papers cite only a few instances of renesting after chicks from the original clutch died. To our knowledge extensive renesting after predation has not been previously reported. Renesting in the same place after predation probably indicates a lack of plasticity in breeding responses of Herring Gulls and was maladaptive in the instance reported here since all eggs produced in the renesting were destroyed by foxes.

The response of South Manitou Herring Gulls to fox predation was different from that reported by Tinbergen (op. cit.). Renesting did not occur at the borders of the colony although apparently adequate space was available. Spreading out or even desertion of the original territory may not be assumed to be a singular response to predation because in this instance Herring Gulls renested in the same territory after hatching and predation upon the first clutch. The response of the Herring Gull to predation upon eggs or chicks may be related to the stage of the breeding cycle or the length of time spent on 1 territory, or both.—GARY W. SHUGART, *Dept. of Biological Sciences, Northern Illinois Univ., DeKalb 60115* and WILLIAM C. SCHARF, *Dept. of Biology, Northwestern Michigan College, Traverse City 49684.* *Accepted 5 May 1976.*

Egg quality in relation to nest location in Ring-billed Gulls.—A number of studies of colonial nesting birds have shown that pairs which nest in the center of a colony have a higher reproductive success than pairs nesting near the outside or periphery of the colony. This phenomenon has been recorded for the Black-headed Gull (*Larus ridibundus*) (Patterson, Ibis 107:433–459, 1965), Adelie Penguin (*Pygoscelis adeliae*) (Tenaza, Condor 73:81–91, 1971; Spurr, Ibis 117:324–338, 1975) and Black-legged Kittiwake (*Rissa tridactyla*) (Coulson, Nature 217:478–479, 1968). Coulson et al. (Auk 86:232–245, 1969) found that eggs in centrally located nests of Black-legged Kittiwakes were significantly larger than eggs in nests on the periphery and postulated that part of the early mortality of peripheral Black-legged Kittiwake and Shag (*Phalacrocorax aristotelis*) nestlings may be due to the smaller size and quality of the eggs, particularly the yolk.

From our studies of Ring-billed Gulls (*L. delawarensis*) on Granite Island, northern Lake Superior, Ontario (48°43′N, 88°29′W), we have found proportionately more eggs hatched in the center than in the periphery of the colony (see Ryder, Wilson Bull. 87:534–542, 1975). We define central and peripheral nests respectively as those in the geometric center of the colony and those forming the outside border (see Dexheimer and Southern, Wilson Bull. 86:288–290, 1974). Stimulated by the suggestion of Coulson et al. (Auk 86:232–245, 1969) that egg yolk quality might be related to nestling mortality, we tested eggs from both areas for relative amounts of nutrient and energy content in the yolk assuming that differences in these parameters might provide a clue to help explain the low hatching success of peripherally located eggs. Romanoff (Pathogenesis of the Avian Embryo, Wiley, N.Y., 1972) stated that deficiencies of various compounds in the egg may seriously disturb embryonic development and lead to premature death.

We collected one freshly-laid egg from each of 24 3-egg clutches in the center and 28 3-egg clutches on the periphery of the Granite Island colony on 17 and 21 May 1975. The length and maximum breadth of each egg was measured to 0.001 cm with vernier calipers. Egg volume was calculated using the formula $V = 0.489 \cdot B^2(\max) \cdot L$, where B is the maximum breadth and L the length of each egg (see Ryder, Wilson Bull. 87:534–542, 1975). Eggs were weighed to the closest 0.1 g on a triple beam balance in the field. Within 6 h after collection, whole yolks were separated from the albumen and stored frozen until chemical analyses were made.

TABLE 1

THE MEAN LENGTH, BREADTH, VOLUME, AND WEIGHT OF RING-BILLED GULL EGGS, GRANITE ISLAND, 1975[1]

	Location in Colony	
	Center	Periphery
length (mm)	58.34 ± 0.23[2]	57.80 ± 0.32
breadth (mm)	41.81 ± 0.12	41.88 ± 0.13
volume (cc)	49.71 ± 4.02	49.64 ± 4.63
weight (g)	53.93 ± 3.74	53.42 ± 4.06

[1] N = 24 eggs from center and 28 eggs from periphery of colony.
[2] 1 S.D.

In the laboratory each yolk was weighed wet to the closest 0.001 g on an analytical balance. Yolks were dried individually in a vacuum desiccator over sulphuric acid until constant weight and then analyzed for total protein, carbohydrate, and lipid content. Protein quantities were determined according to the procedure in Kolthoff and Sandell (Textbook of Quantitative Inorganic Analysis, MacMillan, N.Y., 1956). Lipid analyses followed Freeman et al. (J. Biol. Chem. 227:449–464, 1957) and carbohydrate determinations followed Dubois et al. (Anal. Chem. 28:350–356, 1956). The following constants given by Brody (Bioenergetics and Growth, Hafner, N.Y., 1945) were used to convert g organic material into caloric units: 9.45 Kcal/g lipid; 5.65 Kcal/g protein; 4.10 Kcal/g carbohydrate. These conversions were used for Brown Pelican (*Pelecanus occidentalis*) eggs by Lawrence and Schreiber (Comp. Biochem. Physiol. 47A:435–440, 1974) and Laughing Gull (*L. atricilla*) eggs by Schreiber and Lawrence (Auk 93:46–52, 1976).

Table 1 presents data on the length, breadth, volume, and total weight of central and peripheral eggs. In all parameters but breadth, eggs from central nests were slightly but

TABLE 2

NUTRIENT COMPOSITION OF RING-BILLED GULL EGG YOLKS, GRANITE ISLAND, 1975[1]

	Location in Colony		
Nutrient	Center	Periphery	Combined
protein	1.81 ± 0.33[2]	1.86 ± 0.26	1.84 ± 0.29
	10.20 ± 1.86[3]	10.54 ± 1.48	10.39 ± 1.65
carbohydrate	0.05 ± 0.02	0.06 ± 0.02	0.05 ± 0.02
	0.19 ± 0.08	0.24 ± 0.10	0.22 ± 0.09
lipid	4.44 ± 0.69	4.59 ± 0.48	4.53 ± 0.58
	41.99 ± 6.48	43.42 ± 4.56	42.80 ± 5.47

[1] N = 21 for center, 27 for periphery and 48 for combined sample.
[2] Weight (g).
[3] Energy (Kcal).

not significantly larger, $P > 0.05$) than eggs from peripheral nests. Protein, carbohydrate, and lipid weights and their energy values from both locations were equal (Table 2).

These results support the finding that embryos of equivalent age from the center and periphery of the Granite Island colony (Ryder and Somppi, Wilson Bull. 89:243–252, 1977) showed no significant differences in developmental characteristics and size. It appears that the differences in hatching success in relation to nest location in our colony may not be due solely to differential quantities of proteins, carbohydrates, and lipids in the yolks. The results do not preclude the possibility that differences exist in the types and quantities of essential amino acids and/or other compounds which may be important in determining egg hatchability. Additionally, low egg success in peripheral areas may reflect lower parental attentiveness than in central regions.

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Roof-nesting by Common Terns.—During the summer of 1975 a pair of Common Terns (*Sterna hirundo*) nested on the flat roof of a building on Great Gull Island, New York (at the eastern end of Long Island Sound). Gill (Auk 70:89, 1953) reported Common Terns nesting on a boat on Long Island. I find no reference in the literature to Common Terns nesting on buildings. Least Terns (*S. albifrons*) have been reported nesting on roofs in Florida (Fisk, Am. Birds, 29:15–16, 1975).

On 12 July 1975 I first noticed a Common Tern sitting on the roof of 1 of the old army buildings, now used as sleeping quarters on Great Gull Island. On 13 July I climbed onto the roof and found 2 warm eggs in a shallow depression where I had seen the adult tern sitting. A loose layer of pebbles on the flat surface of the roof covered most of the tar and roofing paper. The nest depression was shielded on 1 side by a piece of roofing paper and was partly lined with small pieces from a rotting board lying on the roof about 1 m from the nest. While I was on the roof one of the adult terns dove at me. A tern was last seen incubating on 25 July during a storm. On 26 July and on following days no birds were seen on the nest. On 18 August 1 egg was left in the nest. I opened it and found an embryo which I judged to be 11 to 12 days old using the criteria of Hays and LeCroy (Wilson Bull. 84:187–192, 1971).

On Great Gull Island Common Terns often nest on the crumbling concrete of the old fort which covers most of the island (Cooper et al., Proc. Linn. Soc. 71:108–118, 1970). Most of the concrete surfaces are effectively at ground level. At times terns have nested on concrete lookout platforms at least 2 m above the ground. This roof nest was about 4 m above the ground. The roof's pebble surface gave the nest a substrate similar to the island's pebble beaches. During the period when the roof-nest terns probably chose their nest site, many of the traditional nesting areas were overgrown or still being defended. A resulting shortage of nesting habitat may have caused the selection of the roof as a nest site. I do not think that the desertion of the eggs on the roof was due to any particular disadvantage in the nest site, rather, it may have been caused by factors which influenced the desertion of many nests on the night of the storm of 25–26 July.