

recently-dug pit from which earth was removed to build the adjacent Adventure Island amusement park. Roughly rectangular, the pond is about 300 m x 120 m, with two patches of cattails (*Typha* sp.) occupying about 900 square meters of edge. The pond and its shores are enclosed in a chain-link fence, which precludes human access and probably reduces nest predation by mammals. Many waterbirds use the pond, including several species of ducks in winter. On 4 June we found on the pond about 40 Pied-billed Grebes (*Podilymbus podiceps*), 30 Common Moorhens (*Gallinula chloropus*), and 20 American Coots (*Fulica americana*), each species having several broods of young.

Man-made impoundments provide good, albeit temporary, sites for nesting waterbirds in Florida (Ogden 1979, Maehr 1981). The fact that the breeding birds in some of these impoundments include species not known to breed locally in natural wetlands suggests the artificial sites possess locally unique, attractive conditions. Eutrophy and non-wooded shorelines might be two such features that attract Ruddy Ducks.

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**Play-like behavior of American Crows.**—Play has been relatively little described in birds as compared to mammals, although in some families, such as the Corvidae, it appears to be well developed. Other than an incident described by Good (1952), however, I have encountered no accounts of play among wild American Crows (*Corvus brachyrhynchos*). The following observations were made mostly on yearlings (Emlen 1936) in January-May in 1981, 1982, and 1983 at the Hendrie Ranch, 24 km south of Lake Placid, Highlands County, Florida.

On 31 January 1981, I first saw two adults carrying sticks, the stick part of their nest being then nearly complete. At about 1100 on the next day three crows landed 200 m from the nest in a tree, which crows often visited late in the morning to rest and preen. One crow, which I believed to be a breeding adult, rested on a low branch. Two yearlings moved about between the branches and ground, manipulating objects in a play-like manner. I twice saw one hang upside down, swinging from a streamer of Spanish moss as if trying to work it loose. Several smaller clumps were pulled away and briefly carried about, one serving in a tug-of-war between the two active crows. In 1982 I saw yearlings swinging from streamers of Spanish moss on three occasions, with bills pointed toward the ground.

I have seen several instances of play-like behavior with sticks. On 31 January 1981, two crows picked up sticks 7-12 cm long which, like the Spanish moss, they pecked while holding in their toes against a branch. One crow twice flew up into the air with a stick in its bill, dropped, then caught it in its feet before it hit the ground. The two finally perched on either side of a resting crow, each with a 7-cm stick in its bill. None of the crows carried anything away from the tree when they left and none of the sticks was used in nest building. On 9 February 1981, when about 20 m from the nest, I saw a crow pecking at a short stick held in its toes while perched on the back of a cow. When the stick fell, the crow went to the ground and fetched it back up. In the course of wiping its bill on the cow's back, the stick fell again. This time the crow cached it in a tussock of grass about 1.5 m from the cow. After covering the stick with a few pieces of dry cow dung, the crow flew away. On inspection, I found that the stick was a dry, semi-rotten piece of wood measuring 11.5 x 2.3 cm. Because I saw no indication that it contained termites, wood-boring larvae, or food of any kind, I do not believe that the behavior was related to feeding.

I also witnessed a dancing-like behavior in crows. The crows at the ranch took an interest in the various animals with which they associated, perching on cattle and feral hogs (*Suis scrofa*) in search of lice (Kilham 1982a) and pulling the tails of river otter (*Lutra canadensis*) (Kilham 1982b). On 4 February 1981, when two Sandhill Cranes (*Grus canadensis*) began to dance, a crow flew to them immediately. When the cranes danced again, the crow jumped up to as high as 15 cm from the ground and moved in bounces, with wings open, keeping ahead of and among the cranes. I made a similar observation on 6 July 1966 in New Hampshire. About 5 weeks after fledging, a crow I had hand-raised, seeing me from the roof, held out its wings and quivered its tail, an important display of various species of *Corvus* (Goodwin 1976), then picked up a twig and jumped into the air with wings half-spread, turning to one side, then jumping to the other. On the following afternoon I noticed it performing in similar fashion by itself on the lawn. Its leaps with wings out and turns reminded me at the time of the dances of cranes. Another behavior that seemed to be play-like at the ranch was leaping over animals on the ground, as my wife and I saw crows doing, once over a newborn calf and twice over Turkey Vultures (*Cathartes aura*).

Some of the play-like and dance-like behavior observed has been described for other species of *Corvus*. Skead (1952, p. 437), described a family of Black Crows (*C. capensis*) flapping their wings and hopping about in a form of dance on the roof of his farmhouse in South Africa; McKendry (1973) reported a Carrion Crow (*C. corone*) playing with a short piece of wood and maneuvering it from bill to feet in the air; and Gwinner (1966), Ravens hanging upside down. Hanging upside down, however, is not necessarily play. I have observed yearling crows doing so when pushed along a branch by a dominant male, and McIntyre (1953) observed a Carrion Crow doing the same when pursued by another crow. Few accounts of play in wild corvids have stated the age of birds involved. Good's (1952, p. 27) account of a yearling American Crow lying on its back tossing a piece of paper with its bill and feet in March, the month of nest building in Ohio, is of interest in relation to the play of crows with objects in Florida. Play with the feet, while lying on the back has been described for Keas (*Nestor mobilis*), parrots that occupy

in New Zealand "the ecological niche and practice a life-style like that of large corvids in other localities," (Fagen 1981, p. 214-215). The variety of motives involved in play has been discussed by Kilham (1974) and Ficken (1977). One that seems pertinent here is that yearling crows may perform activities that are innate, learned from older conspecifics, or partly both, when they have nothing much else to do, the behaviors being ones that could be functional under other conditions. This was brought out to me at the ranch in 1983 after the above report was first written. A pair of crows lost a first nest in mid-incubation. The breeding female, in what seemed a first move in starting a new one, which she had done by the next morning (27 January), picked up and dropped a few sticks, then swung on a streamer of Spanish moss. Spanish moss is not easy to pull loose. Crows use it to hold large sticks in place at the start of nest building and swinging is one way of obtaining it. Another example of a play-like behavior with a potential function was jumping over a vulture. Crows, in my experience, do not feed on carrion that is surrounded by Black Vultures (*Coryvus atratus*). When two crows were at a well-rotted hog carcass on 19 February 1983, a Black Vulture alighted nearby. One of the crows began walking around it immediately. When the vulture started to walk away, the crow jumped over its back several times as if to keep it moving. When the vulture was 6 m from the carcass, the crow crouched in the grass less than a meter away giving the loudest vocalizations that a Florida crow can make, the "*C.b. pascuus screams*" recorded by Chamberlain and Cornwell (1971). These examples, one relating to Spanish moss and the other to a vulture, indicate, I feel, that acts performed as play can be a way of practicing a skill that may have value later on. The important thing is that one must study the total behavior of an avian species if one is, hopefully, to comprehend anything as complex as play.

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**On describing color abnormalities in birds.**—The interesting note by Richardson (1981) entitled "Xanthochromism in the Rose-breasted Grosbeak" raises questions about the terminology and interpretation of color abnormalities in birds. He observed a bird with normal black and white coloration but with a yellow rather than rose breast. Following the definition in the glossary of Van Tyne and Berger (1959), Richardson called this observation an example of "xanthochromism" (which should be spelled "xanthochroism"). The point I shall discuss is that this term has no stable meaning, and furthermore the grosbeak described is unlikely to be an example of the most commonly used meaning of xanthochroism.

Xanthochroism has been used to mean at least five different things. (1) At root (from the Greek *xantho-*, yellow, coupled with *chroa*, color) it should mean simply "yellow coloration," although rarely used thus. (2) In their glossary Van Tyne and Berger (1959: 586) define the term as "abnormal yellow coloration" (emphasis added), and taken thus Richardson's use is correct. (3) The commonest meaning in the literature is the more restricted view given by Van Tyne and Berger (1959: 100) in the text: abnormal yellow coloration that is "a special type of schizochroism." This latter term refers to the absence of one pigment from two or more that together produce the normal color, so that the resulting coloration is abnormal. Pettingill (1970: 193) takes a similar, but equivocal, view: "erythrism and xanthochroism *usually* result from the absence of melanin and the retention of red or yellow carotenoid pigments" (emphasis added). (4) The actual example of "xanthochroism" given by Van Tyne and Berger (p. 100)—yellow parrots resulting from the loss of blue in normally green species—may be yet another phenomenon. The authors say that the yellow "apparently results from loss of the dark pigment," but note later that "Blue in feathers is apparently never the result of blue pigment." There is a double problem here. First, a blue pigment is known from birds (rhodoxanthin, a xanthophyll producing the blue of fruit pigeons, *Ptilinopus*; see Buckley 1982: 61), although the blue of parrots is almost certainly not based on a pigment (biochrome), but rather is a schemochrome (structural color). Second, the classical notion that all blue-producing schemochromes are due to Rayleigh back-scattering by minute melanin particles is open to question (Hailman 1977: 100-101), as Dyke (1971) has proposed the physical basis to be thin-layer interference with no involvement of pigments of any kind in *Agapornis* parrots. Furthermore, even if the blue of parrots were based on minute melanin particles, loss of blue might not entail loss of pigment—rather it might result from other physical abnormalities in the feather. Therefore, although Van Tyne and Berger (1959: 99) define schizochroism as "the absence of one of the pigments normally present," their example is not clearly such a