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 In a survey (unpublished) of feral hogs made in January 1981, just south of where I made my observations, hog lice (*Haematopinus suis*) were "found on all hogs" and were "too abundant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 (*Damalinia* (*Bovicola*) *bovis*), is listed as found in greatest numbers at the tail root. The worms eaten by the crows could have been ascarids (*Neoascaris 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

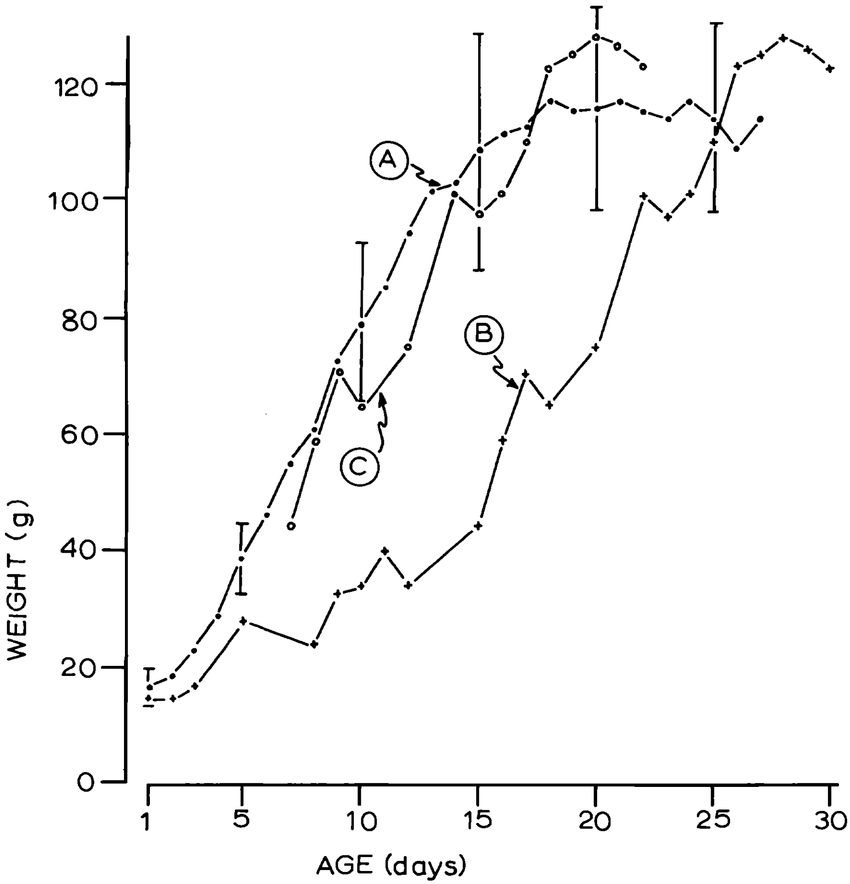

FIGURE 1. Weight according to age for Common Tern chicks. A. Average with 95% confidence intervals for 22 chicks. B. Growth of a single runt (see text for explanation). C. Growth of the runt transposed 8 days earlier.

early chick period and observations showed that it was getting little to eat while its siblings were well fed. On 2 different days it appeared to be dying and lay on the ground, weak and unable to coordinate its movements, but it recovered during the day. The chick survived but seemed developmentally retarded by about a week compared to other chicks (Fig. 1). This was the runt considered in this study. I followed this chick as I followed the others, except that every few days after age 15 days I took all the measurements in order to examine whether and when this bird reached the same developmental stage as the other birds on day 15.

In analyses I assumed that at each stage body proportions are fairly constant but that proportions change with development because the major growth of different body parts occurs at different ages (Coulter 1977, Ph.D. Thesis, Univ. of Pennsylvania). To compare body proportions of the runt at various ages with the population average at day 15, I calculated a "z" statistic for each measurement at each age for the runt: $z = (x_r - \bar{x})/SD$, where x_r is the measurement for the runt at the given age, $\bar{x}$ is the estimate of the

Table 1. Sizes and "z" scores for various body parts of a runt Common Tern according to age. See text for explanation.

Age (days)	Weight[a]	Total wing length[b]	Manus length[b]	Tarsus[b]	Middle toe[b]	Bill length[b]	Bill depth[b]	Bill width[b]	Tenth primary[b]	Ninth primary[b]	Ninth primary covert[b]	Alula[b]	Outer tail feather[b]	Average	Standard Deviation
Population average—	108.4	105.4	60.7	23.83	23.29	20.69	6.47	4.20	51.66	54.30	38.93	27.38	27.73		
SD on day 15	−8.55	−6.31	−3.25	−0.86	−0.99	−1.22	−0.39	−0.26	−4.03	−4.65	−3.37	−3.26	−2.56		
A. Sizes of Body Part															
15	44	50	37	19.50	20.05	14.05	6.05	3.30	15.40	15.65	13.70	8.80	3.75		
22	101	105	60	22.18	21.45	19.00	6.50	4.35	51.95	53.90	35.80	29.60	19.30		
23	97	112	65	22.35	21.70	18.65	6.45	4.75	55.75	60.80	41.00	28.55	30.00		
28	128	153	70	21.95	21.85	22.05	6.70	4.90	86.05	98.15	60.80	37.75	47.30		
29	126	161	69	22.40	22.85	24.15	7.30	5.25	90.25	104.65	33.60	34.10	53.80		
30	123	167	70	22.40	22.40	25.30	7.15	4.80	100.05	104.65	49.35	36.70	56.10		
33	119	184	71	22.00	22.85	26.95	7.35	5.10	116.10	121.15	52.25	36.80	70.70		
35	121	195	72	21.35	23.55	26.50	7.45	4.65	120.45	130.60	59.15	35.60	75.50		
B. "z" score															
15	−7.54	−8.77	−7.29	−5.04	−3.27	−5.43	−1.08	−3.47	−8.99	−8.32	−7.49	−5.69	−9.38	−6.29	2.54
22	−0.87	−0.06	−0.22	−1.92	−1.86	−1.38	0.07	0.59	0.07	−0.09	−0.93	0.68	−3.30	−0.71	1.15
23	−1.33	1.05	1.32	−1.73	−1.61	−1.67	−0.06	2.14	1.02	1.40	0.61	0.36	0.89	0.18	1.34
28	2.29	7.54	2.86	−2.19	−1.45	1.10	0.59	2.72	8.52	9.44	6.49	3.18	7.65	3.75	3.83
29	2.06	8.81	2.55	−1.67	−0.45	2.82	2.13	4.08	9.56	9.85	4.35	2.06	10.20	4.36	4.00
30	1.71	9.76	2.86	−1.67	−0.89	3.76	1.74	2.33	11.99	10.83	3.09	2.86	11.09	4.57	4.68
33	1.24	12.46	3.17	−2.13	−0.45	5.11	2.25	3.50	15.97	14.38	3.95	2.89	16.80	6.09	6.46
35	1.47	14.20	3.48	−2.89	0.26	4.75	2.51	1.75	17.05	16.42	6.00	2.52	18.68	6.63	7.28

[a] Weight in grams.
[b] Measurements in mm.

population mean at day 15, and SD is the estimate of the population standard deviation. This statistic is dimensionless and so comparable among body parts; it is normally distributed with mean 0.0 and standard deviation 1.0. When the runt measurements are smaller than, equal to, or larger than the corresponding population mean, the z-values are negative, zero, or positive, respectively.

If the runt followed a development pattern similar to most birds, then, at some age its body proportions should have been similar to those of other birds at age 15 days. That is, at the age when the runt passed through the 15-day-equivalent developmental stage the z-values should have been fairly constant and the standard deviation of z-values should have been small. Furthermore, if the runt were small, or stunted for its developmental stage compared with other birds, then its z-values should have been large and negative, but if the runt were of normal size, then the magnitude of the z-values should have been small.

The small standard deviation of z-values at ages 22 and 23 days suggests that the runt passed through a developmental stage equivalent to that of most birds at 15 days (Table 1). The runt did follow a normal pattern of development, although at a later age. The low magnitude of z-values at this age suggests that the chick was not stunted, but was well within the normal variation in the population. The larger implication is that in avian growth studies some of the measured variation in size is contributed by variation in developmental rate.

The range of z-values with ages for the different body parts reflects the overall developmental pattern. The large range of values for feathers reflects the concentration of feather growth late during the chick period. The little variation for tarsus and toe suggests that by day 15 they had largely completed growth.

The runt left the colony on 18 July, 36 days after hatching. This was 11 days after its siblings left, at ages of 26 and 27 days, more normal ages for departure.

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Communal Roosting in Wintering Hooded Mergansers.—Monospecific winter roosting assemblages by relatively large numbers of Hooded Mergansers (*Lophodytes cucullatus*) are not recorded in the literature. Brewster (1924, *in* Palmer 1975) saw evening flights from woodland streams and ponds to Lake Umbagog in Maine, but failed to mention whether they were to feed or roost. Typically, flock size of Hooded Mergansers is small, with birds usually seen singly, in pairs, or in flocks of up to 10 birds (Bent 1923, Kortwright 1953, Johnsgard 1975, Palmer 1975, Bellrose 1976).

In central Florida (Pasco Co.) during the winter of 1976, we located a pond of about 45 m diameter at which many wintering Hooded Mergansers were roosting. The pond was approximately .75 m deep in the center and was about 50% covered by emergent vegetation, mostly maidencane (*Panicum hemitomon*) with scattered small clumps of Pickerelweed (*Pontedaria lanceolata*). The pond was within a large pine-palmetto (*Pinus palustris—Serenoa repens*) flatwoods that was dotted with numerous ponds, lakes, cypress swamps, and marshes, several of which were in the immediate vicinity.

We made 8 trips to the roost from 1 Jan. through 8 Feb. Initially we watched the pond while hidden only by the shoreline vegetation, but later we placed a blind at the pond edge. We entered the blind well before sunset and recorded numbers of Hooded Mergansers coming to the pond. Mergansers appeared around sunset, and dropped into the pond with much aerobatical twisting and vocalizing. The number of Hooded Mergansers coming to the pond varied between 100 to 223 (mean 176.5 ± 32.5). They arrived