Pólya's urn scheme, spread of contagion

- A town initially contains $r + s$ inhabitants; r are royalists, s are seditionists.
  - The town's population grows periodically, each increase occasioned by the arrival of a group of a new arrivals.
  - Each newly arriving group of size a casts its lot with one sect or the other depending on the allegiance of the first random inhabitant the group meets.
- A crude model for the spread of contagion. The metaphor of balls and urns.
- Formulate an appropriate probability space for this problem. What is the probability that the first inhabitant met is a royalist given that the next inhabitant met is a royalist? What is this probability if the next two inhabitants met are royalists?

Pólya's urn scheme, spread of contagion

urn red balls black balls

- A town initially contains r + s inhabitants; r are royalists, s are seditionists.
  - The town's population grows periodically, each increase occasioned by the arrival of a group of α new arrivals.
  - Each newly arriving group of size α casts its lot with one sect or the other depending on the allegiance of the first random inhabitant the group meets.
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ball drawn red ball ball drawn red ball

balls drawn red balls