The Macaulay Library: Using digital media to explore the behavioral phenotype

Mike Webster
Dept of Neurobiology & Behavior
Director, Macaulay Library
Cornell University
Biological Specimens

Magnificent Riflebird
Specimens at the Netherlands Centre for Biodiversity Naturalis

Bird Collection at NMNH
(Smithsonian Inst)

Images: Burke Museum, Univ. Sheffield
Biological Specimens

Magnificent Riflebird
Specimens at the Netherlands Centre for Biodiversity Naturalis

ML Video #455444, Magnificent Riflebird, Indonesia, 2009
Biological Specimens

Magnificent Riflebird Specimens at the Netherlands Centre for Biodiversity Naturalis

ML481498 (Piccaninny Plains) & ML481876 (Iron Range NP), filmed by Benjamin Clock
The Macaulay Library

The Macaulay collection has over 700,000 audio/video recordings*

Musician Wren
(Cyphorhinus arada)
ML Audio #29734
Recorded by Ted Parker
August 1982
Madre de Dios, Peru

*plus over 15.5 Million photos
Infrastructure

- Currently >140 Tb
- Homemade database (Oracle, moving to Postgres)
- Search (Solar, moving to Postgres)
- Hardware = Cornell IT, but moving to Cloud
Swamp Sparrow
Melospiza georgiana | ML169006

Matthew D. Medler
23 May 2012
Arnot Forest; Irish Hill
Schuyler, New York, United States

Age and Sex: Unknown – 1
Sounds: Song
Behaviors: Not Used
Breeding: Not Used
Tags: CUMV Bird specimens 54895
Playback: Not Used
Specimen ID: CUMV Bird specimens 54895
Comments: This sparrow was recorded and observed between 11:20 am and 1:10 pm. Phenotypically, it appeared to be a Swamp Sparrow (Melospiza georgiana), with a Rufous crown, gray median stripe, gray supercilium, brown eyestripe, light moustachial stripe and lateral throat–stripe separated by a white malar, white throat, gray breast with light gray streaking, rufous flanks, strongly rufous wings, streaked uppertail, and a rufous tail. However, the bird consistently sang these two unusual song types, unlike any

Media
“Specimens”
Extended Specimens
Extended Specimens

(1) Blurs distinction between specimens and data

(2) Organized around specimens, but also collecting events
Sources of Media

• The original contributor (e.g., recordist) retains copyright and owns the media.
• Licenses it to ML, usually for “any lab use”.
• License is similar to CC-BY, but does not allow (automatically) for any use.
• Contributors are not charged a fee.
• No fee to use media for research and most educational purposes.
Sources of Media

- Researchers
- Citizen Scientists
- Other Collections
- Macaulay Library
New Digital Audio Assets by Year
Macaulay Library Requests

Files Delivered

Request Types

- Research (66%)
- Commercial (26%)
- Education (9%)
Over 1,300 publications to date
The Road Ahead

• Moving to the Cloud
• Strategic partnerships with other collections
• AI-enabled approaches to data quality & search
Strategic Partnerships

Provide infrastructure & technical support

Curator Tools to facilitate direct uploads by other collections
AI-Enabled Pipelines (Data Quality)
Media “Specimens”

Hyperolius phantasticus

Age and Sex: Adult Male – 1
Sounds
Behaviors
Breeding
Tags
Playback: Unspecified
Specimen ID: CMUV Amphibian specimens 14899
Comments: Calling from leaf in secondary vegetation, 1 meter above ground, near muddy pool at forest edge. Humidity: 100%. Collectors: Bryan L. Stuart, Rayna C. Bell, Pascal Minko, Toussaint Essene.

Technical Information
Recorder: EDIROL R-09
Microphone: RØDE NTG2
Accessories

Archival Information
Cataloged: 19 Apr 2010 by Jessie Barry
Digitized: 19 Apr 2010 by Jessie Barry
Edited: 19 Apr 2010 by Jessie Barry

Photo by Casey Dillman
Thanks!

The Cornell Lab of Ornithology