## Ammons' Observations:

- Flock is neither ordered nor chaotic.
- *Rule as the sum of rulelessness:*

— Short-range interactions produce large-scale organization.

— Simple rules produce complicated, complex patterns.

## Questions:

- What mathematical vocabulary can we use to describe phenomena like the flock of swallows?
- How can we discover and characterize patterns? Is there an objective notion of pattern, or is the discovery of patterns a purely subjective process?
- How does organization arise in nature? How do chaos and order combine?