SOME ASPECTS OF THE ONTOGENY OF CLIFF NESTING BEHAVIOUR IN THE KITTIWAKE (*Rissa tridactyla*) AND THE HERRING GULL (*Larus argentatus*)

by

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(With 15 Figures)
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INTRODUCTION

This present study is a continuation and expansion of E. CULLEN's (1957) work in which she describes a number of features in which the Kittiwake (*Rissa tridactyla*) differs from most other gulls, and interprets them as being parts of a comprehensive adaptive system for breeding on cliffs. A major problem is how to cope with the disadvantages of the precarious habitat. My interest in this field was initially prompted by a wish to investigate in more detail how the newly hatched Kittiwake chicks manage to avoid falling off the narrow ledges.

Since E. CULLEN's work was published, attention has focussed on the behaviour of gull chicks when disturbed. Attempts have been made to discover whether the Kittiwake's characteristic habit of freezing in the nest, which contrasts so strongly with the running and hiding of the ground nester's chick, is a general characteristic of cliff nesting gulls, and if so, how genetical and environmental factors are involved in its

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development. The Ivory Gull (*Pagophila eburnea*) can nest on cliffs or on the ground and BATESON & PLOWRICH (1959) observed that all chicks run from their nests and crouch, by the wall in the case of the cliff nesters, at an alarm. This observation can be reconciled with NEAL SMITH's (1966) data from a detailed study of four species of gulls all of which are, like the Ivory Gull, capable of nesting on either cliff or flat ground. In the Canadian Arctic where he worked, most of the colonies of the Iceland Gull (*Larus glaucoides*) and Thayer's Gull (*Larus thayeri*) are on cliff sides. The Glaucous Gull (*Larus hyperboreus*) also nests on cliffs but on ledges of almost twice the area of those occupied by the other two gulls, while the Herring Gull (*Larus argentatus*) nests on the ground. From his total study it emerged that Thayer's Gull is the best adapted to cliff nesting. As part of his study he observed the response of 7-14 day old chicks from cliff nests to disturbance and he found that the chicks of the Glaucous Gull showed the greatest tendency to flee. The chicks of the Iceland Gull showed a greater tendency to flee than Thayer's Gull chicks, which usually crouched against the cliff wall. Observations were made in the same manner in ground nesting colonies and here only Thayer's Gull chicks remained immobile. Reciprocal transfers of eggs and chicks indicated that in the other three species these differences in behaviour develop as the result of experience in the first eight days of life.

The same conclusion was reached by EMLEN (1963) in his Herring Gull studies, although his experiments involved a different technique. He assessed the resistance of Herring Gull chicks, from 1-25 days old and from ground and cliff nest sites, to jumping, not from natural ledges, but from a platform on which he had recently placed them. All the chicks up to the age of three days refrained from jumping but after this the ground nesting chicks jumped significantly more often than the cliff nesters, though both groups showed a progressively poorer performance with increased age. Egg transfer experiments suggested that this difference was the result of early experience and not based on genetical differences.

EMLEN also tested the tendency of Herring Gull chicks to avoid a cliff edge by placing them on a perspex platform, over part of which the opaque protective layer was retained. Thus, the chick could be placed at a "visual" or apparent edge and its tendency to withdraw measured by the observer, who remained invisible under the platform. Chicks from ground and cliff nests were tested in the colony, and a group of incubator-hatched chicks tested in the laboratory confirmed that in the first day of