HOW TO
PREPARE BIRD SPECIMENS

Introduction

Part A – The look of the bird

Part B – Series overview

Part C - When not to skin a bird & A few things to look for
The Migratory Bird Conventions Act regulates the take and possession of birds in Canada. The Migratory Bird Treaty Act regulates the take and possession of birds in the United States. In addition, the provinces (in Canada) and the states (in the United States) also require permits. For some species SARA, ESA, or CITES permits may be required.

Always check the laws of your country and obtain the proper permits; failure to do so may result in civil and/or criminal penalties.

When handling dead birds, it is probably impossible to tell if a bird is infected with a pathogen that may cause human illness even if you know the cause of death to be a wound or an injury. Take reasonable precautions to protect yourself. The Ornithological Council offers a peer-reviewed fact sheet on avian zoonotic disease and safety precautions for those who handle birds in the field and in the lab.

http://www.nmnh.si.edu/BIRDNET/documents/AVNV&H5NI-FactSheet.pdf
This introduction is an overview of round skin bird preparations. Taxidermy methods (mounting birds on a stand in a life-like pose) are not included in this series.

Please be warned that subsequent PowerPoints in this series contain graphic depictions of the internal anatomy of birds which some people may find disturbing.
A conventional round study skin has the beak aligned with the main axis of the body.

There are lots of exceptions, especially with long-necked or long-billed species. The objective is to make a skin which is compact, as durable as possible, and portrays the proportions of the bird correctly.

Part A – The look of the bird shows how the variation found in bird body shapes is handled by different preparators and highlights the control that you, the preparator, have on how realistic and useful your finished skin will be.
Folding of long legged and long necked birds is common.

Measure the drawer (storage space) before preparing large birds. Aim for the specimen being 3-5 cm smaller.
The bird in the center is prepared in the classical way - but not for a duck.

Typically duck heads are turned to the side which protects the beak and reduces the amount of drawer space required.

The next several slides show why body length measurements taken from study skins are problematical.
The length of the neck can be compressed or stretched.
The grebe on the left was slimmed down to make it thin and compact.

The opposite was done with the grebe in the center.

The grebe on the right was prepared to be stored on its left side.

All three of these round skins gives a different impression. When preparing skins, consult photos of live birds and check what taxonomic features are important.
Most birds are dried on their backs making these ventrally prepared ducks atypical.

It is correct to tie the beak closed while drying. Keeping or removing the thread later depends on museum protocol.

On some birds the base of the beak is sewn onto the belly of the specimen. This protects the beak but makes it difficult to measure.
Accentuate crest and manes by turning the head. Don’t compress or hide important taxonomic features.
Dry heavy beaks in an upright position. Turning the head sideways stresses the fragile neck skin.
Stuffing gular pouches makes them easier to examine.
Museums call taxidermy preparations mounts (i.e. to prepare birds in life-like poses). Mounts are fragile and difficult to store.

The dowel extending past the tail of round study skins (stickbirds) protects the tail. It is NOT a handle, picking up the bird by the dowel may damage it.
Mount preparation is beyond the scope of this series. This American Crow exemplifies possible mistakes.

The combination of incorrect posture, exaggerated tail, drooping wings, plus wrong eye colour leads some people to conclude that it must be an exotic corvid from Southeast Asia or …
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Part 1 - Spread wings, a good way to start

The preparation of spread wings is becoming common practice.

Disadvantages:
- Tradition
- Aesthetics

Advantages on the round study skin:
- Flank pattern visible
- Rump pattern visible
- Potentially less damage to the specimen caused by people trying to see the above patterns by prying open a closed wing

Advantages of a spread wing:
- Complete upper wing visible
- Normally hidden underwing pattern visible
- Primary and secondary feather moult visible
This California Condor wing is terrific for studying moult:

- Two moult waves in the primaries
- P3 appears to be missing
- Three secondaries are visibly being replaced
- Condors have 22 secondaries, 3 of which are tertials
- Lifting the underwing coverts would reveal more growing secondaries.

The adult plumage white tips of some of the inner Greater Secondary Coverts are typically acquired by the 7th year (after the 6th annual moult).
Part 2 - Skinning your first bird

Part the breast feathers by:
- Hold the bird so the head is pointing towards your stomach
- Hold the bird breast side up
- Use your thumbs to part the breast feathers
  or
- Blow on the breast feathers

Remember to:
- Cut none or as few feathers as possible
- Keep blood and body fluids away from feathers

Optional: After parting the breast feathers, moisten slightly to keep the feathers away from the center.
(Especially recommended for novices or densely feathered birds).
Method No.1: Base-of-sternum-to-cloaca

Use fingers to locate the end of the sternum.

Make a small incision by:
• Using a scalpel, cut lightly through the skin
or
• Pinch the skin away from the body and use scissors to make the vertical cut
Extend the cut to the cloaca making sure to cut only the skin.

After completing the incision, gently push the skin away from the center.

**Warning:**
Do not cut into the visceral cavity.
Method No. 2: Neck-to-the-base-of-the-sternum

Advantages:
- The first incision is easier
- Difficult to accidently eviscerating the bird

Disadvantages:
- Greater possibility of disturbing or destroying throat and upper breast feather patterns
- If preparing a partial skeleton, it is extremely difficult to disarticulate next vertebrae resulting in bone damage

Part the breast feathers and find the furcula.

Make an incision from the base of the neck to the end of the sternum.
Part 3 - Other skinning methods

The appearances of the two hyoid horns of the tongue startle some people. In woodpeckers, these muscle sheath wind around the head and terminate just above the beak.

Unless the tongue (hyoid apparatus), is being saved pull out and discard.
Keep track of the right and left eye. There is only one way that they fit snugly back into the eye sockets.

Experiment, and sort out which goes where and at what angle before creating the cotton wool eyes.

Temporary blood supply for growing feathers shows up as dark spots on the inside of the skin. This owl is undergoing heavy body moult.
Note how the breast feathers begin to fold forward and lie flat as you work towards the cloaca.

Use a probe or forceps to rearranging wayward feathers.

**Warning:**
Feathers cannot be fixed after the bird has dried. Each feather is cemented in place by the shrinking skin. Double check that all feathers are aligned and that none are tangled in the stitches.

If you are not pleased with the result, cut the stitches and start again.
A fine needle can be threaded through the nares of many birds. Depending on museum protocol, this is either left in or removed.
Spread the feet. It is significantly easier to extra toe-pad tissue for DNA testing from birds with spread toes.
Part 6 - Sexing birds using gonads (includes 2 quizzes with answer sheets)

Once in a blue moon, you find a shelled egg.

The first clue was the weight of this McCall’s Screech-Owl.

Note the two unshelled developing ova.
Gynandromorphs have bilateral asymmetry:
- The Orchard Oriole in the center has male plumage on the right and female plumage on the left
- Gynandromorphs can have one testis and a sperm duct on the male side and an ovary and oviduct on the female side
Part 7 - Determining skull pneumatization & Skeleton preparation

0% pneumatized:

Check skull transparency after removing the brain and cleaning the cranial cavity.
Put the prepared birds in the colony, each in its own tray.

Shake the skeleton gently to return the beetles and larvae to the colony. Freeze to kill bugs and eggs (2 weeks @ -25°C, 1 week @ -80°C).

Photos taken at The Field Museum
In medium and large birds, slice the first layer of breast muscle. Take the muscle tissue sample from the ultra-clean inner layer.
The stomach has digested green plant matter (clover & unidentified), yellow seeds, and grit.

The crop of this Ruffed Grouse contains liquorice fern and clover.
Part 9 - Washing skins for ectoparasites & Drying washed skins

Empty lice egg cases looked like silver glitter on this Snowy Owl.

Photo courtesy of Donald Griffiths
Spencer Entomological Collection
The object is to dry the outside and inside at the same time. If your bird is white, this is the best drying method. Pack the absorbent into the belly and the beak.

Fasten the lid:
- Shake 100 times - up and down not sideways.
- Do not crumple or ram the bird against the side walls of the container.
- Open, dump the moist absorbent out of the inside of the bird, repack.
- Repeat until dry.
Part 10 - Recording fat levels & Cleaning fatty or stinky skins

Trace fat:
- Small deposit of fat in the furcula
- No fat in the feather tracks
- No fat anywhere else

European Starling
Savannah Sparrow
Most of the fat ends up under this ledge. Clean frequently to prevent jelly-fat dripping onto the skin.

To much abrasion results in the feathers falling out.

Note the heavy moult (blood supply to growing feathers looks black on the inside of the skin).
Part 11 - Flat skins, shmoos, and other types of study skins

Storage system used for Harris’s Sparrow flat skins at the University of Washington Burke Museum.
Shmoos are beakless, boneless round skins named after Al Capp’s 1948 cartoon character.

Occasionally they are called “muppets” after Jim Henderson’s Sesame Street creations.

A shmoo is a by-product of a complete skeleton. One boneless wing is retained.

Photos courtesy of William S. Clark taken at the Royal Ontario Museum
Part 12 - Preserving eggs and shell fragments (in prep)

Egg collection are use by ornithologists, ecologists, systematises, toxicologists, palaeontologist, and anthropologist for morphology and DNA research.
Part 13 - Determining cause of death

Being towed by a boat was the MECHANISM of death.

The necropsy confirmed that the MANNER of death was drowning.

Drowned lungs are:
• Paler (salmon pink)
• Appear to be coated with froth or soapy bubbles
• A removed lung generates a frothy puddle around itself

Normal lungs are:
• Redder
• The bubbles are less slimy
• A removed lung does not generate a frothy puddle around itself
Check the feet.

It is easy to tell which foot of this juvenile Bald Eagle completed part of an electrical circuit.
Take a reference photograph containing a landmark. Something that is visually incontrovertible.

A minor error in recording GPS coordinates can lead to a case being dismissed.

A reference tree, building, etc. is unlikely to move!
Part 14 - Labelling: the most important step

Basic rules:
- The date is a number
- The month is a 3-letter abbreviation, written out in full, or roman numerals.
- The year is 4 digits, never 2-digits

The newer label tells us that ’94 is 1894.
Appendix to Part 14:

The following collection of labels is included to help you design labels that match your requirements.

Styles vary from free form, fill in the blanks, to computer generated.
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Not all birds can be made into round study skins.

Birds are normally handed in frozen making it difficult to judge the condition of the bird. This Western Scrub Jay looked perfect when it was retrieved from the freezer.

Always check the following:
- Do chunks of feathers come off when the bird is touched
- Look inside the eyes, mouth, and under the wings for maggots
This bird is a write-off as far as doing a round skin prep! If your facility prepares skeletons, this is a good candidate for the Dermestid (Carpet) Beetle colony.

The same bird has egg cases on the underwing coverts.

Sometimes a spread wing can still be prepared from a badly decayed bird.
A lean bird is much easier to prepare.

If a thick layer of fat is visible after the first cut, return the bird to the freezer until you are more experienced.

Looking at the base of the throat or in the wing pits for fat or feeling the sternum may help you select a thin bird.
At the other extreme is freezer burn (dehydration).

Extracting the body was reasonably easy but inverting the head would have been a supreme challenge.

Body parts (wings, tails, and feet) can still be salvaged, or it can be turned into a complete or partial skeleton.
Barn Owls are frequently killed by motor vehicles. Examine every bird carefully before rejecting. It is easy to miss an extra toe.
Both feet of this fledgling Swanson’s Hawk exhibit polydactyly, a congenital birth defect.

The bones inside the wing of this bird may also be abnormal.
Both feet of this Swanson’s Hawk from California had a partial extra foot.

A Sharp-Shinned Hawk in British Columbia had a similar condition.
The feet of this Red-tailed Hawk merit a second look.
The tomia on the maxilla of these Song Sparrow’s is overgrown.
The cause of Avian Keratin Disorder is unknown. Diurnal raptors, hummingbirds, woodpeckers, and passerines get it.
The eye rings, nares, and mandible are effected by avian pox.

For more information on external bird diseases, download:
Part 13C – Determining Cause of Death: Collision, diseases, and Ectoparasites
This young Great Blue Heron still has natal down attach to the crest feathers.
This is normal. Moulting from hatch year to second year results in a funky transitional plumage.
This is normal. T6’s or the tail deck feather are being replaced.
This is NOT normal. T6’s or the tail deck feathers have extra dark markings on the outer vane.
In all these pictures, the bottom bird has dilute plumage (leucistic).

In North America, Red-tail Hawks and crows are the best species to check for albinism.

Partial albinism is not uncommon but complete albinism is.

Photo taken at the Royal British Columbia Museum
If you suspect albinism, check the talons, beak, and skin colour. If they are all completely white, then the bird is an albino. Eye colour must be pink-red.
Melanism is caused by an excessive deposition of the pigment melanin. This masks normal plumage patterns causing the bird to appear darker than normal or black.

My first impression was that this was a melanistic Tree Swallow or possibly an interesting hybrid.

Before preparing a bird that you suspect may be something out of the ordinary, take a series of pictures.
As soon as I started ... it was hard not to noticed that my hands were turning black.

The first wash water yielded an opaque black liquid which remained in suspension for weeks.

Possible explanations:
1 – Bird was nesting in a chimney.
2 – Bird had been in the vicinity of a forest fire. The black cinders found in the stomach support this theory.

**Warning:**
If you see something odd, make sure the bird is clean before uttering a word!
IN MEMORIAM

DR. REX KENNER
Former Curator of the Cowan Tetrapod Collection who encouraged me to begin this project.

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Unless otherwise indicted, all pictures were taken by the author at the Cowan Tetrapod Collection, University of British Columbia Beaty Biodiversity Museum.
PRESENTATIONS IN THIS SERIES

Introduction: The look of the bird & A few things to look for

Part 1 - Spread wings, a good way to start
Part 2 - Skinning your first bird
Part 3 - Other skinning methods
Part 4 - Stuffing your first bird
Part 5 - Other stuffing and pinning methods & Bird parts
Part 6 - Sexing birds using gonads (includes 2 quizzes with answer sheets)
Part 7 - Determining skull pneumatization & Skeleton preparation
Part 8 - DNA tissue sampling & Gut analysis
Part 9 - Washing skins for ectoparasites & Drying washed skins
Part 10 - Recording fat levels & Cleaning fatty or stinky skins
Part 11 - Flat skins, shmoos, and other types of study skins
Part 12 - Preserving eggs and shell fragments (in prep)
Part 13 - Determining cause of death
Part 14 - Labelling: the most important step

To download another PowerPoint presentation in this series go to:
http://www.beatymuseum.ubc.ca/research/birds