FURTHER OBSERVATIONS OF TERNS' EGGS ENCLOSED BY HATCHED EGGSHELLS

by I. C. T. NISBET*

Hatch reported observing seven clutches of Common Terns in a colony in Manitoba in which one of the eggs was partly enclosed by half of the shell of an earlier-hatched egg.[2] During a 4-year study of Common Terns in Massachusetts, I have observed this phenomenon only twice, although I have examined some 320 nests with marked eggs daily through the hatching period and have made more casual observations at several hundred other nests at the time of hatching.[3] However, I have seen the same phenomenon four times in only 92 two-egg clutches of Roseate Terns that were examined daily through hatching.

The most likely reason why this phenomenon should be more frequent in Roseate than in Common Terns is that the former do not remove hatched eggshells from the nest, whereas Common Terns usually do so within 30 minutes of hatching (Cullen[1] and personal observations). Hence the second egg is more likely to be brooded in the nest with a part of the hatched shell of the first and thus to be shuffled into it by accident. Once inside, it is fairly tightly enclosed and is unlikely to be removed by the parent.

It is also likely that the probability of this phenomenon occurring depends on the relative sizes of the eggs. At my main study-colony, Bird Island (41°40'N, 70°43'W), Roseate Tern eggs usually differed more in size within clutches than those of Common Terns. The average difference between the first and second eggs in 71 clutches of Roseate Terns (which rarely lay clutches of three) was 1.62% (standard deviation 2.54%) in breadth and 4.56% (s.d. 6.57%) in volume. The corresponding differences between first and third eggs in 64 clutches of Common Terns were 1.19% (s.d. 2.23%) and 3.39% (s.d. 5.58%). In only one of the Common Tern clutches did the first and third eggs differ by more than 11 percent by volume, but this difference was exceeded in 11 of the 71 Roseate clutches.

In 1973 I found significantly larger differences in egg-size within clutches in a Common Tern colony at Yarmouth, Massachusetts (41°43'N, 70° 15'W). The average difference between first and third eggs in 51 three-egg clutches was 2.24% in breadth and 7.19% in volume, greater even than in the Roseates at Bird Island. In 13 of the 51 clutches the first and third eggs differed in volume by more than 11%. It is significant that both cases of egg-enclosure occurred in this group of 13 clutches at Yarmouth (differences 11.4 and 22.7% by volume, and 4.4 and 5.3% by breadth): both of these clutches fell into the most extreme 10 percent of the 159 three-egg clutches of Common Terns that I have measured in Massachusetts. These data suggest that egg-enclosure is most likely to occur when the last egg in the clutch is very small.

Hatch reported that three of the seven enclosed eggs observed by him

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failed to hatch.[2] However, I have recorded no case of hatching failure clearly attributable to this cause in Massachusetts. In four of my six study-nests described above, I removed the enclosing eggshell, but in the remaining two (one Common, one Roseate) I left it on and the chicks nevertheless hatched. More significantly, I have examined several hundred unhatched eggs in eight colonies but I have not yet found a dead embryo in an enclosed egg.

Hatch's observations suggest the possibility that egg enclosure may be more frequent among Common Terns in Manitoba than in Massachusetts. If this is confirmed by subsequent observation, it would be interesting to determine whether it is associated with unusually large differences in egg-size within clutches, or perhaps with an unusual failure of the parents to remove eggshells promptly. It would also be important to determine the level of embryonic mortality in these colonies and to discover whether it is associated clearly with egg enclosure, or with other factors such as parental neglect or toxic chemicals. A relatively high incidence of hatching failure has been reported among Common Terns in Alberta (Switzer *et al.*[4,5]; G. A. Fox, personal communication) and in Ontario (M. Gilbertson, personal communication).

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[1]CULLEN, J. M. 1960. *Some adaptations in the nesting behaviour of terns.* Proc. XII Intern. Ornith. Congr. : 153-157.

[2]HATCH, D. R. M. 1973. *Hatched egg-shells covering Common Tern eggs.* Blue Jay 31: 91.

[3]NISBET, I. C. T. 1972. *Disaster years for terns.* Man and Nature, Dec. 1972: 16-21.

[4]SWITZER, B., V. LEWIN, and F. H. WOLFE. 1971. *Shell thickness, DDE levels in eggs, and reproductive success in Common Terns (Sterna hirundo), in Alberta.* Can. J. Zool. 49: 69-73.

[5]SWITZER, B., V. LEWIN, and F. H. WOLFE. 1972. *Effects of DDE on reproductive success in Common Terns, (Sterna hirundo), at Chip Lake, Alberta.* MS. presented as exhibit USDA-RBTL-9 at public hearings on DDT (Environmental Protection Agency, Washington, D.C.).

CHAPMAN'S 1908 RECORD OF CALIFORNIA GULL NESTING IN MANITOBA

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Although the California Gull breeds in Saskatchewan and North Dakota, its status in Manitoba is unclear.[3] [11] In 1908 Frank M. Chapman referred to California Gulls nesting at the Shoal Lakes in his "Camps and Cruises of an Ornithologist" (pp. 319, 345).[1] However, since Chapman gave no details and did not mention Herring Gulls there, Taverner included this record under "Herring Gull" and

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