AGGRESSIVE COMMUNICATION BY LARUS GLAUCESCENS
PART VI: INTERACTIONS OF TERRITORY RESIDENTS
WITH A REMOTELY CONTROLLED, LOCOMOTORY MODEL

by

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(With 10 Figures)
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INTRODUCTION

In previous papers (Stout et al., 1969; Stout & Brass, 1969; Stout, 1975; Galusha & Stout, 1977; Hayward et al., 1977) communication during aggressive interactions by Larus glaucescens was evaluated. Data were presented which showed that these gulls can discriminate among the postural features for most of the aggressive displays used in territorial defense (Stout & Brass, 1969; Galusha & Stout, 1977). During experimental work with nonmoving (static) models a relatively complete repertoire of behaviors was elicited. However, Galusha & Stout (1977) noted that certain displays and complete behavioral responses were not seen as frequently as were noted in normal intruder-defender interactions. Hayward et al. (1977) showed that territory owner responses given to model gulls that could be rotated or move their heads up and down vary in some detail from responses given to natural intruders. They suggested that this difference might be due in part to the fact that a model could not move away, whereas intruders moved away when threatened or attacked. Galusha (1975) suggested that the lack of side to side head movements by the model might also contribute to differences in the response by territory residents. The response of territory residents was in some respects similar to both static models and to natural neighbors during boundary disputes. A neighbor and a model are similar in that a neighbor will not leave the area in response to a defender's aggressiveness. By using a model capable of locomotory movement, (Amlaner, 1976) more frequent

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responses of longer duration involving a greater variety of displays were
given by the territory resident.

Much of the previous work on Larid behavior (Tinbergen, 1953, 1958,
1959, 1960; Moynihan, 1955, 1958; Stout et al., 1969; Stout & Brass,
1969; Stout, 1975; Galusha & Stout, 1977; Hayward et al., 1977) dealt
with descriptions of and hypotheses about the meaning of individual behaviors.
Stout (1975) and Hayward et al. (1977) suggested further that sequences
of individual behaviors might convey information that may not be conveyed
by individual behaviors alone. Analysis of sequences of interactions for
specific individuals have been made for a number of species of animals
(Altmann, 1965; Hazlett & Bossert, 1965; Blurton-Jones, 1968; Dingle,
1969; Heckenlively, 1970). Recent analyses of communicative behavior by
L. glaucescens (Hayward et al., 1977) included descriptions and analyses of
sequences of behaviors during natural aggressive interactions. The use of a
locomotory model allows the independent evaluation of factors leading to an
individual behavior or a series of behaviors following a standard model
movement or posture or sequence of movements and postures.

Hayward et al. (1977) showed that orientations between defender and
intruder play an important role in territorial defense during natural inter-
actions. They found that territory owners most frequently approach the
intruder from behind (with an angle of greater than 90 degrees from the
intruder’s head) while forcing the intruder out of the territory. Particular
components affecting orientation were not clearly defined due to an inability
to independently control any one of the interacting birds. By utilizing the
locomotory model as an intruder, an independent evaluation of orientation
was possible.

It has been demonstrated that head-neck position was a very important
feature used by this species to discriminate between the postural components
of the aggressive displays (Stout & Brass, 1969; Galusha & Stout, 1977).
One purpose of this paper is to further evaluate the significance of the
head-neck position experimentally using a model gull with the capability of
locomotory movement. This study also evaluates in an experimental frame-
work, levels of threat relative to body posture and directional movement.

One of the important deficiencies in the above mentioned descriptive and
experimental studies of Larid behavior was the inability to control locomotory
movement. Thus it was not possible to determine whether movement of one
bird toward or away from the other bird was causally related to a subsequent
response or merely correlated with it. The most important contribution of this
study is a clear evaluation of the effect of locomotory movement during an
interaction in the territory on subsequent behaviors.