The Pragmatic Cartography of Population Biology: Army Ants, Flour Beetles, and the Lab-Field Border

Rasmus Grønfeldt Winther, UC Santa Cruz
rgw@ucsc.edu ; www.rgwinther.com
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Maps and cartographic reasoning play important roles in biological practice (e.g., Hall 1992; Gannett and Griesemer 2004; Turnbull 1993, 2004; Winther under contract). While significant attention has been paid to mapping in population genetics and genomics (e.g., Haraway 1997; Gaudillère and Rheinberger 2004, 2011), the importance of mapping to population biology in general has been underappreciated. I track mapping practices—actual and analogical—in two influential moments of ecology and animal behavior:

(1) T.C. Schneirla's laboratory (American Museum of Natural History, NYC) and field work (Barro Colorado Island, Panama) on army ants (genus *Eciton*) from the 1930s to the 1960s. Maps played a critical role in Schneirla's theorizing, laboratory, and field practices. In his published work, they were often combined with other visual and pictorial representations/performances to produce integrated knowledge (e.g., Figure 1 from Schneirla 1957 "Theoretical Consideration of Cyclic Processes in Doryline Ants" *Proc Am Philo Soc*, 108).

(2) Thomas Park's contemporaneous work at the University of Chicago on the "population physiology" of flour beetles (genus *Tribolium*). Park used maps to a lesser extent. Yet, representing and analyzing the structured spatialization of his laboratory populations involved implicit mapping practices.

Map tracking is useful in that "maps can provide valuable markers of changing theoretical interests, goals, commitments, and values" (Gannett and Griesemer 2004, 84); maps are also a central metaphor for the pragmatic production of scientific knowledge (e.g., Peter Galison; Ronald Giere; Thomas Gieryn; Thomas Kuhn; Bruno Latour; Helen Longino; Stephen Toulmin). I nestle my concrete map tracking analysis in the broader philosophical contexts of (i) the activities and nature of the lab-field border (Kohler 2002), (ii) the trichotomy of theoretical, laboratory, and natural populations (Winther, Giordano, Edge, and Nielsen forthcoming *SHPSC*), and (iii) the sustained impact of pragmatic map analogy discourse across the sciences and humanities (Winther under contract).

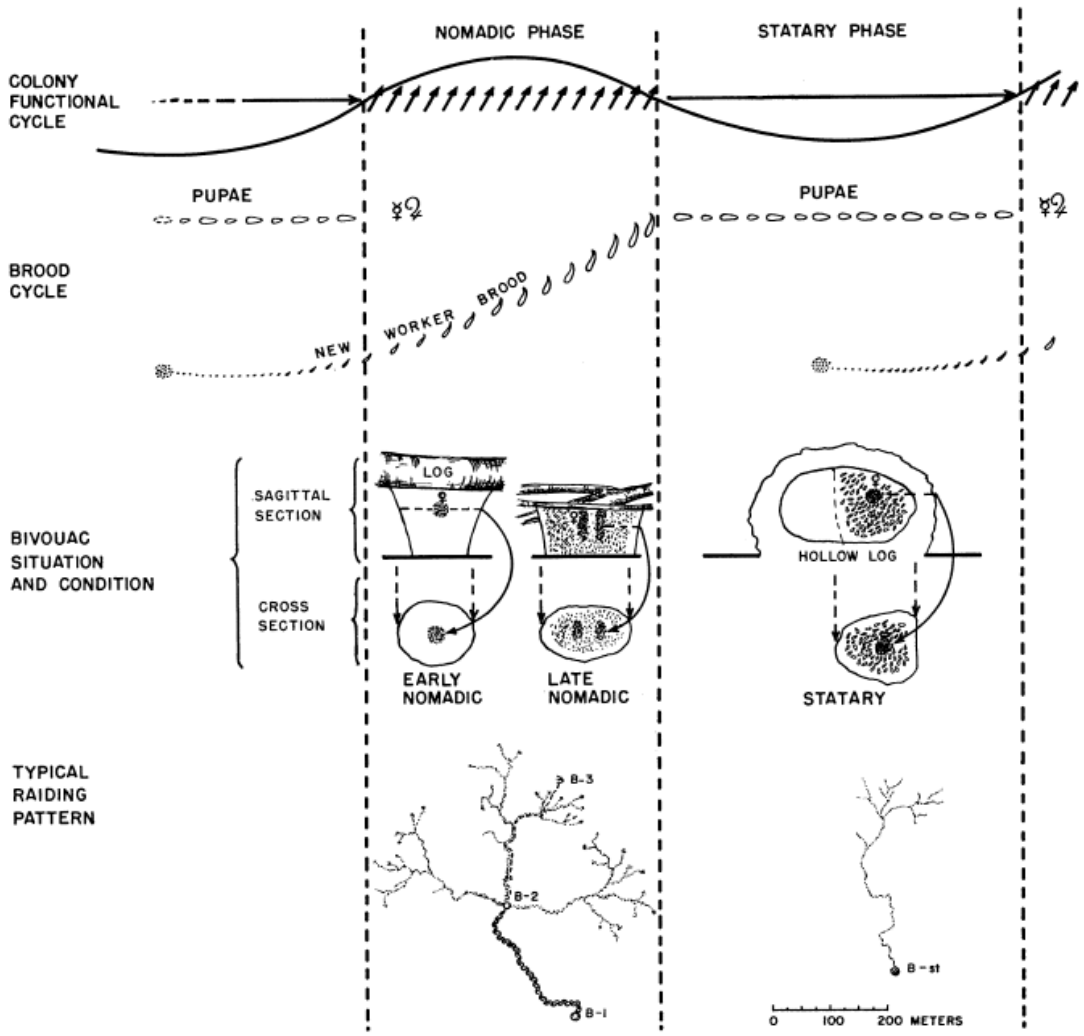

FIG. 1. Schema representing concurrent events in the nomadic and statary phases of the Eciton functional cycle, based on *Eciton hamatum*.

Colony functional cycle.—Crest of sine wave, nomadic phase: arrows represent large daily raids, ending in nightly emigrations. Trough of sine wave, statary phase: line represents reduced raiding, absence of emigration.

Brood cycle.—One complete brood series is represented, from *left*—eggs, larvae, and enclosed pre-pupal and pupal stages, to newly emerged callow workers at *right*.

Bivouac.—At *left*, exposed bivouac cluster of the nomadic phase, suggesting principal changes in brood distribution; at *right*, sheltered bivouac of the statary phase, suggesting new brood as egg mass centered below queen, advanced brood as enclosed pupae

Raiding pattern.—*Left*, three-system column raid of the nomadic phase, developed from the bivouac at B-2; previous night's emigration line, B-1 to B-2; emigration line after current raid ends, B-2 to B-3. *Right*, single-system column raid of the statary phase, from the fixed bivouac site *B-st*.