Shearwater AX6587 at the edge of the water, 100 yards from the point and on the southern shore of a tiny peninsula. It flew directly over the water to the end of the peninsula and then abruptly turned eastward over the ocean. This was at 8:15 a. m., E. D. S. T. June 3, 1952.

On June 20 I was surprised to receive the following cable: "MAZZEO, SYMPHONY HALL, BOSTON, MASS. No. AX6587 back 0130 BST 16th stop—FANTASTIC—MATTHEWS." A letter subsequently received said that Matthews on making his second round of the night of June 15/16, was "completely flabbergasted" to find AX6587 in its own burrow. He continued, "I read the ring several times, and then put the bird back and blocked the entrance. I wanted to make sure it would still be in when I took Peter Conder along to verify my observation. As we had not then had your letter, I was convinced that you must have run into trouble with our customs and released the bird at London. The boat came over that morning with your letter—there was no gainsaying the result then! A pretty touch, the bird beating the mail!"

The bird travelled more than 3200 land miles in 12 days, 12 hours, and 31 minutes, or an average of 250 miles per day.—ROSARIO MAZZEO, *Symphony Hall, Boston, Massachusetts.*

Night Rafting of American Golden-eyes on the Mississippi River.—Numerous observers have reported regular daily movements of flocks of American Golden-eyes (*Bucephala clangula americana*) on their wintering grounds. Recently I have had opportunity to study some of these movements in detail. For the past 12 years I have lived on the west bank of the Mississippi River about five miles north of the city limits of Minneapolis. Small flocks of golden-eyes, which fed during the day in the open places in the river, would fly down river past my home in the evening and up river again early in the morning. After a little local investigating I found that a night raft existed not far from the center of Minneapolis. Occasional observations during subsequent winters indicated that this was a relatively permanent, well-established concentration.

It was located at the upstream end of a long, narrow island about midway between the Broadway and Plymouth Avenue bridges, where the river is about 300 yards wide. A large steam electrical plant of the Northern States Power Company occupies the east bank of the river 1⅝ miles upstream; and the water, heated in the process of cooling the huge generators, keeps the river channel at least partially open to a point below the raft site even in the coldest weather. Evidently this accounts for the regular use of this location by the ducks. During the winter of 1949–50 I made many observations of this raft in an effort to understand better the nature of this regular concentration.

During a normal evening the ducks began arriving at the raft site about an hour before sunset and would continue to arrive until nearly an hour after sundown (Fig. 1). (This graph indicates the percentage of the entire flock that came in during 10-minute intervals before and after sundown.) It was so dark when the last flocks arrived that they could be distinguished only with difficulty against the faint light in the western sky. As a rule the birds arrived in small flocks that could be actually counted or at least fairly accurately estimated after a portion of the flock had been counted. As the birds settled down after dark they rafted into a compact mass in midstream just above the upper end of the island. In the morning small flocks of birds could be distinguished in the semi-darkness leaving the raft and going both up and down stream to their feeding spots. Only a few birds remained in the raft in the morning after the light became strong enough to discern its position on the water. The maximum number of birds recorded in the raft was somewhat more than 600.

From coordinated observations by a number of volunteer observers it was found that birds comprising this raft came from as far up stream as Elk River, nearly 27 miles, and from as far down stream as Fort Snelling, about 10 miles. Another similar raft was established in St. Paul and a third one on the St. Croix River a short distance above its confluence with the Mississippi.

The raft concentration came into being suddenly with the freeze-up in early winter. Figure 2 shows the total numbers of birds checked on 18 different evenings from December 9 to April 2. The river was open until early in December, when a cold

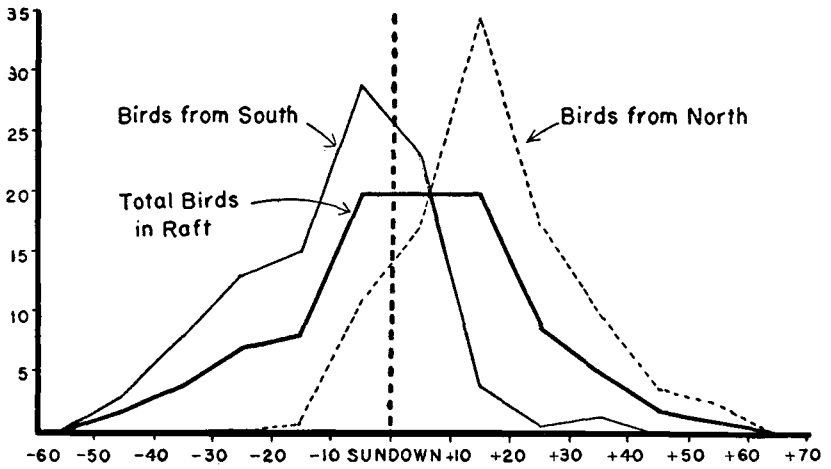

FIGURE 1. Arrival time of birds at night rafting site.

snap about December 8 suddenly froze over all the quieter portions of the river. Then, and not until then, did the birds begin the night concentration; and once it began, the maximum numbers started assembling there almost immediately. In spring the termination was almost as abrupt. This was brought about by warm weather and rain, causing the final break-up of the river ice on April 4.

It will be noticed (Fig. 2) that the numbers of birds making up the raft remained about the same until early February, when they dropped suddenly to almost half, then built back up to nearly the early winter maximum before the raft broke up in spring. Wide areas of comparatively rapid waters in the Mississippi River remained open well into January. It was not until a couple of weeks after the long continued cold spell of late January and early February (Fig. 2) that many of these areas finally became completely frozen over. Apparently this loss of feeding waters forced some of the ducks to move down river to adequate open feeding places. As soon as warmer weather in late February and March allowed some of these frozen feeding areas to reopen, the birds moved back to their former feeding locations before going on north to their breeding grounds. It will be noted that the later winter totals were only slightly below early winter counts. The same was the case during the previous winter. These slight differences might reflect some actual mortality, but no evidence supporting this was secured.

One interesting and still unexplained fact became evident as soon as the observations began. The majority of the birds coming to the raft from the south invariably came in earlier than did the birds from the north (Fig. 1). Here the average of 17 observations shows that the peaks in numbers of arriving birds from north and south

came about 20 minutes apart. A number of factors may be concerned with the arrival time of the birds at the raft. First, the birds that traveled farthest to this point came from the north, where the maximum distance was nearly three times as great as the maximum distance traveled by some birds from downstream. This could account for the very last birds to arrive at the raft always coming from the north, but does not adequately explain the fact that the earliest birds at the roost were invariably from the south. Another factor involved concerned the nature of the Mississippi River channel. Only a mile and a quarter below the raft site the

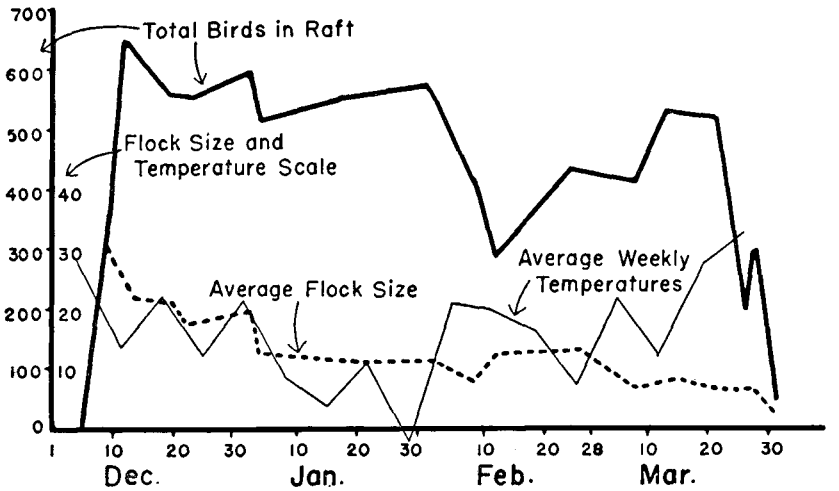

FIGURE 2. Numbers of birds, flock size, and temperatures throughout the winter, 1949–1950.

river drops over St. Anthony Falls. Below the falls the river is in a relatively narrow channel about 75 feet lower than the river surface above the falls. Naturally the light in late afternoon fails in the north-south portions of the gorge somewhat earlier than in the shallower channel above the falls. Numerous simultaneous light readings were taken at the raft site and at points below the falls where the evening shading effect of the west bluff was only moderate, and an average of only a few minutes lag was found between light readings of identical intensities. This was hardly enough to account for a 20-minute difference in the birds' arrival time at the raft.

Since failing light would seem to stimulate the birds' travel to the raft area, one would anticipate that the birds would arrive markedly earlier on cloudy days than on clear days. Strangely enough, this did not prove to be the case. In comparing light readings taken on cloudy and clear days (Fig. 3), one finds that the high intensities before sundown on clear days plunge rapidly after sundown while the lower intensities of cloudy days drop much more gradually until about a half-hour after sundown the readings become almost the same for clear and cloudy days. It thus seems evident from my limited observations that the movements to the raft by the majority of the American Golden-eyes are initiated by the light variations at low intensities at and soon after sunset and that the rapidly changing higher light intensities before sunset have no effect on their movements.

The average size of the flocks (Fig. 2, *dotted line*) coming in to the raft throughout the winter's observations shows that the birds have a definite tendency to be less

gregarious with the approaching mating season. This average flock-size dropped from 32 to 2.7 throughout the course of the winter. However, a definite drop occurred early in the winter, and the average did not drop toward spring as gradually as one might expect it to do. In this connection it was noted that active "courting" occurred throughout the period of observation, with little increase being observed in March over that seen in December. This suggests that perhaps these antics should be considered more as social behavior than as courting. Unfortunately,

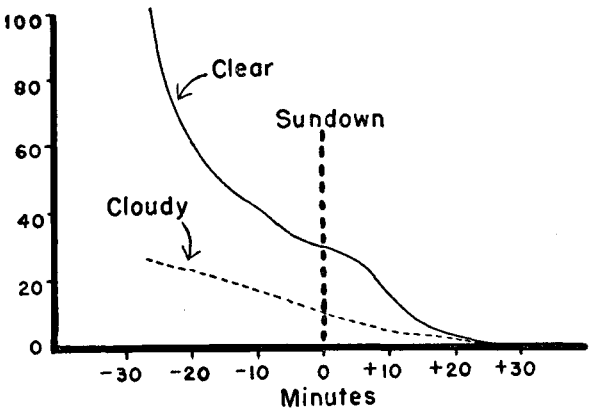

FIGURE 3. Light intensity readings at raft site on clear and cloudy days.

little could be recorded as to sex ratios in this study, since the majority of the birds came in after it was too dark to distinguish sexes. However, of those checked early in the winter, there were between seven and eight adult males to one female or immature.

The author appreciates the field assistance in this study rendered by the following: Harvey Gunderson, Bruce Hayward, John Jarosz, R. A. Kortmann, Warren Nord, Brother Pius, A. C. Rosenwinkel, Mr. and Mrs. Morris Self, and J. Donald Smith.—WALTER J. BRECKENRIDGE, *Museum of Natural History, University of Minnesota, Minneapolis, Minnesota.*

Notes on the Greater Sandhill Crane (*Grus canadensis tabida*).—*Feeding on acorns.*—On March 28, 1948, Harold Wing, Clarence Owens, Robert Whiting, and I observed a group of about 45 Sandhill Cranes feeding in a wood-lot on the Jasper-Pulaski State Game Preserve in Pulaski County, Indiana. The woods consisted almost entirely of white oak (*Quercus alba*) 30 to 75 feet in height and one to two and a half feet in diameter. The trees extended from the roosting marsh of the cranes up a gradually sloping hill. Apparently the cranes had gone into the woods from the marsh. Surprised at our sudden appearance, they took to the air. Until they had cleared the woods their wings often struck branches of the surrounding trees. Apparently they were feeding on acorns in the woods. Arthur E. Staebler at the W. K. Kellogg Bird Sanctuary, Augusta, Michigan, reported that a captive crane fed on acorns during 1951 when it was allowed to roam about the grounds.

Flying with retracted legs during cold weather.—On November 4, 1951, Robert Cornell and I watched 405 cranes come from the roosting area at Jasper-Pulaski Game Preserve in the early morning. The terrific snow storm of the previous night had covered the feeding area, a field of uncut corn, with several inches of snow. The