HOW TO PREPARE BIRD SPECIMENS

Part 2 – Skinning your first bird
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/WNV&H5N1-FactSheet.pdf
Selecting your first bird:  
Fresh or recently frozen birds are best.  
Opinions differ on what is the perfect “first bird”.

Choose a mid-size bird with a tough skin:  
- Small raptors (falcons, accipiters, mid-size owls)  
- Icterids (cowbirds, black birds, grackles)  
- Corvids (crows, jays)  
- Starlings

Novices should avoid:  
- Fat ducks, or any fat bird  
- Small warblers (under 10 grams)  
- Large birds (over 2 kilograms)  
- Mid-size birds with thin skins (thrushes)  
- Nighthawks, nightjars  
- Birds with loosely attached feathers (cuckoos and some pigeons)  
- Baby birds with fragile bones
Fill containers with:
- Water
- An absorbent
- Optional: a desiccant

Nature centers and other facilities without insect pest management protocols should use Borax. It is both a desiccant and an insect repellent.

Try different absorbents. Find the one that works best for you. Some Preparators combine 2 types, or use different ones for different birds.
Set up a workstation:

- Scissors
  - multiple sizes
  - straight
  - curved
- Bone crushing scissors
- Forceps
  - multiple sizes
  - straight
  - curved
- Scalpel & new blades
- Callipers & rulers
- Weight scale
- Preparation (prep) sheet
- Archival pen or a pencil
- Dissecting probes
- Surgical gloves
- Paint brush (optional)

Download:
Part 4 – Stuffing your first bird for stuffing and sewing materials.
Alternative tools:
- Exacto, or utility knife with new blades
- Rose shears (for big birds)

Drug store quality:
- Eyebrow tweezers
- Nail scissors: straight and curved
- Meat skewers
- Disposable cutlery
The importance of **DATA** can not be overstated

The more data you record, the more likely your specimen is included in research projects by future generations of scientists.

**Internal information can only be collected during the skinning process**

Sexing the bird using gonads is not enough.

Answer all the following questions:
- Was it in breeding condition? (measure the gonads)
- Was it fat?
- Was the skull fully pneumatised?
- What it in good health? or was there internal bleeding or ...
- What was the last meal?
- Where there any internal parasites?
- Any plastic or other odd objects in the guts?

When a specimen is accessioned (assigned a museum number), all this information is entered into the database/museum catalogue along with field notes, collection/salvage information, tissues and other sub-samples taken, images, songs, etc.
Everything, *no matter how trivial*, is recorded on the prep sheet.

Information on moult, ectoparasites, or anything unusual is recorded on the prep sheet and may add to the specimen’s research value. If the tag is lost, or becomes unreadable, this information can help to re-identify the specimen.

Document all tissue and feather samples taken and associate sub-sample numbers, method of sub-sample preservation, etc. Ask your local university or large museum if they can supply you with DNA sampling supplies.

Standard measurements are body weight, total body length, wing chord, and wingspan. Tarsus length and exposed culmen are often included. The range varies from taking no measurements (not recommended) to all of the above plus several not listed.

How and which measurements differs between:

- Countries
- Bird orders
- Research centres

Check the introduction of your local bird banding reference book for illustrations on how to take standard bird measurements.
WARNING

My reason for NOT using any absorbent material such as:
• Corn meal (white preferred, lower oil content than yellow)
• Potato starch
• Corncob dust
• Sawdust
to soak up body fluids is to make the images in this photo-essay easier to read.

This is **UNORTHODOX**.
The normal rule of thumb is:
“When in doubt, sprinkle on more absorbent material.”

There are a myriad of different ways to skin and stuff avian round study skins.
The aim of this PowerPoint series is to show the basics. Everyone develops a slightly different technique.

Two methods are presented:
1. Base-of-sternum-to-cloaca Method
Plug the beak with cotton.

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 feathers, moisten slightly to keep the feathers away from the incision. (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.

**Warning:**
Do not cut into the visceral cavity.
Bird skin is elastic.

Experiment gently to discover how stretchy it is.

The leg is just visible.
Gently grip the tarsus with your fingers (long joint above the foot). Use the tarsus to push the knee into the body cavity.

It should glide smoothly and easily. If not, STOP, reposition the leg and try again.
Check the skin is not attached to the inside of the knee.

- Thread scissors underneath the knee
- Double check no skin will be cut
- Sever the joint
- Repeat with the other leg

Remember to keep sprinkling absorbent material on any newly exposed body parts.

Keeping the feathers clean saves a lot of work later.
Immediately after cutting the knee joint, find the tarsus.

Gently pull the tarsus until the thigh is back in its natural position. This prevents feathers adhering to the sticky muscle tissue.
Loosen the back skin until a blunt object (empty scalpel handle, plastic spoon handle, popsicle stick, etc.) or your finger can be inserted under the body.
Carefully sever the body from the tail by cutting through the vertebra just above the base of the tail feathers.

- Cut as close to the tail as possible
- If you are measuring the bursa, leave the cloaca intact
- Read “Find The Wiggle” slides in Method No. 2: Neck-to-the-base-of-the-sternum Method
Peel the skin from the body. Do this by pushing not pulling the skin with your fingers or a blunt probe.

Always be conscious of the need to keep the body away from the “clean” feathers.

Small birds have either weak threads that snap when you touch them or none.

Ducks, raptors, etc. have strong mesentery threads attached to the skin. Sever with a probe or scalpel.
Cut the humerus or Disarticulate the elbow if a partial skeleton is needed.

Sever both wings.
Check that you have severed the legs, wings, and the tail before skinning the head.

Note:
- Using a strip of paper towel to wrap the body helps keep the feathers clean
- I often do this even when the bird is swimming in a bed of corncob dust or other absorbent
The degree of difficulty in skinning the head depends on the species, size, and condition of the bird.

- Check the head and body are not twisted
- Gently push the skin towards the body

- Use your fingers to loosen the skin
- Only if necessary, use a scalpel to cut connective tissue
- If the skin is dry, moisten with water
- Stop when the base of the skull is exposed

Download Part 3 – Other Skinning methods, if you are skinning a bird with a large head and a small neck.
Locate the ears:
- On most birds, the ear skin is strongly attached to the skull
- Cut the ear skin in the ear canal or as close to the skull as possible
- Sometimes feathers are visible through the ear opening

Keep pushing the skin until the eye socket is exposed.
Pull the eyeball.

Find the optic nerve. Sever using curved tweezers, curved scissors, or a scalpel.
Two methods:
1) Remove eye. Cut connective tissue (this slide)
2) Leave eye in skull. Cut connective tissue (see next 2 slides)

Pull eyeball out of the socket before cutting the connecting tissue.

Practice both methods.
Degree of dehydration and the species alters which method is best. Keep the eyes. Use as models for the replacement cotton eyes.
Locate the eye.

Cut membrane connecting the eye to the skin.
Continue cutting until the eye ring emerges.

Stop when the eye ring is completely visible.

Do NOT damage eye rings. Take special care if they are a diagnostic feature for the specimen.

Hydrate eye rings and bare orbital skin by dabbing with water before inverting the head.
Remove the tongue by sliding a tool under it.

Use forceps to pull it out.
Using scissors or a scalpel, cut around the neck where it enters the skull.

**DNA Tissue collection:**
To minimize degradation, collect tissues immediately after the body detached from the skin.

Download Part 8 - DNA tissue sampling & Gut analysis

**Warning:**
Do not throw out the body. It is required for:
- DNA tissue collection
- Gonad sexing
- Gut analysis
- Model for cotton body
Typically four or five cuts are required to sever the skull from the neck vertebrae.

The order of the cuts does not matter.
Cut along the inside of the jaw. This is easier to see if the tongue is removed. Cut and remove most of the soft palate.

For detailed soft palate removal instructions, download:
Part 3 - Other skinning methods.

The lighter pink tissue is the brain.
If you are stuffing small birds using the body on a stick method, leave the soft pallet intact.

Clean the brain by inserting cotton-wool into the brain case.

Repeat several times until clean.

Though messy, using a syringe to injecting water into the braincase is effective. Not recommended. Bird must be washed afterwards.
Trim jaw muscle tissue.

Finished cleaned skull.
The decision to use, or not use, Borax, magnesium carbonate, or other chemicals to desiccate fleshy tissue is hotly debated.

Most large museums prepare birds “chemical free” and no longer use any form of desiccant.

If your lab uses a desiccant, bury the skull in it. Shake off the excess.

Nature centres, etc. without insect-proof cabinets should use an insect repellent like Borax to protect their collection.

Borax is thought to “fox” (cause browning) of feathers. This is irrelevant for short-lived outreach teaching aids that are handled on a weekly basis.
Warning:
This is a picture of what the neck skin SHOULD NOT look like.

These folds will make it difficult or impossible to turn the head right side out.

Before starting, untwist the neck. Use your fingers to push the skin over the skull.

This is **EXTREMELY** important.
NOW, the neck skin is fold free.
Wetting the skin makes it more flexible. Wet the skull. Water acts as a lubricant helping the skin glide easily.

Wet fingers adhere to and pull out feathers. Wipe fingers constantly on papertowels or dip frequently in an absorbent (potato starch or Borax work especially well).
With one hand inside the bird, gently push the back of the skull.

Double check:
- The beak and neck are straight
- The beak is not piercing the skin

Applying gentle pressure to the back of the skull until you feel or see the beak.
At first the head pulls out easily. 
Next, it commonly snags on the jawbone hinges. Guide the skin over the jawbones. Keep the pressure gentle and steady. If the skin is not gliding, look inside for twisted or folded neck skin. Seesaw over each of the skull-jaw bulges if necessary.
Eventually the head pulls through with a bit of a “pop”.
Smoothing head feathers:
• Guide a blunt probe between the skin and skull
• Rotate probe around the skull ruffling the feathers from underneath
• On larger birds, the blunt probe can be inserted inside the ear or the eye

This realigns the feather bases. For more information on this technique, Download Part 3 - Other skinning methods.
Peel back the skin on the dorsal surface of the bird’s tail. Find the heart- or round-shaped oil-filled preening gland.

Remove the preening gland.
- Do not rupture
- Have a paper towel ready to quickly absorb any leaking oil or waxy secretions
- Optional: dip in Borax

Consider removing owl preening glands from the feathered side of the skin.
Look for fat in the feather tracks. Carotenoid pigmentation makes the fat easy to find in this Western Tanager.

Remove small amounts of fat by:
- Pulling
- Scoring with a scalpel and blotting with paper towels, corn meal, etc.

Novices should avoid fat birds. If you encounter fat, download:

Part 10 - Recording fat levels & Cleaning fatty or stinky skins
Peel back the leg skin to the top of the tarsus joint:
- Cut the tendons near the tarsus joint
- Grip the tendons and pull muscles towards the knee (severed part of the bone)
- Remove muscles
- Scrape clean of muscle tissue
Wrap cotton wool around the tibiotarsus bone to mimic ½ of the missing muscle.

Gently tug on the foot or tarsus and return the leg to its natural position.

This serves two functions:
• Replaces muscle mass aiding the thigh feathers to lie correctly
• Stabilizes the finished specimen’s leg if it is inversely pulled

Wing muscle removal methods vary depending on bird size. Consult the list on the next slide.

For medium to large birds, download Part 1 - Spread wings, a good way to start
Wing Prep Summary Table

Wing muscle removal methods vary with bird species and size. Rough guidelines are:

Hummingbirds:
   Remove the humerus. Do not remove any muscles.

Small birds (Warblers):
   Peel back the skin until the muscles on the radius-ulna bones are visible. Using scissors, cut away the largest chunk you can. Remove the humerus. Try to not strip the secondaries.

Cuckoos, pigeons, etc. with weakly attached flight feathers:
   Same as warblers but try to sever the tendons at the elbow and peel towards the shoulder. Remove radius and muscles.

Medium or large birds:
   INTERNAL METHOD: After skinning the bird, strip the secondaries, cut the radius bone and tendons, pull muscle mass towards the humerus, remove muscles, radius, and humerus.
   EXTERNAL METHOD: Make an incision on the ventral side of the wing down the entire length of the ulna. Cut the tendons. Remove muscles and humerus. Leave feather attachments intact.

Albatrosses, swans, and extreme long winged birds:
   Prepare using the internal or external method. Using a variation of the External Method to remove muscles in the metacarpus area. Drill bones and remove ulna marrow if bird is fatty.
Download Part 3 - Other skinning methods for detailed illustrates on how to strip secondaries.

Peel back the skin of the wing. On small birds, this automatically strips the secondaries feathers.
- Sever the tendons at the manus-ulna joint
- Use scissors to remove the radius and the muscles
- Check the humerus has been removed
Your first bird is now skinned. Download Part 4 – Stuffing your first bird.

Stuffing is like icing a cake, if the frosting (feathers) are slapped together resulting in an awful exterior, you have null and voided the care taken in preparing the interior. If the bird must to be frozen or stored in the fridge, tucking the head into the body cavity protects the beak. Cross the legs and smooth feathers.

If you are tired, take a break or leave the important finishing steps for another day.
Method No. 2: Neck-to-the-base-of-the-sternum Method

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 neck vertebrae resulting in bone damage

Stuff the beak with cotton.
Part the breast feathers and find the furcula.
Make an incision from the base of the neck to the end of the sternum
Furcula:
- Depression created by the two clavicle bones (wishbone)
- Fat or a full crop can obscure it
- Remove fat or crop before proceeding

This is a broad patch.
Insert a probe between the skin and the neck. Sever the:
1. Oesophagus
2. Trachea
3. Neck

It is easy to miss the oesophagus. It’s rubber-band elastic properties make it hard to proceed if it is not severed.
Push the neck back into the head. Hold the bird in front of you.

Run your finger nail down the dorsal feather tracks. Push – not pull – the skin down the bird.
Push the skin down the wing. Push the skin below the “armpit-wingpit” area. Insert a probe to check no skin will be cut. Cut humerus or disarticulate shoulder (not shown).
Sever both wings. Push the skin down the body.

This process is faster if you hold the bird in the air – let gravity help you.

Find the thigh muscle. As previously demonstrated:
• Use tarsus to push leg into the body cavity
• Cut both legs at the knee.
Sever both wings. Push the skin down the body. This process is faster if you hold the bird in the air – let gravity help you.

Find the thigh muscle:
- Use tarsus to push leg into the body cavity
- Cut both legs at the knee.
Find “The Wiggle”:
- Cutting where the tail is rigid results in the tail feathers falling out – maybe all of them!
- Locate the spot where the body bend just above the base of the tail feathers.
Two options:
- Single Cut Method
- Two Cut Method

Single Cut Method:
- Carefully sever the body from the skin by cutting through the vertebra above the base of the tail feathers
- Look for:
  - White tips
  - White tubes
  - Some people think tail feathers bases look like worms
Two Cut Method:

Dorsal side:
- Cut a V-shape through the vertebrae
- Follow the contours of the tail feathers

Ventral side:
- Cut through soft tissue only
- If you feel something hard – STOP it could be a feather!
All other steps of turning the head, cleaning the leg and wing muscles are the same.
Extremely dehydrated birds and birds with large heads and thin necks require a different head skinning method.

Download: Part 3 – other skinning methods for additional information and skinning tips.

If you have to take a break:
• Insert a damp paper towel inside the body to keep the bird hydrated
• If there is no leg tag on the bird, keep the datasheet with it at all times
Never leave a bird unlabeled

Use Ziploc bags to reduce dehydration.
Put a damp paper towel in the body cavity to keep the skin from drying out.

Before storing, double check that you have:
- Taken tissue samples
- Measured gonads
- Done gut analysis
- Recorded fat
- Recorded skull ossification

Store the body in a separate bag inside the larger bag to keep body fluids away from feathers and data sheets.

Looking at the extracted body helps novices gage the size of the replacement cotton body.
IN MEMORIUM

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.
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