feathers

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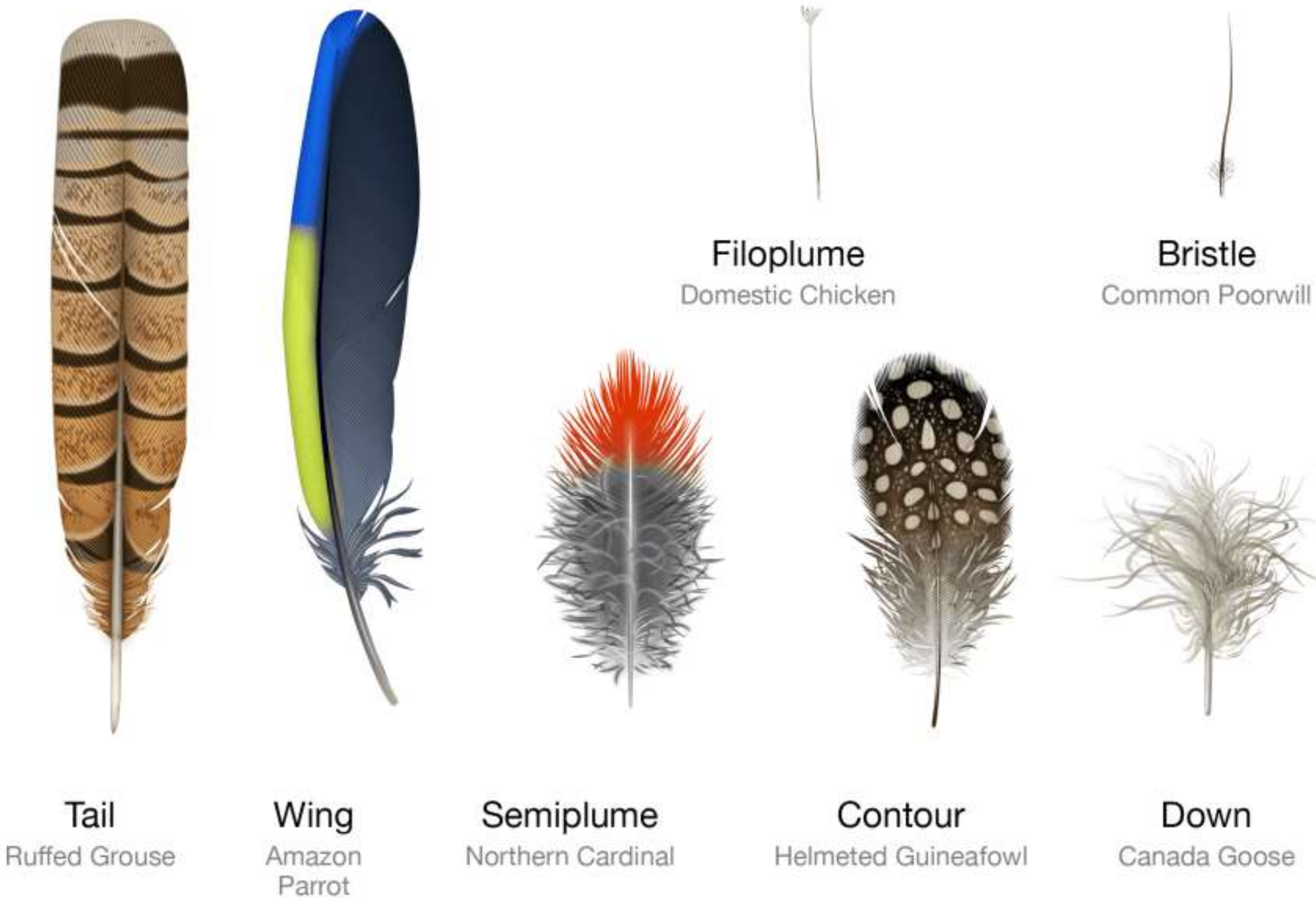
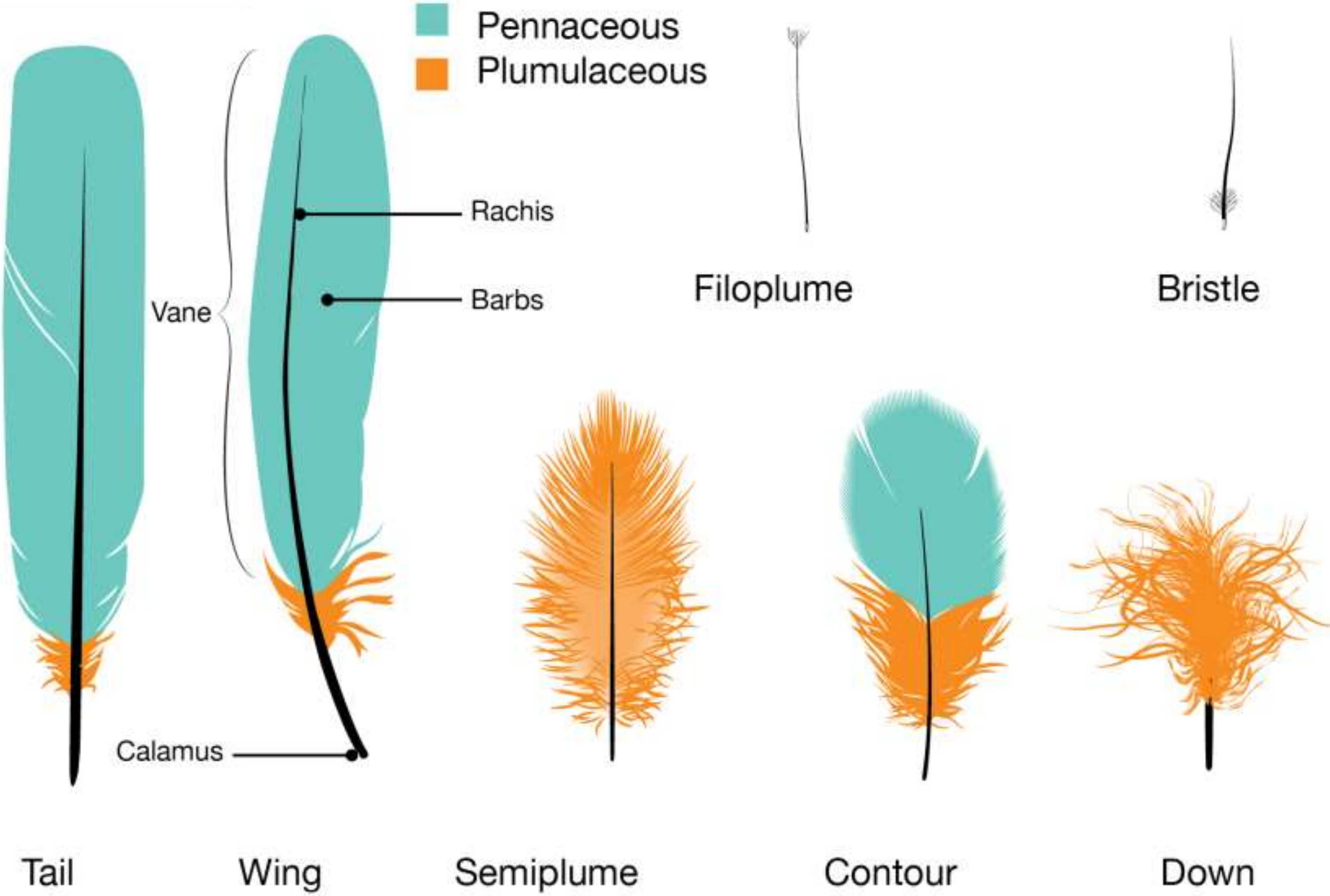
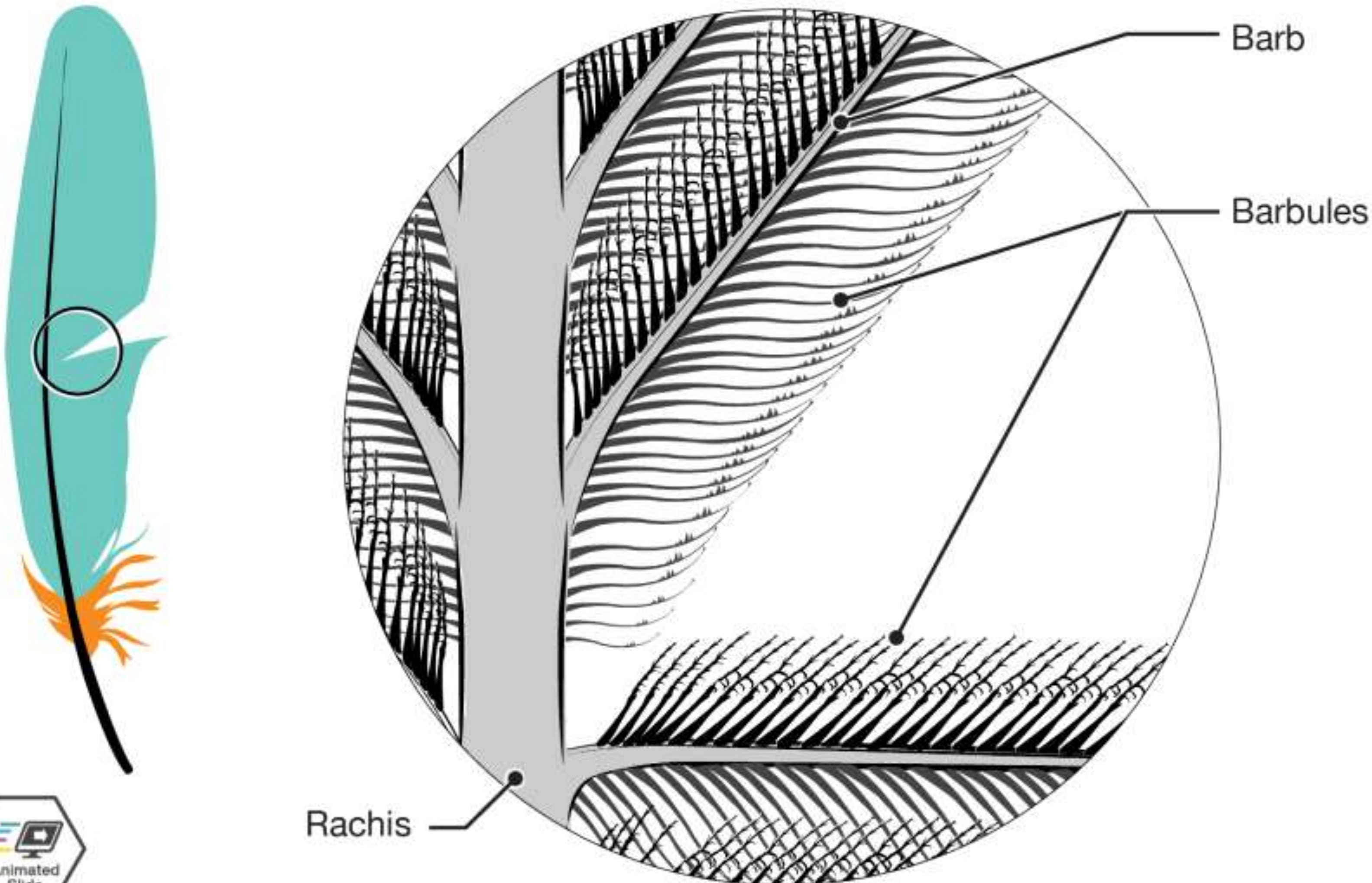
What’s a Feather For?

- Flight
- Thermoregulation
- Waterproofing
- Buoyancy
- Protection
- More: mate attraction, camouflage, sound production, silence, digestion, nest building, bracing, tactile sensation, etc.


Filoplume
Domestic Chicken
Bristle
Common Poorwill
Tail
Ruffed Grouse
Wing
Amazon Parrot
Semiplume
Northern Cardinal
Contour
Helmeted Guineafowl
Down
Canada Goose

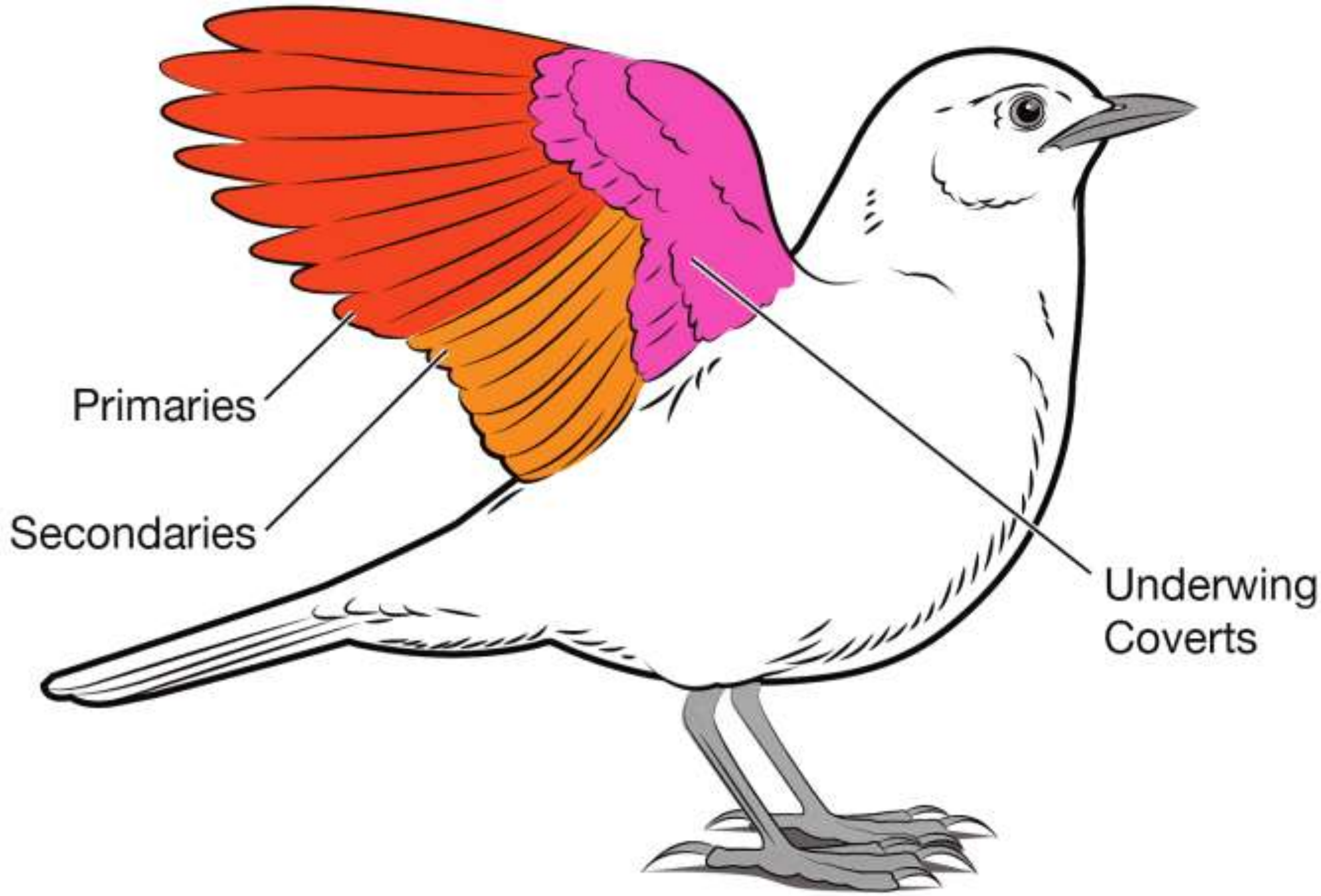
TheCornellLab





Animated Slide

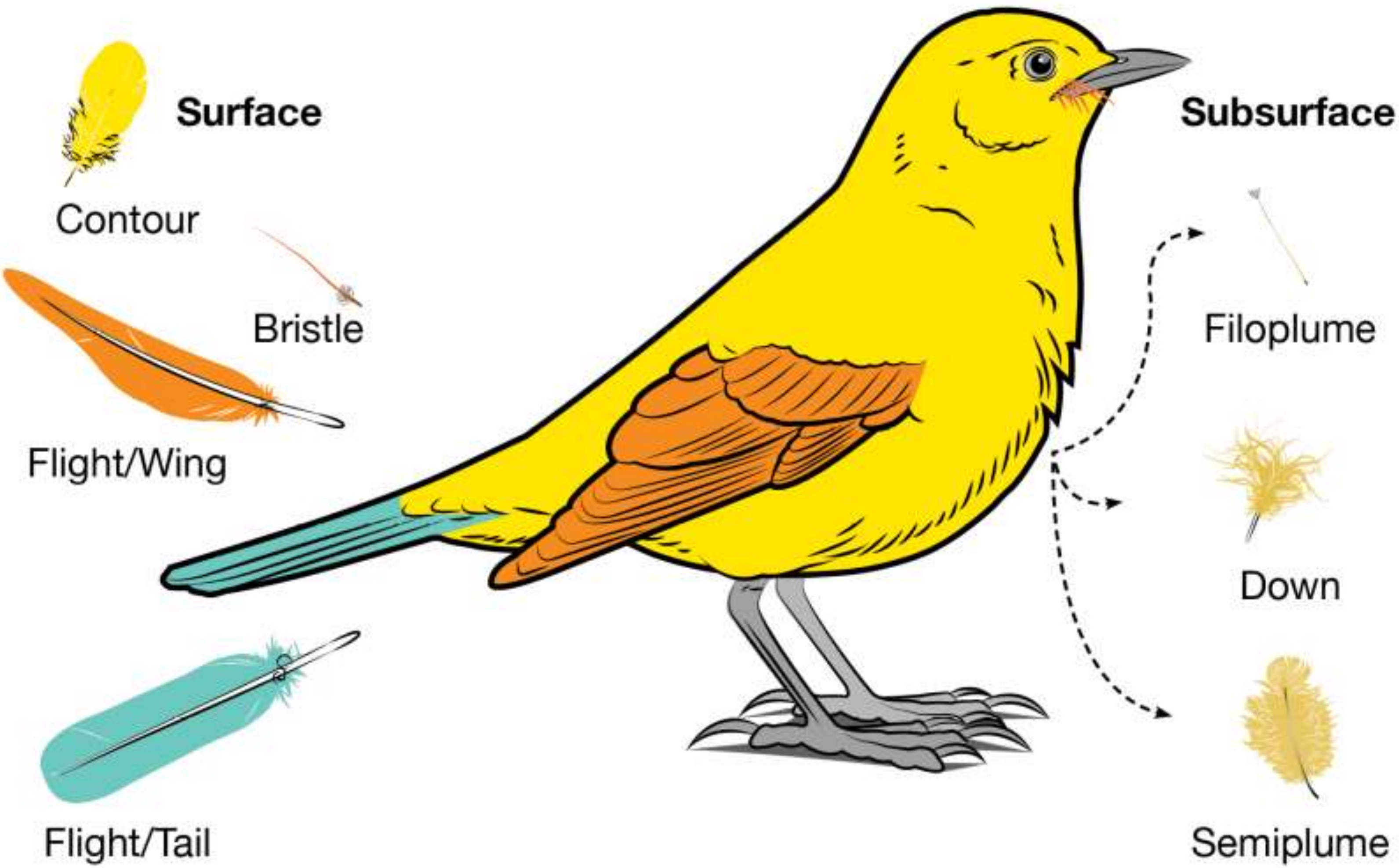
Advance to play



Animated Slide

Advance through three wing positions

AABB.AN.fa.008
Illustrations by Andrew Leach


Surface
Contour
Bristle
Flight/Wing
Flight/Tail
Subsurface
Filoplume
Down
Semiplume

Complete

Animated Slide

Advance to play

Molt

- Triggers
- Patterns
- Species variations

- 1s molt inside out
- 2s molt outside in

- Stress molt (e.g., MODOs)
- Catastrophic molt (penguins)
- Head molt

Image courtesy of shutterstock

Image courtesy of Karen Hilton.

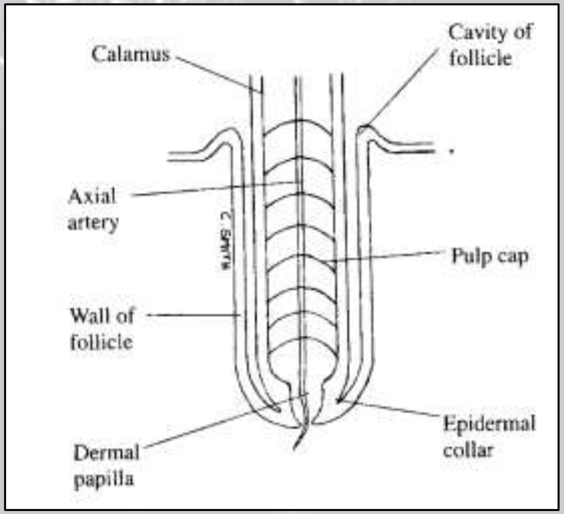
Feather Problems

- Delay or prevent return to the wild
  - Stress bars
  - Physical damage (burnt, trauma, handling, cage)
  - Parasite damage
  - Ingrown / inspissated / cyst
  - Folliculitis (bacterial or fungal)
  - Malformed (viral or other cause)
  - Contaminants (oil, dirt, feces, food, medication)

Stress Bars

Fault bars / Hunger lines

- During feather formation
- Stress→corticosterone
- Epidermal collar suppression



Drawing by Colin Smith

Stress Bars

White Feathers

Broken Feathers — Cause

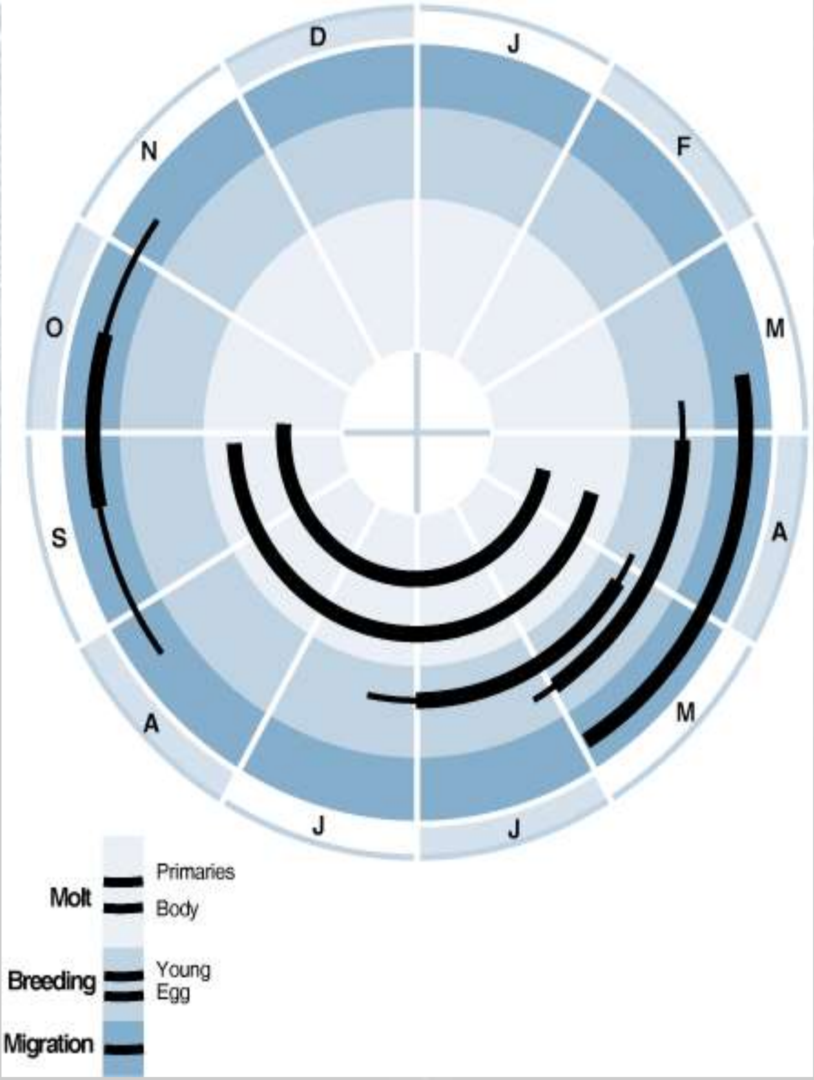
- Trauma
  - Vehicle, gunshot, predator, zebra
  - Injured leg/foot

Broken Feathers — Cause

- Handling
- Caging
  - Course wire
  - Chain-link top

Broken Feathers — Treatment

- Pull feather(s)
  - <100g: pull alternating feathers
  - >100g: sedate/brachial plexus block/levo-thyroxin/ methocarbamol/lidocaine
- Induce molt
  - Light
  - Herbal
  - Thyroid
- Wait for molt
- Imp



[Birds of the World - Cornell Lab of Ornithology]

Broken Blood Feathers

- Active blood supply
- Place hemostats around outside of calamus and insert tips of hemostat deep into follicle
- Grasp calamus
- Pull broken feather from follicle in one smooth motion

Broken Mature Remiges/Rectrices

- Remiges attach to periosteum
- Nerve innervation
- Muscular attachment

= Pain

= Easily damaged

Broken Mature Remiges/Rectrices

Ectoparasites

- Lice, mites
  - Most are species specific
  - Chewing lice
  - Direct feather damage
  - Cause feather loss
  - Cause self mutilation as bird over preens

Lice

- Order *Mallophaga*
  - Lacey appearance to feathers; nits on feathers; lice crawling on bird
  - Gross or microscopic observation of the lice or nits (eggs attached to fur or feathers)

Lice

30-35 day life cycle:

nit—nymph—adult — death

Treat with pyrethrin spray or powder

Feather mites

e.g., Ornithonyssus sp.

- Lacey appearance to feathers
- Microscopic exam of feathers
- Treat with pyrethrin spray or powder

Feather Cysts

- Neoplasia?
- Blocked follicular pore
- Keratin build up

- Incise
- Extract content
- Flush with antibiotic
- Guarded prognosis

Feather Cysts

Scaly leg mites

Knemidocoptes sp.

- Hyperkeratosis of feet, legs and occasionally beak; Feather loss on face
- Treat with Ivermectin
- Secondary fungal or bacterial infections when severe

Eagle photo credit: Peter Fimrite, UCD

“Pinching Off”

- Pinching off syndrome 1975-2006 Sea Eagles in Germany (genetic??)
- Bacterial folliculitis
  - cyanobacteria
- Mycotic folliculitis
  - Mucor spp.
- Viral

Viral infections

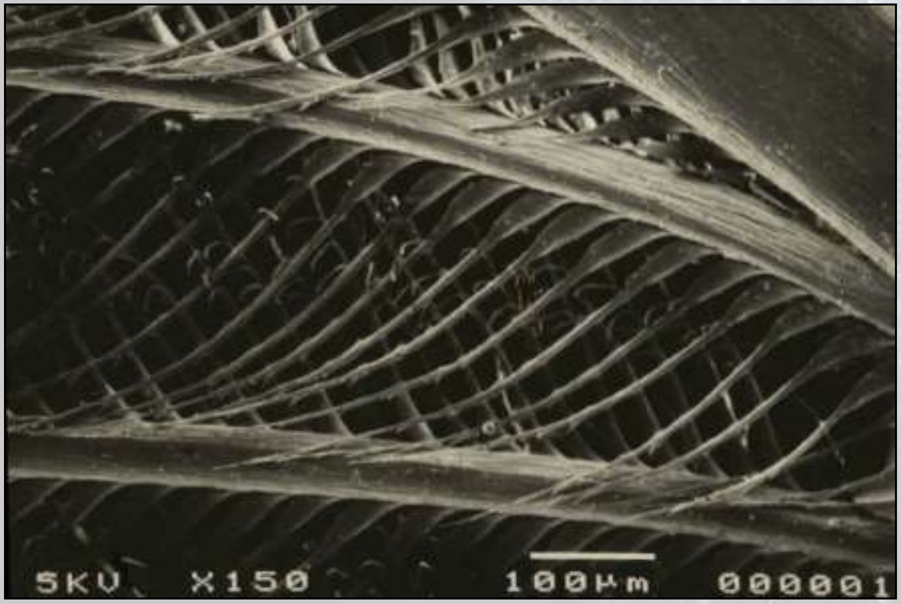
- Tapered feather shaft results because changes to the epidermal collar
- Feather pinches off and drops out

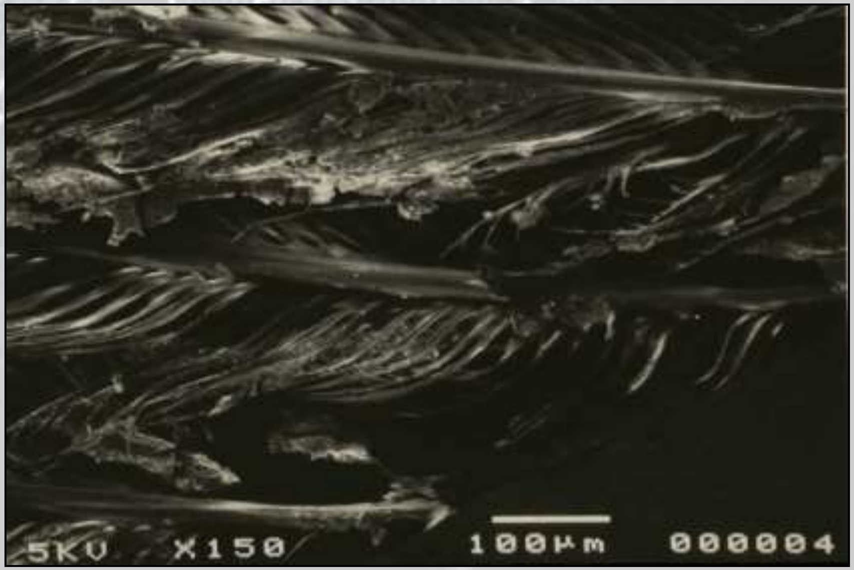
- Circovirus
- Polyomavirus
- Adenovirus
- Parvo-like virus
- WNV
- Bornavirus

Damaged Feathers

Damaged Feathers

Contaminants





Removal of Contaminants

- 2-3 Contaminated
- Preferably breast/ contour feathers
- Feather testing

Wash Feather(s)

- Wash feather before bird!
- Start high; repeat at lower percentages
- Rinse well

Detergent Concentration

% DAWN® Solution	cc / 12 oz.*	Cups / 1 gal*	Oz / 1 gal*	Cups / 5 gal*	Oz / 5 gal*	Cups / 10 gal*	Oz / 10 gal*	Cups / 15 gal*	Oz / 15 gal*
1 %	3.5	0.2	1.3	0.8	6.4	1.6	12.8	2.4	19.2
2 %	7	0.3	2.6	1.6	12.8	3.2	25.6	4.8	38.4
3 %	10	0.5	3.8	2.4	19.2	4.8	38.4	7.2	57.6
4 %	14	0.6	5.1	3.2	25.6	6.4	51.2	9.6	76.8
5 %	18	0.8	6.4	4.0	32.0	8.0	64.0	12.0	96.0

** REMEMBER: The goal is to use the lowest possible concentration of DAWN® **

* This the DAWN® to water ratio needed to make the % solution in the left column

Pre-treat to Break up Contaminant

- Some oils
- Tars
- Sticky substances
- Used/aged cooking & fish oils
- Caulk
- Paints

Applying Pre-treatment

- Use spray bottle
- Warm pre-treatment
- Don't spray in or near face
  - Protect eyes
  - Prevent inhalation
- May need several minutes contact

Canola Oil
Methyl Oleate
Ethyl Soyate
Ethyl Lactate

STR / Tag Off!
Art Wash!
Elastol
Simple Green

Remove Pre-Treatment (Wash)

- May need 5+% detergent solution depending on contaminant and treatment

Remove Detergent (Dunk Rinse)

- Rinse tub of warm water
  - submerge
- Then rinse with spray
  - 60psi for larger birds
  - 20-40 psi smaller

Remove Detergent (Spray Rinse)

- Rinse tub of warm water
  - submerge
- Then rinse with spray
  - 60psi for larger birds
  - 20-40 psi smaller

Drying

- Monitor body temp & activity
- Give clear fluids ca. 30 min. after done with rinse

Preen

- Need to “comb” (realign) feathers
- Spritz $\geq$ TID
- Access to pool/bathpan
- Egress from pool

Unknown Substances

- Quickly assess birds
- Check for odors/fumes
- Try to obtain SDS
- Feather test

- SAFETY FIRST!!

Used Motor Oil

- Most come off w/just detergent
- May need to pre-treat
- Always feather test
- Often contain ‘sandy’ residue that may etch feathers
- Rinse well

Used Motor Oil

Tar/Asphalt

- Always feather test
- Apply warm oil
- WD40?
- Use warmest water possible
- May need to “pre-treat” in layers
- Anticipate capture myopathy

Sticky Traps

- Cover head
- Spray feathers AND trap surface w/ warm oil
- Gently peel in direction of feathers
- Wait to wash
- Check carefully for fractures

Tanglefoot®

- Apply warmed oil
- Stroke gently in direction of feathers
- ~3-4% Detergent wash

Silicone Caulk

Silicone Caulk

- STR® (Special Tape Remover), Uni-Solve®, Eaze-off®
- Works best when caulk still soft
- Allow time to soak in
- Detergent wash

Used Cooking Oil

- Often detected by odor
- May need pre-treatment
- Usually need ‘higher’ temperatures
- 3-5% detergent

Fish Oil

- Often detected by odor
- May need pre-treatment to soften
- Often need esters vs. plain oil to pre-treat
- Usually need ‘higher’ temperatures
- 3-5% detergent

Molasses

233,000 GALLONS OF MOLASSES IN HONOLULU HARBOR KILLED THOUSANDS OF FISH IN SEPTEMBER 2013.

1919 Boston Molasses Disaster

Food

- Hand-feeding formula
- Nektar® or sugar water on hummingbirds

- Warm water and very low (~1%) detergent

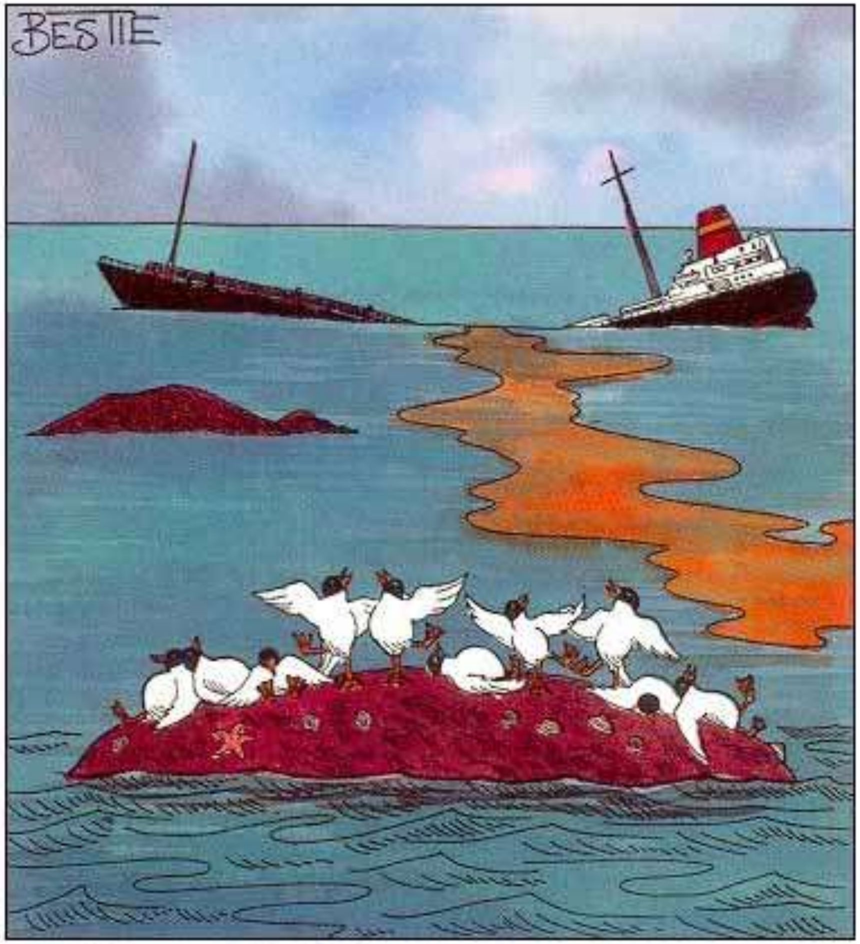
PIB (polyisobutene)

- Used in
  - Adhesives
  - Sealants
  - Chewing gum
  - Additive in lubricating oil
- >4,000 seabirds killed in 2 ‘legal’ spills in 2012
- Margarine used to treat

These Gannets and Common Guillemots are just a few of the thousands of victims of PIB pollution off the South-West coast. Photo: BTO Picture Library

Alcohol

- Will <u>WET</u> feathers
- Waterproofing returns when dry
- Okay to use on birds!



AFTER 50,000 CALLONS OF WHISKY LEAKED INTO THE SEA, NO TERN WAS LEFT UNSTONED

Paint

- Water for water-based paints if wet
- Artwash!™ may work
- May have to wait for molt

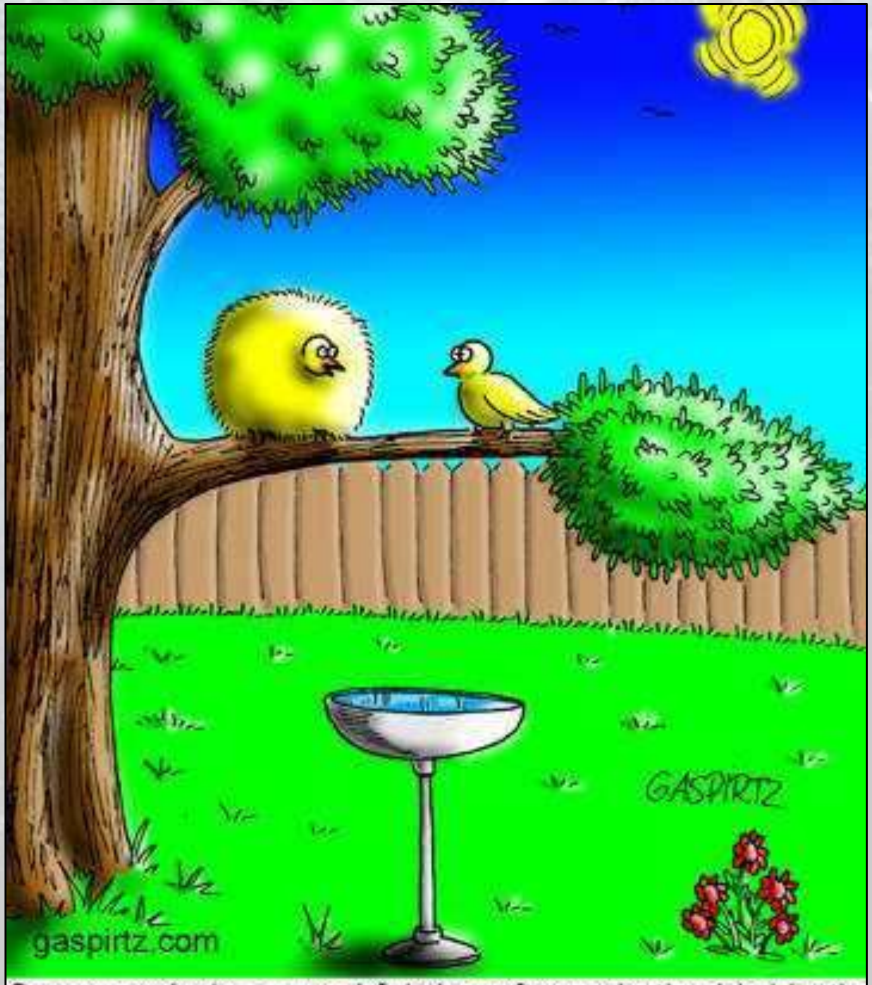
Sawmill River Paint Spill, 16 May 2012, Yonkers, NY

Mud/dirt

- Dunk rinse in warm water tub
- Hose rinse
- 1-2% detergent tub
- Tub rinse
- Hose rinse

Detergent

- Common contaminant in poorly rinsed birds
  - Feather test
  - Re-rinse
  - May need ~1% detergent, then rinse (detergent residue may pick up dirt and oils)



Some asshole poured fabric softener in the bird bath.

Prevent Tail Feather Damage

When to Use Tail Guards

- Certain species
  - Accipiters
  - Osprey
- Birds that aren't standing or are ataxic
- Birds with a leg injury
- Birds that like to hang….

Tail Guard Supplies

- Used x-ray film
- Micropore (paper) tape
- Waterproof tape
- Scissors
- Marker or template

Natural position; fold over

Measure approximate size

From calamus (quill) to tip

Mark & Trim to Fit

(Paper) Tape Top to Calamus

Reinforce Center & Close Edges

Tail Guards

Improper

Proper

Tape Tail Guards

Paper Packing Tape

Double arm’s length

Moisten w/warm water

Overlap >½ width

Press firmly

Tape bottom w/water-proof tape

Dip in warm water to remove

Tape Tail Guards

Continue entire length

Press firmly in place and dry w/paper towel or cloth

Tape Tail Guards

Plastic tape at bottom

Completed tailguard

Removing Tape Tail Guards

Repair Bent Feathers: Heat

Indications for Imping

- Prevent Further Damage
- Quality of Life
- Pre-release

Harvesting Donor Feathers

Feather Storage

Masking tape

File folders

Supplies


ark, Delawa

Imped Tail & Primaries

Rx For Healthy Feathers in Rehabilitation

- Treat parasites
- Provide proper nutrition
- Minimize stress
- Wear gloves
- Keep cages and pools clean
- Encourage preening (spritz or swim)
- Provide proper housing

Questions?