

the ability to follow an airborne odor-gradient (Wenzel, pp. 41–64 in Behavior of Marine Animals, Vol. 4, Burger et al., eds., Plenum Press, New York, New York, 1980), it follows that a decaying whale would provide a strong stimulus as a potential food item.

Ashmole and Ashmole (Peabody Mus. Nat. Hist., Yale Univ. Bull. 24:1–131, 1967) suggested that it is disadvantageous for procellariiformes to transport intact food containing a large percentage of water. By digesting food as it is caught and then excreting the excess water, these birds can build up large food reserves. Dermal whale tissue in whales has a low ratio of water relative to fat content (Arai and Sakai, Sci. Repts. Whale Res. Inst. 7:51–67, 1952); such food can be converted to stomach oil quickly and carried with a minimum demand for water excretion. Thus, we suggest that decaying whale fat, which is detectable by smell and is easily digestible with a high caloric value, would be a most desirable food item when available to procellariids at sea.

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Enhanced foraging efficiency in Forster's Terns.—Light winds have been considered to be detrimental to the feeding efficiency (i.e., no. of successful prey captures/no. of attempts for prey) of Great Blue Herons (*Ardea herodias*) (Bovino and Burt, *Auk* 96:628–630, 1979), but apparently have no effect on Common Murre (*Uria aalge*) foraging (Birkhead, *Br. Birds* 69:490–492, 1976). Grubb found no direct wind effects on Osprey (*Pandion haliaetus*) feeding efficiency, although he did find a reduction in efficiency due to rippling of the water surface (Grubb, *Auk* 94:146–149, 1977). However, for Common Terns (*Sterna hirundo*) and Sandwich Terns (*S. sandvicensis*) Dunn (Nature 244:520–521, 1973) found that a mild wind and rippling water increased feeding-success rates. We studied the effects of mild wind, water surface condition, and direction of tidal flow on feeding efficiency of Forster's Terns (*S. forsteri*).

A total of 212 min of observation were made primarily between 06:00 and 11:00. Data were collected from 4–23 August 1980. The study-site was a bridge over a causeway leading from the mainland to Chincoteague Island, Accomack Co., Virginia (75.5°W, 38°N). Eighty-two individual observations of Forster's Terns were made. For each individual the feeding method used was recorded, as was the total number of dives for fish and the number of captures. Wind speed was estimated every 30 min using a Beaufort wind scale (BWS). Also, direction of tidal flow and water surface condition (i.e., height of waves: smooth, 1 cm, 2 cm, etc.) were recorded for the same interval.

Terns were considered to be actively foraging when the head and bill were oriented downward (Salt and Willard, *Ecology* 52:989–998, 1971), and this method was used for both styles of foraging. A description of perching behavior may be found in Reed et al. (*Wilson Bull.* 94:567–569, 1982). Terns dived from a height of approximately 4–6 m. Only actively foraging terns were included in the analysis.

Efficiency comparisons for Forster's Terns were made between individuals feeding under no-wind (BWS 0) and mild (BWS 1 and 2) wind conditions using a contingency χ^2 test. The same test was used to compare successes/h and attempts/h of foraging. Because the feeding efficiency of Forster's Terns varies significantly with feeding strategy (i.e., aerial vs perched

TABLE 1
COMPARISONS OF ATTEMPTS/H AND CAPTURES/H FOR PREY BY FORSTER'S TERNS
BETWEEN WINDS OF DIFFERENT SPEEDS

	N	df	Att./h	χ^2	Succ./h	χ^2
Aerial						
BWS 0 (no-wind)	15		79.8		20.4	
BWS 1 and 2 (mild)	14	28	46.8	8.6 ^a	19.2	0.036
Perched						
BWS 0	22		68.4		25.8	
BWS 1 and 2	31	52	67.2	0.01	39.6	2.91

^a $P < 0.005$.

attack [Reed et al., 1982]), each strategy was analyzed separately. Effect of tidal direction was calculated using a Student's *t*-test.

Wind speed and water surface condition were highly correlated during this study ($r = 0.87$, $P \leq 0.01$), and their individual effects could not be statistically separated. Direction of tidal flow was found to have a non-significant effect on success rate ($t = -0.57$, $P > 0.05$). This is in accord with previous findings (Dunn, *J. Anim. Ecol.* 44:743-754, 1975; Erwin, *Ecology* 58:389-397, 1977).

Forster's Terns showed a significant increase in foraging efficiency while aerial-feeding from no-wind (25.4%) to mild wind (40.6%) ($\chi^2 = 5.22$, $df = 1$, $P \leq 0.05$) but not when feeding from a perch—no-wind (45.2%) and mild wind (58.8%) ($\chi^2 = 3.71$, $df = 1$, $P > 0.05$).

The data on number of attempts/h and successes/h for aerially feeding Forster's Terns showed that significantly more attempts were made by individuals feeding during no-wind conditions than by individuals feeding during mild wind conditions ($\chi^2 = 8.6$, $df = 28$, $P \leq 0.005$) (Table 1). However, there was no significant increase in capture rate (no. of prey items taken/h) ($\chi^2 = 0.036$, $df = 28$, $P > 0.05$). Perched feeders showed no significant change in dive rate ($\chi^2 = 0.01$, $df = 52$, $P > 0.05$) or success rate ($\chi^2 = 2.91$, $df = 52$, $P > 0.05$) whether feeding under no-wind or mild wind conditions.

Dunn (1973) proposed two explanations for the increase in feeding success with light wind that she observed: (1) with a mild wind terns need not flap so vigorously while hovering, which might therefore reduce the chance of being detected by their prey, and (2) the rippling of water may actually impede the prey fish's vision. We would predict perch-feeders to show no wind-enhanced increase in feeding efficiency if detection by prey was the key since perched feeders are not visible to the fish (Reed et al., 1982). No significant change in the feeding efficiency of perched birds was observed ($\chi^2 = 2.91$, $df = 52$, $P > 0.05$). This suggests that water surface condition, more than wind speed, is the most important factor in the increased efficiency. The noted increase in efficiency by aerial feeders possibly reflects an improvement in aerodynamic stability and diving speed. If reduced flapping resulted in an increased efficiency (Dunn's [1973] first hypothesis), we would have expected an increased capture rate in aerial feeders, and this did not occur (Table 1). It should be noted that the increased efficiency is due to a decrease in attempts/h, not an increase in successes/h. The reduced number of attempts may be due to reduced visibility of prey (Salt and Willard 1971; Grubb 1977). The success rate remains constant, probably because the fish's vision is more hindered than is the tern's (Dunn 1973), and evasive actions by the prey are thus less

effective. This notion is supported by the reduced visibility of aerial feeders during mild wind.

Both of Dunn's (1973) explanations of increased success rate are based on the prey's ability to detect foraging terns. Our results support her second hypothesis (as stated above) that water surface conditions are the most important factor influencing foraging efficiency in terns due to its inhibitory effect on the prey's ability to detect terns.

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Atypically colored Little Blue Heron eggs.—Egg colors of the Little Blue Heron (*Egretta caerulea*) are described as pale hues of blue, green, and bluish green (Bent, U.S. Natl. Mus. Bull. 135, 1926; Palmer, Handbook of North American Birds, Vol. 1, Yale Univ. Press, New Haven, Connecticut, 1962; Oberholser, The Bird Life of Texas, Vol. 1, Univ. Texas Press, Austin, Texas, 1974; Hancock and Elliott, The Herons of the World, Harper and Row, Publ., New York, 1978). In 1973, I examined 2332 Little Blue Heron clutches in Texas and found two clutches of which the eggs had a ground color of deep olive-buff (Ridgway, Ridgway Color Standards and Nomenclature, Washington, D.C., 1912) with very small brownish orange spots (Kornerup and Wanscher, Reinhold Color Atlas, Reinhold Publ. Corp., New York, New York, 1962) less than 0.5 mm in diameter each scattered over the entire shell, but more concentrated near the large end. One clutch was in the Ennis heronry (Ellis County, 32°20'N, 96°37'W) and the other clutch was in "The Slough" heronry at the Beaver Catfish Hunting and Fishing Club (Anderson County, 31°52'N, 95°53'W). The two heronries were about 100 km apart. Exact locations and descriptions of these heronries can be found in Telfair (pp. 88–90, 96–99, 109–117, 130–133 in Ph.D. diss., Texas A&M Univ., College Station, Texas, 1979).

To my knowledge, no eggs of this olive-buff color have been reported in the literature nor have I noted any others among several hundred clutches I have seen since 1973. Answers to my inquiries about 28 museum egg collections confirmed the uniqueness of my observations. However, one clutch (taken in Orange Lake, Florida) in the Reading Public Museum and Art Gallery (Pennsylvania) has olive-buff blotches; seven clutches in the New York State Museum (taken in Florida and South Carolina) have a wash of extremely pale, inconspicuous olive blotches or stains, while some have a few small and very widely scattered orange spots; four clutches at the Museum of Zoology, University of Michigan (all taken in Texas) have brownish splotches and smears; one clutch in the Baylor University Strecker Museum (Waco, Texas) has small orange spots; and several eggs in the Corpus Christi Museum (Texas) have very small brownish orange spots. Thus, based upon my observations, literature descriptions, and museum collections, absence of green and blue pigment in the egg shells of the Little Blue Heron occurs in less than 0.1% of clutches.

All five eggs in the Ennis clutch produced "normal" chicks and the piped egg shells were collected. One of the four eggs in "The Slough" heronry was collected; but the others were destroyed in a flood. Both clutches were photographed (35 mm Kodachrome 64 color transparencies) and each egg was measured. Length and breadth for each of the nine eggs were within the range of measurements obtained from 180 randomly chosen eggs from the two heronries.

Perhaps these atypically colored eggs resulted from a rare allele that may be restricted to