

Endless forms most beautiful: Iterative self-organization in biology

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Abstract

The Malthusian struggle for existence infused Darwin's and Wallace's understanding of natural selection, the mechanism by which evolution occurs. This aspect of struggle profoundly shapes self-organisation as observed in living systems, including, for example, programmed cell death. I will provide a number of examples — the enigmatic fairy circles of Namibia, viral factories and virophages, sea squirt metamorphosis and the origin of the starfish's distinct form — all involving replacement or destruction of previous structures, sometimes iteratively, rather than pure hierarchical construction. I wish to emphasize the sometimes overlooked role of destruction in self-organised beauty.

Research area(s): Mathematical biology, Experimental mathematics