Solving the Mysteries

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Case #1: Raccoon Hit by a Car

This animal came into the center after being hit by a car. The obvious wound is the right rear leg that is just hanging limply with blood loss evident from a laceration on that same leg.

This is a situation where it would be easy to "tunnel-vision" onto the right rear leg. Clinical presentations like this tend to catch our attention and pull us away from something that could even be more life threatening.

In a situation such as this, a thorough but quick physical exam was absolutely imperative. Findings of hyperthermia, increase CRT, tachycardia, tachnypnea, weak pulse and an increased skin turgor are all indicative of early decompensatory shock.

After quickly stabilizing the leg to prevent further damage, fluid resuscitation along with body temperature stabilization should be instituted immediately. Infusion of a replacement solution, (e.g., LRS), should be given at an initial rate of 40-90 ml/kg/hour. Although difficult at times in raccoons, intravenous administration would be the route of choice due to the severity of the shock condition. Monitoring should include serial heart and pulse rates, mucous membrane color, CRT check and pulmonary auscultation for lung sounds. Serial PCV/TS measurements will suggest if there is a continuing blood loss occurring. Since the patient is continuing to decline, this suggests further fluid loss.

In this case, due to the tachypnea and increased respiratory efforts, a thoracic radiograph was taken which showed patchy areas of alveolar patterns. Respiratory function was monitored constantly and supplemental oxygen given. If the animal stabilizes, then the femoral fracture can be treated.

The fecal test shows the presence of roundworms (most likely Baylisascaris). Although this is a significant finding, it is not life-threatening for the raccoon; as a zoonotic problem, these parasites should be noted and treated when the animal is stronger. Also, the possibility of rabies should always be considered and appropriate safety measures should be taken.

Sadly, the raccoon did not survive.
Necropsy showed a mid-shaft femoral fracture with vascular damage and significant blood loss in this area. Pulmonary contusions were present with hemorrhage in the lung parenchyma, most likely due to direct trauma to the thorax. Also present was a significant population of roundworms in the intestinal tract. With this many roundworms present, one wonders if it made a significant difference in the animal's ability to function fully.

Case #2: The Hawk at the Roadside Diner

In the case of this bird from the SPCA, the wing injury consisted on a simple ulnar fracture. A Figure of 8 (F8) wrap should be sufficient to treat this type of fracture, as the ulna is still aligned and the intact radius can act as a splint. Surgical repair could be performed, but since the fracture is closed and aligned, and the radius is intact, a F8 wrap for 2-3 weeks, followed by PT, should be sufficient.

The bird is in good body weight and has normal blood values; with that in mind, you probably wouldn't deworm this bird unless it was going to be housed with other birds. Expect all wildlife to have some parasites, but only treat if the parasites pose a threat to that animal (e.g., if they are present in large numbers), to other animals in your care (i.e., if the parasites or a disease carried by the parasites might spread to another animal), or to the people in your care (i.e., if the parasites or a disease they carry are zoonotic).

Did you find the crop injury on your initial exam? Hawks with impact injuries often rupture their crops (especially if they just ate a full meal on the side of the road). This type of injury can be more life-threatening than a fracture, and should be treated immediately. Gavaging the bird with clear fluids on entry will help to discover crop wound. The crop wound should be flushed carefully with dilute Nolvasan® solution. In most cases, easily accessed food material in the crop should be removed, food withheld, and injectable fluids and antibiotics begun (injectable Baytril® diluted 1:4 with saline or lactated Ringers; NOTE undiluted Baytril can be very necrotizing to the tissues). After the wound has been cleaned, Tegaderm®

should be put over it and held in place with Micropore® tape, to keep the wound edges moist until the bird is stable and can be sutured under anesthesia. When sutured closed, all necrotic tissue should be debrided, and the crop should be closed separately from the skin. The bird should not be given anything orally for 12 hours after surgery, and should then be gently gavaged clear fluids (such as lactated Ringers or Pedialyte®). The bird should continue to be gavage fed a liquid, elemental diet until approximately 72 hours post-op, at which time soft whole foods (such as chicken breast) can be offered. By 96 hours (4 days) post-op, the bird should be able to eat whole foods such as mice.

Redig, P.T. 1993. Medical Management of Birds of Prey, 2nd edition. The Raptor Center at the University of Minnesota, St. Paul, MN.

Rosskopf W. and Woerpel, R. (eds). 1996. *Diseases of Cage and Aviary Birds, 3rd edition*.Williams and Wilkins, Philadelphia, PA.

Case #3: Triple Turtle Troubles

A brief overview of general recommendations for care and examination:
The enclosure depends on the species. Do your husbandry homework. All housing must facilitate sanitation and should be easy to clean. The habitat should be constructed so the turtle/tortoise can easily climb in and out of water. The general habitat can be heated by radiant heat sources such as heat strips or a basking place can be created with overhead radiant heat source. The heat source for basking must be recessed from above to prevent burns. Full spectrum lighting is necessary if direct sunlight is unavailable. Acceptable substrates include alfalfa pellets, blank newspaper, large gravel. Unacceptable substrates include ground corncobs, weed chips, pea gravel (anything that can be ingested and cause impaction; cedar chips may cause toxicity).

The physical exam should include exam for evidence of trauma, fungal disease, bacterial dermatitis, ectoparasites, exudates, swellings or discoloration. Lab tests should include fecal flotations or direct smears. Motor function should be checked and this includes checking if aquatic turtles can float symmetrically horizontal in the water. If history or previous exam warrants, further diagnostic tests such as: tracheal washes and radiographs" CBC and chemistries can be utilized. Jugular veins are the vessel of choice for blood samples followed by the venous plexus in the caudal femoral area of the back leg.

Turtle #1 Hungry Box Turtle

This was the case of the turtle that came in found by an old school building. It was anorectic, anemic, and appeared clinically blind. There was no evidence of physical trauma. A radiograph was taken. Multiple metallic objects were present in the alimentary tract. These were found to be chips of lead-based paint that caused lead poisoning. Chemical determination of the amount of lead in the blood was performed. The plasma contained 21 mcg/dl of lead. The lead fragments were removed from the stomach with an endoscope and forceps. Sodium calcium edetate was administered at 35mg/kg daily for two weeks by IV infusion using a butterfly catheter set placed into the jugular vein. The animal was given fluids and kept warm. He soon started eating and gaining vigor.

Turtle #2: Broken Box Turtle

The obvious problem is the recent minor fracture of the carapace above the right front leg. Before rushing into the repair, always give supportive care. In this case we placed the turtle in an optimum temperature, gave fluids, and started it on antibiotics.

After anaesthetizing with isoflourane, the area was lavaged with sterile saline and prepped with a dilute Betadine solution. It is important to remember that shells heal from deeper endochondral layers and these should not be covered with repair material. Wires were used to hold the sides in apposition and layers of sterile fiberglass cloth and epoxy resin were placed over the fracture.

The second exam finding was a white substance in the old shell defect. It was examined microscopically

and found to contain elongated structures that were divided into compartments. Diagnosed as a microsporum infection, this was probably an opportunistic· infection of the soft tissues that were exposed when the carapace was fractured. The wound was thoroughly cleansed and treated with a topical fungicide; and ketoconazole was administered at 30mg/kg daily for the 30 days the animal was at the center recuperating. Stools from a disease-free turtle were given to the patient for replacement of normal flora cellulose fermenters.

The dark shiny object near the midline of the plastral surface of this turtle was identified as a leech. All you need to do is place the turtle in a shallow container of carbonated water for a few minutes. This will cause the leech to release its hold on the turtle and enable its easy removal.

Turtle #3: Red-bellied Beach Ball

This turtle wouldn't sink…causes could be air trapped beneath the carapace (from the time of the initial fracture), gas in the bowel/GI tract, a respiratory infection or trauma causing emphysema in the lung. This is not an uncommon problem in sea turtles and is often referred to as "bubble butt" (seriously…we're not making this up). In this case, the radiographs showed that it wasn't gas in the bowel, and the lungs looked symmetrical and normal. We first gave the turtle oxytocin to induce her to lay her eggs, then we treated her shell over the next 3 months. When the shell healed and she wasn't able to sink, we sedated her and placed a needle through the healed shell, along the inside of the carapace, and aspirated approximately 180cc of air. By the next day she was able to swim to the bottom of her tank and eat from the bottom! We kept her for 10 more days to make sure she didn't return to floating, then released her with her babies (which had hatched while her carapace was healing).

Case #4: "Lucky" the Not-so-Lucky Goose

This is the case where "Lucky" the goose wasn't so lucky. Pennies minted after 1981 contain up to 98% zinc, coated with copper. When a goose like Lucky dabbles on the bottoms of ponds, they pick up pennies tossed in by people making wishes. The acid in the goose's stomach dissolves the copper, and then begins to dissolve the zinc. The penny is too big to pass out of the goose's ventriculus (gizzard), so the gizzard continues to grind it up, slowly releasing zinc which is then absorbed into the blood system and causes toxic effects similar to lead poisoning. The clinic signs of lead and zinc poisoning in all species include: ataxia, diarrhea, tremors, clinical blindness, limb weakness or paralysis. In birds, crop stasis, change in "voice", and bright green droppings are often seen; in mammals, petechial hemorrhage of the gums is not uncommon. The treatment for lead poisoning and zinc poisoning are the same: both involve the administration of a "chelating agent" that binds to the metal in the blood stream and allows it to be removed from the system. Common chelating agents are Calcium EDTA and Succimer (Chemet®). In the case of this goose, the penny also has to be removed: this can be done by a veterinarian through endoscopy or by surgically opening the gizzard and removing the coins.

By the way, the lead level in this case was 0.06ppm (>.5 ppm = toxic). Blood zinc levels can be run by most labs; in this case the zinc level was 80 ppm (>40 ppm = toxic).

Beynon, P.H. 1996. *Manual of Raptors, Pigeons and Waterfowl*. Iowa State University Press, Ames, IA.

Friend, M., and J.C. Franson, (eds.) 1999. *Field Manual of Wildlife Diseases*. USDI, USGS, Washington, D.C..

Miller, E.A. 2007. Common Toxicoses of Wildlife. Topics in Wildlife Medicine, vol 2, (F.S. Tseng and M.A. Mitchell, eds.). Pp 71-97.

Case #5: Raccoon With A Hidden Agenda

Of concern to the family bringing in the raccoon is the fact that the animal had been eating out of the dog's dish, and that at least one child (possibly three children and the mother) had direct contact with this animal. The possibility of transmission of Baylisascaris to the dog (or the humans) and the possibility of rabies transmission to anyone who handled the animal should be discussed with the mother.

Upon initial exam, the raccoon was found to be comatose with an acute fracture of the left tibiotarsus, and a healed fracture of the right femur. After warming her and stabilizing with subcutaneous fluids to help

rehydrate her (the physical exam suggested dehydration present: CRT 2 seconds, skin turgor 2 seconds, mucous membranes tacky), radiographs were taken.
The leg fractures were confirmed. The big surprise on the radiograph was the presence of approximately three fetuses. SonoSite, a locally-based company, generously provided he use (and interpretation!) of a portable ultrasound machine for a more thorough examination of the viability of the fetuses.

The fecal findings are incidental to the major problem this animal had. The coccidia do, however, present a concern to the health of the kits and possible spread to the other animals in the facility, so treatment should be initiated when the raccoon is stable.

So what was be done in this case? Because the kits were viable and showing signs of breathing motions, a Caesarian section was performed, and all three babies survived the surgery. The mother remained comatose, but was able to nurse her young for several days following delivery, enabling them to benefit from antibody transfer in the colostrum. The mother did not recover, but the kits were successfully hand-raised and released when they were an appropriate age and demonstrating normal raccoon behavior.

Discussion of Case #6: Duck Duo

Duck #1: Muscovy

According to the finder and the people at the vet clinic, the duck in this case was in respiratory distress. Unfortunately, you didn't get to see the live bird, but you did see the radiograph and the necropsied duck. In the radiograph, you should have seen the syringeal bulla, also known as the developed "voice box" section of the trachea. This voice box enables drakes to produce their mating call that they use to lure hens. Did you notice that the syringeal bulla was NOT present on the radiograph of the female? You should have also been able to find the syringeal bulla in the carcass. The raspy breathing sound with the neck extended was normal behavior for a drake defending his territory. What wasn't visible on the radiograph but was visible on the necropsy (and ultimately responsible for the bird's death), were liver contusions. The bird was probably hit by a car and may have survived if it had been kept quiet and rested. In the course of being handled, transported, stressed in a clinic of barking dogs, and especially being placed on its back for radiographs, the bird bled to death internally. Due to the extent of the injury, the bird may not have survived no matter what was done to it. What are some things that could have been done to increase the bird's chance of survival?

- ✓ Keeping the bird in a less stressful environment, away from dogs, cats and human activity.
- ✓ Keeping the bird in a normal position (if he was turned on his back for the radiograph, this would increase the motion and potential trauma to the liver.
- ✓ If someone in the veterinary office had noticed that the bird was pale (due to the internal bleeding), they may have provided supplemental heat and oxygen to keep the bird alive, possibly affording time for the liver wounds to clot.

The liver heals very quickly—old, traumatic liver lesions are a common finding on necropsy of all species of wildlife.

Duck #2: Duck with a Droop

Avian Botulism is a paralytic, often fatal disease of birds resulting from ingestion of toxin produced by the bacterium, *Clostridium botulinum*. Botulism toxicoses are commonly seen in waterfowl and also in wading birds and gulls. It is essentially a food poisoning involving the CNS; a neurotoxin produced by a ubiquitous bacterium. It is usually seasonal and is most prevalent from July through September, especially in drought conditions when water sources become stagnant. Transmission is by ingestion of contaminated food and water. Flies lay eggs on the decaying material, the feeding maggots concentrate the toxin and the birds then feed upon the maggots. Often called limberneck, you will commonly find healthy birds, sick birds, and recently dead birds together with the birds lining the shoreline.

Avian botulism affects the peripheral nerves and results in paralysis of voluntary muscles. Inability to sustain flight is seen early in botulism, but this is not enough in separating botulism from other diseases.

Other disease entities may also present with loss of flight ability (e.g.: salmonellosis, toxicities (e.g. lead, mercury), trauma (fractures), and viruses). Once the power of flight is lost and paralysis of leg muscles has occurred, ducks often propel themselves across water with their wings. This sequence of signs contrasts with lead-poisoned birds who retain their ability to walk.

Paralysis of the inner eyelid or nictitating membrane and neck muscles follows. At this point the bird loses its ability to hold its head up and often drowns.

Another significant sign is the presence of projectile diarrhea that is often green in color, but non-odorous as compared to that of salmonellosis.

Breathing is depressed and shallow and most birds present with hypothermia.

In diagnosing botulism, the most reliable test for avian botulism is the mouse protection test. However, a presumptive diagnosis is usually based on a combination of history and signs in sick birds, response to fluid therapy and the absence of obvious lesions in necropsy of dead specimens. In this case, the necropsy of the submitted carcass revealed maggot in the gizzard and fluid present associated with drowning.

Treatment consists of reducing exposure and providing nutritional and fluid support. The toxin is diluted by flushing the gastrointestinal tract by tubing fluids (water to begin with switching to Lactated Ringer's) every few hours. Due to the paralysis of the eyelid, make sure that the eyes are kept moist. Once the bird regains the ability to keep its head erect it should be given unrestricted access to fresh water, maximum shade provision and minimum disturbance.

The prognosis is good and the birds can usually be released after a few weeks recovery. However, this is one case where "put them back where you found them" isn't the release plan.

Friend, M., and J.C. Franson, (eds). 1999. *Field Manual of Wildlife Diseases*. USDI, USGS, Washington, D.C.

Case #7: Dove in Mourning

Candida and Trichomoniasis often look very similar in the bird, causing large, whitish, proliferative lesions in the mouth and esophagus. These two diseases can only be distinguished by looking for the causative organism (known as the "etiologic agent") under the microscope. *Candida albicans* is a yeast that causes the disease known as "thrush", which may present as vomiting, anorexia, weight loss, diarrhea, and/or crop stasis, in addition to the white coating on the inside of mouth and / or crop Candida looks sort of like "snowmen" under the microscope, as new yeast cells bud off of larger yeast cells. It is treated with an antifungal drug such as Nystatin (100,000IU/300gm PO BID for 7 days). Trichomoniasis is caused by the protozoal (single-celled) parasite *Trichomonas gallinae* that has a tail (flagella) that it uses to move very quickly across the microscope slide. Birds with trichomoniasis may have weight loss, gagging, regurgitation, diarrhea, emaciation, a distended crop, and the classical white material in the back of the mouth and esophagus. It is treated with an anti-protozoal drug such as Carnidazole (Spartrix®) at 10mg/250gm. Both organisms are spread by direct contact and by contaminated seed and contaminated feeding utensils. Both organisms are also shed in the feces, and can often be diagnosed by finding the organisms on a fecal exam. Both organisms, fortunately, are killed fairly easily with most disinfectants.

Beynon, P.H. 1996. *Manual of Raptors, Pigeons and Waterfowl*. Iowa State University Press, Ames, IA.

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Davidson, W.R. and V.F. Nettles. 1988. *Field Manual of Wildlife Diseases in the Southeast United States*. Southeast Cooperative Wildlife Disease Study, Athens, GA.

Hartup, B.K. and E.A. Miller. 1995. *Willowbrook Wildlife Haven Pharmaceutical Index*, 2nd ed.Willowbrook Wildlife Center, Glen Ellyn, IL.

Ritchie, B.W., G.J. Harrison, and L.R. Harrison, eds. 1994. *Avian Medicine: Principles and Application*. Wingers Publishing, Inc., Lake Worth, FL.

Whiteman, C.E. and A.A. Bickford. 1983. Avian Disease Manual, 2nd ed. American Association of Avian Pathologists, Kennett Square, PA.

Case #8: Squirrel with a Bad Hair Day

This juvenile gray squirrel was found at the bottom of a tree and presented at the center. He seemed lethargic but responded to stimulation. The primary physical exam revealed some exudates from the eyes, rough appearance and a few patchy rough skin areas around the face. The animal was mildly hypothermic. Before delving for a diagnosis, you need to stabilize the animal. Almost any young animal that comes in will be mildly dehydrated. Remember, until you reach about 6% dehydration, clinical signs of dehydration are hard to pick up. This animal was stabilized by general body warming and fluid therapy with subcutaneous lactated Ringers solution.

The only obvious abnormal finding was the patchy rough skin areas. Skin scrapings and fungal tests were negative. Notoedric mange is common in the area. Since scrapings can be false negative and notoedric mange is common in the area the squirrel was from, ivermectin was given IM.

However, the squirrel did not improve and became anorexic and depressed. He started showing respiratory difficulty and the lesions were becoming reddened, thick and elevated around his face, extremities and genital area.
A tentative diagnosis of squirrel fibromatosis was made. Primarily a disease entity of eastern gray squirrels, this poxvirus agent occurs most frequently in the juvenile population, and primarily results in multiple skin tumors. The virus is presumed to be transmitted by insect vectors and has a high transmittance capability.

Squirrel fibromatosis is a viral disease characterized grossly by multiple cutaneous nodules primarily, but not exclusively, of the extremities, head, and abdomen. Their appearance ranges from thickened, reddened areas around the face and genitals to multiple hyperkeratotic popular thickenings that are elevated, flattened and firm or a single tumorous mass. Generalized disease can occur and often presents with anorexia, lethargy, and respiratory difficulty metastasis to the lungs has been reported).

Histopathological examination of the skin nodules will generally confirm a· diagnosis of squirrel fibromatosis with eosinophilic intracytoplasmic inclusion bodies. Acute pulmonary edema may also be present. Electron microscopy can identify poxvirus particles.

Various opinions exist on whether treatment is viable. Even with supportive therapy and various antibiotic therapy regimens, the prognosis for recovery/remission can be poor. Due to this, some feel humane euthanasia avoids prolonged suffering of the animal and transmission potential. A treatment protocol that has been used consists of 0.5mglkg ivermectin IM given once followed by pyrethrin spray for lice (possible vectors), 20,000u/kg vitamin A once weekly, 40,000 u/kg Dual-Pen SID x7d. Acemannan, as an Immunostimulant and Ribavirin as an antiviral has been tried but no data on efficacy is available.

Hartup, B.K. and E.A. Miller. 1995. *Willowbrook Wildlife Haven Pharmaceutical Index*, 2nd ed. Willowbrook Wildlife Center, Glen Ellyn, IL.

Miller, E.A. 1992. Squirrel fibroma virus: review and case reports. *Wildlife Rehabilitation*, 10:185-192.

Case #9: Tied up Heron

Initially, after removing the line from the bird's feet, you would probably want to examine the whole bird, then clean and bandage the foot. You would probably also give the heron some fluids and calculate a course of antibiotics for the foot injury, as foot injuries are very prone to secondary infections. Because the bird is anemic and dehydrated, you probably wouldn't want to offer whole food right away, but might

gavage feed a more readily absorbed diet with a high fluid content. You should plan to give an injection of iron dextran (10 mg/kg IM) as well as an injection of vitamin A&D_3 (100,000 IU/kg IM, based on the concentration of vit. A) over the next few days because of the anemia and emaciation.

Young great blue herons, like other juvenile animals, are very susceptible to heavy parasite burdens. The larvae of the nematode *Eustrongyloides ignotus* are carried by fish, which are then ingested by the herons. As the larvae develop into adult worms, the embed in the wall of the proventriculus (glandular stomach), and eventually migrate through the stomach wall into the ceolomic cavity, causing a fibrinous reaction and the equivalency of a peritonitis, as well as anemia, emaciation and dehydration. The combination of the worms in the abdomen and the fibrinous reaction result in the "ropey" feeling on exam. If the worms haven't caused too much damage, the bird can be treated systemically with ivermectin, and extensive supportive care; if the damage is extensive, the gastrointestinal (GI) tract will become non-functional and the bird will eventually die.

Ziegler, A.F., S.C. Welte, E.A. Miller, T.J. Nolan. 2000. Eustrongylidiasis in Eastern Great Blue Herons (*Ardea herodias*). Avian Diseases. 44:443-448.

Case #10: Young Opossum

Whenever we receive baby animals that have been hand-raised by someone from the general public, we automatically tend to think that they have done something incorrect and not raised the baby as well it would have been raised by a rehabilitator. Of course, in many instances, this is correct. In this case, the weak nature of the opossum, its inability to stand and the palpated leg fractures probably lead you to the same initial conclusion. However, when you saw that the diet really was a very balanced diet and that the presenter was truly concerned and conscientious, you should begin to think of other things that can cause sudden fractures: it may have fallen from a branch or something in its cage; or perhaps someone accidentally dropped it, stepped on it, or shut its leg in the cage door, and the presenter didn't know about it or is embarrassed to admit it.

The pain withdrawal reflex (when you pinched the toe) suggests the spinal cord is functioning and that the inability to stand probably isn't due to a fractured back.
The radiographs show you two things: 1) that several bones have folding fractures (the bones aren't actually broken, but are folded or bent in weak areas), and 2) all of the bones are very "faint", suggesting not a poor radiograph, but a lack of sufficient calcium in the bones.

The most common cause of Metabolic Bone Disease (MBD) is a relative lack of calcium, either from a true deficit of calcium or from an insufficient ratio of calcium to Phosphorous (Ca:P ratio). Dietary Ca:P ratios in growing mammals should be no less than 1.3:1. An insufficient ratio results in "rickets", seen as deformed bones, fractures, poor fur quality, and sometimes a rigid paralysis.
Other causes of rickets/MBD include inadequate amount of vitamin D3 or protein in the diet, kidney disease, liver disease, intestinal disease, or primary bone disease (such as a bone tumor), and a lack of exposure to ultraviolet light.

In this case, the apparent lack of ultraviolet light in the basement resulted in an inability to synthesize vit D from its precursor in the body. Under normal circumstances, UV light triggers the conversion of the hormone 7-dehydrocholesterol to cholecalciferol (vitamin D3). Vitamin D3 is then converted to a more active form in the liver, and is then carried to the kidney where it is again converted (which is why kidney and liver disease can cause a lack of this vitamin). Vitamin D3 is necessary in the regulation Parathyroid hormone levels, which in turn regulates the movement of Ca & P into and out of bone.

You could attempt to provide the opossum with a more balanced (Ca:P) diet, treat the bone fractures, give it supplemental vitamin D and expose it to natural UV light, but the prognosis is poor due to the advanced state of the MBD and the multiple fractures.

Murnane R. D. 1997. Common Nutritional Disorders of Wildlife in Principles of Wildlife Rehabilitation. A.T. Moore & S. Joosten, eds. National Wildlife Rehabilitators Association, St. Cloud, MN. Pp 276-277.

Answers to bonus questions

1) These are lice of the Cyamidae! Okay, so they aren't technically lice, but they're called that. They are actually crustaceons, but they cling .to their host (whales) just like lice.

2) The turtle radiographs are from a turtle that had a rubber band around it as a small turtle and as the turtle grew, the rubber band constricted the shell. This also happens when young turtles get caught in 6-pack rings. Thanks to Noni Beck for providing the rads (and saving the turtle!)

3) This bear cub had a form of metabolic bone disease. It was found with one other live cub and one dead cub. The two live cubs were raised the same: one did fine, and this one developed multiple fractures. The mother was killed illegally, and we suspect that the cub that thrived had managed to stay warm by staying close to the mother's body, while this one had wandered off a ways and gotten chilled for long enough that some organs began to shut down and the cub lost the ability to properly metabolize calcium. Other factors may have contributed to his problems (e.g., congenital abnormality), as a definitive cause was not discovered on necropsy.

4) This beaver was found out of its den in January. It was a yearling, so may have been driven out by the family, or simply wandered out on a warmer day and got hit by a vehicle. A cold snap hit that night and without the lodge to protect it, the beaver's tail was frost-bitten. The changes caused by frost bite often take several days to occur, as the tissue slowly dies. Without ½ of his tail, the beaver wouldn't have been able to swim properly, build dams, or tail slap to sound an alert and ward off danger, so the animal was euthanized.