

Digitization of Vertebrate Natural History  
Collections:  
Egg Set Photography at the  
Western Foundation of Vertebrate  
Zoology

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With some comments about  
egg digitization at the MVZ

# The WFVZ Collection Range



## Details about the Eggs of the WFVZ:

- More than 400 individual collections; ~300,000 egg sets
- More than 8,700 individual collectors
- Individual collections range in size from 1 egg set to >14,000 sets
- Materials are primarily from North, Central, and South America, but we also have sizeable collections from Australia, Indonesia, Africa, and other regions.

## Modern Uses for Empty Eggshells and Egg Contents:

- Analyses of eggshell thinning (e.g., DDT studies)
- Analyses of other contaminants in embryos and contents (heavy metals, flame retardants, PCBs)
- Genetic research; species distinctions
- Testing new coloration hypotheses; UV reflectance and spectrophotometric studies
- Continued new egg and nest descriptions
- Eggs are typically not loaned, so digitization important for increasing access

# Summary of Digitization of WFVZ Materials from ~2000-2012

Volunteers and collections staff entered basic data from 56,000 study skin labels

Entered basic data from ~100,000 egg set records

Staff photographed egg sets and nests of approx 750 species of birds breeding in the USA for Birds of North America online project

In 2006, these digitized data were uploaded into ORNIS (thank you Carla!), and were regularly updated thereafter

## NSF-supported Digitization Project from 2012-2015

- Part- and full-time data entry technicians scanned an additional 83,000 Passerine egg and nest record cards;
  - Captured and entered data from these egg and nest records;
  - Photographed all of these egg sets;
  - And georeferenced 72,000 records.
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- All data were uploaded regularly throughout the project into ORNIS and ORNIS<sub>2</sub>; VertNet; GBIF; and during the last year of the project, iDigBio
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- All photos, scans, and data will also be available for downloading through the WFVZ's website (coming shortly)

# Photography Procedure for Egg Sets



NSF really wanted us to photograph all of our egg sets, although we initially balked at the idea...

*The Problem Being:* How to photograph 83,000 sets of old, fragile, empty eggshells without breaking them, while using inexperienced student assistants to take the photos!



*Our Solution:*

Don't let anyone actually handle the eggs themselves

All of our Passerine eggs sets are housed in small acrylic boxes with lids.





## Basic Eggset Digitization Method:

- Collection Mgr/PI gives drawer of egg sets to student
- Photographers handle 1 box at a time from drawer kept on a safe, high surface, away from where it could accidentally get tipped over
- Each egg box lid is opened very carefully
- The set label is removed and placed above ruler under camera

At the MVZ, we also used undergrads/postbacs  
But we but handled every egg (~14.5K specimens)

- Removed them from the boxes
- Put them on a standard background
- Positioned eggs to max features (color, patterns)
- Included ruler, label, color standard

## Additional Details:

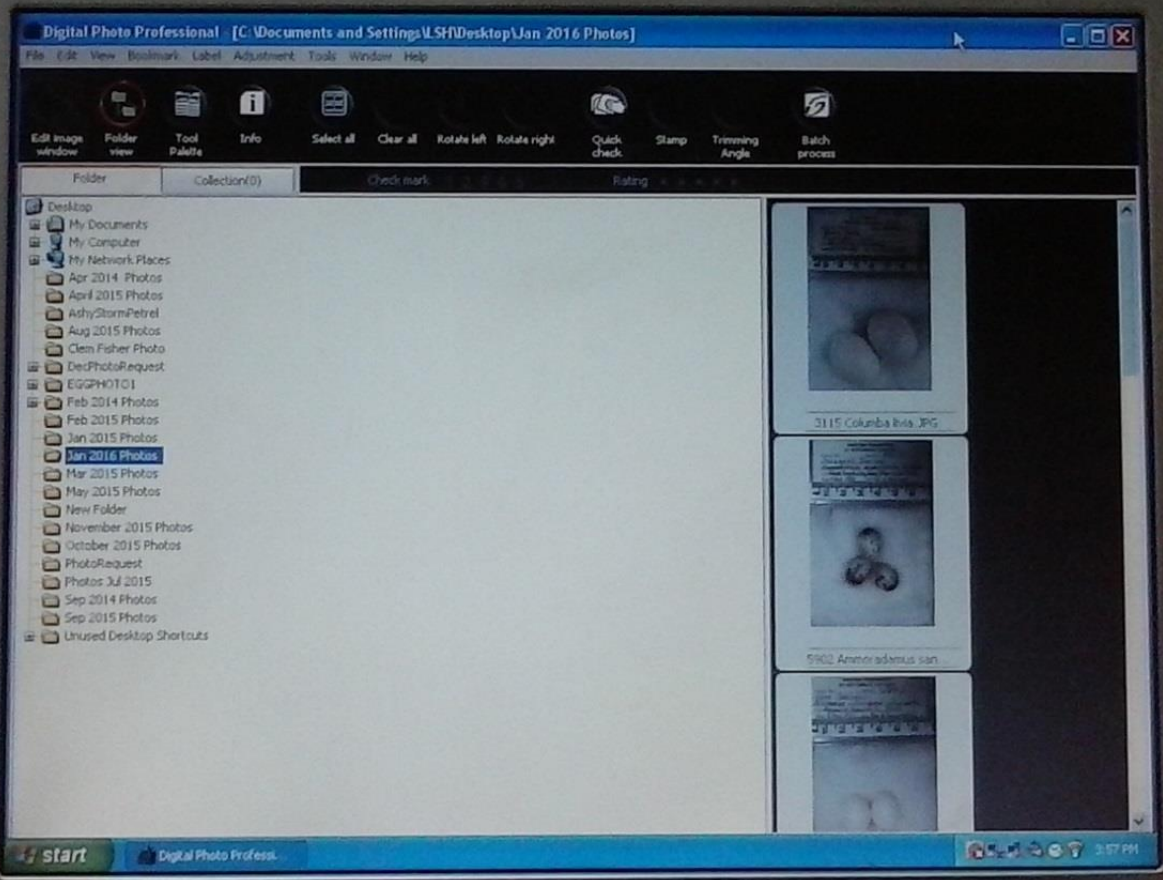
- Used 2 Canon Eos cameras (~\$400 ea), each mounted to a copy stand (~\$100 ea), and each connected to a computer

At the MVZ, we used a similar camera setup  
Adjusted camera based on egg set (size, # eggs)  
Adobe Lightroom software (processing, metadata)  
Saved all pictures in RAW  
Processed images to TIFF  
Uploaded TIFF files to TACC  
Processed to jpeg and thumbnails for web

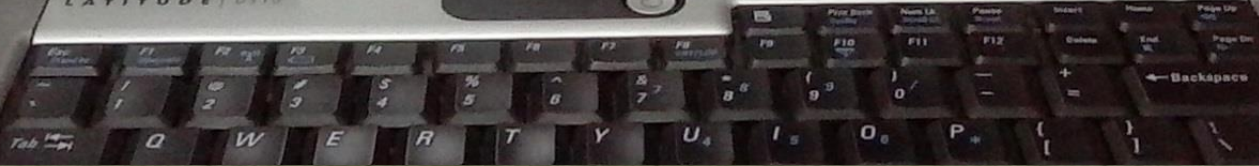
Egg Photography Protocol: [ccicero@Berkeley.edu](mailto:ccicero@Berkeley.edu)







LATITUDE | D510





ED. H. HARRISON  
ZOOLOGICAL COLLECTION 3115  
A.O.U. No. 913.1 Set No. 3115-2  
Rock Dove  
COLUMBA LIVIA  
Loc. BEAMPTON, YORKSHIRE  
Date 25 MAY 1917 Coll. by C.A. LOWE



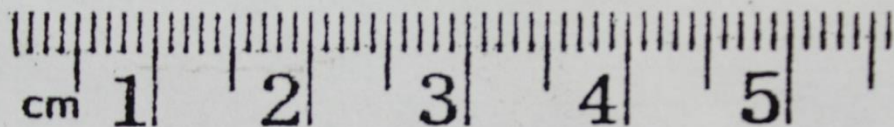
ED N. HARRISON  
OOLOGICAL COLLECTION

A.O.U. No. \_\_\_\_\_ Set No. 24494-2

VARIABLE ANTSHRIKE  
THAMNOPHILUS C. CAERULESCENS

Loc. ARGENTINA

Date 15 OCT. 1941 Coll. by CHAGAS



ED N. HARRISON

OOLOGICAL COLLECTION

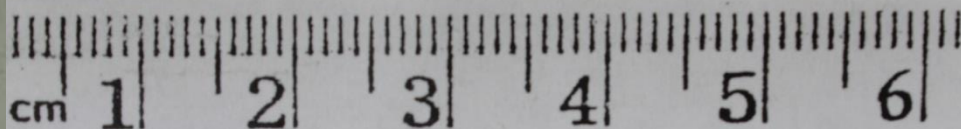
A.O.U. No. 447 Set No. 4882-3

ARKANSAS KINGBIRD

TYRANNUS VERTICALIS

Loc. SAN DIEGO CO., CALIF.

Date 20 MAY 1920 Coll. by E. E. SECORIST



WESTERN FOUNDATION  
OF VERTEBRATE ZOOLOGY

A.O.U. No. 730b Set No. 4114-6

Pygmy Nuthatch

*Sitta pygmaea melanotis*

Loc. Nr. Mt. Pinos, Kern Co., Calif.

Date 20 May 1922 Coll. by W.M. Pierce

UNIVERSITY OF CALIFORNIA  
MUSEUM OF VERTEBRATE ZOOLOGY

No. 3972 Orig. No.

*Sitta pygmaea melanotis*

Mt. Pinos,

Kern Co., Calif.

May 29, 1922

Alden H. Miller

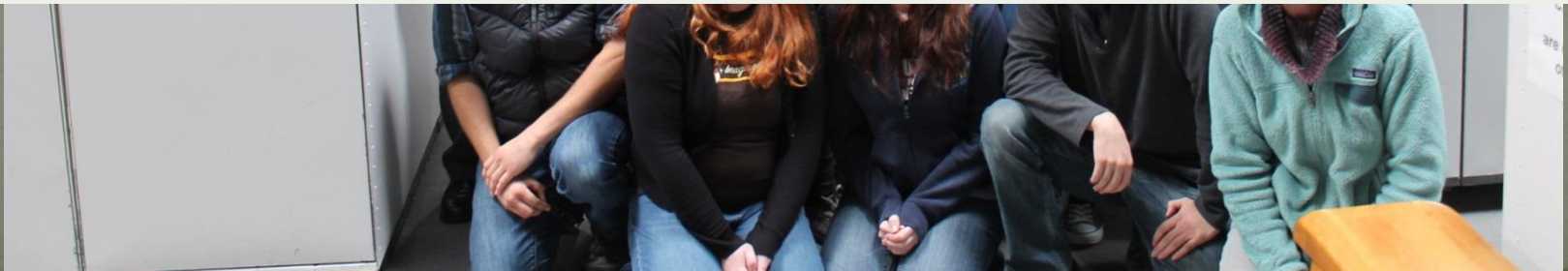


Ended-up having 10 part-time helpers assist with the photo-taking (they are included here, with other digitizing students)



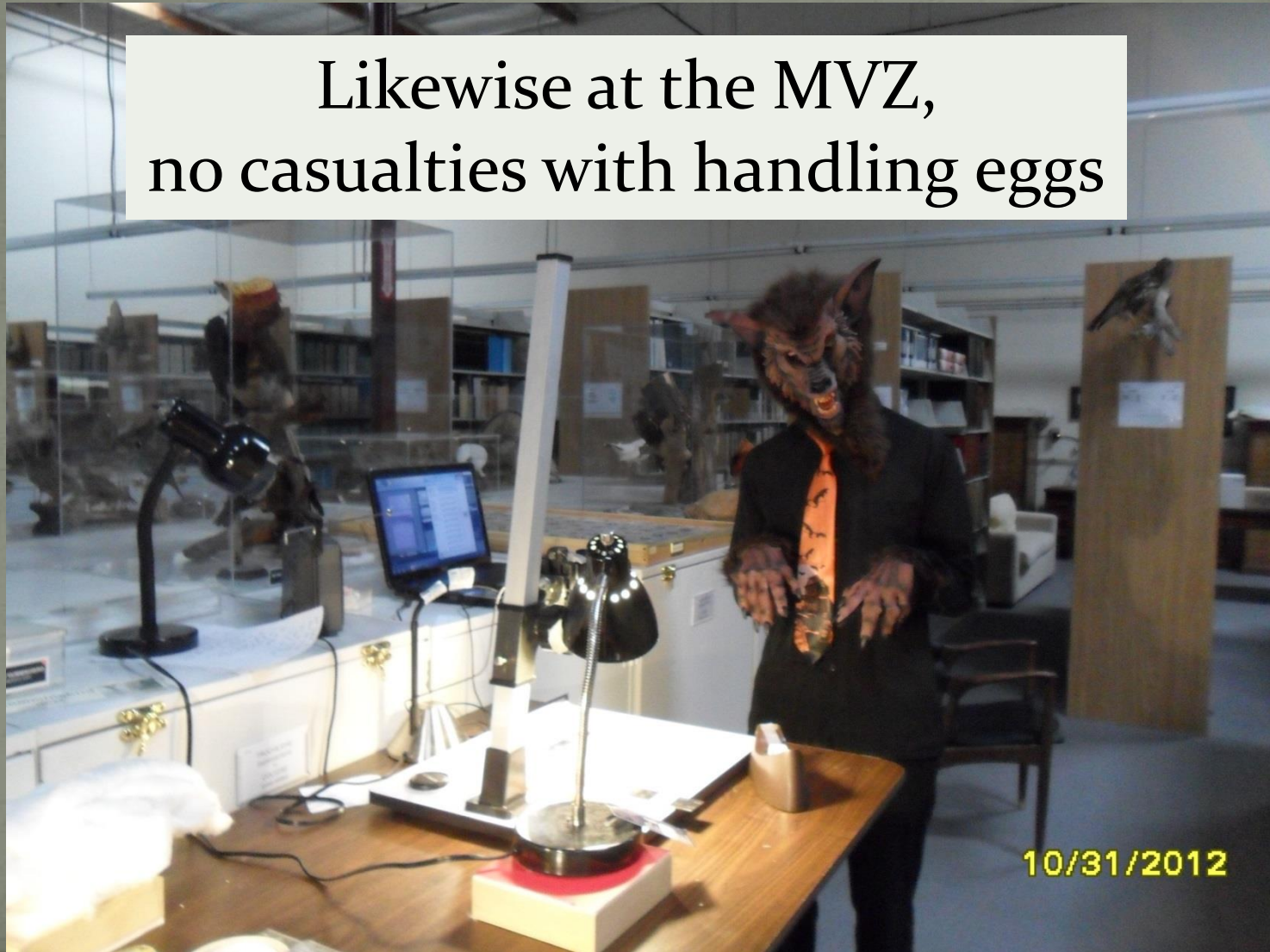
- MVZ egg/nest collection photographed with 3 part-time assistants working at different times
- Postbac – now photographer, Nat Geographic
  - Undergrad – now scientific illustrator
  - Undergrad – freshman, will give demo at tour

Nice intersection of science and art!



There were some shenanigans along the way, but only 1 egg, from 83,000 sets, was ever broken!!

Likewise at the MVZ,  
no casualties with handling eggs



## “Pros” of our methodology:

- Minimized broken eggs
- Minimized computer/cloud storage and backup space for 83,000+ photos by using PDFs vs jpegs or TIFs, etc, and not using RAW files
- Efficient, streamlined process; were able to get all photos taken in about 1.5 years, so we had more time for georeferencing materials

MVZ method took longer, requires more storage  
Collaboration with TACC key to storage & backups  
Smaller collection, so less daunting to handle eggs

## “Cons” of our methodology:

- Some missed photos of eggsets b/c students took them from the drawers themselves, and missed photographing a few sets. May be a good idea to have the CM or project mgr hand the specimens to the students directly, and for the CM/PI to keep the running list of catalog numbers for completed sets rather than the students

- Similar issues at the MVZ – if data are in a collection management system, it’s easy to figure out which specimens lack images
- We also found data errors that were corrected during photography process – added bonus!



## An additional issue:

- As always, having a lot of undergrad student assistants, or other volunteers, who do not have as much at stake in the project as the CM or PI means that some quality control issues will arise.
- For us, this mostly concerned the ruler used in the photos (some photos were taken with a worn ruler bar), and some egg sets weren't photographed.
- Thus, we found that the CM/PI/manager for the project needs to be even more on top of QC than you would think when volunteers and students are doing the bulk of the work

All in all, however, it was a good experience, and so later this year we will embark on taking photographs of all of our non-passerine eggs sets (approx. 150,000 sets) and the nest collection (~20,000 specimens)

Thanks for your attention, and thanks, Carla, for making this presentation for me!

