

and checked 24 h later, thus enabling a full cycle of tidal flow and allowing the tidal water to flood the area beneath each nest. Such manipulations were done during early laying (those nests having 1 to 5 eggs), middle laying-incubation (those nests having 8 to 12 eggs), and late incubation (the first day an egg pipped). Experiments were done at 6 nests for each of the 3 stages of nesting.

Observations were made from a position 3–6 m from the displaced eggs. Typically within 1 h a rail from the nest ran in a crouched position to the egg and picked it up in its bill and returned it to the nest. Observations of birds retrieving eggs were made at 9 nests. A chi-square ($df = 2$, $\chi^2 = .48$, $P > .05$) revealed that the stage of the nesting cycle did not influence egg retrieval more than would be expected by chance. Eighty-three percent (15 out of 18 nests) of the displaced eggs were returned to the nest within 24 h (those not returned included: 1 early, 1 middle, and 1 during late incubation). Of those not returned, one was eaten by a predator and 2 were not found and assumed to be carried off by the tides.

I thank Karen Williams for her field assistance, and Joanna Burger for her critical field suggestions.—PAUL A. KOSTEN, 1217 New York Ave., Cape May, New Jersey 08204. Received 6 Feb 1982; accepted 15 May 1982.

Cleaning/Feeding Symbioses of Common Crows with Cattle and Feral Hogs.—The following observations were made by my wife and I between January and March 1981 and 1982, at the Hendrie Ranch, 24 km south of Lake Placid, Florida, where the owners had been feeding corn and protecting wildlife for many years. This made both the Common Crows (*Corvus brachyrhynchos*) and the feral hogs (*Suis scrofa*) relatively tame, enabling us to watch them, at times, within 7 m, using 8 × 30 binoculars.

Interactions with feral hogs.—Cleaning/feeding, hereafter referred to as feeding, was observed on 29 occasions, wherever crows and hogs aggregated to feed on corn. The commonest feedings were on well-grown sucklings. Litters of 4–6 pigs sometimes fell over to rest, seemingly completely relaxed. As many as 3 crows then fed on one pig after another, either while walking around it or perching on an exposed flank. The crows worked over all exposed surfaces from head and ears to the back, belly, and inguinal regions, pecking at rates of up to 60/min with bills slightly opened. The pigs never appeared disturbed, even when the crows stood on their heads or tried to pull a leg aside. The longest I saw crows working in this manner was 15 min on 14 January. The sucklings sometimes solicited the crows by rolling over. I saw crows feeding on sows on 7 mornings and on adult boars, which were comparatively scarce, on a few occasions. One sow appeared to solicit on 2 successive mornings by walking toward a crow, then rolling on her side when the crow alighted on her back.

Interactions with cattle.—Pecking at the base of the tail of range cattle was witnessed on 31 occasions in 1981. In nearly all, the cows were lying down when 1–2 crows, flying from a distance, came to visit them in succession, alighting or walking to the rear to peck at the underside or base of the tail and adjacent inguinal regions, first from one side, then the other, making 50–150 or more pecks. The crows appeared to feed more extensively on cattle in a second winter (50 observations) after approximately 400 feral hogs had been removed from the ranch. Although our main interest lay in studying the nesting of crows, we made a special effort to follow crow-cattle interactions on 9 March, when a herd of 55 cattle spent much of a morning close to one of our crow nests. In the course of 70 min, 1 to 3 crows from a total of 5 that were actively foraging in the area (the breeding female was on the nest) fed on the cattle on 8 occasions. On 7 of these the crow stood on the rear end of the cow it was feeding upon, to peck down, and as much as possible under the proximal 20 cm of the tail. A third of the cows cooperated by holding the tail out. Crows also lowered themselves by clinging to the tail as to a rope, to peck at inguinal regions. When cows were especially close (15 m) I could see that the crows were making feeding motions with the tips of their bills. They occasionally leaned down from the back to pick prey from haunches or shoulders, but were usually tossed off when they tried to work on cows' heads. Feeding times on a succession of cows ranged from 1–20 min. One crow flew directly from feeding on the cattle to feed the female crow incubating

on the nest. After 12 March, with the onset of warmer weather, the crows spent most of their time pursuing pasture insects, suggesting that the feeding on cattle may have been a winter or cooler weather phenomenon.

A different kind of interaction related to intestinal worms. Three crows were behind one cow that was lying down on 29 January, when one, then another, picked up from the grass what appeared to be whitish, intestinal worms, or segments of them, 20–23 cm in length.

Discussion.—The following information on parasites that the crows may have been seeking on cattle and feral hogs was sent to me by Mrs. P. Humphrey of the College of Veterinary Medicine of the University of Florida, Gainesville. In a survey (unpublished) of feral hogs made in January 1981, just south of where I made my observations, hog lice (*Haematopinus suis*) were “found on all hogs” and were “too abundant to allow accurate counting.” The only tick found with any regularity was the black-legged tick (*Ixodes* spp.), 3.2/hog, mainly on head and neck, but also inside the ears, on ventor, sides, and back. There was no comparable survey of cattle. There are 5 species of cattle lice listed for Florida, of which only one, the red louse (*Damalinea (Bovicola) bovis*), is listed as found in greatest numbers at the tail root. The worms eaten by the crows could have been ascarids (*Neoscaris vitulorum*) but, since the ascarid is rare and tapeworms (*Monezia* spp.) are prevalent, the latter, or segments of them, would appear the more probable.

Although I have been unable to find descriptions of cleaning/feeding symbioses between Common Crows and other animals, there are descriptions for other corvids. Bent (U.S. Natl. Mus. Bull. 191, 1946) mentions Fish Crows (*Corvus ossifragus*) as picking ticks from the backs of cattle, and Black-billed Magpies (*Pica pica*), insects from the heads and backs of mule deer and elk. More recently Baker and Morris (Auk 97:202, 1980) have described Florida Scrub Jays (*Aphelocoma coerulescens*) foraging on the backs of feral hogs.

Christian (Auk 97:887–889, 1980) raises questions as to how cleaning/feeding mutualism could arise among birds and reptiles, whether as a genetically determined behavior or by the invention of some individual genius. With the crows at the ranch, I did not feel that special mechanisms needed to be invoked. The crows were curious and investigative about all parts of their environment from cowpies to cabbage palms and river otter (*Lutra canadensis*) (Kilham in press, Fla. Field Nat.) that might yield something to prey upon. The feral hogs and cattle were a profitable food source, if one could judge by the amounts of time the crows devoted to feeding on them in winter months.—LAWRENCE KILHAM, Department of Microbiology, Dartmouth Medical School, Hanover, New Hampshire 03755. Received 14 Apr. 1981; accepted 21 Feb. 1982.

Development of a Runt Common Tern Chick.—Most studies of avian growth have involved birds growing close to the average pattern. Cases of extreme variation in development, such as runts, are rare. Although the growth of runt birds appears to be quite variable, the growth is presumably under the same control as the growth of more average birds. It is helpful to investigate such cases for insight into the control of growth. I report here on the development of a runt Common Tern chick (*Sterna hirundo*). At age 23 days this bird appeared equivalent to others at 15 days. I examined the growth of the runt to see first whether it followed the same pattern of development as other birds and second whether the bird was significantly smaller than others or merely developing later.

In the second question I make the important but subtle distinction between size at a given age and development rate. The runt at 15 days was smaller than other chicks at 15 days. But it was not necessarily stunted. If it were developing more slowly, it would merely have reached the 15-day-equivalent developmental stage and comparable size at a later age.

I investigated the growth of Common Tern chicks on Great Gull Island, Long Island Sound, New York, in 1979. I followed 22 chicks at 12 nests, measuring weight with a Pesola scale, and total wing and manus lengths with a wing rule every day to every few days. At 15 days I measured with dial calipers: tarsus, middle toe, alula, and bill length, depth, and width as well as tenth primary, ninth primary, ninth primary covert, and outer rectrix. One chick, the third and last to hatch in its nest, was extremely light during the