

FROM FIELD AND STUDY

Selection and Emberizine Distraction Display.—Savannah Sparrows (*Passerculus sandwichensis*) and Song Sparrows (*Melospiza melodia*) are abundant inhabitants of *Salicornia* salt marshes in coastal California. In the course of field work conducted between 1950 and 1955 on a population of Song Sparrows (Johnston, Condor, 58, 1956:24-44; 254-272), I had opportunity to observe nesting behavior of these two finches. One of the major behavioral differences in the breeding season between the two is that the Savannah Sparrow almost always exhibits a marked distraction display when flushed from eggs or young, whereas the Song Sparrow almost never so displays. Since the position of the nest is related to the occurrence of distraction display, it should be noted that the salt marsh Savannah Sparrow is consistently a ground-nester whereas the salt marsh Song Sparrow nests in low bushes about ten inches off the ground.

It seems general that ground-nesting birds show some type of distraction display, and the adaptive advantages are clear. My notes show I flushed *Passerculus* 23 times and recorded distraction displays 17 times. This seems to place the distraction display of salt marsh Savannah Sparrows within the range of normality known for the whole species. In passing I should mention that this species flushes from its eggs in the same manner as it does from nestlings; the relative importance of incubating and parental drives involved in releasing distraction display would thus appear to be nearly the same. Armstrong (Ibis, 98, 1956:641-654) notes much variation in importance of the two component sets.

Birds that nest off the ground are less often seen to give distraction display, apparently for reasons having to do with the distance of a predator or the alarm stimulus received at the nest when flushing occurs. *Melospiza* may be considered normally an above-ground nester over much of its distributional range; however, on salt marshes it must nest in situations that approximate ground nesting. Under these conditions I recorded one instance of distraction display out of approximately 130 possible times it might have been given. On an unknown number of other times Song Sparrows merely stole from the nest quietly and unobtrusively. The instance of distraction display, rather than headlong flight, occurred in the following way: the bird had built its nest only four inches from the end of a stranded log that was 18 to 20 inches in diameter; this log formed a pathway clear of surrounding *Salicornia*. It was to this log and along it that the Song Sparrow ran, using the "rodent run."

Thus, in broadly equivalent nesting situations on *Salicornia* marshes, we see in one finch the persistence of distraction display and in the other its absence in favor of headlong flight or stealthy removal.

If it may be assumed that the existence of distraction display in birds is due to a particular configuration within the species genotype, the following hypotheses may be considered: (1) Distraction display is not advantageous to salt marsh Song Sparrows or it is merely of neutral adaptive value, with no selection for or against it. (2) Distraction display is of adaptive advantage to salt marsh Song Sparrows but the selective factor has not yet caused the display to appear phenotypically in any significant portion of the population.

Were the first hypothesis valid, we would be left mainly with a fact that in the salt marsh environment, distraction display is not useful to Song Sparrows. If the second hypothesis were valid, we should inquire into the forces of selection and the genetic process. The selective factor would be mortality caused by the dominant predator on salt marshes, the Norway rat (*Rattus norvegicus*). There is no way now of assessing the strength of rat selection against headlong flight as opposed to distraction display. Presuming such selection to exist, in time a significant number of appropriate alleles will be found in the population. But why are they not now found?

The answer probably lies with the time factor (see, for example, Dobzhansky, Genetics and the Origin of Species, 1941:220). Norway rats have been present on Californian salt marshes probably for less than 150 Song Sparrow generations. This is an exceedingly short time in an evolutionary sense, and especially so in view of the large breeding populations that these birds maintain.—RICHARD F. JOHNSTON, Department of Biology, New Mexico College of Agriculture and Mechanic Arts, State College, New Mexico, February 1, 1957.