the Old-squaw can dive as deeply as the loon. Tarrant⁹ was told by Capt. Nathan Saunders that he had caught "ducks" on lines set in Green Bay, Wisconsin, at a depth of 200 feet.

The number of Old-squaws that have been netted at times is very large but not beyond belief when it is considered that some of the nets used are over 8,000 feet in length. Bacon¹⁰ records that fishermen at Dunkirk, New York, have taken from 5,000 to 7,000 Old-squaws at

one haul. Lake Erie being comparatively shallow, most of the ducks were taken at a depth of 15 fathoms, and some at 18 to 27 fathoms. According to his personal knowledge, the largest single haul at Erie was 800 ducks. A single haul on the Great Lakes in December 1934 yielded 1,500 Old-squaws.⁸

Some figures on the number of Old-squaws taken in the waters of the Door Peninsula have been published by Scott:² 80 were taken at a depth of 90 feet; 12 at 115 feet; and 16 at 120 feet. There is a recent illustrated note¹¹ on the netting of these ducks in Lake Michigan, off Saugatuck, Allegan County, Michigan. One haul has produced 400 to 500 ducks. Most of them were taken in nets set for whitefish at depths of 8 to 16 fathoms, but it is not uncommon to find them in nets set for lake trout at a depth of 30 fathoms. I received a letter from R. W. Sewers, Saugatuck, in which he states: "We take these ducks in our nets at depths ranging from 30 feet of water to 180 feet and once in a great while at depths over 200 feet. . . . Last year [March, April, and part of May, 1946] I caught 27,000 of these ducks."

The annual loss of Old-squaws through unavoidable netting is tremendous, and exceeds vastly the number killed by hunters. Dr. W. E. Saunders, who investigated this phase of the subject in 1917, found 12 tons of these ducks at one fertilizer factory. Estimating 1,500 birds to the ton, there were approximately 18,000 in the lot.⁸ R. W. Sewers gives away many of the ducks for food though the edibility of this species is low. The remainder are buried. Years ago his father obtained \$1.25 per dozen for them in the Chicago market. The present law prevents the sale of wild ducks, but here is a special economic problem that deserves immediate consideration.

The depths to which birds can dive is a controversial point. Dewar¹² concludes that there is no reliable record of a bird diving to a depth greater than 10 fathoms (60 feet), but admits the possibility that some species may descend to greater depths. He dismisses the records of birds caught in nets at depths greater than 10 fathoms with the suggestion that the birds became entangled in the net while it was being raised. Irving¹³ considers that the diving ability of certain birds "has probably been overrated on account of their skill at concealment when emerging." Taking into consideration the number of records and the number of Old-squaws that have been taken in nets set at great depths in the Great Lakes, it is wholly improbable that they were all caught during the raising of the nets. Dr. Robert Cushman Murphy writes: "I believe that Dewar is over-conservative in doubting avian diving records of depths greater than 60 feet. There are too many known cases of Old-squaws and other diving birds being found in lobster pots, etc., at depths as great as 240 feet."¹⁴

Advances in knowledge of the physiology of diving birds in recent years permit us to conclude that birds can dive to great depths, and

to explain the mechanism whereby this feat is accomplished. A careful study of the problem forces the conclusion that the diving bird must be capable of reducing its specific gravity to, or approximately to, that of water. Having accomplished this change, the amount of energy required to move through the water is reduced to a minimum. Everyone who has watched grebes has observed that they can submerge the body with scarcely a ripple. Townsend remarks that the Horned Grebe (*Colymbus auritus*) "disappears suddenly with a vigorous kick, or mysteriously and quietly *sinks* in the water."¹⁵

The ability of a bird to contract its body is illustrated by the observations of Audubon on the Least Bittern (*Ixobrychus exilis*): "Replacing it on the table, I took two books and laid them so as to leave before it a passage of an inch and a half, through which it walked with ease. Bringing the books nearer each other, so as to reduce the passage to one inch, I tried the Bittern again, and again it made its way between them without moving either. When dead, its body measured two inches and a quarter across, from which it is apparent that this species . . . is enabled to contract its breadth in an extraordinary degree."¹⁶

The suggestion that water birds can change their specific gravity was advanced over a century ago. Atkinson¹⁷ thought that the Gallinule ("moorhen"—*Gallinula chloropus*) remained submerged by grasping vegetation with its feet. A distinct contribution was made by Slaney¹⁸ when he proposed that diving birds have the power to expel air from the body cavities prior to submergence. Reduction in specific gravity could be accomplished by expulsion of the air or by reducing the volume of the air by compression. The latter method was favored by Morris.¹⁹ Foottit²⁰ thought that the specific gravity could be controlled by the extent to which the plumage was contracted by the muscles of the skin.

The observations of Coues on the Horned Grebe are pertinent: "I once noticed a singular fact connected with the power these birds have, in common with other Grebes, of sinking quietly into the water. By the respiratory process they are able to very materially reduce or enlarge their bulk, with the consequence of displacing a varying bulk of water, and of so changing their specific gravity. Once holding a wounded Grebe in my hand, I observed its whole body to swell with a labored inspiration. As the air permeated the interior, a sort of ripple or wave passed gradually along, puffing out the belly and raising the plumage as it advanced. With the expiration, the reverse change occurred from the opposite direction, and the bird visibly shrunk in dimensions, the skin fitting tightly and the feathers lying close."²¹

The extent to which the body of a bird is expanded by inhalation and contracted by exhalation is shown clearly in the paper by Zimmer²² (See Figure 1).

The problem of diving is stated succinctly by Dr. Stresemann: "In order to force under water their specifically lighter bodies, some species must make use of the acceleration to be obtained by a steep dive or by a free fall. . . . A protracted immersion of the body through natural strength requires special construction not only in the motor, but also in the respiratory apparatus; hence the task of the extremities to shove the bird under water must be facilitated by contrivances that make possible a controlled decrease in specific gravity. The diving birds have this arrangement in their very large inspiratory air-sacs, which can be emptied at need by application of pressure on the abdomen. After exhalation the diving bird is specifically heavier than the swimming and land birds, for the decrease in pneumaticity of the skeleton runs parallel with the increase in diving ability. This pneumaticity is extremely slight in *Podiceps* [= *Colymbus*] *cristatus*, *Mergus*, *Phalacrocorax* (in contrast to those *Steganopodes* [= *Pelecaniformes*] that do not dive) . . . and disappears completely in *Colymbus* [= *Gavia*] and *Fratercula*. In addition, many diving birds are able to reduce their buoyancy by compression of their plumage, i.e., by pressing the enclosed air from the cloak of feathers."²³

Frogs can regulate their specific gravity by the amount of air held in the sac-like lungs.²⁴ Seals frequently, if not normally, exhale prior to diving.²⁵ Data on the specific gravity of birds during submergence are greatly needed. It would be a comparatively simple experiment to determine the specific gravity during diving by weighing the bird and determining the volume of water displaced by submergence, preferably voluntary. Stubbs²⁶ found the absolute specific gravity of a freshly killed Little Grebe (*Poliiocephalus ruficollis*) to be 0.86; the bulk specific gravity (the bird dry and clean with plumage unruffled and the aerial envelope kept as large as possible), 0.66; and the apparent specific gravity (the bird with feathers bound down with fine yarn in as natural a position as possible), 0.84. A Little Grebe weighing 6 ounces

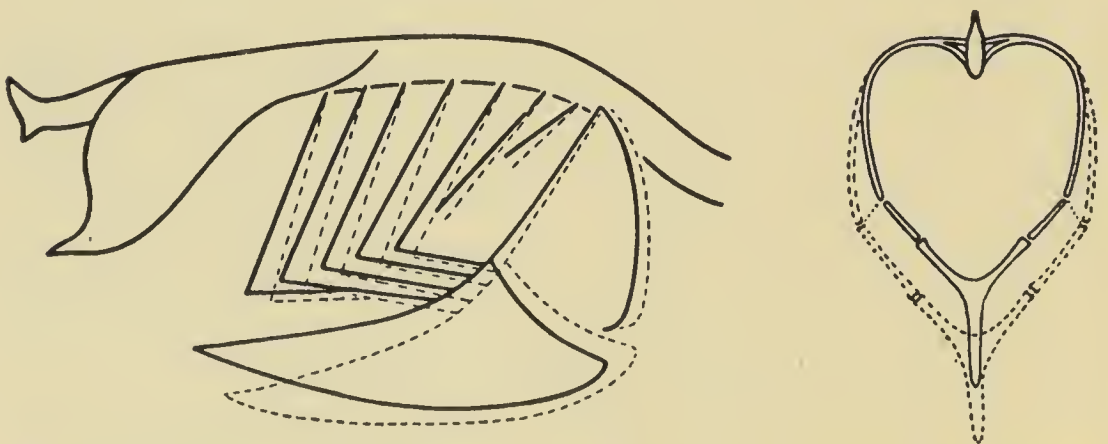


Figure 1. Lateral and frontal views of the body of a standing bird showing change of volume during expiration and inspiration. After Zimmer.²²

and having a volume of 13 cubic inches, lost 2.24 cubic inches in the volume of its feathers under the above conditions. The method by which the specific gravity was determined is not stated. Unfortunately the above data give only a suggestion as to the actual specific gravity of the bird while submerged.

The submerged bird is apparently lighter than water. Forbush²⁷ mentions wounded ducks that dived and died while entangled in vegetation. They rose to the surface when set free. R. W. Sewers informed me that 95 per cent of the Old-squaws when taken from his nets will sink in water. The nets are down from 24 hours to 10 days. Some of the ducks are still warm when taken into the boat. Those that have been held under water until the plumage has become completely saturated will sink. The buoyancy of others seems to be due entirely to the small amount of air retained by the feathers. There is no evidence that water enters the interior of the duck after it has died. There is good reason for believing that the apparent specific gravity of the bird would be greater than that of water if the down feathers were completely free from air.

The absence of pneumaticity in the skeleton of the loon was mentioned (by Stresemann) above. Dr. Alexander Wetmore kindly examined the skeleton of the Old-squaw and reported that the coracoid and scapula are pneumatic, but the bones of the wing and leg are not.

Aside from the ability of the diving bird to adjust its specific gravity, there must be considered the time factor in reaching great depths and the supply of oxygen through which most of the energy is produced. Stresemann²³ states that the dive of birds seeking food seldom lasts more than 90 seconds or exceeds a depth of 10 to 12 meters (32.8 to 39.4 feet). The longest dive for the Old-squaw that I have found recorded is 70 seconds, and the depth of the water was about 35 feet.²⁸ This would be a speed of only about one foot per second, but we are unaware of how much time was spent on the bottom. Dewar's rule requires 20 seconds for the first fathom and 10 seconds for each additional fathom. On this basis it would require approximately 6 minutes for a bird to reach a depth of 200 feet and return to the surface. A dive of this duration has not been recorded for the Old-squaw; however a wounded Common Loon was alive after 15 minutes of forced submersion, according to Jourdain,³ who cites other cases of immersion lasting 8 to 10 minutes. Eaton⁵ observed that the Horned Grebe could remain submerged for three minutes; and Forbush²⁷ thought that diving birds in general could remain under water for that length of time.

Dewar¹² gives the "average inclusive speed" of the diving bird under water as between one and two feet per second, but mentions a record of four feet per second for the Great Crested Grebe (*Colymbus cristatus*). Some of the diving birds show remarkable speed under

water for brief periods. Coues²¹ states that the Pacific Loon (*Gavia arctica pacifica*) shot through the water with "marvellous swiftness." Regarding Holboell's Grebe (*Colymbus grisegena holböllii*), Cahn wrote: "The speed which is developed under water is marvelous, at times it being almost impossible to follow its movements, which were so rapid that the bird appeared more like a large, gray fish darting about."²⁹ In one case the grebe remained under water for over a minute and reappeared more than 200 feet distant. It is evident that a bird with sufficient incentive can travel under water at far greater speeds than have been assumed.

The grebes and mergansers, according to Brewster,³⁰ do not compare with the loon for swiftness and distance traveled under water. He shot a loon with a .44 caliber rifle and gives the following remarkable example of vitality: ". . . the heavy bullet passed directly through the middle of her neck, about three inches above the body, partially shattering some of the vertebrae and cutting the jugular vein, yet she dove twice after receiving this ghastly wound, going each time a long distance under water. When I finally came up with her, she was swimming on the surface with head and neck erect and so vigorously that I had to make use of my shot gun before I could lay hands on her." Jourdain³ mentions that a wounded Common Loon, attached by a line to a 13-foot boat, was able, while submerged, to tow the craft.

Disbelief in the capability of birds to dive to great depths has been based on false assumptions as to the source of the oxygen required. Forbush²⁷ believed that preparatory to a dive the bird filled its lungs with air; and that "extreme propulsive efforts" were required to force the buoyant body through the water. Dewar¹² states that the maximum vital capacity is "controlled initially by the amount of respirable air the bird can breathe into its lungs and air-sacs." This is not the case.

Oxygen needs of the diving bird are met in a way differing decidedly from that of the non-diver. Krogh says: "The main difference between a diver and a non-diver appears to be in the regulation of the circulation which allows the diver to reduce greatly the blood-flow to the muscles and perhaps also to the other organs and to reserve the supply mainly for the central nervous system."³¹ The diver is also much more resistant to carbon dioxide than the terrestrial animal and can withstand breathing 5 to 6 per cent oxygen for a long time. During submergence the diving bird places little dependence on free oxygen. The main source of oxygen is the oxyhemoglobin and oxy-myoglobin stored in the muscles. The dark color of the flesh of waterfowl is due to these substances. This oxygen is loosely combined chemically and becomes readily available when needed. Not only has the diving bird a high tolerance for carbon dioxide, but, as the tension of this gas increases, more oxygen is liberated from the oxyhemoglobin.

Further energy is derived from the formation of lactic acid from the glycogen in the tissues without the intervention of oxygen. The oxygen debt created cannot be paid until the bird rises to the surface and resumes normal respiration.

The ability of aquatic birds to prolong life under involuntary submergence is extraordinary. When the domestic duck was held under water, Bert³² found that it would resist asphyxiation for a maximum of 16 minutes. Richet³³ closed the trachea with a ligature and extended the survival to 27 minutes. The longer survival in this case was attributed to the air forcibly retained in the lungs and air-sacs. The domestic duck is a "puddler"; different data are to be expected for a diving duck. Land animals when submerged expend their energy in violent effort. The contrary is true in general of aquatic animals. Bert observed that the domestic duck when forced under water usually remained still and endured asphyxiation quietly. A hen struggled and survived but 3.5 minutes. The Old-squaws netted in the Great Lakes die without struggling. The nets are torn only by the weight of the birds when the nets are lifted or during the removal of the entangled birds.

Paton³⁴ and Huxley³⁵ made the interesting discovery that posture produces apnoea, i.e. partial suspension of breathing. When a duck dives with neck extended, apnoea follows automatically. Apnoea also results from posture without contact with water. However, in air, regardless of the position of the body, if the duck can turn its head so that the dorsal surface is upward, breathing can be resumed. Ostensibly the essential difference between flight and diving posture is that one is horizontal and the other vertical. However, contact with water may also play a part in producing apnoea since the Common Loon will travel submerged a long distance in shallow water, where it must take a horizontal posture.

There are apparently no physical or physiological reasons why some exceptionally skillful individuals among diving birds cannot descend to a depth of 200 feet. There is ample evidence that this depth is actually reached.

REFERENCES

1. FORBUSH, EDWARD HOWE. Birds of Massachusetts and other New England States. Mass. Dept. Agric., Boston. Vol. 1(1925):20, 258.
2. SCOTT, WALTER E. Old-squaws taken in gill-nets. *Auk* 55(1938):668.
3. JOURDAIN, F. C. R. (in *The British bird book*, edited by F. B. Kirkman). T. C. and E. C. Jack, London. Vol. 4(1913):444, 446.
4. ROBERTS, THOMAS S. The birds of Minnesota. University of Minnesota Press, Minneapolis. Vol. 1(1932):144.
5. EATON, ELON HOWARD. Birds of New York. *N. Y. State Mus. Mem.* 12, Part 1(1910):214, 95.

6. BARROWS, WALTER BRADFORD. Michigan bird life. Mich. Agric. College, Lansing. (1912):103.
7. BUTLER, AMOS W. The birds of Indiana. *22nd Ann. Rept. Dept. Geol. Nat. Res. Indiana*, Indianapolis. (1898):626.
8. KORTRIGHT, FRANCIS H. The ducks, geese and swans of North America. Amer. Wildlife Inst., Washington, D.C. (1942):285. Cf. COTTAM, CLARENCE. Food habits of North American diving ducks. *U.S. Dept. Agric. Tech. Bull.* 643 (1939):74.
9. TARRANT, W. P. Fishing and catching ducks. *Ornith. and Ool.* 8(1883):3.
10. BACON, SAMUEL E., JR. Old squaw (*Clangula hiemalis*). *Ornith. and Ool.* 17(1892):45.
11. ANONYMOUS. *Mich. Conservation* 15, No. 10(Nov., 1946):15.
12. DEWAR, JOHN M. The bird as a diver. H. F. and G. Witherby, London. (1924): 18, 19, 5.
13. IRVING, LAURENCE. The ability of warm-blooded animals to survive without breathing. *Sci. Monthly* 38(1934):422-428.
14. MURPHY, ROBERT CUSHMAN. *In litt.*
15. TOWNSEND, CHARLES WENDELL. The birds of Essex County, Massachusetts. *Nuttall Ornith. Club Mem. No. 3* (1905):77.
16. AUDUBON, JOHN JAMES. Ornithological biography. Adam and Charles Black, Edinburgh. Vol. 3 (1835):77.
17. ATKINSON, JOHN CHRISTOPHER. Notes on the moorhen. *Zoologist* 2(1844): 497-499; Further remarks on the power of moorhens, etc. to keep the body submerged. *Zoologist* 2(1844):756-761.
18. SLANEY, W. H. Notes on the moorhen. *Zoologist* 2(1844):667-669.
19. MORRIS, B. R. On the power that certain birds possess of remaining partially submerged in deep water. *Can. Jour. Sci. Arts.* 7(1862):509-515.
20. FOOTTIT, W. F. On the submergence of water birds. *Zoologist* 23(1865):9469.
21. COUES, ELLIOTT. Birds of the Northwest. *U. S. Geol. Surv. Misc. Publ.* 3 (1874):733, 723.
22. ZIMMER, K. Beiträge zur Mechanik der Atmung bei den Vögeln in Stand und Flug. *Zoologica* (Stuttgart) 33(1935):1-69.
23. STRESEMANN, ERWIN. Aves (in W. Kükenenthal und T. Krumbach. *Handbuch der Zoologie*). Walter de Gruyter & Co., Berlin. Vol. 7, Part 2 (1927-1934): 600, 471.
24. JACOBS, W. Das Problem des spezifischen Gewichtes bei Wassertieren. *Arch. Hydrobiol.* 39(1943):432-457.
25. IRVING, LAURENCE, *et al.* The respiratory metabolism of the seal and its adjustment to diving. *Jour. Cell. Comp. Physiol.* 7(1935):137-151; IRVING, LAURENCE. Respiration in diving mammals. *Physiol. Reviews* 19(1939):112-134.
26. STUBBS, F. J. The mechanism of plumage in water birds. *Zoologist* (4th ser.) 14(1910):201-206.
27. FORBUSH, EDWARD HOWE. Some under-water activities of certain waterfowl. *Mass. Dept. Agric., Econ. Biol. Bull. No. 8* (1922):47, 32-33.
28. ANDERSON, J. ALASTAIR. Periods of dives made by Long-tailed Ducks. *Brit. Birds* 13 (1920):298.
29. CAHN, ALVIN R. The freezing of Cayuga Lake in its relation to bird life. *Auk* 29(1912):440.

30. BREWSTER, WILLIAM. The birds of the Lake Umbagog region of Maine. *Bull. Mus. Comp. Zool.* 66, Part 1(1924):46-48.
31. KROGH, A. The comparative physiology of respiratory mechanisms. Univ. Penn. Press, Philadelphia. (1941):85, 80.
32. BERT, PAUL. Leçons sur la physiologie comparée de la respiration professées au Muséum d'histoire naturelle. J.-B. Baillière & Fils, Paris. (1870):537.
33. RICHTER, C. De la résistance des canards à l'asphyxie. *Jour. Physiol. et Path. gén.* 1(1899):641-650.
34. PATON, D. NOEL. The relative influence of the labyrinthine and cervical elements in the production of postural apnoea in the duck. *Quar. Jour. Exper. Physiol.* 6(1913):197-207; Studies of the breathing mechanism of the duck in submergence. *Proc. Roy. Philos. Soc. Glasgow* 45(1914):1-16; Submergence and postural apnoea in the swan. *Proc. Roy. Soc. Edinburgh* 47(1927):283-293.
35. HUXLEY, F. M. On the reflex nature of apnoea in the duck in diving. *Quar. Jour. Exper. Physiol.* 6(1913):147-157, 159-182; On the resistance to asphyxia of the duck in diving. *Quar. Jour. Exper. Physiol.* 6(1913):183-196.

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SEASONAL FLUCTUATIONS IN WEIGHTS OF
PENGUINS AND PETRELS

BY L. E. RICHDALÉ

FROM August 1936 to May 1946 I carried out a banding study of the Yellow-eyed Penguin, *Megadyptes antipodes*, on the Otago Peninsula, New Zealand. In all, I paid 973 visits to the breeding areas, which are 20 miles from the city of Dunedin with the outermost colonies 20 miles apart. The observations concerned 88 male and 96 female penguins which were found breeding for at least one season. A total of 292 matings was noted.

Weights were recorded as often as possible throughout the year. Finally, in the tenth season, weights were taken at 7-day intervals, from a point 56 days before the deposition of the first egg to the end of the guard stage, when the chicks are abandoned in the daytime and the two parents fish simultaneously.

In addition, seasonal weights were taken of two species of petrels—the Broad-billed Prion, *Pachyptila vittata* [= *forsteri*] and the Diving Petrel, *Pelecanoides urinatrix*. These weights were taken with much less thoroughness, but even so, the results should indicate general tendencies and serve for comparison. The petrel research was carried out on the tiny island of Whero off the southeast corner of Stewart Island.

In conclusion, I have compared the weights of the petrels and penguins with the findings of other workers on other species. This paper owes its inspiration largely to the researches of Wolfson (1945). My thanks are due to Mr. R. K. Wilson, who drew the graphs.

WEIGHT FLUCTUATION IN THE PENGUIN MEGADYPTES

The weekly weights of the penguin *Megadyptes* are given in Tables 1 and 2; their differences are worked out statistically in Table 3. There is little difference from week to week; only 7 of the 42 differences are significant.¹ Four other types of interval were worked out. In weights taken at two-weekly intervals (Graph 1), 9 differences out of 20 are significant; at three-weekly intervals, 5 out of 12; and the division of each stage into two equal parts gives 5 significant differences out of 10. It will be observed that as the intervals are widened the differences in weight tend to become statistically more significant. A further tendency, however, is for significant phases in the breeding cycle to be obscured.

¹ Before allowing that a difference between means is significant, I have followed the ruling that it must be at least four times the value of the probable error of the difference.

In an endeavor to obviate this factor, I made a final broad grouping, as shown in Graph 2. All but one of the eight differences are significant, and the one exception is nearly so. One important point, however, is hidden. This is the fact that the females are heavier than the males for four weeks preceding the laying of the first egg, a phenomenon best appreciated by the use of weekly intervals as shown in Tables 1 and 2. Graph 2 shows several points between 56 days before the first egg and 48 days after hatching where a change in weight occurs that is significant statistically. Moreover, a close study of the behavior of the sexes during this period shows a correlation with the statistics.

The period from 42 days before laying to the laying of the first egg is best discussed in weekly intervals, since wider intervals fail to reflect important changes in behavior. In the interval 42-36 days before egg-laying, the males have reached their heaviest weight, after which a steady decline occurs till the end of the pre-egg period, when

TABLE 1

MEAN WEEKLY WEIGHTS OF MALE PENGUINS FROM 56 DAYS BEFORE EGG
TO END OF GUARD STAGE

Stage	Class interval	n ¹	Mean	σ^2	PE _m ³	Range
	days		lbs.	lbs.		lbs.
Pre-egg	56-50	4	14.13	.70	.23	13 -14 ³ / ₄
	49-43	2	13.38	.22	.10	13 ¹ / ₄ -13 ¹ / ₂
	42-36	9	14.22	.45	.10	13 ¹ / ₂ -14 ³ / ₄
	35-29	10	13.82	.83	.17	12 ¹ / ₂ -15 ¹ / ₂
	28-22	7	12.50	.77	.20	11 ³ / ₄ -14 ¹ / ₄
	21-15	13	11.96	.46	.08	11 -12 ³ / ₄
	14- 8	17	11.57	.72	.11	10 ¹ / ₂ -13
	7- 1	17	11.47	.50	.08	10 ¹ / ₂ -12 ¹ / ₄
Post-egg	0- 6	20	12.04	.61	.09	10 ³ / ₄ -13
	7-13	33	11.93	.84	.09	10 ¹ / ₂ -14 ³ / ₄
	14-20	16	11.90	.73	.12	11 -13 ³ / ₄
	21-27	18	11.79	.59	.09	10 ³ / ₄ -12 ¹ / ₂
	28-34	21	12.33	.91	.13	11 ¹ / ₄ -14
	35-41	25	12.57	.60	.08	11 ¹ / ₂ -13 ³ / ₄
	42-48	20	12.27	.61	.09	11 -13 ¹ / ₂
Guard	0- 6	31	12.51	.85	.10	11 -14 ³ / ₄
	7-13	26	12.59	.84	.11	11 ¹ / ₂ -14
	14-20	27	12.12	.91	.11	10 ¹ / ₂ -14
	21-27	25	11.74	.58	.07	10 ³ / ₄ -13
	28-34	22	11.47	.59	.08	10 ¹ / ₄ -13 ¹ / ₄
	35-41	21	11.62	.97	.14	10 ¹ / ₂ -14 ¹ / ₄
	42-48	12	11.91	.83	.16	10 ¹ / ₂ -12 ¹ / ₂

¹ n = number of weights taken.

² σ = standard deviation.

³ PE_m = probable error of mean.

TABLE 2

MEAN WEEKLY WEIGHTS OF FEMALE PENGUINS FROM 56 DAYS BEFORE EGG
TO END OF GUARD STAGE

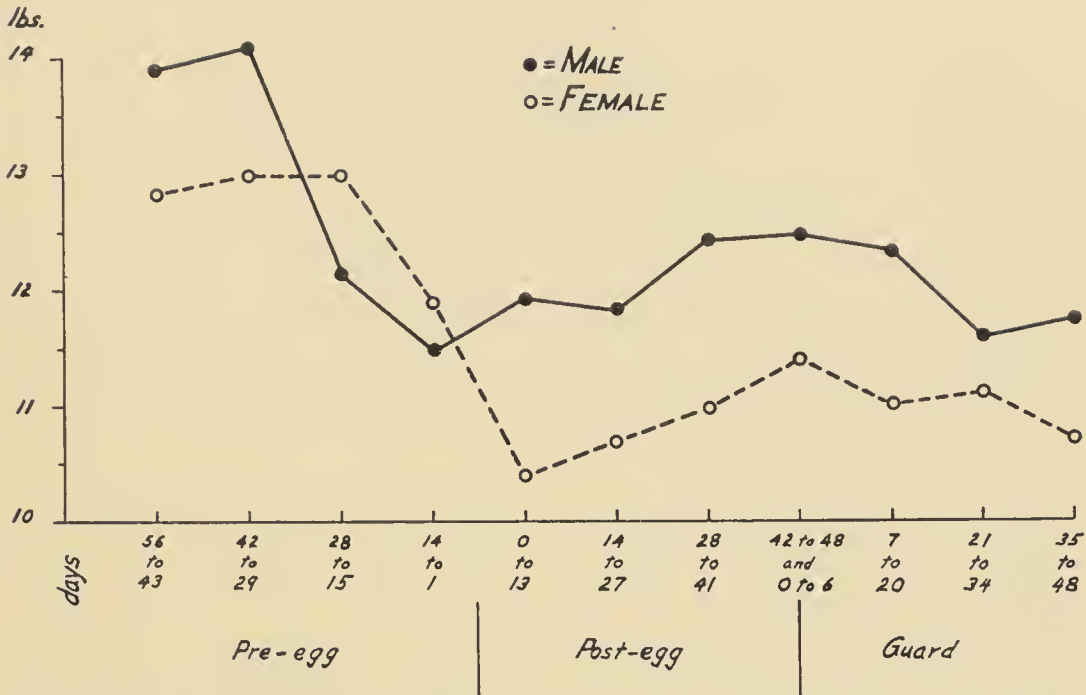
Stage	Class interval	n ¹	Mean	σ^2	PE _m ³	Range
	days		lbs.	lbs.		lbs.
Pre-egg	56-50	3	12.58	.33	.13	12 ¹ / ₄ -13
	49-43	2	12.75	—	—	12 ¹ / ₂ -12 ³ / ₄
	42-36	3	11.92	.66	.25	11 -12 ¹ / ₂
	35-29	4	13.81	.72	.24	12 ³ / ₄ -14 ³ / ₄
	28-22	5	13.30	.56	.17	12 ³ / ₄ -14 ¹ / ₄
	21-15	11	13.05	.62	.12	12 -14
	14- 8	21	12.20	.62	.09	11 -13 ¹ / ₄
	7- 1	18	11.57	.63	.10	10 ¹ / ₂ -12 ³ / ₄
Post-egg	0- 6	39	10.42	.52	.06	9 -11 ¹ / ₂
	7-13	17	10.40	.48	.08	9 ³ / ₄ -11
	14-20	22	10.76	.55	.08	10 -12 ¹ / ₄
	21-27	16	10.59	.53	.09	9 ¹ / ₂ -11 ¹ / ₂
	28-34	16	10.94	.79	.13	10 -12 ¹ / ₄
	35-41	19	11.19	.63	.10	10 ¹ / ₄ -12
	42-48	21	11.29	.61	.09	10 ¹ / ₄ -12 ¹ / ₂
Guard	0- 6	34	11.46	.62	.08	10 -12 ¹ / ₂
	7-13	26	11.26	.85	.11	9 ³ / ₄ -13
	14-20	24	10.84	.67	.09	9 ³ / ₄ -12 ¹ / ₄
	21-27	17	11.88	.62	.10	10 -12
	28-34	27	11.27	.94	.12	9 ³ / ₄ -13 ¹ / ₂
	35-41	20	10.87	.51	.08	10 -12
	42-48	22	10.43	.52	.07	9 ³ / ₄ -11 ¹ / ₂

¹ n = number of weights taken.² σ = standard deviation.³ PE_m = probable error of mean.

their weight tends to increase. From 40 days before the egg appears, the males begin to stay ashore in the daytime, and they remain there for much longer periods than the females. Although some of the females begin to stay ashore quite early, they spend far more time than their partners at sea, fishing. Because of this fact, the females continue to increase in weight till the 35-29 day interval.

The result is that the weights of the two sexes in the 35-29 day interval are nearly equal. After this interval the males are lighter than the females till the last week of the pre-egg period, when the weights are once more equal. In the 21-15 day interval, females are on the average slightly over one pound heavier than males.

With the appearance of the first egg, the story changes abruptly. In the 7-1 day interval before egg-laying, the males begin to seek food more often and the females tend to remain ashore. For some days after the first egg is laid the females rarely enter the water and the males seldom stay ashore in the daytime. (There are, of course, exceptions to this general rule.) Thus the females reach their lowest



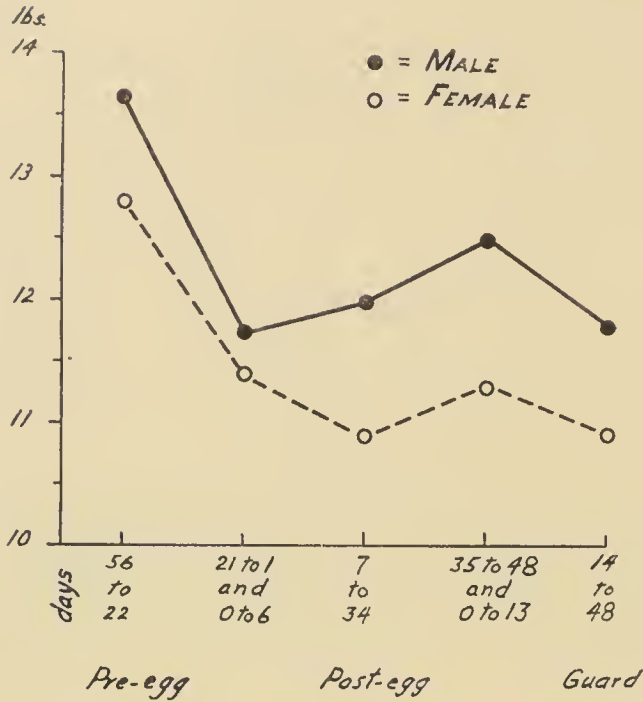
Graph 1. Mean weights of Yellow-eyed Penguins at two-weekly intervals from 56 days before egg-laying to the end of the guard stage.

TABLE 3

DIFFERENCES IN WEEKLY MEANS TAKEN FROM TABLES 1 AND 2

Intervals	Male		Female	
	Difference	PE _d ¹	Difference	PE _d ¹
	lbs.		lbs.	
56-50 and 49-43	.75	.251	.17	.130
49-43 and 42-36	.84	.141	.73	.250
42-36 and 35-29	.40	.197	1.89	.346
35-29 and 28-22	1.32	.262	.51	.294
28-22 and 21-15	.54	.215	.25	.208
21-15 and 14- 8	.39	.136	.85	.150
14- 8 and 7- 1	.10	.136	.63	.134
7- 1 and 0- 6	.57	.120	1.15	.116
0- 6 and 7-13	.11	.127	.02	.100
7-13 and 14-20	.03	.150	.36	.113
14-20 and 21-27	.11	.150	.17	.120
21-27 and 28-34	.54	.158	.35	.158
28-34 and 35-41	.24	.152	.25	.169
35-41 and 42-48	.30	.120	.10	.134
42-48 and 0- 6	.24	.134	.21	.144
0- 6 and 7-13	.08	.149	.20	.136
7-13 and 14-20	.47	.162	.42	.142
14-20 and 21-27	.38	.130	.04	.134
21-27 and 28-34	.27	.106	.39	.156
28-34 and 35-41	.15	.163	.40	.144
35-41 and 42-48	.29	.213	.34	.106

¹ PE_d = probable error of difference.
Statistically significant differences are given in boldface.



Graph 2. Mean weights of Yellow-eyed Penguins at wide intervals from 56 days before egg-laying to the end of the guard stage.

weight level during the first two weeks after the egg is laid, whereas the males reach theirs before the egg is laid.

From these respective depression points the weights of both sexes gradually increase during incubation until the highest peak in weight for the post-egg period is reached in both sexes (during the interval from 42–48 days post-egg to 0–6 days guard). Soon after the parents begin to feed the chicks, a decline occurs. This seems to indicate that even though the parents themselves acquire food daily (which they did not during the incubation stage), the additional task of feeding the chicks has an adverse influence on their weight. At the end of the guard stage, weights of the adults have once more reached a low level.

The graph for the guard stage tends to be irregular. This is the most difficult period for which to obtain an even sampling, since there is a great disparity in weight between a bird that has been ashore for nearly 24 hours and one that has just returned from feeding. The true test would be to weigh the birds at a definite period, say five or six hours after they had returned home. This, however, would be an almost impossible task.

WEIGHT FLUCTUATION IN PETRELS

Before attempting to interpret Tables 4, 5, and 6 it will be advisable to summarize briefly the behavior of the species concerned; more detailed accounts have already been published (Richdale, 1943, 1944, 1945). *Pachyptila* will be dealt with first. The period from May 12

TABLE 4
SEASONAL WEIGHTS OF THE BROAD-BILLED PRION

Periods	Remarks	n ¹	Mean	σ^2	PE _m ³	Range
May 12 to 20	Winter months	13	gms. 206.6	gms. 14.75	2.73	gms. 177 to 227
Aug. 24 to Sept. 2	Laying begins end of August	19	189.4	16.65	2.54	160 to 220
Dec. 6 to 16	End of chick-feed- ing stage	27	189.8	17.65	2.26	170 to 234
Feb. 7 to March 7	All in molt	22	197.2	13.70	1.92	172 to 225

¹ n = number of weights taken.² σ = standard deviation.³ PE_m = probable error of mean.

to May 20, as shown in Table 4, is the middle of the off-season. All the birds handled during this period had completed their molt, but their breeding status was unknown. In the winter months *Pachyptila* visits the shore at irregular intervals.

August 24 to September 2 marks the end of the pre-egg stage and the beginning of laying. One or two of the 19 birds weighed during this period were incubating; the breeding status of the others was unknown.

The adults caught between December 6 and 16 were all feeding chicks (which were near the end of their stay in the burrows). Some adults were caught before they had fed their young and others afterwards. Since chicks may receive up to 80 grams of food in a night (Richdale, 1944:194), the range in weight of feeding adults is very wide.

Finally, the span between February 7 and March 7 is the time the molt occurs. On February 7, 1942, I was present when *Pachyptila* made its first appearance on the island since the completion of the breeding season a little more than a month earlier. All individuals inspected were molting, and all showed considerable wear on the toes—

TABLE 5
DIFFERENCES IN SEASONAL WEIGHTS OF THE BROAD-BILLED PRION

Periods	Difference	PE _d ¹
Between May and August	gms. 17.2	3.73
“ August and December	.4	3.40
“ December and February	7.4	2.96
“ February and May	9.4	3.35
“ December and May	16.8	3.54

¹ PE_d = probable error of difference.

indicating that they were old birds. Their breeding status was unknown.

For *Pelecanoides* (Table 6) only two periods are available. The first extends from August 23 to 26, which probably represents the beginning of the pre-egg period. The birds were all caught and weighed at night just after they had landed. Some were known to be breeding birds, but others were unbanded. Those handled between December 22 and January 30 were all attending chicks and were caught sometimes before and sometimes after they had fed the chicks. For this reason a wide range in weights is apparent.

TABLE 6
SEASONAL WEIGHTS OF THE DIVING PETREL

Periods	Remarks	n ¹	Mean	σ^2	PE _m ³	Range
Aug. 23 to 26	End of winter months	26	gms. 136.15	gms. 6.25	.83	gms. 125 to 152
Dec. 22 to Jan. 30	Chick-feeding stage	100	124.10	10.27	.68	108 to 158
		Difference	12.04	± 1.07		

¹ n = number of weights taken.

² σ = standard deviation.

³ PE_m = probable error of mean.

The difference between the December and February weights of *Pachyptila*, as shown in Table 5, is not significant as it stands. When it is realized, however, that the December weights include, in some cases, a quantity of undelivered food for the chicks, it is clear that the real difference would be much greater and possibly significant. This suggests that the month at sea during which the molt commences is a period of recovery from the stress of feeding young.

During the period of molt, February 7 to March 7, individuals were weighed on four occasions. These weights did not show any significant difference. If this represents the true state of affairs, *Pachyptila* does not lose weight while molting.

In *Pachyptila* the difference between the May and December weights is significant. May is the middle of the off-season, and the weights would probably be much higher at the beginning of the pre-egg stage, about the end of July. This is the case in *Pelecanoides*, which also shows a significant difference between the early pre-egg stage and chick stage weights (Table 6). It would seem, then, that weights in *Pachyptila* and *Pelecanoides* rise during the off-season to a peak at the beginning of the pre-egg stage and drop to a low point during the feeding of the chicks.

Finally, Table 4 also indicates that, as in *Megadyptes*, there is a depression point at the end of the pre-egg stage in *Pachyptila*. This

is corroborated by the fact that there is a significant difference between the May and the late August weights.

DISCUSSION

According to Baldwin and Kendeigh (1938:431, 435) most species of birds show a maximum weight in winter and early spring and a decrease at the approach of the breeding season. Nice's observations (1937:25-26) on Song Sparrows, *Melospiza melodia*, were similar. Marples (1942 and 1945) indicates a similar trend in the Little Owl, *Athene noctua*, and in the Wax-eye, *Zosterops lateralis*.

Wolfson (1945:109-121), however, objects that these generalizations are only partially true. He states that there is in Oregon Juncos, *Junco oreganus*, and other passerines a significant correlation between an increase to a maximum body weight and the beginning of the spring migration. He produces convincing evidence in support of his contention. His impressive graph (p. 120) indicates that, in the spring, migrants increase rapidly in weight, whereas residents continue to decrease. Further, he points out that the increase in weight of the migrants is due to the deposition of fat, subcutaneously and intraperitoneally (p. 109).

The statements of Wolfson are interesting in view of what happens in *Megadyptes*. Not only is there a tendency to follow the same pattern of weight fluctuations as migrant passerines, but also, heavy deposits of fat develop as the breeding season approaches.

From the beginning of winter to six weeks before egg-laying, there is a gradual steady increase in weight and fat deposition in both sexes. This is true not only of the group of penguins as a whole recorded in Graph 1, but is also true, in the main, of the individuals that I was able to weigh several times during the period. Further, although no birds were collected for autopsy, it was obvious that the males, in particular, were extremely fat by August 24, the beginning of the pre-egg stage. Even their ability to walk was impaired.

Side by side with this gradual development there is manifested a growth in the testes and presumably in the ovary. Dissection of two males killed by a fall of rock toward the end of the winter period showed that the testes were much enlarged. The physiological state of the penguins eventually reached a condition that allowed them to stay ashore for a time without food.

Doubtless there are external as well as internal factors which help to bring about these changes culminating in the pre-egg stage. If so, these external factors, one of which is probably the increase in day-length, apparently act differently on the two sexes. The females reach their peak weight and fat deposition later than the males and are later in beginning to stay ashore in the daytime; they do not, at first, fast as frequently as the males. Wolfson (p. 110) found a comparable situ-

ation in migrant passerines, a fact which explains why females arrive on the breeding grounds later than the males.

To sum up, it will be seen that in *Megadyptes* a steady increase in body weight and fat deposition precedes the pre-egg stage and that the females lag behind the males. The sexes, in this way, are prepared for the behavior patterns which will be released in the succeeding period. This preparation occurs at the correct time presumably because of the response of the endocrine glands to external factors in the environment. The response of the endocrine system then causes a change in the metabolism which results in an accumulation of surplus fat.

During the last four weeks of the pre-egg stage the female *Megadyptes* is heavier than the male (Tables 1 and 2). The reason for this is noted above and is not caused by the advent of the eggs, which average about 136 grams and are laid four days apart. In the third week before laying, occurs the greatest disparity in weight between the sexes, when the females average a little more than one pound heavier.

This advantage in female weight in species in which the male is the heavier during most of the year has been recorded elsewhere. When occurring just before laying it has been thought to be due to the presence of the eggs (Nice, 1937:27; 1938:7. Marples, 1942:247). Another possibility is that the male's weight may tend to fall because of his greater activity, especially noticeable in species which are highly territorial. Such a possibility is suggested by Nice (1937:25).

In species in which only the female incubates there are records that she continues to be heavier even after the eggs are laid and during the subsequent incubation. Nice (1937:26-27; 1938:7) found this tendency in Song Sparrows. She also quotes Riddle and Braucher as stating that there is an eight per cent rise in weight during incubation in pigeons and doves. From this it would seem that incubation is not the arduous task that some people think. As for the male, in species in which he does not share the task of incubation (so far as records are available), his weight continues to fall. This is recorded in Song Sparrows (Nice, 1937:22) and in the Little Owl (Marples, 1942:247).

In *Megadyptes*, incubation is shared equally by the sexes. The female remains lighter than the male throughout, and, in fact, at the beginning of the period she reaches one of her two lowest depression points. This is due to an increase in fasting toward the end of the pre-egg stage and particularly during egg-laying. From this low level she rises steadily till the eggs are hatched. The male's weight also registers a steady rise. These facts support Nice's view that incubation is a recuperative period. It would seem that in species in which both sexes incubate both male and female gain in weight. If the female alone incubates, the female alone becomes heavier. A knowledge of what happens if only the male incubates, as in the phalaropes, would be of considerable interest.

With the hatching of the chicks there seems to be a general drop in weight for at least those parents which feed the young. This applies to *Megadyptes*. (In this penguin there is a rise again, however, after the end of the guard stage, a condition characteristic of this species and probably of all penguins.) Nice (1937:27) states that feeding young is strenuous in the two sexes for both Song Sparrows and Tree Sparrows, *Spizella arborea*. The same conditions appear to apply in the Little Owl (Marples, 1942:pl. 20).

Finally, weights connected with the molt will be considered. Immediately following the breeding season in autumn, the molt commences for most penguins of both sexes. The greatest amount of fat is developed (being greater than at the end of the winter months) and the heaviest weight of the yearly cycle is attained just as the molt commences, but on completion of the molt the birds register the minimum weight for the year.

As regards other families of birds, Nice (1937:22) indicates that Song Sparrows are "undoubtedly" at their lowest weight in August and September, when the molt occurs. Beck found a heavy loss at this time in four domestic fowls (Nice, 1938:7). In the Little Owl, Marples (1942:247) thinks that the minor loss in weight he recorded in the autumn was due to molt.

The contrary view is held by Baldwin and Kendeigh (1938:463), who say that "molting and renewal of feathers in August and September is not joined with a decrease in weight; rather there is an increase in weight at that time." In support of this, Laskey (Nice, 1938:7) reports the "highest weight during the inactive period of molting" in male Mockingbirds, *Mimus polyglottos*.

In petrels, it would seem from the meagre evidence available that they reach peak weight at the beginning of the pre-egg stage and decrease steadily till the egg is laid. They are again low in weight at the end of the chick stage, and up to this point the graph of their weight closely resembles that of *Megadyptes*. During the molt *Pachyptila*, at least, does not lose weight.

In conclusion, it is obvious that not all species of birds reach their maximum weight in the winter months and then decrease as the breeding season approaches. Some, like the migrant passerines, penguins, and at least some petrels, reach a peak at the beginning of the pre-egg stage. The weight of incubating birds tends to rise; if a bird does not incubate, its weight tends to fall. Parents that feed the young also lose weight, but no data are available on parents that do not feed the young. As regards the molt, some birds—particularly penguins—certainly lose weight during the process. On the other hand, there is evidence that some birds do not and that others even gain weight. It is abundantly clear that data collected on bird weights are of inestimable value in clarifying many physiological and psychological problems.

SUMMARY

In the course of a 10-year study (1936–1946) of the Yellow-eyed Penguin, *Megadyptes antipodes*, weights were taken at 7-day intervals from 56 days before the egg was laid to 48 days after hatching—a period of about 146 days.

Males reach their peak weight at the end of the off-season and drop steadily during the pre-egg stage until just before egg-laying.

Females reach their peak in weight a week later than the males, and for four weeks are heavier than the males, which again exceed the females in weight as the eggs appear.

As incubation progresses, both sexes steadily increase in weight, but another drop occurs during the 48 days after the hatching of the chick.

Weight fluctuations in two species of petrel, the Broad-billed Prion, *Pachyptila vittata* [= *forsteri*], and the Diving Petrel, *Pelecanoides urinatrix*, were also examined. The same pattern of fluctuation seemed to occur in these two species as in the penguin *Megadyptes*.

The results of the study were compared with the findings of other workers on other species. They were found to follow closely the deductions of Wolfson, who studied migrant Oregon Juncos, *Junco oreganus*. They differ, however, from data on non-migratory birds, most of which apparently reach peak weights in the winter.

Megadyptes resembles Juncos in that a heavy deposit of fat develops as the pre-egg period approaches. In both species this is coincident with growth of the gonads.

The pattern of weight fluctuation indicates that incubation in birds is not the arduous task that it is supposed to be, but that feeding of young is a time of stress.

The penguin *Megadyptes* reaches its peak weight for the year at the beginning of the molt, its minimum weight at the end; the petrel *Pachyptila* apparently does not lose weight during the molt. Evidence from other workers on other species indicates that in some birds there is a gain of weight during the molt; in others, a loss; in still others, no significant change.

LITERATURE CITED

- BALDWIN, S. PRENTISS, and S. CHARLES KENDEIGH
1938 Variations in the weights of birds. *Auk*, 55: 416–467.
- MARPLES, B. J.
1942 A study of the Little Owl, *Athene noctua*, in New Zealand. *Trans. Royal Soc. of N.Z.*, 72: 237–252.
1945 *Zosterops lateralis* at Dunedin, New Zealand. *Emu*, 44: 277–287.
- NICE, MARGARET MORSE
1937 Studies in the life history of the Song Sparrow. 1. A population study of the Song Sparrow. *Trans. Linn. Soc. N.Y.*, 4.
1938 The biological significance of bird weights. *Bird-Banding*, 9: 1–11.

RICHDALE, L. E.

1943 The Kuaka or Diving Petrel, *Pelecanoides urinatrix* (Gmelin). *Emu*, 43: 24-48, 97-107.

1944 The Parara or Broad-billed Prion, *Pachyptila vittata* (Gmelin). *Emu*, 43: 191-217.

1945 Supplementary notes on the Diving Petrel. *Trans. Royal Soc. of N.Z.*, 75: 42-53.

WOLFSON, ALBERT

1945 The role of the pituitary, fat deposition, and body weight in bird migration. *Condor*, 47: 95-127.

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GENERAL NOTES

Zone-tailed Hawk breeding along Colorado River.—Since the Zone-tailed Hawk (*Buteo albonotatus*) nests principally in canyons of mountainous country from central Arizona southward, a report of its breeding in the immediate valley of the lower Colorado River on the western border of Arizona is of interest. On July 13, 1946, I found a juvenile Zone-tail, obviously not long out of the nest, perched on a branch of dead mesquite in the Bill Williams River delta, Yuma County, Arizona. At my close approach it made no effort to escape, and when I reached to pick it up, its only defense was to spread its wings and open its bill. I tested its ability to fly by tossing it into the air. It flapped clumsily and came to an awkward rest on a near-by bush. During this time the parent birds were flying boldly overhead, uttering a shrill screaming, and frequently alighting in a large dead cottonwood near by. Upon scanning the cottonwood, I discerned a moderate-sized nest of twigs about 40 feet from the ground in one of the main crotches of the tree. Since there were no other suitable nest trees close by, this was undoubtedly the birds' nest. A thorough search (as thorough as the denseness of the brush would permit) failed to reveal the presence of more than the one juvenile, and from the actions of the parent birds I judged that there were no more.

The general area is an almost impenetrable jungle of dead mesquite (*Prosopis juliflora*) and rank arrowweed (*Pluchea sericea*), from which protrudes an occasional stark, dead cottonwood. Close at hand is a small beaver-dammed stream, flowing through the dead mesquite and arrowweed; further away are willow-cottonwood woodlands and towering cliffs. The nest tree is about half a mile from where the small stream of the Bill Williams River joins the waters of Havasu Lake (impounded by Parker Dam).

In this same restricted area, I had seen Zone-tailed Hawks before: on August 14, 1943, three (including one I thought to be a juvenile); on August 25, 1943, two; on September 7, 1943, two; and on May 29, 1946, one. (I did not visit the area in 1944 or 1945.) My latest fall record for the Colorado River valley is September 16 (1946), when I saw one along the Colorado River, about two miles southwest of Parker Dam, in San Bernardino County, California.—GALE MONSON, *Fish and Wildlife Service, Parker, Arizona.*

Late nests in Yellowstone National Park.—Yellowstone National Park has long been known as a favorite nesting locality for American Ospreys (*Pandion haliaetus carolinensis*). For many years these birds have used Eagle Nest Rock in Gardner Canyon and the lofty pinnacles in the Grand Canyon of the Yellowstone. Apparently one of these picturesque sites has been occupied every year at least since 1875. Skinner, former park naturalist (in A. C. Bent, 1937. *U.S. Natl. Mus. Bull.* 167:359) reported 25 nests on pinnacles of the Grand Canyon during the spring of 1914 and a larger number in tree sites. David de L. Condon, Chief Park Naturalist of Yellowstone National Park (letter of January 7, 1947) wrote that on one trip to the Grand Canyon of the Yellowstone during July 1946 he casually noted 17 nests in use; he added that Ospreys were common nesters throughout the Park, probably about as common as in 1914.

Nest construction and incubation ordinarily take place during May and June. The birds usually produce but one brood in a season, but if their first attempt is unsuccessful they may nest again after an interval of three or four weeks. For the northern part of the United States, Bent (page 361) mentions May 25 as the earliest date recorded for nests containing young and June 18 as the latest date for eggs. In the Yellowstone eggs have hatched during the very last of June. Young Ospreys develop slowly, remaining in the nest from 35 days to 8 weeks.

During the last two weeks, by which time the wings are well developed, the young exercise their wings vigorously. Bent says that the birds may leave the nest as early as July 26, but Yellowstone records indicate that the young may leave any time in August (there are no records of young Ospreys unable to fly after the last of that month). According to Skinner's records (Bent, page 375), October 7 is the latest date on which Ospreys have been recorded in Yellowstone; Condon noted one in the Park on October 7, 1946; he remarked, however, that Ospreys may have remained there much later.

On September 23, 1946, I saw young Ospreys in three nests on pinnacles in the Grand Canyon of the Yellowstone. In one of these nests the young bird was just beginning to emerge from the downy stage. In the other nests the primaries were about half developed. In two hours of observation I did not see the young exercise their wings, a fact which would suggest that they were far from ready to leave the nest. Their size, appearance, and habits indicated that the birds would require at least another two weeks before they could fly.

Other species also were known to nest late in Yellowstone in the summer of 1946. On September 22 and 23, 1946, I noted a female Barrow's Golden-eye (*Glaucionetta islandica*), with her brood of six downy young, on Yellowstone Lake near the "Thumb." The young appeared to be less than two weeks old.

In Yellowstone the mercury is low before the last of September, and snow almost invariably has covered the ground before that time. The cold wet spring of 1946 may have caused failure of the first nesting attempts of these birds, so that the young Ospreys and Golden-eyes noted on September 22 and 23 were probably the result of second nestings.—CLARENCE COTTAM, *Fish and Wildlife Service, Chicago 54, Illinois.*

Another atypical House Wren song.—Along the Greenbelt road near Branchville, Prince George's County, Maryland, on July 10, 1946, I heard a completely unfamiliar song given by a House Wren (*Troglodytes aëdon*). In its fullest version, the song was: three to five *chukka's*, a *tsuh-swee* (the *swee* rough, yet musical, and rising in pitch), then a typical bubbly wren-song. Sometimes the *chukka's* were omitted and the song began with the *tsuh-swee*; at other times the bubbly song was omitted and only the first two sections given—it was this version that led me to search the bird out and watch it sing, which I did at only a few yards' distance. Murray (1944. *Wils. Bull.*, 56:49) has reported atypical song by a House Wren in Virginia.—HERVEY BRACKBILL, 4608 Springdale Avenue, Baltimore 7, Maryland.

Western Palm Warbler in Colorado.—The Western Palm Warbler (*Dendroica palmarum palmarum*) has been listed from Colorado on the basis of one observed by H. G. Smith in Denver on June 20, 1891. We now have a specimen (No. 25375) collected in the State, a female taken near Limon, Lincoln County, by Joseph Stephens, on May 13, 1947.—ALFRED M. BAILEY, *The Colorado Museum of Natural History, Denver.*

An Oven-bird incubates a record number of eggs.—On May 23, 1947, I found a nest containing one egg of the Oven-bird (*Seiurus aurocapillus*) and three eggs of the Cowbird (*Molothrus ater*) in a woods five miles southwest of Ann Arbor, Michigan, where I had previously studied the Oven-bird and the Cowbird (Hann, 1937; 1941. *Wils. Bull.*, 49:145-237; 53:209-221). On the following day, about 11 a.m., I revisited the nest and found the same Oven-bird egg (which I had marked) and four Cowbird eggs. (Three of the Cowbird eggs were quite similar in coloration, being finely mottled with brown, but the fourth was whiter and had larger markings, a possible indication that more than one Cowbird had laid

in the nest.) Since there was still only the one Oven-bird egg in the nest, I supposed that the nest had been deserted; but six days later, on May 30, I found the Oven-bird incubating four Oven-bird eggs and four Cowbird eggs. This was the largest number of eggs I had ever found in one Oven-bird nest. The time of the Oven-bird's laying and the beginning of incubation were, of course, uncertain, but in all probability the second egg was laid on the morning of May 24 (the day of my second visit to the nest) and was taken by a Cowbird before I arrived. If the regular pattern of laying and incubation was then followed, the remaining eggs were laid May 25, 26, and 27, and incubation was started on May 26. In the afternoon of June 8, the eight eggs were still present, and none was pipped. On the morning of June 11, two Cowbirds had hatched; one was about two days old, the other scarcely one day. The larger Cowbird had probably hatched on June 9, and the smaller late on June 10. If incubation began on schedule, the incubation period for these Cowbirds was about 14 and 15 days instead of the average 11.6 days. It is possible, however, that the regular habit of beginning incubation on the day before the laying of the last egg was disturbed by the presence of Cowbird eggs so that incubation was delayed for one or two days. During my later observations, however, the Oven-bird was very attentive and was on the nest three out of four times when I arrived.

On June 15, when the Cowbirds were presumably five and six days old, I took the unhatched eggs to the laboratory. Calculations by water displacement, checked by the volume formula used by Worth (1940. *Auk*, 57:44), showed that the four Oven-bird eggs and four Cowbird eggs had a volume about 1.8 times that of the regular 5-egg clutch of the Oven-bird. Upon opening the eggs, I found that the two Cowbird eggs and one Oven-bird egg had developed well toward the hatching stage, but the remaining three Oven-bird eggs had not gone beyond the early stages of development.

The position of the eight eggs in the nest is important in this connection. The Oven-bird eggs, on May 30, were in the bottom of the nest, and the Cowbird eggs around the edge, above the Oven-bird eggs. On June 8 the arrangement was similar except that one Cowbird egg was at the edge of the bottom layer and an Oven-bird egg was on the edge above. The Cowbird egg that was in the bottom layer was the one with the larger spots and was one of those that failed to hatch.

It is a well-known fact that any very appreciable reduction in the amount of heat delivered to the eggs during incubation, especially during the early stages, lengthens the time required for hatching or is fatal to the embryos (Baldwin and Kendeigh, 1932, *Physiology of the temperature of birds*, *Sci. Publ. Cleveland Mus. Nat. Hist.*, 3:143-144). The largest number of eggs incubated hitherto by an Oven-bird under my observation was four Oven-bird and two Cowbird eggs. These all hatched, and the young lived to leave the nest, but the incubation period was unknown, since the nest was not found until after incubation had started. The volume of these six eggs that hatched successfully I estimated to be about 1.3 times that of the normal clutch, as compared with the present group of eggs, with 1.8 times the normal volume, which hatched only two Cowbirds. It is probable that the limit of egg volume that an Oven-bird is able to hatch is between 1.3 and 1.8 times the volume of the normal 5-egg clutch, and doubtless is much nearer 1.3 than 1.8. Probably also the eggs must lie in a single layer in the bottom of the nest.

On June 18, the nest had been torn out by a predator, and undoubtedly the two Cowbirds were destroyed.—HARRY W. HANN, *Department of Zoology, University of Michigan, Ann Arbor*.

Flight speeds of some south Texas birds.—In the course of field work in south Texas in 1945, I recorded the following flight speeds (taken at Alice and Bentonville, Jim Wells County, and at Bishop, Nueces County). All records were made by automobile.

	MPH	Date 1945	Distance (yards)	Remarks
Bob-white <i>Colinus virginianus</i>	28	June 2	200	Into slight wind
Ground Dove <i>Columbigallina passerina</i>	26	June 2	100	Into slight wind
	28	June 2		No wind
	32	June 20	100	No wind (Bentonville ¹)
Inca Dove <i>Scardafella inca</i>	28	June 2		No wind
Texas Nighthawk <i>Chordeiles acutipennis</i>	20	June 2		No wind
	35	July 5	100	Against slight wind
Hairy Woodpecker <i>Dryobates villosus</i>	20	July 16	200	No wind
Scissor-tailed Flycatcher <i>Muscivora forficata</i>	22	June 2		No wind
	25	June 20	250	No wind (Bentonville)
Mockingbird <i>Mimus polyglottos</i>	22	June 2	100	Across and into wind
Sennett's Thrasher <i>Toxostoma longirostre</i>	23	June 2		No wind
	29	July 16	400	No wind
Shrike <i>Lanius ludovicianus</i>	39	Sept. 18	100	No wind
English Sparrow <i>Passer domesticus</i>	20	June 2		No wind
Meadowlark <i>Sturnella</i> sp.	25	June 2		No wind
Great-tailed Grackle <i>Cassidix mexicanus</i>	32	May 23	100	No wind
	27	June 2	300	No wind
	34	June 20	300	No wind (Bishop)
	39	Aug. 21	440	No wind; flock of 40 (Bishop)
Cardinal <i>Richmondia cardinalis</i>	26	June 21	50	No wind
Pyrrhuloxia <i>Pyrrhuloxia sinuata</i>	20	June 2	300	No wind
	22	June 21		No wind
Varied Bunting <i>Passerina versicolor</i>	28	June 18		No wind
Dickcissel <i>Spiza americana</i>	25	June 2	100	Into slight wind
Lark Sparrow <i>Chondestes grammacus</i>	27	June 2		No wind
	21-28	June 2		No wind

¹ All records were made at Alice, Texas, except as otherwise indicated in this column.

—CLARENCE A. SOOTER, 1336 North 40, Lincoln, Nebraska.

Brewer's Blackbird breeding in Ontario.—During the summer of 1943, one of us (A. E. Allin) observed a small male blackbird with straw-coloured eyes in an unsettled portion of the city of Port Arthur, Ontario. Since Brewer's Blackbird (*Euphagus cyanocephalus*) was not known to occur in the Province, this bird was thought to be a Rusty Blackbird (*E. carolinus*), which is a regular spring and fall migrant locally although there does not appear to be any recent record of its occurrence during the summer months. Circumstances did

not permit further investigation at the time. The area was kept under observation for the remainder of the summer of 1943 and in 1944, but no unusual blackbirds were observed. It should be noted that the area had also received some study during the summer of 1942, when a Clay-colored Sparrow (*Spizella pal-lida*) was heard singing there.

On June 13, 1945, a male blackbird similar to the above was noticed in the same area. Subsequently, at least eight birds were seen there, including females with brown eyes, and we realized that we had located a colony of Brewer's Blackbirds. The birds were carrying insect larvae—suggesting that young birds were near by. The following day we collected a male, and that evening a typical nest of the species was found (by L. S. Dear). It contained four young, about a week old. On our return the next morning the nest was empty; presumably it had been visited by a predator during the night. The nest was collected and forwarded to the Royal Ontario Museum of Zoology with the male obtained the day before. The colony was not further disturbed. The birds were not seen during the summer of 1946.

The region occupied by this colony lies between the two main roads connecting the cities of Port Arthur and Fort William and covers a more or less cleared area, eight acres in extent. A few small, dead American aspens (*Populus tremu-loides* Michx.) stood in the portion where the nest was found, and these were used as perching sites. The ground was covered by a six-inch growth of grasses, chiefly reedtop (*Agrostis alba* L.). Early flowering sedges (*Carex* spp.) and the sweet white violet (*Viola pallens* (Banks) Brainerd) were generally distributed, as were the early leaves of flowering plants later identified as grass of Parnassus (*Parnassia palustris* L.), asters (*Aster novae-angliae* L. and *A. umbellatus* Mill.) and golden-rods (*Solidago canadensis* L. and *S. uliginosa* Nutt.). To the rear of this area, the ground was heavily covered with Labrador tea (*Ledum groen-landicum* Oeder) and scattered pale laurel (*Kalmia polifolia* Wang.). Above this undergrowth rose a few black spruce (*Picea mariana* (Mill.) BSP) and tamarack (*Larix laricina* (DuRoi) Koch) which were also used by the blackbirds as perching sites.

Brewer's Blackbird has been considered a prairie bird which, like the Clay-colored Sparrow, is spreading eastward, utilizing small open areas in the coniferous forests. It has not yet been seen in Lake or Cook counties in the northeast corner of the neighboring State of Minnesota, but Dr. W. J. Breckenridge, Director, Minnesota Museum of Natural History, has kindly permitted us to include the following evidence of its recent eastward movements in that State as taken from his notes:

"Several Brewer's blackbirds seen along the highway near Virginia, St. Louis County, between June 5th and 11th, 1938." Swedenborg and Prosser.

"Several seen in meadow near Lake Vermillion, St. Louis County, June 9th to 21st, 1938." Swedenborg.

Brewer's Blackbird has not previously been found nesting in Ontario, nor is there a published record of its occurrence in the Province.—A. E. ALLIN, *Regional Laboratory, Ontario Department of Health, Fort William*, and L. S. DEAR, *Box 127, Port Arthur, Ontario*.

EDITORIAL

Preparations are now well advanced for the Wilson Ornithological Club's Annual Meeting at Columbus, Ohio, November 28 and 29. Headquarters will be at the Ohio State Museum. In addition to the regular business and paper sessions, the Local Committee on Arrangements has planned field trips to Buckeye Lake and Hocking County State Park and hopes to have a showing of bird paintings by L. A. Fuertes. Edward S. Thomas, Chairman of the Local Committee, is being assisted by Mrs. Paul A. Barry, Donald J. Borrer, Herbert Brandt, Robert M. Geist, Lawrence E. Hicks, Arthur S. Kiefer, John W. Price, Gene Rea, Carl R. Reese, Irvin B. Rickly, Mrs. Edward S. Thomas, Walter A. Tucker, Mrs. Frank Warner, Rowland S. Wilson, and Miss Olga Zurcher.

President Sutton has appointed the following Nominating Committee to prepare a slate of officers to be voted on at the Annual Meeting: Lawrence H. Walkinshaw, Chairman, S. Charles Kendeigh, and Fred T. Hall. Members are asked to send their suggestions to the Committee.

A combined committee of the Wilson Ornithological Club, the Cooper Ornithological Club, and the American Ornithologists' Union has gathered information on the needs of those European ornithologists who, as a result of the war, lack necessary food and clothing. Cheques for "C.A.R.E." food packages (ten dollars) or for Mutual Aid food packages (five dollars or three dollars and a half) should be sent to Mrs. John T. Emlen, 2621 Van Hise Avenue, Madison, Wisconsin. Members who wish to send used clothing may write to Mrs. F. N. Hamerstrom, Jr., Pinckney, Michigan, stating the sizes and types of clothing they have available. Mrs. Hamerstrom will supply from her files the names and addresses of ornithologists to whom such clothing may be sent. To arrive on time winter clothing must be mailed now.

OBITUARY

WILFRED H. OSGOOD, mammalogist and ornithologist, died in Chicago June 20, 1947, at the age of seventy-one. He was the first president (1893) of the Cooper Ornithological Club, a Fellow of the American Ornithologists' Union since 1905, a member (1897-1909) of the U.S. Bureau of Biological Survey, and a member of Field Museum of Natural History (now Chicago Natural History Museum) since 1909.

ORNITHOLOGICAL NEWS

The Society for the Study of Evolution has founded a new quarterly journal, *Evolution*, edited by Ernst Mayr. The first number, which appeared in July, contained an article by Dean Amadon, "Ecology and Evolution of Some Hawaiian Birds."

W. Earl Godfrey, formerly of the Cleveland Museum of Natural History, has been appointed to the staff of the National Museum of Canada in Ottawa.

The *Ornithologische Monatsberichte*, edited by Erwin Stresemann, was before World War II one of the world's leading ornithological journals. We therefore welcome the news that it is resuming publication as *Ornithologische Berichte* under the editorship of Stresemann and Gustav Kramer. The publisher is Carl Winter, Universitätsverlag, Heidelberg, Germany.

ORNITHOLOGICAL LITERATURE

A FIELD GUIDE TO THE BIRDS. Text and illustrations by Roger Tory Peterson. (3rd ed., revised and enlarged.) Houghton Mifflin Company, Boston, 1947: $4\frac{1}{2} \times 7\frac{1}{4}$ in., xxvi + 290 pp., 25 line illustrations, 60 half-tone plates (36 in color), 2 illustrated end papers. \$3.50.

In the third edition of a work which was highly successful in both earlier editions (1934 and 1939), and which in the second edition earned for its author the Brewster Medal, one might reasonably expect to find the original work modified only slightly by refinements and additions. Therefore, it comes as a surprise to find that the famous Peterson Field Guide (eastern) has been completely rewritten and re-illustrated.

Although the content has been altered substantially, the basic plan remains unchanged from that pioneered in the earlier editions. Birds are depicted as they are seen in the field, with a minimum of detail except as it may be useful in identifying the species. In figure and text, attention is focussed upon those characters which make it possible to discriminate among similar birds. By condensing into terse phrases his comment on appearance, voice, and range, Peterson has been able to compress a great amount of information into a volume of pocket size. The book is intended for use in the States and Provinces east of the Rockies. People in the western Plains will need to supplement this book with its western counterpart, a Field Guide to Western Birds (1941), or with some other work specializing in western forms.

In the main body of this book, in A.O.U. Check-List order, Peterson treats 440 species plus 7 hybrids and other forms. All but about 20 are illustrated, many by two or more figures; for example, most ducks are shown in three views and some warblers in four. Of those species not figured, the majority are western birds not likely to be encountered except at the border of the area. In the appendix, Peterson discusses 74 species of accidental occurrence and 181 subspecies—a total of 702 forms in the book.

Unlike most other illustrated books about birds, this guide is concerned exclusively with field identification. There is, for example, no discussion of behavior except as peculiarities in actions or habitat may be an aid to recognition. Although such a guide is of greatest value to the beginner, the expert also will find much of interest in it, particularly with regard to accidentals or unfamiliar areas.

Since most readers of this review are familiar with the earlier editions of the Field Guide, they will be interested in noting how this edition differs. The most striking improvement is the more generous use of illustrations, particularly those in color. All of the illustrations are new, and the insert plates have been increased from 40 plates, 4 in color, to 60 plates, 36 in color. Most of the figures are larger than previously, and the total number has been increased from about 600 to 1,000.

The text has been enlarged from 180 to 290 pages, and has been improved materially. In the discussion of each bird, a separate paragraph headed "Similar species" offers suggestions for distinguishing among the birds which bear even a superficial resemblance to one another. The author has followed the practice of his Western Guide in discussing subspecies in an appendix, rather than with the individual species. This is an improvement, it seems to me, for it avoids some confusion in the mind of the beginner and reduces the temptation to glib use of trinomials when subspecific identifications are not possible in the field.

In the main body of this edition, there have been added several species which are found occasionally at the fringes of the area, and in an appendix there are paragraph descriptions of those accidentals which have been seen in the East less

than 20 times. Among the minor innovations are groups of silhouettes of common birds at rest or in flight (a ready-made quiz program for a bird club entertainment) and an eastern check list on which the rarity chaser can record his "life list." An improvement in detail is the listing of the text pages opposite the figures on each plate; thus, the text and the figures now refer to each other.

Peterson deserves praise for his very thorough treatment, in figure and text, of the fall warblers, which have never before been handled so well. The illustrations in the book, in order to show field characters to the best advantage, have a diagrammatic quality; yet some of the color plates are vividly beautiful (for example, the heads of the terns opposite page 134).

This book is the culmination of Peterson's unmatched experience in the preparation of field guides, and I confess that I see no serious faults in it. However, it is probably too much to expect that any critical bird student will ever be satisfied entirely with a set of color plates. Although the draftsmanship is excellent, it seems to me that the printing of the plates is somewhat variable in quality. Many of them are excellent, but others are less well done, particularly those of the fall warblers (grays with a pinkish wash, gray-greens too yellowish) and the sparrows (too reddish-brown). Still, all the illustrations are satisfactory for their purpose.

Peterson shows wisdom in retaining the accepted common names for all species even though in some instances he expresses a preference for another name and offers it as an alternate (for example, British names for the Falcons). In a few instances, alternative names are given opposite figures in the plates without explanation to indicate whether Peterson is advocating a change or accepting a regional usage (for example, Black-necked Grebe, Arctic Loon, Sandwich Tern).

Unfortunately, two plates (Nos. 7 and 9) showing ducks in flight have been transposed. In "My Life List" six names have been placed at the ends of the wrong columns so that they are far out of systematic order (the Robin appearing between the Whip-poor-will and the Nighthawk, for example). I understand that these errors have been corrected in the later books of the first printing.

Although the introduction states that the cover is "waterproofed," a simple test shows that the color comes off with even a slight wetting. It is to be hoped that in some future printing the publisher can offer a genuinely water-resistant cover at little or no increase in cost, since, as tattered copies of the earlier guides testify, a large proportion of beginners carry this book in the field.

The significance of a book like this is tremendous because its greatest influence is felt among the rapidly expanding group of people who are taking their first steps in bird study. We are fortunate that such a superb book is available for the purpose.—Harold Mayfield.

LIFE HISTORIES OF NORTH AMERICAN JAYS, CROWS, AND TITMICE. By Arthur Cleveland Bent. United States National Museum Bulletin 191. 1947: xi + 495 pp., 68 half-tone plates. \$1.75.

This, the fifteenth volume of the famous "Bent's Life Histories," deals with some of our best known birds. The work is not a summary, but rather a symposium, with selections of observations, and students generally will come here for data and for ideas. Here we have the field naturalist giving us glimpses of birds' lives chosen from the pertinent literature and from his own experience.

Sometimes we see nearly the same thing through several people's eyes, or hear it through several people's ears: We find Clark's Nutcrackers' nests with Bendire in Oregon in 1876; with Dixon in California in 1934; with Munro in British Columbia in 1912; and again with Skinner in Wyoming in 1916. With Townsend, under his open lean-to, in his "forest" at Ipswich, we listen to mating Crows; again with Forbush on the banks of the Musketaquid we listen to Crows

giving melodious, soft, cooing notes; with Taylor we listen to the tender notes of a Crow in a treetop; and with Allen, we listen to a Crow rhythmically cawing. The material is often in the original observer's own words. This makes for greater bulk and less ease in finding things, but it adds meat to the dry bones, for selections have been made with an eye to the color and charm of their writing. This adds to the readability, and one may get a truer picture, for each writer sees the same thing in his own way.

When we come to the food of Clark's Nutcracker, before the method of getting seeds from pine cones is taken up, the stage is set: "Near me an ancient, gnarled limber pine (*Pinus flexilis*) stood on a wind-exposed knoll, raising a broad, open crown on a brown-plated trunk 2 feet in thickness . . . One of the nutcrackers flew to the tree above me . . ."

Fortunately, no one pattern of interpretation pervades the volume. It is a mine, not only of information, but of the original observers' ideas about the various subjects. Lorenz's idea of *imprinting* is included, as well as many anthropomorphic interpretations of behavior: Crows mobbing an owl because of "antipathy"; the California Jay plaguing a cat for "amusement," in a spirit of "mischief," while a Magpie is doing it "maliciously"; Clark's Nutcracker raising an outcry over game from "curiosity."

The material is classified under such headings as habits, nesting, eggs, incubation, young, plumages, longevity, food, voice, migration, winter, distribution, and egg dates. A section on field identification, included for many of the birds, gives an excellent idea of what the bird looks like in life, and a behavior section describes its "personality." Each subspecies receives a separate heading and treatment, but the better known forms of each species receive most of the attention; there is a protest against "millimeter races" quoted from Taverner under the Long-tailed Chickadee, and some subspecies are dismissed with only characterization and range. The accounts of several species are prepared by special contributors: J. M. Linsdale, B. W. Tucker, E. von S. Dingle, A. O. Gross, and A. Sprunt.

There are many items of special interest because they illustrate how varied are the lives and adaptations of the birds of a given group. The Blue Jay has been recorded as putting ants among the feathers under its wing to store them as food, or carry them to its young (though this may be an example of the little understood behavior called "anting"). The Florida Jay, along with many other corvids, hides away bright objects, such as bottle tops and bits of glass, as well as food.

With material such as this volume provides, comparisons may be drawn and correlations made. Browsing backward and forward, one notes, for example, geographical variation in habit. Crows in the east tend to make solitary nests, high in coniferous trees; in the west Crows tend to be colonial nesters and make their nests lower, and in deciduous trees. The Verdin, in Arizona, uses sticks to reinforce its nest and makes a firm rigid structure, while in Lower California it uses few sticks, and the result is a flexible nest.

The suggestion is put forward that Fish Crows have abandoned a former habit of picking ticks from the backs of cattle and sucking the blood of the animals, and that Florida Jays also have abandoned a habit of picking ticks from cattle. Both these habits were recorded by N. B. Moore, about 1870, in manuscript notes, and have hitherto not appeared in the literature.

The lack of natal down in the Magpie is postulated as an adaptation to a covered nest, but this does not agree with the fact that we find a similar nakedness in some other species, such as the Blue Jay, which have open nests.

Frequently birds appear as "good" or "bad": the Blue Jay is an outlaw and a robber; the Hooded Crow is a rascal; while the good Chickadee is one of the

farmer's friends. But it is pointed out that the food habits of the whole population over the whole year must be considered before a correct estimate of the Crow's economic importance can be gained, and in the case of the Rook an estimate was made of the size and density of the population before conclusions were reached. This last is a good example of work undertaken for its biological interest having real economic value.

Crows, as with many of their relatives, are aggressive birds, well equipped to cope with their environment. They are omnivorous and apparently have great curiosity and activity, continually getting new experiences. One would expect them to be intelligent, and they have long been considered to "have brains." Crows are often kept as pets, learn readily, and sometimes repeat human words such as "hello" and "mama." Psychologists have proved that they are intelligent by having them learn to distinguish geometrical figures. But an unintentional experiment is given in the food section when it might well have been used as an example of intelligence. In almond orchards in Washington, Crows were causing great damage. Thirty thousand Crows were involved, and the destruction of an eight hundred dollar crop was the work of but two days. After various failures at control, poison was inserted in almonds. Not more than one per cent of the Crows were poisoned, but the rest stopped feeding on almonds and left the area. This is intelligence of a high order—for the many to profit by the unfortunate experience of the few.

One is filled with admiration for this compilation—a guide to birds' life histories and to the writings of naturalists. The manuscript was completed in 1941, and only a few things have been added since. Consequently the list of literature lacks a good many items from recent years. A practice that may prove disconcerting to many readers is that of giving the distribution of a whole species under a single subspecies, sometimes not the first subspecies of that bird to be dealt with. The volume closes with 20 pages of "literature cited"; 68 half-tone plates with photographs of birds, their habitats, nests, and young; and an 11-page index.—A. L. Rand.

THE BIRDS OF NORTH AND MIDDLE AMERICA. Part 10. Commenced by Robert Ridgway, continued by Herbert Friedmann. U.S. National Museum Bulletin 50, 1946: 459 pp., 28 figs.

Part 10 of *The Birds of North and Middle America*, "commenced by the late Robert Ridgway, continued by Herbert Friedmann," is concerned wholly with the Galliformes or "Fowl-like birds." Like its predecessor, Part 9, which contained the Gruiformes (cranes, rails, gallinules, coots, sun grebes, and sun bitterns) it is issued under a title page which implies dual authorship, but the volume is actually the work of Friedmann. While one cannot but be impressed by Friedmann's scrupulous sense of fairness to his predecessor as Curator of Birds at the National Museum, it would simplify matters if the linkage of names were discontinued in the concluding volumes. As it stands now, a bibliographer is somewhat at a loss as to just how to cite Parts 9 and 10. Ridgway's contributions are fully set forth in the preface, and full credit is given to him. It would seem that such an acknowledgment more than fulfills every ethical requirement.

In manner of treatment this volume follows closely (as does Part 9) the form used by Ridgway in Parts 1 to 8, save that the figures are incorporated in the text at the appropriate places instead of being inserted at the end of the work. This has its obvious advantages and is to be commended. Further, I approve strongly the adherence to the Ridgway pattern of presentation. This has been criticized mildly by Alden H. Miller (1947. *Condor*, 49:134) as being—though adequate for the standards and limited available knowledge of a half century ago—unsatisfactory for more modern analytical formulae. This criticism

would seem uncalled for in light of Miller's subsequent observation that "surveys like the Ridgway series are by nature comprehensive rather than intensive." In such a case, uniformity would seem to be preferable to any radical change midway. I have in mind particularly the large groups of transoceanic users of this particular series who certainly would not welcome a change from the simplicity of Ridgway to some of the statistical analyses which at times are much more difficult to comprehend than are the characters of the helpless subjects to which they are applied.

A feature worthy of note is the close agreement between the quite independent opinions of Friedmann and the digest of opinions as represented by the findings of the American Ornithologists' Union Committee on Classification and Nomenclature (referring of course to the North American forms treated). Differences of opinion were, particularly in the days of Ridgway's earlier volumes, many and at times violent. These have tended to disappear, in large part because of the infinitely greater amount of data now available. I note but five divergencies in the present volume. These involve one race of the Spruce Grouse and three of the Ruffed Grouse which are recognized by Friedmann but not recognized by the A.O.U. Committee, and one race of the California Quail for which the reverse is the case.

A minor criticism, but one which is valid, is the irritating absence of a closing date for the book. It is obvious that some forms have been given consideration or rather re-consideration at dates later than others, even within the limits of a single genus. An investigator is often uncertain, even with the help of the extensive bibliographies, just where Friedmann's inquiries have ended. A definite date line which could easily be stated in the preface, would be a distinct help. Certain other items have been noted by previous reviewers and need not be reiterated here. They are, however, all of similarly minor character, and indeed one hesitates to mention them at all, considering the general magnitude of the work.—A. J. van Rossem.

BIRDS IN THE GARDEN AND HOW TO ATTRACT THEM. By Margaret McKenny. University of Minnesota Press, Minneapolis, 1947: 7 × 9½ in., 8 (unnumbered) + 349 pp., 32 photographic plates, 16 colored plates. \$5.00.

Bird-lovers who have tried to purchase "Birds in the Garden" (reviewed in *Wilson Bulletin*, 52, 1940:47-48) will be glad to know that it is now available in a reprint. First published by Reynal and Hitchcock in 1939, it filled a real need by offering authentic natural history material in a style that is interesting to laymen as well as to specialists.

The same press—the Cornwall Press of Cornwall, New York—but a new publisher, the University of Minnesota Press, are responsible for the reprint. The text remains unchanged. There is a slight alteration in the arrangement of the introductory sections, including a welcome list of page references to the diagrams, the color plates (from Roberts' "Birds of Minnesota"), and the photographs. The photographs have been grouped together in one section of the book. The color plates, which are scattered through the book, are in a different order. The colored reproduction of a painting by Walter Weber on the dust cover of the original printing has been replaced by a photograph. Since the portraits of several species of birds were grouped on each of the plates in the original Roberts' book, some birds which certainly never frequent gardens appear in the illustrations—for example, the Kirtland Warbler.

Not only are the trees, plants, and flowers which attract birds listed for easy reference, but means of protecting and helping birds are discussed. Both town and country dweller will find this book an invaluable and attractive reference, whether his interest is in birds or in gardens. Although the book will be of most value to those living in the Minnesota region, anyone in North America will find it useful.—Helen Belfield Bates.

SPRING IN WASHINGTON. By Louis J. Halle, Jr. Illustrated in black and white by Francis Lee Jaques. William Sloane Associates, Inc., New York, 1947: $5\frac{1}{2} \times 8\frac{1}{2}$ in., viii + 227 pp. \$3.75.

Mr. Louis J. Halle, Jr., writes a long essay in the manner of Thoreau, whom he ardently admires, on the exciting natural phenomenon, "Spring in Washington." As is too often the case, the work of the disciple is weaker than that of the master. But when Mr. Halle forgets Thoreau and writes with the excitement which a true birdman feels on discovering an unfamiliar bird or recording something unusual, then he makes his greatest appeal. When he describes his love of the songs of the thrushes, the Veery nesting record, or the swifts going to roost, the reader is rewarded.

Mr. Halle is a keen observer and contributes a few "good" or unusual natural history records. Therefore, it is disconcerting to read his diatribes against man and his works, yet find him resorting to a description of man's handiwork, such as a cathedral, to characterize what he finds most exalting in nature. Or again, to find that he does not perceive that many of the characteristics which he admires in birds he finds distasteful in man.

The black and white illustrations by Francis Lee Jaques are many and add charm to the book. Mr. Jaques' ability to portray beautiful trees, the strength and power of the wings of big birds, especially of waterbirds, and to give in small drawings the feeling of space and breathtaking height will delight his many admirers.—Helen Belfield Bates.

THE FLAME BIRDS. By Robert Porter Allen. Dodd, Mead & Company, New York, 1947: $5\frac{3}{4} \times 8\frac{3}{8}$ in., xiv + 233 pp., 16 plates (unnumbered). \$3.50.

Since "there is no accounting for tastes" is as true as it is trite, I cannot do better than quote the publisher's own description of this book for the benefit of *Wilson Bulletin* readers who have not yet seen it: "The informal story of a bird . . . it tells of adventures with night-prowling crocodiles, of lonely islands weirdly beautiful, of unbelievable human derelicts on lost and forgotten rivers, of the vast solitudes . . ." (from the front of the dust-jacket under two handsome Roseate Spoonbills in flight by F. L. Jaques). The jacket-flap adds: "an informal story that will be enjoyed by *the perfectly normal* person who can't tell a bird from a bumblebee" (italics, mine, I'm afraid).

Mr. Allen writes with considerable poetic enthusiasm, breaking on occasion into rhyme: inadvertent—

"Time is nothing to the mangrove, a decade or two is as fleeting as a half-drawn breath! Time, and the vigor of the mangrove. Life without death." (page 64); as well as advertent—

". . . there're frigate birds and oysters
Little hermits in their cloisters

And proud pelicans who romp [*sic*] beside my door." (page 78).

The ornithological student (with his abnormal faculty for telling a bird from a bumblebee) will no doubt prefer Mr. Allen's previous book on the Roseate Spoonbill (1942. *National Audubon Society, Research Report No. 2*), to which Mr. Allen calls this "a sequel, in a more popular vein" without claiming to present new ornithological material. Indeed, he uses parts of the earlier monograph almost word for word (though without quotation marks); compare page 129 of "The Flame Birds" with page 71, column 2, of "The Roseate Spoonbill." However, all but four of the twenty-one excellent photographs (by Eleanor Pettingill, Allan D. Cruickshank, and others) are apparently new. At least, only four of them are taken from Allen's earlier monograph. One of the new photos shows the downy Roseate Spoonbill (by Hugo H. Schroder), and a fine series of three (by Eleanor Pettingill) shows a pair courting, calling, and nest-building. The book has no index.—J. Van Tyne.

THE COUNTRY DIARY OF A CHESHIRE MAN. By A. W. Boyd. Collins, London, 1946: $5\frac{3}{8} \times 8\frac{1}{2}$ in., 320 pp., 15 plates. 12s. 6d.

The charm of the English countryside, with its social and architectural stability, its (to us) old-fashioned agriculture, and its surprising (to us) wealth of wildlife, is known on this side of the Atlantic to a favored few travellers and to the naturalists. Mr. Boyd's book (with occasional exotic bird observations from Morocco, Spain, southern France, and Finland) is mainly confined to the animal cycle of bird and insect life in the Cheshire countryside, in the west of England, and finds a worthy place in the competent vein of English natural history that stems quite directly from Gilbert White.

As I was marking passages in *The Country Diary* for discussion in this review, a note on a green viviparous cockroach from the West Indies caught my eye because I once presented just such a specimen, also from bananas, to my own museum, and was twitted by my colleagues on the Museum's acknowledgment in its annual report of the gift of "one cockroach." There is mention of the remarkable phenomenon of the increasing proportion of melanistic butterflies and moths in English urban districts, which has given rise to biological investigations of first rate importance. There are factual notes on predation on song birds by various owls and hawks. Constant mention is made of the recapture of banded birds. There are, in fact, too many items well worth mentioning to be catalogued further.

Much of the charm of the book lies in the range and variety and linguistic flavor of the bird names, many of which are familiar to anyone who reads English literature, ornithologist or no. The common names of birds are for the most part authentic in the vocabulary of the country folk and are not mere artificial book names, like those applied to many American birds. I fear that this is in fact more evidence that appreciation of natural history, and specifically of the kind of competent but non-professional natural history exemplified by Mr. Boyd's *Diary*, flourishes in England but lamentably not in the United States. This disparity between the British and the American amateur naturalists and between the audiences available to the professional naturalists on the two sides of the Atlantic should be a challenge to wealthy America, which too often boasts of its greatness without looking to the elements of culture that make for true and sound greatness.—Karl P. Schmidt.

HISTORY AND MANAGEMENT OF MERRIAM'S WILD TURKEY. By J. Stokley Ligon. University of New Mexico Publications in Biology, No. 1, 1946: x + 84 pp., 19 pls., 2 figs. \$1.00.

"Although this turkey has been known since earliest historic times, dating from 1540 . . . authentic information relative to it was scant and sketchy for more than three centuries. Even up to very recent times, comparatively little concerning this strain was known generally" (p. ix). Mr. Ligon has had an unusual opportunity to study the Merriam's Turkey, both through his own observations over many years and through the reports of other Federal and State investigators. Information from both sources is here brought together in five chapters on range and subspecific characters, life cycle and behavior, distribution, nesting and rearing of young, and management. The discussion of management takes up about half of the publication, dealing with such topics as land administration, population estimates, food habits and winter feeding, limiting factors, and restoration through transplantings of wild stock. Ligon considers the major limiting factors to be four, predation, habitat deficiencies and human influences, hunting, and fire, all of which are "more or less man-made, or are influenced by man's activities" (p. 68).

There is a lack of quantitative data in some of the life history material (how many nests, broods, etc.) which will make it difficult for later investigators to

integrate their findings with Ligon's. Quantitative figures on the effect of predation are especially needed, since he emphasizes predator control throughout. Although he has developed a strong argument in support of the necessity for coyote control, he has seriously weakened the whole discussion by the statement: "Increase in predatory animal populations invariably results in decrease of game species, turkeys in particular" (p. 70). There are, perhaps, too few published data on which to challenge his specific reference to turkeys, but the generality simply will not stand inspection.

Ligon is at his best when writing on the larger aspects of his subject—range, distribution, and history; the broad outlines of the life cycle; land use in relation to turkey management. His quotations from field notes give an excellent sampling of some of the details of the bird's life history. Altogether, he has given a great deal of information on a bird which is little known and unusually hard to study.—F. N. Hamerstrom, Jr.

BIBLIOGRAPHY *

PHYSIOLOGY (including weights)

BELLROSE, FRANK C., and ARTHUR S. HAWKINS. Duck Weights in Illinois. *Auk* 64 (3), July 1947:422-430, 2 figs.

ANATOMY (including plumage and molt)

GLENNY, FRED H. A Systematic Study of the Main Arteries in the Region of the Heart—Aves XIV. Gruiformes, Part 2. *Auk* 64 (3), July 1947:407-410, 1 fig. (Anatomy and relationships of *Rhynchotos*)

PLATH, KARL. Albino White-throated Sparrow. *Auk* 64 (3), July 1947: 460, pl. 16 (middle).

SOUTHERN, H. N., and D. L. SERVENTY. The Two Phases of *Astur novae-hollandiae* (Gm.) in Australia. *Emu* 46 (5), Apr. 1947:331-347, map. (Geographical distribution of color phases.)

DISTRIBUTION AND TAXONOMY

BAILEY, ALFRED M. Wryneck from Cape Prince of Wales, Alaska. *Auk* 64 (3), July 1947: 456.

BARNÉS, VENTURA, JR. Additions to the Puerto Rican Avifauna with Notes on Little-known Species. *Auk* 64 (3), July 1947:400-406.

BEHLE, WILLIAM H., and JOHN W. ALDRICH. Description of a New Yellowthroat (*Geothlypis trichas*) from the Northern Rocky Mountain-Great Plains Region. *Proc. Biol. Soc. Wash.* 60, July 2, 1947: 69-72. (*G. t. campicola* new subsp.)

BROWN, N. R. Observations on the birds of the Petawawa Military Reserve and surrounding district, Renfrew County, Ontario. *Canad. Field-Nat.* 61 (2), March-Apr. 1947:47-55, map.

CAMPBELL, LOUIS W. American Egrets nesting on West Sister Island in Lake Erie. *Auk* 64 (3), July 1947:461-462.

DELACOUR, JEAN. Les Timalinés. *L'Oiseau Rev. Franç. d'Ornith.* (n.s.) 16, 1946:7 [second page 7 of vol.]-36. (A revision of the subfamily Timaliinae. *Chamaea fasciata* of California is included.)

EATON, STEPHEN W., and ERNEST P. EDWARDS. The Mangrove Cuckoo in interior Tamaulipas, Mexico. *Wils. Bull.* 59 (2), June 1947:110-111.

EISENMANN, EUGENE. Audubon's Caracara in New York. *Auk* 64 (3), July 1947: 470.

FLEETWOOD, RAYMOND J. The Mountain Vireo nesting for the first time in the Lower Piedmont Plateau of Georgia. *Auk* 64 (3), July 1947:462-463.

* Titles of papers published in the last number of *The Wilson Bulletin* are included for the convenience of members who clip titles from reprints of this section for their own bibliographic files. Reprints of this section are available at a small cost.

- FRIEDMANN, HERBERT. The Spotted Rail, *Pardirallus maculatus*, in southern México. *Auk* 64 (3), July 1947: 460, pl. 16 (bottom).
- GABRIELSON, IRA N. A North American record of the Bean Goose. *Auk* 64 (2), Apr. 1947:325. (*Anser fabalis sibiricus*.)
- HOPE, C. E. Nesting of the Evening Grosbeak in Algonquin Park, Ontario, 1946. *Auk* 64 (3), July 1947:463-464.
- MCATEE, W. L. Cuban Nighthawk a species, rather than a race, additional to the Check-List. *Auk* 64 (3), July 1947:455-456.
- McMURRY, FRANK B., and GALE MONSON. Least Grebe Breeding in California. *Condor* 49 (3), May-June 1947:125-126. (*Colymbus dominicus bangsi*.)
- MANSELL, WM. C. Ring-necked Duck breeding in Ontario. *Auk* 64 (3), July 1947: 474.
- MILLER, ALDEN H. The Tropical Avifauna of the Upper Magdalena Valley, Colombia. *Auk* 64 (3), July 1947: 351-381, pls. 12-13.
- OBERHOLSER, HARRY C. A New Flycatcher from the Western United States. *Proc. Biol. Soc. Wash.* 60, July 2, 1947:77. (*Empidonax traillii zopholegus* new subsp.)
- PHILLIPS, ALLAN R. Records of Occurrence of Some Southwestern Birds. *Condor* 49 (3), May-June 1947:121-123.
- PITELKA, FRANK A. British Columbian Records of the Clay-colored Sparrow. *Condor* 49 (3), May-June 1947:128-130, map.
- SLIPP, J. W. Swainson's Hawk in Western Washington with a Note on the Type Locality. *Auk* 64 (3), July 1947: 389-400.
- SPEIRS, DORIS H., and J. MURRAY SPEIRS. Birds of the vicinity of North Bay, Ontario. *Canad. Field-Nat.* 61 (2), March-Apr. 1947:23-38, map.
- SPRUNT, ALEXANDER, JR. First winter observance of the Yellow-breasted Chat in South Carolina. *Auk* 64 (3), July 1947:467-468.
- TEN KATE, C. G. B. Over het voorkomen van de Canadese gans, *Branta canadensis* (L.) in Nederland. *Limosa* 20 (1-3), June 1947:159-163. (With summary in English.)
- TWOMEY, ARTHUR C. Critical Notes on Some Western Song Sparrows. *Condor* 49 (3), May-June 1947:127-128.
- VAN ROSSEM, A. J. Two Races of the Bridled Titmouse. *Fieldiana Zool.* 31 (10), February 28, 1947:87-92. (*Parus wollweberi phillipsi* and *P. w. caliginosus* new subspp.)
- VAN ROSSEM, A. J. A Synopsis of the Savannah Sparrows of Northwestern Mexico. *Condor* 49 (3), May-June 1947:97-107, col. pl. by George M. Sutton, fig. 20.
- VOOUS, K. H., JR. On the History of the Distribution of the Genus *Dendrocopos*. *Limosa* 20 (1-3), June 1947:1-142, 29 figs. (*Dendrocopos* = "Dryobates" of 1931 A.O.U. Check-List.)
- WESTON, FRANCIS M. Barn Swallow nesting in Florida. *Auk* 64 (3), July 1947: 472-473.
- WETMORE, ALEXANDER. The races of the violet-crowned hummingbird, *Amazilia violiceps*. *Jour. Wash. Acad. Sci.* 37 (3), March 15, 1947:103-104.

See also *Anatomy*: Glenny; Southern and Serventy.

EVOLUTION AND SPECIATION

SEE *Ecology*: Amadon.

MIGRATION AND FLIGHT

- BLAKE, EMMET R. Barred Owl thirty miles from land. *Wils. Bull.* 59 (2), June 1947:111.
- BOURLIÈRE, F. Notes biologiques sur les oiseaux de l'Atlantique Nord. *L'Oiseau Rev. Franc. d'Ornith.* (n.s.) 16, 1946:42-60, 3 maps.

- BURLAND, LEE J. Air speed of Belted Kingfisher. *Wils. Bull.* 59 (2), June 1947: 113.
- DEMENTIEFF, G.-P. Les migrations transatlantiques de la Mouette tridactyle *Rissa tridactyla tridactyla* L. *L'Oiseau Rev. Franç. d'Ornith.* (n.s.) 16, 1946:37-41.
- MCCABE, ROBERT A. The Homing of Transplanted Young Wood Ducks. *Wils. Bull.* 59 (2), June 1947:104-109, 1 fig.
- O'NEILL, EDWARD J. Waterfowl grounded at the Muleshoe National Wildlife Refuge, Texas. *Auk* 64 (3), July 1947:457.
- PHILLIPS, ALLAN R. Status of the Anna Hummingbird in southern Arizona. *Wils. Bull.* 59 (2), June 1947: 111-113.
- POUNDS, HUBERT E. Storm soaring of Swifts. *Brit. Birds* 40 (5), May 1947:150-151. (*Apus a. apus.*)
- SINDING, ERIK. Bestemmelse af Fugletraekkets Højde ved Hjaelp af Afstandsmaaler. *Dansk Ornith. Foren. Tidsskr.* 41 (1), May 1947:56-60. (With summary in English: Determination of the Altitude of the Passage of Birds by Means of a Range-Finder.)
- SNYDER, L. L. The Snowy Owl Migration of 1945-46: Second Report of the Snowy Owl Committee. *Wils. Bull.* 59 (2), June 1947: 74-78, map.

ECOLOGY

- AMADON, DEAN. Ecology and the Evolution of Some Hawaiian Birds. *Evolution* 1 (1-2), March-June 1947:63-68, 2 figs.
- JAEGER, EDMUND C. Use of the Creosote Bush by Birds of the Southern Californian Deserts. *Condor* 49 (3), May-June 1947:126-127.
- QUAY, T. L. Winter Birds of Upland Plant Communities. *Auk* 64 (3), July 1947:382-388. (North Carolina)

See also *Food and Feeding Habits*: Dice; Dorst.

LIFE HISTORY AND BEHAVIOR

- ADAMS, R. G. Mating behaviour of Wigeon and Red-breasted Merganser. *Brit. Birds* 40 (6), June 1947:186-187.
- ALLEN, FRANCIS H. The Mockingbird's Wing-flashing. *Wils. Bull.* 59 (2), June 1947: 71-73.
- ALLEY, RONALD, and HUGH BOYD. The hatching and fledging success of some Coot. *Brit. Birds* 40 (7), July 1947:199-203. (*Fulica a. atra.*)
- BRACKBILL, HERVEY. Aberrant sexual behavior in the American Robin. *Wils. Bull.* 59 (2), June 1947:116.
- BRACKBILL, HERVEY. Choice of nest-site in the American Robin. *Wils. Bull.* 59 (2), June 1947:116.
- BRACKBILL, HERVEY. Period of dependency in the American Robin. *Wils. Bull.* 59 (2), June 1947:114-115.
- BRANDT, ALFRED E. The Rearing of a Cowbird by Acadian Flycatchers. *Wils. Bull.* 59 (2), June 1947:79-82, pl. 6.
- CRAMP, S. Notes on territory in the Coot. *Brit. Birds* 40 (7), July 1947:194-198, 2 figs. (*Fulica a. atra.*)
- EATON, STEPHEN W., and ERNEST P. EDWARDS. An unorthodox nest of the Rose-throated Becard. *Auk* 64 (3), July 1947:466-467.
- ETCHECOPAR, R.-D. Considérations sur le dernier ouvrage de Stuart Baker: "Cuckoo Problems." *L'Oiseau Rev. Franç. d'Ornith.* (n.s.) 16, 1946:153-167.
- GIBB, JOHN (comp.). Sun-bathing by birds. *Brit. Birds* 40 (6), June 1947:172-174.
- GORDON, SETON. Male Golden Eagle incubating. *Brit. Birds* 40 (6), June 1947: 181-182.
- GULLION, GORDON W. Use of Artificial Nesting Sites by Violet-green and Tree Swallows. *Auk* 64 (3), July 1947:411-415.

- HAMERSTROM, FRANCES. House Wren feeding a Cowbird. *Wils. Bull.* 59 (2), June 1947:114.
- HAVERSCHMIDT, FR. Duetting in Birds. *Ibis* 89, April 1947:357-358.
- HERING, LOUISE. Courtship and Mating of Broad-tailed Hummingbird in Colorado. *Condor* 49 (3), May-June 1947:126.
- HOYT, J. SOUTHGATE Y. An Unusually Persistent Yellow-breasted Chat. *Bird-Banding* 18 (2), Apr. 1947:80.
- KEIGHLEY, J., and R. M. LOCKLEY. Fledging-periods of the Razorbill, Guillemot and Kittiwake. *Brit. Birds* 40 (6), June 1947:165-171. (*Alca torda britannica*, *Uria aalge albionis*, and *Rissa t. tridactyla*.)
- LAWRENCE, LOUISE DE KIRILINE. Five days with a pair of nesting Canada jays. *Canad. Field-Nat.* 61 (1), Jan.-Feb. 1947:1-11, 3 figs.
- LAWRENCE, RALPH E. Mockingbird (*Mimus polyglottos*) flashing its wings. *Wils. Bull.* 59 (2), June 1947:pl. 5. (photo.)
- LOVELL, HARVEY B. Observations on the Breeding Habits of the Prairie Horned Lark. *Ky. Warbler* 23 (2), Spring 1947:21-29.
- NEFF, JOHNSON A. Habits, Food, and Economic Status of the Band-tailed Pigeon. *North Amer. Fauna No.* 58, 1947:1-76, 10 figs. (From the Supt. Documents, U.S. Govt. Print. Off., Washington 25, D.C.—20 cents.)
- NORRIS, RUSSELL T. The Cowbirds of Preston Frith. *Wils. Bull.* 59 (2), June 1947: 83-103, pls. 7-11. (Pennsylvania)
- PARKS, G. HAPGOOD. The Evening Grosbeaks Return to Hartford. *Bird-Banding* 18 (2), Apr. 1947:57-76.
- SHACKLETON, WALTER, and ELIZABETH SHACKLETON. Anting by the Indigo Bunting. *Ky Warbler* 23 (1), Winter 1947:1-4.
- SNYDER, L. L. The Hawks and Owls of Ontario. Rev. ed. *Roy. Ont. Mus. Zool. Handb. No.* 2, 1947:1-47, illus.
- SUGDEN, JOHN W. Exotic Eggs in Nests of California Gulls. *Condor* 49 (3), May-June 1947:93-96, figs. 17-19.
- WARBURTON, FREDERICK E. Common Tern's nest with seven eggs. *Auk* 64 (3), July 1947: 459, pl. 16 (top).
- WILLIAMS, LAIDLAW. A Winter Wren Roost. *Condor* 49 (3), May-June 1947: 124, fig. 21.

See also *Distribution and Taxonomy*: Barnés; Brown; Fleetwood; Hope; McMurry and Monson; Mansell; Miller; Speirs and Speirs; Weston.

FOOD AND FEEDING HABITS

- BRACKBILL, HERVEY. Birds eating blossoms. *Wils. Bull.* 59 (2), June 1947:114.
- BRACKBILL, HERVEY. Birds that eat Japanese beetles. *Auk* 64 (3), July 1947: 458-459.
- CAYOUILLE, RAYMOND. Starlings catching insects on the wing. *Auk* 64 (3), July 1947:458.
- DICE, LEE R. Effectiveness of Selection by Owls of Deer-mice (*Peromyscus maniculatus*) which Contrast in Color with Their Background. *Contrib. Lab. Vert. Biol. Univ. Mich. No.* 34, Apr. 1947:1-20.
- DORST, J. Quel est le rôle des oiseaux dans la vie des fleurs? *L'Oiseau Rev. Franç. d'Ornith.* (n.s.) 16, 1946:113-128.
- KNOWLTON, G. F. Some insect food of the Yellow-headed Blackbird. *Auk* 64 (3), July 1947: 459.
- RIGGS, CARL D. Purple Martins feeding on emerging may-flies. *Wils. Bull.* 59 (2), June 1947:113-114.

See also *Life History and Behavior*: Allen; Hamerstrom; Neff.

POPULATION (including age, and mortality rates)

- CRAIGHEAD, F. C. and J. J., and WILLIAM H. LAWRENCE. Survival of a brood of Cooper's Hawks. *Wils. Bull.* 59 (2), June 1947:110.
- EATON, RICHARD J. An Old Herring Gull. *Bird-Banding* 18 (2), Apr. 1947:79.
- JACOBSON, M. A. Purple Martins killed on a highway. *Auk* 64 (3), July 1947:457.
- JACOBSON, MALCOLM A. Hooded Merganser and a watersnake. *Auk* 64 (3), July 1947:457-458.
- LACK, DAVID. The Significance of Clutch-size. *Ibis* 89, April 1947:302-352.
- ROOT, OSCAR M. Aged Chickadee, Tree Sparrow, and Chipping Sparrow. *Bird-Banding* 18 (2), Apr. 1947:79-80.

See also *Ecology*: Quay.

TECHNIQUES (including banding)

- MICHENER, HAROLD. Band Size Determination. *Bird-Banding* 18 (2), Apr. 1947:77-79, 1 fig.

See also *Migration and Flight*: McCabe; Sinding. *Life History and Behavior*: Parks. *Population*: Craighead *et al.*

HISTORY, BIOGRAPHY, BIBLIOGRAPHY, AND INSTITUTIONS

- LAING, HAMILTON M. Allan Brooks, 1869-1946. *Auk* 64 (3), July 1947:430-444, pl. 15.
- MCATEE, W. L. Hidden note on the Passenger Pigeon. *Auk* 64 (3), July 1947:461.
- SCHORGER, A. W. The Passenger Pigeon in Wisconsin and the Problems in its History. In "Silent Wings, A Memorial to the Passenger Pigeon." Wis. Soc. Ornith., 1947:7-17.
- SCHORGER, A. W. The Ruffed Grouse in Early Wisconsin. *Trans. Wis. Acad. Sci. Arts Letters* 37 (for 1945), April 10, 1947:35-90.
- THOMSON, A. LANDBOROUGH. Scissors and Paste are Mightier than the Pen. *Ibis* 89, April 1947:362-364. (On A. H. E. Mattingley's "Orientation in Birds," *Ibis* 88, Oct. 1946: 512-517.)

WILSON ORNITHOLOGICAL CLUB



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BOOKS: List 5

Books added to the Wilson Ornithological Club Library since the publication of List 4 (*Wilson Bulletin* 58, No. 3, September 1946:194-195). Lists 1 to 3 were published in the September numbers, 1943-1945.

- Alexander, W. B., *Birds of the ocean*. 1928.
- Allen, Arthur A., L. A. Fuertes, M. D. Pirnie, *General ornithology laboratory notebook*. 1927.
- Allen, Arthur A., *The book of bird life*. 1930.
- Baerg, W. J., *Elementary ornithology* (rev. ed.). 1941.
- Bailey, B. H., *200 wild birds of Iowa—a handbook*. 1906.
- Barrows, Walter Bradford, *Michigan bird life*. 1912.
- Barrows, Walter B., and E. A. Schwarz, *The common crow of the United States*. 1895.
- Becker, Bob, *Birds and birdhouses* (rev. ed.). 1934.

- Bent, Arthur Cleveland, *Life histories of North American diving birds. Order Pygopodes* (reprinted). 1946.
- Blanchan, Neltje, *Birds that hunt and are hunted*. 1904.
- Campbell, Louis W., *Birds of Lucas County*. 1940.
- Chapman, Frank M., *Handbook of birds of eastern North America*. (6th ed.). 1900.
- Chapman, Frank M., *Bird-life*. ("Popular colored edition"). 1919.
- Clarke, Frances E. (ed.), *Great wings and small: Bird stories of our day*. 1940.
- Cory, Charles B., *The birds of Illinois and Wisconsin*. 1909.
- Davie, Oliver, *Methods in the art of taxidermy*. 1900.
- Dixon, Charles, *Birds' nests*. 1902.
- Eckstorm, Fannie H., *The woodpeckers*. 1901.
- Farwell, Ellen D., *Bird observations near Chicago*. 1919.
- Fuertes, Louis A., *Plates from Eaton's "Birds of New York."* 1910-1914.
- Gault, Benjamin T., *Check list of the birds of Illinois*. 1922.
- Grinnell, Joseph, *Bibliography of California ornithology. Third installment* (to end of 1938). 1939.
- Harris, Harry, Robert Ridgway, with a bibliography of his published writings. 1928.
- Headley, F. W., *The flight of birds*. 1912.
- Hornaday, William T., *The American natural history*. (vols. 2, 3—birds). 1914.
- Howell, Arthur H., *Birds of Arkansas*. 1911.
- Howell, Arthur H., *Florida bird life*. 1932.
- Jardine, William, *Hummingbirds*. 1833.
- Keeler, Charles A., *Bird notes afield: a series of essays on the birds of California*. 1899.
- Linsdale, Jean M., *Variations in the Fox Sparrow (Passerella iliaca) with reference to natural history and osteology*. 1928.
- Littlejohns, R. T., *Lyrebirds calling from Australia*. 1943.
- Longstreet, R. J., *Bird study in Florida*. 1930.

- Macoun, John, and James M. Macoun, Catalogue of Canadian birds. 1909.
- Merriam, Florence A., Birds of village and field. 1898.
- Miller, Loye, and Ida DeMay, The fossil birds of California. An avifauna and bibliography with annotations. 1942.
- Musselman, T. E., A history of the birds of Illinois. 1921.
- Nice, Margaret M., The birds of Oklahoma (rev. ed.). 1931.
- Peterson, Roger Tory, A field guide to the birds (2nd rev. ed.). 1947.
- Pettingill, Olin Sewall, Jr., A laboratory and field manual of ornithology. 1946.
- Preble, Edward A., A biological investigation of the Athabasca-Mackenzie region: birds. 1908.
- Reed, Chester A., American game birds. 1912.
- Reed, Chester A., Harry F. Harvey, and R. I. Brasher, Western bird guide. Birds of the Rockies and west to the Pacific. 1913.
- Schantz, Orpheus M., Birds of Illinois. 1928.
- Spiker, Charles J., A biological reconnaissance of the Peterboro swamp and the Labrador pond areas. 1931.
- Sutton, George Miksch, Eskimo year. 1934.
- Taverner, P. A., Birds of eastern Canada. 1919.
- Tinbergen, L., De sperwer als roofvijand van zangvogels. 1946.
- Tinbergen N., An objectivistic study of the innate behaviour of animals. 1942.
- Woodruff, Frank Morley, The birds of the Chicago area. 1907.
- Wyman, Luther E., and Elizabeth F. Burnell, Field book of the birds of southwestern United States. 1925.

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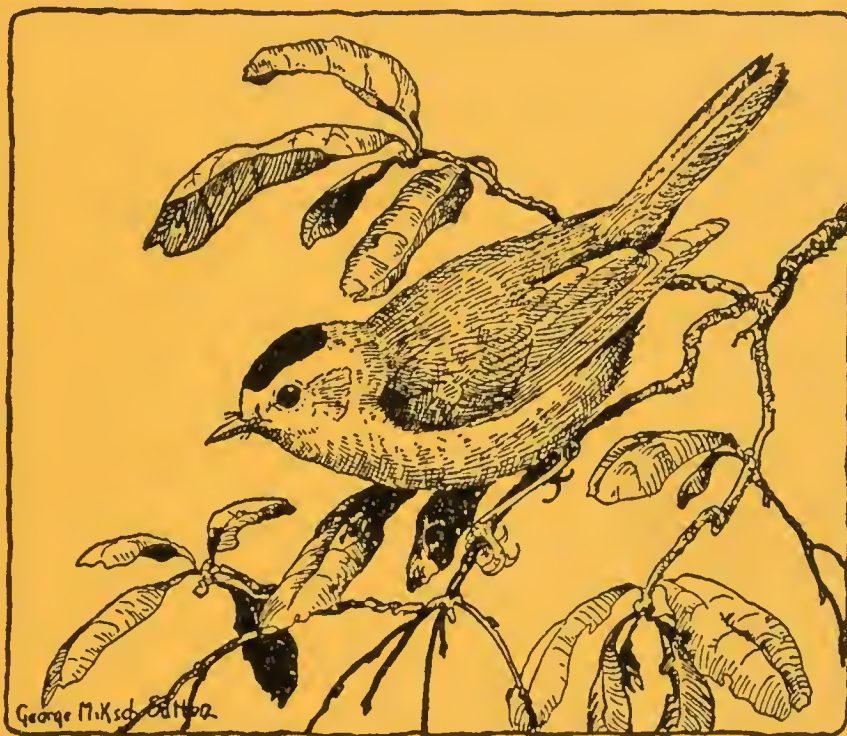
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AMERICAN REDSTART
Setophaga ruticilla

*Immature male photographed at Washington, D.C., May 24, 1947,
by Ralph E. Lawrence*

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BIRDS OF PERRY RIVER DISTRICT, NORTHWEST TERRITORIES

BY ANGUS GAVIN

THE following notes on the birds of the Perry River district, Northwest Territories, Canada, were made during the four years (April 1937 to July 1941) that I was stationed at the Perry River post of the Hudson's Bay Company. My stay was interrupted only from August 1939 to March 1940.

The post is about 75 miles north of the Arctic Circle, near the mouth of the Perry River (Lat. $67^{\circ} 48' N.$; Long. $102^{\circ} 10' W.$) which empties into Queen Maud Gulf. For convenience, I repeat here with only slight variation a description of the district given in my earlier paper on the mammals (1945. *Jour. Mamm.*, 26:226-230). To the south, from the coast to the Garry Lake-Back River system, some 85 miles inland, lay an unmapped and unexplored territory. The Ellice



Figure 1. Perry River region.

River is about 45 miles west, Sherman Inlet about 90 miles east, of the Perry River. The territory between the Ellice River and the Inlet is in general flat and marshy. Many rivers not shown on maps flow into the Queen Maud Gulf from innumerable lakes, large and small, that dot the landscape in every direction. From the coast inland, low hills relieve the general flatness in a succession of ridges, tending to run east and west, which gradually increase in elevation from about 600 feet near the coast to 3,000 feet in the vicinity of the Garry lakes. Between these ridges are flat valleys, varying in width from a quarter of a mile to 8 or 10 miles, that are cut by so many marshes, lakes, and streams that one's general impression is that there is more water than land. I made my first journey into the interior in March 1938, when I accompanied hunters of a tribe of Caribou Eskimos to the Garry lakes, returning alone about two weeks later. This, a traverse of 85 miles, was, I am told, the first penetration of the territory by a white man. During the summers, from 1938 to 1941 inclusive, I journeyed into the interior for varying distances up to 30 miles. At this season the hills are ablaze with red, yellow, orange, and gray-green lichens and white, yellow, and purple heather. In the valleys are acres of white arctic cotton, but red arctic poppies, purple dryas, and a blue flower like a forget-me-not, make glorious patches of color. Foot-high grass grows abundantly in the marshy places of the valleys, and the tundra is green with mosses upon which the caribou feed. The prostrate arctic willow is common on the hills and in the valleys. The vegetation makes remarkably rapid growth after the ground is exposed in early June, the first growth starting in the marshes, at river mouths, and in the valleys. August is the most colorful month in the arctic summer.

This area, about 120 miles wide and approximately 80 miles deep, with its innumerable lakes, marshes, and streams, is an ideal waterfowl breeding ground. Off the coast are literally thousands of small islands, only a few of which are shown on existing maps, that are the favorite fawning places of the Barren Ground caribou and the nesting places of ducks, geese, and gulls. The geology is mainly Pre-Cambrian, with patches here and there of sedimentary rocks. The average mean temperature (Fahrenheit) from November 1 to March 1 is about 38° below zero; from April 1 to November 1, it is about 30° above. In four years the lowest temperature I recorded was 58° below zero; the highest, 80° in the shade (July 1937). The average temperature in July and August at mid-day was about 50°. In winter, high winds are frequent and commonly reach a velocity of 50 miles per hour; in summer they are less frequent and less violent. Break-up in the rivers takes place from June 5 to 14. The sea ice persists throughout the year except in August and September, when the sea is usually clear, but at times, even during these two months, north winds drive heavy pack ice into the gulf, completely blocking it.

A band of Kogmuit Eskimos, numbering about 35 all told, live 15 miles inland from the Perry River mouth. "Kogmuit" means "the people who live at the place of the swans" or, more briefly, "the swan people." Their name for the Perry River is *Kog-yuak*, meaning "the place of the swans." The Eskimo names given in parentheses in the following annotated list are those in use by this tribe. The list comprises 41 forms of birds that I recorded in the Perry River district.*

Loon (Tood-lik). *Gavia immer* subsp.

Abundant breeding species on freshwater lakes from near the coast back into the interior for at least 25 miles, nearly every lake having one or more breeding pairs. I never saw more than two eggs in a nest. The loons appear in the spring with the advent of open water (May 15-25). In fall they gather in large rafts on the sea, after all inland lakes are frozen, and sometimes remain till the first week in October when the sea ice is forming. Occasionally some get frozen in. In this region loons become very fat and in calm weather have great difficulty getting off water; they sometimes paddle over water a mile or more without being able to get into the air. Rafts vary from 60 to 100 birds.

Pacific Loon (Mal-ar-ek). *Gavia arctica pacifica*.

Fairly common breeder. In a radius of 15 miles I usually found 2 pairs as compared with 20 or 30 pairs of *immer* and *stellata*. Nests in similar situations. Arrives May 15 to 25.

Red-throated Loon (Kaa-raak). *Gavia stellata*

Quite as abundant as *Gavia immer*. Nests in similar situations, and both species may be found nesting on the same lake. Arrives about mid-May.

Whistling Swan (Kog-yuk). *Cygnus columbianus*

Abundant breeder on the inland lakes. Never more than one pair of swans to a lake, intruders being driven away. Nests are large mounds of moss, reeds, and grass, placed on marshy islands in the lakes. Six nests that I examined contained two eggs each. The swans arrive about May 20 and depart about the end of August. (None have been seen later than August 31.) Nesting is general by June 15. On July 4, 1940, the majority were flightless; by the end of the second week in July, all were again capable of flight. Adults and young gather on the inland lakes early in August; they are never seen on the sea. During the spring migration, many pass over Flagstaff Island, 12 miles off the mouth of the Perry, to nest on islands to the north.

Lesser Canada Goose (Ood-loon). *Branta canadensis leucopareia*

Only one subspecies of Canada Goose is found in the district. Individuals weigh five to eight pounds, but no specimens were saved. They

* I wish to acknowledge the kind assistance of B. W. Cartwright in the preparation of these notes.

nest abundantly on islands in lakes close to the coast and in large colonies on islands of the sea, close inshore. They are rarely found more than three or four miles inland. An exception was a solitary pair found nesting among the Ross's Geese (*Chen rossii*), about 15 miles airline from the coast, on June 25, 1941. Some 20 pairs nested on an island about 300 yards long by 60 yards wide with 20 feet elevation. The nests were grouped on the highest part of the island and were from 18 inches to 6 feet apart. These geese arrive the latter part of May and depart during the first 10 days of September.

American Brant (Nerg-lik). *Branta bernicla hrota*

Thousands of American Brant nest on coastal islands from the mouth of the Ellice River eastward to Sherman Inlet. From 1937 to 1940, about 40 pairs nested on an island at the mouth of the Perry River, but in 1941 only 12 pairs were present. (This island is raided for eggs by the Eskimos, but in 1941 the natives moved their camp to a spot 15 miles away and did not molest the birds that year.) The nests are from 3 feet to 50 yards apart. The Brant arrive about June 1 and depart about September 1. The peak of the flightless period is about July 10. After the breeding season, they raft along the rocky coast among the islands.

Black Brant (Nerg-lik-nak). *Branta bernicla nigricans*

Much less common than the American Brant. About 20 pairs nested in the marshes and adjoining tundra in the delta of the Perry River, the only breeding colony I found in the territory. They were never seen on the coastal islands during the breeding season, and there was no intermingling of the two forms. The nests were widely distributed—200 to 300 yards apart. The eggs and down are darker than those of the American Brant. The dates of arrival, departure, and the peak of the flightless period are the same for the two forms. After the nesting season, the Black Brant gather in flocks on the sandy flats at the mouth of the Perry.

White-fronted and Tule Geese (Kig-e-uk). *Anser albifrons* subsp.

In June 1941, I found two forms of *Anser albifrons* nesting in the district, but, unfortunately, neither photographs nor specimens were taken. The geese I identified as *Anser a. albifrons*, which weighed about five pounds, nested on a small lake some 20 miles inland and about 6 miles east of the main branch of the Perry. Those I identified as Tule Geese (*Anser albifrons gambelli*), whose breeding grounds have not been previously discovered, nested on a large lake some 6 miles away from the White-fronted Geese. They weighed about nine pounds.

Lesser Snow Goose (Kang-o-wak). *Chen hyperborea hyperborea*

Not common. Every year 10 or 12 pairs nest on an island two miles up from the mouth of the Perry River. I know of no other colony in

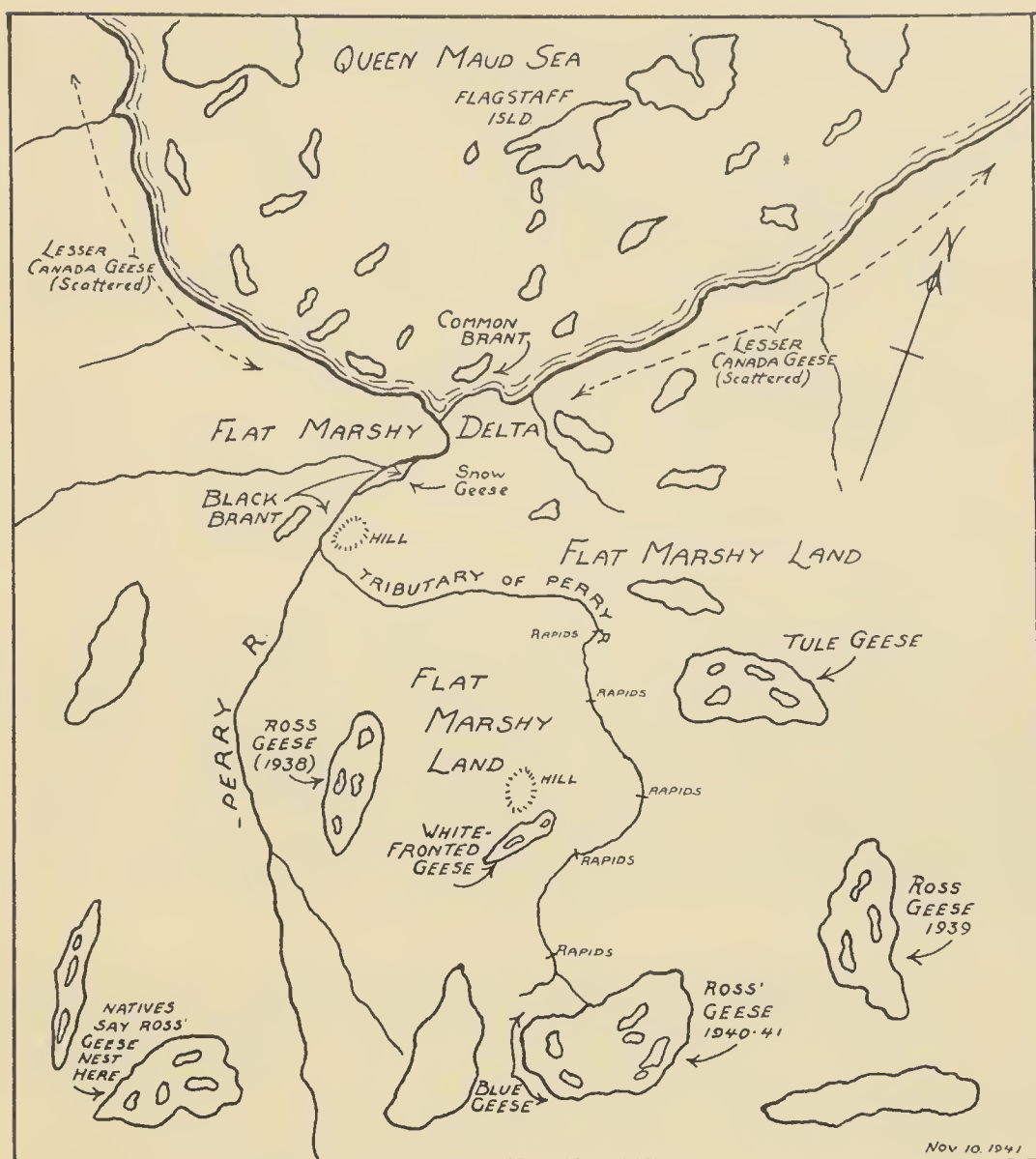


Figure 2. Diagram of study area.

the district. On June 21, 1941, I found two, three, and five eggs, in nests placed four or five feet apart; egg laying was still in progress.

Blue Goose. *Chen caerulescens*

Four pairs were found on July 2, 1940, nesting in a grassy bay of the lake in which Ross's Geese were nesting. One male standing guard at a nest was shot and photographed. This species had not been observed before in the district. The Eskimos had not seen it and had no name for it. This observation extended the breeding range of the Blue Goose approximately 600 miles west and was the first mainland breeding record (Taverner, 1940. *Can. Field-Nat.*, 54:127-130).

Ross's Goose. *Chen rossii*

I first found the previously undescribed nest of Ross's Goose in June 1938, on an island in a small lake about 12 miles up the Perry River, and 8 miles southeast along a tributary (Taverner, 1940. *Can. Field-Nat.*, 54:127-130; Cartwright and Gavin, *Beaver*, Dec. 1940:6-9). I again visited the colony in 1939, 1940, and 1941. In 1941, about 100 pairs were nesting on four islands, an increase of about 50 per cent over the number in 1940. In 1940, the largest clutch noted contained six eggs; in 1941, there were several nests with seven eggs, and two nests with eight and nine eggs respectively. These geese were also found on two lakes near by. About 600 pairs nest on the three lakes. The Eskimos informed me that Ross's Goose nested right down to the coast when they first arrived there, but had retreated in face of raids on their eggs by the natives. They are now, however, quite unmolested by the Eskimos.

American Pintail (Kir-kaak). *Anas acuta tzitzihoa*

Thousands of Pintails nest on the sloughs and river banks over a wide area from Ellice River, 45 miles west of Perry, to the Kolgyuak River, about 45 miles east, and for at least 20 miles inland. No other surface-feeding ducks have been observed in the Perry River district. Nests contain from 7 to 12 eggs. The flightless period extends from July 1 to 14; the peak is about July 7; on July 3, 1940, most of the males and some females were flightless.

Old-squaw (Ah-hang-nirk). *Clangula hyemalis*

About as abundant as the Pintail. Breeds on sea islands, along the coast, along the river banks, and on islands and shores of freshwater lakes. Nests are well concealed in grasses and reeds, usually within 12 feet of water. Nests contain from 12 to 15 eggs.

Pacific Eider (Meet-tirk). *Somateria mollissima v-nigra*

Nests only on sea islands. Most abundant around Kent Peninsula. There are few in the immediate vicinity of Perry River, and they are not numerous east of Perry, but I have seen one or two pairs on the islands of the southwest coast of King William Island.

King Eider (King-a-lik). *Somateria spectabilis*

Abundant breeder on the coastal islands and mainland; in the interior along river banks, and on islands and shores of freshwater lakes. I occasionally saw nests with seven or eight eggs.

American Rough-legged Hawk (Keel-gavik). *Buteo lagopus s.johannis*

Fairly common and quite well distributed. Nests on rocky ledges among the hills back from the coast and on the coast where high cliffs are found. Only the light phase occurs in the district. Nest is composed of twigs of prostrate arctic willow and grasses. Eggs two to four,

more or less splotched and spotted with brown on a pale buffy ground color. Preys on lemmings; occasionally seen chasing small birds.

Pigeon Hawk. *Falco columbarius* subsp.

More numerous than the Rough-leg. Nests on ledges on cliffs in the most inaccessible places. A few twigs and grasses compose the nest. Two to four eggs, dark brown, splotched with darker brown markings. I have examined dozens of nests but never found more than four eggs in a set.

Willow Ptarmigan (Ah-kid-le-ge-ak). *Lagopus lagopus albus*

Abundant year-round resident on the mainland. Very tame. Nests on tundra. Eggs 7 to 17.

Rock Ptarmigan (Ah-kid-le-ge-ak). *Lagopus mutus* subsp.

Less abundant than the Willow Ptarmigan. Most common among the hills, coming down to the lower country during the winter. Nests on tundra in the higher ridges. Eggs 7 to 13.

Little Brown Crane (Ta-tid-le-gak). *Grus canadensis canadensis*

Thousands nest on the flats up to at least 25 miles inland. It is possible to see a hundred or more in flight, or walking around on the flats, at any time during the breeding season. Nests are mounds of reeds and grasses visible from a mile or more away, especially when the bird is on the nest. Two eggs.

Semipalmated Plover. *Charadrius hiaticula semipalmatus*

Common summer breeder. Arrives about the end of May.

American Golden Plover (Tood-lee). *Pluvialis dominica dominica*

Fairly common summer visitor. Arrives about the end of May. One nest found contained four eggs.

Black-bellied Plover (Tood-leet). *Squatarola squatarola*

Fairly common summer visitor, arriving about the end of May.

Pectoral Sandpiper. *Erolia melanotos*

Common in summer. Nests on tundra. Four eggs.

Stilt Sandpiper. *Micropalama himantopus*

Fairly common nester. Arrives about the end of May.

Semipalmated Sandpiper. *Ereunetes pusillus*

Quite numerous. Arrives about the end of May.

Red Phalarope (Heg-gariak). *Phalaropus fulicarius*

Abundant breeder, along marshes and on the tundra. Never seen on the sea in this district. Arrives the latter part of May.

Northern Phalarope (Heg-gariak). *Lobipes lobatus*

As abundant as the Red Phalarope and nests in similar situations. There is no ecological segregation of the two species.

Parasitic Jaeger (Ee-hong-gak). *Stercorarius parasiticus*

Common nester on tundra, inland from the coast. Two eggs.

Long-tailed Jaeger (Ee-hong-gak-pom-e-ok-talik). *Stercorarius longicaudus*

Less common than the Parasitic Jaeger but breeds in the same locations without noticeable segregation. Two eggs.

Herring Gull (Now-ya). *Larus argentatus* subsp.

Two forms of Herring Gull (possibly *Larus a. smithsonianus* and *Larus a. thayeri*) breed in the Perry River district. They are abundant breeders on coastal islands and on islands of inland freshwater lakes. Arrive about May 15.

Sabine's Gull (Now-yat). *Xema sabini*

Not common. Have not found them breeding at Perry, though I have seen them flying overhead occasionally. However, in 1934, I found them nesting at King William Island.

Arctic Tern (Mit-ko-tai-lak). *Sterna paradisaea*

Abundant; breeds in large colonies on coastal islands.

Dovekie. *Plautus alle alle*

In late November 1940, an Eskimo trapper brought me a Dovekie (partly eaten by some predator) that he had found on the beach five or six miles northeast of the post. This bird was freshly killed and had possibly been blown out of its range by the heavy storms which had prevailed two or three days before. It is the only known occurrence of the Dovekie in the district.

Snowy Owl (Ook-pik). *Nyctea scandiaca*

Abundant breeder on knolls or hummocks on the tundra in years of lemming abundance. Very few seen when lemmings are scarce. Eggs are pure white, two to six in number. I have seen dozens of nests but never found more than six eggs in a clutch. The food of the Snowy Owl in the Perry district is almost exclusively lemmings, though I have seen them (very rarely) prey on small birds. *

Horned Lark (Sik-inik-tarieu). *Otocoris alpestris* [hoyti?]

Abundant nester. I have never noticed a Horned Lark in the district with yellow on the throat (*O. a. alpestris*).

* I used my observations on Snowy Owl abundance to govern extension of credit to the Eskimos. When the owls were abundant, I knew the lemmings were also, and that in consequence the white foxes would be abundant the following winter. I could, therefore, extend liberal credit to the Eskimos with every assurance that the white fox catch would be good and they would be able to liquidate their debts.

Northern Raven (Too-le-gak). *Corvus corax principalis*

Seen only in the winter from November to April. Feeds on lemmings and on white foxes caught in traps. Regarded as a nuisance because it destroys the fox pelts.

Redpoll (Ku-pan-o-wak). *Acanthis flammea* subsp.*

Abundant. Nests on the ground among prostrate willow on the tundra. Arrives about May 20, and departs the first week in September.

Lapland Longspur (Kap-an-o-wak—also: Poo-took-e-luk and Ah-mou-le-gak-nak). *Calcarius lapponicus lapponicus*

Very abundant. Breeds on tundra on coastal islands and in the interior. Arrives about May 20, and departs about the first week in September.

Eastern Snow Bunting (Ah-mou-le-gak). *Plectrophenax nivalis nivalis*

Very abundant nester on coastal islands and in the interior. Arrives in March usually, in February occasionally, and leaves about September 10.

* Mr. Harrison F. Lewis (with the concurrence of Oliver H. Hewitt and Austin L. Rand) informs me that both *Acanthis flammea* and *A. hornemanni* "are known to occur at Coronation Gulf and at Chesterfield Inlet, and it is our opinion that both are to be expected at Perry River."—Ed.

THE OYSTER-CATCHER OF THE ATLANTIC COAST OF
NORTH AMERICA AND ITS RELATION TO OYSTERS

BY IVAN R. TOMKINS

OYSTER-CATCHERS, in their specialized morphology, are much alike the world over, and there are no doubtful species. Their most definite character is the "oyster-knife" mandibles with the related modifications of head and neck.

It is my belief that the evolution of these specialized characters has attended a long-continued practice of feeding on bivalves, such as oysters and clams. Though some of the various species, now widely dispersed along the sea margins all around the globe, may have departed somewhat from the ancient mode of feeding and now live on food not requiring this specialization and this skill, the bird I know, the American Oyster-catcher (*Haematopus palliatus palliatus*)¹ of the south Atlantic coast of North America, continues to feed mainly on bivalves and to be limited in range by the accessible supply of this sort of food.

The facts on which this conclusion is based may be summarized in five general statements, with brief comment, as follows:

1. *Oysters and clams furnish a large portion of this oyster-catcher's food.* Clarence Cottam (*in litt.*) has provided information from the files of the Fish and Wildlife Service about stomach contents of birds taken in Virginia, North Carolina, South Carolina, and Georgia. Bivalves, such as oysters and clams, made up about 93 per cent, marine algæ and the remains of beetles making up the remainder. Cottam says: "The limited data indicates that this bird feeds to a large extent on bivalves or other molluscs. Oysters are commonly taken. In nearly all cases, however, only the fleshy parts of the animal are consumed and the outer horny calcareous covering rejected. Insects, primarily beetles, are taken rather commonly."

My own experience, so far as stomach contents are concerned, includes one young bird, still unable to fly, which contained five fair-sized oysters and one small gastropod, and two adults whose stomachs were filled largely with oysters. One of the adults contained also a pearl slug (doubtless swallowed with an oyster). I have also observed oyster-catchers work over an exposed oyster bed and search out small marine life much as a Willet (*Catoptrophorus semipalmatus*) or a Turnstone (*Arenaria interpres*) would do. They habitually linger on the oyster reefs long after these are uncovered by the tides—when all of the oysters would be closed.

¹ Peters (1934. "Birds of the World," vol. 2, p. 231) and R. C. Murphy (1936. "Oceanic Birds of South America," vol. 2, p. 977) place this form in the species *ostralegus*.

2. *The chosen habitat, summer and winter, is where suitable oyster beds are found.*

For about 20 years (1922–1942) my time was spent mostly in the region about the mouth of the Savannah River, from Tybee Light inland about 25 miles. My work was there, and my leisure was largely spent in exploring the vicinity and studying the animal life. During all these years I saw no oyster-catchers farther than a couple of miles from the oyster beds that are regularly exposed by the receding tides. They did not come into the wide salt marsh meadows, the fresh-water marshes, or the transition area along the river from salt to fresh water. The same has held true in the marshes and along the beaches of Glynn County, Georgia; of Charleston County, South Carolina; of Duval County, Florida; and the hundreds of miles of the Intracoastal Waterway between these points, all of which I have covered at various times.

3. *Oyster beds, to be suitable for oyster-catchers, must be covered and uncovered by the tides each day.*

Oysters will not prosper where they are not covered by saline water for a large portion of each day; oyster-catchers cannot obtain them unless they are uncovered long enough daily to allow the birds to wade out and find them open. The tidal range must be sufficiently great to ensure that the beds will not be covered by storm tides for days at a time. This is particularly important in the breeding season, for young birds might starve in a much shorter time than adults would.

4. *Where the tidal range is insufficient to allow daily feeding on bivalves, the oyster-catcher population is small or lacking; where optimum conditions for such feeding exist, there the population is largest.*

As one moves from Georgia north to the Capes of Virginia, or south toward Miami, Florida, the tidal range dwindles to a mean of about two and a half feet. With such a low tidal range, storm tides might cover the beds for several days at nearly any time.

The A.O.U. Check-List (4th ed., 1931) defines the status of *pallidus* as casual north of Virginia, and S. A. Grimes has informed me that the species is almost entirely lacking along the Florida peninsula from Daytona south. Reports by other observers indicate doubt whether there is any sizeable group on the Gulf Coast east of Mississippi.

The reentrant coast line from Cape Hatteras to Florida provides a mean tidal range of nearly seven feet in the central part, which usually ensures that the intertidal oyster beds will be uncovered daily, and in that area the oyster-catcher population is the greatest. Georgia and South Carolina south of Charleston now produce comparatively few oysters and, as a consequence, have small (though relatively stable) oyster-catcher populations, but north of Charleston, in the Cape Romain region, where oysters have continued plentiful, there are reports

of winter flocks of oyster-catchers totalling a thousand or more—as contrasted with the winter flocks of less than a hundred on the jetties at the mouth of the Savannah River, Georgia, and at the entrance to Charleston Harbor. The Cape Romain region is reported to have about 300 breeding pairs, whereas I doubt if there are more than 35 pairs on the coast of Georgia or between the Savannah River and Charleston. In 1938, Grimes told me that he estimated 6 pairs on the northeast coast of Florida. (It must be remembered that since the oyster-catcher is a large, conspicuous, and noisy bird, it is not difficult to make accurate estimates of a total population.)

5. *The oyster-catcher is largely non-migratory.* There is no direct evidence that our local birds (of the Savannah area) migrate farther south in the non-breeding season. I believe that after the nesting season they flock away to the rock jetties of the harbors and to the larger oyster reefs, which may not be near suitable nesting grounds. I believe that virtually the entire oyster-catcher population of the Atlantic Coast of North America—probably not more than two or three thousand birds in all—may be found in winter on the coast of South Carolina and Georgia.

Another phase of oyster-catcher activity of great importance is the exact method used by the American Oyster-catcher to obtain ingress to the live healthy oyster. For years I have questioned anyone who might know, naturalist or fisherman, about this matter, but without success. Some naturalists have even doubted that the birds are able to accomplish the feat. I find three accounts of the American Oyster-catcher's method of feeding on oysters:

“They would alight among the oysters [at Smithville, North Carolina] and when the bivalves gaped open, as is their habit when the water first leaves them, the birds would thrust in the point of their hard, flat bills, divide the ligament with which the shells are fastened together, then, having the helpless inhabitant at their mercy, would at once devour it.”—Maynard, 1881:366.

“I have seen it probe the sand to the full length of its bill, knock off limpets from the rocks on the coast of Labrador, using its weapon sideways and insinuating it between the rock and the shell like a chisel, seize the bodies of gaping oysters on what are called in the Southern States and the Floridas “raccoon oyster beds”—Audubon, 1835:181.

“Many years ago in Florida I watched these birds feeding on the oyster-bars, disabling the small “coon” oysters with a clip of the powerful bill. These oysters are exposed at low tide, and the birds know how to open them as well as any professional oyster-opener. They feast on them until their flesh has the flavor of an oyster.”—Forbush, 1925:481.

All three quotations leave much to be desired, for they give no clear explanation of method. Actually, oysters *close* when "the water first leaves them"; Maynard appears to be in error on this point. Perhaps he meant: when the water first *covers* them, or: when the small swells of ebb tide bring the water level nearly down to them. From the accounts of Audubon and Forbush one gains an impression of woodpecker-like hammering far different from what I have seen. At no time have I observed the birds attempt to open oysters that were uncovered and hence completely closed.

"Raccoon" or "coon" oysters grow close together, are generally small because of crowding, and usually point upward—in contrast to "single" oysters, which have more room for growth, are larger, and frequently lie on their sides. Oysters that are feeding (which they do only when covered with water) open the valves slightly, perhaps an eighth of an inch. At other times the valves are held tightly together by the adductor muscle. The slightest touch or jar will usually bring the closing reaction.

The oyster-catcher takes advantage of the small opening, but is only able to do so at low tide levels, when it can walk or wade on the oyster bed while the oysters are feeding.

One day I watched from a car parked by a much-traveled highway, where the birds had learned some tolerance of traffic, as an oyster-catcher fed on oysters covered by roily water as the tide came in. The bird walked carefully among the oysters, often wading up to its belly. It probed the turbid water, apparently finding the oysters by touch rather than by sight. It would probe until (it appeared to me) the bill was entering between the valves of an oyster, press down, repeatedly tip the head from side to side, and soon lift the head with an oyster in plain sight between the mandibles, raising the bill to swallow. If the entire oyster had not been obtained the first time, the oyster-catcher would reach back to get the rest of it. The downward pressure could not have been great, certainly less than the weight of the bird. There was no woodpecker-like hammering, and no sudden thrust. The extreme edge of an oyster shell is very thin and fragile, and it seems that tipping the head sideways allows the bill to fulcrum against one valve and slide inward and downward against the crumbling edge of the other valve. As the head is tipped the other way, the process is reversed. As soon as the bill reaches well in between the valves, the tension on the adductor muscle is released and the flesh of the oyster easily obtained. In experiments trying to duplicate the oyster-catcher's feat, I found that a toothbrush handle whittled to a wedge could easily be slipped well down into an oyster provided the initial insertion was made before the valves closed tightly together.

No other bird of our coast has the mandibular development necessary to take advantage of this food in this manner. But the oyster-

catcher bill is only one of the important parts of body structure showing adaptation to this method of feeding. The size of the bird, development of neck muscles, the heavy feet, the ability to turn the bill almost straight downward—all these are parts of the assisting morphology.

The oyster-catcher's method of opening oysters would also be effective in obtaining limpets and clams for food, but clams are far more difficult to open than oysters. Baldwin (1946) reports a dead oyster-catcher found with its bill caught fast by a hard-shell clam (in Charleston County, South Carolina). It may be possible that feeding on clams (for example, where oysters are becoming scarce) introduces a lethal factor of importance.

The account in Witherby's "Handbook of British Birds" (vol. 4, 1940, pp. 414–415) refers to several published accounts of methods used by European Oyster-catchers (*Haematopus o. ostralegus*) to obtain ingress to mussels, oysters, limpets, and similar prey. These accounts indicate a wider diversity of food and feeding methods than I have reported here, but after careful consideration I believe the above analysis of feeding habits and habitat requirements to be essentially correct for *palliatu*s in the south Atlantic States.

My thanks for helpful information and friendly criticism are due to E. Burnham Chamberlain, G. Robert Lunz, Jr., S. A. Grimes, and others.

LITERATURE CITED

- AUDUBON, JOHN JAMES
1835 Ornithological biography (vol. 3). Edinburgh.
- BALDWIN, WILLIAM P.
1946 Clam catches oyster-catcher. *Auk*, 63:589, pl. 15.
- BENT, ARTHUR CLEVELAND
1929 Life histories of North American shore birds (part 2). *U.S. Natl. Mus. Bull.* 146.
- FORBUSH, EDWARD HOWE
1925 Birds of Massachusetts and other New England States (vol. 1). Mass. Dept. Agric.
- MAYNARD, C. J.
1881 The birds of eastern North America. Newtonville, Mass.

1231 EAST 50TH STREET, SAVANNAH, GEORGIA



Avocet (Recurvirostra americana) at nest, photographed by W. H. Carrick
at Yorkton, Saskatchewan, June 5, 1945



Avocet (*Recurvirostra americana*) at nest, photographed by W. H. Carrick
at Yorkton, Saskatchewan, June 5, 1945

GENERAL NOTES

Field notes on the Black-bellied Tree Duck in Dutch Guiana.—In their important study on the Anatidae, Delacour and Mayr (1945. *Wilson Bulletin*, 57:1–55) state that the “Whistling Ducks, *Dendrocygnini*,” are among the least known of all the ducks. This prompts me to publish the following notes on the Black-bellied Tree Duck (*Dendrocygna autumnalis discolor*), which is a common bird in the coastal area of Surinam, Dutch Guiana. Delacour and Mayr state that the *Dendrocygnini* only seldom perch in trees (p. 11), but in my experience this does not hold true for the Black-bellied Tree Duck, at least during the breeding season.

On August 4-5, 1946, I camped with some Hindustani fishermen on one of the lagoons that lie behind the woods bordering the seacoast east of Nieuw Nickerie, and on leaving camp in the early morning of August 5, we flushed several Black-bellied Tree Ducks from the high trees that bordered the lagoon and dotted the small islands all over the water. On the dead branches of one high tree, 5 pairs were resting. At that time I had not read Delacour and Mayr's paper, and I made no special notes on this perching habit of the ducks, which is, moreover, well known to all local fishermen and hunters. From August 16 to 18, 1947, I camped in the same locality; early in the morning of August 17, we paddled all over the lagoon in search of Tree Ducks, and I made careful notes of the numbers of all ducks perched in trees, with the following results: I observed, in all, 46 birds resting in trees as follows: 3, 2, 6, 7, 3, 1, 2, 2, 4, 3, 1, 1, 6, 3, and 2 (each number representing a total of birds seen in one tree); I saw only 2 small groups (one of 2, and one of 4, birds) swimming in the shallow water of the lagoon. The first group of 3 perching birds was in company with a Wood Ibis (*Mycteria americana*); further, we flushed from a group of trees about a dozen Tree Ducks with a pair of Muscovy Ducks (*Cairina moschata*). When flushed from their resting place, all the ducks flew about for some time and then alighted again in trees. All the ducks rested on dead branches high up in tall trees. The perching habit of the Black-bellied Tree Duck is mentioned in Bent (1925. *U.S. Natl. Mus. Bull.* 130:271).

At the time of my observations, the birds must have been breeding, for on August 5, 1946, we found, in a small creek meandering through the woods a pair of Tree Ducks with about a dozen newly hatched young closely packed behind them. The young, with a splash, dived again and again on our approach. These parents showed no “injury feigning,” but on August 17, 1947, we observed an adult with about 14 newly hatched young in the shallow water of the lagoon. When our boat surprised them, the adult gave a fine example of “injury feigning,” splashing with its wings through the water in front of our boat as if it were crippled, while the young birds dived and dispersed in all directions. (When actually crippled, the adults also dive, hiding in the midst of the vegetation in the water, where they are very difficult to find.)

On the same day, another party of fishermen came into camp with a clutch of 12 fresh eggs that they had found in the grass.

At night during the big rains, in May and June, great flocks of Tree Ducks visit the rice fields, where they are seen only during this time of year (and where they do a lot of damage). On moonlit nights they are much harassed by hunters, who use live decoy birds; the flocks readily respond to the decoys and alight near by. Under these conditions many are shot but many crippled birds are not retrieved. These birds are hunted eagerly all through the year, for their flesh is excellent and there is in this country no closed season. It is no wonder that all the fishermen complain that the “Weeseeweese,” as the Black-bellied Tree Duck is called here, after its call-note, has decreased considerably.—FR. HAVERSCHEIMDT, 14 *Waterkant*, Paramaribo, Surinam, Dutch Guiana.

Unusual behavior of a Cowbird and Scarlet Tanager at a Red-eyed Vireo nest.—During the summer of 1947, while studying a nest of the Scarlet Tanager (*Piranga olivacea*) in the midst of an oak-hickory woods on the Edwin S. George Reserve, Pinckney, Michigan, I was able to observe also, about 15 feet from my ground-blind, a nest of the Red-eyed Vireo (*Vireo olivaceus*) which was placed on a slender white oak sapling branch 5 feet above the ground, about 45 feet from the Scarlet Tanager nest, and 3 feet from a woods road.

Dr. George M. Sutton found the nest June 24, at which time it contained four Vireo eggs and one Cowbird egg. On June 27 the nest contained four Vireo and two Cowbird eggs. At 4:55 a.m., June 28, hearing a disturbance, I observed a female Cowbird (*Molothrus ater*) on the ground 10 feet from the Vireo nest and about 6 feet from my blind. A Vireo (possibly two, but my field of vision was limited) was scolding and flying at the Cowbird and striking her with its wings. Then a male Tanager flew down from a near-by sapling and dove at the Cowbird's head. The Cowbird flew out of my vision; the Vireo(s) and Tanager withdrew.

Approximately 40 seconds later, I again heard a disturbance and saw a female Cowbird fly to a bush 3 to 5 feet from the Vireo nest, then directly to the nest branch, landing approximately 10 inches from the nest. It was attacked by a Vireo, which made short flights 3 to 5 feet above the Cowbird, diving at the Cowbird and appearing to strike it with the wings, for a loud slapping noise was heard at the end of each dive. The Cowbird crouched low and, head and neck outstretched, advanced, walking or hopping toward the nest, which was occupied by a Vireo. The Cowbird reached the nest and made a distinct pecking motion at the nest as the Vireo left. The action was so rapid that I could not see whether the Vireo flew as the Cowbird pecked or as a result of the peck. The Cowbird was facing away from me, and I could not see whether or not she took anything from the nest. She settled on, or over, the nest and was immediately attacked by the displaced Vireo. Both Vireos, continually scolding, dove and struck at the Cowbird with their wings. Meanwhile a male Tanager lit on the nest branch, 2 to 3 feet from the nest; with tail high and wings held well below the tail, he advanced on the Cowbird, giving the high *chip* alarm note. He hopped to the nest, head outstretched, and gave the Cowbird one distinct and apparently vicious peck, walked or hopped back a foot or two, still looking at the Cowbird and scolding, then flew to a near-by sapling. The Vireos continued their attack during the Tanager's advance. The Cowbird left the nest 2 to 6 seconds after the Tanager's peck, having been on, or over, the nest for approximately 30 seconds. After this occurrence, the nest contained six eggs, but unfortunately I failed to make sure that they were the same eggs (four Vireo and two Cowbird) as on June 27.

A Cowbird egg hatched June 30 between 11:30 a.m. and 2:26 p.m.; the nest then contained the one Cowbird, two Vireo eggs, and one Cowbird egg. On July 2, between 7:35 and 11:00 a.m., a Vireo egg hatched; the nest then contained one Cowbird and one Vireo nestling and two Cowbird eggs. At 11:00 a.m., July 2, A. E. Staebler and I found a Vireo egg on the ground directly below the nest. The egg had a hole in the larger end and a distinct V-shaped incision in the side, the apex of the V directed toward the smaller end of the egg. The egg (examined by Dr. Sutton) proved to be in an advanced stage of incubation.

Later history of the nest may be of interest: On July 3, it contained one Cowbird and one Vireo nestling and two Cowbird eggs; on July 7 and 8, the two nestlings and one Cowbird egg; on July 10, only the two nestlings. On July 10, the Cowbird (aged 10 days) was able to fly a few feet; the Vireo nestling (aged 8 days) was quiet, seemed weak, and kept its eyes closed most of the time. On July 14, the nest was empty, and I could not find either of the young, but the adult Vireos (one of which I had banded) protested my presence near the nest by scolding close overhead.—KENNETH WADE PRESCOTT, *University of Michigan, Ann Arbor.*

Swainson's Warbler in southern Ohio.—The morning of May 4, 1947, while passing through a small ravine in Lawrence County, Ohio, 1.3 miles north of Chesapeake, I heard a warbler's song similar to that of Swainson's Warbler, *Limnothlypis swainsonii*, but I could not find the bird that day. On May 7, I visited the area shortly after daybreak and observed the warbler for more than an hour. At times it sang from a dead branch, 10 feet above the ground and scarcely 20 feet away, where the distinctive characters of Swainson's Warbler were plainly visible. It used at least three singing perches in the area, shifting from one to another at irregular intervals, singing about every 50 seconds.

I watched the warbler at this spot until May 17. I next visited the area on May 27 but failed to find the bird and did not see it again until May 31, when I found it about a quarter of a mile away near the head of the same ravine. It remained there for several days, but between June 9 and 21 I could not find it at either station. On June 21, I collected it at the first locality. The skin, an adult male Swainson's Warbler, is now in the collection of the Ohio State Museum. It constitutes, so far as I can determine, the first record for the species in Ohio. Lawrence County, the southernmost of Ohio, is but 50 miles west of Kanawha County, West Virginia, where Sims (1946. *Auk*, 63:93) reported a Swainson's Warbler nest in 1945.

The two localities in which I saw the warbler were quite similar ecologically. Both were dense tangles of Japanese honeysuckle, Virginia creeper, cross vine, and blackberry canes about 150 yards up the steep side of a valley through which a small stream flowed. A few scattered trees of black locust, honey locust, ash, and hickory provided the perches from which the bird most frequently sang.

Within the past decade the known range of the Swainson's Warbler has been extended from the Coastal Plain to the mountainous regions of North Carolina, Tennessee, Virginia, and West Virginia. The behavior of the Ohio bird indicated that it may have been unmated and beyond its normal nesting range. As the season advanced, the boundaries of its territory seemed to become more flexible, and on June 21 I heard it singing over a wide area that included both of the earlier localities.

It is possible, however, that the species nests regularly somewhere in southern Ohio. Because of its preference for dense thickets, the superficial similarity of its song to that of the Louisiana Water-Thrush, and the dearth of resident ornithologists in this section of the State, the bird might easily have been overlooked.—N. BAYARD GREEN, *Department of Zoology, Marshall College, Huntington, West Virginia*.

Nomenclature of the higher groups in swifts.—The generic name for the group of species that includes the Common Swift of Europe has long been accepted as the basis for the name of the order as well as for the categories of lower rank that include these birds. For a long period, the accepted generic term was *Micropus* of Meyer and Wolf, published in 1810. More recently it has been decided that the genus name *Apus* of Scopoli, dating from 1777, is the proper one, a decision accepted by the American Ornithologists' Union Committee on Classification and Nomenclature. The change from *Micropus* has led to some misunderstanding about the formation of the higher group names that requires brief explanation.

Scopoli proposed the name *Apus* for the Common Swift on page 483 of his "Introductio ad Historiam Naturalem," published in 1777. In the same work, on page 404, he used the name *Apos* for a crustacean, the two differing by a single letter. There is no question that the two terms, so closely similar, were used intentionally, for both appear together in the index to the work.

When *Apus* was accepted as the valid name for the Swift, in place of *Micropus*, the order became APODIFORMES in place of MICROPODIFORMES, the suborder APODI instead of MICROPODI, the family APODIDAE instead of MICROPODIDAE, and the subfamily APODINAE instead of MICROPODINAE. J. L. Peters used these newer terms in Volume 4 of his Check-list of Birds of the World, published in 1940.

P. Brodkorb, in a review of Peters' work published in the *Wilson Bulletin*, 52, 1940, page 214, discussed these changes in names, and made proposals that require consideration. The pertinent part of his statement follows:

"The use of *Apus* unfortunately calls for a change in the A. O. U. subfamily, family, subordinal, and ordinal names for the group of swifts allied to "*Micropus*." Following certain European writers, Peters calls these Apodinae, Apodidae, Apodi, and Apodiformes, respectively. He has overlooked, however, Burmeister's much earlier use of the term Apodidae for a family of crustaceans. This name is still in current use among carcinologists. Burmeister's action precludes employing this term for the swifts and would seem to also preclude the use of its derivatives for ordinal, subordinal, or subfamily terms. One cannot use the terms Micropodidae or Cypselidae as the family name of the swifts, either, since these names are based on synonyms of *Apus*. Article 5 of the International Rules states: "The name of a family or subfamily is to be changed when the name of the type genus is changed." The best solution of this unhappy situation seems to be the erection of a new family name for the swifts, *Chaeturidae*, nom. nov., with *Chaetura* Stephens as the type genus. The suborder may be known as *Chaeturae*, nom. nov., and the order *Chaeturiformes*, nom. nov. A new subfamily term for the swifts allied to *Apus* is also required. These birds may be called *Panyptilinae*, nom. nov., with *Panyptila* Cabanis as type genus."

Brodkorb is correct in stating that APODIDAE has been used as a family term in Crustacea but is mistaken in his belief that this usage is still current. Through the assistance of Dr. Fenner Chase, Jr., Curator of Marine Invertebrates in the National Museum, the following data has been assembled:

Early writers erroneously used the genus *Apos* Scopoli for a group of phyllopod crustaceans, which was recognized by various authors as the family APODIDAE. Ludwig Keilhack (*Zool. Ann.*, vol. 3, pt. 1, 1908, pp. 177-184) discusses this matter in detail, showing that the diagnosis given by Scopoli for *Apos* demonstrates clearly that it refers to a branchiopod, not to a phyllopod, and that *Apos* Scopoli, 1777, is thus a synonym of *Branchipus* Schaffer, 1776. *Apos*, of authors, for a phyllopod, basis for the crustacean family name APODIDAE, has to be replaced with another name, and the family name is changed thereby. According to Keilhack, the genus becomes *Triops* Schrank, 1803, but this is disputed by some, notably by Folke Linder. Regardless of this argument (with which, as ornithologists, we are not concerned), the family name APODIDAE is not valid now for use for a group of crustaceans, so that it is fully available in ornithology. Therefore, the higher group names for the swifts concerned in this discussion are to be formed from the genus name *Apus*, as listed by Peters, namely, APODIFORMES for the order, APODI for the suborder, APODIDAE for the family, and APODINAE for the subfamily.—ALEXANDER WETMORE, *Smithsonian Institution, Washington, D. C.*

EDITORIAL

The steadily increasing interest in the Wilson Ornithological Club Library and the activity of the Library Committee have enabled us to publish in this issue a record list of donors for the last three months. The Book Purchase Fund has made possible the purchase of several recent books which had been in demand; the original Fund has now been largely expended, and further contributions will be needed if we are to keep our Library abreast of ornithological progress.

The Roll of Members published in this issue has been prepared with great care by our Treasurer, Burt L. Monroe, who requests that any necessary corrections or alterations be sent to him as soon as possible. Those who regret the use of *Bulletin* space for the Roll (which by itself, perhaps, makes dull reading) are reminded that the principal means of contact for our group of widely scattered ornithologists is provided by the Roll and that the *Bulletin*, therefore, performs one of its major functions by regularly publishing an up-to-date list. In an average year our hard-working Treasurer records over six hundred changes in the Roll.

Many members and friends have helped materially to improve the accuracy and completeness of the *Bulletin* in 1947. Special thanks are due to Harrison F. Lewis, A. D. Moore, Max M. Peet, L. L. Snyder, M. B. Trautman, A. J. van Rossem, and Alexander Wetmore, who repeatedly gave special assistance in their particular fields; to Ernst Mayr and Henry van der Schalie for expert advice on translations and other matters; to W. J. Breckenridge, Roger T. Peterson, and Arthur E. Staebler for invaluable help with illustrations; and to President George Miksch Sutton for his untiring labors on illustrations and on all phases of putting the *Bulletin* through the press.

The 1947 Annual Meeting of the Wilson Ornithological Club was held in Columbus, Ohio, on November 28 and 29, while this issue of the *Bulletin* was going through the press.

The new officers elected were: President, Olin Sewall Pettingill, Jr.; Vice-Presidents, Maurice Brooks and Walter J. Breckenridge; Secretary, James Boswell Young; Treasurer, Burt L. Munroe. A full account of the meeting will be published in the March 1948 issue of the *Bulletin*.

OBITUARY

MICHAEL JARDEN MAGEE, banker and ornithologist, died at Sault Ste Marie, Michigan, on August 22, 1947, aged eighty-four. He had been a leader in bird-banding and had published extensively on the birds of northern Michigan for nearly thirty years.

COURTENAY BRANDRETH, noted bird painter and landscape artist, died at his home in Ossining, New York, on November 3, 1947, at the age of fifty-six.

ORNITHOLOGICAL NEWS

N. B. Kinnear, President of the British Ornithologists' Union, has been appointed Director of the British Museum (Natural History).

R. E. Moreau has succeeded Claude H. B. Grant as Editor of the *Ibis*, the oldest ornithological journal in the English language.

W. L. McAtee, who founded *Wildlife Review* in 1935, has retired from the editorship after publishing 51 issues. His successor is Neil Hotchkiss, Patuxent Research Refuge, Laurel, Maryland.

The Sixty-fifth Annual Meeting of the American Ornithologists' Union was held in Toronto, Ontario, September 8 to 11, 1947. President Hoyes Lloyd, Vice-Presidents Robert Cushman Murphy and Josselyn Van Tyne, Secretary Olin S. Pettingill, Jr., and Treasurer Frederick C. Lincoln were reelected. New members elected to the Council were: John T. Emlen, Jr., Alden H. Miller, and Herbert L. Stoddard. Fellows elected: John W. Aldrich, Francis H. Allen, H. B. Conover, Olin Sewall Pettingill, Jr., L. L. Snyder. Corresponding Fellow: L. E. Richdale, New Zealand. Members elected: Elsa G. Allen, Frank Bellrose, Jr., Herbert W. Brandt, C. H. D. Clarke, Donald R. Griffin, Charles R. Mason, Burt L. Monroe, R. Allyn Moser, Ralph S. Palmer, Harold S. Peters, Richard H. Pough, George B. Saunders, Gustav Swanson, James T. Tanner, Lewis McI. Terrill. The Brewster Medal was awarded to Francis H. Kortright for his book, "The Ducks, Geese and Swans of North America." The 1948 meeting will be held in Omaha, Nebraska.

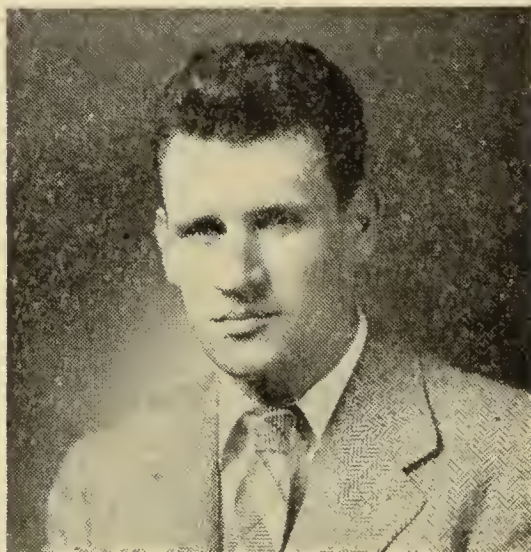
WILSON ORNITHOLOGICAL CLUB LIBRARY

The following gifts have been recently received. From:

James L. Baillie, Jr.—1 reprint	Lynds Jones—38 books, 66 bulletins,
Stanley C. Ball—2 reprints	213 reprints
James Bond—11 reprints	Leon Kelso—1 reprint
F. Bourlière—2 reprints	Ernst Mayr—1 bulletin
W. J. Breckenridge—7 reprints	Lyle DeVerne Miller—1 book
George H. Breiding—1 reprint	Margaret M. Nice—2 books
W. Lee Chambers—2 reprints, 1 bulletin	Frank A. Pitelka—3 books, 51 bulletins
James P. Chapin—30 reprints	F. W. Preston—1 reprint
H. B. Conover—31 reprints	T. L. Quay—4 reprints
Clarence Cottam—13 reprints and bulletins	Myra Katie Roads—1 book, 10 reprints
David E. Davis—30 reprints and bulletins	Chandler S. Robbins—1 reprint
Howard K. Gloyd—1 reprint	W. E. Scott—1 reprint
A. M. Guhl—2 reprints	J. Murray Speirs—1 reprint
Carlton M. Herman—13 reprints	Herbert L. Stoddard—8 books, 30 reprints
John C. Jones—5 reprints	M. G. Vaiden—1 reprint
	J. M. Winterbottom—2 reprints
	F. R. Zimmerman—4 reprints

NEW LIFE MEMBER

ROBERT L. EDWARDS, before World War II, collected and studied mammals and did volunteer work at the American Museum of Natural History under the direction of Dr. John Eric Hill. Mr. Edwards was in the AAF for five years, serving as a combat officer and as a staff officer. After the War he completed his undergraduate work at Colgate University while teaching in the biology department there, and is now at Harvard doing graduate work in biological fields. Mr. Edwards has been an Active Member of the Wilson Ornithological Club since 1945.



ORNITHOLOGICAL LITERATURE

ALKEN. By Knud Paludan. Einar Munksgaard, Copenhagen, 1947: 6 × 9 in., 107 pp., 20 pls. (1 colored), 8 figs. Dan. cr. 12.

This is a careful, detailed study (in Danish) of the breeding biology and occurrence of the Razor-billed Auk, *Alca torda*, in Denmark. After a short preface, the author gives a history of the occurrence of the species in Denmark based on the recorded observations of the last 200 years. To those of us of the present day who know Pontoppidan chiefly as the author of some scientific names of birds, it is refreshing to find that the good bishop also was interested in living birds and made some observations of the Razor-bill in his country. Denmark is largely south of the breeding range of the Razor-bill, but nesting colonies have been known for many decades on the island of Bornholm, an outlying part of the Danish Kingdom in the Baltic. Since 1922, another colony has been recorded annually on Graesholm, a small islet off Bornholm. A lone breeding record in the southern Kattegat, north of Holbaek (in Zeeland, the main island of the Kingdom) is regarded as doubtful.

The bulk of the paper is concerned with the breeding habits of the species in and around Denmark. A list of breeding localities, chiefly along the Norwegian coast, but also on the Swedish and Finnish coasts, is given with those in adjacent areas. During the winter months, the birds show little inclination to remain in or even near these localities, and the first sign of the awakening of the reproductive urge is described in a subchapter entitled "Interest in the Breeding Localities Begins." In March, individuals begin to return to their nesting grounds, but it is not until April that they remain there constantly; the earlier arrivals go off considerable distances in their daily search for food—they are not really settled on their nesting grounds but are merely feeding offshore from them. The next step, "The Auks Go to Land. Mating Time," starts during during the middle of April, and the birds appear to have gathering places and also mating places. Quickly following this comes "nest-building," which in this species does not involve any real construction, and egg laying. The first eggs are laid about May 5; in 1943 and 1944 the last were laid by June 20, although in 1941 and 1942 egg laying continued into the first half of July. Series of measurements and weights of the eggs are given.

During the period (25 to 35 days) of incubation and of caring for the young while they remain in or near the nest, both sexes share the family tasks. The author has made some curiously intensive though discontinuous observations on selected nests, and he proves by needlessly elaborate means (such as his diagram on p. 50) what he could have said very simply—the sexes take turns incubating the eggs and brooding the young.

The development of the young is discussed in detail, with graphs showing the growth rate (weight in grams plotted against days of age) and also the daily change in rate of growth. The latter is surprisingly uneven, the curve revealing periods of retarded as well as of accelerated growth rate. The greatest speed in growth is usually shown in the third and fourth, or third, fourth, and fifth days after hatching.

Following the description of the young and their development, a short chapter presents the actual nest "journals" of the author, covering in detail 14 nests, a statement of observational data with which the reader may judge the validity of the author's interpretations and accounts of the breeding activities. This, in turn, is followed by an account of the changes in the whole populations of the colonies on and around Bornholm from year to year. A final chapter on winter records for the Razor-bill in Denmark completes the study, and the paper concludes with a bibliography of the species in Danish waters. The 20 plates, reproducing 43 excellent photographs of the birds, and 8 text figures (including 2 maps) abundantly illustrate the text of this valuable study.—Herbert Friedmann.

LIFE HISTORIES OF NORTH AMERICAN GULLS AND TERNS: ORDER LONGIPENNES. By Arthur Cleveland Bent. Reprinted. Dodd, Mead & Company, New York, 1947: $6\frac{1}{4} \times 9\frac{1}{4}$ in., xii + 333 pp. \$5.00.

Dodd, Mead and Company, publishers of the reprint of Bent's "Diving Birds" (Bulletin 107), reviewed in the March issue of *The Wilson Bulletin* (vol. 59, pp. 46-47), have now produced a second volume, called an "unrevised reprint" of Bent's "Gulls and Terns," first published in 1921 as U. S. National Museum Bulletin 113.

This time the main body of text seems to have been reproduced very faithfully—apparently even arranged the same, line for line, except on pages 162, 204, and 253. The introduction has been slightly altered, omitting all reference to the illustrations and also omitting the paragraph referring to a quotation from T. S. Roberts which had been included by error in the original Bulletin 107. (This omission of this quotation, as noted before, was one of the revisions in the "unrevised reprint" issued last year by Mr. Bent's new publishers.)

Since all illustrations have been left out of the reprint, the twelve pages of "explanation of plates" (pp. 329-340) have likewise been omitted, and the reader thereby loses a considerable amount of detailed data which Mr. Bent supplied in his original volume. The index seems to be unchanged, though spaced somewhat differently on the pages.

It was surprising enough that the color plates had been omitted from the reprint of Bulletin 107 and substitution made among the half-tone plates, but the complete and unexplained omission of all illustrations from the present reprint is beyond my understanding.—Josselyn Van Tyne.

A PRELIMINARY LIST OF BIRDS OF MARYLAND AND THE DISTRICT OF COLUMBIA. By Irving E. Hampe and Haven Kolb. The Natural History Society of Maryland, Baltimore, 1947: $5\frac{1}{4} \times 8\frac{1}{2}$ in., xii + 80 pp., 9 pls., map. Lithoprinted. \$1.00. [Address orders to: 2101 Bolton St., Baltimore 17, Md.]

Except for the Washington-Baltimore region, Maryland has received singularly little attention from ornithologists. Yet the introduction to this new list characterizes Maryland (quite correctly I think) as "a state which was, it would seem, especially cut out to exhibit the maximum of geographical diversity in the minimum of area. . . ."

Although its land and water area is only 12,327 square miles, it fronts on the Atlantic, encircles the head of Chesapeake Bay, crosses the valley-and-ridge physiographic province, and reaches the Allegheny Plateau and the Mississippi basin west of the Allegheny Backbone. Furthermore, it is strategically located between North and South. Where else in a comparable area might one find Chuck-will's-widows, Brown-headed Nuthatches, Boat-tailed Grackles, Winter Wrens, Mourning Warblers, and Purple Finches, all as breeding birds?

The present list includes annotations on 338 species and forms, plus 27 species of the hypothetical list. It is precisely what the title states, a preliminary catalogue, and forms an excellent point of departure for future work; it is now being supplemented constantly by the work of Stewart, Robbins, and other observers. Literature dealing with Maryland and the District of Columbia has been carefully scanned and evaluated, and I can find but few significant omissions. I am well aware of the difficulty of evaluating sight records for inclusion in a State list; yet I confess some surprise at finding many of my own sight records accepted when Wetmore's record of Wilson's Phalarope is given only hypothetical status.

The authors divide Maryland into five regions: the Eastern Shore, Southern Maryland, the Baltimore-Washington Region, Central Maryland, and Western Maryland. An excellent example of the surprising gaps in our present ornithological knowledge is afforded by the Central Maryland region. This is an area

close to Washington and Baltimore, and it has three considerable towns, Frederick, Hagerstown, and Cumberland. Yet data on many common species are lacking.

A final word of approval should be said for the Natural History Society of Maryland, which sponsors this publication. This organization is made up largely of amateurs; its members work "for the fun of it." Yet it has consistently made valuable contributions to our knowledge of Maryland's biology, geology, and ethnology. This bulletin is a worthy example of their work.—Maurice Brooks.

BIRDS OF MALAYSIA. By Jean Delacour. [The Pacific World Series.] The Macmillan Company, New York, 1947: $5\frac{3}{8} \times 8$ in., xvi + 382 pp., with line drawings by Earl L. Poole and Alexander Seidel. Cloth. \$5.00.

This "popular" guide to the Malaysian avifauna follows the general pattern of its valuable predecessors in the Pacific World Series (especially that of "Birds of the Philippines," which the same author published jointly with Ernst Mayr in 1946). In a remarkably compact volume are treated briefly, with references to their numerous insular races, all the 660 resident and 120 visiting species of the Malayan, Sumatran, Javan, Bornean, and Paláwan zoogeographical provinces. The birds of Paláwan and its neighboring islands have, for reasons of politicogeography, already been dealt with in "Birds of the Philippines," to which the reader is referred, but they are at least mentioned here.

An idea of the phenomenal richness of the bird life of the Malaysian Subregion is given by the fact that the author, well known as a "lumper," has nevertheless found it necessary to recognize so many specific entities; in Java alone (48,504 square miles, against 88,737 for Great Britain), he accepts 337 breeding species.

In a work of so broad a scope, one must not be surprised to find occasional paragraphs that promise to be more or less misleading to the novice in Malaysian bird study. One such appears on page 45, where *Accipiter badius* is alleged to occur in Malaya, Sumatra, and the islands to the west, with the comment: "A common hawk, even in gardens." This hawk, the "Shikra," is indeed common in the compounds of India and the Indo-Chinese countries, but, despite an old record from Nias, probably does not reach Malaysia proper at all. Since members of this genus are with difficulty distinguished even in the museum, and no "sparrow hawk" other than *badius* is stated to be common, it may be expected that amateur users of this book will shortly report *badius* from all manner of unlikely localities.

On page 223, it is asserted that *Pycnonotus brunneus* has the eyes red, while *P. simplex* has them white; there is unfortunately no indication of the fact that since the race of *simplex* inhabiting Borneo, Billiton, and the South Natunas (*perplexus*) has red irides (and is distinguished from *P. s. simplex* solely by that character), the species is in all these places not separable, in the field, from *P. brunneus*.

I cannot forbear from commenting also on one or two species in which I feel a vested interest. It should be noted that *Pitta guajana irena* (p. 191) was described from Sumatra, and *P. g. rileyi* from Malaya, rather than the reverse as Delacour states here. And the Malayan race of *Dicaeum ignipectus* (pp. 305-306) should bear the (somewhat forbidding) subspecific name of *dolichorhynchum* instead of *ignipectus*.

The illustrations are on the whole well made and should prove to be of the greatest assistance to the student. A few of them are reproductions of those used in the earlier work of Delacour and Mayr, but the others are wholly new. A map inside the front cover, beautifully drawn by D. F. Levett Bradley, is one of the book's most valuable features, since few non-specialists may be expected to be familiar with the complicated geography of "Island India."

The volume is fittingly dedicated to the memory of Frederick N. Chasen, whose death by enemy action in 1942 closed prematurely a brilliant career devoted to study of Malaysian ornithology and mammalogy.—H. G. Deignan.

WINGS IN THE WILDERNESS. By Allan D. Cruickshank. Oxford University Press, New York, 1947: 8 × 10 in., 18 unnumbered pages + 125 plates with legends. \$6.00.

This very attractive book presents 125 excellent, large-scale reproductions of Cruickshank's deservedly famous bird photographs. Some of the pictures have been reproduced before in *Audubon Magazine* and elsewhere, but many seem to be new, and all of them are well worth preservation in book form. Nevertheless, it is disappointing to find that in selecting 125 pictures for this book from his "collection of 30,000 negatives" Cruickshank decided to use again 10 pictures that had appeared in his earlier book ("Birds around New York," 1942).

The text includes only a table of contents, preface, a short paragraph opposite each picture, and a list of "photographic data" (i.e., camera, lens, and exposure used for each picture).

The book would have been more valuable to scientists and, I believe, more interesting even to laymen if full ornithological data had accompanied each plate.

However, these minor criticisms should not obscure the fact that the author and publishers have given us a very impressive and biologically valuable series of bird portraits.—Josselyn Van Tyne.

BIBLIOGRAPHY *

PHYSIOLOGY (including weights)

- AMADON, DEAN. An Estimated Weight of the Largest Known Bird. *Condor* 49 (4) July-Aug. 1947:159-164, fig. 27. (*Aepyornis maximus*, of Madagascar, with useful comparative data.)
- BOSS, WILLIS R., and EMIL WITSCHI. The permanent effects of early stilbestrol injections on the sex organs of the herring gull (*Larus argentatus*). *Jour. Exper. Zool.* 105 (1), June 1947:61-77, figs. 1-10.
- FAVALORO, NORMAN J. Birds Sheltering from Heat. *Emu* 47 (1), July 1947:61-62.
- FULLER, F. D., and W. A. HIESTAND. Heat Death Temperatures and Normal Body Temperatures of Birds and Mammals. *Turtox News* 25 (8), Aug. 1947:148-149.
- HIATT, ROBERT W., and HARVEY I. FISHER. The Reproductive Cycle of Ring-necked Pheasants in Montana. *Auk* 64 (4), Oct. 1947:528-548, 3 figs.
- KOSSACK, CHARLES W. Incubation Temperatures of Canada Geese. *Jour. Wildl. Manag.* 11 (2), April 1947:119-126, pl. 9.
- MCATEE, W. L. Torpidity in Birds. *Amer. Midl. Nat.* 38 (1), July 1947:191-206.
- MCATEE, W. L. Luminosity in Birds. *Amer. Midl. Nat.* 38 (1), July 1947:207-213.
- RICHDALE, L. E. Seasonal Fluctuations in Weights of Penguins and Petrels. *Wils. Bull.* 59 (3), Sept. 1947:160-171. (*Megadyptes antipodes*, *Pachyptila forsteri*, *Pelecanoides urinatrix*.)
- SHAW, WILLIAM T. Relative Weights: Ross Snow Goose and Mallard. *Murrelet* 28 (2), May-Aug. 1947:21. (*Chen rossii* and *Anas platyrhynchos*.)

See also *Techniques*: Latham.

PARASITES, ABNORMALITIES, AND DISEASE

- CHAPPELL, BERTRAM. The Dissimilar Egg and Other Problems, Part I. *Ool. Record* 21 (3), Sept. 1947:12-15. (To be continued.)
- HERMAN, CARLTON M., and MERTON N. ROSEN. Another Outbreak of Fungus Disease in Gulls. *Condor* 49 (5), Sept.-Oct. 1947:212.
- RAUSCH, ROBERT. Pullorum Disease in the Coot. *Jour. Wildl. Manag.* 11 (2), April 1947:189.

* Titles of papers published in the last number of *The Wilson Bulletin* are included for the convenience of members who clip titles from reprints of this section for their own bibliographic files. Reprints of this section are available at a small cost.

ANATOMY (including plumage and molt)

- DAVIS, DAVID E. Size of Bursa of Fabricius Compared with Ossification of Skull and Maturity of Gonads. *Jour. Wildl. Manag.* 11 (3), July 1947:244-251.
- FISHER, HARVEY I. The Skeletons of Recent and Fossil Gymnogyps. *Pacif. Sci.* 1 (4), Oct. 1947:227-236.
- JOLLIE, MALCOLM. Plumage Changes in the Golden Eagle. *Auk* 64 (4), Oct. 1947: 549-576, pls. 18-22, 6 figs.

DISTRIBUTION AND TAXONOMY

- BAILLIE, JAMES L. JR., and CLIFFORD E. HOPE. The Summer Birds of Sudbury District, Ontario. *Contrib. Royal Ont. Mus. Zool. No.* 28, 1947:1-32, map.
- BICK, GEORGE H. The Wild Turkey in Louisiana. *Jour. Wildl. Manag.* 11 (2), April 1947: 126-139.
- FRIEDMANN, HERBERT. Geographic Variations of the Black-bellied, Fulvous, and White-faced Tree-Ducks. *Condor* 49 (5), Sept.-Oct. 1947:189-195. (*Dendrocygna autumnalis*, *D. bicolor*, and *D. viduata*; with new subsp. *D. autumnalis fulgens*, Texas; and *D. a. lucida*, Veracruz.)
- GRISCOM, LUDLOW. Common Sense in Common Names. *Wils. Bull.* 59 (3), Sept. 1947:131-138.
- PITELKA, FRANK A. Taxonomy and Distribution of the Mexican Sparrow *Xenospiza baileyi*. *Condor* 49 (5), Sept.-Oct. 1947:199-203, figs. 41-42. (*Xenospiza baileyi sierrae*, new subsp., Mexico, D. F.)
- RIGGS, AUSTEN FOX II. Notes on the Birds of Groton in Massachusetts. *New England Faunal Studies No.* 1, 1947:1-49, illus. Publ. by Mass. Aud. Soc., 155 Newbury St., Boston. \$1.00. (A detailed study of the 200 species recorded from the region since 1901.)
- SOPER, J. DEWEY. Observations on mammals and birds in the Rocky Mountains of Alberta. *Canad. Field-Nat.* 61 (5), Sept.-Oct. 1947:143-173, 5 figs.
- STRESEMANN, ERWIN. An Unrecorded Specimen of *Neochloe brevipennis*. *Condor* 49 (5), Sept.-Oct. 1947:210.
- SUTTON, GEORGE MIKSCH. Eye-color in the Green Jay. *Condor* 49 (5), Sept.-Oct. 1947:196-198. (*Xanthoura yncas*.)
- TABER, RICHARD D. The Dickcissel in Wisconsin. *Passenger Pigeon* 9 (2), April 1947:39-46, illus.
- TODD, W. E. CLYDE. Notes on the Birds of Southern Saskatchewan. *Ann. Carnegie Mus.* 30, 1947:383-421.
- TODD, W. E. CLYDE, and HERBERT FRIEDMANN. A Study of the Gyrfalcons with Particular Reference to North America. *Wils. Bull.* 59 (3), Sept. 1947:139-150.
- YOCOM, CHARLES F. Observations on Bird Life in the Pacific Ocean off the North American Shores. *Condor* 49 (5), Sept.-Oct. 1947:204-208, fig. 43.

See also *Life History and Behavior*: Mowat; Yocom. *Population*: Kenyon.

MIGRATION AND FLIGHT

- BLAKE, CHARLES H. Wing-flapping rates of birds. *Auk* 64 (4), Oct. 1947:619-620.
- BREIDING, GEORGE H. The range of an individual Bob-white. *Auk* 64 (4), Oct. 1947:629.
- CROWE, GRACE IRENE. Migration of Rufous Hummingbirds. *Gull* 29 (8), Aug. 1947:29-30.
- GLOVER, FRED A. Flight speed of Wild Turkeys. *Auk* 64 (4), Oct. 1947:623-624.
- GROSS, ALFRED O. Cyclic Invasions of the Snowy Owl and the Migration of 1945-1946. *Auk* 64 (4), Oct. 1947:584-601.
- MITCHELL, MARGARET H. Fall migration of the Purple Martin. *Auk* 64 (4), Oct. 1947:627-628.
- RUST, HENRY JUDSON. Migration and Nesting of Nighthawks in Northern Idaho. *Condor* 49 (5), Sept.-Oct. 1947:177-188, figs. 29-40. (*Chordeiles minor hesperis*; with photographs of young.)

- SOOTER, CLARENCE A. Flight speeds of some south Texas birds. *Wils. Bull.* 59 (3), Sept. 1947:174-175.
- WHITAKER, ARTHUR. Some Cases of Abnormal Flight of Birds. *Brit. Birds* 40 (9), Sept. 1947:262-264.
- ZIMMERMAN, DALE A. Evening Grosbeaks Invade Michigan. *Jack-Pine Warbler* 25 (3), July 1947:113-117, photo, map.

ECOLOGY

- BRECKENRIDGE, W. J. Wood Ducks versus squirrels. *Auk*. 64 (4), Oct. 1947:621.
- BROOKS, MAURICE. Interrelations of House Wren and Bewick's Wren. *Auk* 64 (4), Oct. 1947:624.
- DALKE, PAUL D., A. STARKER LEOPOLD, and DAVID L. SPENCER. The Ecology and Management of the Wild Turkey in Missouri. *Missouri Cons. Comm. Tech. Bull. No. 1*, 1946:1-86, illus.
- MCATEE, W. L. Distribution of Seeds by Birds. *Amer. Midl. Nat.* 38 (1), July 1947: 214-223.

See also *Food and Feeding Habits*: Graf.

LIFE HISTORY AND BEHAVIOR

- ALLEN, FRANCIS H. January singing in the Black-capped Chickadee. *Auk*. 64 (4), Oct. 1947:616-617.
- ANTEVS, ADA. Towhee Helps Cardinals Feed Their Fledglings. *Condor* 49 (5), Sept.-Oct. 1947:209.
- BAILLIE, JAMES L. JR. The double-crested cormorant nesting in Ontario. *Canad. Field-Nat.* 61 (4), July-Aug. 1947:119-126, 2 figs. (*Phalacrocorax a. auritus*.)
- BASKETT, THOMAS S. Nesting and Production of the Ring-necked Pheasant in North-Central Iowa. *Ecol. Monog.* 17, Jan. 1947:1-30, 20 figs.
- BEATTY, ROBERT O. Behavior of nestling Tree Swallows in water. *Auk*. 64 (4), Oct. 1947:617-618.
- BEEMER, ELEANOR GUYER. Adaptability of Bewick Wrens to Nest Molestation. *Condor* 49 (4), July-Aug. 1947:169.
- BRACKBILL, HERVEY. Another atypical House Wren song. *Wils. Bull.* 59 (3), Sept. 1947:173.
- FITCH, FRANK W. JR. The roosting tree of the Scissor-tailed Flycatcher. *Auk* 64 (4), Oct. 1947:616.
- GANIER, ALBERT F. Nesting Habits of the Great Horned Owl. *Migrant* 18 (2), June 1947: 17-24. (Tennessee.)
- GULLION, GORDON W. Post-nuptial copulation among swallows. *Auk* 64 (4), Oct. 1947:617.
- HALL, EDWARD M. Concentrated Nesting of Marsh Hawks. *Condor* 49 (5), Sept-Oct. 1947:211-212. (*Circus cyaneus*, California.)
- HANN, HARRY W. An Oven-bird incubates a record number of eggs. *Wils. Bull.* 59 (3), Sept. 1947:173-174.
- JOHNSON, R. A. Rôle of male Yellow-bellied Sapsucker in the care of the young. *Auk* 64 (4), Oct. 1947:621-623.
- KOZLOWA, MME E. V. On the Spring Life and Breeding Habits of the Pheasant (*Phasianus colchichus*) in Tadzikistan. *Ibis* 89, July 1947:423-429. (With Addendum by B. W. Tucker.)
- MILLER, RICHARD F. The Florida Gallinule. Breeding Birds of the Philadelphia Region (Part III). *Cassinia* No. 36, 1947 (for 1946): 1-16, photo. (*Gallinula chloropus cachinnans*.)
- MOORE, TILFORD. The Victims of the Cowbird. *Flicker* 19 (2), June 1947:39-42.
- MOWAT, F. M. Notes on the birds of Emma Lake, Saskatchewan. *Canad. Field-Nat.* 61 (3), May-June 1947:105-115.

- PRICE, HOMER F. Female Cowbird dead at Prothonotary Warbler's nest. *Auk* 64 (4), Oct. 1947:626.
- PROCTOR, CHARLES A. The Peregrine Falcon and Its Eyrie. *Aud. Soc. New Hampshire Bull.* 18 (1,2), Spring, Summer 1947:15-24, 54-62. (A series of 25 excellent photos with brief explanatory text.)
- PROVOST, MAURICE W. Nesting of Birds in the Marshes of Northwest Iowa. *Amer. Midl. Nat.* 38 (2), Sept. 1947:485-503, figs. 1-6. (13 species.)
- RICHDALE, L. E. The Pair Bond in Penguins and Petrels; A Banding Study. *Bird-Banding* 18 (3), July 1947:107-117.
- ROWE, E. G. The Breeding Biology of *Aquila verreauxi* Lesson.—Part I. *Ibis* 89, July 1947:387-410. (To be concluded.)
- SEVERINGHAUS, C. W., and DIRCK BENSON. Ring-necked Duck broods in New York State. *Auk* 64 (4), Oct. 1947:626-627.
- SMYTH, THOMAS. Late nesting of the Hermit Thrush in New York. *Auk* 64 (4) Oct. 1947:625-626.
- SNYDER, DOROTHY E. Nest-building by the Virginia Rail. *Auk*. 64 (4), Oct. 1947: 618.
- SUTTON, GEORGE MIKSCH. A Female Cardinal and Her Reflection. *Bird-Banding* 18 (4), Oct. 1947:151-154.
- TANNER, JAMES T. The Holston River Vulture Roost. *Migrant* 18 (1), March 1947:4-6. (Tennessee.)
- TOOBY, JOHN. Notes on Sand-Martins. *Brit. Birds* 40 (10), Oct. 1947:290-297, map. (*Riparia r. riparia*.)
- VAN DEUSEN, HOBART M. Bank Swallow and Belted Kingfisher nest in man-made niche. *Auk* 64 (4), Oct. 1947:624-625.
- WALKINSHAW, LAWRENCE H. Some Nesting Records of the Sarus Crane in North American Zoological Parks. *Auk* 64 (4), Oct. 1947:602-615, pl. 23. (*Grus a. antigone*.)
- WEITNAUER, E. Am Neste des Mauerseglers, *Apus apus apus* (L). *Ornith. Beob.* 44 (Supplement—paged in vol. between Nos. 4 and 5), Oct. 1947:133-182, pls. 2-7, figs. 1-13. (With an unusually fine series of photographs of nesting stages.)
- WHITE, C. A. Night-Heron alighting on water and swimming. *Brit. Birds* 40 (10), Oct. 1947:314. (*Nycticorax n. nycticorax*.)
- WIGGINS, IRA L. Yellow-billed Magpies' Reaction to Poison. *Condor* 49 (5), Sept.-Oct. 1947:213.
- WILLIAMSON, KENNETH. Field-Notes on the Faeroe Starling. *Ibis* 89, July 1947: 435-439. (*Sturnus vulgaris faroensis*.)
- WILLIAMSON, KENNETH. The Distraction Display of the Ringed Plover, *Charadrius hiaticula hiaticula* Linnaeus. *Ibis* 89, July 1947:511-513.
- WILLIAMSON, KENNETH. Subdued Song of the Faeroe Rock-Pipit. *Ibis* 89, July 1947:513. (*Anthus spinoletta kleinschmidti*.)
- WILLIAMSON, KENNETH. Three Displays of the Faeroe Wren. *Ibis* 89, July 1947: 514-515. (*Troglodytes troglodytes borealis*.)
- WYNNE-EDWARDS, V. C. Sun-bathing by birds. *Brit. Birds* 40 (8), Aug. 1947:256.
- YEATES, G. K. Irregularity of hatching period in Whimbrel. *Brit. Birds* 40 (10) Oct. 1947:315-316. (*Numenius ph. phaeopus*.)
- YOCOM, CHARLES. Notes on Behavior and Abundance of the Black-footed Albatrosses in the Pacific Waters off the Continental North American Shores. *Auk* 64 (4), Oct. 1947:507-523, pl. 17, 2 figs.

See also *Physiology*: Favalaro. *Parasites . . . and Disease*: Chappell. *Distribution and Taxonomy*: Taber. *Migration and Flight*: Rust. *Population*: Frank; Lack and Arn; Rand.

FOOD AND FEEDING HABITS

- BANFIELD, A. W. F. A Study of the Winter Feeding Habits of the Short-eared Owl (*Asio flammeus*) in the Toronto Region. *Canad. Jour. Res. D* 25, April 1947:45-65, 12 figs.
- CAMPBELL, JAMES W. The Food of some British Wildfowl. *Ibis* 89, July 1947: 429-432.
- COTTAM, CLARENCE. Zone-tailed Hawk Feeds on Rock Squirrel. *Condor* 49 (5), Sept.-Oct. 1947:210 (*Buteo albonotatus*.)
- FITCH, HENRY S. Predation by Owls in the Sierran Foothills of California. *Condor* 49 (4), July-Aug. 1947:137-151, fig. 24, plate. (*Bubo virginianus* and *Tyto alba*.)
- GRAF, WILLIAM. Mouse Populations in Relation to Predation by Foxes and Hawks. *Murrelet* 28 (2), May-Aug. 1947:18-21.
- HAVERSCHMIDT, FR. The Black Vulture and the Caracara as Vegetarians. *Condor* 49 (5), Sept.-Oct. 1947:210 (*Coragyps atratus* and *Polyborus cheriway*.)
- JAEGER, EDMUND C. Stone-turning Habits of Some Desert Birds. *Condor* 49 (4), July-Aug. 1947:171. (*Geococcyx californianus* and *Campylorhynchus brunneicapillus*.)
- KNOWLTON, GEORGE F. Food of the Lark Bunting in central Utah. *Auk* 64 (4), Oct. 1947:627.
- LEHTI, ROBERT W. The Golden Eagle Attacking Antelope. *Jour. Wildl. Manag.* 11 (4), Oct. 1947:348-349.
- RICHARDSON, FRANK. Water-surface Feeding of Blackbirds. *Condor* 49 (5), Sept.-Oct. 1947:212. (*Agelaius phoeniceus* and *Euphagus cyanocephalus*.)
- TUCKER, BERNARD W. (ED.). Carrion Crow taking food off water. *Brit. Birds* 40 (8), Aug. 1947:245-246. (*Corvus c. corone*.)

See also *Population*: Gullion.

POPULATION (including age, and mortality rates)

- FRANK, WILLIAM JOHN. Ruffed Grouse Drumming Site Counts. *Jour. Wildl. Manag.* 11 (4), Oct. 1947:307-316.
- GLEGG, WILLIAM E. Fishes and other Aquatic Animals Preying on Birds: Additional Matter. *Ibis* 89, July 1947:433-435.
- GULLION, GORDON W. Duck Hawk Predation upon Ring-necked Pheasants. *Condor* 49 (5), Sept.-Oct. 1947:209-210.
- KENYON, KARL W. Breeding Populations of the Osprey in Lower California. *Condor* 49 (4), July-Aug. 1947:152-158, figs. 25-26.
- LACK, DAVID, and HANS ARN. Die Bedeutung der Gelegegrösse beim Alpensegler. *Ornith. Beob.* 44 (5), Oct. 1947:188-210. ("The significance of clutch-size in the Alpine Swift," *Apus melba*, with table captions and summary in English.)
- McMILLAN, IAN I. Establishment of Artificially Propagated Quail. *Condor* 49 (4), July-Aug. 1947:170. (*Lophortyx californica*.)
- RAND, A. L. Clutch size in the spruce grouse and theoretical considerations of some factors affecting clutch size. *Canad. Field-Nat.* 61 (4), July-Aug. 1947: 127-130.
- SCOTT, THOS. G. Comparative Analysis of Red Fox Feeding Trends on Two Central Iowa Areas. *Iowa State Coll. Agric. Mech. Arts, Agric. Exper. Sta. Research Bull.* 353, Aug. 1947:425-487. (On birds: especially pp. 452-458, 465-468, and a number of the tables.)
- SHICK, CHARLES. Sex Ratio-Egg Fertility Relationships in the Ring-Necked Pheasant. *Jour. Wildl. Manag.* 11 (4), Oct. 1947: 302-306.

See also *Anatomy*: Davis. *Life History and Behavior*: Baskett. *Techniques*: Allen; Fisher *et al.*; Ginn; Gross; Paynter; Whitlock.

TECHNIQUES (*including banding*)

- ALLEN, DURWARD L. Hunting as a Limitation to Michigan Pheasant Populations. *Jour. Wildl. Manag.* 11 (3), July 1947:232-243, figs. 1-2.
- COOK, DAVID B. A Useful Nestbox Design. *Jour. Wildl. Manag.* 11 (2), April 1947:185-188, 1 fig.
- COTTAM, CLARENCE. Some Improvements Needed in Wildlife Research. *Jour. Wildl. Manag.* 11 (4). Oct. 1947:339-347.
- FISHER, HARVEY I., ROBERT W. HIATT, and WILLIAM BERGESON. The Validity of the Roadside Census as Applied to Pheasants. *Jour. Wildl. Manag.* 11 (3), July 1947:205-226, figs. 1-11.
- GINN, WM. E. Band Returns from Indiana Club-Reared Pheasants. *Jour. Wildl. Manag.* 11 (3), July 1947:226-231.
- GROSKIN, HORACE. Bird-Banding. *Cassinia* No. 36 1947 (for 1946):25-31.
- GROSS, ALFRED O. Recoveries of Banded Leach's Petrels. *Bird-Banding* 18 (3), July 1947: 117-126, figs. 1-4. (*Oceanodroma l. leucorhoa*; with photographs of young.)
- LATHAM, ROGER M. Differential Ability of Male and Female Game Birds to Withstand Starvation and Climatic Extremes. *Jour. Wildl. Manag.* 11 (2), April 1947:139-149.
- PAYNTER, RAYMOND A. JR. The Fate of Banded Kent Island Herring Gulls. *Bird-Banding* 18 (4), Oct. 1947:156-170.
- SHAUB, B. M. A Device for Applying Celluloid Bands to Birds' Legs. *Bird-Banding* 18 (4), Oct. 1947:155-156, fig.
- VAN DEN AKKER, JOHN B. A Suggestion for Pinioning Birds. *Jour. Wildl. Manag.* 11 (4), Oct. 1947:348, pl. 15.
- WHITLOCK, S. C., and H. J. MILLER. Gunshot Wounds in Ducks. *Jour. Wildl. Manag.* 11 (3), July 1947:279-281, pl. 11. (With X-ray photos.)
- WOOD, HAROLD B. Few Robins Return to Their Hatchplace. *Bird-Banding* 18 (3), July 1947:127-129.

See also *Anatomy*: Davis. *Ecology*: Dalke *et al.* *Population*: McMillan. *History . . . and Institutions*: Aldous.

HISTORY, BIOGRAPHY, BIBLIOGRAPHY, AND INSTITUTIONS

- ALDOUS, J. G. Simple Method for Cross-Indexing a Reference File. *Science* 106, August 1, 1947:109.

PALEONTOLOGY

SEE *Anatomy*: Fisher.

LIFE HISTORIES OF FRINGILLIDAE

To the Editor of *The Wilson Bulletin*: Some of your readers may be interested to know that I have finished my work on the Life Histories of the Icteridae and Thraupidae, and am now starting work on the Fringillidae. The first volume on this family is to contain the birds on the 1931 A.O.U. Check-List, from the cardinals to the crossbills inclusive, for which I am ready to receive contributions of notes on habits and photographs.

A. C. BENT

Taunton, Massachusetts
September 25, 1947

WILDLIFE CONSERVATION

U.S. Forests

During 1945 and 1946 the U.S. Forest Service made a reappraisal of the forest situation. About ten "Reappraisal Reports" were planned for publication; six have already appeared.

Report 1, 1946, "Gaging the Timber Resource of the United States," shows how much growing timber we have now, estimates our future need, and suggests what we must do to fill this need. "For three centuries we, as a Nation, lived in an era of timber abundance. Now we have passed into an era in which we must depend increasingly upon the timber we grow each year" (p. 1). In fact, "the present rate of saw-timber cutting exceeds our annual growth" (p. 37). The Forest Service estimates that we will soon require an annual production of about 20 billion cubic feet of all timber, including about 72 billion board feet of saw timber. This means that we must increase the present annual increment of all timber by 50 per cent and of saw timber by 200 per cent. There is enough forest land available. Growing stock, however, is inadequate. "Quality" timber is especially scarce—for example, Douglas fir for plywood, Sitka spruce of airplane quality, and even New England white birch for turning. Of necessity, smaller trees are now being used for saw timber, even in the West.

As a long-term program, the report recommends: (1) better forest management, especially on private lands; (2) better fire protection; (3) planting—about 5 million acres have been planted, but 30 to 35 million acres still need it; and (4) less logging waste and less mill waste. As an immediate expedient, the report recommends cutting more of the virgin timber of the West. Most of this timber is on national forests and other public lands: "More than anything else, this opening up will involve road construction and plenty of it" (p. 38). Even with the best possible progress, "it looks as though drain should be held below 50 billion board feet for several decades . . . before any large net expansion of forest industry could safely get under way" (p. 43). And even if we follow a conservative cutting plan, the Forest Service shows that the growth goal of 72 billion board feet *cannot be reached until the year 2020*.

The series of reports thus far treats forest lands as nothing more than timber factories. Wildlife is mentioned only once (Report 3, p. 21): "Except for certain lands (unusually dry and unfavorable sites in the West and lands used for special purposes such as game habitat or military training grounds), these areas should be restored to a reasonable productivity. As a rule this means planting." How much land they consider "game habitat" is nowhere specified. Planting of existing openings—although their continuance is *of prime importance to wildlife*—is recommended as a major point in the Forest Service's planting program. Further, Report 5 (p. 12) points out that a forest floor with little or no ground cover is desirable for suppression of the gypsy moth; the value of ground cover to other wildlife is ignored. The series is still incomplete, but "no report will be issued discussing forest wildlife" (letter, U.S. Forest Service, 1 August 1947).

It may be that the intent of these Reports is to cover only the technical and economic aspects of forest management and of wood processing and use. Even if one agrees (but I do not) that an adequate "reappraisal" of our forests really can be based on technical and economic values alone, there is still an intimate relationship between the techniques of forest management and the welfare of forest wildlife. The foresters themselves have assured us that on public land, at least, they are managing timber and wildlife together. The management plan which is taking shape in the first six reports seems to be singularly one-sided. Yet, this plan is projected into the future for at least 75 years. It seems fair to ask, therefore: What provision is to be made for forest wildlife?—F.N.H.

Waterfowl

The U. S. Fish and Wildlife Service, in a release dated 1 August 1947, reported these facts concerning the situation on the Canadian breeding grounds last summer:

New Brunswick: On the Wildlife Management Institute's 32,500 acre study area there was a 50 per cent decrease in the breeding population between 1945 and 1946. There was a further decrease this year, especially in the Blue-winged Teal and Wood Duck, and probably also the Black Duck (Bruce S. Wright).

Ontario and Quebec: Many of the early nests were flooded out in the south-east of Ontario and the south of Quebec. An extremely late season in the James Bay region apparently interfered with nesting. "A month's search for nests of black ducks in the marshes on the west coast of James Bay from Moose River to Albany River revealed none" (Department of Mines and Resources, Ottawa).

Prairie Provinces: "Great floods have hurt nesting over much of Manitoba's principal nesting areas such as Whitewater and Oak Lanes in the southwest, Proven Lake to the Saskatchewan border in the west, Dauphin marshes in the central, Saskatchewan Delta in the north, and Netley in the east. The expected poor breeding success has been verified by the scarcity of broods making their appearance. . . . Any improvement in waterfowl numbers during 1947 must come from some place outside Manitoba" (Arthur S. Hawkins).

Waterfowl conditions were very poor in the Grande Prairie district; "the same conditions exist north of Peace River. . . . The situation is universal in the Northwest. . . . More water areas exist this year than there were ducks to inhabit them. Hundreds of sloughs, potholes, and small lakes in the Prairie Provinces were . . . underpopulated or completely destitute of ducks of any kind" (J. Dewey Soper).

Waterfowl populations were extremely low throughout northern Saskatchewan and Alberta, including the Mackenzie and Athabasca deltas and the Lake Claire marshes: "the duck picture in the north country looks much worse than it does on the Prairies" (Robert H. Smith).

In some areas in southern Alberta and southern Saskatchewan, however, the Fish and Wildlife Service reported (without details) that the situation was considerably better.

British Columbia: Here also there were reports of good nesting populations of both ducks and geese.

The Fish and Wildlife Service's January 1947 estimate indicated a continental waterfowl population of 54,000,000. In the light of the situation on the breeding grounds this summer, the following statement from H. Albert Hochbaum (letter) is especially significant:

"The 54,000,000 is less than the original bison population, far less than the original Passenger Pigeon numbers. Yet this is not a number for one species. There are 32 game ducks and the coot to make up this total. If evenly divided, this would give little more than a million and a half for each species. But the kinds of ducks are not evenly divided in numbers; there are many more of some than there are of others. For some species there must be less than a million birds left. . . . In any event we don't know how many birds there are for each species, except that there are less than a million for some; and we don't know what is a "safe" figure for any species. . . .

"Still another disturbing matter is our inability to prescribe a remedy for the situation. In the 1930's more breeding and wintering waters were suggested as a means to restore numbers, and we entered upon the heaviest land management program in waterfowl conservation history. Ducks have declined nevertheless, and more of the same program cannot promise more ducks now, when many fine marshes are almost devoid of breeding birds. We need more birds rather than more marshes. . . ."—F.N.H.

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Raleigh, North Carolina.....1936
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- *Bartsch, Paul, U. S. National Museum, Washington 25, D.C.....1894
- *Bashour, Frederick Tamir, 71 New Britain Ave., Hartford, Connecticut...1945
- *Batchelder, Charles Foster, 7 Kirkland St., Cambridge, Massachusetts...1927
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- Batts, H[enry] Lewis, Jr., 4930 Washtenaw Rd., Ypsilanti, Michigan...1946
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- *Baumgartner, Frederick Milton, Department of Entomology,
 Oklahoma A. & M. College, Stillwater, Oklahoma.....1935
- Baumgartner, Milton D[aniel], Route 3, Stillwater, Oklahoma.....1944
- *Baxter, William, Mayflower Apts. C-503, Wilmington, Delaware.....1945
- Beach, Pearle Leenhouts (Mrs. Walter H.), 328 Parsells Ave.,
 Rochester 9, New York.....1941
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 Rosedale Gardens, Plymouth, Michigan.....1942
- Beardslee, Clark Smith, 132 McKinley Ave., Kenmore, New York.....1942
- Beardsley, Miss Margaret Hortense, 410 S. Prospect St., Box 327,
 Ravenna, Ohio.....1941
- Beatty, Harry A[ndrew], Firestone Plantation Company, Harbel,
 Liberia, West Africa.....1936
- Beck, Rollo Howard, Planada, California.....1943
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- Becker, Mrs. Paul A., 251 E. Phelps Ave., Owatonna, Minnesota.....1944
- Bedell, Miss Marie L., 1430 W. 20th St., Lorain, Ohio.....1940
- *Beebe, Ralph, 4169 Tenth St., Ecorse 18, Michigan.....1924
- *Beebe, William, 33 W. 67th St., New York City.....1944
- Begley, Devere Marshall, 508 N. Water St., Sparta, Wisconsin.....1947
- Behle, William H[arroun], Department of Biology, University of Utah,
 Salt Lake City 1, Utah.....1935
- *Behrend, Fred W[illiam], 606 W. D St., Elizabethton, Tennessee.....1944
- *Belcher, Paul Eugene, 988 Jefferson Ave., Apt. 3, Akron, Ohio.....1938
- *Bell, Henry III, 296 W. Evergreen Ave., Chestnut Hill,
 Philadelphia 18, Pennsylvania.....1946
- *Bellrose, Frank, Jr., Illinois Natural History Survey, Havana, Illinois....1935
- *Bennett, Logan J[ohnson], 206 Forestry Bldg., Pennsylvania State
 College, State College, Pennsylvania.....1934
- *Bennett, Miss Mary A[llison], 623 E. Carroll St., Macomb, Illinois....1933
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- *Bennitt, Rudolf, Department of Zoology, University of Missouri,
 Columbia, Missouri.....1932
- *Benson, Mrs. Mary Heydweiller, 183 Cherry Rd.,
 Rochester 12, New York.....1937
- Benson, Seth Bertram, 645 Coventry Rd., Berkeley 7, California.....1930
- *Bent, Arthur C[leveland], 178 High St., Taunton, Massachusetts.....1893
- Berger, Andrew J[ohn], Department of Zoology, University of Michigan,
 Ann Arbor, Michigan.....1940
- Bergstrom, E[dward] Alexander, 233 Ridgewood Rd.,
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- *Berkowitz, Albert Clarence, Tension Envelope Corporation,
 1912 Grand Ave., Des Moines 14, Iowa.....1946

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West Indies.....1945
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- *Biette, Robert Norman, Pennellville Rd., Brunswick, Maine.....1945
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St. Louis, Missouri.....1941
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- Bissonette, Thomas Hume, Trinity College, Hartford 6, Connecticut.....1939
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Conservation, Lansing 13, Michigan.....1935
- ***Blain, Dr. Alexander W[illis], 2201 Jefferson Ave., E.,
Detroit 7, Michigan.....1902
- *Blake, Emmet R[eid], Chicago Natural History Museum,
Chicago 5, Illinois.....1939
- Blanchard, Harold H[oopar], 32 Calumet Rd.,
Winchester, Massachusetts.....1946
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- *Boggs, Ira Brooks, West Virginia University, Morgantown, West Virginia.1938
- *Bole, Benjamin Patterson, Jr., 2717 Euclid Ave., Cleveland 15, Ohio.....1938
- Bolt, Benjamin F[ranklin], 1110 Armour Blvd., Kansas City 3, Missouri.1914
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Albuquerque, New Mexico.....1936
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Ohio State University, Columbus 10, Ohio.....1927
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South Hadley, Massachusetts.....1941
- Boyd, Hugh J., 24 Bedminster Rd., Bristol 3, England.....1946
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- *Brackbill, Hervey [Groff], 4608 Springdale Ave., Baltimore 7, Maryland.1942
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- Bradley, Homer L., Sand Lake Refuge, Columbia, South Dakota.....1939
- Brandenburg, Miss Arminta A[lice], State Hospital, Toledo, Ohio.....1941
- Brandt, Alfred Edwin, c/o F. E. Andrews, Forest Home,
Ithaca, New York.....1946
- ***Brandt, Herbert W., 2245 Harcourt Dr., Cleveland 6, Ohio.....1945
- *Branum, Miss Florence [Pauline], 117 N. Ewing St., Lancaster, Ohio....1946
- Braun, William Adolph, 833 N. 15th St., Manitowoc, Wisconsin.....1947

- Brauner, Joseph, 2315 Dwight Way, Berkeley, California.....1942
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- Breckenridge, Bruce, 2236 Storm St., Ames, Iowa.....1947
- Breckenridge, Henry Ralph, Box 626, Bozeman, Montana.....1946
- *Breckenridge, Walter J[ohn], Museum of Natural History,
 University of Minnesota, Minneapolis, Minnesota.....1929
- Breiding, George H[erbert], Ohio Wildlife Research Unit,
 Ohio State University, Columbus 10, Ohio.....1942
- Brereton, Dr. E[wart] L[ount], Box 99, Barrie, Ontario, Canada.....1943
- ***Bretsch, Clarence, 690 Broadway, Gary, Indiana.....1925
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 Battle Creek, Michigan.....1931
- *Brigham, H[erbert] Storrs, Jr., 3817 Sedgwick Ave., New York City 63..1942
- Bristow, Harry Sherman, Jr., Pine Ave., Cedars, Marshallton, Delaware..1942
- Broley, Charles L[avelle], Delta, Ontario, Canada.....1945
- Brooks, Mrs. Benjamin Talbot, 191 Shore Rd.,
 Old Greenwich, Connecticut.....1945
- *Brooks, Earle A[mos], 166 Plymouth Rd.,
 Newton Highlands, Massachusetts.....1933
- ***Brooks, Maurice Graham, Division of Forestry,
 West Virginia University, Morgantown, West Virginia.....1927
- Broome, Forrest Jones, 7411 Keeler Ave., Detroit 21, Michigan.....1947
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- *Brown, N. Rae, Department of Forestry, University of New Brunswick,
 Fredericton, New Brunswick, Canada.....1945
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 Bozeman, Montana.....1946
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 Conservation, Lansing 13, Michigan.....1937
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 Ann Arbor, Michigan.....1928
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New Orleans 15, Louisiana.....1942
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- Campbell, John David, 1222 W. State St., Geneva, Illinois.....1944
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Indianapolis 1, Indiana.....1938
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Alexandria, Indiana.....1946
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Colorado A. & M. College, Fort Collins, Colorado.....1940
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Central Park W. at 79th St., New York City 24.....1945
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Charlotte, North Carolina.....1940
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Louisville 8, Kentucky.....1947
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College of Agriculture, Madison 6, Wisconsin.....1921
- *Coles, Victor, 2910 Grasselli Ave., Westwood, Cincinnati, Ohio.....1929
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- Collum, Thomas Francis, 1070 Lucile Ave., S.W., Atlanta, Georgia.....1947
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- Compton, Miss Dorothy M[ay], 22 Wilton St., Princeton, New Jersey...1945
- *Compton, Lawrence Verlyn, Biology Division, Soil Conservation Service,
Washington 25, D.C.....1923
- *Congdon, Dr. R[ussel] T[hompson], Medical Arts Bldg.,
Wenatchee, Washington.....1944
- Conkey, John H., 11 Chestnut St., Ware, Massachusetts.....1947
- *Conlon, Llewellyn Henry, 310 E. Conant St., Portage, Wisconsin.....1947
- Conn, Robert Carland, 769 Park Ave., Bound Brook, New Jersey.....1945
- ***Conover, [H.] Boardman, 6 Scott St., Chicago 10, Illinois.....1944
- Conrad, Charles L[ouis], 1206 Warwood Ave., Wheeling, West Virginia...1937
- Conway, Albert E., Department of Psychology, Lafayette College,
Easton, Pennsylvania.....1939
- *Cooch, Graham, 685 Echo Dr., Ottawa, Ontario, Canada.....1945
- *Cook, Miss Fannye Addine, State Fish and Game Commission,
2550 N. State St., Jackson 44, Mississippi.....1923
- Cook, Frankland S., 20 Lynd Ave., Toronto, Ontario, Canada.....1946
- ***Cooley, Miss Eleanor Graham, R.F.D., Berwyn, Maryland.....1936
- Coombes, Robert Armitage Hamilton, Sea Bank, Bolton-le-Sands,
Carnforth, Lancashire, England.....1936
- Corn, Lawrence R., 329 N. 41st St., Camden, New Jersey.....1945
- *Cottam, Clarence, Fish and Wildlife Service, Department of the
Interior, Washington 25, D.C.....1929
- Cottrell, George William, Jr., 70 Lake View Ave.,
Cambridge 38, Massachusetts.....1941
- Counce, Miss Sheila [Jean], Hayes Center, Nebraska.....1947
- *Court, Edward J., 1723 Newton St., N.W., Mt. Pleasant,
Washington, D.C.....1944
- *Cowan, John M., Jr., Box 89, Lockhart, Texas.....1947

- Cox, Dorothy Ploch (Mrs. Lawrence G.), Star Route,
Crosslake, Minnesota1947
- *Creager, Joe C[lyde], L. A. Cann Rd., Drawer 1267,
Ponca City, Oklahoma.....1947
- Crewson, Ray[mond] [Charles], 111 E. Texas Ave., Sebring, Ohio.....1947
- Crowder, Orville W[right], Chase, Maryland.....1946
- *Cruikshank, Allan Dudley, Highland Hall, Rye, New York.....1939
- Cruttenden, John Rudy, 2020 Maine St., Quincy, Illinois.....1945
- Cryder, Mrs. Sherman C., Woolrich, Pennsylvania.....1947
- Cunningham, James W., 3009 E. 19th Terrace, Kansas City, Missouri....1935
- *Currier, Edmond S[amuel], 8541 N. Chicago Ave., St. Johns Station,
Portland, Oregon.....1930
- Curtis, Elizabeth L[ong], 5648 Beach Dr., Seattle 6, Washington.....1935
- *Curtis, Robert A[ndrews], Route 1, Goffstown, New Hampshire.....1945
- *Dahlberg, Wendell O[scar], 11312 S. Michigan Ave., Chicago 28, Illinois..1939
- Dainty, Jack, 6 Wolfe Ave., Deep River, Ontario, Canada.....1947
- *Dambach, Charles A., Department of Zoology and Entomology,
Ohio State University, Columbus 10, Ohio.....1934
- Damon, David, Game, Forestation and Parks Commission,
State Capitol, Lincoln, Nebraska.....1933
- Dana, Edward Fox, 57 Exchange St., Portland, Maine.....1939
- Danner, May S. (Mrs. John M.), 1646 Cleveland Ave., N.W.,
Canton, Ohio.....1921
- **Darden, Constance S. (Mrs. Colgate W., Jr.), East Lawn,
University of Virginia, Charlottesville, Virginia.....1943
- Davey, Dr. Winthrop N[ewbury], University Hospital,
Ann Arbor, Michigan.....1941
- *Davidson, William Mark, Box 66, Laurel, Maryland.....1933
- Davies, Howard Henry, Little Stoke, Patchway, Bristol, England.....1947
- Davis, Clifford Vernon, Department of Zoology and Entomology,
Montana State College, Bozeman, Montana.....1945
- *Davis, Dr. David E[dward], School of Hygiene and Public Health,
Johns Hopkins University, Baltimore 5, Maryland.....1940
- **Davis, Mrs. Edward M., 159 E. Lyman Ave., Winter Park, Florida....1946
- Davis, George, Route 5, Murfreesboro, Tennessee.....1936
- Davis, George W., 148 Northfield St., Montpelier, Vermont.....1941
- *Davis, John, Museum of Vertebrate Zoology, University of California,
Berkeley 4, California.....1939
- *Davis, L[ouie] Irby, Box 988, Harlingen, Texas.....1933
- *Davis, Russell S., Clayton, Illinois.....1947
- Davis, W[illiam] B., Department of Fish and Game,
College Station, Texas.....1938
- Davis, William Franklin, 423 W. 46th St., Ashtabula, Ohio.....1947
- *Davisson, A. Paul, Fleming Ave., Edgemont, Fairmont, West Virginia....1947
- *Dean, Mrs. Blanche Evans, 2100 20th Ave., S., Birmingham, Alabama....1947
- Dear, Lt. Col. L[ionel] S[extus], Box 127, Port Arthur,
Ontario, Canada.....1939
- Dechen, Mrs. Lillian Orvetta, 14 Summer St., Port Dickinson,
Binghamton 6, New York.....1939
- *Decker, C[harles] O., 6450 Kenwood Ave., Chicago 37, Illinois.....1938
- *DeGarmo, William Russell, 306 Belvedere Apts.,
Charleston, West Virginia.....1946
- Dehner, Rev. Eugene W[illiam], St. Benedict's College, Atchison, Kansas..1944
- Dehring, Herbert Carl, 501 Superior St., Genoa, Ohio.....1946

- ***Delacour, Jean Theodore, American Museum of Natural History,
 Central Park W. at 79th St., New York City 24.....1944
- Delavan, Wayne G., Route 2, Box 61, Bronson, Kansas.....1943
- *DeLury, Ralph Emerson, 330 Fairmont Ave., Ottawa, Ontario, Canada...1920
- Denton, J[ames] Fred, Jr., 1510 Pendleton Rd., Augusta, Georgia.....1935
- Derdiger, Mrs. Caroline V., 3122 15th Ave., S., Minneapolis 7, Minnesota.1944
- Derleth, August [William], Sauk City, Wisconsin.....1940
- **de Schauensee, Rodolphe Meyer, Devon, Pennsylvania.....1945
- ***Desmond, Hon. Thomas C[hables], Box 670, Newburgh, New York.....1942
- *Deusing, Murl, Milwaukee Public Museum, Milwaukee 3, Wisconsin.....1937
- Devitt, Otto Edmund, 218 Eglinton Ave., E., Toronto, Ontario, Canada..1935
- Dice, Lee R[aymond], Laboratory of Vertebrate Biology,
 University of Michigan, Ann Arbor, Michigan.....1943
- Dickinson, J[oshua] C[lifton], Jr., Department of Biology,
 University of Florida, Gainesville, Florida.....1939
- Dickinson, Miriam S. (Mrs. William Winston), 2006 Reid Ave.,
 Bluefield, West Virginia.....1942
- Dietrich, Otto Killian, 225 Glendora Ave., Louisville 12, Kentucky.....1947
- *Dilger, William C[hristopher], 126 Lake Ave., Hilton, New York.....1946
- Dille, Frederick Monroe, 822 Grand Ave., Nogales, Arizona.....1912
- Dingle, Edward von Siebold, Huger, South Carolina.....1921
- Dixon, Miss Clara, Albion College, Albion, Michigan.....1947
- *Dixon, J[ames] B[enjamin], Route 1, Box 688, Escondido, California...1936
- Dixon, Keith Lee, International House, Berkeley 4, California.....1946
- Dobbins, Miss Edith E., 1456 W. Clifton Blvd., Lakewood 7, Ohio.....1941
- **Dodge, Victor K[enney], 137 Bell Court West, Lexington 23, Kentucky..1935
- Doerhoefer, Basil, Route 6, Box 538, Louisville, Kentucky.....1947
- *Doering, Hubert R., 6522 Michigan Ave., St. Louis 11, Missouri.....1945
- Dole, Sumner A[lvord], Jr., 19 Tahanto St., Concord, New Hampshire..1947
- Domm, Lincoln V[alentine], Whitman Laboratory of Experimental
 Zoology, University of Chicago, Chicago 37, Illinois.....1936
- *Donaghho, Walter Raymond, 913 Alowa Dr., Honolulu, Hawaii.....1945
- Donahue, Miss [Henri]etta Helen, Department of Zoology,
 Botany and Zoology Bldg., Columbus 10, Ohio.....1947
- *Donnelly, Thomas Wallace, 1432 44th St., N.W., Washington 7, D.C....1947
- *Douglass, Donald W., Game Division, Michigan Department of
 Conservation, Lansing 13, Michigan.....1929
- *Downer, Alice Porter (Mrs. C. T.), 1634 19th Place, Vero Beach, Florida.1945
- *Downing, Paul E[arl], 835 Waukegan Ave., Highland Park, Illinois.....1943
- **Driscoll, Mrs. Walter Bridges, 421 Summit Ave., St. Paul 2, Minnesota...1947
- Drum, Miss Margaret, 217 South St., Owatonna, Minnesota.....1937
- *Dudley, John M[urchie], 20 Germain St., Calais, Maine.....1944
- Duer, Harry E., 9304 Edmunds Ave., Cleveland, Ohio.....1941
- Duff, C. V., 1922 Tamarind Ave., Hollywood 28, California.....1946
- ***Dugan, Dr. William Dunbar, 221 Pierce Ave., Hamburg, New York.....1945
- *DuMont, Philip A[tkinson], Fish and Wildlife Service,
 Department of the Interior, Washington 25, D.C.....1928
- *Duncan, Donald Pendleton, 509 N. 17th St., Manhattan, Kansas.....1936
- Dundas, Lester Harvey, Slade National Wildlife Refuge,
 Dawson, North Dakota.....1943
- Dusi, Julian L[uigi], 251 Taylor Station Rd., Blacklick, Ohio.....1941
- *Duvall, Allen Joseph, Fish and Wildlife Service,
 Department of the Interior, Washington 25, D.C.....1942
- *Dyer, William A., 112 Allen St., Union City, Michigan.....1947
- *Eagleson, Joseph P., 85 E. Gay St., Columbus 15, Ohio.....1943

- *Eastman, Whitney H[askins], c/o General Mills, Inc.,
General Mills Bldg., Minneapolis 1, Minnesota.....1941
- *Eastwood, Sidney Kingman, 5110 Friendship Ave.,
Pittsburgh 24, Pennsylvania.....1928
- Eaton, Stephen W[oodman], 808 S. Main St., Geneva, New York.....1942
- Eddy, Garrett, 4515 Ruffner St., Seattle 99, Washington.....1947
- *Edeburn, Ralph M[ilton], Department of Zoology, Marshall College,
Huntington, West Virginia.....1947
- *Edge, Mrs. Charles N[oel], 1215 Fifth Ave., New York City 29.....1931
- Edwards, Ernest P[reston], Fernow Hall, Cornell University,
Ithaca, New York.....1947
- Edwards, James L., 27 Stanford Place, Montclair, New Jersey.....1947
- **Edwards, Robert Davis, c/o Stock Trend Service, 95 State St.,
Springfield, Massachusetts.....1945
- ***Edwards, Robert L[omas], c/o George E. Pierce, Atlantic Rd.,
Gloucester, Massachusetts.....1945
- *Edwards, Sylvia P. (Mrs. Robert L.), 81 Hamilton St.,
Hamilton, New York.....1946
- *Eifert, Virginia S[nider] (Mrs. Herman D.), 705 W. Vine St.,
Springfield, Illinois.....1941
- *Eifrig, Charles William Gustave, Windermere, Orange Co., Florida.....1907
- Eighme, Miss Marietta M[uriel], 131 W. 5th St., Ottumwa, Iowa.....1947
- ***Eisenmann, Eugene, 110 W. 86th St., New York City.....1942
- *Ekblaw, George Elbert, 511 W. Main St., Urbana, Illinois.....1914
- **Ekblaw, Walter Elmer, Clark University, Worcester, Massachusetts.....1910
- **Eklund, Dr. Carl M[ilton], 96 Bedford St., N.E.,
Minneapolis 14, Minnesota.....1945
- *Elder, William H[anna], 105 Wildlife Conservation Bldg.,
University of Missouri, Columbia, Missouri.....1938
- *Elliott, Richard M., 1564 Vincent St., St. Paul 8, Minnesota.....1940
- Ellis, Miss Hazel Rosetta, Keuka College, Keuka Park, New York.....1942
- Emans, Miss Elaine V[ivian], Hutchinson, Minnesota.....1947
- Emerson, David L[owell], 25 Everett Ave., Providence, Rhode Island...1939
- ***Emerson, Guy, 16 E. 11th St., New York City 3.....1938
- *Emilio, S[hepard] Gilbert, Route 4, Laconia, New Hampshire.....1929
- Emlen, John Thompson, Jr., Department of Zoology,
University of Wisconsin, Madison 6, Wisconsin.....1936
- Empey, Miller, Freeland, Michigan.....1939
- *English, Pennoyer Francis, Department of Zoology,
Pennsylvania State College, State College, Pennsylvania.....1934
- Ennis, J[ames] Harold, Cornell College, Mt. Vernon, Iowa.....1942
- *Erickson, Mary M[arilla], University of California Santa Barbara
College, Santa Barbara, California.....1930
- Erickson, Ray C[harles], 1104 Washington Ave., St. Peter, Minnesota...1939
- **Errington, Paul L[ester], Iowa State College, Ames, Iowa.....1932
- Eshleman, S[ilas] Kendrick III, 733 E. Lassiter St.,
Gainesville, Florida.....1947
- Etter, Alfred Gordon, Brookhill Farm, Clarksville, Missouri.....1947
- *Etz, Mrs. Elizabeth Cecilia, Thornhedge, Wheeling, West Virginia.....1940
- **Eustice, Mrs. Alfred L., 1138 Sheridan Rd., Evanston, Illinois.....1944
- *Evans, Dr. Evan Morton, 550 Park Ave., New York City.....1929
- Evans, Ulmont Lorden, 3112 S. Fourth St., Shelbyville, Illinois.....1945
- Eynon, Alfred E., 33 Montclair Ave., Verona, New Jersey.....1947
- *Eyster, Marshall Blackwell, 203 Vivarium Bldg., Wright and Healey Sts.,
Champaign, Illinois.....1947

- Fales, John H[ouse], 1917 Elkhart St., Silver Spring, Maryland.....1939
- **Fargo, William G[ilbert], 506 Union St., Jackson, Michigan.....1923
- **Farmer, Earl Wilson, Box 1362, Steubenville, Ohio.....1946
- *Farner, Donald S[ankey], Department of Zoology,
 The State College of Washington, Pullman, Washington.....1941
- Feeney, W. S., Box 132, Ladysmith, Wisconsin.....1937
- *Feighner, Miss Lena Veta, 298-1 S. Tremont St., Kansas City, Kansas....1935
- *Feigley, Miss Margaret D[enny], 544 Chestnut St., Winnetka, Illinois...1944
- *Ferguson, William, 5907 Mason St., Omaha, Nebraska.....1946
- Fetherston, Miss Kathleen E[lizabeth], Fernow Hall,
 Cornell University, Ithaca, New York.....1946
- *Finster, Miss Ethel B., Louisberg College, Louisberg, North Carolina....1931
- *Fischer, Richard B[ernard], 140-19 Beech Ave., Flushing, New York....1942
- Fisher, Miss Katherine, Worden, Montana.....1947
- Fleetwood, Raymond J[udy], Camp Cornelia, Folkston, Georgia.....1931
- *Fleisher, Edward, Brooklyn College, Brooklyn 10, New York.....1947
- Fliegel, James Bush, 1104 American National Bank Bldg.,
 Kalamazoo, Michigan.....1942
- Floyd, E[arl] Pershing, Northeastern State College, Tahlequah, Oklahoma.1939
- *Floyd, Judge Joseph Larke, 302 Citizens Bldg., Canton, Ohio.....1903
- Flynn, Michael B[urke], 282 Rider Ave., Syracuse 4, New York.....1942
- *Foley, Edward J[ames], 5349 N. Bay Ridge Ave.,
 Milwaukee 11, Wisconsin.....1947
- Folger, Miss Edith Virginia, 1 Vestal St., Nantucket, Massachusetts....1946
- *Foote, Maurice E[dwin], Route 1, Mantua, Ohio.....1932
- Ford, Edward R[ussell], Newaygo, Michigan.....1914
- Forsyth, Mrs. Louise A[nn], 71 Lebanon Rd., Hanover, New Hampshire.1940
- Foster, Ben R., Agricultural Station, Christiansted, St. Croix,
 Virgin Islands.....1947
- Fowle, C[harles] David, Royal Ontario Museum of Zoology,
 100 Queen's Park, Toronto, Ontario, Canada.....1947
- *Fox, Adrian C., Box 1451, Lincoln, Nebraska.....1937
- *France, H[orace] Owen, Box 104, Allenwood, New Jersey.....1941
- *Fredrickson, Richard William, 1536 Tennessee St., Lawrence, Kansas....1947
- Freer, Marian F. (Mrs. R. Lloyd), 14 Chateau St., Missoula, Montana...1942
- **French, Mrs. Elizabeth Thomas, 1801 Las Lomas,
 Albuquerque, New Mexico.....1943
- French, Norman Roger, 1031 W. Edwards St., Springfield, Illinois.....1947
- *Fries, Waldemar Hans, 220 Valley Rd., Merion Station, Pennsylvania.....1947
- Fromholz, Miss Addie Nye, 1101 W. Cherokee Ave., Enid, Oklahoma....1947
- Frost, Herbert Hamilton, 178 E. 2nd St., S., Rexburg, Idaho.....1941
- *Frye, O. Earle, Jr., Box 834, Punta Gorda, Florida.....1940
- *Fryman, Miss Kathryn E[lizabeth], 114 Oak St., Wyandotte, Michigan..1943
- Fulmer, Mary Frances (Mrs. L. R.), 437 Crane Ave., Kent, Ohio.....1947
- *Furniss, Owen C[ecil], Port Alberni, Vancouver Island,
 British Columbia, Canada.....1934
- *Gabrielson, Ira N[oel], 1807 Preston Rd., Parkfairfax,
 Alexandria, Virginia.....1913
- Gaillard, Stephen Lee, 9 Lee Place, Bronxville, New York.....1942
- Gaines, Jack Raymond, 411 W. Koch St., Bozeman, Montana.....1945
- *Galley, John E[dmund], 3543 E. 22nd St., Tulsa 4, Oklahoma.....1945
- Gallup, Frederick Norman, Escondido, California.....1947
- *Gammell, Dr. R[obert] T[heodore], Kenmare, North Dakota.....1943
- **Ganier, Albert F[ranklin], 2112 Woodlawn Dr., Nashville 5, Tennessee...1915
- Garrett, Miss [Mary] Lois, 1709 Chestnut St., Kenova, West Virginia...1942

- Garrison, David L[loyd], Lincoln, Massachusetts.....1940
- Gashwiler, Jay S., Maine Wildlife Research Unit, University of Maine,
Orono, Maine.....1944
- Gavin, Angus, c/o Ducks Unlimited, 201 Bank of Commerce Bldg.,
Winnipeg, Manitoba, Canada.....1942
- Gensch, Robert Henry, U. S. Fish and Wildlife Service, Box 138,
Billings, Montana.....1939
- George, John L[othar], Museum of Zoology, University of Michigan,
Ann Arbor, Michigan.....1939
- Gerstell, Richard, c/o Animal Trap Company of America,
Lititz, Pennsylvania.....1939
- Ghent, Percy, 425 St. Clair Ave., E., Toronto, Ontario, Canada.....1946
- Gibbs, Walter C., Whitehall, Michigan.....1941
- *Gier, Herschel Thomas, Department of Zoology, Kansas State College,
Manhattan, Kansas.....1937
- Gifford, Harold, 3636 Burt Ave., Omaha, Nebraska.....1936
- Gilbert, Gareth E., 2422 Indianola Ave., Columbus, Ohio.....1943
- Gilbert, Miss Kathryn Helen, 714 1st Ave., W., Grand Rapids, Minnesota.....1945
- Gill, C[harles] T[erry], Box 1607, Harlingen, Texas.....1947
- **Gillen, Harold W., Denslow Rd., New Canaan, Connecticut.....1944
- Gillette, Mary Howie (Mrs. Darwin Clay), Box 73, Ulster, Pennsylvania.....1946
- Gilligan, James P., Department of Biology, Boise Junior College,
Boise, Idaho.....1938
- Giltz, Maurice L[eroy], Department of Zoology and Entomology,
Ohio State University, Columbus 10, Ohio.....1939
- Ginn, William Edward, 511 E. Van Buren St., Columbia City, Indiana...1941
- Glenn, Robert W., 509 Orchard Ave., Avalon, Pittsburgh 2, Pennsylvania..1934
- Glore, W[alter] S[cott], Jr., 350 Maple Ave., Danville, Kentucky.....1947
- Glover, Fred A[rthur], Department of Zoology, Iowa State College,
Ames, Iowa.....1947
- Gloyd, Howard K[ay], Chicago Academy of Sciences, 2001 N. Clark St.,
Chicago 14, Illinois.....1925
- Goebel, Herman [John], 78-52 80th St., Brooklyn 27, New York.....1946
- *Goetz, Christian John, 3503 Middleton Ave., Cincinnati 20, Ohio.....1930
- *Goldman, George M., Emory at Oxford College, Oxford, Georgia.....1947
- Goldthwaite, Miss Marion, 210 Berkley Rd., Indianapolis 8, Indiana....1946
- Good, Ernest E[ugene], Route 1, Van Wert, Ohio.....1937
- Goodman, John David, Department of Zoology, University of Michigan,
Ann Arbor, Michigan.....1944
- *Goodridge, Edwin Tyson, Province Line Rd., Princeton, New Jersey....1944
- *Goslin, Charles R[ussell], 726 E. King St., Lancaster, Ohio.....1940
- *Goslin, Robert M[artin], 316 Wilson Ave., Columbus 5, Ohio.....1936
- Gough, William McDonald, 28 Baby Point Rd., Toronto,
Ontario, Canada.....1944
- *Gram, Margaret Edwards (Mrs. H. James, Jr.), 207 McKinley Ave.,
Detroit 30, Michigan.....1941
- *Grant, Cleveland P[utnam], 245 Davis St., Mineral Point, Wisconsin...1928
- Grave, Miss Kathryn Ann, 4925 29th Ave., S.,
Minneapolis 6, Minnesota.....1947
- Graves, Miss [Cynthia] Katherine, 1209 N. Illinois St., Apt. 28,
Indianapolis 2, Minnesota.....1942
- Gray, William Arthur, Room 646, 224 S. Michigan Ave.,
Chicago 4, Illinois.....1938
- Grayce, Robert, 141 Main St., Rockport, Massachusetts.....1946
- Greeley, Fred[erick], 1121 Rutledge St., Madison, Wisconsin.....1942

- *Green, N[orman] Bayard, Zoology Department, Marshall College,
Huntington 1, West Virginia.....1943
- **Greene, Albert E., 517 Oswego St., Ann Arbor, Michigan.....1939
- *Greene, Earle R[osenbury], 116 S. Scott St., New Orleans 19, Louisiana..1930
- Greenhalgh, Clifton M., 1230 E. 1st St., S., Salt Lake City 2, Utah.....1939
- *Greenwell, Guy A., Wildlife Conservation Bldg., University of Missouri,
Columbia, Missouri.....1947
- *Gregory, Stephen S[trong], Jr., Box N, Winnetka, Illinois.....1922
- Griffie, W[illet] E., 510 Yeon Bldg., Portland 4, Oregon.....1947
- *Griffin, William W[elcome], 135 Peachtree Way, N.E., Atlanta, Georgia..1946
- Grimes, S[amuel] A[ndrew], Route 6, Box 82 G, Jacksonville 7, Florida.1924
- *Grimm, William C[arey], Laughlintown, Pennsylvania.....1939
- *Grinnell, Lawrence I[rving], 710 Triphammer Rd., Ithaca, New York...1939
- **Griscom, Ludlow, Museum of Comparative Zoology,
Cambridge 38, Massachusetts.....1937
- Groesbeck, William M[aynard], 376 Seneca Rd., Hornell, New York....1947
- Grose, E. R., Sago, West Virginia.....1939
- *Groskin, Horace, 210 Glenn Rd., Ardmore, Pennsylvania.....1937
- *Gross, Alfred Otto, 11 Boody St., Brunswick, Maine.....1927
- *Grossenheider, Richard P., 5415 Gilmore Ave., St. Louis, Missouri.....1941
- *Guelf, George F., Brockport, New York.....1944
- *Guest, Mrs. Thomas K., Star Route, Rushford, New York.....1946
- Gullion, Gordon W[right], 1657 E. 13th St., Eugene, Oregon.....1947
- Gunderson, Harvey Lorraine, Museum of Natural History,
University of Minnesota, Minneapolis 14, Minnesota.....1941
- Gunn, W[illiam] W[alker] H[amilton], 49 Barrington Ave.,
Toronto, Ontario, Canada.....1945
- Hacskaylo, John, Valley Grove, West Virginia.....1947
- Hadeler, Miss Catherine [Wilma], 900 Harmon Ave., Dayton 9, Ohio...1945
- *Hadley, Thomas E., 48 Wellesley Dr., Pleasant Ridge, Michigan.....1944
- *Haecker, Frederick Woods, Box 191, Kemmerer, Wyoming.....1918
- *Haessler, Dr. F[erdinand] Herbert, 324 E. Wisconsin Ave.,
Milwaukee 2, Wisconsin.....1947
- **Hagar, Mrs. Jack, Box 339, Rockport, Texas.....1930
- **Hague, Florence S., Sweet Briar College, Sweet Briar, Virginia.....1931
- *Haines, Robert L[ee], 54 E. Main St., Moorestown, New Jersey.....1947
- Haines, T. P., Biology Department, Mercer University, Macon, Georgia..1941
- *Hainsworth, William P[ickard], 216 Railroad Ave.,
North Andover, Massachusetts.....1930
- Hale, James B[all], 409 Washburn Place, Madison, Wisconsin.....1947
- *Hall, Fred T., 1568 Winton Rd., N., Rochester 9, New York.....1937
- *Hall, George A[rthur], Department of Chemistry, University of
Wisconsin, Madison 6, Wisconsin.....1946
- *Hall, Mrs. Gladys A[reta], 912 Douglas Ave., Kalamazoo 52, Michigan...1947
- **Haller, Frank D[enver], Department of Forestry and Conservation,
Purdue University, West Lafayette, Indiana.....1940
- *Hallman, Roy Cline, Box 826, Panama City, Florida.....1928
- Hamann, Carl F[erdinand], Maple Lane, Aurora, Ohio.....1947
- Hamer, Austin F[rank], Route 2, Box 238, Springfield, Oregon.....1947
- *Hamerstrom, Frederick N., Jr., Edwin S. George Reserve,
Pinckney, Michigan.....1934
- *Hamilton, William J[ohn], Jr., Department of Zoology,
Cornell University, Ithaca, New York.....1933
- *Hammond, Merrill C[lyde], Upham, North Dakota.....1939

- Hampe, Irving E., 5559 Ashbourne Rd., Halethorpe,
Baltimore 27, Maryland.....1945
- Hancock, James W[illiam], Route 1, Madisonville, Kentucky.....1946
- *Handley, Charles Overton, Box 445, Blacksburg, Virginia.....1925
- *Handley, Charles Overton, Jr., Box 445, Blacksburg, Virginia.....1941
- *Hann, Harry W[ilbur], Department of Zoology, University of Michigan,
Ann Arbor, Michigan.....1930
- *Hanna, Wilson Creal, 141 E. F St., Colton, California.....1936
- Hanson, E[lmer] C[harles], 1305 Wisconsin Ave., Racine, Wisconsin.....1940
- Hardy, [Cecil] Ross, Department of Zoology, Weber College,
Ogden, Utah.....1940
- *Harford, Dr. Henry M[inor], 926 Argyle Bldg., Kansas City 6, Missouri..1946
- *Harkness, Reed B., 4908 Laclede Ave., St. Louis 8, Missouri.....1942
- Harley, James Bickel, Route 1, Box 393, Pottstown, Pennsylvania.....1947
- Harmon, Dr. Karl S., 209 S. Walnut St., Eldon, Missouri.....1947
- Harmon, Wendell H[arold], Humboldt, Nebraska.....1947
- *Harper, Francis, Moylan, Pennsylvania.....1930
- Harrell, Byron Eugene, 1594 Stanford Ave., St. Paul, Minnesota.....1943
- **Harriot, Samuel C[arman], 200 W. 58th St., New York City 19.....1934
- Harris, Dave, Deadwood, South Dakota.....1947
- Harris, Stuart Kimball, 33 Lebanon St., Winchester, Massachusetts.....1946
- **Harrison, Hal H., 1102 Highland St., Tarentum, Pennsylvania.....1941
- Hartley, Albert Thomas, Columbiana, Ohio.....1944
- *Hartman, Frank A[lexander], Hamilton Hall, Ohio State University,
Columbus 10, Ohio.....1941
- *Hartwell, Arthur M[owry], 1506 Mt. Curve, Minneapolis, Minnesota....1940
- Hartwell, Reginald Warner, 121 N. Fitzhugh St., Rochester 4, New York.1947
- Haskins, Mrs. Edith D., 39 Park St., Hanover, New Hampshire.....1941
- Hausler, Mrs. M., 7348 Paxton Ave., Chicago, Illinois.....1936
- **Havemeyer, Henry O[sborne], Mahwah, New Jersey.....1930
- Haverschmidt, Fr., 14 Waterkant, Paramaribo, Surinam, Dutch Guiana...1946
- *Hawkins, Arthur S., Lake Mills, Wisconsin.....1936
- Hawkins, B. L., Hamline University, St. Paul 4, Minnesota.....1936
- Hawksley, Mrs. Janet P., 123 Lafayette Circle, Cincinnati, Ohio.....1942
- Hawver, Miss Marguerite N., 621 N. Grove St., Bowling Green, Ohio....1946
- *Hayward, C[harles] Lynn, Brigham Young University, Provo, Utah....1947
- *Hazard, Frank Orlando, Wilmington College, Wilmington, Ohio.....1946
- **Hebard, Frederick V[anuxem], 1500 Walnut Street Bldg.,
Philadelphia 2, Pennsylvania.....1940
- Heckler, S[ydney] B[aer], 1207 N. 7th St., St. Louis 6, Missouri.....1942
- Hedges, Harold C[harles], Route 2, Lake Quivira, Kansas City 3, Kansas.1940
- Heed, William B[attles], 101 West Virginia Ave.,
West Chester, Pennsylvania.....1947
- *Hefley, Harold M[artin], Department of Biology, Texas Technical
College, Lubbock, Texas.....1942
- Heft, Orvil F., 15790 Lindsay, Detroit 27, Michigan.....1945
- *Heidenkamp, Joseph, Jr., 538 Glen Arden Dr., Pittsburgh 8, Pennsylvania.1942
- Heiser, J[oseph] M[atthew], 1724 Kipling St., Houston, Texas.....1939
- *Heit, William S., Texas Waterfowl Survey, Rockport, Texas.....1947
- Helema, Miss Flarel Ann, 1224 W. Oklahoma Ave., Enid, Oklahoma....1947
- Helfer, Miss Louise, 111 Ninth St., Watkins Glen, New York.....1938
- *Helm, Robert William, Trailer 105, Unit 2, Montana State College,
Bozeman, Montana.....1947
- Hendricks, G[eorge] Bartlett, c/o The Berkshire Museum,
Pittsfield, Massachusetts.....1943

- *Hendrickson, George O[scar], Department of Zoology, Iowa State College,
Ames, Iowa.....1933
- Hendrix, Miss Marjorie [June], Amsterdam, Ohio.....1946
- Henning, Miss Kay, 302 5th Ave., Decorah, Iowa.....1947
- Henning, Mrs. Tom, 710 5th Ave., Decorah, Iowa.....1947
- *Henry, C. J., Lower Souris Refuge, Upham, North Dakota.....1933
- *Hensley, Marvin Max, 203 Vivarium Bldg., Wright and Healey Sts.,
Champaign, Illinois.....1947
- Henwood, Mrs. Ethel May, 604 W. Main St., Urbana, Illinois.....1941
- Herbert, Richard A., 961 Fox St., Bronx, New York.....1947
- Herman, Carlton M., 1060 Cragmont Ave., Berkeley 8, California.....1946
- *Hickey, J[oseph] J[ames], Patuxent Research Refuge, Bowie, Maryland..1940
- ***Hicks, Lawrence Emerson, 8 Chatham Rd., Columbus, Ohio.....1925
- Hiett, Lawrence D[avison], 1945 Ottawa Dr., Toledo 6, Ohio.....1929
- Higgins, Harold G[uymon], 455 S. 3rd St., E., Salt Lake City, Utah...1941
- Higgins, Mabel E. (Mrs. Howard H.), 6302 8th Ave., Kenosha, Wisconsin.1947
- Higgins, Thomas Francis, 32-73 43rd St., Astoria 3, New York.....1947
- Hill, Herbert Oliver, 2420 Ridge Rd., Berkeley 4, California.....1938
- Hill, Julian Werner, 1106 Greenhill Ave., Wilmington 56, Delaware.....1935
- Hill, Raymond W., 3316 Kenmore Rd., Shaker Heights,
Cleveland 22, Ohio.....1941
- *Hillmer, Davis B., 8228 Woodward Ave., Detroit 2, Michigan.....1926
- *Hinds, Frank J., Biology Department, Western Michigan College of
Education, Kalamazoo, Michigan.....1935
- Hindwood, Keith Alfred, Wingello House, Angel Place, Sydney, Australia.1945
- *Hinshaw, Thomas D[oane], 1827 San Juan Ave., Berkeley 7, California..1926
- Hobson, Dorothy Madden (Mrs. L. G.), 1309 N. Pennsylvania, Apt. 39,
Indianapolis 2, Indiana.....1935
- Hock, Raymond J[ames], Fernow Hall, Cornell University,
Ithaca, New York.....1946
- Hodges, Jim, 3132 Fair Ave., Davenport, Iowa.....1946
- *Hoff, Clayton M., 810 Blackshire Rd., Wilmington 56, Delaware.....1943
- Hoffman, Paul William, 8415 Kenyon Ave., Wauwatosa 13, Wisconsin...1940
- Hoffmeister, Linus C[hristian], 504 W. Ripa Ave., Lemay 23, Missouri...1939
- Hofslund, Pershing B[enard], Zoology Department, University of
Michigan, Ann Arbor, Michigan.....1944
- Höke, Mrs. Glen A., 801 E. 21st St., Little Rock, Arkansas.....1946
- Holden, Fenn M[itche]ll, 920 Lake Angelus Shores, Pontiac 17, Michigan.1947
- *Holland, Harold May, Box 615, Galesburg, Illinois.....1915
- Holsen, James N., 612 Cuyler Ave., Princeton University,
Princeton, New Jersey.....1944
- Hopkins, Ralph C[leary], Box D, Horicon, Wisconsin.....1947
- Horton, Louise D. (Mrs. M. B.), 360 Prospect St.,
Fall River, Massachusetts.....1941
- Hostetter, D[avid] Ralph, Eastern Mennonite School,
Harrisonburg, Virginia.....1937
- Hotchkiss, Neil, 5704 41st Ave., Hyattsville, Maryland.....1940
- Hough, Mrs. Eleanor Sloan, 1515 Mariposa Ave., Boulder, Colorado....1941
- Hough, Mrs. Mary [Yeager], 1214 W. Charles St., Champaign, Illinois..1946
- *Hovind, Ralph Bernard, Box 321, Ladysmith, Wisconsin.....1947
- Howe, [Henry] Branch, Jr., 414 W. Ponce de Leon Ave.,
Decatur, Georgia.....1943
- Howell, Joseph C., Department of Zoology and Entomology,
University of Tennessee, Knoxville, Tennessee.....1938

- Howell, Thomas R[aymond], Museum of Vertebrate Zoology,
University of California, Berkeley 4, California.....1947
- *Hoyt, J[ohn] Southgate Y[eston], Fernow Hall, Cornell University,
Ithaca, New York.....1936
- Hubbard, Dr. Hugh Wells, American Board Mission,
Peiping, North China.....1947
- Hughes, Wallace, 6630 S. McArthur Ave., Apt. 83-D,
Oklahoma City, Oklahoma.....1947
- Hulbert, Lloyd Clair, 529 W. Grand River Ave.,
East Lansing, Michigan.....1938
- *Hunt, Ormond Edson, General Motors Bldg., 3044 W. Grand Blvd.,
Detroit 2, Michigan.....1937
- Hurley, John B[eatty], 401 S. 17th Ave., Yakima, Washington.....1937
- Hurst, John W[ildeboor], 522 S. 6th St., Bozeman, Montana.....1945
- Hutchinson, Arthur E., 40 Glendessary Lane, Santa Barbara, California...1940
- *Imler, Ralph H., Fish and Wildlife Service, 600 Weatherley Bldg.,
Portland 14, Oregon.....1937
- **Ingersoll, Albert M[ills], 908 F St., San Diego 1, California.....1921
- **Ingersoll, Marion C[rory] (Mrs. Raymond V.), 130 E. 57th St.,
New York City 22.....1942
- Ivor, H. Roy, Route 1, Cooksville, Ontario, Canada.....1945
- *Jackson, C[icero] F[loyd], University of New Hampshire,
Durham, New Hampshire.....1936
- *Jackson, Francis Lee, 541 Hammond St., Chestnut Hill, Massachusetts...1941
- Jacobs, Miss [Chloe] Veda, 212 Nichols Blvd., Longview, Washington..1947
- Jacobson, Dr. Malcolm A[rthur], 57 W. 57th St., New York City 19...1947
- James, Douglas Arthur, 25455 Dundee Ave., Huntington Woods, Michigan.1946
- Jameson, Everett Williams, Department of Zoology, Cornell University,
Ithaca, New York.....1941
- Janson, Reuel G., Box 864, Mobridge, South Dakota.....1947
- *Janvrin, Dr. Edmund R[andolph] P[easlee], 38 E. 85th St.,
New York City.....1942
- Jaques, F[rancis] L[ee], 610 W. 116th St., New York City 27.....1939
- Jenkins, James H[obart], 2012 Eljosa Ave., Waycross, Georgia.....1939
- *Jenner, William, 806 W. Davis St., Fayette, Missouri.....1933
- Johnson, Albert George, Route 2, Box 457, Waukesha, Wisconsin.....1947
- *Johnson, Clifford O., 771 Seminary Ave., Dubuque, Iowa.....1944
- *Johnson, Donald T[heodore], 2336 W. 108 Place, Chicago 43, Illinois....1947
- *Johnson, Frank M[organ], 404 6th St., Fairmont, West Virginia.....1946
- Johnson, Miss Mabel Claire, 30 Westfield Rd.,
West Hartford, Connecticut.....1946
- *Johnson, Mrs. Oscar, 38 Portland Place, St. Louis, Missouri.....1931
- Johnson, Perry Frank, Y.M.C.A., Michigan City, Indiana.....1935
- *Johnson, Robert A[nthony], 98 East St., Oneonta, New York.....1930
- Johnson, William M[cNutt], Route 4, Knoxville, Tennessee.....1939
- Johnston, David Ware, 1037 St. Charles Ave., N.E., Atlanta, Georgia...1943
- Johnston, Miss Verna R[uth], 1812 W. Sonoma Ave.,
Stockton, California.....1941
- *Jonah, Miss Christie May, 221 Anderson St., Hackensack, New Jersey...1942
- *Jones, Harold C[harles], Box 61, East Carolina Teachers College,
Greenville, North Carolina.....1929
- Jones, John C[ourts], 5810 Namakagan Rd., Washington, D.C.....1931
- ***Jones, Lynds, 352 W. College St., Oberlin, Ohio.....Founder
- *Jones, S[olomon] Paul, 509 West Ave., N., Waukesha, Wisconsin.....1921

- *Jones, Victor E[mmons], University of Idaho, Southern Branch,
Pocatello, Idaho.....1938
- Jorae, Miss Irene Frances, Central Michigan College of Education,
Mt. Pleasant, Michigan.....1942
- Joyner, J. W. E., Box 647, Rocky Mount, North Carolina.....1947
- *Jung, Clarence [Schram], 6383 N. Port Washington Rd.,
Milwaukee 9, Wisconsin.....1921
- *Jurica, E., Lisle, Illinois.....1940
- Kahmann, Karl W., Route 2, Hayward, Wisconsin.....1941
- Kahn, Dina H[o]pe (Mrs. Reuben L.), 1122 Michigan Ave.,
Ann Arbor, Michigan.....1938
- *Kalmbach, Edwin Richard, Fish and Wildlife Service,
546 Custom House, Denver 2, Colorado.....1926
- Karplus, Martin, 259 Otis St., West Newton 65, Massachusetts.....1947
- *Kase, John C[h]arles, 501 Chestnut St., Mifflinburg, Pennsylvania.....1937
- Kaspar, John Loren, 392 23rd St., Oshkosh, Wisconsin.....1947
- *Keating, Dr. F[r]ancis Raymond, Jr., 1414 Damon Court,
Rochester, Minnesota.....1944
- *Keefer, Charles A., Box 68, Austwell, Texas.....1947
- Keely, Josiah, Box 383, Huntington, Long Island, New York.....1947
- *Kelker, George Hills, School of Forestry, U.S.A.C., Logan, Utah.....1938
- Keller, C[h]arles E[dward], 637 Eastern Ave., Indianapolis 1, Indiana...1946
- Keller, Richard T[homas], 717 S. 16th St., St. Joseph, Missouri.....1943
- Kelly, George Fleming, Department of Research and Education,
Solomons, Maryland.....1947
- *Kelsey, Homer Stone, 16 Chestnut St., Spring Valley, New York.....1945
- *Kelso, Leon H[ugh], 1370 Taylor St., N.W., Washington 11, D.C.....1930
- *Kendeigh, S[amuel] Charles, Vivarium Bldg., University of Illinois,
Champaign, Illinois.....1923
- Kendrick, Miss Muriel S[herburne], 201 Pleasant St.,
Laconia, New Hampshire.....1945
- *Kennedy, Bruce A[lbert] H[amilton], 389 W. 10th Ave.,
Columbus 1, Ohio.....1947
- **Kerr, Mrs. Mary Helen, 1246 Delaware, Springfield 4, Missouri.....1943
- Kessel, Miss Brina, Fernow Hall, Cornell University, Ithaca, New York..1946
- Key, Mrs. J. Frank, Buena Vista, Virginia.....1945
- Kiefer, Elizabeth D[eyo] (Mrs. Francis), 243 Gratiot Blvd.,
Port Huron, Michigan.....1941
- ***Kieran, John, 4506 Riverdale Ave., New York City 63.....1942
- Killip, Thomas III, 139 Edgeview Lane, Rochester 10, New York.....1946
- Kindler, Mrs. Grace E[mma], Sheridan Dr., Route 1, Lancaster, Ohio...1937
- *King, Miss Betty Jean, 3212 Maher St., Toledo, Ohio.....1947
- King, John Arthur, Museum of Zoology, University of Michigan,
Ann Arbor, Michigan.....1947
- *King, Louise E. (Mrs. Stanley), 1103 N. 2nd St., Ames, Iowa.....1944
- Kirby, Edward Vincent, 5145 Lowe Ave., Chicago 9, Illinois.....1945
- Kizer, Richard Allen, 426 Forest Hill Dr., West Lafayette, Indiana.....1947
- *Klein, Richard P[aul], 24805 Emery Rd., Warrensville Heights 22, Ohio..1946
- *Klinkerfuss, Dr. G. H., 340 Bermuda Ave., Normandy, Missouri.....1941
- *Klinkerfuss, Mrs. G. H., 340 Bermuda Ave., Normandy, Missouri.....1941
- *Klonick, Allan S., 28 Ericsson St., Rochester 10, New York.....1941
- Kluge, Miss Helen H[enrika], Woodtick Rd., Waterbury 63, Connecticut.1942
- Knollmeyer, Lewis Edward, Department of Commerce and Economics,
University of Vermont, Burlington, Vermont.....1945

- Knox, Miss Margaret R[ichardson], 4030 Park Ave.,
Indianapolis 5, Indiana.....1937
- Koch, Peter, Cincinnati Museum of Natural History, Cincinnati 10, Ohio.1939
- Koehler, Mrs. Arthur, 109 Chestnut St., Madison, Wisconsin.....1941
- Koestner, E. J., 1202 Barrancas Ave., Pensacola, Florida.....1938
- Kolb, C[harles] Haven, Jr., 5021 Midwood Ave.,
Baltimore 12, Maryland.....1937
- **Kortright, Francis H[erbert], 633 Eastern Ave., Toronto, Ontario, Canada.1943
- Kossack, Charles W[alter], 715 S. Division St., Barrington, Illinois.....1945
- *Kozicky, Edward L[ouis], 206 Forestry Bldg., State College, Pennsylvania.1943
- *Kramar, Nada, 1906 K St., N.W., Washington 6, D.C.....1947
- *Kramer, Theodore C[hristian], Department of Anatomy,
East Medical Bldg., Ann Arbor, Michigan.....1939
- Kraus, Douglas L[awrence], 92 Keene St., Providence 6, Rhode Island...1942
- Kreag, Keith K., 1348 Edgewood Ave., Birmingham, Michigan.....1942
- Krebs, Juanita F[ile] (Mrs. R. W.), 3416 North Blvd.,
Baton Rouge 12, Louisiana.....1946
- Kritzler, Henry, Marine Studios, Inc., St. Augustine, Florida.....1945
- Krug, Howard H[enry], Chesley, Ontario, Canada.....1944
- *Krutzschnig, Miss Barbara E[llen], 3025 Meridian St., Apt. 401,
Indianapolis, Indiana.....1945
- Kubichek, Wesley Frank, Fish and Wildlife Service,
Department of the Interior, Washington 25, D.C.....1947
- *Kugel, Miss Agnes R[ose], Lena, Wisconsin.....1946
- Kuitert, Louis Cornelius, Entomology Department,
Kansas State College, Manhattan, Kansas.....1938
- Kurth, E[rnest] A[lbert], 1024 Elm St., Grinnell, Iowa.....1947
- *Kutz, George C[arl], 705 S. Holcombe St., Stillwater, Minnesota.....1944
- *Kutz, Harry Leon, Maine Cooperative Wildlife Unit,
University of Maine, Orono, Maine.....1939
- Kyle, Mrs. Jennie Lynne, 2905 E. 5th Ave., Knoxville 15, Tennessee....1947
- *Kyllingstad, Henry C[arrell], Mountain Village, Alaska.....1940
- *Lacey, George Macrae, 1313 Olive St., Jackson, Mississippi.....1945
- Lacey, Miss Mifton H., Box 614, Canton, Ohio.....1939
- Laffoon, Jean Luther, 2704 Lincoln Way, Ames, Iowa.....1940
- Lagler, Karl F., Department of Zoology, University of Michigan,
Ann Arbor, Michigan.....1941
- Lake, Robert N., Woodstock, Vermont.....1941
- Lamb, Robert Edward, 417 Jackson St., Sterling, Colorado.....1947
- Lambert, Adaline Train (Mrs. Howard T.), 1903 Ross St.,
Sioux City, Iowa.....1947
- ***Lambert, Bert H., 16854 Wildemere Ave., Detroit, Michigan.....1936
- *Lambert, Robert John, Jr., 2802 Kenmore Ave., Dayton 10, Ohio.....1945
- Lane, Edna L[uella] (Mrs. Arthur C.), Route 1, Ithaca, New York....1947
- Lanyon, Wesley E[dwin], 23 E. Wheelock St., Hanover, New Hampshire.1943
- *Larrabee, Austin Park, Yankton College, Yankton, South Dakota.....1921
- *Larrison, Earl J[unior], Laboratory of Vertebrate Biology,
University of Michigan, Ann Arbor, Michigan.....1946
- Larson, Goodman Kenneth, Fish and Wildlife Service, P.O. Box 1381,
Billings, Montana.....1945
- *Laskey, Amelia Rudolph (Mrs. Frederick Charles), Graybar Lane,
Nashville 4, Tennessee.....1928
- *Lattin, Jack D[aniel], 5726 W. Ohio St., Chicago, Illinois.....1945
- Lawlor, Mrs. Gene, Victor, Iowa.....1947
- Lawrence, Miss Louise de Kiriline, Rutherglen, Ontario, Canada.....1946

- *Lawrence, William Hobart, 1410 Decatur St., N.W.,
 Washington 11, D.C.....1943
- Lawton, Miss Amy C., 3316 Burt St., Omaha 3, Nebraska.....1946
- Lay, Daniel Wayne, Box 133, Silsbee, Texas.....1939
- Layne, James N[athaniel], 6308 N. Oakley Ave., Chicago 45, Illinois.....1947
- *Lea, Robert B[ashford], 24 N. Worth Ave., Elgin, Illinois.....1940
- Leavitt, Benjamin Burton, Department of Biology, University of Florida,
 Gainesville, Florida.....1947
- Lee, Forrest Byron, 1502 Kilian Blvd., St. Cloud, Minnesota.....1947
- Lee, [William] Donald, 431 Greenmount Blvd., Dayton 9, Ohio.....1947
- **Lee, Miss Zell Charlotta, 1423 Douglas St., Sioux City 18, Iowa.....1946
- *Leebrick, Karl C[layton], Jr., Route 3, Canastota, New York.....1946
- Leedy, Daniel L[ovey], Ohio Wildlife Research Unit,
 Ohio State University, Columbus 10, Ohio.....1936
- Legg, William C[larence], Mt. Lookout, West Virginia.....1939
- *Lengemann, Miss Martha A., 360 Cedar St., Imlay City, Michigan.....1946
- *Leopold, Aldo, 424 University Farm Place, University of Wisconsin,
 Madison 6, Wisconsin.....1928
- *Leopold, A[ldo] Starker, Museum of Vertebrate Zoology,
 Berkeley 4, California.....1940
- Lepingwell, Alan Rix, 3800 St. Joseph St., Lachine,
 Montreal 32, Quebec, Canada.....1947
- *Leshner, Samuel W., 303 N. 17th St., Corvallis, Oregon.....1941
- Levy, Alice K[lund] (Mrs. H. P.), 11680 Laurelwood Dr.,
 North Hollywood, California.....1941
- *Lewis, Harrison Flint, Lands, Parks and Forest Branch,
 Department of Mines and Resources, Ottawa, Ontario, Canada.....1939
- Lewis, Bro. Hubert, La Salle Institute, Glencoe, Missouri.....1940
- Lewis, Kenneth M[acKay], Children's Nature Museum,
 849 Clifton Rd., N.E., Atlanta 6, Georgia.....1947
- *Lewy, Alfred, 2051 E. 72nd Place, Chicago 49, Illinois.....1915
- Lieftinck, John E[dmund], 1826 W. Market St., Akron 13, Ohio.....1945
- Lincoln, Frederick Charles, Fish and Wildlife Service,
 Washington 25, D.C.....1914
- *Linsdale, Jean M[yron], Jamesburg Route, Monterey, California.....1928
- Linton, M[orris] Albert, 315 E. Oak Ave., Moorestown, New Jersey.....1941
- Lloyd, C[lark] K., 11 N. Elm St., Oxford, Ohio.....1925
- *Lloyd, Hoyes, 582 Mariposa Ave., Rockcliffe Park,
 Ottawa, Ontario, Canada.....1922
- Lodge, William R[alph], Route 3, Box 1, Cuyahoga Falls, Ohio.....1935
- Loetscher, Frederick W[illiam], Jr., 143 N. 3rd St., Danville, Kentucky..1946
- **Logan, Dulaney, Route 1, Box 449, Louisville, Kentucky.....1947
- Longley, William H[oward], 1429 N. Cleveland Ave.,
 St. Paul 8, Minnesota.....1943
- Loomis, Mrs. Mary L., 1014 S. 30th Ave., Omaha 5, Nebraska.....1946
- Loop, George Andrew, 205 S. Keystone Ave., Sayre, Pennsylvania.....1944
- Lord, Frederic P[omeroy], 39 College St., Hanover, New Hampshire.....1939
- Lorenz, Mary Rachael (Mrs. Fred A.), Route 1, Ravenna, Ohio.....1947
- Lovell, Harvey B., 3011 Meade Ave., Louisville 4, Kentucky.....1936
- ***Low, Seth Haskell, Salt Plains Wildlife Refuge, Jet, Oklahoma.....1931
- *Lowe, William Joseph, 205 Second St., Bismarck, North Dakota.....1947
- ***Lowery, George H[ines], Jr., Museum of Zoology,
 Louisiana State University, University, Louisiana.....1937
- *Ludwig, Claud C[ecil], 506 Wilson Bldg., Lansing, Michigan.....1938
- ***Ludwig, Dr. Frederick Edwin, 2864 Military St., Port Huron, Michigan..1941
- *Lueth, Francis X[avier], 104A 5th St., Blakeley Island, Mobile, Alabama.1947

- Lukens, William Weaver, Jr., 1711 Spruce St.,
Philadelphia 3, Pennsylvania.....1947
- Lum, Miss Elizabeth C[aroline], Cincinnati, New York.....1940
- *Lunk, William A., 29 Bell Run Rd., Fairmont, West Virginia.....1937
- Lupient, Mrs. Mary [Louise], 212 S.E. Bedford St.,
Minneapolis, Minnesota.....1944
- *Luthy, Ferd, Jr., 306 N. Institute, Peoria, Illinois.....1937
- *Lyman, Clara Cross (Mrs. Frederick C.), 1716 Colfax Ave., S.,
Minneapolis, Minnesota.....1944
- Lyons, Mrs. Robert C., 25 Woodland St., Huntington, Long Island,
New York.....1940
- MacDonald, Donald L[aurie], 72 Alexandra Blvd.,
Toronto, Ontario, Canada.....1941
- *MacLulich, D[uncan] A[lexander], 15 Bellwood Ave.,
Ottawa, Ontario, Canada.....1933
- *MacMillan, Comdr. Donald Baxter, Provincetown, Massachusetts.....1946
- *MacMullan, R[alph] Austin, 28321 Ford Rd., Garden City, Michigan...1940
- *McArthur, H[arold] E[dward], 723 County St., Waukegan, Illinois....1947
- *McAtee, Waldo Lee, 6342 Ellis Ave., Chicago 37, Illinois.....1911
- *McCabe, Robert A[lbert], 424 University Farm Place,
Madison, Wisconsin.....1942
- *McCamey, [Benjamin] Frank[lin], [Jr.], 1637 Netherwood Ave.,
Memphis, Tennessee.....1945
- **McClary, Miss Susan C., N. Main St., Windsor, Vermont.....1945
- *McClure, H[owe] Elliott, Box 292, Station A, Bakersfield, California...1942
- *McCue, Earl Newlon, Box 104, Morgantown, West Virginia.....1941
- *McCullagh, Dr. E[rnest] Perry, 2020 E. 93rd St., Cleveland, Ohio.....1937
- McDaniel, William M[ilton], Fortuna, Missouri.....1947
- McDonald, Malcolm E., 443 S. Division St., Ann Arbor, Michigan.....1936
- **McGaw, Elizabeth T[aylor] (Mrs. G. Hampton), 18 Beech St.,
Woodsville, New Hampshire.....1945
- McGeen, Daniel S., 144 Garfield Ave., Waukesha, Wisconsin.....1944
- *McGraw, Harry A[rthur], 1600 5th Ave., Altoona, Pennsylvania.....1936
- ***McIlhenny, Edward Avery, Avery Island, Louisiana.....1910
- McIntosh, William B[axter], 1384 Hanover Court,
Willow Run Village, Michigan.....1942
- McIver, Samuel H., 2409 Fremont Ave., S., Minneapolis 5, Minnesota...1947
- McKinley, George G[ael], 104 North Western Parkway,
Louisville 12, Kentucky.....1945
- McKinney, Mrs. Walter A., 2932 S. Woodward Blvd., Tulsa 5, Oklahoma.1945
- *McKnight, Edwin T[hor], 5038 Park Place, Friendship Station,
Washington, D.C.....1936
- McManus, William Reid, Memramcook, New Brunswick, Canada.....1946
- *McMath, Robert R., Route 4, Pontiac, Michigan.....1934
- McMurray, Arthur A., 2110 Fairfax Ave., Nashville 5, Tennessee.....1939
- *McMurry, Frank B[aily], 2733 Hollister St., Santa Barbara, California..1939
- McNish, E[dgar] M[ann], Route 1, Franklin, North Carolina.....1940
- Mack, H[orace] G[ordon], c/o Gilson Mfg. Co., Ltd.,
Guelph, Ontario, Canada.....1937
- Mackenzie, Dr. Locke Litton, 829 Park Ave., New York City.....1947
- Maclean, Miss Dorothy W[illiams], 21 Ashley St.,
Hartford 5, Connecticut.....1939
- Magath, Dr. Thomas Byrd, Mayo Clinic, Rochester, Minnesota.....1935
- Magney, Mrs. G. R., 5329 Washburn Ave., S., Minneapolis, Minnesota...1940
- Malley, Philip P., 114 Glendale Rd., Upper Darby, Pennsylvania.....1935

- *Mallory, Dr. Dwight H[arcourt], 17 Sherwood St.,
Brockville, Ontario, Canada.....1946
- *Manley, C[alvert] H[amilton], 649 Ridge Ave.,
New Kensington, Pennsylvania.....1946
- *Manners, Edward Robert, 216 New Broadway, Brooklawn, New Jersey..1942
- **Mannix, Mrs. Lucille Marie, 790 Prospect Ave., Winnetka, Illinois.....1947
- Manville, Richard H[yde], Department of Zoology,
Michigan State College, East Lansing, Michigan.....1941
- *Margolin, A[braham] S[tanley], Science Hall, West Virginia University,
Morgantown, West Virginia.....1944
- *Markle, Jess Matthew, 917 Sierra St., Madera, California.....1943
- *Marshall, Raymond O[scar], Route 2, Columbiana, Ohio.....1945
- *Marshall, Terrell, 372 Skyline Dr., Park Hill,
North Little Rock, Arkansas.....1944
- Marshall, William H[ampton], Division of Entomology and
Economic Zoology, University Farm, St. Paul 1, Minnesota.....1942
- Martin, Paul S[chultz], Box 532, West Chester, Pennsylvania.....1946
- *Maslowski, Karl H[erbert], 1034 Maycliff Place, Cincinnati 30, Ohio....1934
- *Mason, Charles Irving, Wildlife Research Laboratory, Delmar, New York.1947
- Mason, C[harles] N[athan], Sr., 6432 31st St., N.W.,
Washington 15, D.C.....1947
- Mason, Miss Esther, 2523 Montgomery St., Louisville 12, Kentucky....1941
- Mason, Robert F., Jr., Box 277, Maitland, Florida.....1938
- *Mathiak, Harold A[ibert], Box D, Horicon, Wisconsin.....1941
- Maxson, Mrs. Melva T[horngate], 437 Rogers St., Milton, Wisconsin...1947
- *Mayfield, G[eorge] R[adford], Vanderbilt University,
Nashville, Tennessee.....1917
- *Mayfield, Harold F[ord], 2557 Portsmouth Ave., Toledo 12, Ohio.....1940
- ***Mayr, Ernst, American Museum of Natural History,
Central Park W. at 79th St., New York City 24.....1933
- *Mazzeo, Rosario, 120 Elm St., North Cambridge 40, Massachusetts.....1947
- **Meade, Gordon M[ontgomery], Box 25, Trudeau Sanatorium,
Trudeau, New York.....1937
- **Meitzen, Logan H[erman], Route 2, Box 166, Port Arthur, Texas.....1947
- Mellinger, E[nos] O[ren], North Lima, Ohio.....1939
- Melone, Miss Theodora G[ardner], Geology Library, Pillsbury Hall,
University of Minnesota, Minneapolis 14, Minnesota.....1947
- Meltvedt, Burton W., Paullina, Iowa.....1930
- Mendall, Howard L[ewis], 28 Pendleton St., South Brewer, Maine.....1936
- Meng, Heinz Karl, 116 Miller St., Ithaca, New York.....1943
- **Mengel, Robert M[orrow], c/o Arthur D. Allen, Glenview, Kentucky...1937
- *Meredith, Col. Russell Luff, 2500 2nd Ave., S., Great Falls ,Montana...1946
- *Meritt, James Kirkland, 99 Battle Rd., Princeton, New Jersey.....1944
- ***Merry, Miss Katherine, 268 Auburn Ave., Pontiac, Michigan.....1944
- Messner, Clarence John, 308 McKinley, Grosse Pointe 30, Michigan.....1944
- **Metcalf, H[omer] N[oble], Department of Horticulture,
Montana State College, Bozeman, Montana.....1944
- *Metcalf, Zeno P[ayne], State College Station, Raleigh, North Carolina...1900
- *Mewaldt, L[eonard] R[ichard], Department of Zoology,
Montana State University, Missoula, Montana.....1947
- *Meyer, Henry, Biology Department, Ripon College, Ripon, Wisconsin...1939
- Michaud, Howard H[enry], 824 N. Main St., West Lafayette, Indiana...1938
- Michaux, Joy Houston (Mrs. Frank W.), 1607 Bluff St.,
Wichita Falls, Texas.....1947
- *Michener, Harold, 418 N. Hudson Ave., Pasadena 4, California.....1926

- Mickey, Arthur B[ayard], 1516 Rainbow Ave., Laramie, Wyoming.....1935
- Middleton, Douglas S[arsfield], 7443 Buhr Ave., Detroit 12, Michigan....1946
- *Miles, Merriam Lee, Box 709, Vicksburg, Mississippi.....1941
- Miles, Eleanor Burgess (Mrs. Philip E.), 1900 Arlington Place,
Madison 5, Wisconsin.....1943
- Miller, Alden H[olmes], Museum of Vertebrate Zoology,
Berkeley 4, California.....1930
- * Miller, Mrs. Alice, 2200 Belmont, Dearborn, Michigan.....1944
- Miller, Mrs. Clarence Heath, 1354 Herschell Ave., Cincinnati 8, Ohio....1941
- ***Miller, Douglas Scott, 122 Lawrence Ave., E., Toronto, Ontario, Canada.1939
- Miller, J[ames] Robert, 1523 E. Jefferson St., Detroit 7, Michigan.....1946
- Miller, Lyle [DeVerne], 650 Almyra Ave., Youngstown, Ohio.....1947
- Miller, Loye H[olmes], University of California, 405 Hilgard Ave.,
Los Angeles 24, California.....1939
- Miller, R[aymond] F[oster], Baker University, Baldwin City, Kansas...1945
- Miller, Richard F[ields], 2627 N. 2nd St., Philadelphia 33, Pennsylvania.1942
- Miller, William R[osewarne], Box 22, University of Connecticut,
Storrs, Connecticut.....1946
- Mills, Nancy (Mrs. Peter J.), Route 2, Chesterton, Indiana.....1947
- Mills, Robert H[enry], 2466 Medary Ave., Columbus 2, Ohio.....1941
- *Milnes, Miss Hattie K[ernahan], 331 Gowen Ave., Mt. Airy,
Philadelphia 19, Pennsylvania.....1935
- Miner, Miss Edna Wolf, 2206 Brun Ave., Houston 6, Texas.....1947
- *Minich, Edward C., 1047 Fairview Ave., Youngstown 2, Ohio.....1923
- *Mitchell, Harold Dies, 378 Crescent Ave., Buffalo, New York.....1936
- *Mitchell, Mrs. R. V., Wade Park Manor, E. 107th St., Cleveland 6, Ohio.1943
- *Mitchell, Mrs. Osborne, Route 1, Streetsville, Ontario, Canada.....1933
- **Mitchell, Walton I[ungerich], 398 Vassar Ave., Berkeley 8, California...1893
- Mockford, Edward [Lee], 4140 Graceland Ave., Indianapolis, Indiana....1946
- Mohler, Levi L[app], 1000 S. 35th St., Lincoln, Nebraska.....1942
- Mohr, Charles E[dward], Audubon Nature Center,
Greenwich, Connecticut.....1947
- *Monk, Harry C[rawford], 406 Avoca St., Nashville 5, Tennessee.....1920
- Monroe, Burt L[eavelle], Jr., Ridge Rd., Anchorage, Kentucky.....1946
- *Monroe, Burt L[eavelle], Sr., Ridge Rd., Anchorage, Kentucky.....1935
- *Monson, Gale, P.O. Box 1717, Parker, Arizona.....1933
- Moore, Miss Clara Alma, 5339 Carrollton Ave., Indianapolis 5, Indiana..1939
- *Moore, Miss Dora, 18 W. Carpenter St., Athens, Ohio.....1934
- Moore, George A[zro], 289 Admiral Rd., Stillwater, Oklahoma.....1928
- Moore, Miss Jeanne [Ellen], 718 Onondaga St., Ann Arbor, Michigan...1943
- Moore, Robert B[yron], 3554 Hollywood Dr., Baton Rouge 5, Louisiana.1947
- ***Moore, Robert Thomas, Meadow Grove Place, Flintridge,
Pasadena 2, California.....1939
- Moorman, Robert B., Route 3, Chariton, Iowa.....1941
- Moran, James Vincent, 1 Alfred St., Jamaica Plain,
Boston 30, Massachusetts.....1943
- Morgan, Allen Hungerford, Cochituate Rd., Wayland, Massachusetts....1943
- Morgan, Thomas Nolen, 142 Woodland Ave., Oberlin, Ohio.....1947
- Morrell, Charles K., 119 E. Maxwell St., Lexington, Kentucky.....1943
- *Morrell, Miss Elise, 1311 White Ave., Knoxville 16, Tennessee.....1942
- Morrissey, Thomas J[ustin], 325 McClellan Blvd., Davenport, Iowa....1946
- *Morse, John Salls, Route 3, Benton, Kentucky.....1947
- *Morse, Margarette Elthea, 122 W. South St., Viroqua, Wisconsin.....1921
- **Morton, Duryea, Route 1, Sinking Spring, Pennsylvania.....1947
- Morton, Miss Thelma [Pauline], 1300 Burch Ave., N.W.,
Cedar Rapids, Iowa.....1947

- *Moseley, Edwin Lincoln, University Museum, Bowling Green, Ohio.....1925
- Moser, Jane Myers (Mrs. R. Allyn), R.F.D. 1, Benson Station,
Omaha 4, Nebraska.....1946
- *Moser, Randolph, Aberdeen, Idaho.....1944
- **Moser, Dr. R[euben] Allyn, R.F.D. 1, Benson Station,
Omaha 4, Nebraska.....1940
- Moul, Edwin T[heodore], 146 W. Lehigh Ave.,
Philadelphia 33, Pennsylvania.....1942
- *Mousley, William H[enry], 4073 Tupper St., Westmount,
Montreal, Canada.....1922
- *Mudge, Edmund W., Jr., 5926 Averill Way, Dallas, Texas.....1939
- *Muirhead, Miss Peggy Porter, University of Illinois,
Biological Sciences Division, Navy Pier, Chicago, Illinois.....1940
- Munro, J[ames] A[lexander], Okanagan Landing,
British Columbia, Canada.....1935
- *Munter, Rear Admiral W[illiam] H[enry], 4518 52nd Ave., N.E.,
Seattle 5, Washington.....1933
- Murdock, James Ingram, 311 Irving Ave., Glendale 1, California.....1940
- *Murie, Adolph, McKinley Park, Alaska.....1932
- *Murie, O[laus] J[ohn], Moose, Wyoming.....1934
- *Murphey, Eugene Edmund, 432 Telfair St., Augusta, Georgia.....1935
- *Murphy, Paul C[harles], 935 Goodrich Ave., Apt. 10,
St. Paul 5, Minnesota.....1944
- Murray, Rev. J[oseph] J[ames], 6 White St., Lexington, Virginia.....1931
- Murray, Robert Bruce, 2320 Vaughan Ave., Parkersburg, West Virginia...1947
- *Musgrove, Jack W[arren], 2414 Adams Ave., Des Moines, Iowa.....1947
- Musselman, T[homas] E[dgar], 124 S. 24th St., Quincy, Illinois.....1940
- Neal, Dorothy Phillips (Mrs. Charles), Box 133, Demorest, Georgia.....1946
- *Necker, Walter L., 6843 Hobart Ave., Chicago 31, Illinois.....1947
- *Neff, Johnson Andrew, 546 Custom House, Denver, Colorado.....1920
- Nelson, Arnold Lars, 3256 Van Hazen St., N.W., Washington 15, D.C....1932
- *Nelson, Bernard Anton, Department of Game, Fish and Parks,
Pierre, South Dakota.....1947
- Nelson, Charles E[llsworth], Jr., 124 Oxford Rd., Waukesha, Wisconsin..1937
- Nelson, Detlof B[ennett], 12039 S. Princeton Ave., Chicago 28, Illinois..1947
- Nelson, Mrs. Donna Madeline, Salem, Wisconsin.....1947
- Nelson, Mrs. Esther Marie, 515 E. Minnehaha Parkway,
Minneapolis 9, Minnesota.....1945
- Nelson, Grace Sharritt (Mrs. Almer P.), Box 22, Jackson, Wyoming....1946
- Nelson, Miss Theodora, 315 E. 68th St., New York City 21.....1928
- Nelson, Urban C., Box 358, Fergus Falls, Minnesota.....1939
- Nero, Robert William, Route 1, Box 427, Cudahy, Wisconsin.....1947
- Nessle, James P., 1823 Barrows St., Toledo 12, Ohio.....1936
- *Netting, M[orris] Graham, Carnegie Museum,
Pittsburgh 13, Pennsylvania.....1941
- Nevius, Mrs. Richard, Route 1, Greenville, Tennessee.....1940
- New, John, 340 W. 86th St., New York City 24.....1946
- **Newlin, Lyman W[ilbur], Deephaven Park, Route 3, Wayzata, Minnesota.1945
- Newton, Earl T[homas], 5145 Swope Parkway, Kansas City 4, Missouri..1939
- *Nice, L[eonard] B., 5725 Harper Ave., Chicago 37, Illinois.....1932
- ***Nice, Mrs. Margaret Morse, 5725 Harper Ave., Chicago 37, Illinois.....1921
- *Nichols, Charles K[etcham], 212 Hamilton Rd., Ridgewood, New Jersey..1933
- *Nichols, John Treadwell, American Museum of Natural History,
Central Park W. at 79th St., New York City 24.....1941
- *Nichols, L[eon] Nelson, 331 E. 71st St., New York City.....1937
- Nicholson, Donald John, 1224 Palmer St., Orlando, Florida.....1945

- *Nickell, Walter Prine, Cranbrook Institute of Science,
Bloomfield Hills, Michigan.....1943
- *Nielsen, Beatrice Wise (Mrs. G. W.), c/o Mrs. J. H. Wise,
141 Belleview Dr., San Leandro, California.....1945
- Nordquist, Theodore C., 1423 James Ave., N., Minneapolis 11, Minnesota.1941
- Noren, Oscar B., 17145 Indiana, Detroit 21, Michigan.....1945
- *Nork, Theodore J., 420 Fullerton Parkway, Chicago 14, Illinois.....1947
- *Norris, Frank G[iles], Route 3, Steubenville, Ohio.....1946
- Norris, Robert Allen, 505 W. 8th St., Tifton, Georgia.....1941
- Norris, Russell T[aplin], 50 Milk St., Newburyport, Massachusetts.....1939
- *Norse, William J[ohn], 531 W. 211th St., New York City 34.....1939
- *North, George W[ebster], 249 Charlton Ave., W.,
Hamilton, Ontario, Canada.....1941
- *Northrop, Myron, c/o A. S. Aloe Co., 1831 Olive St.,
St. Louis 3, Missouri.....1945
- *Nowland, Paul J[ennings], 700 Equitable Bldg., Wilmington 7, Delaware.1947
- Nyc, Fred[erick] F[rancis], Jr., c/o John T. Peterson, Brenham, Texas..1943
- Oakes, Clifford, 13 Olympia St., Burnley, Lancashire, England.....1946
- *Oberholser, Harry Church, 2933 Berkshire Rd., Cleveland Heights,
Cleveland 18, Ohio.....1894
- *O'Conner, Miss Esther [Laura], 4344 Locust Ave.,
Kansas City 4, Missouri.....1940
- *Odum, Eugene P[leasants], Department of Zoology,
University of Georgia, Athens, Georgia.....1930
- Odum, Howard Thomas, Pittesboro Rd., Chapel Hill, North Carolina...1946
- Oehler, Edward, 748 S. Orange Ave., Newark 6, New Jersey.....1947
- Oliver, Miss Mary C[lara], Ganado Mission, Ganado, Arizona.....1934
- Olsen, Humphrey A., Pikeville College Library, Pikeville, Kentucky.....1941
- Olsen, James H., 1052 Forest St., Columbus 6, Ohio.....1947
- **Olsen, Dr. Richard E., 1996 Lakeland Ave., Pontiac 19, Michigan.....1938
- Olson, Mrs. Ethel M., South Wayne, Wisconsin.....1947
- **Olson, Mrs. Gladys E[lizabeth], 17906 Lake Rd., Lakewood 7, Ohio....1942
- Olson, Mrs. Monrad J., Box 145, Sanish, North Dakota.....1946
- Ommanney, G. G., Post Office 14, Hudson Heights, Quebec, Canada.....1944
- O'Neill, Edward J[ohn], Box 707, Muleshoe, Texas.....1946
- **O'Reilly, Ralph A., Jr., Davisburg, Michigan.....1936
- Orians, Rev. Howard Lester, 2401 S. Williams St.,
Milwaukee 7, Wisconsin.....1947
- Orr, Ellison James, 14 Dewey Ave., Waukon, Iowa.....1947
- Orr, Mrs. Mary, Box 183, Reserve, New Mexico.....1947
- *Osborn, Hon. Chase S[almon], Sault Ste Marie, Michigan.....1943
- *Ott, Frederick Louis, c/o Jake Baer, 861 Wisconsin River Ave.,
Port Edwards, Wisconsin.....1941
- *Overing, Robert, R.F.D. 4, Raleigh, North Carolina.....1930
- *Owre, Oscar T., 2625 Newton Ave., S., Minneapolis, Minnesota.....1935
- Painton, Dr. Harry R., 175 Foothill Rd., Santa Barbara, California.....1939
- *Palmer, Ralph S[imon], Department of Zoology, Vassar College,
Poughkeepsie, New York.....1934
- *Palmer, T[heodore] S[herman], 1939 Biltmore St., N.W.,
Washington, D.C.....1914
- *Palmquist, Clarence O[scar], 7400 N. Odell Ave., Chicago 31, Illinois...1945
- Paoliello, Miss Frances [Jane], 1705 18th Ave., S., Nashville, Tennessee..1946
- *Parker, Dean Roberts, Box 202, University, Mississippi.....1944
- *Parker, Henry M[elville], 122 School St., Concord, New Hampshire....1941

- *Parkes, Kenneth Carroll, Laboratory of Ornithology, Fernow Hall,
 Cornell University, Ithaca, New York.....1946
- Parks, Richard Anthony, 3754 Peachtree Rd., N.E., Atlanta, Georgia.....1942
- Parlee, Miss Phyllis Gertrude, Route 4, Mt. Airy, Maryland.....1945
- Partch, Max L[orenzo], R.F.D., Lake Mills, Wisconsin.....1940
- Paynter, R[aymond] A[ndrew], Jr., 208 Forest Hill Rd.,
 Hamden 14, Connecticut.....1946
- Pearson, Miss Dorothy, 3 Church St., East Weymouth, Massachusetts....1944
- *Peartree, Edward William, 425 S. State St., Oconomowoc, Wisconsin.....1941
- *Peasley, Mrs. Harold R[aymond], 2001 Nash Dr., Des Moines, Iowa.....1934
- Peebles, Edward McCrady, c/o Dr. Edward McCrady,
 University of the South, Sewanee, Tennessee.....1946
- Peelle, Miles L., 329 Rice St., Adrian, Michigan.....1940
- ***Peet, Dr. Max Minor, 2030 Hill St., Ann Arbor, Michigan.....1935
- Penner, Lawrence R., Department of Zoology, University of Connecticut,
 Storrs, Connecticut.....1940
- Perkins, Mrs. Mary Loomis, 1305 S. 52nd St., Omaha 6, Nebraska.....1946
- *Perner, Miss Margaret E., 3463 Woodridge Rd.,
 Cleveland Heights 21, Ohio.....1943
- Perry, Morton H., 729 8th Court, W., Birmingham, Alabama.....1946
- Peter, Miss Patricia, 302 Kerby Rd., Grosse Point Farms 30, Michigan...1947
- Peters, Ellen, 442 5th St., Brooklyn 15, New York.....1942
- *Peters, Harold S[eymour], 54 Folly Rd., Charleston 50, South Carolina..1924
- *Peterson, Alfred, Box 201, Brandt, South Dakota.....1931
- Peterson, Mrs. C[harles] E[mil], Madison, Minnesota.....1936
- Peterson, Liven A[dam], P.O. Box 1381, Billings, Montana.....1940
- Peterson, Randolph L., Division of Mammals, Royal Ontario Museum
 of Zoology, Toronto, Ontario, Canada.....1946
- *Peterson, Roger Tory, P.O. Box 7, Glen Echo, Maryland.....1942
- *Petrides, George A., Wildlife Research Unit, Ohio State University,
 Columbus 10, Ohio.....1942
- ***Pettingill, Olin Sewall, Jr., Carleton College, Northfield, Minnesota.....1930
- *Petty, John Littleton, Jr., 297 Gordon Ave., N.E., Atlanta, Georgia.....1947
- ***Phelps, William H[enry], Apartado 2009, Caracas, Venezuela.....1940
- **Philipp, Frederick B[ernard], 99 John St., New York City.....1940
- ***Phillips, Allan Robert, 113 Olive Rd., Tucson, Arizona.....1934
- Phillips, Cyrus Eastman, 255 Polk St., Warsaw, Illinois.....1944
- Phillips, Homer Wayne, FPHA Dormitory B, San Jacinto Blvd.,
 Austin, Texas.....1947
- Phillips, Richard Stuart, 834 Liberty St., Findlay, Ohio.....1944
- Pickett, Gertrude C[aroline] (Mrs. Franklin), 2503 17th Ave.,
 Monroe, Wisconsin.....1947
- Pieczur, Walter H[enry], 1143 Rogers Ave., Brooklyn 26, New York....1945
- Pierce, Fred J[ohn], Winthrop, Iowa.....1947
- Pierce, Robert Allen, Nashua, Iowa.....1941
- *Pirnie, Miles David, W. K. Kellogg Bird Sanctuary, Augusta, Michigan..1928
- Pitelka, Frank Alois, Museum of Vertebrate Zoology, University of
 California, Berkeley 4, California.....1938
- Pittinger, Mrs. Cornelia Milhollin, Route 2, Gaston, Indiana.....1947
- *Pittman, James Allen, Jr., 436 S. Osceola, Orlando, Florida.....1945
- Plath, Karl, 305 S. Cuyler Ave., Oak Park, Illinois.....1942
- **Poole, Cecil A[very], 830 Chapman St., San Jose 11, California.....1942
- **Poor, Hustace Hubbard, 112 Park Ave., Yonkers 3, New York.....1935
- Porter, Dr. Eliot F[urness], Route 1, Box 5B, Santa Fe, New Mexico...1947

- *Porter, T[homas] Wayne, Department of Entomology, Snow Hall,
University of Kansas, Lawrence, Kansas.....1938
- *Potter, David M., Queen's College, Oxford, England.....1946
- *Potter, Julian K[ent], 437 Park Ave., Collingswood, New Jersey.....1915
- Potter, Louis Henry, R.F.D. 2, West Rutland, Vermont.....1941
- ***Pough, Richard H[oooper], 33 Highbrook Ave., Pelham 65, New York....1938
- Prather, Millard F[illmore], 1129 Brown-Marx Bldg.,
Birmingham 3, Alabama.....1940
- *Preble, Edward Alexander, 3027 Newark St., Washington, D.C.....1929
- *Preble, Norman A[lexander], Department of Biology, Union College,
Schenectady 8, New York.....1941
- Prentice, Don Smith, 5216 East Dr., Rockford, Illinois.....1947
- Prescott, Kenneth Wade, Museum of Zoology, University of Michigan,
Ann Arbor, Michigan.....1946
- *Presnall, Clifford C[hables], 5315 Earlston Dr., Washington 16, D.C.....1930
- Prestegard, Miss Tillie L., 1429 5th Ave., S.E., Cedar Rapids, Iowa.....1947
- *Prill, Dr. Albert G., Main St., Scio, Oregon.....1921
- Pritchard, C. G., Juniata, Nebraska.....1947
- Prucha, Miss Alma H., 3052 N. Maryland Ave., Milwaukee 11, Wisconsin.1942
- Pueschel, Paul, 520 Drexel Ave., Glencoe, Illinois.....1939
- Pusch, R. J., 714 S. Summit St., Appleton, Wisconsin.....1947
- Putman, William L[loyd], Dominion Entomological Laboratory,
Vineland Station, Ontario, Canada.....1945
- Putnam, Loren Smith, Department of Zoology, Ohio State University,
Columbus 10, Ohio.....1942
- *Pyle, George W[inner], South Valley Rd., Box 604, Paoli, Pennsylvania..1939
- Quam, Mrs. Mary Battell, 141 Joralemon St., Brooklyn 2, New York....1944
- Quay, Thomas L., Zoology Department, North Carolina State College,
Raleigh, North Carolina.....1939
- Quimby, Don C., 4742 Garfield Ave., S., Minneapolis, Minnesota.....1942
- *Ragusin, Anthony V[incent], P.O. Box 496, Biloxi, Mississippi.....1937
- Rahe, Carl W., 4666 Turney Rd., Cleveland 5, Ohio.....1931
- Ramisch, Miss Marjorie [Viola], 1835 Noble Rd., East Cleveland 12, Ohio.1943
- Ramsden, Charles Theodore, 8 & 19, Vista Alegre, Santiago, Cuba.....1914
- Randall, Robert Neal, Fish and Wildlife Service, Box 1381,
Billings, Montana.....1939
- Rapp, William F[rederick], Jr., Gaylord Hall, Doane College,
Crete, Nebraska.....1941
- *Rausch, Robert [Lloyd], Department of Veterinary Science,
University of Wisconsin, Madison 6, Wisconsin.....1947
- Rawson, George William, c/o Aba Pharmaceutical Products, Inc.,
Lafayette Park, Summit, New Jersey.....1947
- **Rebmann, G. Ruhland, Jr., 729 Millbrook Lane, Haverford, Pennsylvania.1941
- *Reeder, Miss Clara Maude, 1608 College Ave., Houghton, Michigan....1938
- Rees, Earl Douglas, Suite B-31-1, Wigglesworth Dormitory,
Harvard College, Cambridge, Massachusetts.....1946
- **Reese, Teresa S. (Mrs. Hans H.), 3421 Circle Close, Shorewood Hills,
Madison 5, Wisconsin.....1941
- *Reilly, E[dgar] M[ilton], Jr., 305 E. Veterans Place, Ithaca, New York..1946
- Reimann, Edward J[oseph], 4147 O St., Philadelphia 24, Pennsylvania...1947
- Remington, Charles Lee, Biological Laboratories, Harvard University,
Cambridge 38, Massachusetts.....1944
- *Rett, Egmont Z[achary], Museum of Natural History,
Santa Barbara, California.....1940
- Reuss, Alfred Henry, Jr., 12911 S. Mozart St., Blue Island, Illinois.....1936

- Rice, Dale [Warren], 432 W. 42nd St., Indianapolis 8, Indiana.....1946
Rice, Mrs. Harry Wilson, 3940 Richfield Rd., Minneapolis 10, Minnesota.1940
Richdale, Lancelot Eric, 23 Skibo St., Kew, Dunedin SW 1, New Zealand..1945
Richter, Carl H., 703 Main St., Oconto, Wisconsin.....1947
*Ricker, W[illiam] E[dwin], Department of Zoology,
Indiana University, Bloomington, Indiana.....1943
Riggs, Austen Fox II, 23 Coolidge Hill Rd., Cambridge 38, Massachusetts.1946
Riggs, Carl D[aniel], Department of Zoology, University of Michigan,
Ann Arbor, Michigan.....1943
**Riker, Mrs. Mary Louise, 4050 Commerce Rd., Pontiac, Michigan.....1947
Rilling, William Peter, 125 Glendale Ave., Findlay, Ohio.....1947
Riner, Miss Alice, 641 S. Roosevelt Ave., Wichita 9, Kansas.....1939
*Ripley, S[idney] Dillon II, Litchfield, Connecticut.....1946
*Ritchie, Dr. R. C., 99 Northcliffe Blvd., Apt. 4, Toronto 10,
Ontario, Canada.....1944
Ritter, Rhys T[heophilus], Route 4, Bethlehem, Wheeling, West Virginia.1944
*Roads, Miss Myra Katie, 463 Vine St., Hillsboro, Ohio.....1914
*Robbins, Chandler S[eymour], Patuxent Research Refuge,
Bowie, Maryland.....1941
Roberts, C. LaVerne, 531 Tussing Bldg., Lansing 7, Michigan.....1946
Roberts, Harold D., 218 N. Sixth St., Black River Falls, Wisconsin.....1946
Robertson, Miss Bertha May, Route 4, Bowling Green, Ohio.....1946
***Rogers, Charles Henry, East Guyot Hall, Princeton, New Jersey.....1903
Rogers, Gerald [Talbot], 4 Whitney St., Westbury, Long Island,
New York.....1945
*Rogers, Irl, 402 Alturas Ave., Modesto, California.....1937
***Rogers, Miss Mabel T., 203 N. Columbia St., Milledgeville, Georgia....1947
*Rogers, Mrs. Walter E., P.O. Box 385, Appleton, Wisconsin.....1931
Rognrud, Merle J., Box 296, St. Ignatius, Montana.....1947
Rooney, James P., Route 7, Yakima, Washington.....1947
***Root, Oscar M[itche]ll, Brooks School, North Andover, Massachusetts...1940
Rorimer, Irene Tuck (Mrs. J. M.), c/o Empire Plow Co.,
3140 E. 65th St., Cleveland 4, Ohio.....1938
Rosene, Walter, Jr., 1212 Jupiter, Gadsden, Alabama.....1942
*Rosewall, O[scar] W[aldemar], Department of Zoology,
Louisiana State University, University, Louisiana.....1931
*Ross, C[harles] Chandler, 7924 Lincoln Dr., Chestnut Hill,
Philadelphia 18, Pennsylvania.....1937
*Ross, Hollis T., 29 S. 2nd St., Lewisburg, Pennsylvania.....1945
Rowe, Kenneth C[hristian], 619 West Blvd., N., Columbia, Missouri....1947
*Rudd, Dr. Clayton G[lass], 315 Medical Arts Bldg.,
Minneapolis, Minnesota.....1944
Rudd, Robert L., 225 W. Alisal St., Salinas, California.....1939
Ruecker, Miss Emilie, Seapowet Ave., Tiverton, Rhode Island.....1943
Ruhland, Miss Phyllis, 201 Center St., Bellevue, Ohio.....1946
Ruhr, C[lifford] E[ugene], 1007 Laurel St., Atlantic, Iowa.....1947
Ruthven, Miss Katherine N[orcross], 13225 Marlowe Ave.,
Detroit 27, Michigan.....1947
Sabin, Walton B., 828 Ackerman Ave., Syracuse 10, New York.....1945
Sandve, J[oseph] Reuben, 883 23rd Ave., S.E., Minneapolis, Minnesota..1943
Sanford, Miss Janette, Sanford Hall, University of Minnesota,
Minneapolis 14, Minnesota.....1947
Satterly, J[ack], 100 Castlewood Rd., Toronto 12, Ontario, Canada.....1947
*Satterthwait, Mrs. Elizabeth Allen, 806 W. Ohio St., Urbana, Illinois....1925
*Saugstad, N[els] Stanley, Route 4, Minot, North Dakota.....1939

- *Saunders, Aretas A[ndrews], 361 Crestwood Rd., Fairfield, Connecticut. .1934
- *Saunders, George B[radford], Fish and Wildlife Service,
546 Custom House, Denver 2, Colorado.1926
- *Savage, James, Buffalo Athletic Club, Buffalo, New York.1939
- *Sawyer, Miss Dorothy, R.F.D. 1, Unadilla, New York.1937
- *Schaub, Mary Hall (Mrs. J. B.), 1040 Isabella St., Wilmette, Illinois. . . .1939
- *Scherer, Violet F. (Mrs. Chester), Route 6, Olney, Illinois.1947
- Schildman, George J., 436 S. 9th St., Lincoln, Nebraska.1947
- *Schneider, Miss Evelyn J., 2207 Alta Ave., Louisville 5, Kentucky.1935
- Scholes, Mrs. Doris Kathryn, 385 E. Hall St., Bushnell, Illinois.1947
- Scholes, Robert T[hornton], Bushnell, Illinois.1946
- *Schorger, A[rlie] W[illiam], 168 N. Prospect Ave., Madison, Wisconsin. .1927
- **Schramm, Wilson [Cresap], 321 Kensington Rd., Syracuse, New York. . .1944
- *Schuette, C[onrad] H[erman] L[ouis], 1446 Beaver Rd.,
Sewickley, Pennsylvania.1942
- Schumm, William George, 302 C St., LaPorte, Indiana.1944
- *Schwall, Eugene E[dward], New Concord, Ohio.1943
- Schwank, James E., 432 N. 6th St., Reading, Pennsylvania.1946
- *Schwartz, Charles Walsh, c/o Board of Agriculture and Forestry,
Lihue, Kauai, Hawaii.1943
- *Scotland, Minnie B[rink], 42 Continental Ave., Cohoes, New York.1938
- Scott, Frederic R[obert], 4600 Coventry Rd., Richmond 21, Virginia. . . .1947
- *Scott, John William, 1409 Garfield St., Laramie, Wyoming.1938
- **Scott, Peter, 8, Edwardes Square, London, W.8, England.1947
- Scott, Thomas G[eorge], Zoology Department, Science Bldg., Ames, Iowa.1936
- *Scott, W[alter] E[dwin], Mendota Beach Heights, Madison 5, Wisconsin.1938
- Scott, Mrs. Walter E[dwin], Mendota Beach Heights,
Madison 5, Wisconsin.1947
- Seaberg, Dr. John A[rthur], Veterans Administration Hospital,
Minneapolis 6, Minnesota.1944
- Sealander, John A[rthur], Jr., 203 Vivarium Bldg.,
University of Illinois, Champaign, Illinois.1947
- **Sedwitz, Walter W[illiam], 229 W. 36th St., New York City 18.1947
- Seeber, Edward L[incoln], 186 Wabash Ave., Kenmore 17, New York. . .1944
- Seeley, George Mervil, 461 High St., Long Branch, New Jersey.1945
- Seibert, Henri C., Ohio University, Athens, Ohio.1941
- *Sell, Richard N., 3615 Dexter Rd., Ann Arbor, Michigan.1946
- *Sener, Miss Ruth, 233 Charlotte St., Lancaster, Pennsylvania.1943
- Serbousek, Miss Lillian, 1226 Second St., S.W., Cedar Rapids, Iowa. . . .1935
- **Shackleton, Elizabeth C[atterall] (Mrs. Walter H.), Route 1,
Box 76 A, Prospect, Kentucky.1947
- **Shackleton, Walter H., Route 1, Box 76 A, Prospect Kentucky.1947
- *Shaffer, Chester M[onroe], Junior League Speech School,
1430 Peachtree St., Atlanta, Georgia.1934
- *Shaftesbury, Archie D., Women's College, University of North Carolina,
Greensboro, North Carolina.1930
- Shapiro, Jacob, New York State College of Forestry,
Syracuse 10, New York.1947
- Sharp, John Cessna, 501 James Blvd., Signal Mountain, Tennessee.1947
- Sharp, Ward M., Red Rock Lakes Refuge, Monida, Montana.1936
- Shaver, Jesse M[ilton], George Peabody Teachers College,
Nashville, Tennessee.1922
- Shaw, Dr. Charles H[icks], Bremen, Ohio.1941
- Shaw, Mrs. Elizabeth Martin, 6709 Kensington Ave.,
Richmond 21, Virginia.1943

- **Shearer, A[mon] R[obert], Box 428, Mont Belvieu, Chambers Co., Texas. 1893
- **Shelar, Keller, State Teachers College, Slippery Rock, Pennsylvania. 1940
- *Shelford, Victor E[rnest], Vivarium Bldg., University of Illinois,
 Champaign, Illinois. 1931
- Sheppard, Alan C[ampbell], 618 Bayou Texas Blvd., Pensacola, Florida. . 1947
- *Sherwood, John Willitts, 26 Smith St., Salinas, California. 1936
- Short, Wayne, One Thousand Fifth Ave., New York City 28. 1941
- Shortt, Angus H[enry], 101 Morier Ave., St. Vital, Winnipeg,
 Manitoba, Canada. 1942
- *Shortt, Terence Michael, Royal Ontario Museum of Zoology,
 Queen's Park at Bloor St., Toronto, Ontario, Canada. 1941
- Schuman, Miss Bertha C., 136 S. 19th St., LaCrosse, Wisconsin. 1947
- Sibley, Charles G[ald], 1637 LeRoy Ave., Berkeley 9, California. 1942
- **Simmons, Mrs. Amelia C., 2742 N. Maryland Ave.,
 Milwaukee 11, Wisconsin. 1943
- ***Simmons, Edward McIlhenny, Avery Island, Louisiana. 1942
- Simmons, Elbert R[ulon], 177 Veterans Place, Ithaca, New York. 1947
- Simon, James R., Jackson Hole Wildlife Park, Moran, Wyoming. 1947
- Simon, Stephen Wistar, 7727 York Rd., Towson 4, Maryland. 1947
- **Simon, Miss Tina, 1340 W. Elmdale Ave., Chicago 40, Illinois. 1945
- Sims, Harold L[ee], 714 St. Philip St., Thibodaux, Louisiana. 1942
- Sinclair, Kate Taylor (Mrs. Marshall Wray), 1338 Whitethorn St.,
 Bluefield, West Virginia. 1947
- *Singh, Ram S[war], British Guiana Museum of Natural History,
 Georgetown, British Guiana, South America. 1946
- Sisman, Mrs. Lois M., Yonge, Aurora, Ontario, Canada. 1947
- Skaggs, Merit Bryan, 2066 Alton Rd., East Cleveland 12, Ohio. 1934
- Skutch, Alexander F[rank], San Isidro del General, Costa Rica. 1944
- Slack, Miss Mabel, 1004 Everett Ave., Louisville, Kentucky. 1934
- Smalley, Alfred E[vans], Open Hearth, Lewistown, Pennsylvania. 1946
- *Smith, Dr. A[rthur] F[rancis], Manning, Iowa. 1934
- Smith, Asa H., 9 Ridge Rd., Delmar, New York. 1947
- Smith, Carl E[rnest], Halsey, Nebraska. 1947
- Smith, Earl E[mmett], 68 Jones Ave., Morgantown, West Virginia. 1947
- *Smith, Frank R[ush], Route 2, Box 100, Laurel, Maryland. 1910
- *Smith, Harry M[adison], Department of Zoology, University of Arkansas,
 Fayetteville, Arkansas. 1936
- *Smith, Lewis MacCuen, 8040 St. Martins Lane, Chestnut Hill Station,
 Philadelphia, Pennsylvania. 1931
- Smith, Luther E[ly], 1554 Telephone Bldg., 1110 Pine St.,
 St. Louis, Missouri. 1941
- Smith, Orion O., 1539 Crosby St., Rockford, Illinois. 1936
- *Smith, Robert L[eo], Route 1, Reynoldsville, Pennsylvania. 1945
- *Smith, Roy Harmon, 183 N. Prospect St., Kent, Ohio. 1936
- Smith, Wendell Phillips, Wells River, Vermont. 1921
- *Smith, Winnifred Wahls (Mrs. E. R.), Winghaven, Route 1,
 Two Rivers, Wisconsin. 1946
- Snapp, Mrs. R. R., 310 W. Michigan, Urbana, Illinois. 1940
- *Snyder, L[ester] L[ynne], Royal Ontario Museum of Zoology,
 Queen's Park at Bloor St., Toronto 5, Ontario, Canada. 1929
- Sooter, Clarence Andrew, 1336 N. 40th St., Lincoln, Nebraska. 1940
- Soper, J[oseph] Dewey, 827 Riverwood Ave., Fort Garry,
 Winnipeg, Manitoba, Canada. 1937
- Spangler, Miss Iva M., 128 E. Foster Parkway, Fort Wayne, Indiana. 1939
- *Speirs, Mrs. Doris Huestis, 17 Wolfrey Ave., Toronto 6, Ontario, Canada. 1936

- Speirs, J[ohn] Murray, 17 Wolfrey Ave., Toronto 6, Ontario, Canada...1931
- Spencer, Haven Hadley, Turpin Rd., Route 1, Newtown, Ohio.....1946
- **Spencer, Miss O[live] Ruth, 1030-25 Avenue Court, Moline, Illinois.....1938
- Sperry, Charles Carlisle, 1455 S. Franklin St., Denver 10, Colorado.....1931
- Spofford, Walter R[ichard] II, Vanderbilt University Medical School,
Nashville, Tennessee.....1942
- Springer, Paul F[rederick], 417 S. Kensington Ave., La Grange, Illinois..1946
- Stabler, Robert M[iller], Colorado College, Colorado Springs, Colorado..1939
- Stackpole, Richard, Wayland, Massachusetts.....1940
- *Staebler, Arthur E[ugene], Museum of Zoology, University of Michigan,
Ann Arbor, Michigan.....1937
- **Stahl, Miss Marjoretta Jean, Kimberly, West Virginia.....1942
- Stamm, Anne (Mrs. Frederick W.), 2118 Lakeside Dr.,
Louisville, Kentucky.....1947
- Stanford, Jack A[rchibald], 1900 N. Circle Dr., Jefferson City, Missouri..1941
- *Stanley, Willard F[rancis], State Teachers College, Fredonia, New York.1946
- Stark, Miss Wilma R[uth], Meridian Hill Hotel, 16th St., N.W.,
Washington, D.C.1939
- Starrett, William C[harles], Department of Zoology and Entomology,
Iowa State College, Ames, Iowa.....1933
- Stearns, Edwin I[ra], Jr., 92 Farragut Rd., Plainfield, New Jersey.....1945
- *Steffen, Earnest William, 1000 Maplewood Dr., Cedar Rapids, Iowa.....1944
- Steggerda, Morris, Kennedy School of Missions, Hartford 5, Connecticut..1941
- Stegle, Joseph J[ames], 220 Pondfield Rd., W., Bronxville, New York...1944
- Stephens, T[homas] C[alderwood], Morningside College,
Sioux City, Iowa.....1911
- Stevens, Charles E[lmo], Jr., 426 2nd St., N.E., Charlottesville, Virginia..1947
- *Stevens, Q. A., State College Station, Fargo, North Dakota.....1926
- Stevenson, Henry M[ills], Jr., Department of Zoology, Florida State
College for Women, Tallahassee, Florida.....1943
- Stevenson, James O[sborne], Fish and Wildlife Service,
Department of the Interior, Washington 25, D.C.....1933
- *Stewart, Paul A[lva], Leetonia, Ohio.....1925
- Stewart, Robert Earl, Patuxent Research Refuge, Bowie, Maryland.....1939
- Stidolph, Robert H. D., 114 Cole St., Masterton, New Zealand.....1945
- *Stillwell, Jerry E., 8160 San Benito Way, Dallas 18, Texas.....1935
- **Stine, Miss Perna M., Box 386, Olney, Illinois.....1931
- ***Stoddard, Herbert Lee, Sherwood Plantation, Route 5,
Thomasville, Georgia1916
- Stoffel, Miss Vera, 822 Lane St., Clay Center, Kansas.....1947
- Stokes, Allen W[oodruff], Pelee Island, Ontario, Canada.....1945
- *Stone, Harry H[erbert], Jr., Box 101, Sturbridge, Massachusetts.....1941
- Stoner, Emerson Austin, 149 E. L St., Box 444, Benicia, California.....1947
- ***Stoner, Lillian C[hristiansore] (Mrs. Dayton), 399 State St.,
Albany 6, New York.....1945
- *Stophlet, John J[ermain], 2612 Maplewood Ave., Toledo 10, Ohio.....1934
- Storer, Robert Winthrop, Museum of Vertebrate Zoology,
Berkeley 4, California.....1938
- *Storer, Tracy I[rwin], Division of Zoology, University of California,
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- Stratton, Miss Nellie Mary, 209 Cutler St., Allegan, Michigan.....1945
- Straw, Richard M[yron], 973 W. County Rd. B, St. Paul 8, Minnesota..1947
- Street, Phillips B[orden], 520 Packard Bldg., Philadelphia 2, Pennsylvania.1946
- Street, Thomas M., Bottineau, North Dakota.....1940
- ***Strehlow, Elmer William, 721 W. Mason St., Green Bay, Wisconsin.....1941

- Stringham, Emerson, Box 94, Madison, Wisconsin.....1940
 Stromgren, Carl, Box 771, Iowa City, Iowa.....1944
 ****Strong, R[euben] M[yron], 5840 Stony Island Ave., Chicago, Illinois. Founder
 Strunk, William Franklin, 700 Madison Ave., Morgantown, West Virginia. 1944
 *Stultz, Mrs. Alma J., 2223 Sunset Blvd., Los Angeles 26, California.....1946
 Stupka, Arthur, Great Smoky Mountains National Park,
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 ***Sturgeon, Myron T., Department of Geography and Geology,
 Ohio University, Athens, Ohio.....1934
 Sturgis, S[ullivan] Warren, 66 Marlboro St., Boston, Massachusetts.....1941
 *Sturm, [William] Louis, Wittenberg College, Springfield, Ohio.....1943
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 *Suthard, James G[regory], 1881 Raymond Ave., Long Beach 6, California. 1936
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 ***Sutton, George Miksch, Museum of Zoology, University of Michigan,
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 *Swanson, Gustav [Adolph], 5245 N. Sawyer, Chicago 25, Illinois.....1927
 *Swedenborg, Ernie D[avid], 4905 Vincent Ave., S.,
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 *Taber, Wendell, 3 Mercer Circle, Cambridge, Massachusetts.....1936
 *Taber, William R[ichard], 58 Bridge St., Plattsburg, New York.....1947
 Tabler, Fan Boswell (Mrs. William B.), 2923 Riedling Dr.,
 Louisville 6, Kentucky.....1947
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 *Taintor, Mrs. Elizabeth Taber, 11 Story St., Cambridge, Massachusetts. 1945
 Tallman, William S[weet], Jr., 4 Linden Place, Sewickley, Pennsylvania. 1940
 *Tanger, Louise F. A. (Mrs. C. Y.), 318 N. President Ave.,
 Lancaster, Pennsylvania.....1943
 Tanghe, Leo J[oseph], 852 Stone Rd., Rochester 13, New York.....1943
 Tanner, James Taylor, Department of Zoology, University of Tennessee,
 Knoxville, Tennessee.....1937
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 ***Taylor, Arthur Chandler, 309 N. Drew St., Appleton, Wisconsin.....1929
 ***Taylor, Mrs. H. J., 900 Santa Barbara Rd., Berkeley, California.....1916
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 Pasadena 2, California.....1947
 *Taylor, Walter P[enn], 254 Faculty Exchange, College Station, Texas...1937
 *Taylor, William Ralph, Museum of Zoology, University of Michigan,
 Ann Arbor, Michigan.....1940
 *Teachenor, Dix, 1020 W. 61st St., Kansas City, Missouri.....1923
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 *Thomas, Edward S[inclair], 319 Acton Rd., Columbus 10, Ohio.....1921
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 *Thomas, Ruth H. (Mrs. Rowland), 711 Broadway Ave.,
 Brunswick, Missouri.....1937
 Thompson, Daniel Q., 521 E. Mifflin St., Madison 3, Wisconsin.....1945
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 Department of Wildlife Management, Madison 5, Wisconsin.....1947
 **Thompson, John Bernard, 6027 Gwynn Oak Ave., Baltimore 7, Maryland. 1946
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- *Thorley, Robert F., 3 Midland Gardens, Bronxville 8, New York.....1946
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 *Tilley, Francis Thomas, 26 Mohican Ave., Buffalo 8, New York.....1944
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 *Tipton, Dr. Samuel R[idley], 300 W. Adair Dr., Fountain City,
 Knoxville 18, Tennessee.....1941
 **Todd, Elizabeth D. (Mrs. Paul H.), 918 W. Main St.,
 Kalamazoo 48, Michigan.....1939
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 Pittsburgh 13, Pennsylvania.....1911
 *Tomkins, Ivan Rexford, 1231 E. 50th St., Savannah, Georgia.....1931
 **Tordoff, Harrison B[ruce], Museum of Zoology, University of Michigan,
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 *Towle, Miss Helen Jessie, 5148 29th Ave., S., Minneapolis 6, Minnesota..1944
 **Townsend, Miss Elsie White, Wayne University, Detroit 1, Michigan....1938
 ***Trautman, Milton B[ernhard], Stone Laboratory, Put-in-Bay, Ohio.....1932
 *Traylor, Melvin Alvah, Jr., 759 Burr Ave., Winnetka, Illinois.....1947
 Trimm, H. Wayne, 421 South Dakota Ave., Sioux Falls, South Dakota...1943
 *Trussell, Miss Malvina, 10 W. Kennedy Ave., Statesboro, Georgia.....1946
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 University of Pittsburgh, Pittsburgh 13, Pennsylvania.....1942
 *Tubbs, Farley F., Game Division, Department of Conservation,
 Lansing 13, Michigan.....1935
 ***Tucker, Mrs. Carll, Penwood, Mount Kisco, New York.....1928
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 *Tyrrell, W. Bryant, 246 Park Ave., Takoma Park 12, Maryland.....1947
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 *Vaiden, M[eredith] G[ordon], Rosedale, Mississippi.....1937
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 Plymouth, Michigan.....1939
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 Vane, Dr. Robert F[rank], 600 Dows Bldg., Cedar Rapids, Iowa.....1946
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 *Van Pelt, Raymond Drake, 2687 Waverly Dr.,
 Los Angeles 26, California.....1946

- ***van Rossem, A[driaan] J[oseph], 2205 W. Adams St.,
 Los Angeles 7, California.....1939
- **Van Tyne, Mrs. C[laude] H., 405 Awixa Rd., Ann Arbor, Michigan..... 1939
- ***Van Tyne, Josselyn, Museum of Zoology, University of Michigan,
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- *Vaughan, William C[oleman], 115 Fairbanks Ave.,
 Kenmore 17, New York.....1938
- Vaurie, Charles, American Museum of Natural History,
 Central Park W. at 79th St., New York City 24.....1946
- *Veghte, James Henry, 211 S. William St., Johnstown, New York.....1947
- *Visscher, Paul, Biology Laboratory, Western Reserve University,
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- *Voak, Mrs. Floyd S., 909 S. Custer Ave., Miles City, Montana.....1945
- *Vogt, William, 32 Cunningham Ave., Floral Park, New York.....1935
- **Vollmar, Mrs. Joseph E., 6138 Simpson Ave., St. Louis, Missouri.....1941
- *von der Heydt, James A[rnold], Box 155, Nome, Alaska.....1947
- Vore, Marvin E[lmer], 1128 N. 8th Ave., Route 3,
 West Bend, Wisconsin.....1947
- *Wade, Douglas E., Office of the Naturalist, Dartmouth College,
 Hanover, New Hampshire.....1936
- *Wade, Katherine White (Mrs. Sydney J.), Box 73, Oakwood, Illinois...1940
- Wagar, Dr. Harold Wesley, 619 5th St., Brookings, South Dakota.....1947
- *Waggoner, J[ohn] S[heaffer], 889 Storer Ave., Akron, Ohio.....1945
- *Wagner, Nancy Elizabeth (Mrs. C. R.), South Lane Farm, Utica, Ohio..1947
- Wagner, Miss Esther E., 13 Locust Ave., Danbury, Connecticut.....1937
- Wagner, Helmuth O., Apartado 7901, Sucursal 3, Mexico, D.F.....1945
- Wagner, Julia Elizabeth (Mrs. H. J.), 818 E. Boulder St.,
 Colorado Springs, Colorado.....1945
- **Walcott, Hon. Frederick Collin, Investment Bldg., Washington, D.C.....1945
- *Walker, Charles F[rederic], Museum of Zoology, Ann Arbor, Michigan ..1939
- Walker, M[yril] V[incent], Zion National Park, Springdale, Utah.....1943
- ***Walkinshaw, Lawrence Harvey, 1703 Central Tower,
 Battle Creek, Michigan.....1928
- *Wallace, Miss Edith Adell, 421 W. 8th Ave., Gary, Indiana.....1945
- *Wallace, George J[ohn], Zoology Department, Michigan State College,
 East Lansing, Michigan.....1937
- Wallner, Dr. Alfred, 13938 Calvert St., Van Nuys, California.....1941
- Walters, Miss Kathleen, 312 Crane, Royal Oak, Michigan.....1944
- *Wampole, John H[enry], Box 447, Grant, Nebraska.....1944
- Wandell, Willet N[orbert], Natural History Survey, Urbana, Illinois....1944
- Wangnild, Miss Lillian M[arie], 2818 Gaylord St., Denver 5, Colorado...1943
- Wanless, Harold R[ollin], 704 S. McCullough St., Urbana, Illinois.....1940
- Warner, Dwain Willard, Museum of Natural History, University of
 Minnesota, Minneapolis 14, Minnesota.....1946
- *Waterman, Ralph T[en Eyck], 13 Meadow Rd., Poughkeepsie, New York.1947
- Watson, Frank Graham, c/o Shell Chemical Corporation, Box 2527,
 Houston 1, Texas.....1937
- Watson, James Dewey, Jr., 7922 Luella Ave., Chicago, Illinois.....1945
- *Watson, Robert J[ames], Box 75, Blacksburg, Virginia.....1943
- *Weaver, Richard L[ee], P.O. Box 1078, Chapel Hill, North Carolina...1936
- Webb, Veda Hart (Mrs. T. R.), 1535 Ambler Ave., Abilene, Texas.....1946
- *Weber, Louis M[arkus], House Springs, Missouri.....1941
- Webster, Harold M., Jr., 636 E. Whitman St., Pocatello, Idaho.....1947
- Webster, J[ackson] Dan, Jamestown College, Jamestown, North Dakota.1939
- Webster, Victor S[tuart], College Station, Brookings, South Dakota....1944
- Weiser, Virgil Leonard, 507 2nd Ave., E., Dickinson, North Dakota.....1946

- Welch, Arthur, 431 Rossendale Rd., Burnley, Lancashire, England.....1947
 Welch, Mrs. Lola Harriet, Box 245, South Wayne, Wisconsin.....1943
 Welles, Mary Pyke (Mrs. George M.), R.F.D. 1, Elmira, New York.....1938
 **Wernicke, Maleta Moore (Mrs. Julius F.), Gull Point,
 Escambia Co., Florida.....1944
 Westerskov, Kaj [Ejvind], Ohio Wildlife Research Unit,
 Ohio State University, Columbus 10, Ohio.....1947
 Weston, Henry G[riggs], Jr., Department of Zoology, Science Bldg.,
 Iowa State College, Ames, Iowa.....1947
 **Weston, Robert, Salmon Pool Farm, Brewer, Maine.....1944
 Wetherbee, David K[enneth], Museum of Natural History,
 12 State St., Worcester 8, Massachusetts.....1947
 *Wetmore, Alexander, U. S. National Museum, Washington 25, D.C.....1903
 *Weydemeyer, Winton, Fortine, Montana.....1930
 *Weyl, Edward Stern, 6909 Henley St., Philadelphia 19, Pennsylvania.....1927
 **Wheatland, Miss Sarah B[igelow], 46 Dudley St.,
 Brookline, Massachusetts.....1942
 Whitaker, Mrs. Lovie M., School of Journalism, Syracuse University,
 Syracuse 10, New York.....1947
 White, Courtland Y., Box 31, Bennett Hall, University of Pennsylvania,
 Philadelphia, Pennsylvania.....1942
 *White, Francis Beach, Brattleboro Retreat, Brattleboro, Vermont.....1926
 *Whitehead, Miss Edith May, Lawrence County Public Health Nursing
 Service, Missouri State Board of Health, Mt. Vernon, Missouri.....1947
 *Whitney, Nathaniel R[uggles], Jr., 975 Willow Ave., Glendale, Ohio.....1942
 *Whittier, Mrs. Lida, 2830 E. 130th St., Cleveland 20, Ohio.....1943
 **Widdicombe, Harry T., 439 Fulton St., S.E., Grand Rapids 3, Michigan..1943
 Widmann, Berthold, 4621 Wesley Ave., Los Angeles 37, California.....1936
 *Wiggin, Henry T[aylor], 151 Tappan St., Brookline, Massachusetts....1941
 Wilcox, Harry Hammond, Jr., Department of Biology,
 Morningside College, Sioux City 20, Iowa.....1938
 Wilcox, LeRoy, Speonk, Long Island, New York.....1944
 Wiles, Harold O[liver], 407 Winston Ave., Wilmington 175, Delaware...1936
 Wilkowski, William [Walter], 119 Bronson Court,
 Kalamazoo 12, Michigan.....1943
 *Williams, George G., The Rice Institute, Houston, Texas.....1945
 *Williams, Laidlaw O[nderdonk], Route 1, Box 138, Carmel, California...1930
 Williams, Miss Mary Jane, Department of Conservation,
 Roscommon, Michigan.....1946
 Willis, Franklin E[lling], Marietta, Minnesota.....1946
 Willis, Miss Myra G., 1726 4th Ave., S.E., Apt. C, Cedar Rapids, Iowa..1944
 **Wilson, Archie F[rancis], 1322 Braeburn Rd., Flossmoor, Illinois.....1937
 Wilson, Bruce Vernon, Okemos, Michigan.....1943
 *Wilson, Gordon, 1434 Chestnut St., Bowling Green, Kentucky.....1920
 *Wilson, Harold Charles, Ephraim, Wisconsin.....1938
 Wilson, Myrtha M. (Mrs. Henry E.), Route 3, Box 118,
 Raleigh, North Carolina.....1942
 *Wilson, Rowland S[teele], 2130 E. Broad St., Columbus 9, Ohio.....1941
 Wilson, Ruth (Mrs. Carl), 11285 Lakepointe, Detroit 24, Michigan....1941
 ***Wineman, Andrew, 150 Michigan Ave., Detroit, Michigan.....1934
 ***Wing, Harold F[rancis], Route 3, Jackson, Michigan.....1941
 *Wing, Leonard [William], Washington State College,
 Pullman, Washington.....1924
 Winn, Howard Elliott, 398 N. Elm St., West Bridgewater, Massachusetts.1947
 Wistey, Lorene S., South English, Iowa.....1944
 Woerner, H[erbert] Ray, Route 3, Lancaster, Pennsylvania.....1947

Wolfe, Harold R[eclus], Biology Bldg., University of Wisconsin, Madison 6, Wisconsin.....	1947
Wolfson, Albert, Department of Zoology, Northwestern University, Evanston, Illinois.....	1944
*Wollam, Miss Mary [Kathryn], Mendon, Ohio.....	1946
*Wood, Dr. Harold B[acon], 3016 N. Second St., Harrisburg, Pennsylvania.....	1932
*Wood, Merrill, 811 N. Allen St., State College, Pennsylvania.....	1945
**Woodward, Miss Barbara, Wolcott St., Le Roy, New York.....	1943
*Worley, John G[raves], 237 Charleston St., Cadiz, Ohio.....	1936
Wright, Miss Audrey Adele, 1312 Hepburn Ave., Louisville, Kentucky...	1941
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Wright, James H[enry] III, State Rd., Cornwells Heights, Pennsylvania.	1947
*Wright, J[ohn] T[homas], Route 5, Box 618, Tucson, Arizona.....	1941
Wright, Philip L[incoln], Montana State University, Missoula, Montana..	1940
Wright, Thomas J., Jr., 17 Mechanic St., Wakefield, Rhode Island.....	1939
Wyatt, Miss Grace, College Station, Murray, Kentucky.....	1946
Wylie, William L[ewis], 1310 National Rd., Wheeling, West Virginia....	1947
*Yeager, Lee E[mmett], Colorado Wildlife Research Unit, Colorado A. & M. College, Fort Collins, Colorado.....	1939
*Yeatter, R[alph] E[merson], Illinois Natural History Survey, Urbana, Illinois.....	1932
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**Young, James B[oswell], 514 Dover Rd., Louisville 6, Kentucky.....	1937
*Young, J[oseph] O[ran], 131 W. 74th St., Chicago 21, Illinois.....	1947
**Young, Miss Nettie T[anton], 1788 National Rd., Wheeling, West Virginia.....	1947
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*Zimmerman, Dale, 480 N. Almont St., Imlay City, Michigan.....	1943
*Zimmerman, Fred R[obert], 4110 Birch Ave., Madison 5, Wisconsin....	1935
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Errata, volume 59:

Page 153, line 3: *For gravity, read volume; for approximately, read approximately.*

Page 153, line 25: *For gravity, read volume.*

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