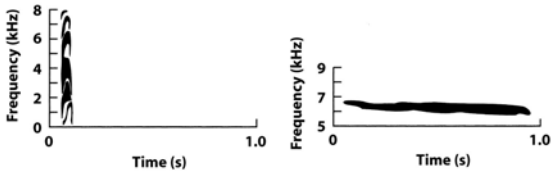
Vocalizations

Songs vs. Calls

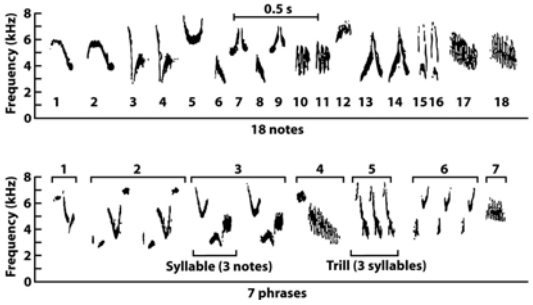
- Songs
  - Loud, long duration, vocal display of males
  - Territorial
- Calls
  - Short, simple, from either sex
  - Distress, warning, feeding, nest, etc.

Calls

- Location or attraction
  - Short, broad frequency range
- Alarm
  - Long, narrow frequency range



Songs



Habitat Effects

- Long-distance Communication
  - Owls, doves, etc.
  - Low frequency
- Forest Birds
  - Simple
- Open-area Birds
  - Complex

Habitat Effects

- Birds sing louder to combat background noise
  - Great Tits in Holland sing at higher frequency in an urban area

Infrasound

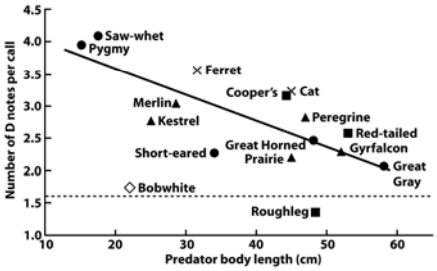
- Low frequency sounds
- Long distance communication
- Felt as "strange vibrations" by humans

Vocabulary

- 5 to 14 distinct vocalizations/species
  - e.g., Chaffinch: 12 adult sounds
    - 7 only for breeding; 6 by male, 1 by female

Vocabulary

- Chickadee alarm calls indicate predator identity



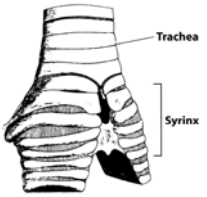
Vocabulary

- 1 Song

- Hundreds of Songs

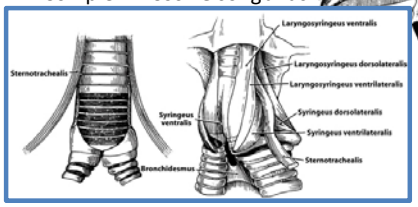
Syrinx

- **Efficient**
  - Nearly 100% of air used to produce sound (2% in humans)



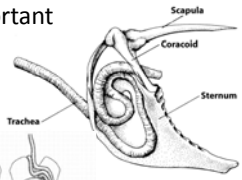
Syrinx

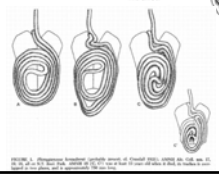
- **Syringeal Muscles**
  - Lacking in some species
    - Ratites, storks, vultures
  - Complex in **oscine** songbirds



Sound Production

- Complex, involves other parts beside syrinx
- Respiratory muscles important
- Tracheal Length
- Opening/closing mouth





Learning

- Most birds and mammals cannot learn songs
- Birds
  - Hummingbirds
  - Parrots
  - Oscine Songbirds

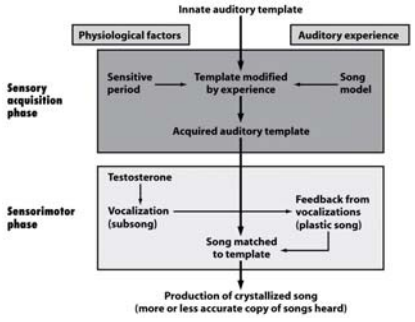
Learning

- Some species can learn songs throughout their lives
  - Northern Mockingbird
- Others only learn during specific age periods
  - **Critical learning** (sensitive) period varies
    - White-crowned Sparrows: 10 to 50 days old
    - Chaffinches: up to 12 months into first breeding season

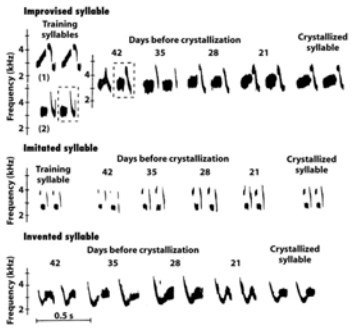
Learning

- Four Stages
  1. Critical Learning Period
  2. Silent Period
  3. Subsong Period
  4. Song Crystallization

Learning



Learning



Learning

- Only learn own species song
  - Neural controls filter sounds
  - Song Sparrows **hearts beat faster** when they first hear a song from their own species
  - **Song Sparrow** unable to learn temporal pattern
  - **Swamp Sparrow** unable to learn syllables

Programmed Songs

- Most birds songs are genetic
  - Suboscine Passerines
  - Most Non-Passerines

- Sing a normal song, even if raised away from all other birds

Mimicry

- 20% of passerine songbirds mimic
- More complex and varied songs preferred by females

Territoriality

- Removal of a Great Tit from its territory
  - New male will take over within 10 hours
- Countersinging
  - Adjacent males sing back-and-forth

Mate Choice

- Do songs convey **useful information** to females?
- Only dominant males sing best songs (despite all having the ability) in Brown-headed Cowbirds
  - Subdominant males will get attacked
- Long songs delivered at fast rates signal good energy reserves in House Finches
- Starlings with the best immune systems sing the longest songs at greatest frequency

Mate Choice.

- Do songs convey **useful information** to females?
- Generally, females tend to prefer males with more complex and varied songs
  - Well-fed birds can allocate more energy to the part of the brain responsible for song
  - Indicates the males had good nutrition and care during development