Although nesting female Spotted Antbirds are known to stay on the nest at night, as is usual for female antbirds (Skutch 1969), it is not known if females roost in the way this bird did during periods when they have no nest. It would be interesting to determine the kinds of roosting in this species and their relationship to foraging, reproduction, and other biological activities in both nonseasonal and seasonal forests.

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SHELL THINNING IN EGGS OF THE COMMON MURRE, *URIA AALGE*, FROM THE FARALLON ISLANDS, CALIFORNIA

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In recent years several fish-eating or raptorial birds that depend entirely or in part upon the marine food chains in California no longer occur as breeding species or are now experiencing reproductive failures as a result of excessive shell thinning. The Peregrine Falcon (*Falco peregrinus*) began to lay thin-shelled eggs in California in 1947 (Hickey and Anderson 1968) and now no longer breeds in the wilderness environment of the Channel Islands (Herman et al. 1970). The Bald Eagle (*Haliaeetus leucocephalus*) was a common resident of the Channel Islands in the 1930s (Willett 1933:18–19), but there have been no reports of eagles in that area in recent years. Extensive field work carried out on Anacapa Island by Banks in 1963 and 1964 (Banks 1966) and the authors in 1969 and 1970, failed to find a single eagle where several pairs of eagles once nested. Significant shell thinning was found in eggs of the Brown Pelican (*Pelecanus occidentalis*) collected on Anacapa in 1962 (Anderson and Hickey 1970), and in 1969 virtually all eggs of the Brown Pelican on Anacapa broke during incubation (Risebrough, Davis, and Anderson 1970). In investigating the status of other marine birds in California that might be experiencing reproductive failures, we have looked for shell thinning in the eggs of several species. In this paper we report on our investigations of the Common Murre (*Uria aalge*) on the Farallon Islands.

The Farallon Islands west of San Francisco have long been the breeding site of vast numbers of murres. Ray (1904) wrote of Great Murre Cave on South Farallon Island, where all ledges and projections, as well as the cave floor, were covered with murres, as a "wonder to behold." Initially we examined five murre eggs collected on the Farallon Islands in 1968 for shell thickness, shell weight, and shell thickness index. The thickness index, devised by Ratcliffe (1967), was determined by dividing 10 × the weight (in g) of the shell by the product of the length and the breadth (in cm^2). The values obtained were compared with those of 66 eggs in the Museum of Vertebrate Zoology, University of California, Berkeley, collected by M. S. Ray on the Farallons in 1913. These were measured by D. W. Anderson, using methods described by Anderson and Hickey (1970). The eggs obtained in 1968 were found to have significantly thinner shells, and significantly lower shell weights and shell thickness indices ($P < 0.05$). Since the sample size was small, we examined an additional 24 eggs collected on the Farallons in 1970. The average value of each parameter, with the 95 per cent confidence limits of the mean of the combined 1968 and 1970 collections, are given in table 1.

The length and the breadth of the recent eggs do not differ significantly from the length and breadth of the eggs obtained in 1913. Thickness, thickness index, and shell weight, however, all show significant decreases ($P < 0.05$). Thickness decreased by 12.8 per cent, thickness index by 11.9 per cent, and shell weight by 11.5 per cent.

The five eggs collected in 1968 were analyzed for chlorinated hydrocarbons by methods described by Risebrough, Florant, and Berger (1970). Lipid extracts of the eggs contained an average of 297 ppm DDE (range, 240–395), 168 ppm PCB (range, 122–283), and 0.021 ppm dieldrin (range, 0.00–0.045). No p,p'-DDD or p,p'DDT were detected. An average of 12.9 g of lipid was extracted from each egg, comprising 13.7 per cent of the total wet weight contents.

Ratcliffe (1970) found no differences in thickness index of eggs of the Common Murres of Great Britain in collections obtained before 1937 and after 1950. Chlorinated hydrocarbon pollution of British seas appears, however, to be considerably lower than in California coastal waters. The average DDE concentration in 16 recent eggs of British murres was 2.12 ppm on a wet weight basis (total weight of fresh egg contents), or approximately 16 ppm on a lipid basis. PCB concentrations in the British murres averaged 5.13

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TABLE 1. Changes in characteristics of shells of eggs of the Common Murre (*Uria aalge*) from the Farallon Islands, California.

	1913 ($n = 66$)	1968 and 1970 ($n = 29$)
Length (mm)	82.52 ± 0.78	83.60 ± 1.48
Breadth (mm)	50.51 ± 0.37	50.24 ± 0.64
Weight (g)	13.63 ± 0.33	12.10 ± 0.49
Thickness index[a]	3.27 ± 0.06	2.88 ± 0.10
Thickness (mm)	0.70 ± 0.01	0.61 ± 0.02

[a] $\frac{\text{weight (g)} \times 10}{\text{length (cm)} \times \text{breadth (cm)}}$

ppm on a wet weight basis, or approximately 38 ppm on a lipid basis.

The murres of the Farallons, with a 13 per cent decrease in shell thickness, might be expected to experience lowered reproductive success. A reduction in shell thickness of 13 per cent in eggs of Mallards (*Anas platyrhynchos*) induced by dietary DDE under controlled experimental conditions was associated with increased numbers of cracked eggs, reduced hatchability of eggs with uncracked shells, and increased embryonic mortality (Heath et al. 1969).

Studies of the effects of marine pollution upon the Common Murres and other marine avifauna are continuing at the Farallon Island Station of the Point Reyes Bird Observatory.

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FOOD HABITS OF THE STARLING IN EASTERN TEXAS

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The objectives of this study were to determine the seasonal variations in the foods of the Starling (*Sturnus vulgaris*) in eastern Texas, and to compare these findings with those of authors in more northern and eastern areas of the United States.

The most comprehensive report on the food habits of the Starling is contained in Kalmbach and Gabrielson's (1921) paper on the economic value of the Starling. The animal composition of these Starlings' diet is shown in figure 1. Over one-half of the insects found were Coleoptera, of which the clover-leaf beetle (*Hypera puncata*) was the most prominent. Kalmbach and Gabrielson (1921) stated that the Starling is the most effective bird enemy of this pest in America and, because of this, should be considered a neutral, if not benefical bird. Wood (1924) in his survey of the Starling included a warning that "it is too early yet to say what will be the result of the introduction of the Starling into this country. Its value as an insect destroyer is plain, but its unchecked increase may prove a calamity to several species of useful native birds, and from the experience of other countries we may assume that it is likely to become a pest to fruit growers." Kalmbach (1922) summarized his data from earlier papers and reaffirmed his faith that the Starling is a useful bird and would cause few problems.

Lindsey (1939) found that insects constituted 35 per cent of the annual food of the adult Starling in New York and 77 per cent of the food of nestlings. Garbage was utilized in large quantities by adult birds as a winter food. Killpack and Crittenden (1952) reported that Starlings in the Unita Basin of Utah fed mainly upon grain from feedlots, corn silage, and garbage during the winter. Besser et al. (1968) reported Starlings feeding heavily upon high protein pellets in feedlot operations in Colorado. Briefer articles mention specific foods of the Starling, such as the monarch butterfly (*Dianus archippus*) in California (Brooks 1952), and the fruits of yaupon (*Ilex vomitoria*), American holly (*Ilex opaca*), hackberry (*Celtis laevigata*), camphor tree (*Cinnamomum camphora*), and chinaberry tree (*Melia azedarach*) in Louisiana (McIlhenny 1936).

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