Progress Log & Hour Tracker

May 9, 2020

- Examined bones (checked to see what I was working with, condition of bones, etc.).
  ↳ Some damage (chipping / fragments in the bottom of the box), discolouration, air bubbles in connective tissue, unfused / rough bone segments, and holes (likely from underdevelopment / young age of calf upon death) noted.

- Attempted to set-up / align some sections of bone (hip, tail, and neck).

- Photographed some sections / progress.
  ↳ Some photos sent to a robotic engineer (who is assisting with 3D scanning of bones / software opperation / technical aspects) at UBC.

- Set-up Independent Study progress log & hour tracker. Reported to Roy and contacted The Brain Scoop.

∴ Notes: - Bone spurs stick to carpet and skin
  ↳ Need gloves / hard surface to prevent itchy splinters / damage to bones from peeling off carpet
  - Tape may be useful to remove bone fragments from skin, carpet, and/or clothes.
  - Poster paper and wire and/or a chemistry stand may be useful for taking photos / scanning.
  - Stickers needed for labeling bones.

90 mins

May 9, 2020

- Called robotic engineer to discuss 3D scanning photo taking techniques / techical details

- Reviewed video and text resourses regarding 3D scanning (see notes section)

60 minutes

May 11, 2020

- Set-up in lab, set-up camera / got tutorial from Roy on how to use camera

- Talked w/ robotic engineer (Rod / Rodney McLatchy) about photo-taking / setting requirements, uploading / data sharing, Meshroom downloads / oppenatrional requirements, and object creation

- Created sample bone scan to test feasibility of factors of data collection

Notes:
- a tri-pod would help ~~(slightly un-~~ (hands unsteady)
- 2 lamps ideal (do not more lamps / do not cast shadows w/ camera)
- put bone on stool in lab (ideal) to rotate around it

2.5 hr

May 12th, 2020

- Asked Roy how to change camera settings for longer exposure
  ↳ Roy added timer to allow for stabilization

30 mins — Borrowed tri-pod and lamps from Roy.

May 14th, 2020

- Set-up make-shift photo studio in office
- took photos and scanned top of skull
- Uploaded photos for Rod to process
- Took down camera equipment/studio + debriefed

Notes: - Uploading photos may be an issue (consider purchasing external hard drive and mailing to Rod)
- lamps are hot (do not move them, it hurts and alters scans)
- use a smaller table (easier to get under)
- Consider borrowing a chem stand
- Clean office before hand (avoid tripping, cluttered images, droping bone (mirror damage to bottom of skull)
- Close door, more consistent light + less bugs
- table cloth problematic (moves)
- bananas not great, use styrofoam
- clean out video card b/w pones

3 hr. - teeth fall out, consider epoxy.

May 26th, 2020

- Researched articulation methods for moose skeletons
  - ↳ Found "The Boneman" Lee Post
    - has written several books on skeletal articulation, and one specifically on moose skeleton articulation
    - I emailed him to inquire about applying the manual's methods to a moose calf skeleton (awaiting reply).
- Relayed findings to Rod at UBC.
  - discussed altering methods to accomodate moving / adjustable legs
- Researched ungulate anatomy & skeletal structure } see notes
- Researched articulation equipment + supplies
  - ↳ see list
- → found ARTSTATION 3D model of a moose skeleton (adult)
- → found Deviantart 3D moose skeleton model

~120 mins

June 24th, 2020

- Calculated new schedule to meet hour requirements (emergency leave)
- Researched textbooks/manuals that may help with the articulation project
  - ↳ purchased "The Moose Manual, Vol. 6" and "Bone Builders Notebook, Vol. 10" by Lee Post (a.k.a the Boneman)
- Emails
  - ↳ explained leave of absence / emergency leave to supervisor
  - ↳ replied to The Boneman who offered assistance and asked for more details about the calf.
- Browsed through Moose Manual and made notes! 120 mins

July 1st, 2020

90 mins

- listened to podcast: Nassology (Taxidermy) with Allis Markham on Ologies with Alie Ward
  ↳ learned teeth will have to be recreated, otherwise (without the moist environment that is a living mouth) tooth enamel will degrade and the teeth will fall out.
  ↳ need to take measurements + photos of taxidermied calf to correctly/accurately articulate the skeleton
  ↳ might be fun to do a call back to a historical Nassological artifact
  ↳ note on plaque about ethical sourcing

- listened to podcast: Functional Morphology (Anatomy) with Joy Reidenberg on Ologies with Alie Ward
  ↳ learned travelling with bone-altering equipment should be done with care
  ↳ Functional anatomy is a unique combination of art (sketching/illustration) and science
  ↳ Functional morphology/anatomy of animals is applicable to human medicine in bromémedics
  ↳ Whales originated as deer/ungulate-like creatures that evolved to go into the sea and expanded over time; their lungs adapted to calling underwater by becoming very large due to their body size; e.g. whales' lungs use air to make sounds/calls/echolocation that are over 200 decibels (160 = rupture eardrums, 180 = death of a human) which can be heard by other whales thousands of miles away.
  ↳ studying adaptations like those of the ungulate-turned-whale could additionally be helpful in creating new equipment for humans to utilize (e.g. improved military sonar).

70 mins

July 4th, 2020

- Browsed the Bone Builder's Notebook by Lee Post (a.k.a. the Boreman).
  ↳ read about navigating challenges of young bones, fixing broken bones, fabricating missing bones, and suggested materials for building quadrupedal mammals.

- Replied to Roy regarding new hours schedule, progress on project, and needed supplies.

Notes:
- make a supplies list (with approximate costs and submit to Roy.
- Make scanning schedule for bones
- look into shared drive online to share photos / large files for 3D scans + images

5.0 mins

- Worked on new schedule for working on moose calf project → adjust from 6 to 11.6 (12) hours / week to catch up by Aug. 21

July 12, 2020

- Supply list:
  ↳ 5 tubes 5-minute Epoxy gel
  (Devon™ High Strength Epoxy Gel 5-210 21045
- Hot glue gun + hot glue
- Drill bit set
- Spade bit set
- hacksaw
- 2' x 4' corrugated cardboard
- pliers
- 3 Tubes 100% Silicone Caulk (without mold inhibitors) + caulk gun
- bench vise
- bubble solution
- plastic bowl
- caliper
- Elmers high strength white glue
- 26 inches of 1/4 inch all-thread steel rod
- 12 gauge galvanized steel wire

↳ priced out items and sent to Roy

- Plan to photograph/scan bones
  ↳ each day, scan 1 section (1 leg, 1 neck, skull, etc.)
  ↳ upload to google drive

70 mins ↳ replied to Roy re movable limbs + stand set-up

July 20, 2020

- Met with Doug from the EFL last week (07/14/20) and went over the equipment they could provide me.
  ↳ Agreed to work on building aspect there. (30 mins)

~~Recounted~~

- Recalculated cost of project/what materials were still needed
  ↳ new project cost $90 minimum (Chen, Chair of ESM, approved up to $150)
  ↳ Sent updated calculation to Roy, pending purchase ~~approval~~ aproval → aproved

- Set-up camera w/ noted modifications to plan from last time
  ↳ Short, textured stool, do not change lighting, raise bone on styrofoam.
  ↳ used books to prop-up.

- Photographed 3 bones from front left leg
  ↳ uploaded to Google Drive to send to Rod for processing

- Charged batteries x2 (all 4 dead)

- Cleaned up from styrofoam cutting & phototaking

4.00 hr
(incl. 30 mins on 07/14/20)

July 23, 2020

- Went through uploaded photos of the front left leg
  - ↳ deleted poor quality / mistakes
- ↳ Sent to Rod for processing
- ↳ Processing showed that some bones have insufficient texture for scanning in bright light

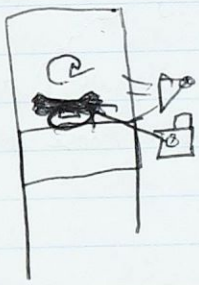
4 hrs.

Notes: - new photo set-up (less light, more texture, plain background, direct contrast ~~of~~ under bone (ruler!).

July 29, 2020

- Researched how to correct photo / texture issue
  ↳ found solutions in bone scanning resources online related to anthropology
- Emailed Farid from anthropology to ask about ~~borrowing~~ borrowing the lab's documentation photo set-up
- Emailed Roy to ask about artistic enhancement to bones to both emphasize texture + curves (for photographic 3D scanning as an an educational aid)
- Discussed a new set-up for taking photos at home with Rod
  ↳ he will help w/ ~~texturing~~ w/ charcoal / lines
  ↳ plain background, photos on a lazy susan (ordered) camera stationary
- Researched moose history, morphology, current research, anatomy, and diseases currently affecting North American moose.
  ↳ downloaded articles to read later

Notes:



Consider:
- asking Roy about taking camera to Likely
- building a simple website to house the scans + explain the project

To do: - build new photo set-up
- try multiple softwares for 3D scan composition
- read moose resources
- write moose paper
- Prep bones + articulate skeleton
- buy supplies for articulation + mount

1.) Design / finalize build plan
2.) get supplies
3.) Prep. bones
4.) articulate + mount

2 hours.

July 31st, 2020

- Met with Dr. Farid Rahemtulla (an archaeologist from the Anthropology Department), after some email correspondence, in the Archaeology Lab in Building 4 to discuss photo set-up.
  - ↳ the Archaeology ~~Department~~ Lab has a photo set-up specifically designed for photographing artifacts (like bones)
  - ↳ Farid has a special black cloth for photographing bones (which he has granted me premission to use)
  - ↳ The condition of using the lab is Farid must also be in the lab as it is a restricted space due to the artifacts

- ~~After~~ I sent photos of the lab's photo set-up to Rob to see if it will be better for taking photos with more defined shading/texture for the 3D configuration software to recognize.

Notes: - ordered and recieved a lazy Susan for better photo-set-up technique.
- ordered reserve material from library + picked up (articles and B.C. ~~gov~~ Government moose information pamphlet)

1.5 hr

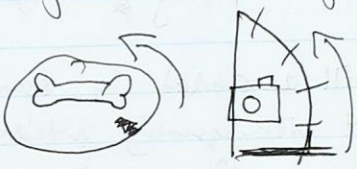
August 5th, 2020

3.5hr - Drove to Likely, B.C. to meet Rod.

August 7th, 2020

- Rod built me a computer (using discarded pieces/extras) from NOS home and UBC) that is able to process 3D modeling; this expidites the process as I no longer need to wait on him to make corrections/find out if I need to take supplimentary (additional photos to complete a ~~scan~~ scan.
  ↳ Also allows for 2 computers to process data. ~~and~~

- First try with new set-up (Lazy Susan, stationary camera)



↳ scanned skull + Scapula

↳ seems to work much better as the background does not have constantly changing items that 'confuse' the software

↳ Note: moldable eraser works as a positioning putty to hold the bone at a specific angle as it spins.

↳ computer had almost no trouble processing these photos (1 error* as opposed to 30+ errors with old set-up).

4hr

Aug. 10th

- Drove back to Prince George with new computer.

4hr. ↳ need to find a mouse and monitor(s)

August 17 - 20, 2020

- Researched monitors (~~free~~ nearly to me w/ giftcard from warranty on a gift)
  - ↳ learned about colour accuracy, time delay, different types of monitors, etc.
  - ↳ either 2 monitors or 1 1440/2K monitor for 30% ~~increase~~ increase in efficiency

- Supplies for bones to be purchased this week:
  - ↳ glue
  - ↳ ~~frosting~~ wire } harden bones + sand for non-glossy / realistic texture
  - ↳ hooks

  - ↳ talk to Doug at the ETL regarding a hanging-to-dry set-up.
  - ↳ as each bone dries, it will be sanded and scanned.
  - ↳ once scanned, the flow chart with assembly guidelines will be followed to begin building the moose calf.

5 hr

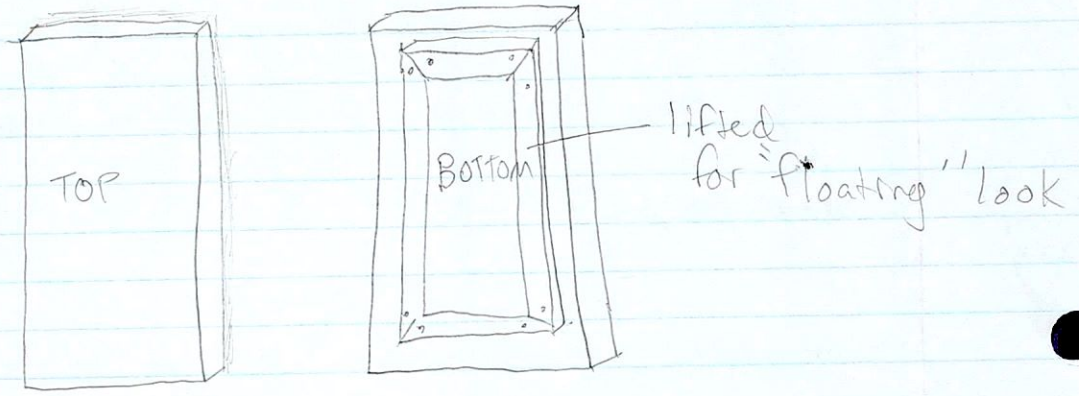
Note: recently been given access to welding equipment if need-be.

September 12, 2020

0:5 ↳ Scheduled Moose time into class schedule + did calculations to make final hour count

September 14th, 2020

↳ Went through materials Roy mailed me.
↳ Updated Roy on new plan (building timeline, new computer, website for paper?)
↳ Met with Doug & John at the EFL
• built base for skeleton to be mounted to



3

5 hrs.

Note: - After sanding and building today, tomorrow I will pick a stain colour and stain the base.
- Next week, I will ~~harden the bones~~ (yes) Oct. 26, 2020 begin good copy scanning for the 3D file.

September 15th, 2020

1 hr

↳ Went to Michael's, Dollarama, and Canadian Tire in search of supplies
↳ started a receipt envelope
↳ shopped on Amazon.ca
↳ posted on Facebook to try to get cheap fishing line and rocks for bare hardening.

September 16, 2020

↳ Stained base black (3 coats)

↳ Learned a new technique in staining so the wood grain is highlighted; the older wood absorbs the stain less efficiently due to being more dense so if one stains an area and quickly wipes it off you get multiple dimensions of your stain colour and the wood grain is accentuated.

3 hrs ↳ Updated Roy on progress

September 18, 2020

↳ corrected scratches on base with Sharpie
↳ tested glaze
↳ cleaned base
1 hr. ↳ applied 3 coats of protective glaze

14
13
21+6

43.5

19.75 hr/week.

October 26th, 2020

↳ recalculated hours/week
- 14 weeks in summer/spring + 13 weeks in fall - not including first week/term as they are short
= 27 week x 6 hr/week = 162 hours required
→ 162 - 43.5 complete = 119.5 remaining / 6 weeks remaining
= 19.75 hours/week

Notes:
- Too many technical complications regarding scanning every single bone (insufficient turntable, knee bones spheres, etc.)
↳ instead will scan groups (a complete leg, the tail, etc.) -- this will likely be more useful anyway as an educational tool
↳ I plan to also scan the full skeleton once articulated

- Need to follow-up on website permissions for calf
- Need to update Ray on research publication feature + articulation progress

- Need to order/purchase remaing needed supplies and print reciepts.

↳ Brought bones to EFL
↳ began sanding/set-up for hardening
↳ emailed Ray
↳ talked to Lena
5.5 hr ↳ emailed photos/questions to The Boneman

October 27th, 2020

↳ worked on scheduling moose work

0.5 hr ↳ checked email for response from "The Boreman"

October 28th, 2020

↳ sanded more bones (Note: use facemask + lab coat b/c of bone dust)

↳ Called Lee Post "The Bone Man" to discuss methods of cleaning and articulating young bones with chemicals available in Canada.

4hr.

October 29, 2020

↳ purchased NH_3 solution (5%) + more epoxy (gel)

↳ $C_1V_1 = C_2V_2$

$\frac{5\% \cdot 1 \text{ gallon}}{5 \text{ gallons}} = C_2 \; 5 \text{ gallons} \quad = 1\% \; NH_3$

↳ mixed w/ ½ c dishsoap, labelled, and placed in fume hood then into greenhouse to remove fats and oils

Notes: - As per conversation yesterday with Lee Post, bones will need to soak for about 2 weeks

- meanwhile, I need to drill out bones containg a lot of bone marrow and clean them out (some are beginning to rot
  ↳ I will take off eph. caps, drill them out, and put them in the ammonia bath
- after, I will articulate / harden parts that I can while I wait for the NH_3 to do its thing

3hr

-

October 30th, 2020

- did photoshoot in EFL
  ↳ gave credit to Lena Ritcher
  ↳ told story about calf

- Checked spine in NH_3 solution
  ↳ Note: lipids dissolving nicely

Notes: - STILL need to drill out bones, but epiphysial caps are difficult to remove
  ↳ metal file would be useful, as well as a flat screwdriver
  ↳ may be worth soaking bones before drilling to avoid breaking the bones as the solidified fat is harder than the bone

1 hr

November 6th, 2020

- Picked-up elongated drill bit brought-in from Vanderheeb

- Notes: - I have also picked-up fishing hooks & fishing line (for hardening the bones in a glue solution, and hanging them to dry), paint brushes (to put glue into softer bones (instead of ~~dipping~~ dipping for faster drying) and gluing in teeth), and fish hangers to hang bones from as they dry.

  - Lena sent me photos of the calf during dis-articulation to help with the articulation of the cleaned bones

  - Various members of the community have asked for progress photos as the project goes on (mostly those who have donated supplies to the project)

  - I need to look into placques soon to order it and have enough time for the engraving

  - I need to bring-in a metal file (nail file will work) as well as nail brushes (as recommended by the Boreman) to remove the lipids once the ammonia bath is complete)

  - I need to research ~~the~~ a substance that will look like teeth (some are damaged/missing (I am thinking about ceramic paint as inspired by my brother's dentist who hand-paints

porcelain replacement teeth for people who lose them).

- I am going to leave the ads in the skull (no ammonia bath) as in the literature there is evidence that it is the lack of moisture that causes teeth to degrade / the skull to lose its teeth). I may paint it to change the colour (as approved by The Bareman).

- I will need to get thank-you cards + do baking / deliver coffee as promised in exchange for goods donated to project (I have many cards stock-piled, and baking supplies ~~to~~ I need to use-up, so I will donate these to the project).

- I will need to determine if a corded or cordless drill is better for such soft / crumbly bones (The Bareman defines 'soft' young bones as being able to crumble them / scratch away matter with a finger nail) & soft bones may be ~~easily~~ more susceptable to damage from a corded drill that provides more torque.

- I need to still find needle-nose pliers.

- I will need to recalculate hours to make-up for illness → added to new schedule.

1 hr.

I will try to take photos every day I work on the moose

November 9th, 2020

- Checked on bones in ammonia bath
  ↳ fat turning white ~~[illegible]~~ and falling off bones and the solution has turned dark-yellow (indicating a lot of oil is being extracted from the bones).

- drilled large leg bones and cleaned out narrow
  ↳ put clean bones in ammonia solution to remove fat and any left-over marrow
  ↳ one bone casualty → will have to epoxy back together

- Need to email Roy regarding plaque inscription + update

- I found a metal file digging in ~~the~~ drawers in the EFL
  ↳ now I need:
  - needle-nose ~~pliers~~ pliers
  - a nail-brush (dollar-store?, I'll dig around the EFL first)
    ↳ not needed, found brush in EFL Nov. 11, 2020

- I need to set-up the drying line on the back-counter for bones who need to air-out
  ↳ maybe in fume-hood for bones in ammonia
  ↳ back-counter for bones in glue solution

- Seth Dee gave me his father's email (who is a taxidermist & wildlife biologist who has articulated a moose cow before!)
  ↳ I will ask both him and the Boneman

4 hr - I will start a list of everyone who has donated to the project & what they have donated/lent (to ensure thank-yous and items are returned)

~~1:30 Setup~~

November 10th, 2020

- made itemized donation list in research/notes section of this note-book

- Checked-on bones in ammonia solution
  ↳ originally placed bones ready, others need more time
- ~~Set-up hanging lines in fumehood & on counter~~
  ↳ need more chemistry stands
- emailed Roy plaque questions + updates, and emailed Mr. Lee & The Bateman re/ teeth issues
  ↳ received replies, will reply tomorrow.
- removed bone marrow from some neck bones

- met w/ Roy to pick-up stands, a dissection kit, and a dissection tray
  ↳ discussed plaques and display options
    ↳ will need to measure display cabinets (don't mount to base until sure of display needed) → See Notes

~~7.5~~ hr
8 hr

- Cleaned-off cartilidge from bones
  ↳ put in fume-hood to dry

Notes: - ammonia dissolves wax (dissecting tray will need to be fixed)
- look at display stand measurements + attatchment

November 11th, 2020

- cleaned cartilage off ribs, sternum, and spine
  ↳ hanging to dry in fumehood

- ~~sanding~~ sanded off paper from bones that dried on paper towel ~~with~~ covered with glue solution

- Emailed / responded to Lee (The Boneman) & Bill Dex
  ↳ will call Bill tonight to hear his story of building a moose cow (7pm).
  Note: he recommended re-soaking the vertebrae in de-oiling solution before threading the ready rod, otherwise oils will seep out.
  ↳ need acetone.

- Emailed Conan Ma at Chemstores re/ getting acetone

- Re-coated Skull ~~(1)~~ (not jaw) in bone-hardening solution

- Coated some vertebrae in bone-hardener & set to dry

↳ rotated bones in cabinet drying for even drying.

- Called McKenzie Taxidermy Supply for quote on epoxy sculpt + shipping to Canada
  ↳ need to look at broker info for UNBC (emailed)

- reels & rubber bands
  - all-thread (ready-rod)
  - metal pins
  - finishing nail
  - 1/16th" drill bit
  - cardboard (distribution servers)
  - square
  - clear silicone caulk ✓
  - bubble soap

- Re-read Moose building guide by Lee Post
  ↳ made supply list
  ↳ need to read Bone Builder's Notebook again re/ damaged & missing bones, teeth cracking, normal bone identification and siding, bone reps & Osteology vocabulary.

6 hr

(call expected to be 0.5-1, will add after)
↓
1 hr for call + emails

Nov. 13, 2020

(7h)

- acrylic paint

November 13, 2020

- PiA research on mixing $NH_3OH + C_3H_6O$
  - ↳ mixing ammonia and ~~bleach~~ acetone can produce a precipitate and release toxic vapours
  - ↳ will just go purchase more ammonia (cheaper)
  - ↳ Note: will reduce quantity to ½ → 500 mL ammonia and 1/4 c dish soap.

↳ Budget Calculation (Re-calculation due to unforseen expenses)

$150.00
~~3.36~~
51.90
- 19.50

$75.24 remaining

↳ $35.00 for Apoxie sculpt (1 lb)
↳ ~~$12.00 for ammonia?~~

Future expenses

↳ electrical conduit (½ inch) $8.77 — $20 remaining.
↳ paint: cream, yellow, and white, ~~$25~~ - $7.99 colour matching set
  ↳ +5% for white
↳ ~~plaque: $20~~
↳ high density foam brick? $7
  ↳ Foam Shop: 250-561-6324 (email sent)

- Nov. 16, '20

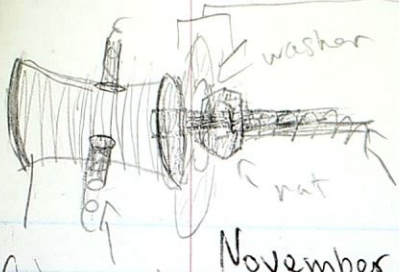
↳ Emailed Roy re/budget

↳ Emailed Bill re/ bands / skull filler alternative

↳ removed bones from drying section (needed plastic wrap)

↳ switched-out $NH_3OH_{(aq)}$ to soap and water
  ↳ saturated w/ lipids

3 hr ↳ found tools / supplies needed in EFL



November 16, 2020

↳ Checked bones drying in fume hood
- ~~seem dry enough for hardening dunk~~ X
- will dip in bone-hardening solution once dry Nov. 17, 2020

↳ Checked bones in soap solution
↳ soap solution worked, more lipids / marrow cleaned off
→ rinsed-out bones and made new solution with hot water and 2 types (and more total) dish soap
→ bones will soak overnight and be checked tomorrow

→ Emailed Ray updates → reply, new budget approved
- plaque ordered (wood - laser engraving) → donated
- priced-out paint ($7.99, maybe + $5 if new white needed)
- no longer need NH_3OH → used dish soap solution above
↳ will manually remove what remains after a soak or two
- May be able to get paint from a friend, or most of it

3 hr

→ Updated Donation Table to include paint + sign / plaque

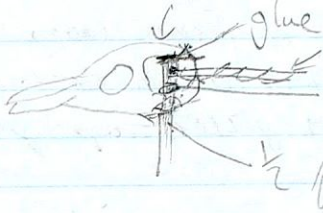
Notes: - Ask about using pressure washer to clean bones?

↳ Recalculated budget: up to max $200
- From original $150 → -$3.10
↳ 50 to play with

Nov. 17, 2020

↳ Spoke with forestry technician regarding ideas of how to secure skull in place when mounting
→ idea

use top of skull to distribute forces exerted
glue top w/ apoxy
ready rod
glue inside hole with apoxy
½ flattened ½" pipe



→ cheaper than filling the skull cavity with Bondo

↳ checked bones in soap solution
→ water with connective tissue and particulate, but less oil than 1st soak, connective tissue getting soft

↳ checked bones in fumehood
↳ not dry enough, put in oven at 35°C to help accelerate drying.

- Shopping List
  ↳ ¼ inch ready rod (3 ft)
  ↳ electrical conduit (½ inch) (3 ft)
  ↳ pick-up sign
  ↳ white acrylic paint

- Emailed Tom Lyon Northern Art Designs regarding plaque to add a "donated by" mark
  ↳ will pick-up once complete

- Sent online receipt to Barry Bonfield at Copy Services
  ↳ will pick-up later

- Notes: • Need to talk to Doug re/ building a plaque stand
• Need to measure display cabinets in Building 8

- Reviewed Bone Builder's Notebook by Lee Post

- Note: #2 • Michaels: 9 a.m. - 9 p.m.
#1 • Central Builders' Supply Prince George: 1a.m. - 6 p.m.
#3 • Northern Hart Designs: 10 a.m. to 7 p.m.
→ went shopping ~~for~~ + picked-up plaque.

- Talked to Lena about the project

6 hr

~~Wed~~ November 18, 2020

- Picked up clay / apoxie sculp ~~from~~ invoice from Barry
- Checked on bones ~~in~~ in oven, sufficiently dry, will dip today in bone renderer
- Checked on bones in soap solution
  ↳ Oil present, more visible particulate
  ↳ more oil pulled from bones.
  ↳ maybe will attempt to clean out / dry today if time
- Set up plastic for drip-dry to avoid paper towel sticking to drying bones
  ↳ coated all ribs / ~~the~~ vertebrae cleaned and ~~the~~ dried in oven

6 hrs.

November 22, 2020

- Checked on bones on plaster ~~bbbb~~ which have gone through hardener
  ↳ look good! Ready for dip #2

- Checked on bones in soap solution
  ↳ whiter and most of lipids removed
  ↳ will clean & put in oven today
    • 35°C, 1 tray for bones & 1 for caps

- While waiting for everything to dry, I pulled out more supplies (plaque, paint, sprue clay, etc.) and made a building plan (see notes section)

- Emailed Bill to ask about photos of pelvis assembly of his cow.

1 hr

November 23, 2020

- Checked on bones in oven
  ↳ dry enough, removed from oven
  ↳ dipped in bone-hardener

- checked on bones dipped yesterday
  ↳ dry, removed extra glaze

- sculpted rip ends + ephisial caps.

3 hrs.

Nov. 25, 2020

- Sanded rib bones (smoothed-out aporke sculpt)
- removed extra glue from hardening leg bones
- figured out where hip bones align
- determined aporke was bad and needed to be returned

3 hrs.

Nov. 27, 2020

- Returned bad apple

1 hr

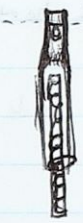
November 28, 2020

- built tail and broken hip
  ↳ will need to use apoxie sculpt to correct some missing bone from hip-joint

- rebuilt all vertebrae and sternum
  ↳ sternum using wire and apoxie to make it flexible, yet strong
  ↳ used apoxie & rubber bands to hold bones together while vertebrae ~~were~~ were being reconstructed
  → will need to rebuild 2 vertebrae using apoxie sculpt.

5 hrs.

December 1, 2020

- re-aligned tail and built nest of pelvis
- aligned vertebrae + drilled for spine rod
  ↳ emailed Roy re/ atlas (not sure how it goes together)
- drilled hole in pelvis for T-support + drilled hole in sacrum for spine rod to attatch to
- John & Roxy helped make alternate support prong
  ↳ 
  → will need top cut again as too tall for hip-attatching vertebrae ✓
  → will need to flatten more ✓
- Will go to Building 10 (LT & L) to measure moose / get spine shape estimate (see notes)
- Need to look into how to remove rust
  ↳ will return pipe, get conduit from EEL

6hr

Dec. 4, 2020

- aligned skeletal stand
  - ↳ 7 cervical vertebrae
    - ↳ 13 thoracic vertebra
    - ↳ 6 lumbar vertebra
- glued vertebrae onto spiral rod
- glued support rods to washers
- glued hip to rod

- Note: will do cosmetic corrections at the end, after major alignment adjustments have been made

- drilled ribs, added wire, and inserted into ribcage
- showed progress to Ray
- emailed Bill about extra ribs
-

7 hrs

December 9, 2020

- attatched sternum and made corrections to ribs
- began re-assembly of leg bones
  ↳ will need to add plaster / apoxie sculpt to correct missing / broken sections

- Note: ribs more easily
  ↳ I may have to re-inforce ~~[illegible]~~ with wire

2 hrs.

December 11, 2020

- while reading, I discovered that I put the sternum too low
  ↳ this has been corrected by shortening the bones

- The two sets of mystery ribs are lower ribs, they are now attatched to the 12th & 13th pairs of thoracic ribs. After looking at photos, I confirmed the other ribs were connected via non-calcified tissue.

3 hrs.

December 12, ~~2019~~ 2020

- fixed leg bones with apoxie sculpt
  ↳ filled in big & gaps with hard glue
- fixed broken vertebrae and holes drilled in pelvis
- Recalculated hours: currently at 142 / 162 ~~REVISED~~

4 hr

Dec. 14, 2020

- sanded leg bones so apoxie-sculpt is nearly flush with bone

1 hr.

December 15, 2020

- arranged legs
  ↳ need more ready rod? no. use screws
  ↳ will need to sculpt / repair some missing / damaged bones
  ↳ will need to email [illegible] Rey to ask about style of knees

- drilled leg bones + tarsals
  ↳ strung bones + glued toes to wire

- cleaned up and sorted borrowed items

Note: Tomorrow: — attatch legs
  ↳ fix knees after talking to Rey

— ~~apple~~ epoxy skull
  ↳ mount to body
  ↳ fix teeth

— cosmetic
  ↳ paint
  ↳ add silicone
  ↳ add apoxie sculpt
  ↳ add sign

6 hrs

Dec. 16, 2020

- Ray came to help me build the front knees

- I drilled 1 knee & made twisted wire to attatch knees to legs.

2 hrs

Dec. 17, 2020

- put skull together & onto a stick

2 hrs

Dec. 18, 2020

~~attaching~~

- assembled head mount by drilling a hole in base
  - ↳ permanently ~~[illegible]~~ glued head onto post
  - ↳ put head post on adjustable standing post

2 hrs

Dec. 19, 2020

- built rear knees and attatched to legs
- ~~painted~~
- painted skeleton
  - ↳ too dark, needed more white (purchased)
  - ↳ White more overpowering than last contact so washed some off (acrylic paint is water soluble)

- began positioning legs to look like ~~holding~~ mount

- made stand for sign (sanded & coated)

- began cosmetic touch-ups.

- Tomorrow:
  - attatch rear leg circular bones
  - build toes + broken sections of bone with apoxie-sculpt + paint
  - position legs & glue into place
  - finish ribs w/ silicone & wire
  - clean up posts + stand
  - attatch sign + tighten bolts for display

(+)

  - Finish paper

9 hrs

Dec 20th, 2020

- Completed checklist outside from paper, will do that in the morning during final adjustments once dry)

- Checked set on taxidermy → male

- [redacted] Humphrey is complete! :)
  ↳ Updated Lera

- Will scan tomorrow
  ↳ will download onto drive (photos) and then return gear
  ↳ will send scan [redacted] once data is processed on PC

- will clean-up + send thank-you cards + return items [redacted] during holidays.

6 hrs

Dec. 21, 2020

- Wrote paper & submitted project

2 hrs.

May 9, 2020

- Photogrammetry = 3D scanning w/ photos

- Open Source software = Meshroom
  ↳ Pro options / scan available
  - checkmark = good photo / okay to use
  - 20-30 photos (5-6 mp min)
  - take photos w/ ruler & note labeling which bone is which (sep. bones into baggy.

- Technique: Tutorial for Beginners
  - high shutter speed (avoid motion blur)
  - reduce apeture (high f-value) for large depth of field
  - reduce ISO to minimize noise

May 26th, 2020

- The Moose Manual, Vol. 6 by Lee Post
  ↳ supplies + equipment
  ↳ drilling techniques

- Suggested materials:
  - 5-min epoxy
  - hot glue + glue gun
  - ~~notebook + writing utensil~~
  - 100% Silicone caulk (w/out mold inhibitors) 3 Tubes Caulk Gun
  - nuts + washers
  - Wire (galvanized) multiple gauges
  - bench vice
  - corrugated cardboard
  - spade bit or awl (for vertebrae)
  - hacksaw
  - Files
  - Galvanized All-Thread
  - drill bits + drill
  - bench vice
  - measuring devices
  - rollers
  - bubble soap + plastic bowl

June 24, 2020

The Moose Manual, Vol. 6 Notes

- Backbone rod: 1/3 diameter of smallest vertebra
  - ↳ use galvanized steel all-thread rod.
- Glue for pins
  - ↳ 5-minute epoxy gel
- fill holes w/ bonedust + glue to hide pins
- need a sharpie to mark bones
- Need plywood or particle board for stand
- No welding = need pipe
- Don't twist rods when bending
- glue in b/w vertebrae on rod + Sillcare → need specific brand to avoid unpleasant chemical reaction

Young Bones

- epiphyseal caps need to be reattached with epoxy & rubber bands
- dip soft/crumbly bones into 1/3 water, 2/3 white glue for 15 seconds (then hang to dry) to harden)
- feet require special attention to sort
- drill from both ends of bones & meet in the middle
  - ↳ use a spade bit to mark drill points on both sides
- Carpals attatched with hot glue, then drill and pin
- legs/ulna & radius may be unfused
  - ↳ if unfused, attatch w/ epoxy
- Glue pelvis together w/ epoxy
  - ↳ glue + drill tail (depending on size of bones)
- Use finishing nails in skull, and wire it shut

Steps of Articulation:

1.) Positioning
↳ collect photos of moose in various positions, then draw bones inside that shape (blueprint)

Note: Tentatively planning to articulate bones to match taxidermied calf in Building 10.

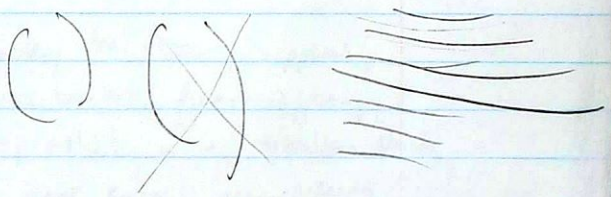
2.) Feet

3.) Legs + Knees

4.) Spine
+ backboards

5.) Stand

6.) Match ribs w/ size + order
↳ l.v.s. right different



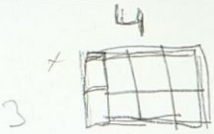
Questions/discussion:

- Stand
- Teeth
- Take apart rib cage w/ labels

Donations

Name	Item(s)
Lydia Adams + her father	12" 3/8" drill bit to remove marrow
Dakota Den Duyf ↳Student Life Dept.	fishing hooks to hang bones to dry Paint brushes to paint glue solution on bones
Mike, Lana, and Molly Mabbett	fishing ~~line~~ line ~~and~~, hooks, and 2 metal bone hangers (fish hangers, ~~paint~~ acrylic paint
Doug Thompsen & John Orlawski ↳EFL ↳Stain & lacquer (personal)	Workspace, tool support, supplies (gloves, buckets, fume hood, soap, water, mallet, wire, vibration stands, drop paper, knives, screwdrivers, drills + bits, hot glue + gun, wood, saws, caulk + guns, sandpaper, paper bags, ready-rod, nails, screws, metal file, etc.
Biology Dept. ↳Ken Otter	Funding for project
Northern Heart Design ↳ Thomas Torraville	Sign for display

$50 / in^2

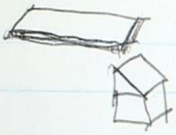


- $19 $250 for drill holes.

→ black w/ silver or gold engraving.

– silver w/ black

letter $.25 / letter
min $10



–

– $10

$15

Notes

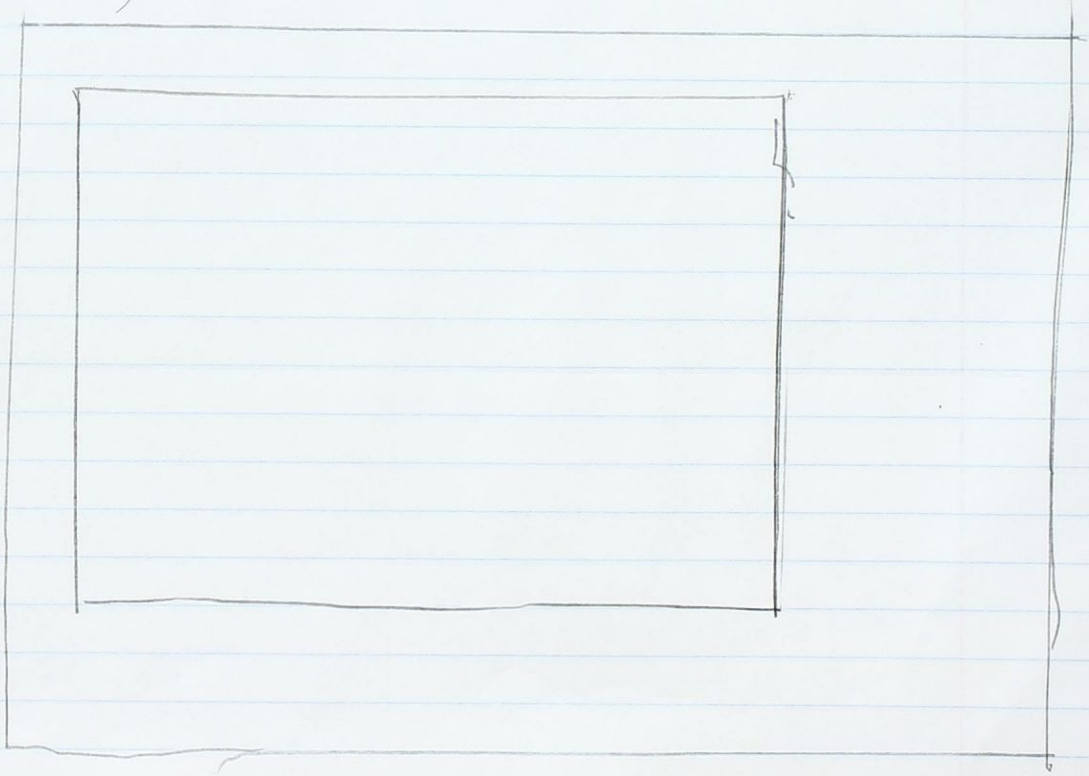
Engraving Options:

- Van Horlick's : info@vanhorlicks.com, 250-562-2320
  - ↳ signs:
    - material: $0.50 / in² (min $5)
    - engraving: $0.25 / letter (min $10)
    - graphics (QR code): $5.00

Free

- Northern Hart Designs: info @ northernhartdesigns.ca, 250-552-9281
  - ↳ prices not listed

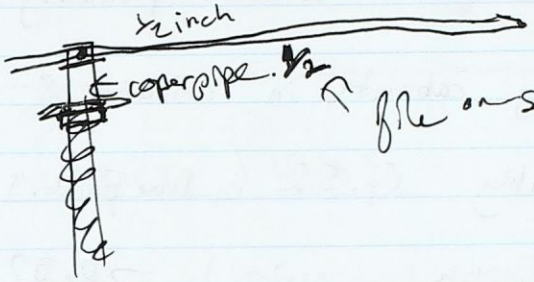
- ~~Metal signs~~ Vista Print
  - ↳ metal signs
    - ~ $20
  - ↳ consider: table top easel for changable display?



Meeting with Bill Lex → can ask for photos

- Home Depot
  ↳ connectors + ready-rod

- Stands



- fill brain cavity w/ Bondo (Canadian Tire)

- upright copper T at hip joint + add nails

- Salva to polish teeth made of epoxi-sculpt
  ↳ bubble solution

- AAA Supply in Calgary
  ↳ White Apoxie-sculp. → change
  ↳ Michaels? Check

- (2x4) 2 steps on rod to bend for spine

- wrist → small drill + finishing nails
  ↳ use toothpicks?

- silicone doesn't stick to

- high density styrofoam → will sand (blue) → ½ inch.
  ↳ petroleum will dissolve, use acrylic

- 40 vol peroxide → hair salons.

Building Plan: End Game

1.) Buy variety rubberbands pack + bubble solution
↳ fix up broken bones

2.) Go take photos of moose calf & take measurements
↳ note for rod bend + articulation positioning

3.) Measure display cabinets in building 8

4.) Pelvic assembly (p. 52 in Bone Builder's Notebook)

5.) Vertebrae assembly
↳ drill
↳ bend rod + attatch to sacrum
↳ give vertebrae to rod
↳ insert silicone cartilidge

→ p. 32 of Moose Manual

6.) Attatch ribs to vertebrae

7.) Attatch sternum to ribs + add "cartilage" on wires

8.) Build rear limbs (p. 52)

9.) ~~Front~~ Build front limbs (– scapula) (p. 52)

10.) Attatch rear limbs to pelvis & to base

11.) Attatch scapula to ribs

12.) Attatch front limbs to scapula & to base

13.) Assemble scull

14.) Attatch skull to mount + add supports

15.) Build + attatch plaque display

16.) Any last minute touch-ups.
↳ paint
↳ sanding
↳ finishing nails / extra glue.

Paper Plans

- Report (Professional report, expenditure, acknowledgements, etc.)

- Citations:
  ↳ Lee's 2 Books (Moose Building Manual & Bow Builders Notebook)
  ↳ Lee's website
  ↳

- Submit receipts with report

Clean-up

- Return Borrowed equipment

- sanitize work area

- send thank-you's

- [redacted]

Measurements Needed

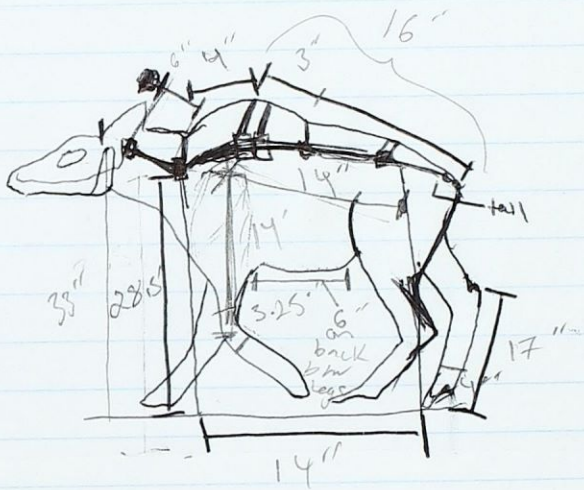
Display Case:

- Height: 48"
- Width: 45.5"
- Depth: 11"

| - Height between base & shelf: 19"

Calf:

Photos
- Profile
- Front
- back
- underneath



Distance b/w:
- scapula (outer) = 7.25
- front legs: 4.5