

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Developmental Shape Transition in Cowrie Seashells MICHAEL LEVY, Biophysics Graduate Group – University of California, Berkeley, GEORGE OSTER, University of California, Berkeley — Cowries are a family of sea snail – prevalent off the coast of Africa, in the Indian Ocean, and in the Pacific – that undergoes a transition from laying shell down in a typical seashell spiral to spiraling inward and thickening the shell en route to maturity. This developmental path involves the formation of teeth-like ridges on the underside of the shell. Here we present modeling work that builds on the physics of wrinkling elastic sheets and mathematical approaches to the form and development of seashells to provide an avenue towards understanding the process underlying this transition. We also present experimental data on the link between geometry of the shell and material coupling of soft-body mantle growth and shell deposition. Our calculations, based on elasticity theory and geometry, link a behavioral change in the lifecycle of the mollusc to this under-studied shape transition. Coupling mechanics to shell repair mechanisms and development provides a physical understanding of the emergent structure of Cowrie shells.

Michael Levy
Biophysics Graduate Group – University of California, Berkeley

Date submitted: 11 Nov 2016

Electronic form version 1.4