BIRD OBSERVER

OF EASTERN MASSACHUSETTS

OL.3 NO.2
AR.-APR.1975

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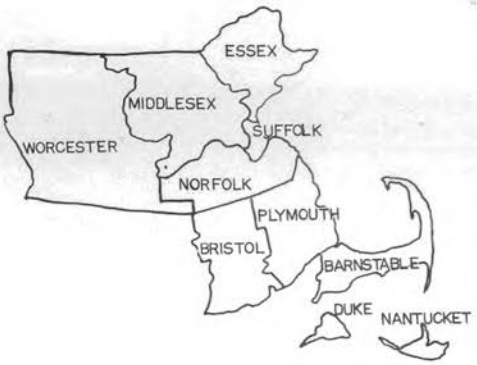

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EDITOR'S PAGE

Dear Subscriber,

Two years ago, when BIRD OBSERVER first began publication, each issue contained 24 pages (counting the covers). With the fourth issue, our size was expanded to 28 pages. During 1974 we published three issues of 32 pages each followed by three more issues of 36 pages each. Our first two issues for the year 1975 have both contained 40 pages. We have thus increased our per issue size by 67% in these first two years.

We like our new size. Our present plans are to include in each of the next few issues
1 Where-to-go article, with map
1 or more major articles on varying topics, and
2 months' Records of bird sightings from Eastern Massachusetts.
With the present issue (Bruce Sorrie's article on Willow and Alder Flycatchers), we are inaugurating a new series: a species update detailing the changing status of some Eastern Massachusetts bird. We hope to make these articles a monthly feature.

As we hope that you have noted, the subscription rate has NOT gone up, although our costs have. The cost of paper is much higher now than it was two years ago, and we are using more of it with each issue. Unfortunately, our subscriber list has not grown as rapidly as we might wish, and thus we find ourselves in an increasingly tight economic bind.

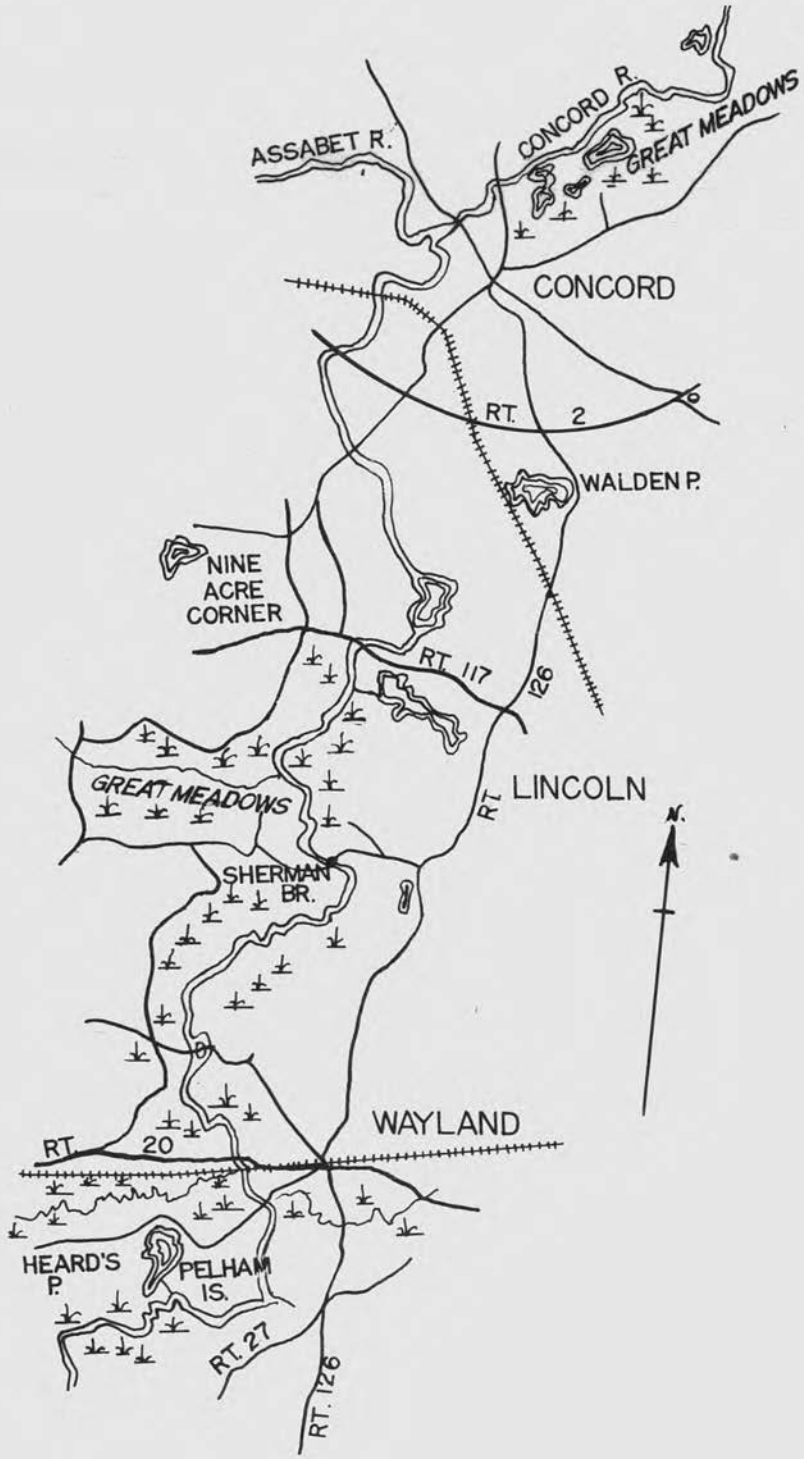
Please help us. We prefer not to decrease the number of pages we publish; we prefer not to raise subscription rates; and so we MUST add new subscribers. We ask you to assist us in this endeavor. Please take it upon yourself this summer to introduce BIRD OBSERVER to those of your birding friends not already acquainted with our magazine and encourage them to subscribe. If each present subscriber were to obtain one new subscriber in the next three months, our financial problems would be much simplified.

Thank you.

Paula R. Butler
Editor-in Chief

BIRD OBSERVER, at this mailing, is now a tax exempt non-profit corporation. This status will help hold down the cost of mailing. All extra contributions, above the basic subscription rate, are tax-deductible.

Here are the "Baby Great Horned Owls" that somehow were lost on p. 10 of the January-February issue. Photo by Herman Weissberg of Manchester.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BIRDING THE SUDBURY VALLEY

Richard Forster, Wellesley

Probably no other area in America has had as thorough and continuous an ornithological coverage as the Concord-Sudbury Valley region of Massachusetts. Beginning with Henry Thoreau's accounts, continuing with the tireless exploits of William Brewster, and on through the era of Griscom and his disciples, the Sudbury Valley has a well-documented history. Unfortunately, much of this history is a story of decline, and sadly, this is particularly true today. For a more detailed account of Sudbury Valley ornithology, see Birds of Concord, by Ludlow Griscom.

The area was one of rural farmlands, with a major river system and adjacent meadows. However, what few farms existed even a decade ago have now disappeared as tremendous pressures from land developers and urban sprawl have taken their toll. Last year, for example, I did not record a single Least Flycatcher in the Valley in an area where they had previously been termed "common." So also, the Orchard Oriole, which had occupied the area nearly continuously since 1887, has not bred there since 1962 and occurs now only as a straggler. Constant encroachment on the marshes and meadows have further reduced the numbers of waterbirds.

What then is left in the Sudbury Valley? The area is still a relaxing half-day or a leisurely full-day birding adventure, especially in late March and April. It is most productive during or after rainy weather or under cloudy conditions. (The exception to this rule is in birding at Round Hill for hawk flights.) Ideal sunny conditions have the disadvantage of bringing out numerous canoeing and boating enthusiasts who scatter the waterfowl to unknown locales. Birds which are commonly sought out in the Valley include ducks, hawks, marsh birds, swallows and blackbirds.

When birding the Sudbury Valley, you should include Great Meadows National Wildlife Refuge in Concord in your itinerary. For further information see Bird Observer, Vol. 1, No. 5, pp. 109-113. Other areas are described below.

Pelham Island Road, Heard's Pond, Wayland

Because of its diverse habitat, this is the most rewarding area in the Valley for a number of species. Heard's Pond is the main objective. Various ducks, including Ring-necked Ducks, Pintails, teal, Common and Hooded Mergansers and even Canvasbacks and Pied-billed Grebes are to be looked for here. Check the gulls resting on the water or on the ice for Iceland, Glaucous, and Ring-billed Gulls (even for a Lesser Black-backed Gull, if you are an optimist). During rainy weather in late April and May, thousands of swallows may be seen flying low over the pond. All the common species will be present, and occasionally one can find a Purple Martin. In late May, if you are really lucky, a Black Tern may be present. The wet woodland adjacent to the pond is probably the best general area for landbirds in the Valley. Rusty Blackbirds can easily be found in late March-April. Early warblers (Yellow-rumped and Palm) are most reliable here in good numbers, and others are usually present in May. Thrushes, Rose-breasted Grosbeaks and Scarlet Tanagers are numerous at times, and I have recorded Blue-gray Gnatcatchers on several occasions. If birds are obviously present, it is well worth persisting in your searches.

The Great Meadows Refuge has a subsidiary parking lot and trail in the above-mentioned woodland. Park here and walk along the old path north to the edge of Wash Brook meadows. Along the path you will surely flush Wood Ducks, if someone hasn't done so before you. The vantage point over the meadows is poor, but by clapping your hands you can easily flush teal and sometimes Pintail, American Wigeon, or, rarely, a Northern Shoveler. In late April-May this is a good area to hear or see Common Gallinules, Virginia Rails, Soras and Long-billed Marsh Wrens. I have had both King Rail and Least Bittern from this spot.

To the east of Heard's Pond is Heard Road, which is a dead-end street. Park here and enter the Conservation Area. Mockingbirds abound, and in winter an occasional Northern Shrike may be found. Walk to the river and look for Pied-billed Grebes, American Coots, and ducks. Watch for Ospreys (also at Heard's Pond) both in spring and in fall.

Warbling Vireos still breed in the tall shade trees at the beginning of Pelham Island Road, just off Route 20.

When you are birding the Valley, it pays to spend a good deal of time in this area. Remember, Red-headed and Black-backed Three-toed Woodpeckers were seen here in 1974!

For a better vantage point for Wash Brook, drive west on Route 20, past the Wayland dump (left) to the top of the hill, where there is a pull-off on the left (south) side of the road. Park here along the road and scope the marsh. If the water is high and vegetation is low, this offers a good vantage point for ducks. The Wayland dump has recently (1974-1975) had Fish Crows, and occasionally white-winged gulls appear in the winter and spring.

Water Row Road, Sudbury

This area can be reached by driving north from Wayland center and bearing left on Route 27. Drive about one and one-half miles to Water Row Road on the right (the first right after you cross over the river). About three hundred yards down the road is a dangerous curve where you can park with discretion. There is a rock ledge here which affords an excellent vantage of the river. Birds to be looked for include grebes, teal, Pintail, Ring-necked Duck, American Wigeon, Wood Duck and perhaps a Northern Shoveler. When the water is high, species such as Greater Scaup, Common Goldeneye, Bufflehead, and even Horned Grebe have been seen. In the winter this is also a good lookout spot for hawks. Usually Red-tailed Hawks are seen, but one sometimes finds a Rough-legged Hawk or Goshawk.

Proceed along Water Row Road, stopping where it looks good (e.g., the field beyond the Riding Stable), or wherever birds are in evidence. In winter I have seen Goshawk and Northern Shrike in this area more frequently than anywhere else in the Valley.

Round Hill--Sudbury

At the end of Water Row, take a right (east) on Sherman Bridge Road. About 1/4 mile on your left is Round Hill Park (at the dilapidated building). A path leads from there up the hill. When weather conditions are right, and if you are persistent enough, this is a good spot for viewing migrating hawks. Often swallows and other landbirds can be observed as well. Warblers and kinglets are seen here in spring, and banding results indicate that in some years warblers are again present in some numbers in the fall, although I have been significantly unsuccessful in finding many. In mid-April, if no hawks are flying, you can enjoy the engaging songs of Field Sparrows, which are common.

Continue east along Lincoln Road (Sherman Bridge Road) to Route 126, stopping at Stone Bridge to view the river. Look for ducks and grebes here. Pileated Woodpeckers are known residents in the vicinity.

Turn left (north) at Route 126 to Route 117. Turn left again and proceed about two miles to the intersection with Sudbury Road, known as

Nine-Acre Corner--Concord

Next to the Heard's Pond area, this is the most productive area in the Valley, and it is the place where you are most likely to find something unusual. Geese feed in the fields and on the golf course. Occasional Snow Geese have put down in rainy weather in early April. Ducks are present from mid-March through April along the edge of the flooded fields and river. Ring-necked Ducks are present in some numbers, and Wood Ducks, teal, Pintails, American Wigeons and Gadwalls are often found. Horned Larks are regularly present in spring and fall; and Water Pipits are occasionally there in spring and are frequently seen in fall.

The flooded fields are the most likely area to find shorebirds. Killdeer are present from mid-March on, and Common Snipe are particularly common in April. Depending on the condition of the fields, other shorebirds can be found. These species include Greater and Lesser Yellowlegs, and Pectoral, Least, Solitary and Spotted Sandpipers. There is always the possibility of almost any other shorebird species. American Golden Plovers can rarely be found here in late September or early October; and it was here that I saw my first Massachusetts Ruff.

In spring and fall the fields are covered with blackbirds, although I defy anyone to find anything other than the common ones! If it is a nice day, keep your eyes skyward

for passing hawks.

When you are in the area during the winter, drive south from the four corners at Nine-Acre Corner to the road that leads to the golf course clubhouse. The road is lined with crabapple trees, and Cedar Waxwings, American Robins and Pine Grosbeaks (when present in the Valley) can generally be found here.

When you have finished birding, if you still have some time on your hands, retrace your route east on Route 117 about three miles to Massachusetts Audubon's Drumlin Farm Sanctuary. There you can visit the Nature Center and browse in the fine bookstore (closed Mondays).

If you are interested in a leisurely spring trip, try the Sudbury Valley. You might be surprised!

PUFFIN EGG TRANSPLANTS

by Wayne Hanley, M.A.S.

There are 54 new Common Puffins in Maine coastal waters this autumn as a result of an experiment carried out by Stephen W. Kress of the Cornell Laboratory of Ornithology. The puffin, in case you have forgotten, is a short, plump bird that looks like a small penguin hiding behind an enormous parrot bill. In breeding season, bands of yellow, blue-gray and vermilion make the huge bill a colorful spectacle.

Prior to 1900 the edibility of puffin eggs almost extirpated puffins from the southern rim of their range. Too many potential puffins were truncated sunny-side-up in Maine and Canadian skillets. Apparently there never were many puffins on the Maine coastal islands. The bird is an arctic resident, more acclimated to the frigid barrenness of Greenland. Even in winter, puffins rarely venture as far south as Massachusetts.

Until Kress carried out the transplant last summer, Matinicus Rock, with possibly 80 to 100 pairs, was the only confirmed breeding area for puffins in Maine waters. The presence of a few pairs in summer around Old Man Island made it a possible breeding site. Otherwise, the nearest southern breeding island was Machias Seal, which is a Canadian island just off the Maine coast, far downeast.

Financed by a grant from the National Audubon Society and a few wealthy contributors, Kress removed 68 puffin chicks, each about two weeks old, from burrows on Great Island, Newfoundland, and had them flown by private plane to Bangor, a 1000-mile trip. The chicks were collected with permission of the Canadian Wildlife Service. Veterinarians inspected chicks and found them free of Newcastle disease, but four were held for further study.

The remaining 64 chicks were taken to Eastern Egg Rock in Muscongus Bay where they were placed in artificial burrows. Puffins, and a few other seabirds, dig burrows for nests, much like woodchucks. Forty-nine chicks were placed in burrows made of ceramic chimney tiles. The other 15 were placed in burrows dug into the earth. To prevent Great Black-Backed and Herring Gulls on Eastern Egg from preying on the chicks, wooden doors with a quarter-moon arch cut out at the bottom were placed over the burrow entrances. The arch not only provided ventilation but also admitted some light during the day. Puffin chicks, which are rather discrete housekeepers, excrete toward daylight, thus keeping the burrow interior clean.

From July 17 through August 24, two people remained on the island. Their main duty was to place a thawed smelt in each burrow entrance three times daily. Young puffins are fed by their parents that way.

As the chicks matured, the burrow doors were opened each evening so that the young could come out and exercise their wings. On August 24, the last of the 54 chicks left the burrow site and flew away.

The 10 chicks which were not released were involved in an experiment by the Mount Desert Biological Laboratory which studied the effect of DDE, a metabolite of DDT, on puffins.

These were the first Common Puffins fledged on Eastern Egg Rock since 1907. Investigators now must wait three years to learn whether the former chicks will return as breeding birds to Eastern Egg Rock.

ALDER AND WILLOW FLYCATCHERS IN MASSACHUSETTS

Bruce A. Sorrie, Manomet Bird Observatory

Among the more notable changes to the A.O.U. Check-list enumerated by the 32nd supplement (Auk 90(2), 1973) is the splitting of Traill's Flycatcher into two species. The northern birds, which formerly passed as Empidonax traillii alnorum and E. t. traillii (in part), are now Empidonax alnorum, to be known by the common name Alder Flycatcher. The southern and western birds, formerly E. t. brewsteri and E. t. traillii (in part), have been elevated to separate species status. They retain the old Latin name E. traillii and have been given the common name Willow Flycatcher.

Since both the Alder and Willow Flycatchers breed in the state, this paper will attempt to give BOEM readers, especially those working on Massachusetts Audubon Atlas blocks, a guide to the identification and habitats of these closely related species. Many of the comments are taken freely from various published sources; others are from my own observations.

As early as 1858, S. Baird described two species on the basis of minor physical differences, but later taxonomists had treated the two distinct populations as comprising two subspecies of one species (Traill's Flycatcher) whose songs differed. Thus, it was not until 1963 that two species were once again formally described in the literature (Stein, 1963). The northern birds (Alder Flycatcher) utter a song which can be written as fee-bée-o, whereas more southern and western birds sing fítz-bew. Recently, the two song-types were found to be associated with differences in habitat, nest structure, and morphology (Aldrich, 1953, and Snyder, 1953). Then R. Stein reinterpreted the facts and made the definitive studies (1958, 1963) in which he showed that sympatric populations maintained constant differences of song, behavior, etc., without interbreeding. Let us examine these differences:

1. Voice

Above all, this is the one character that best serves to identify the species. As stated, the Alder sings fee-bée-o. It is not high-pitched like the Black-capped Chickadee's familiar fee-bee, nor is it a clear whistle. Rather, the song is gruff and throaty, more so than the Eastern Phoebe's song. The syllables are run together, with the accent on the second. Actually the third syllable is very short in duration and merely represents a drop in pitch. I prefer to render the song as rhhe-béer, uttered with a lack of enthusiasm, quite unlike the Phoebe's vigorous effort. In Bent (1942) it is aptly written as vee-féel.

By contrast, the Willow Flycatcher's fítz-bew is more distinctly bi-syllabic, with a strong accent on the first syllable. Its quality is less gruff than the Alder's, and the song is given with much more enthusiasm. I liken it to an excited sputter. You can be your own judge by listening to Kellogg and Allen's A Field Guide to Bird Songs (1959). Under Traill's Flycatcher, the first three songs plus one call are alnorum; the last two songs are traillii. Apparently this distinction in voice only holds for normally singing birds, because when disturbed near the nest, the Willow can give calls and alarm notes similar to those of the Alder Flycatcher.

2. Habitat

Alder Flycatchers inhabit more or less forested areas, especially along streams or in wet open places, whereas the Willow Flycatcher prefers stream and pond edges in open country. This distinction is not clear cut, especially where the forests have been divided into small parcels. Nonetheless, I would expect Alders in shrubby edges of the Quabbin Reservoir, and Willows in the broad shrubby or marshy edges of the Sudbury River, or along bushy streams through fields. At a locality in Worcester County, Bradford Blodget (pers. comm.) has found both species within earshot of each other, presumably nesting. Here the Willows tended to segregate out into Aspen-Gray Birch thickets at the edge of a cattail marsh, whereas the Alders preferred true alder thickets, as they apparently do elsewhere in that county.

The vernacular names are suggestive of habitat preferences, but alder and willow shrubs are both likely to be found within any given nesting territory in Massachusetts. As a general rule of thumb, areas extensively covered with alders will attract Alder Fly-

catchers; areas largely composed of willows and cattails will support Willow Flycatchers. The former habitat will most often be encountered in uplands; the latter, in lowlands.

3. Nest

Alders build nests low to the ground, almost always less than 30 inches high. Willow Flycatchers place theirs higher, averaging about 48 inches, even when using the same species of shrub as alnorum. Traillii shows a strong preference for nesting in willows, but alnorum nests indiscriminately with respect to shrub type. Alder nests have been compared to those of Song Sparrows, loosely woven and unkempt, usually with long streamers dangling beneath. Willow nests are compact and interwoven with pale tufts of cattail or willow fruits; they resemble nests of Yellow Warblers. Eggs are too variable to be of much value in determining species.

4. Plumage and size

Here again there is too little separation to be of any value in the field, but there are measurable differences that, when taken together, serve to distinguish most individuals in the hand.

Status in Massachusetts

From the various state treatises a composite description of the breeding range of the Alder Flycatcher can be had: locally common in hill country of the Connecticut Valley counties and westward, uncommon and local in Worcester County, rare and local in eastern counties, and essentially absent from southeastern counties. There can be no doubt that these published accounts all refer to the Alder Flycatcher, for only this song-type was known formerly in Massachusetts. Bagg and Eliot (1937) make one reference to a single Willow singing in early June in Longmeadow. This parallels the situation in New York, southern Ontario, and elsewhere: the Willow Flycatcher has only in the past 20-40 years extended its range to these latitudes.

As yet I can find no published record of the Willow Flycatcher breeding in the state, and its distribution here is poorly known. Many current observers have found singing birds and even a few nests (pers. comm.). These reports are confined, so far as I can determine, to the eastern counties, where many of the same observers have noted a decline in alnorum. At Lancaster and Brookfield Station in Worcester County, Blodget has found Willow and Alders at the same locales. Such locales are of great interest with respect to monitoring relative population changes in the two species, and in understanding the apparent decline in alnorum and the influx of traillii.

Spring migration of both species is essentially simultaneous, from late May to mid-June. At MBO, dates range from 23 May to 14 June, with a concise peak around 4 June. Upon arrival both species apparently set up territories quickly and are then most vocal, for after eggs are laid (19 June-3 July), the birds sing only occasionally and are likely to be overlooked. Fall migration involves half the number of birds at MBO as in the spring and all are immatures. Banding studies elsewhere show that adults migrate south via more inland routes. Dates at MBO range from mid-August to late September, with no well-defined peak.

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"WEATHER OR NOT" INDEED !

The intense sunsets seen during January (BIRD OBSERVER, Vol. 3, No. 1, p. 27) were not the result of abnormal meteorological conditions. Rather, they were caused by sunlight that was scattered by a three-mile-thick dust layer some 12 miles above the earth's surface. The dust had been injected into the atmosphere in October 1974 by Fuego, a volcano in Guatemala. Similar vivid sunsets followed the eruptions of Krakatoa (1883), Pellé (1902), and Agung (1963).

Atmospheric circulation patterns that would affect the dust could have no effect on bird migration or wanderings, which take place some 30 times closer to the earth's surface. Furthermore, since Northern Hemisphere weather fronts normally move from west to east, there was no anomaly in the January weather patterns described by Don Kent.

Leif J. Robinson, Wellesley

PAN-AMERICAN SOCIETY FOR THE PROTECTION OF BIRDS

by David Stirling, Victoria, B.C.

How about a little bird quiz this month? Well then, where would you go to find the following birds, and what do they have in common?

Bean Goose, Garganey, Mongolian Plover, Rufous-necked Sandpiper, Long-toed Stint, Temminck's Stint, Polynesian Tattler, Common Sandpiper, Terek Sandpiper, Black-headed Gull, Common Cuckoo, Skylark, Yellow Wagtail, Red-throated Pipit, Brambling, Little Ringed Plover, Dotterel, Ruff, White-throated Needle-tailed Swift, House Martin, Indian Tree Pipit.

Puzzled? Well, to give you a clue, you could have had all of them on your year's list for 1974 from a single American state---Alaska. And what do they have in common? Each and every one of them, according to the regional reports in American Birds in 1974, was sought out and shot dead in order to document its occurrence in North America.

But what is a mere twenty-one birds? As I write, I have on my desk before me reports of 41 Savannah (Ipswich) Sparrows (an officially endangered subspecies) shot on their breeding ground in two days of the 1974 nesting season; 70 shorebirds shot on Vancouver Island in August of this year; 200 American Golden Plovers shot in Hawaii; 1000 Cattle Egrets shot in four weeks in Florida in 1969 (Auk, 48: 538-546); and, according to the Bureau of Spot Fisheries and Wildlife (now the Fish and Wildlife Service), 196,000 migratory birds collected under federal scientific permit in the U.S. in 1971.

Of course, many worthwhile ornithological studies can be pursued only by careful examination of laboratory material, and our knowledge of birds and of how to protect them would be infinitely the poorer if no one ever handled a specimen.

There are growing numbers of people, however, who have come to believe that on this continent the great majority of birds that are killed ostensibly for "scientific" purposes are killed altogether unnecessarily, and that effective legal controls over bird collecting compared with those in many European countries are negligible. Many people find the killing of extralimital vagrants (the "rarities" of the amateur birder) particularly offensive, and have noted that the custom of shooting such birds to "substantiate" the record contrasts strongly and unfavorably with the custom, for example, in the United Kingdom. There, such birds are zealously protected by amateur birdwatcher and museum ornithologist alike, and there are severe penalties for attempting to molest such a bird.

The Pan-American Society for the Protection of Birds was formed specifically to try to tighten up regulations concerned with bird-collecting. Without in any way wishing to hamper the needs of serious and purposeful biological study, the Society nevertheless has set itself the task of securing far stricter controls over the issuing of collecting permits than exist at present.

A major aim of the Society will be to secure improved regulations or legislation requiring anyone who wishes to kill birds to state in advance the nature of the research he is conducting and how many individuals of each species he wishes to kill, and to make it mandatory for a permit to state the species and number for which it is valid and the purpose for which the dead birds are required.

It may be that some members will oppose all killing for scientific and educational purposes. Although many have sympathy with this viewpoint, the Society itself does not actively oppose (nor does it necessarily condone) the killing of a bird in the course of a planned program of research for which examination of the dead bird is essential, provided that no unnecessary cruelty to the bird in involved.

The Society will, however, oppose the use of wild birds in scientific experiments where extreme cruelty is involved, such as, for example, the current vogue for experiments involving water deprivation to death, surgical deafening, and tethering to free-flying balloons.

The Society recognizes that, in many cases, the killing of birds for collections has a negligible effect on populations compared with such other causes as hard-weather mortality, oil pollution or collision with TV towers. This is not invariably the case, however, for there are instances where scientific collectors have seriously depleted bird populations. Examples are the offering of large sums of money to Tristan da Cunhans for specimens of the Big-billed Bunting, whose population is estimated as 60, and the killing by collectors of about 50% of the known Peruvian population of the Imperial Snipe. Although these are exceptional cases, they are not uncommon. The main reasons why the Society opposes the unnecessary killing of even common species are not primarily because the Society fears that species will be exterminated. Rather, the matter is one of ethics and aesthetics, the recognition that birds are living, sentient creatures, with a greater value alive and singing, to be enjoyed by the great majority of decent people, than as dead specimens, to be examined by a few.

Membership in the Society is not large, for it is a working society with every member either playing an active role or, if time does not permit, offering needed financial support. New members who are committed to the aims of the Society and who are offended by the "collecting" of birds for trivial purposes are welcomed. Birds give us a lot of pleasure. What can we do for them in return?

For those interested, further details can be obtained from

Pan-American Society for the Protection of Birds
Box 3681
Baltimore, MD 21214
or: Department of Physics
University of Victoria
Victoria, British Columbia, Canada.

THE DAWN CHORUS AT BOXFORD

Nancy Claflin, Belmont

Any account of the dawn chorus in Crooked Pond, Boxford, must be personal. For me, it is an annual birding event that I have participated in for almost thirty years. The first consideration must be to pick the right day in May. A day close to or just after May 15th usually fits the bill quite well. Since I admit to a bird-listing addiction, the excitement grows on that particular day with the thought that new birds may be added to my year's list. Anticipation is enhanced if the Barred Owl of Boxford would be my first of the year.

An expedition to Boxford in the early morning may have two purposes. First of all, this is an excellent spot at which to begin a Big Day. However, "Big Day" is an understatement, and years ago I found that my enthusiasm for seeing the maximum number of birds in one day dimmed hopelessly after about fourteen hours in the field. But even if you don't plan an ornithological marathon, there is no more gloriously beautiful spot in Eastern Massachusetts at which to spend the early hours of the morning. And early the hour should be: if there is a ray of light in the sky upon arrival, you are too late. So, to be safe, plan to be at the entrance by 3:30, and at the listening spot by 3:40 a.m.

The excitement begins before reaching the entrance to Crooked Pond. In the dark of the night, with one's headlights in high beam, there is a chance an owl may fly across the road. Park at the entrance, make sure you are well-sprayed with insecticide, and then walk in along the dirt road without delay.

The area is completely familiar to me, even in the dark. First comes a small deciduous wood, and then the swamp on the left with the running stream on the right. A little farther is the fallen-log area, one of the spots where the Louisiana Waterthrush sings, and behind it those giant conifers on the hillside which must be the largest in Eastern Massachusetts. That noisy water feeds from the pond on the left, at the end of which is the listening spot (at the bend of the road). Lights out. Listen. The time is right. It is still pitch dark, with no wind. The silence is overpowering, and the listening so intense that breathing seems noisy. Far off in the distance one can catch a sound. No, it is only a barking dog. The mosquitos are an annoying distraction. Then, from across the pond and up the hillside comes the unmistakable hooting of the Barred Owl--faint, but distinct. He repeats his call twice and speaks no more. We have not seen him, but we have heard him, and the day is made.

Suddenly we are more aware of the outlines of the trees. The frogs are croaking. At first, there is but one, and then in seconds it is as if the pond were too small to contain so many frogs. A Gray Catbird hisses, a Common Yellowthroat sings, and then comes the beautiful, haunting song of a Wood Thrush. The chorus has begun. "Chebec," the Least Flycatcher calls out. Another Wood Thrush and yet another until you begin to think every Wood Thrush in the world is singing at Crooked Pond. "Teacher, teacher, teacher," sings the Ovenbird, tuning up for the day. Then comes another thrill: faintly but clearly starts the unmistakable song of the Winter Wren. How can that tiny bird sing for so long? Great Crested Flycatchers, many dozens of Scarlet Tanagers, Northern Orioles and Black-throated Green Warblers join the chorus. Their music is overwhelming--almost too much. Geese are honking over the pond, and late Evening Grosbeaks call out for the last time before heading North. The sky is pink. It is time to leave the corner. But wait--a Ruffed Grouse is drumming deep in the woods.

We go on up the hill to the abandoned farm area, just in time to hear the Woodcock sound his ground note. He flies upwards, barely visible, and tumbles down with the breathtaking song that is made by his whistling wings. A Field Sparrow sings and swallows fly about overhead. It is time to leave, if the rails are still to be heard in Lynnfield. We shall probably hear more species on the way out, or we can come back later for Louisiana and Northern Waterthrushes, Solitary Vireo, Brown Creeper, and hopefully, Blue-winged and Golden-winged Warblers. Perhaps just one stop to listen for a Blackburnian. There he is, and I can hear the whole song, so my high notes are still intact. Is that a Blue Jay? No, listen closely, it is a Red-shouldered Hawk calling--a nostalgic cry out of the past.

V. ISOLATING MECHANISMS

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In the first article of this series, What is a Bird Species? (BIRD OBSERVER, Vol. 1, No. 5, pp. 104-108). a species was defined as "an evolved or irreversibly evolving aggregate of natural populations, actually or potentially freely interbreeding, genotypically distinctive as a group, and reproductively isolated from all other species." The mechanisms which serve to isolate a species reproductively are the subject of the present article; they have been known since 1937 as isolating mechanisms.

That there is a whole set of special devices, both physiological and behavioral, by which the gap between closely related species is maintained was not at first realized by biologists. Charles Darwin considered the species to be a conceptual construct, arbitrarily delimited, and he consequently neglected the question of the nature and origin of the species gap. Later biologists likewise ignored the problem, or else over-simplified it considerably by assuming that reproductive isolation was synonymous with cross-sterility. Toward the beginning of the twentieth century, however, naturalists began to realize that there were a great many mechanisms other than cross-sterility which tended to prevent the interbreeding of closely related sympatric species.[1] These mechanisms invariably have at least a partially genetic basis, although certain components may be affected by forms of conditioning (especially imprinting).

It is important to realize that each species maintains a whole spectrum of such factors---ecological, behavioral, and physiological---which safeguard its species identity. Interbreeding is prevented, as it were, by a series of hurdles, of which one may be dominant and the others subsidiary. The cross-sterility barrier, when present, is by definition quite effective. Yet it is usually a subsidiary mechanism, for it is rarely tested. Of what importance is it that Cardinals may be cross-sterile with Gray Catbirds, if in fact neither species can be induced to try to mate with the other?

Conversely, cross-fertility is no proof of a common species identity. As Mayr (1963: 90) says,

> "the mallard, Anas platyrhynchos, and the pintail, Anas acuta, are perhaps the two most common fresh-water ducks of the Northern Hemisphere. The total world population of these two species may well exceed 100,000,000 individuals...[In] captivity these two species are fully fertile with each other and...there is no reduction of fertility in the F_1, F_2, or F_3, or in any of the backcrosses.[2] One would therefore expect a complete interbreeding of these species in nature, as their world breeding ranges largely coincide. In northern Europe, Asia, and North America they nest side by side on literally millions of ponds, sloughs, or creeks; yet the number of hybrids found among the many birds shot every year is on the order of one in several thousand. Nor is there evidence of backcrossing between these hybrids and the parent species. Obviously, then, the two species are being kept apart not by a sterility barrier but by some other factors."

Before beginning the investigation of isolating mechanisms in detail, it is important to point out that geographical isolation is NOT considered an isolating device. This may seem paradoxical at first, for surely it must be of significance in understanding why American and European Robins do not interbreed to note that they never occur together, never meet. To the biologist, however, geographical separation is too ephemeral a condition, too extraneous a factor, to be considered a candidate for inclusion in the list of isolating mechanisms. The argument is best made, perhaps, by analogy: Life-term inmates of a penitentiary are quite effectively segregated spatially from the other members of the human species and are thus reproductively isolated. Yet none of us would think of arguing that these individuals constitute a separate species. Again, toy poodles are usually forcibly segregated from other house dogs in breeding condition by pedigree-conscious breeders. They do not form a separate species either. Or again, the San Lucas Robin breeds in an area which is totally disjunct from the breeding range of the other American Robins; it is regarded as a geographical subspecies of the American Robin, not as a separate species.

It is precisely to emphasize the irrelevance of this particular complication (geographical isolation) that isolating mechanisms are currently defined as "biological properties of individuals which prevent the interbreeding of populations that are actually or potentially sympatric." (Mayr, 1963: 91--Italics mine.)

What then does constitute a legitimate isolating mechanism in the eyes of the biologist? I shall not take up the various devices in order of strength or effectiveness, for this may vary from species to species. Rather, following the analogy of the sequence of hurdles used above, I shall discuss these various mechanisms in the order in which they would occur as part of the breeding cycle.

A. Factors limiting all contact: Habitat isolation

Among the more sedentary lower animals, habitat isolation can be a most effective isolating mechanism. Edaphic isolation, or the adaptation of a species to a particular soil substrate coloration is one of its more exotic forms. Certain grasshoppers, for example, acquire a coloration which conceals the adult on certain soils. An individual passively transported to a differently colored substrate becomes very agitated until he can find another background with which he can harmonize. Needless to say, it is quite unlikely that individuals from two distinct soil substrata would ever hybridize.

This same color-consciousness seems to be characteristic of certain South African larks. Reddish-colored larks (such as the Fawn-coloured Lark, Mirafra africanoides)[3] alight consistently on the redder sands, such as are to be found in the Kalahari Desert, These birds cannot be chased onto or over darker soils. Conversely, the darker-backed Small-billed Sabota Lark (Mirafra sabota)[3] flies above and rests on the darker, humus-rich soils exclusively. Since both species are ground-nesting birds, they clearly will not interbreed even in those areas where the two soil types meet along an edge. (Mayr, 1963: 570)

Habitat selection among birds is more commonly a question of vegetation. Birds of the forest will typically not intermingle with species of the open grasslands, even in those places where the forest forms an edge with the more open area. Many avian species are associated with vegetation of a certain height, with the presence of a particular species of plant (e.g., cattails), or with the presence or absence of standing water, etc. Some species require a certain vertical contour to the terrain if they are to find the habitat acceptable. Peregrine Falcons nest exclusively on cliff ledges or on the window ledges of skyscrapers, except for a few of the more remote subspecies inhabiting desert areas or parts of the northern tundra. (Brown and Amadon, 1968: 854)

Neal Smith (1966) found that Glaucous and Kumlien's Gulls preferred to nest "in coastal colonies, usually on cliffs overlooking tidal inlets. Herring Gulls predominated in tundra valleys and flat, marshy regions where they nested on islets in lakes." Glaucous Gulls preferred ledges with greater surface area; Kumlien's utilized the smaller ledges.

A pair of species, each associated with a distinct, albeit neighboring, habitat, will remain reproductively isolated so long as these two habitats remain undisturbed; but therein lies the rub. For man has a great propensity for disturbing natural habitats and for producing new ecosystems of a somewhat more intermediate nature. In so doing, he often affects the bird populations inhabiting the given area. Most frequently, this results in the complete substitution of one set of species for another. Occasionally, however, two or more species which originally preferred distinct habitats both remain, each adapting to the new intermediate habitat and, in the process, coming into contact with each other. Several cases of this sort which have resulted in hybridization between species are discussed below.

B. Factors limiting breeding contact: Seasonal isolation.

Unlike humans, who are sexually willing and able year round, birds have a definite annual reproductive cycle, and each species has its own more or less well-defined breeding period. What better mechanism can there be for preventing interbreeding between species than a lack of synchronization in the periods of peak sexual activity? Indeed, in most multi-species colonies that have been studied carefully, ornithologists have found differences between the respective peak egg-laying periods of the co-resident species. Smith (1966) found, for example, that on Baffin Island, Glaucous Gulls initiated copulations on May 15 with the peak frequency occurring on May 27. Kumlien's Gulls mated between May 23 and June 4, and Herring Gulls copulated first on June 5.

In spite of evidence of this sort, however, Smith and other authorities feel that seasonal isolation is not in and of itself a strong isolating mechanism. There are

several reasons for this opinion:

1. Sharply delimited non-overlapping breeding periods among co-resident species are characteristic principally of colonial nesters. They apparently serve mainly to reduce competition for vital resources (e.g., for food for the chicks). In nearby colonies, if one of the competitive species is lacking, the breeding period of one of the other species will be extended. In colonies where Thayer's Gull and the Herring Gull both nest, Thayer's Gull finishes mating before the Herring Gull starts; in colonies of Thayer's Gull which contain no nesting Herring Gulls, the egg-laying period extends throughout the period utilized elsewhere exclusively by Herring Gulls.

2. Northern European species introduced into Australia promptly shifted their reproductive cycles by six months in order to re-coordinate their breeding with the onset of spring in the Southern Hemisphere. In most of these species, the shift was surely completely involuntary, for the reproductive cycle in birds is closely tied to the lengthening of the daylight hours in the spring. In this sense, these birds would have little "choice" as to when they would breed, and distinct species might well continue to have separate and non-overlapping breeding periods.

The deterministic nature of the "choice" of breeding period is well documented for a few species. Lowery (1974, p. 127) points out that Brown Pelicans transplanted from Florida to Louisiana have a high nesting mortality because they have brought with them the annual rhythm of their ancestors, and thus nest at a season inappropriate to their new home. At the other extreme, however, are those species (such as our cuckoos) which are opportunistic breeders, waiting to nest until they find conditions precisely suited to the raising of their young. (Cuckoos often wait for an outbreak of caterpillars.)

The consensus seems to be that most species can delay the breeding period when forced to do so by inclement weather or other external factors. Since reproduction has at least this modest flexibility to it, authorities feel that seasonal isolation is important only as a secondary mechanism. Seasonal isolation serves to enhance the isolating effect of the other devices, but for most species it is too weak a characteristic to prevent hybridization by itself.

There seems to be one major exception to this rule, however: seasonal isolating factors are particularly potent when they arise in conjunction with factors having to do with water temperature. For instance, the six members of the whale bird genus Pachyptila have breeding ranges in the Southern Hemisphere which are arranged in concentric circumpolar rings. Mayr (1964: 251-252) says, "Different subspecies of the same species in this genus are always found...in the same hydrological zones. But once a population becomes adapted to a new zone of ocean water, it adopts a new mode of life, including a different breeding season, and becomes permanently separated."

C. Morphological species-recognition factors

The importance of color and color pattern in the reproductive life of visual animals has been recognized since antiquity. Red-winged Blackbirds raise their flashy epaulets during courtship. Female redwings discriminate against males whose epaulets have been dyed black. Gulls, as a group, seem particularly conscious of the color of the eye-ring of any potential mate. Females will not mate with a male having an eye-ring of the wrong color (BIRD OBSERVER, Vol. 1, No. 5, p. 126). Ross' Goose probably identifies conspecifics by the contour of the feathers about the upper mandible.

Since a large portion of the bird brain is given over to visual centers, it is not surprising that individual female birds should rely heavily on the visual appearance of the male to identify prospective mates correctly. The bright nuptial plumages of the male bird are already well-known to us birders, who also have a well-developed sense of sight, and we need no further convincing that the visual patterning of the male spring bird may well serve the female as her primary means of identifying conspecifics. A few side comments on these plumages, however, may be of interest:

1. Visual stimuli usually work in conjunction with auditory identification clues among birds. Naturalists have at times suggested that when visual stimuli are predominant and well-developed, the other stimuli tend to be less well-developed; but this generalization admits of far too many exceptions to be useful. Cardinal-grosbeaks, New and Old World orioles and many cardueline finches are both beautiful to see and lovely

to hear. Conversely, Henslow's Sparrow is totally insignificant in song and in appearance.

2. A more accurate generalization is this: brightly-colored males do not as a rule take any part in the nesting activities. But this is putting the cart before the horse. Stated more accurately, elaborate plumages, gaudy coloration and other striking forms of "sexual dimorphism have evolved in birds usually only in species in which the male does not participate in the raising of the young, and consequently does not endanger his brood by his conspicuous presence." (Mayr, 1963: 108)

3. Among phalaropes, all of which practice sex role reversal with a vengeance, it is the female that is gaudily colored. It is she who actively courts the male until he is ready to mate, and,true to the above generalization, it is the dull-colored male alone that attends to all of the nesting duties, while the sporty female cavorts in the harbor with the drake ducks.

4. Among those species which mate promiscuously without the formation of a pair-bond, striking male plumages are the rule. The Ruff, hummingbirds, pheasants, grouse, manakins and birds of paradise all fall into this category. Hummingbird species have developed highly distinctive pendulum aerial displays which serve to identify the male's species to the female (and to us). Ruffs, pheasants and birds of paradise, on the other hand, utilize an unusual mating procedure. Males of these species assemble on a lek, or display ground, to perform pre-mating rituals. The female is attracted to these leks, and mating takes place there after the shortest of acquaintances. Obviously, a distinctively colored male is of high selective value in such species, and the color patterning in these groups is quite remarkable.

It is the reliance of the female on visual clues that results in this strange evolutionary development. Apparently she is attracted not only to males of the proper coloration, but more specifically to that male who is the gaudiest and most elaborately plumaged of the group. Since mating is promiscuous, it is this male who stands the best chance of impregnating the greatest number of females, and it is his genes that will be passed on to the majority of his population's offspring. As Mayr (1963: 199) says, "This is the reason for the almost absurd ornaments of the males in many of those bird groups in which a single male may fertilize many females."

5. Quite surprisingly, certain species in which the male is quite distinctively colored have developed races in which this coloration is lost. Mayr (1964: 48-50) cites

> "the species Petroica multicolor [a flycatcher]. This Australian species has colonized many of the South Sea Islands, where it occurs in thirteen races... Normal sexual dimorphism characterizes the Australian parent race and eight races of the South Seas. In two places, however, the males have lost their bright plumage and wear a feminine one, while on San Cristobal in the Solomon Islands and in Samoa the females have become masculine and wear a plumage which resembles that of the male...It is important to emphasize the fact that loss of sexual dimorphism through feminization of the male plumage seems to develop only in well-isolated and rather small populations...It might also be mentioned that such a breakdown of the male nuptial plumage seems to occur only in localities where no other similar species exists, i.e., where a highly specific male plumage is not needed as a biological isolating mechanism between two similar species."

D. Auditory species-recognition factors

Among birds the two most strongly developed senses are sight and hearing. So it is not surprising that most bird species have developed songs which are quite distinctive. In fact, in certain families (for example, Tyrant Flycatchers, the species of which are extraordinarily similar in appearance), the nature of the territorial song constitutes the diagnostic field mark par excellence. Apparently, the female of many species is just as reliant on auditory clues as we are. Ornithologists believe that she will not mate with a male who does not sing her the correct song. This belief is, however, currently under investigation and revision. Bird-song constitutes the first and most important category of behavior which may serve as an isolating mechanism, and all such ethological patterns are difficult to analyze or assess, for they are usually multivalent in their signification. The territorial song of the Red-winged Blackbird has, for example, at least three major functions:

1) It identifies the singer as a Red-winged Blackbird.
2) It identifies the singer as a male.

3) It advertises the singer as a holder of a breeding territory.

Each of these functions is also served by other clues. The red epaulets serve for species-recognition, and certain aggressive behavioral patterns would identify the individual as a territorial male. Recent experiments seem to suggest that the female uses all available information to recognize the male of her own species, and no one datum functions pre-emptively. (She will mate with a male lacking red wing patches if he sings correctly, or with a male unable to sing if he has the correct wing pattern and maintains a territory.) On the other hand, females of other species fail to respond to males having either the Red-winged Blackbird visual pattern or song. Both coloration and song function, therefore, as isolating mechanisms.

E. Non-auditory ethological isolating mechanisms

The males of every bird species have specific courtships or displays to which usually only females of the same species are receptive. Isolating mechanisms that are based on behavioral incompatibilities are now referred to as ethological barriers. Mayr (1963:95) describes them thus:

> "In most animals it is the male that actively searches for a mate. He is usually somewhat easily stimulated to display to objects, sometimes quite inappropriately. When he does not receive adequate responses from his display partner, or is actively repulsed, his display drive soon becomes exhausted. Consequently, if such a displaying male encounters an individual of a different species, or a male of his own species, he will break off his courtship sooner or later. If the male is displaying to a nonreceptive female, the same will happen, perhaps after a longer interval. However, if the male encounters a receptive female of his own species, he will be sufficiently stimulated by her to continue his displays until the female has passed the threshold of mating readiness. This threshold is on the average much higher in females than in males. 'Species recognition,' then, is simply the exchange of appropriate stimuli between male and female, to insure the mating of conspecific individuals and to prevent hybridization of individuals belonging to different species."

It is these ethological mechanisms which account for the extreme rarity of hybridization in those species which form a pair-bond. After all, pair-bonding is, in essence, an extended "engagement" period during which mutual behavioral incompatibilities are almost sure to surface. Species that do not pair-bond are far more subject to interbreeding. Females have less of an opportunity to "recognize" the species of the prospective mate, and "mistakes" are made. Mayr (1963: 126) estimates that there were as many as 50 hybrids among the 100,000 specimens of the birds of paradise collected in New Guinea during the period 1870-1924.

Ornithologists are just beginning to study intensively ethological barriers, and, although the literature is vast and rapidly growing, many species have yet to come under scrutiny. Here are a few examples to illustrate some of the variety of the patterns which have been observed:

1. During courtship, Boat-tailed Grackles (Cassidix major) fluff the feathers of the head and neck, giving them a rather thick-headed appearance. Great-tailed Grackles (C. mexicanus) slick down the feathers of the head, giving them a thin-headed appearance. (Lowery 1974: 547)

2. Laysan Albatrosses almost invariably touch bills when they first come near each other. Black-footed Albatrosses tend to use this gesture later on in the courtship dance, only rarely initially. Blackfoots dance intensely, with much more vigor than Laysans. They dance on tiptoe, whereas Laysans rise on tiptoe only to pose statue-like. Blackfoots elevate both wings simultaneously and only occasionally tuck the bill under the wing as part of the same gesture. If they do bill-tuck, both birds do so at the same time and on opposite sides of their bodies (as if one were the mirror image of the other). Laysans invariably bill-tuck after a wing-lift, and a pair characteristically wing-lift and bill-tuck alternately. Blackfoots clap bills rapidly, both members of the pair performing the motion simultaneously and with the bill held next to the mate's head. A Laysan pair clap bills alternately and with the bill held low, away from the partner's head. (Fisher 1972)

Readers who are interested in courtship displays, many of which will automatically function quite successfully as isolating mechanisms, are urged to consult Palmer (1962), whose descriptions of behavioral patterns are quite modern and thorough.

F. Mechanical Isolation

When insects were first carefully studied under the microscope, it was discovered that the males of many species sported an elaborate genitalic armature, the shape of which was characteristic of that species. It was assumed that it would be mechanically impossible for the male of one species to mate with a female of another species. Biologists coined the term "mechanical isolation" for this situation. Birds have only a most rudimentary copulatory apparatus, and mechanical isolation is thus meaningless for them. (In fact, biologists have since concluded that mechanical isolation is not an important factor among insects either.)

G. Post-mating Mechanisms.

Let us consider now a pair of birds for which none of the above isolating mechanisms are effective. So they mate. However, there are still many more hurdles to be surmounted before hybridization can occur:

1. Gametic mortality: the male sperm may die from an antigenic reaction of the female.
2. Gametic impotency: the sperm may fail to penetrate the egg.
3. Zygotic mortality: even if the egg is fertilized and laid, the mebryo may not survive.
4. Hybrid inviability: if the embryo does hatch as a chick, this F_1-individual may not survive to reproductive age.
5. Hybrid sterility: the F_1-individual may prove to be sterile.

These five forms of reproductive isolation seem to form, as a group, a natural unit in our minds. We speak of any one of them as an instance of cross-sterility. The layman finds it difficult not to believe that the sterility barrier is pre-eminent among isolating devices. He might argue as follows:

1. All five of these forms of reproductive isolation are especially distinguished in that they have a largely genetic basis.
2. All five are totally effective in their action, at least as described above. A great many pre-mating mechanisms admit of exceptions.
3. None of these five isolating devices are subject to human meddling, at least not yet.

In rebuttal to these points let me observe the following:

1. All forms of reproductive isolation among birds have a largely genetic basis. We humans are born with a most meager set of instincts; our attitudes and behavioral patterns are largely acquired through learning and socialization. In this, humans are unique. A bird's behavioral patterns and his habitat preferences are far more likely to be the result of genetic pre-programming. The Alder Flycatcher cannot be taught to sing the song of the Willow Flycatcher. To the female Mallard, the drake Mallard's nuptial plumage is invariably "in style."

2. Quite obviously, in the great preponderance of individual instances, the five isolating devices above are either inoperative or else totally effective. However, we can reach a characterization of the sterility barrier as an on-or-off attribute only by viewing interbreeding as an activity of individual pairs of birds; and this is an incorrect viewpoint. Hybridization is a population phenomenon, not an individual pastime. Between two closely related species, the more usual situation might be this: of every 10,000 attempts at interbreeding, in perhaps 10 cases the fertilized egg will hatch. The unthinking amateur says, "These birds can interbreed, for hybrids have been found; they are the same species." The trained ornithologist says, "These two species are quite effectively isolated reproductively by, say, different habitat preferences and numerous ethological barriers. In addition, zygotic mortality is an isolating mechanism which is 99.9% effective."

3. The behavior of caged birds is irrelevant to the species problem for two reasons. First, this behavior is unnatural and in no way representative of the

behavior of these same individuals in the wild; and second, the population of caged birds normally represents only a very tiny percentage of the total species population. Humans can effectively meddle with only one type of isolating mechanism on the population level --habitat isolation. A few cases of this are discussed in subsequent paragraphs, and the ornithologist does recognize that perhaps 10 times within recorded history, man has jeopardized the species integrity of a pair of closely related species. But this outcome is quite rare. Man's interference with the ecology all too frequently results in the extinction or local extirpation of a species; only in the most exceptional cases does this meddling cause a merging of distinct species.

H. Introgressive Hybridization

We are now ready to consider a few unusual cases in which the isolating mechanisms separating two species are unusually weak, so that interspecific pairs do form on a more regular basis. Before attempting to classify these exceptional situations into different categories, I must digress to point out one well-known and thoroughly studied phenomenon: certain genetic difficulties inherent in interbreeding often remain hidden in the first generation (the F_1-individuals). Hybrid sterility or inviability, for example, may not show up until the second or third generation. A thorough analysis of a case of hybridization must necessarily, therefore, give prime attention to the progeny of the hybrids. Since F_1-hybrids are ordinarily fairly rare, the prospective mate of such a bird will quite often be an individual from one of the parent species. Their offspring are referred to as backcrosses.

Many cases of hybridization are known for which backcrossing does not occur, but backcrossing is part of the picture in the more serious cases of hybridization. The importance of the phenomenon lies in the potential for the transmission of a gene from one of the parental species through first-generation hybrids into individuals of the other parent species. This transfer of characters from one species to another is referred to as introgression, and there are several well-studied cases of hybridization the effects of which include limited or massive character introgression.

Among North American species pairs, Mayr and Short (1970) list only one case of sympatric species which hybridize introgressively: Prairie Chickens (Tympanuchus cupido) and Sharp-tailed Grouse (T. phasianellus)[4] interbreed in Wisconsin and Ontario. There is a high initial interbreeding rate resulting in populations which are 5-25 percent hybrid. Hybrid males are, however, apparently less successful in their coutship, and the over-all population effects are thereby reduced. (Mayr, 1963: 117).

I. Semi-species

Pairs of species which are so closely related that they cannot normally co-exist in the same geographical area may nonetheless meet along a narrow zone of overlap. Often they hybridize there with backcrossing to produce a whole range of intermediates. In each of the cases below, however, mating is non-random with the result that the two parental types continue to be found in some numbers as part of the hybrid population. Such pairs of species are often referred to as semi-species to emphasize that they have barely separated, and their mutual reproductive isolation is as yet imperfect. Mayr and Short (1970) list the following instances of hybridization between largely allopatric semi-species for which backcrossing has been confirmed:

1. Mallard and Black Duck
2. Herring Gull and Glaucous-winged Gull
3. Semipalmated Plover and Ringed Plover
4. Ladder-backed Woodpecker and Nuttall's Woodpecker
5. Eastern Wood Pewee and Western Wood Pewee
6. Black-capped Chickadee and Carolina Chickadee
7. Golden-winged Warbler and Blue-winged Warbler
8. Rose-breasted Grosbeak and Black-headed Grosbeak
9. Indigo Bunting and Lazuli Bunting
10. Common Redpoll and Hoary Redpoll.

Absence of significant backcrossing in the hybrid zone will probably be part of the basis for arguing that the following should be split:

A. Arctic Loon (Gavia arctica) and Pacific Loon (Gavia pacifica).
B. Yellow-bellied Sapsucker (Sphyrapicus varius), Red-breasted Sapsucker (S. ruber) and Red-naped Sapsucker (S. nuchalis).

J. Complete Intergradation

If isolating mechanisms between two adjoining populations are non-existent or extremely weak, these populations will meet along a hybrid belt and produce a full range of intermediate forms. Within the hybrid zone individuals conforming to the parental types (recombinants) should be almost non-existent (less than 5 percent), and introgression will be detectable at some distance from the edge of the zone of contact.

Most of these cases have been recognized now for some time, and the contiguous populations have already been lumped into a single species. Other instances (potential future lumpings) are the following:

1. Brant and Black Brant
2. Mallard and Mexican Duck
3. Common Crow and Northwestern Crow
4. Tufted Titmouse and Black-crested Titmouse
5. House Wren and Brown-throated Wren
6. Mourning Warbler and MacGillivray's Warbler
7. Gray-crowned Rosy Finch and Black Rosy Finch
8. Dark-eyed Junco and Gray-headed Junco.[5]

The following may be split for lack of evidence of random interbreeding and failure to intergrade completely:

A. Canada Goose (Branta canadensis), Richardson's Goose (B. hutchinsii) and Cackling Goose (B. minima).
B. Eastern Screech Owl (Otus asio) and Western Screech Owl (O. kennicotti).

The Breakdown of Isolating Mechanisms

Hybridization between Blue-winged and Golden-winged Warblers was discussed recently in an article in BIRD OBSERVER (Vol. 2, No. 3, pp. 70-73). These two species diverged from each other, probably during the Ice Ages of the Pleistocene in areas which were geographically isolated from each other. For many centuries their breeding ranges west of the Appalachians remained separated from each other by an arm of the Great Prairie. However, this prairie peninsula has been eliminated as a result of man's activities in the Northwest Territory states, and both species were able to extend their breeding ranges so that they now overlap. The two species now hybridize quite frequently in the Great Lakes region.

Hybridization also occurs in the New England area. Ornithologists have suggested that until some 200 years ago, these two species were isolated by habitat preferences in the Northeastern states, even though they were in contact geographically along the southern border of the region. Man's systematic deforestation of the area and his introduction of agricultural activities have brought the two species into contact much more generally, with the result that hybrids are fairly common thoughout our area also.

The theory that it was alteration of the habitat that induced this hybridization is strengthened by evidence from a much more recent case from tropical Africa. There, three species of Paradise Flycatchers have quite recently begun hybridizing. Two of these species, Terpsiphone rufiventer and T. rufocinerea, live ordinarily in the rain forest, but in different parts of Africa. The third species, Terpsiphone viridis, inhabits second-growth woods and second-growth savanna forest. In most regions where these various species come into contact, they co-exist with each other side by side without any evidence of interbreeding, each species being restricted to its own preferred habitat. Recently, however, African natives have begun clearing parts of the rain forest, and in these areas T. viridis now interbreeds freely with each of the other two species. Areas which have been cleared for some years have evolved stabilized hybrid populations. (Mayr, 1963: 119-121).

In another similar case, that of the Malayan kingfishers Ceyx erithacus and C. rufidorsus, hybridization has progressed so completely that authorities now consider these two species to have merged. (Sims 1959) Note that this is not a case of "lumping" in the usual sense of the word, i.e., it is not a case in which ornithologists have decided that they had formerly inappropriately separated two natural populations into separate categories, giving each its own individual species name. Rather, this is a

case of two valid species whose isolating mechanisms have been broken down as the result of man's ecological disturbance which are now hybridizing so freely as to merge completely into a single species.

Another case of this type may be closer at hand, at least in its incipient stages (Trauger, et al. 1971) The population of the Lesser Snow Goose, as estimated from counts of wintering birds in North America, has grown from 641,000 in 1956-1957 to 966,400 in 1966-1967. During the same period, the population of Ross' Goose increased from 7,930 to 31,400. These population increases occurred during a period of general climatic improvement in Arctic Canada and may be the result of a series of extremely favorable breeding seasons. Concomitant with these increases, the breeding ranges of both species have apparently been extended, and they are now sympatric over a broad area in the Canadian Arctic.

Beginning in 1962, white geese with morphological characteristics intermediate between these two species have been captured or collected, and biologists are sure that these birds represent hybrids of Lesser Snow and Ross' Goose. In the early 1960s most intermediates conformed rather closely to the original description, suggesting that these were all F_1-individuals (first-generation hybrids). More recent observations have included individuals deviating significantly from this original pattern, suggesting that backcrossing with the original species is occurring on a wide basis.

Let us consider a possible explanation for this more recent case of hybridization. During the Pleistocene era, the two species were separated geographically, and, in fact, they may have re-established contact only within the past two decades. Historically, Ross' Goose wintered exclusively in central California. Around 1955, however, Lesser Snow Geese shifted their major migration route eastward, and shortly thereafter (around 1960) Ross' Goose likewise diverted its route to the east. As a consequence of this shift, 200 to 400 Ross' Geese now winter each year with the large flocks of Lesser Snows in Louisiana, Texas and New Mexico.

The birds that winter in the southern and southwestern states will be somewhat isolated from the main concentration of wintering conspecifics and will presumably find difficulty in pairing with another bird of the correct species. Since courtship, pair formation and copulation among Ross' Geese takes place on the wintering grounds and during spring migration (Ryder 1967), the absence of a conspecific mate may allow the mating drive to intensify to such a degree as to overcome the inhibitory effects of incorrect species recognition and permit the formation of mixed pairs. (Mayr 1963: 127-128) This phenomenon of hybridization occurring at the edges of a (winter) range expansion will be examined again below. Undoubtedly it if a factor promoting the interbreeding of these two species, for all of the intermediate geese have appeared in the United States on the wintering grounds in the South; none,in California.

The thesis that hybrid formation is related to the scarcity of appropriate mates is also supported by more recent observations. For instance, Ryder (1973) reports that in 1972, Ross' Goose began nesting at La Pérouse Bay, Manitoba, near Churchill. Of those breeding birds observed, there were a single pair of Ross' Geese, three pairs that consisted of one Ross' Goose mated with a Lesser Snow, and one pair consisting of a male Lesser Snow mated to an intermediate female.

But there may be more to the story. Apparently the spring of 1967 was quite late in the Arctic, and inclement "weather delayed the arrival and nest initiation of both species at Karrak Lake, Northwest Territories. When the snow melted exposing the nesting habitat, Ryder noted considerable interaction between these species as nests were established. Later he found 16 nests containing eggs of both Ross' Geese and Lesser Snow Geese...[and] Trauger and J.B. Gallop found four additional mixed clutches on another island...With the exception of one nest, the incubating female of these clutches was a Lesser Snow. Apparently Ross' Geese were displaced by Lesser Snows from nests established in preferred habitat...Dump nesting[6] by both species also may have occurred." (Trauger, et al. 1971: 865).

The significance of these observations is easy to elucidate:
The courtship displays of all geese are remarkably similar. Hence, there are few instinctual ethological barriers to inhibit interspecific hybridization. Geese are, moreover, subject to two phenomena not characteristic of birds in general. First of all, true geese imprint, i.e., during a certain critical period, the gosling "learns" his parent, accepting for the model any animal of appropriate height which emits goose-like

sounds. Konrad Lorenz and his associates succeeded in imprinting Greylag Geese to human models by waddling about in a squatting position at the head of a line of goslings and imitating the honking of the true parent. Second, geese maintain the family structure throught the first winter. They migrate south together and continue to socialize on the wintering grounds until such time as pair-formation for the new year begins. An egg dumped in the nest of the wrong species will thus hatch a gosling that will (1) imprint to the wrong species, and (2) migrate to the incorrect wintering grounds, there to bond with an individual from the incorrect species. At present, intermediate geese are occurring in the Central Flyway in the ratio of one intermediate to approximately 200 Lesser Snow Geese, or one intermediate to 171 Ross' Geese. Trauger, et al. (1971) estimate that hybrids account for 4.8% of the Ross' Goose population, indicating a fairly high rate of hybridization. They state (pp. 870.873), "If the present trend of hybridization and introgression continues, several valid reasons suggest that Ross' Goose, one of the rarest North American geese, may be in serious jeopardy as a species...Because of its relatively small gene pool, the rare Ross' Goose may be vulnerable to eventual genetic swamping by the Lesser Snow Goose."

Temporary Hybridization

We have seen above how hybridization may on occasion spontaneously begin as an after-effect of climatic amelioration, or be brought about as a result of man's interference in the ecology. But just as interbreeding may start more or less spontaneously, so also may it stop abruptly.

The range expansion of a species will often bring it into (secondary) contact with certain other species from which it is imperfectly isolated. As a result, hybridization begins and will be particularly frequent along the advancing frontier of the expanding species (where conspecific mates are rarest). Biologists feel that introgressive hybridization is potentially dangerous in that it tends to weaken both species by allowing "foreign" genes to be imported into the "pure" gene pools of the parent populations, as perfected by natural selection. In some cases, these foreign genes may alter the habitat preferences of the parent species or yield such other side-effects as would tend to increase the frequency of contact between them. Thus, interbreeding is accelerated, and the two species may even eventually merge.

However, this is not the inevitable scenario. More frequently, in the case of an ongoing range expansion, interbreeding increases and reaches its peak just after the edge of the expanding population first reaches a given locale. Later, as that area becomes part of the interior of the zone of sympatry, both species will find it relatively easy to locate conspecifics with which to mate. They will begin to reassert their special mating preferences, and hybridization will taper off.

Moreover, in at least one case involving a non-ongoing range expansion, hybridization has practically vanished. In the period 1870-1900, the Blue Tit (Parus caeruleus) and the Azure Tit (P. cyanus) mutually expanded their ranges so as to overlap in Western Russia. At first, there were numerous hybrids, but now, some 60 years after the original expansion, interbreeding has greatly decreased, and the isolating mechanisms separating the two species have apparently been strengthened. (Mayr, 1963: 562)

Concluding Remarks

In the decades before the twentieth century, biologists relied almost exclusively on the cross-sterility barrier to explain the species gap. Ornithology was simpler to understand then, but to me it was far less interesting and much less exciting. I have sampled in this article some of the rich variety of devices (as recognized by modern ornithology) that tend to assist a species in the maintenance of its own species integrity. Although the usbject is both complex and technical, it is one which the average birder can and should come to appreciate, for the subject matter is in truth nothing more nor less than the sum total of the complete life histories of all the various separate species, together with an analysis of their similarities and incongruities. Look at it this way; the more we learn of the methods by which the bird itself identifies others of its own species, the better our own field work will become.

Footnotes

1. Sympatry = the occurrence of two or more populations within the same area during the breeding season. The populations may be separated according ot habitat provided that individuals in breeding condition from one population lie within the cruising range of individuals of the other population.
2. Hybrids produced by two individuals each from a different parent population are referred to as F_1-individuals. The offspring of two such F_1-individuals are referred to as F_2-individuals, etc. The offspring produced by an F_1, F_2, etc., and a member of either of the two parent populations is referred to as a backcross.
3. These two species are illustrated in Machworth-Praed, C.W., and C.H.B. Grant. 1962. Birds of the Southern Third of Africa. Longmans, Green and Co., Ltd. Plate 36, before p. 561.
4. Pedioecetes phasianellus in the A.O.U. Check-List. Mayr and Short argue that any two species that hybridize as regularly as these two do should never be placed in separate genera; hence, their change of name.
5. These are not the only potential lumpings which listers have to fear. Several geographical isolates may also be lumpted. Mayr and Short combine the Greater and Lesser Prairie Chickens, for example, and they consider the Golden-cheeked Warbler to be but a well-marked geographical race of the Black-throated Green Warbler.
6. Dump-nesting = the laying of one or more eggs by a species which normally constructs or appropriates its own nest in the nest of another bird. The term is used most frequently of a bird of one non-parasitic species which lays in the nest of anothe- species. Intraspecific dumping may be quite common, but it is much more difficult to detect, for the laying female must be "caught in the act."

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THE BIRD OBSERVER SUMMARY FOR JANUARY 1975

A snowstorm on January 1 left eastern Massachusetts with four inches of snow and dampened the beginning of a new year of birding. The temperatures remained normal through the first week of January. A coastal storm on the 8th brought rain near the coast and snow to most of the interior with 10 to 18 inches reported from northeastern Massachusetts. A second coastal storm on the 10th brought precipitation, but snowfall was much less and occurred mainly in northern Massachusetts again. Temperatures were 5 to 10 degrees above normal January 7-10, then 15-25 degrees above on the 11th. At midmonth, precipitation occurred in New England each day as both rain and snow - a total net gain of three inches in Massachusetts. The week was marked by passage of several cold fronts and by disturbances passing south and east of New England. Temperatures remained above normal until January 20 and a storm dumped one inch of rain on January 25.

Cape Cod was the showplace for birds during January. The White Pelican remained all month at the West Harwich marshes, a holdover from the previous month. Both Little Blue Heron and Snowy Egret and as many as 4 American Bittern were found at Fort Hill, Eastham. Two Blue-winged Teal were reported all month from Sandwich, and a European Wigeon was present at East Orleans.

The Gyrfalcon continued at Monomoy, presumably the same individual reported the previous two years. The Sandhill Crane reappeared in Eastham, feeding in a hen yard no less! This is the same bird that was present at West Harwich last summer. Where was it hiding all fall and early winter? King, Clapper and Virginia Rails were noted in Eastham, and Common Gallinules were found in Chatham and West Harwich. The discovery of a Chestnut-collared Longspur on North Beach, Chatham was well-documented. The bird remained with a small flock of Lapland Longspurs for four days and was carefully studied by many observers.

Good birding was not confined to the Cape, however. A Tufted Duck was well-studied at Lakeville, and Harlequin Ducks were at Magnolia. A Northern Skua was observed chasing gulls at Wollaston Beach on the 26th. Red-bellied Woodpeckers were present at South Natick and Carlisle, and Black-backed Three-toed Woodpeckers were seen at Swampscott and Manchester. A Northern Three-toed Woodpecker appeared at Harvard at midmonth and continued to delight photographers with fantastic opportunities to catch on film this rare visitor from the north.

A Phoebe lingered at Wachusett Meadows, Princeton, and a Gray Jay was found at Hardwick. Fish Crows numbered 250+ in West Roxbury and continued to become more numerous in surrounding communities. A Boreal Chickadee was found at a feeding station in Weston, and the Varied Thrush remained at a feeder in Athol. Other interesting feeder reports were an unbelievable Ovenbird photographed in Abington, a Yellow-breasted Chat and a Western Tanager in Annisquam, a Yellow-headed Blackbird in Bellingham and a Black-headed Grosbeak in Concord.

Perhaps the greatest news, unfortunately overlooked, was an unconfirmed report of a Ross' Gull at Newburyport Harbor on January 12 and 16. The observers, Philip Parsons and Herman Weissberg of Manchester, reported a strange small gull with "gray underwings, rosy color around upper breast, no mark on head or around neck, small head, did not have a thin neck like Bonaparte's Gull when sitting on water; seen also in flight but tail was not noticed." They suspected a Ross' Gull and alerted their friends. Unfortunately, nobody was able to find this bird. The rest of the story is now ornithological history.

R.H.S.

Common Loon:			
4,10-12	Cape Ann,Boylston	8,1	BBC(L.Jodrey),B.Blodget
Red-throated Loon:			
thr.	8 localities	12 individuals	v.c.
Red-necked Grebe:			
thr.	10 localities	24 individuals	v.o.
Horned Grebe:			
12	Barnstable(S.N.),Centerville	300+,54	W.Petersen#,V.Laux
Pied-billed Grebe:			
thr.	11 localities	36 individuals	v.o.
White Pelican:			
thr.	West Harwich	1	v.o.
Gannet:			
10,18	Rockport(A.P.)	1,15	H.Wiggin#,R.Veit#

Great Cormorant:			
4,19	Rockport,Boston Harbor	55,100	BBC(L.Jodrey)(L.Robinson)
Double-crested Cormorant:			
1	Orleans	1	B.Nikula# & v.o.
Great Blue Heron:			
thr.	16 localities	44 individuals	v.o.
5,11	Buzzards Bay,Harwich	10,16	SSBC(K.Anderson),R.Stymeist#
19	Orleans	58	V.Laux
Little Blue Heron:			
thr.	Eastham	1 imm.	v.o.
Snowy Egret:			
thr.	Eastham	1	v.o.
Black-crowned Night Heron:			
4,24	Wollaston,Eastham	43,4	D.Brown,CCBC(D.Baines)
31	Falmouth	5	A.Clarke
American Bittern:			
thr.,17	Eastham,Barnstable(S.N.)	4,4	v.o.,V.Laux
Mute Swan:			
11,23	Westport,Manomet	31,5	BBC(R.O'Hara),B.Sorrie
Canada Goose:			
12	Orleans	1800+	R.Veit#
Brant:			
1,24	E.Orleans,Eastham	200,10	B.Sorrie#,CCBC(D.Baines)
26	Eastham(First Encounter Bch.)	192	A.Clarke#
26,30	Boston,Plymouth Harbor	1,200	L.Robinson#,M.B.O.Staff
Black Duck:			
1	Quincy	1200	BBC(E&H Donovan)
Gadwall:			
21	Manomet	2	B.Sorrie
Pintail:			
thr.	9 localities	64 individuals	v.o.
Green-winged Teal:			
thr.	Centerville,Cohasset	22,3	V.Laux,v.o.
4,12	Clinton,W.Harwich	4,4	B.Blodget#,H.Merriman#
Blue-winged Teal:			
thr.	Sandwich	2	R.Pease
European Wigeon:			
1,1-18	E.Orleans,Cohasset	1,1	B.Sorrie# & v.o.,v.o.
American Wigeon:			
thr.	E.Orleans,Cohasset,Belmont	60,2-4,12	v.o.
5,12	Wareham,Falmouth	8,28	SSBC(K.Anderson),CCBC(D.Baines)
21	Manomet	33	B.Sorrie
Northern Shoveler:			
thr.,26	Winthrop,Yarmouth	1-2,1	M&A Argue & v.o.,B.Nikula
Wood Duck:			
1	Rowley,Lancaster	1,1	D.Alexander,H.Merriman
5,12	Orleans, Falmouth	1,2	W.Petersen#,CCBC(D.Baines)
Redhead:			
thr.,1-19	Plymouth,Boylston	1 f.,2	v.o.,B.Blodget
1,7	Falmouth,Nahant	19,1	L.Jodrey#,M&A Argue
11,31	Westport,Eastham	2,2	BBC(R.O'Hara),G.Soucy#
Ring-necked Duck:			
thr.,12	Cambridge,Lakeville	20-30,30+	R.Stymeist# & v.o.,W.Petersen
18,24	Sandwich,Eastham	36,36	R.Pease,CCBC(D.Baines)
Canvasback:			
thr.	Cambridge,Fall River	45-12,max.50	R.Stymeist & v.o.,T.Athearn
3	Dighton,Berkley,Taunton River	tot.1100	F.Gardner,B.Sorrie,W.Petersen
3-19	Boylston(first winter record in over 12 years)	6-8	B.Blodget
19,26	Lakeville,Harwich	40,51	W.Petersen#,A.Clarke#
26	Somerset	2500	T.Athearn
Greater Scaup:			
1,19	Quincy,Squantum	2500,600	BBC(E&H Donovan)(L.Robinson)
25	Falmouth	250+	BBC(A.Clarke)
Lesser Scaup:			
thr.,1	Cambridge,Sterling	4,5	R.Stymeist &v.o.,H.Merriman& v.o.
3,6	Lakeville,Boylston	22,3	W.Petersen#,B.Blodget

Tufted Duck: (full details rec'd.)			
19-28	Lakeville(Little Quittacas)	1 m.	W&B Petersen,K.Anderson & v.o.
Common Goldeneye:			
4,6	Cape Ann,Boylston	125,29	BBC(L.Jodrey),B.Blodget
19;25	Clinton,Squantum;Falmouth	31,125;150+	B.Blodget,L.Robinson#;A.Clarke#
Barrow's Goldeneye:			
2-10	Plymouth	1-6	H&D Carmichael & v.o.
3,4	Dighton,N.Scituate	1,1	W.Petersen#,R.Emery#
18	Newburyport	4	L.Jodrey#
Bufflehead:			
19,25	Squantum,Falmouth	100,52+	BBC(L.Robinson)(A.Clarke)
26	Newburyport	125	BBC(W.Van Cor)
Oldsquaw:			
4,12	Rockport,Woods Hole	6,4	BBC(L.Jodrey),CCBC(D.Baines)
26	Newburyport	30	BBC(W.Van Cor)
Harlequin Duck:			
1-12,7 on	N.Scituate,Magnolia	1,2-4	J.Nichols# & v.o.,M&A Argue &v.o.
Common Eider:			
thr.	Boston Harbor	5000+	L.Robinson# & v.o.
King Eider:			
7-26,9-12	Hull,Chatham	1,1	D.Brown# & v.o.,v.o.
10,23	Rockport,Plymouth	2,1	B.Keenan,B.Forster
White-winged Scoter:			
10,26	Cape Ann,Wollaston	25,40+	H.Wiggin#,B.Blodget
Surf Scoter:			
1-19,5	Boylston,Marion	1,5	B.Blodget,SSBC(K.Anderson)
12,18	Mattapoisett,Cape Ann	10,10	G.Mock,BBC(G.Grinley)
Black Scoter:			
4,10	Cape Ann	5,2	BBC(L.Jodrey),H.Wiggin#
Ruddy Duck:			
thr.,1-5	Cambridge,Fall River	4-6,20	R.Stymeist & v.o.,T.Athearn
25,31	Falmouth,Eastham	33,30	BBC(A.Clarke),G.Soucy#
Hooded Merganser:			
thr.,1	Cambridge,Cohasset	1-3,15	F.Hammond&v.o.,N.Osborne#&v.o.
5,19	Wareham,Lakeville	8,15	SSBC(K.Anderson),W.Petersen
Common Merganser:			
thr.	Cambridge,Lakeville	2-9,200-20	R.Veit & v.o.,W.Petersen# & v.o.
1-26,18	Fall River,Newburyport	1-8,81	T.Athearn,P.Parsons
20,26	Stoneham,Harwich	3,43	J.Andrews,A.Clarke
Red-breasted Merganser:			
11,12	Westport,Woods Hole	51,45	BBC(R.O'Hara),CCBC(D.Baines)
19,26	off Squantum	200,400	BBC(L.Robinson)
Goshawk:			
5	Harwich,Hopkinton	1,1	S.Higginbotham,Ms.Peloquin
21;23,27	Lancaster;Harvard	1;1,1	H.Merriman;J.Parry & v.o.
26	Eastham	1	J.Bryant
Sharp-shinned Hawk:			
2,4	Lakeville,Cape Ann	1,1	W.Petersen,BBC(L.Jodrey)
11,15	Harwich,Manomet	1,1	R.Stymeist,B.Sorrie
Cooper's Hawk:			
5,31	Eastham,Bolton	1,1	B.Nikula,R.Jenkins
Red-tailed Hawk:			
thr.	17 localities	30 individuals	v.o.
Red-shouldered Hawk:			
5,12	Topsfield,Ipswich	2,1	S.Garrett#,BBC(J.Berry)
14,23	W.Roxbury,E.Bridgewater	1,1	G.Soucy,G.Flaherty
Rough-legged Hawk:			
thr.	Bridgewater,P.I.	1-2,1-2	W.Petersen &v.o.,H.Wiggin# & v.o.
2&9,11	Barnstable,Marshfield	1 light & 1 dark,1	R.Pease,J.Nichols
23,25	Lakeville,Gloucester	1,1	R.Emery#,P.Kitchin#
28,31	Southboro,Harvard	1,1	P.Butler,B.Blodget#
Bald Eagle:			
thr.	Lakeville	1-5(2 imm.)	D.Briggs# & v.o.
Marsh Hawk:			
5,12-21	Wareham,Bridgewater	1,2-3	J.Clancy,J.Nichols# & v.o.
12,19	Ipswich,Boston	1,2	BBC(J.Berry),R.Stymeist
Gyrfalcon:			
5	Monomoy	1	W.Harrington#

Peregrine Falcon:			
10	P.I.	1	E.Morrier
Merlin:			
3,5	Chatham,Scusset	1,1	B.Nikula#,J.Clancy
19,28	Eastham,S.Wellfleet(WBWS)	1,1	C.Goodrich,W.Bailey
American Kestrel:			
thr.	30 localities	52 individuals	v.o.
4,19	Lakeville,Orleans	7,13	P.Regan#,V.Laux
Ruffed Grouse:			
thr.,14	Lancaster,Peabody	7+,1	H.Merriman,B.Cassie
17,28	Hanover,Manomet	1,3	J.Nichols,B.Sorrie
Bobwhite:			
thr.	S.Dennis	23	C&B Holdridge
Sandhill Crane:			
6-31	Eastham	1	C.Campbell# & v.o.
King Rail:			
30	Eastham(Fort Hill)	1	R.Forster
Clapper Rail:			
1,1-7	Eastham,Cohasset	2,1	V.Laux# & v.o.,J.Nichols# & v.o.
5	Plymouth	1	G.Soucy & L.Jodrey
Virginia Rail:			
5,12	Eastham,W.Harwich	3,4	B.Sorrie#,R.Veit#
22	Plymouth	1	B.Sorrie
Common Gallinule:			
1,1-12	Chatham,W.Harwich	1,1	v.o.,B.Nikula
American Coot:			
1-24,4	Fall River,Woburn	50-100,20	T.Athearn,BBC(D.Weaver)
10	Chilmark(M.V.),Boylston	30,24	P.Hughes#,B.Blodget
Killdeer:			
thr.	Squantum,Gloucester	1-4,2	R.Veit & v.o.,M.Argue# & v.o.
5,23	Buzzards Bay,Plymouth	1,6	SSBC(K.Anderson),R.Forster
Black-bellied Plover:			
thr.,24	Winthrop,Eastham	4-6,1	R.Stymeist,CCBC(D.Baines)
Ruddy Turnstone:			
thr.,18	Centerville,N.Scituate	17,6-8	V.Laux# & v.o.,S.Higginbotham#
Common Snipe:			
thr.,1-17	Cambridge,S.Peabody	2,3-4	R.Stymeist,R.Heil
2,23	Bourne	12,9	F.Gardner,B.Sorrie
Greater Yellowlegs:			
thr.	Eastham(Town Cove)	1	v.o.
Red Knot:			
18	Chatham,N.Scituate	43,6	B.Nikula#,SSBC(R.Fox)
Purple Sandpiper:			
4,10	Cape Ann,Rockport	150,95	BBC(L.Jodrey),H.Coolidge#
11,18	N.Scituate	425,250	R.Fox#,SSBC(R.Fox)
Dunlin:			
11,16	Westport,Barnstable	150,200+	BBC(R.O'Hara),R.Pease
18,24	Cohasset,Eastham	600,100+	R.Fox#,CCBC(D.Baines)
Sanderling:			
16,18	Barnstable,Hull	46,30	R.Pease,J.Murphy#
Northern Skua:			
26	Wollaston (excellent details rec'd.)	1	C.Quinlan#
Bonaparte's Gull:			
1,11	Squantum,Westport	200,15	BBC(E&H Donovan)(R.O'Hara)
18	Rockport,Fairhaven	150,250	R.Veit#,G.Mock
24	Newburyport(Merrimack River)	500-600	M.Gardler
Little Gull:			
14 on	Newburyport	1-3	H.Weissberg# & v.o.
Black-legged Kittiwake:			
18	Rockport(A.P.)	200+	R.Veit#
Ross' Gull:			
12,16	Newburyport (details rec'd.)	1	P.Parsons & H.Weissberg
Common Tern:			
11	Cohasset	1	R.Fox
Razorbill:			
1,5	Chatham,Scituate	3,1(dead)	V.Laux# & v.o.,B.Litchfield
Thick-billed Murre:			
11	N.Scituate	1	M&B Litchfield

Dovekie:			
17,26	N.Scituate,Boston(Long Island)	1,1	S.Higginbotham#,C.Quinlan
Black Guillemot:			
thr.	Cape Ann	1-8	v.o.
Common Puffin:	(no details rec'd.)		
11,19	Gloucester,Chatham	1,1	N.Claflin,C.Goodrich
Barn Owl:			
thr.	Boston(Long Island)	1-2	v.o.
Screech Owl:			
thr.	Lancaster,Carlisle	1,1	H.Merriman,K.Harte
1,2	Westwood,Melrose	2,1	J.Clancy,J.Andrews
5,11	Topsfield,Northboro	1,1	W.Foley#,B.Blodget
20,26	Lincoln,Swampscott	1,1	P.Swift,J.Quigley#
Great Horned Owl:			
3,4,12	Norwell,Ipswich,Sandwich	2,1,1	M&B Litchfield,J.Berry,R.Pease
15-18,19&26	Danvers,Lynnfield	1,1	E.Pyburn,J.Anderson
24,26	Weston,Brookline	1,1	L.Robinson,R.Stymeist
Snowy Owl:			
thr.	Squantum,Boston	1-2,1-3	v.o.
thr.,5 on	P.I.-Salisbury,Mattapoisett	2-3,1	v.o.,K.Anderson
6,9	Newton,Edgartown(M.V.)	1,2	J.D'Entremont,G.Ben David#
11,31	W.Goucester,Saugus	1,1	N.Claflin,J.Berry
Barred Owl:			
1-12	Sandwich	1	R.Pease,H.D'Entremont
Long-eared Owl:			
thr.	Newbury,Orleans	1,3	v.o.
15-31,16	Bridgewater,Ashland	4-5,2	G.Flaherty# & v.o.,E.Powers
Short-eared Owl:			
thr.	Chatham(North Beach),Squantum	max.7,2	C.Goodrich# & v.o.,v.o.
thr.	Bridgewater,Duxbury	1-3,2-4	v.o.,R.Emery# & v.o.
thr.,1-7	Barnstable,West Newbury	2,1	v.o.,M.Poore
Saw-whet Owl:			
4	Duxbury	1	fide W.Petersen
Belted Kingfisher:			
19	Orleans	12	V.Laux
Common Flicker:			
thr.	9 localities	14 individuals	v.o.
Pileated Woodpecker:			
thr.,11,21	Lancaster,Manchester,Concord	1-2,1,1	H.Merriman,H.Weissberg,R.Fortin
Red-bellied Woodpecker:			
thr.,17	S.Natick,Carlisle	1,1	W.Biggart & v.o.,R.Anderson
Black-backed Three-toed Woodpecker:			
thr.,26	Swampscott,Manchester	1 f.,1	N.Holmes & v.o.,F.Burnett
Northern Three-toed Woodpecker:			
15-31	Harvard	1 m.	J.Parry# & v.o.
Eastern Phoebe:			
1-24	Princeton(WMWS)	1(from Dec.)	T.Mongeon
Horned Lark:			
4,12	Mattapoisett,Bridgewater	20,60	G.Mock,W.Petersen
16,26	Duxbury,P.I.	20,18	J.Nichols,BBC(W.Van Cor)
Gray Jay:			
12	Hardwick	1	Dzwonkoskies
Blue Jay:			
24	Buzzards Bay	23(at one feeder)	B.Sorrie
Common Crow:			
10	Jamaica Plain(Forest Hills Cem.)	1500-2000	F.Atwood
26	Brookline	275(after 1 Great Horned Owl)	R.Stymeist
Fish Crow:			
thr.	West Roxbury	250+(Jan.1)	F.Atwood & v.o.
Boreal Chickadee:			
9-15	Weston	1	G.Brothers,D.Brown
Tufted Titmouse:			
thr.	9 localities	20 individuals	v.o.
Red-breasted Nuthatch:			
thr.,8	Lancaster,Cambridge(Mt.A.)	5+,3	H.Merriman,R.Veit
23,27	Buzzards Bay,Plymouth	2,1	B.Sorrie,D&H Carmichael
Brown Creeper:			
thr.	7 localities	10 individuals	v.o.

Winter Wren:			
1;5	Brewster;Orleans,Sterling	1;1,1	V.Laux;B.Nikula,B.Blodget
2,3	Winchester,Plymouth	1,1	H.Payson,B.Sorrie#
Carolina Wren:			
thr.	Georgetown,Sandwich	1,1	S.Stetson,R.Pease
1-5,3,11	Orleans,Plymouth,Westport	2,1,1	V.Laux#,B.Sorrie,R.O'Hara
18,20,25	Hingham,Reading,Sherborn	1,1,1	R.Fox,D.Stone,J.Willison
Long-billed Marsh Wren:			
thr.,5	W.Harwich,Concord(GMNWR)	3-4,1	B.Nikula# & v.o.,H.Payson
11,12	Barnstable,Orleans	1,1	R.Pease,R.Veit#
Gray Catbird:			
11,18	Westport,Rockport	1,1	BBC(R.O'Hara)(S.Grinley)
18&23	Manomet	1	M.B.O.Staff
Brown Thrasher:			
9,10	Sherborn,Worcester	1,1	S.Fessenden,Marston
12,22	Brookline,Manomet	1,2	A.Agush,B.Sorrie
American Robin:			
14	Orleans	160	V.Laux
Varied Thrush:			
thr.	Athol	1(from Dec.)	v.o.
Eastern Bluebird:			
14,15	S.Yarmouth,Centerville	3,3	V.Laux
28	Lincoln	3	C.Jenney,Jr.
Ruby-crowned Kinglet:			
4,11	Lexington,Westport	1,1	BBC(E.Taylor)(R.O'Hara)
12,29	Rochester,Westwood	1,3	B.Sorrie,D.Whiting
Bohemian Waxwing:			
2	Plymouth	1	D.Brown
Cedar Waxwing:			
1,3	Ipswich,Sandwich	50+,75	J.Berry,R.Pease
15,18,30	Manomet,Scituate,W.Townsend	70,30,80	B.Sorrie,J.Nichols,L.Larson
Northern Shrike:			
1,3	Annisquam,Manomet	1,1 imm.	M.Argue#,B.Sorrie#
4,12	Truro,E.Orleans	1,1 imm.	S&J Harrison,R.Veit#
15;19	Concord;Rockport,Sherborn	1;1,1	S.Barr#;G.Soucy,J.Willison
Yellow-rumped Warbler:			
4,5	Ipswich,Scusset	25+,300	J.Berry,J.Clancy
Pine Warbler:			
thr.,25	Chatham,Centerville	2,3	V.Saunders#,V.Laux
Palm Warbler:			
12,19	Falmouth,Eastham	1,14	CCBC(D.Baines),V.Laux
Ovenbird:			
1-30	Abington	1(photographed)	A.Pillsbury
Common Yellowthroat:			
1,4,12	Orleans,Plymouth,W.Harwich	1,1,1	B.Sorrie#,W.Petersen,R.Veit
11,12	Westport,Scituate	1,2	BBC(R.O'Hara),B.Litchfield
Yellow-breasted Chat:			
4&25	Annisquam	1	J.Quigley,S.Garrett#
7,12	Edgartown(M.V.),Falmouth	1,1	H.Hough,CCBC(D.Baines)
Eastern Meadowlark:			
thr.	Orleans	11-30+(Jan.12)	H.Merriman# & v.o.
5,27	Mattapoisett,Plymouth	39,20	SSBC(K.Anderson),H&D Carmichael
Yellow-headed Blackbird:			
27	Bellingham	1	M.Philbrick
Red-winged Blackbird:			
12,15	Middleboro,Centerville	3,15	D.Briggs,D.Briggs
Northern Oriole:			
15,16	N.Abington,Brookline	2,1	M.Conant,T.Whitney
Rusty Blackbird:			
15,28	Barnstable,Orleans	9,8	R.Pease,V.Laux
Common Grackle:			
thr.,4	Lancaster,Winchester	1-2,1	H.Merriman,H.Payson
16,29	Wellesley,Concord	1,3	L.Robinson,W.Drummond
Brown-headed Cowbird:			
thr.,11	Lancaster,Westport	75+,30	H.Merriman#,BBC(R.O'Hara)
Western Tanager:			
4-31	Annisquam	1	L.Jodrey# & v.o.

Black-headed Grosbeak:			
1-6,21-31	Worcester,Concord	1,1	C.Quinlan# & v.o.,R.Forster# &v.o.
Dickcissel:			
thr.,11	Orleans,Manchester	2,1	E.Lund,P.Parsons
Evening Grosbeak:			
2;14	Haverhill;Reading,Needham	50;100,200	W.Drummond;C.Smith,L.Eaton
Purple Finch:			
thr.	Ipswich,Lancaster	2-3,1-2	J.Berry,H.Merriman
8-30,25	Hanover,Falmouth	3,8	J.Nichols,BBC(A.Clarke)
House Finch:			
4	Annisquam,Lexington	30,30	BBC(L.Jodrey)(E.Taylor)
12	Falmouth,Ipswich	15,20	CCBC(D.Baines),BBC(J.Berry)
Pine Grosbeak:			
15	Wayland(GMNWR)	6	F.Steadman
Pine Siskin:			
10,26	Cohasset,Brookline	18,6	G.Wilson,R.Stymeist
American Goldfinch:			
5,12	Weston,Ipswich	25,40+	L.Robinson,BBC(J.Berry)
White-winged Crossbill:			
2	Canton	1	D.Brown
Rufous-sided Towhee:			
1-17,9	S.Peabody,E.Millbury	1,1	R.Heil,B.Blodget
11,25	Westport,Falmouth	1,3	BBC(R.O'Hara)(A.Clarke)
Savannah Sparrow:			
4	Duxbury,Plymouth	2,3	J.Nichols,R.Emery#
12,19	E.Orleans,Ipswich	2,1	R.Veit#,J.Berry
Seaside Sparrow:			
4	Plymouth	2	R.Emery,W.Petersen
Dark-eyed Junco:			
5,23	Weston,Middleboro	75,50	L.Robinson,R.Emery#
Tree Sparrow:			
thr.	6 localities	45+	v.o.
Field Sparrow:			
4;5	Mattapoisett;Wareham,Weston	2;4,1	G.Mock;K.Anderson#,L.Robinson
White-crowned Sparrow:			
1	Nauset	1	C.Goodrich# & v.o.
14 on,30	Danvers,Truro	1,1	E.Pyburn & v.o.,R.Forster
White-throated Sparrow:			
thr.	6 localities	55 individuals	v.o.
Fox Sparrow:			
thr.	Mattapoisett,Cambridge(Mt.A.)	2,5-6	G.Mock,R.Stymeist
4,12	Lexington,Vineyard Haven(M.V.)	1,1	BBC(E.Taylor),M.Hancock
15,27	Weston,Peabody	1,2	D.Brown,S.Stetson
Swamp Sparrow:			
thr.	9 localities	24 individuals	v.o.
Lapland Longspur:			
3,12	Chatham,E.Orleans	70,20+	C.Goodrich#,H.Merriman#
19,27	Boston,Salisbury(Mass.)	35-40,10	BBC(L.Robinson),P.Swift
Chestnut-collared Longspur:			
3-6	Chatham(North Beach)	1 (excellent details)	C.Goodrich,B.Nikula,R.Clem, W.Bailey,B.Sorrie,W.Harrington
Snow Bunting:			
18,19	Concord,Ipswich	9,100	H.Payson,J.Berry
22,25	Wayland,P.I.	1,20-25	E.Boulter,P.Kitchin#

THE BIRD OBSERVER SUMMARY FOR FEBRUARY 1975

On February 2, Pennsylvania's famed ground hog saw his shadow and predicted more winter weather. Here in New England it seemed he was dead wrong, since temperatures were 6 to 12 degrees above normal. The weather changed - a coastal storm on February 6 left 6-12 inches of snow in southern Massachusetts, followed by the coldest week of winter. Another storm on February 12 dumped an additional 4 to 8 inches of new snow. Temperatures returned to near normal with a high reading of 49 degrees at Boston on February 19. Fair weather predominated through February 22, when 1.50 inches of rain fell over southern New England. Temperatures continued above normal through the end of the month.

The Cardinal-Titmouse-Mockingbird survey was hampered by the storm of February 6, and higher-than-normal wind conditions made observations difficult this year; results will be forthcoming in a later issue of Bird Observer.

The birding was not much different from January, with the exception of the blackbird arrival on February 23. There has been little effect on the numbers of blackbirds reported, since the destruction of nearly a million birds by civilian and military officials in Tennessee and Kentucky in mid-month. In their efforts to kill off the birds, officials, with the blessing of the National Audubon Society, used a detergent which when sprayed on the roost, matted the feathers, depriving them of body heat, and the blackbirds froze to death. Bird Observer would be interested in knowing if there has been a decline of breeding blackbirds in your area.

The old stand-bys were still around during February: the White Pelican until mid-month when it was reported flying over Otis Air Force Base and not seen since at the West Harwich Conservation Lands. The Little Blue Heron and Snowy Egret continued at Fort Hill, Eastham, as did the King Rail. The Sandhill Crane maintained his stance at Herring Pond, Eastham throughout the month. Other lingerers included Red-bellied Woodpecker, Northern Three-toed Woodpecker at Harvard, despite the cutting down of his favorite elms, the Varied Thrush, Western Tanager and the Black-headed Grosbeak.

A Black Brant was found at Morris Island, Chatham on February 16 and remained in the area with 40-50 Brant through the end of the month. A Tufted Duck was observed at Salisbury on February 17 and continued throughout the month. As many as 1900 Canvasback, 1140 Greater Scaup and 140 Common Mergansers were reported on the Taunton River; this careful count was made between the Towns of Dighton and Fall River. Other impressive waterfowl counts were 900 Brant, 2000+ Common Goldeneye and 7000+ Common Eider in Boston Harbor.

Raptors included 4 Goshawks, 2 Cooper's, 5 Red-shouldered, an immature Bald Eagle at Lakeville, a Peregrine, 3 Merlins, and the Gyrfalcon continued at Monomoy. A partially oiled Common Murre was present in Wellfleet Harbor, and a Common Puffin was picked up alive in Truro and brought to the Wellfleet Bay Audubon Sanctuary where it later died. Note also the high and careful count of Black Guillemots on Cape Ann.

Many owls were reported during the month, with the Barn Owls continuing in Boston Harbor, and Long-eared Owls reported from five localities, including one pair nesting at Mount Auburn Cemetery, Cambridge.

An Eastern Phoebe was found at Orleans, and Carolina Wrens continued in Middlesex County. An Ovenbird was well-observed throughout the month at a feeder in Sherborn, and a lone Pine Grosbeak was seen at Harvard on February 4. Redwings and Song Sparrows started singing everywhere at months end - a prelude to the beautiful season of spring.

R.H.S.

Common Loon:			
7,8	Salisbury,Plymouth	18,7	T.Aberle,SSBC(B.Sorrie)
Red-throated Loon:			
9	Winthrop	7	R.Stymeist
Red-necked Grebe:			
thr.,8	Cape Ann,Plymouth	3-10(max.Feb.16),5	v.o.,SSBC(B.Sorrie)
Horned Grebe:			
15	Gloucester	55	FBC(B.Blodget)
White Pelican:			
1-14	W.Harwich(from Dec.)	1	v.o.
15	"flying over Otis AFB"	1	fide K.Anderson

Gannet:

17,23	Chatham,off Monomoy	3,30	G.Soucy#,W.Harrington#
24	Rockport	2	M.McClellan

Great Cormorant:

2,16	Nahant,Cape Ann	100,30+	BBC(A.Murphy),H.Merriman
22	Chatham	18	W.Petersen#

Great Blue Heron:

22	Outer Cape,Westport	60+,4	W.Petersen#,R.O'Hara
27	Buzzards Bay	7	B.Sorrie

Little Blue Heron:

1-18	Eastham(Salt Pond)	1 imm.(from Dec.)	v.o.

Snowy Egret:

thr.	Eastham(Fort Hill)	1(from Dec.)	v.o.

Black-crowned Night Heron:

thr.,2	Edgartown(M.V.),Eastham(F.H.)	4-5,9	G.Ben David,B.Sorrie#

American Bittern:

thr.	Eastham(F.H.),Concord(GMNWR)	1-3,1	v.o.,H.Payson

Mute Swan:

thr.	Manchester	2	v.o.

Canada Goose:

2	P.I.	500	R.Veit#

Brant:

thr.	Chatham,Eastham	40-50,200-283	v.o.
1	Orleans,Duxbury	90,12-15	B.Blodget#,G.Wilson
21,25	Cape Pogue(M.V.),Squantum	34,100	S.Baird#,E.Morrier
23,28	Rockport(A.P.),Buzzards Bay	7,900	R.Stymeist#,T.Clough

Black Brant: (excellent details)

16-29	Chatham(Morris Is.)	1	W.Petersen,N.Procter,J.Kenneally, R.Fox and v.o.

Black Duck:

2	Newburyport	3000	R.Veit#

Gadwall:

7,22	Manomet,Monomoy	3,3	B.Sorrie,W.Harrington#

Pintail:

8,16	Plymouth,Auburndale	7,1	SSBC(B.Sorrie),R.O'Hara
22	Chatham,Monomoy	5,100	W.Petersen#,W.Harrington#

Green-winged Teal:

thr.,22	Cohasset,Monomoy	2-3,40	v.o.,W.Harrington#

Blue-winged Teal:

thr.,8	Sandwich,Lakeville	2,2	R.Pease,SSBC(S.Higginbotham)

European Wigeon:

1-28	Cohasset(Little Harbor)	1	v.o.

American Wigeon:

1,8,20	Orleans,Manomet,E.Falmouth	50,27,30	B.Blodget#,B.Sorrie#,A.Clarke

Northern Shoveler:

2,22	Barnstable,Monomoy	1,1	R.Pease,W.Harrington#

Wood Duck:

1,15	Orleans,Dighton	3,1	B.Blodget#,F.Gardner#

Redhead:

thr.,7	Plymouth,Eastham	1,1	B.Sorrie# & v.o.,D&V Crompton
15,23	Somerset,Monomoy	3,5-6	B.Sorrie#,W.Harrington

Ring-necked Duck:

2	Cambridge,Sandwich	30,86	L.Robinson,R.Pease
22	Eastham(Herring Pond)	62	R.Stymeist# & v.o.

Canvasback:

1-2	Cambridge	45-18	J.Holman & L.Robinson
15-17	Dighton-Fall River	1900-725	B.Sorrie & W.Petersen
1,26	Falmouth,Newburyport	300,30	B.Blodget#,N.Powell

Greater Scaup:

15	Dighton-Fall River(Taunton River)	1140	B.Sorrie#

Lesser Scaup:

1	Falmouth,Orleans	340,100	B.Blodget,R.Jenkins

Tufted Duck:

17-28	Salisbury	1 m.	W.Holland,E.Treacy & v.o.

Common Goldeneye:

20	Newburyport	2000+	W.Petersen

Barrow's Goldeneye:			
thr.	Newburyport,Plymouth	1-6,1-3	v.o.,G.Wilson# & v.o.
15,16	Berkley,Chatham	1,1	B.Sorrie,B.Nikula
Bufflehead:			
2	Newburyport,Swampscott	400,100	R.Veit#,BBC(A.Murphy)
Oldsquaw:			
2,20	Newburyport	350,100	R.Veit#,W.Petersen#
Harlequin Duck:			
thr.,15	Magnolia,Rockport	2-10,1	v.o.,FBC(B.Blodget)
18	N.Scituate	1	S&R Higginbotham
Common Eider:			
2	P.I.,Nahant	150,500	R.Veit,BBC(A.Murphy)
8	Plymouth	3660	B.Sorrie#
23	Monomoy,Boston(Long Is.)	5000,7000+	W.Harrington#,E.Morrier
King Eider:			
1-11,1,2	P.I.,Hull,E.Orleans	1,2,1	K.Hamilton,J.Murphy#,W.Petersen#
Surf Scoter:			
8,16	Manomet,Rockport	15,2	SSBC(B.Sorrie),H.Merriman
Black Scoter:			
8,9,16	Manomet,Winthrop,Rockport	10,6,3	B.Sorrie#,R.Stymeist#,H.Merriman
Ruddy Duck:			
1;2	Falmouth,Orleans;Cambridge	26,40;12	B.Blodget,R.Jenkins;L.Robinson
10,22	Fall River, Orleans	54,50	T.Athearn,W.Petersen#
Hooded Merganser:			
1,10	Lakeville,Fall River	6,6	G.Wilson,T.Athearn
17,20	Cohasset,E.Falmouth	4,15	D.Brown#,A.Clarke
Common Merganser:			
15,22	Taunton River,Harwich	140,130	B.Sorrie#,W.Petersen#
Red-breasted Merganser:			
23	Monomoy	400	W.Harrington#
Goshawk:			
3,13	Boxboro,Lincoln(DFWS)	1,1	P.Miliotis,S.Lewis
15,16	W.Newbury,Carlisle	1,1	M.Poore,D.Southall
Sharp-shinned Hawk:			
1-22,16	Eastham,Truro	1,1	J.Nichols# & v.o.,W.Petersen#
22,27	Cambridge(Mt.A.),Buzzards Bay	1,1	A.Horn,B.Sorrie
Cooper's Hawk:			
5,17	Carlisle,Lakeville	1,1	D.Southall,G.Flaherty
Red-tailed Hawk:			
thr.	14 localities	23 individuals	v.o.
Red-shouldered Hawk:			
6-17,17	E.Bridgewater,Cohasset	1,1	G.Flaherty & v.o.,B.I[illegible]field
21,22	Mashpee,Westport	1,2	R.Pease,J.Campbell
Rough-legged Hawk:			
thr.	7 localities	12 individuals	v.o.
Bald Eagle:			
8-18	Lakeville	1 imm.	A.Rios# & v.o.
Marsh Hawk:			
thr.;1	Bridgewater,P.I.;Eastham	3-4,1;1	v.o.;B.Blodget#
Gyrfalcon:			
22 (probably thr.)	Monomoy	1	W.Harrington# & v.o.
Peregrine Falcon:			
22	Newbury	1	J.Berry
Merlin:			
1,15,20	P.I.,Chatham,Salisbury	1,1,1	K.Hamilton,B.Nikula,E.Taylor
American Kestrel:			
thr.	18 localities	27 individuals	v.o.
Ruffed Grouse:			
9	Magnolia	1	R.Stymeist#
Bobwhite:			
thr.,17	S.Dennis,Hingham	24,12	C&B Holdridge,V.Curtis
Sandhill Crane:			
thr.	Eastham(Herring Pond)	1(from Jan.)	v.o.
King Rail:			
1-16	Eastham(F.H.)	1 well observed	W.Petersen,R.Fox,N.Procter
Virginia Rail:			
1;2	Harwich,Marshfield;Eastham	1,1;2	P.Aiken,G.Wilson#;W.Petersen
8	Needham,Concord	1,1	G.Walsh,H.Payson
10	Edgartown(M.V.)	1	G.BenDavid

American Coot:			
1,15,28	Lakeville,Woburn,Eastham	100,20,46	G.Wilson#,R.Clayton#,R.Stymeist#
Killdeer:			
thr.	14 localities	33 individuals	v.o.
Black-bellied Plover:			
thr.,9	Chatham,Winthrop	6-9,4	v.o.,R.Stymeist#
Ruddy Turnstone:			
15	N.Scituate	80	D.Brown
American Woodcock:			
8,19,23	E.Harwich,Sandwich,Boston	1,"singing",1	C.Goodrich#,R.Pease,E.Cutler
27,28	Ipswich,Norwell	5 "singing",3	J.Berry#,M.Litchfield
Common Snipe:			
1	Eastham,Marshfield	1,7	BBC(P.Aiken),G.Wilson
8,15	Bridgewater,Woburn	4,1	SSBC(B.Sorrie),R.Clayton#
17	Concord(GMNWR)	5	J.Hinds#
Greater Yellowlegs:			
thr.,25	Eastham,Centerville	1,1	v.o.,V.Laux
Red Knot:			
22	Chatham	42	R.Stymeist & R.Emery
Purple Sandpiper:			
thr.	N.Scituate	1000+(max.Feb.20)	C.Clark & v.o.
Dunlin:			
2,16	Swampscott,Eastham	50,600+	BBC(A.Murphy),W.Petersen#
15,27	N.Scituate,Cohasset	85,400+	D.Brown#,B.Litchfield
Sanderling:			
thr.	Gloucester	12-14	v.o.
2,17	Swampscott,Chatham	50,250	BBC(A.Murphy),G.Soucy#
Glaucous Gull:			
2,4&15	Newburyport,Gloucester	1,1	R.Veit#,R.Emery# & B.Bledget
9,18	Salisbury,N.Scituate	1,1	BBC(W.Drummond),S&R Higginbotham
21,23	Sandwich,Monomoy	1,1	R.Pease,W.Harrington#
Iceland Gull:			
thr.	Newburyport,Gloucester	3-11,2-11	v.o.
10,16,18	Bridgewater,Newton,Hull	1,1,1	B.Sorrie,R.O'Hara,S&R Higginbotham
Black-headed Gull:			
thr.	Newburyport,Eastham	2-4,2	v.o.
16,17	Gloucester,Squantum	2,3	BBC(Hales),H.D'Entremont#
Bonaparte's Gull:			
2	Newburyport	125	R.Veit#
Little Gull:			
thr.	Newburyport	1-2	v.o.
Black-legged Kittiwake:			
2	Nauset Beach	1 imm.	W.Petersen#
Razorbill:			
4&16,23	Rockport(A.P.),Monomoy	1&1,1	G.Wilson# & G.Soucy#,W.Harrington
Common Murre:			
16	Wellfleet	1(partially oiled)	W.Bailey & v.o.
Black Guillemot:			
thr.	Cape Ann 2-25(careful count)(max.25Feb.11)		v.o.(M&A Argue)
Common Puffin:			
23	Truro 1 imm.picked up alive,later died at WBWS, fide W.Bailey		
Rose-ringed Parakeet:			
8-17	Plymouth	2 m.	v.o.
Barn Owl:			
thr.	Boston(Long Island)	1	G.Wilson & v.o.
Screech Owl:			
thr.	10 localities	13 individuals	v.o.
Great Horned Owl:			
thr.	8 localities	10 individuals	v.o.
Snowy Owl:			
thr.	P.I.,Newburyport,Salisbury	3-5	v.o.
thr.	Squantum-East Boston	3	v.o.
thr.	Martha's Vineyard	3-4	v.o.
16,27	Rockport,Duxbury	1,1	BBC(R&D Hale),T.Clough
Barred Owl:			
22	Boxford	1	R.Palmer

Long-eared Owl:			
thr.,7	Newbury,Orleans	1,2	K.Hamilton & v.o.,W&P Bailey
16,20	Concord(GMNWR),Belmont(HFWS)	1,1	A.Saltzman#,H.Brett
17 on	Cambridge(Mt.A.)	2(nesting)	A.Horn,R.Stymeist
Short-eared Owl:			
thr.,8	Squantum,Bridgewater	1-2,4	v.o.,SSBC(B.Sorrie)
15 on	Eastham(F.H.)	1	D.Long# & v.o.
Belted Kingfisher:			
thr.	10 localities	singles	v.o.
Pileated Woodpecker:			
thr.	Lancaster,Princeton(WMWS)	1-2,1	H.Merriman,B.Morrison
2,22	Manchester,Boxford	1,1	BBC(P.Parsons),G.Soucy#
Red-bellied Woodpecker:			
thr.,4	S.Natick,Chelmsford	1-2,1	L.Robinson# & v.o.,M.Whiting
6-13	Worcester	1	B.Blodget,D&V Crompton
Yellow-bellied Sapsucker:			
1	Menemska(M.V.)	1	Y.Suhl
Black-backed Three-toed Woodpecker:			
1-2	Swampscott	1	v.o.
Northern Three-toed Woodpecker:			
thr.	Harvard	1 m.(photographed)	J.Parry & v.o.
Eastern Phoebe:			
22	Orleans	1	C.Goodrich & v.o.
Horned Lark:			
17	Oak Bluffs(M.V.)	20	M.Hancock
20,21	Salisbury,E.Bridgewater	65,30	B.Cassie,W.Petersen
Fish Crow:			
thr.	Cambridge(Mt.A.)	3-5	R.Stymeist,H.Wiggin & v.o.
Tufted Titmouse:			
9	Sherborn	186	v.o.,compiler E.Taylor
Red-breasted Nuthatch:			
thr.	Lancaster,Vineyard Haven(M.V.)	5+,1	H.Merriman,L.Whitney
15,20-27	Athol,Dartmouth	1,2	E.Taylor#,P.Regan
Brown Creeper:			
thr.,9,17	Lancaster,Magnolia,Concord	5,1,1	H.Merriman,R.Stymeist#,J.Hinds#
Winter Wren:			
2,11	Plymouth,Manomet	1,1	H&D Carmichael,F.Gardner
17,25	Sandwich,Bridgewater	1,3	B.Nikula,G.Flaherty
Carolina Wren:			
thr.,1-2	Sherborn,Wellesley	1,1	J.Willison,Ms.Stimpson
1&8	Quidnet(Nantucket)	1	E.Van Duyhe & M.Depue
5,8,9	Carlisle,Waltham,Lexington	singles	H.Meehan,B.Cassie,Ms.Guinanter
11,13,19	Weston,Framingham,Manomet	1,2,2	A.McMullin,F.Kenna,W.Petersen#
Mockingbird:			
9	Sherborn	8	v.o.,compiler E.Taylor
Gray Catbird:			
1;2	Falmouth;Eastham,Nahant	1;2,1	R.Jenkins#;W.Petersen#,A.Murphy#
14	Manomet	1	M.B.O.Staff
Brown Thrasher:			
thr.	Sherborn,Worcester	2,1	C.Comins,J.Marston
1,7,14	Falmouth,Winchester,Holden	1,1,1	B.Blodget#,H.Payson,Furst
22,25	Eastham,Waltham	1,1	W.Petersen#,B.Cassie
26	Edgartown(M.V.)	1	G.Ben David
American Robin:			
2,16,17	Ipswich,Chatham,Cohasset	12,14,24	J.Berry,W.Petersen#,V.Shapiro
Varied Thrush:			
thr.	Athol	1(from Dec.)	v.o.
Hermit Thrush:			
13,15	Manchester,Martha's Vineyard	1,1	H.Weissberg,fide Vineyard Gazette
Eastern Bluebird:			
3,8	Brookline,E.Harwich	1,4	C.Lund,C.Goodrich#
13,28	Lexington,Lincoln	1,2	A.Calkins,C.Jenney
Ruby-crowned Kinglet:			
10	Vineyard Haven(M.V.)	1	J.Hughes
Cedar Waxwing:			
13,16	S.Weymouth,Newton	52,100+	E.Pearson,R.O'Hara
22	Barnstable,Rockport	65,40+	R.Pease,B.Blodget#

Northern Shrike:			
1,6,7	Orleans,Concord,Sandwich	singles	R.Jenkins#,H.Payson,R.Pease
11,16,17	Newburyport,Rockport,Manomet	singles	M.Gardler,R&D Hale#,M.B.O.Staff
19	Essex,Plymouth	singles	P.Parsons,W.Petersen#
22	Eastham,Barnstable	singles	W.Petersen#,R.Pease
Yellow-rumped Warbler:			
2	Truro	130+	W.Petersen#
Pine Warbler:			
thr.	Chatham,Vineyard Haven(M.V.)	2,1	V.Saunders,F.Lopes,Jr.
9&21	Bridgewater	1	G.Flaherty
Ovenbird:			
thr.	Sherborn	1(well observed)	C.Comins,E.Taylor
Common Yellowthroat:			
8	Concord(GMNWR)	1	H.Payson
Yellow-breasted Chat:			
thr.,1	Annisquam,Orleans	1,1	G.Soucy# & v.o.,R.Jenkins#
2	Falmouth,Lexington	1,1	A.Clarke,fide J.Murphy
Eastern Meadowlark:			
thr.	Bridgewater,Eastham	20,7-11	W.Petersen# & v.o.,P.Aiken# &v.o.
15,19	Ipswich,Plymouth	15,4	G.Soucy#,W.Petersen#
Red-winged Blackbird:			
2,23 on	Brewster,general arrival	40+,"flocks"	W.Petersen#,v.o.
27	Middleboro	1000	G.Wilson#
Rusty Blackbird:			
7,24	Concord(GMNWR),Norwell	6,2	H.Payson,B.Litchfield
26	Waltham	6	B.Cassie
Common Grackle:			
25	general arrival	singles	v.o.
27	Middleboro	50	R.Emery#
Brown-headed Cowbird:			
23;26	Ipswich,Byfield;Norwell	15,16;35	J.Berry,T.Joyce;G.Wilson
Western Tanager:			
thr.	Annisquam	1(from Dec.)	v.o.
Cardinal:			
9	Sherborn	55	v.o.,compiler E.Taylor
Black-headed Grosbeak:			
1-17	Concord	1(from Dec.)	v.o.
Evening Grosbeak:			
thr.	20 localities	total 588 individuals	v.o.
thr.	Lancaster	100+(largest flock)	H.Merriman
Purple Finch:			
thr.,15	Ipswich,Tewksbury	8,1	J.Berry,M.Wilson
22,23	Belmont,Annisquam	4,4	BBC(J.Barton),R.Stymeist#
House Finch:			
15,18	Annisquam,Beverly	30+,20	B.Blodget#,G.Soucy
Pine Grosbeak:			
4	Harvard	1	R.Jenkins#
Pine Siskin:			
5	Dorchester	6	J.O'Regan
Rufous-sided Towhee:			
1;12	Eastham,Ipswich;Hingham	1,1;1	B.Blodget#,J.Berry;A.Given
14	Vineyard Haven(M.V.)	1	M.Hancock
Savannah Sparrow:			
14,15	Barnstable,N.Scituate	13,1	R.Pease,D.Brown#
Chipping Sparrow:			
2	Barnstable	1	R.Pease
Field Sparrow:			
1,9,18	Eastham,Lancaster,Beverly	3,2,1	R.Jenkins#,H.Merriman,G.Soucy
White-crowned Sparrow:			
2	Truro	1 imm.	W.Petersen,B.Sorrie
White-throated Sparrow:			
1,16	Duxbury,Weston	15-20,1"singing"	G.Wilson#,L.Robinson
Fox Sparrow:			
thr.	Cambridge,Sherborn	3-7,1	R.Stymeist,C.Comins
5,12	Peabody,Lincoln	2,1	G.Soucy,I.Nisbet
Swamp Sparrow:			
8	Plymouth	2	SSBC(B.Sorrie)

Song Sparrow:			
22 on		"singing everywhere"	v.o.
Lapland Longspur:			
11,20	Salisbury,P.I.	25,28	R.Emery#,W.Petersen#
Snow Bunting:			
7&23,7	Salisbury,Martha's Vineyard	2&2,24	T.Aberle & M.Argue#,S.Baird
8	Waltham,S.Easton	5,12	B.Cassie,D&V Crompton

Abbreviations

ad.	adult	DFWS	Drumlin Farm Wildlife Sanctuary, Lincoln
b.	banded	GMNWR	Great Meadows National Wildlife Refuge
f.	female	HFWS	Highland Farm Wildlife Sanctuary, Belmont
imm.	immature	M.B.O.	Manomet Bird Observatory
m.	male	WBWS	Wellfleet Bay Wildlife Sanctuary
max.	maximum	WMWS	Wachusett Meadows Wildlife Sanctuary
thr.	throughout	A.P.	Andrews Point, Rockport
v.o.	various observers	E.P.	Eastern Point, Gloucester
#	additional observers	F.H.	Fort Hill, Eastham
BBC	Brookline Bird Club	Mt.A.	Mt. Auburn Cemetery, Cambridge
CCBC	Cape Cod Bird Club	M.V.	Martha's Vineyard
FBC	Forbush Bird Club	P.I.	Plum Island
SSBC	South Shore Bird Club	S.N.	Sandy Neck, Barnstable

Addendum

Sabine's Gull:			
Sept.21;74	Nantucket.	1 ad.,1 imm.	E&C Andrews,G.Soucy,L.Jodrey
Double-crested Cormorant:			
Nov. 5;74	Lincoln(Cambridge Resvr.)	1	L.Robinson
Lesser Scaup:			
Nov.17,25;74	Cambridge(Fresh Pond)	5	L.Robinson
Common Merganser:			
Dec. 3;74	Lincoln(Cambridge Resvr.)	92	L.Robinson
Tufted Duck:			
Feb.16-18;75	Nantucket(Sachacha Pond)	1 m.	H.Connor,E.Andrews

Corrigenda

Volume 3, #1 - Summary for December 1974:

Tufted Titmouse:			
14,15	Buzzards Bay,Concord	570,409	CBC
	(should read)		
14,15	Buzzards Bay,Concord	34,409	CBC

(Also correct Buzzards Bay Tufted Titmouse total in December total)

Savannah Sparrow(Ipswich):			
21,29	S.Manomet,Cape Cod	15,4	CBC
	(should read)		
21,29	Plymouth Beach,Cape Cod	15,4	CBC
Savannah Sparrow:			
21,29	Plymouth,Cape Cod	15,47	CBC
	(should read)		
21,29	Plymouth,Cape Cod	5,47	CBC

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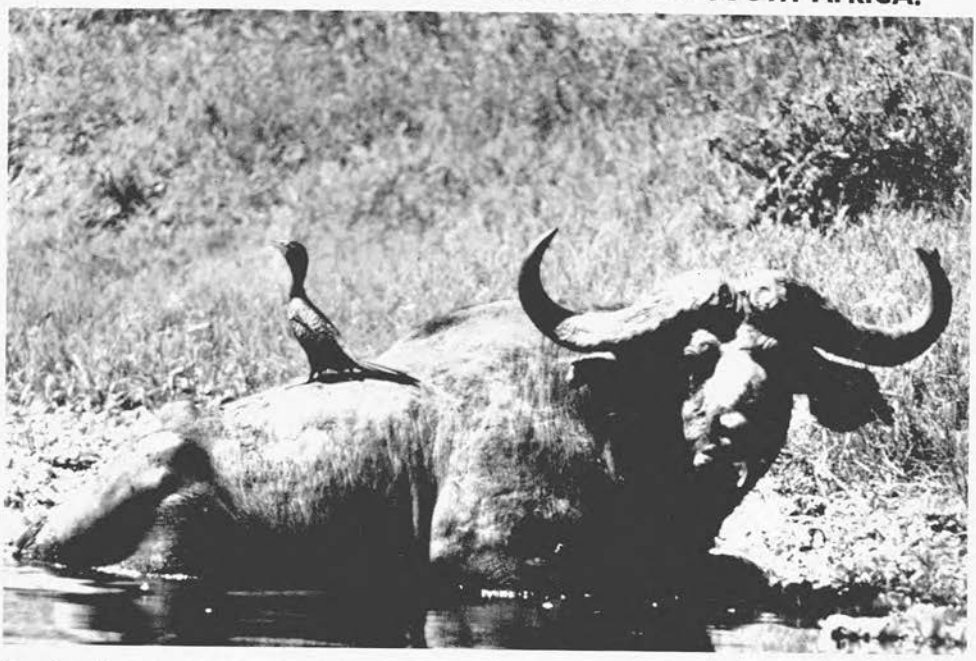

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