Observation of White-necked Raven on Galveston Island, Texas.—On 3 April 1960, Victor L. Emanuel, Steve Williams, Trevor B. Feltner, Dudley Deaver, and I observed a White-necked Raven (*Corvus cryptoleucus*) on Galveston Island. The bird was found four miles west of the intersection of Termini Road and Stewart Road, on the western end of the island.

We were proceeding west on Stewart Road at 2:15 PM and passed a black bird which was standing on the left shoulder of the road. Expecting a Common Crow (*C. brachyrhynchos*), which is unusual on the island, we stopped approximately 50 yards beyond. Feltner and Deaver were following and stopped closer to the bird. As the cars came to a halt the bird flushed and spiraled upward in the strong wind coming from the Gulf of Mexico. At this time the bird was 150 yards from the Gulf.

All five members of the party were able to study the bird for several minutes through 8 × 40 and 9 × 35 binoculars and spotting scopes. The bird was the size of a Common Crow but the broad tail and large beak separated it from this species. The tail was decidedly broader in the middle than at the tip. As the bird flew upward and toward the southwest, it alternately flapped and soared. This flight pattern continued until we lost sight of the bird approximately four minutes after it had been discovered.

We did not hear the bird call and were not able to see the white on the bases of the feathers of the neck, but a combination of characteristics involving size, flight pattern, tail, and beak left no doubt that it was a White-necked Raven—the first record for the Upper Gulf Coast of Texas.

There are several spring records of this species for the vicinity of Rockport, on the Central Coast of Texas.—CARL H. AIKEN III, *3767 Georgetown, Houston 5, Texas, 26 August 1960.*

Age variation and time of migration in Swainson's and Gray-cheeked Thrushes.—On 8 October 1959, Harold Wing found a total of 268 birds of 29 species dead near a TV transmitting tower at Onondaga, Ingham County, Michigan. These birds were given in the flesh to the University of Michigan Museum of Zoology. They all appeared to have been freshly killed, presumably by flying into the tower when attracted by red lights at night (Cochran and Graber, 1958. *Wilson Bull.*, 70:378–380). The bulk of this more or less random sample of nocturnal migrants consisted of 73 Swainson's Thrushes (*Hylocichla ustulata*) and 99 Gray-cheeked Thrushes (*H. minima*). Measuring wing lengths, tail lengths, and bill lengths and comparing the birds with identified specimens in the Museum of Zoology collection indicated that they represented the subspecies usually occurring in Michigan, *H. u. swainsoni* and *H. m. minima.*

Published U.S. Weather Bureau data and weather records from airports at Battle Creek, Lansing, Jackson, Willow Run, and Detroit, all stations within 100 miles of Onondaga, indicated a low ceiling with fog or drizzle at Onondaga beginning between 2300 and midnight on the night of 7–8 October and continuing for several hours. The absence of recognizable, undigested food remains in gizzards of all but four birds (beetle elytra and ants' wings in Gray-cheeked Thrushes) may have indicated that these diurnal and crepuscular feeders were not killed until at least a few hours after sunset, allowing time for digestion. Probably more generalizations about time of migration during the hours of the night in passerines have been drawn from observations of *Hylocichla* thrushes than from any other North American genus. Ball (1952. *Peabody Mus. Nat. Hist. Bull. No. 7*) and Graber and Cochran (1959. *Wilson Bull.*, 71:220–235) heard more call notes in the predawn hours than at other times, but this may mean that thrushes call more at that time, rather than that more thrushes are actually flying at that time (Lowery

and Newman, 1955. *In* "Recent Studies in Avian Biology," pp. 238–263; Vleugel, 1960. *Auk*, 77:10–18). Lowery (1951. *Univ. Kansas Publ. Mus. Nat. Hist.*, 3:361–472) observed by watching the face of the moon that the peak of numbers of small migrants came between 2300 and midnight. Probably most thrushes killed at Onondaga were killed during the hour that the ceiling dropped from 2,000 feet to 700 feet (Lansing data), the hour before midnight. The fog and drizzle after midnight noted for Lansing and Jackson stations north and south of Onondaga probably grounded most low-flying night migrants. The weather records and empty gizzards suggest that *Hylocichla* thrushes do follow the peak of migration at about 2300 as observed by Lowery.

At Southfield, Oakland County, Michigan, I looked for dead birds at two TV transmitting towers on the morning of 8 October but found only one, a male Golden-crowned Kinglet (*Regulus calendula*). Southfield is within 30 miles of the Willow Run and Detroit Metropolitan Airports; hourly weather records from these stations show the drop in ceiling to have occurred during the night between midnight and 0200. The peak of migation for the night may have been over by that time, although differences in night migration routes across the state might also account for the difference in the number of migrants killed.

It is generally recognized that the single layer of bone forming the skull of newly fledged passerines is strengthened during the first year of life by the formation of a second, connected layer of bone. In the House Sparrow (*Passer domesticus*) this ossifying, or double layering, process is complete after about 180 days (Nero, 1951. *Wilson Bull.*, 63:84–88). In the thrushes the last area to become double layered (except for persistent, clear oval "windows" along the midline above the foramen magnum) was an oval area on either side of the midline in the posterior half of the frontal region. In thrushes this last area to ossify is slightly posterior to the corresponding site in House Sparrows. The sample of *Hylocichla* thrushes indicated that some individuals do not develop the complete double layering within a year and possibly never fully ossify. Two skeletons of *H. ustulata* collected in April in Costa Rica (UMMZ 153,287 and UMMZ 153,288) had oval, single-layered areas in these locations. Another skeleton (UMMZ 72,241) taken in Michigan in May had unossified areas 5.0 by 2.8 mm. in these locations. Finally, four *H. ustulata* in the present 8 October sample had a pair of oval, single-layered areas symmetrically located near the posterior margin of the frontal area; these were about 2 by 3 mm. No other thrush skulls in the sample were over three-fourths double-layered in the dorsal aspect of the skull. There was no visible bursa in one of the four thrushes, although I did find a bursa in 8 of 11 immatures; I did not examine the other three birds with nearly-ossified skulls for presence of a bursa. The plumage of the four was adult; I found no spotted or streaked coverts, and under the microscope the upper and lower wing coverts were close-webbed, adult feathers rather than loose-webbed, juvenal feathers. These adult characteristics together with the series of the three incompletely ossified, spring-collected thrushes indicate that some individuals do not ossify completely within a year.

The degree of retention of juvenal feathers was even more variable in thrushes. Banders (e.g., Middleton, 1958. *Ebba News*, 21:65–66) have systematically identified *Hylocichla* thrushes with no spotted or streaked juvenal wing coverts (usually retained at the postjuvenal, premigratory fall molt) as adults, following Dwight's (1900. *Ann. N.Y. Acad. Sci.*, 13:73–360) description of molt sequences. Dwight recognized the presence of "precocious individuals," but generalized that in both thrush species the postjuvenal molt involves "the body plumage, the lesser coverts and not the rest of the wings nor the tail." The TV tower sample indicated a variability among first-year birds. Not all immatures had spotted wing coverts, and those that did (most did) had different numbers of juvenal

feathers retained. Using the characters of the presence of spotted, streaked, or otherwise marked or loose-webbed upper coverts and body feathers and degree of wear of flight feathers, I was able to age correctly all adult (10 male, 19 female) *H. ustulata*, but only 18 of 20 first-year males and 15 of 22 first-year females. Similarly I aged correctly all adult (29 male, 24 female) *H. minima*, but only 13 of 17 first-year males and 25 of 26 first-year females. I repeated these attempts with the same results. Others in the Museum of Zoology had the same experience with this sample. Because of this considerable variation in retention of juvenal plumage, it would be desirable for banders to check age by skull ossification on live birds as described by Miller (1946. *Bird-banding*, 17:33–35) as well as by plumage.

I would like to thank N. L. Ford, F. B. Gill, H. B. Tordoff, and L. L. Wolf for advice in this study. The article was written while I was attending the University of California with support from the National Science Foundation.—ROBERT B. PAYNE, *University of Michigan Museum of Zoology, Ann Arbor, Michigan, 2 October 1960.*

Foot-stirring in the Green Heron.—Dr. A. J. Meyerriecks' article on Foot-stirring behavior in Herons (1959. *Wilson Bull.*, 71:153–158) describes this method of feeding in three North American herons (Snowy Egret, Reddish Egret, Louisiana Heron). A comparative behavior chart ("A summary of existing knowledge of the displays and related activities of ten North American Herons") in his more recent publication, "Comparative Breeding Behavior of Four Species of North American Herons" (*Publ. of Nuttall Ornith. Club*, No. 2), lists only these same three species as known to engage in this type of feeding behavior. On page 8 in this publication, he relates that the feeding behavior of the Green Heron (*Butorides virescens*) is primarily of two types: Stand and Wait, and Wade or Walk slowly. In the light of these two articles the following observation may be of interest.

In the summer of 1954, while taking 16 mm films of Killdeer and Spotted Sandpipers in the shallow water of Fall Creek behind my home in Etna, New York, I noticed a Green Heron perched on a stone just above the surface of the water. With the 150 mm lens I was able to get a fairly large image, and started the camera as the heron stepped off the rock into the water. I recorded it on film as he stirred the water several times with his right foot, and shortly thereafter seized and ate what appeared to be a crustacean. Dr. Meyerriecks reports to me (pers. comm.) that an extensive search of the literature has failed to turn up a published reference to foot-stirring in the Green Heron, nor has he observed it himself in many hundreds of hours of watching this species. The little section of film footage I made is included in a lecture film of mine which has been shown to many audiences. Evidently this type of feeding behavior, while far rarer than other types, does occur at times in the Green Heron.—SALLY F. HOYT, *Laboratory of Ornithology, Cornell University, Ithaca, New York, 29 July 1960.*

Nest-building movements performed by juvenal Song Sparrow.—There have been several accounts recently in the literature of nest-building movements performed by juvenal birds. Dilger described such an activity in a juvenal Swainson's Thrush (*Hylocichla ustulata*) (1956. *Wilson Bull.*, 68:157–158). I have recently observed a similar performance in a fringillid.

On 10 September 1960, I watched a juvenal Song Sparrow (*Melospiza melodia*) feeding on the ground under my window. In a flower bed which was soft from rains, and where the soil was mixed with husks of sunflower seeds so that it was light and porous, my dog had left several rather deep footprints. The immature sparrow settled itself in