Biparental Coordination Mechanics of Leach's Storm-Petrels, *Oceanodroma leucorhoa*
Liam Taylor, 2017

This summer, I gathered data in an attempt to unravel a mysterious step in the reproductive strategy of Leach's Storm-Petrels (*Oceanodroma leucorhoa)*. In order to successfully incubate their single-egg clutches in underground burrows, while also having to travel up to thousands of kilometers away from their nesting colonies to forage, the Storm-Petrels utilize obligate biparental care strategies. Several known adaptations, such as the Storm-Petrel eggs' ability to withstand long periods of non-incubated neglect, are deeply tied to the unknown scheduling processes by which two adults coordinate care. As shown in other species, this care may be most strongly influenced by an individual's physiological condition and that same individual's incomplete knowledge of its mate's behavior.

To uncover the driving forces behind biparental coordination, my project first involved a focus on real-world data. By tagging both parents at several nests with Passive Integrated Transponder (PIT) tags, I could get a unique-ID time record of movements in and out of burrows during incubation. With this information, the length of foraging and incubation bouts-- as well as the cues that appear to be linked with these transitions-- can be matched to specific parents. These PIT data show that the mechanics underlying biparental scheduling behaviors are connected to an individual parent's condition at the time of incubation, as well as the arrival and incubation behavior of a given bird's mate.

A more complete understanding of biparental care will rely on an increasingly generalized model involving stochastic life-history and environmental factors. To this end, I have also begun work on a programmed energetic simulation. By modeling the parameters that drive the Storm-Petrel's survival and reproductive strategies, I can represent actual evolutionary pressures on a population of computer-generated birds. As the parameters are fine-tuned (again using real-world data), and the program is expanded, I hope to see which abstract biparental scheduling strategies may lead to the highest potential fitness, and compare them to the strategies represented in the PIT data. Thus, those hypotheses that involve the actual movements of the birds and those that arise from the simulation can inform each other.

This was my second summer on Kent Island, and my experience only served to solidify my earlier impressions. On the island, you are completely surrounded by both your own and others' study species. Beyond being a marvelous natural show, this display forces you to be honest in representing your work. You can't ignore your organism's (or nature's) reality in favor of a pleasant hypothesis, or an oversimplified model. Your science becomes bound to your environment in the most honest possible way.

Beyond that, the island also offers you the valuable experience to, in the clichéd phrase borne of less sincere opportunities, "network." You get tos meet and live with professors, students, and researchers. This kind of "networking" isn't to get you another fellowship, or a leg-up for graduate school, or some kind of social prestige. It's a sort of honest communication from which you can learn about science, and a certain lifestyle, better than you can from stories or a textbook. You can begin to understand the real scientific methodology, both in a personal and professional sense, that gets edited out somewhere along the way between idea and publication.

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