still perched in the tree. The geese had swum out about 300 yards and had ceased their alarmed calling.

Craighead and Stockstad (J. Wildl. Mgmt., 22: 206, 1958) describe the descent of goslings from an aerial nest and mention the death of a gosling by falling on, and being impaled by, a sharp stick. Bent (Life histories of North American birds of prey, U. S. Natl. Mus., Bull. 167, 1937) lists ". . . all kinds of ducks and geese" as included in the diet of the Bald Eagle, but makes no mention of young waterfowl. In this instance the adults clearly prevented the eagle from pressing its attack. Such protective behavior by the parents is important in the survival of goslings, and may be a factor in determining population size in geese.—MAURICE G. HORNOCKER, *Cooperative Wildlife Research Unit, University of Montana, Missoula, Montana 59801. Present address: Cooperative Wildlife Research Unit, University of Idaho, Moscow, Idaho 83843.*

Note on bill color of the Ruddy Duck, *Oxyura jamaicensis rubida*.—The adult male Ruddy Duck exhibits a seasonal change in bill color from black to blue to black each year. Hays has made the following observations on the timing of color changes. In flocks wintering along the east coast of the United States, a few males begin to show the bright blue bill color early in March. Most males have blue bills by the time they reach their breeding grounds in late April or early May. Bills begin to look black again toward the end of July or in August.

To our knowledge, this note reports the first investigation of the cause of this very striking bill coloration in the Ruddy Duck. Our purpose was to determine whether the seasonal changes in color are caused by a specific pigment or solely by structural characteristics resembling those that are responsible for blue feather color (Van Tyne and Berger, Fundamentals of ornithology, New York, John Wiley and Sons, 1959, p. 100).

Four male Ruddy Ducks were collected by Robert Nero near Minnedosa, Manitoba, Canada on 9 July 1968. Their heads were removed and placed on dry ice within 10 minutes of collection and were kept on dry ice during shipment and storage. Our analyses began on 16 July 1968.

When the bills were thawed under running tap water, we found that the bright blue color was well-preserved. The soft sheath dissected from the bone of the bill appeared blue on the surface with a black layer underneath that had been adjacent to the bone. Pieces (2 to 4 cm^2 in area) were soaked overnight in the following solvents: acetone, chloroform, diethyl ether, dilute NH_4OH, dilute HCl, and glycine-NaOH buffer (pH 9.5). These solvents were selected because they represent a broad spectrum of hydrophilic to lipophilic characteristics. After 16 hours at room temperature, the solutions remained colorless and there was no apparent pigment extraction, although in acetone some loss of color occurred. Dilute NH_4OH (1.5 M) loosened a colorless surface layer, leaving a spongy tissue that appeared blue above an underlying black layer.

Using sheath that had been soaked in NH_4OH (i.e. with the colorless surface layer removed) and working under a dissecting microscope, we next tried to separate the blue surface material from the underlying black tissue. Scraping the blue layer away removed only colorless material, and the underlying black layer remained. When the black layer was removed, the blue color disappeared from the remaining tissue. When the spongy layer was compressed, the blue color disappeared and only the underlying black pigmentation could be seen. It thus appeared that the only pigment present is the black substance located in the lower portion of the spongy sheath tissue.

Assuming that the black pigment was melanin, we proceeded to test this hypothesis by applying the standard tests for melanin described by Hirsh (Physiologia Plantarum, 7: 72, 1954). A sample of the sheath was heated in ca. 0.5 N NaOH at 100°C for 1 hour. The presumed melanin was hydrolyzed under these conditions. We observed the release of an orange-brown pigment, tissue disintegration, formation of a white precipitate, and release of black granules. Addition of several drops of 30 per cent H_2O_2 to the orange-brown supernatant bleached the solution. No bleaching was observed on addition of concentrated HNO_3. The characteristics of the black pigment found in the underlying layer of bill integument thus conform to the usually recognized properties of melanin: relative insolubility, hydrolysis in hot alkali, and bleaching by concentrated H_2O_2 but not by concentrated HNO_3.

We found that it is possible to bleach the melanins in the black layer of intact sheath by soaking for 10 to 15 minutes in concentrated H_2O_2. Such treatment results in a loss of the blue surface coloration concomitant with bleaching of the black, melanin-containing layer.

These observations indicate that the blue bill color of the Ruddy Duck is caused not by the presence of a blue pigment, but apparently by structural peculiarities and the distribution of melanin in the subsurface layer. This phenomenon is similar to that described for blue feathers, where the color is a consequence of the reflection of blue wavelengths by a colorless superficial layer with absorption of all other wavelengths of incident light by a deeper black layer containing large amounts of melanin. The loss of blue color on surgical removal of the underlying melanin-containing layer, or by chemical bleaching of melanin in the intact sheath, supports the hypothesis that blue bill color is a physical, structural phenomenon and not due to the accumulation of a specific blue pigment.

We wish to thank Robert Nero for collecting and Kenneth Parkes for packing and shipping the birds used in this study. We appreciate the interest and helpful suggestions of Gairdner Moment during these investigations.—HELEN HAYS, *14 East 95th Street, New York, New York 10028* and HELEN M. HABERMANN, *Department of Biological Sciences, Goucher College, Towson, Baltimore, Maryland 21204.*

Turkey Vultures land on vessel in fog.—On 2 November 1968 the yacht 'Gay-Ted,' a 57-foot, twin-screw diesel cruiser, was crossing Florida Bay, coming from Marathon headed for Cape Sable. The weather was dead calm, the sea was smooth, and a low-lying fog on the water cut visibility to about ½ mile. The vessel was proceeding at a speed of about 19 knots when a flock of about 50 Turkey Vultures (*Cathartes aura*) came out of the fog and attempted to land on the ship. The speed of the ship was too great for them, but one bird did succeed in landing on the roof of the aft deckhouse. It soon fell off, dropped into the wake, and drowned. We then slowed down to about 10 knots, and the whole flock promptly landed all over the ship from stem to stern—we counted 55. The vessel was about 8 miles from the nearest land at this point.

The birds were so exhausted that they would let us come up and actually touch them. Some of them after landing regurgitated partly digested mice and other objects on the deck. The birds showed no interest whatsoever in the passengers, among whom needless to say they caused some apprehension. The vessel certainly did look like a "ship of death" going through the fog with its load of vultures.

The speed of the vessel was then returned to 19 knots, and the Turkey Vultures stayed aboard. In about 20 minutes the fog started thinning a little and the shoreline of Cape Sable became visible approximately 3 miles away. The birds saw the