Doves in a similar though somewhat younger and denser red spruce forest on Loud's Is., Bristol, 3 km to the south. The parallels between these activities and those that I have reported from Hog Is. suggest that the doves on Loud's Is. were breeding as well.

I made these observations while conducting other research sponsored by the National Science Foundation (GB-6071, GB-31005). The National Audubon Society kindly permitted me to work in the Todd Wildlife Sanctuary.—DOUGLASS H. MORSE, *Dept. of Zoology, Univ. of Maryland, College Park 20742.* *Accepted 18 Dec. 1974.*

Spring migration of Sandhill Cranes from Florida.—The behavior of Sandhill Cranes (*Grus canadensis*) during their spring departure from Florida was described by Williams (Auk 87:156–157, 1970) but little information has been published on the conditions associated with spring departure. During spring of 1972 and 1973, 2198 cranes were observed departing Paynes Prairie, Alachua Co., Florida. Migration was also noted during 1974 and 1975, but detailed records were not kept. Weather information was obtained from daily weather maps of the National Oceanic and Atmospheric Administration, Environmental Data Service, U.S. Department of Commerce, and the Federal Aviation Administration (facilities located 10 Km N Paynes Prairie).

Earliest observed departure was at 09:01 and the latest was 12:29 EST. Mean time of initiation of migration was 10:16 with 91% of the cranes leaving between 09:45 and 11:15. A majority of departures (84%) for the 2 springs studied, occurred during the first 12 days in March. The earliest date of observed departure was 18 February 1975; the latest was 9 birds seen leaving 7 April 1974.

Table 1 shows the mean weather conditions for 26 departure days and 8 days within migration period when no departures occurred. Rising barometric pressure, warm temperature, and southeasterly winds of about 18 km/hr are associated with spring departure. Such conditions occur after west to east passage of high pressure systems during early spring. This phenomenon and the associated winds were described by Bagg, et al. (Wilson Bull. 62:5–19, 1950) as being associated with northward bird migration. Southeasterly winds would be significant to cranes migrating from Florida because their breeding areas in Michigan, Wisconsin, and

TABLE 1

SPRING DEPARTURE OF SANDHILL CRANES AND MEAN WEATHER CONDITIONS*

	26 Days of Departure ± S.D.	Range	8 Days of No Departure ± S.D.	Range
Temperature (C°)	22 ± 1.68	12–26	20 ± 1.26	14–24
Barometric pressure (cm of mercury)	77.10 ± .41	76.33–77.64	76.84 ± .44	76.77–77.66
Wind direction (000–350°)	158 ± 54.28	050–220	(>158)212 ± 36.86 (<158)051 ± 36.86	020–290
Wind speed (km/hr)	17.79 ± 4.08	7.41–27.80	14.45 ± 6.39	5.56–27.80

* Based on 3 hourly readings between 09:50 and 11:50.

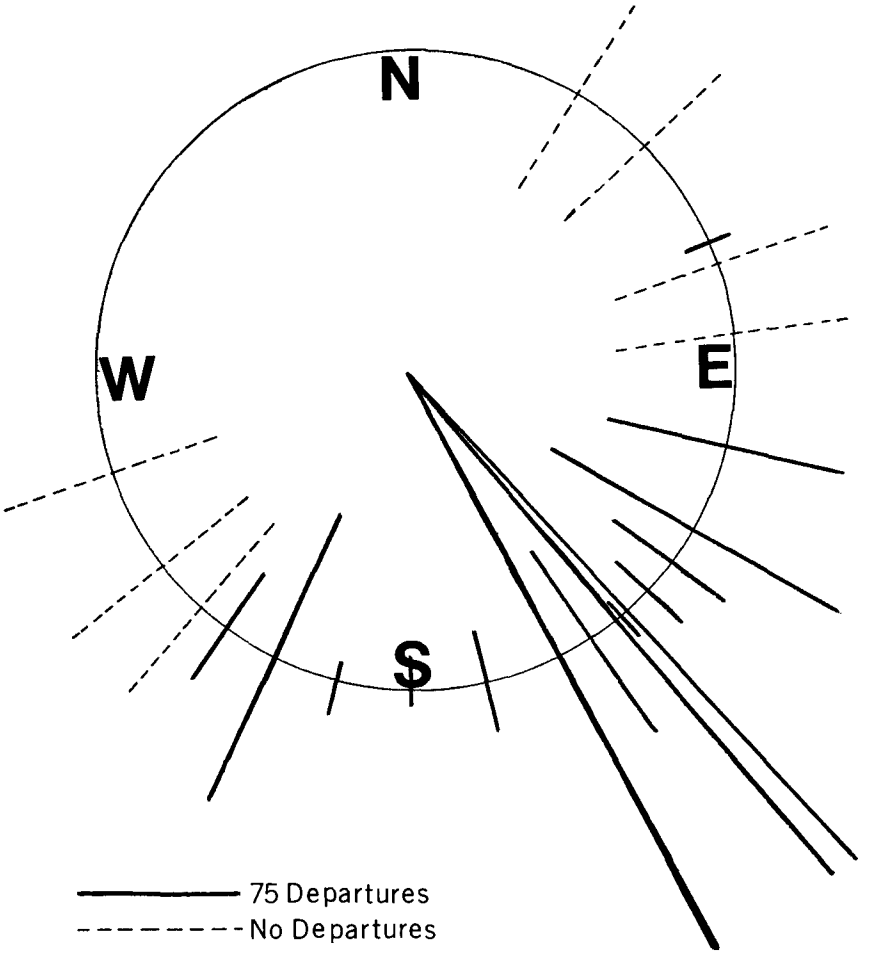

FIG. 1. Number of crane departures (length of line) and relative wind direction.

Minnesota (Williams and Phillips, Auk 89:541–548, 1972) are northwest of Florida. The influence of wind direction on departure is shown in Fig. 1. Although it does not appear in the table, clear skies appeared to be necessary for migration. On 13 March 1973, first departure occurred at 12:15 only after clear sky appeared through a previously complete overcast. On other days of complete overcast no departures occurred.

On several occasions migrating cranes passing over Paynes Prairie, at an estimated altitude of 800–1500 m, descended to approximately 500 m, called excitedly and circled over the northwest side of the prairie. Cranes from the prairie joined these birds and the merged flock gained altitude and disappeared on a northwesterly course. Such departures usually occurred between 12:00 and 13:00. The sight and sound

of these migrating cranes seemed to stimulate migration in remaining cranes. On 2 occasions, cranes were observed to join Wood Storks (*Mycteria americana*) flying over the prairie in a northerly direction.

The supposition by Bowman and Whitman (Auk 89:660, 1972) that cranes migrate simultaneously throughout the state is confirmed by these over-flying cranes. During 10 migration days in 1972 and 1973, 337 cranes were observed passing over Paynes Prairie, some as late as 14:30. Assuming 10:15 as a mean departure time, these cranes had been in the air for over 4 hours. A hypothetical ground speed of 80 km/hr would make the point of departure at about the known southern limit for Sandhill Cranes wintering in Florida (Lewis et al., *In* Management of Migratory Shore and Upland Game Birds in North America, G. C. Sanderson, ed., U. S. Fish and Wildlife Service, Washington, D.C., in press).

I am grateful to Lovett E. Williams, Jr. and James C. Lewis for reviewing this manuscript and offering many helpful suggestions. This study was in part a contribution of the Federal Aid to Wildlife Restoration Program, Florida Pittman-Robertson Project W-41.—STEPHEN A. NESBITT, *Florida Game and Fresh Water Fish Commission, 4005 S. Main Street, Gainesville 32601.* *Accepted 20 Jan. 1975.*

Optical and gamma radiation measurements of the effects of chlorinated hydrocarbons on egg shells of Red-winged Blackbirds.—The relation between the thickness of egg shells of Red-winged Blackbirds (*Agelaius phoeniceus*) and the use of chlorinated hydrocarbons as insecticides was investigated by Fred J. Alsop (Ph.D. thesis, Univ. of Tennessee, 1972). He measured the thickness of each shell microscopically with an image splitting eyepiece allowing an accuracy of approximately 2.4 microns. He found that shells from eggs laid before 1940, before DDT was introduced, were thicker than egg shells laid in 1970 and 1971, and that eggs laid in these latter years in areas where chlorinated hydrocarbons are heavily used had thinner shells than those from other areas.

After completion of Alsop's study, an instrument was developed at the University of Tennessee to measure the density of very small sections of wood cores using gamma radiation from an iron-55 source (Woods and Lawhon, Forest Sci. 20:269–271, 1974). We decided to see if this radiation densitometer could be used to detect thinning and possibly other changes in eggshells due to insecticide use. Eggs collected by Alsop in 1970–71 in 2 areas were used. Hamilton County in southeastern Tennessee includes relatively little agricultural land, and insecticide use is light. Crittenden County, eastern Arkansas, is cotton country where insecticides are frequently dispersed from planes. Sixteen clutches had been collected from each county, 35 eggs from Hamilton and 33 from Crittenden. Samples of egg shell were prepared by cutting pieces about 1 cm square from the flattest part of the shell. Each piece was placed in the beam (circular, 1 mm diameter) of gamma radiation, and the amount of radiation transmitted from the source through the shell to the detector was measured for a period of 100 sec. The radiation transmitted through air alone was measured frequently for a similar interval to allow calculation of the fraction of radiation transmitted by each shell. The thickness of each piece of shell used in the radiation measurements was measured by the same optical apparatus used by Alsop; to facilitate doing this, the pieces were first placed in a weak solution of trypsin for 2 or 3 days until the membranes could be peeled away to leave only the shell.

Of the radiation entering a material, the fraction transmitted through it is an ex-