Team Meeting

Date: 06-07-12

Time: 6:30 PM CDT/7:30 PM EDT

Location: Google +

Facilitator: Scott

Note Taker: Tatinia

Attendees: Moneer, Natalie, Scott, Shanshan, Tatinia, Angele, Andrew, Nathan

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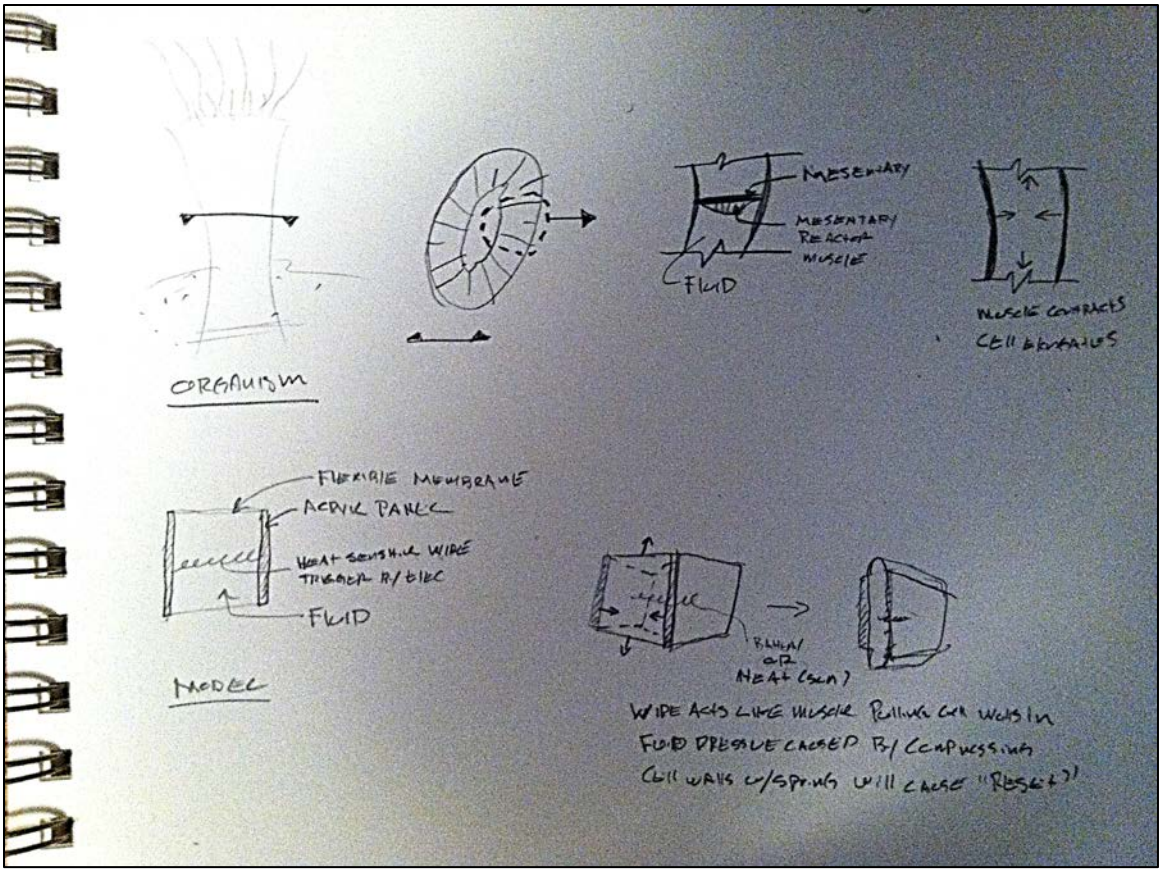
1. Preliminary Items
   - Nate started putting together the book today. He needs Coco to convert her sketches to jpg format and post in group blog.
   - Dale attempted to join in but experienced problems getting set up. Dale spoke with Scott via phone and will join in a future meeting when connection issues have been resolved. Dale reviewed minutes from the last meeting (06.06.2012). Team 11 is heading in the right direction and needs to focus on model exploration with provocative mechanisms and materials. Meeting minutes from tonight's meeting will be sent to Dale for further review.

2. Models
   - Scott: Posted the following model sketch and comment to Blackboard Blog before the meeting. The model sketch attached explores using a heat activated spring to act as the mesentary reactor muscle. The intent is to use thin acrylic panels to represent the inner and outer body walls. There would be a spring attached to each panel and then the panels would be wrapped with a flexible membrane filled with fluid. As the spring is heated up (by a battery to represent the electrical impulse sent from the tentacle or an ambient air temperature to illuminate out inside force). The spring will contract, pulling the two panels closer together. The membrane will allow the fluid to expand outward while building internal pressure. Once the spring cools or is removed from the power source the shape will reset.



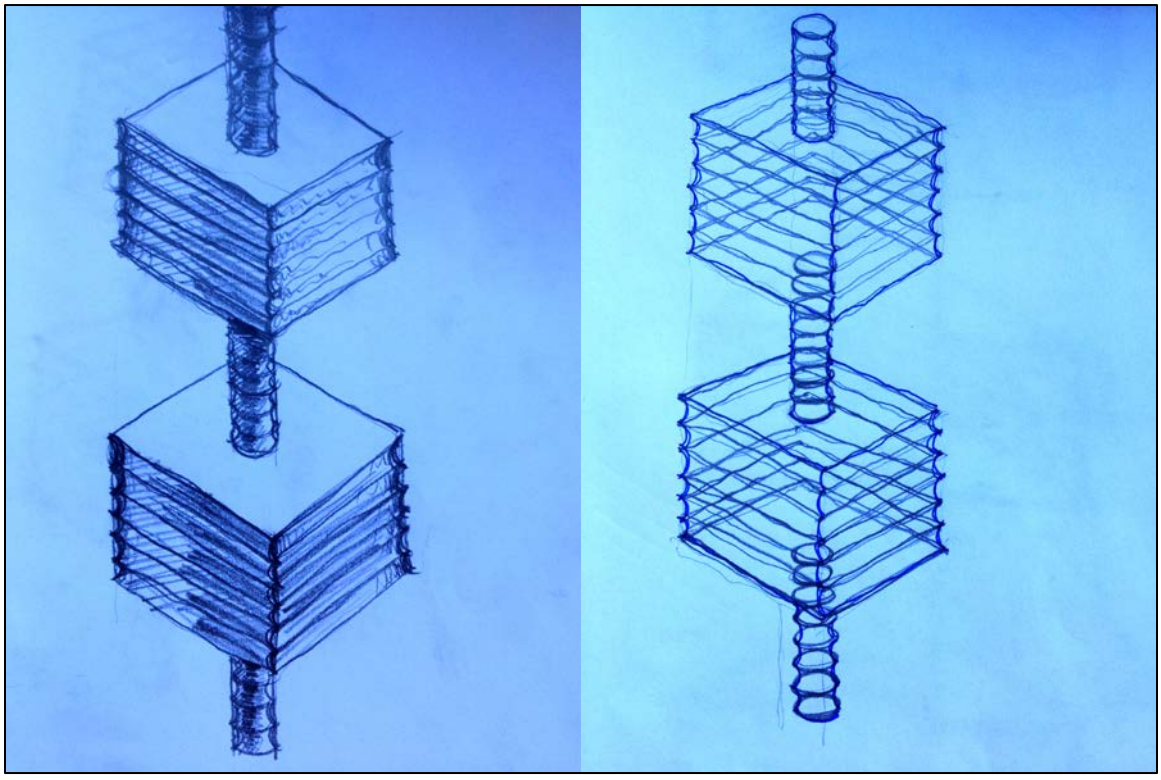
- Nate: Looking at camera shutter and how it creates larger and smaller diameter within the same circle. Possible side model idea. Can send sketches out later.

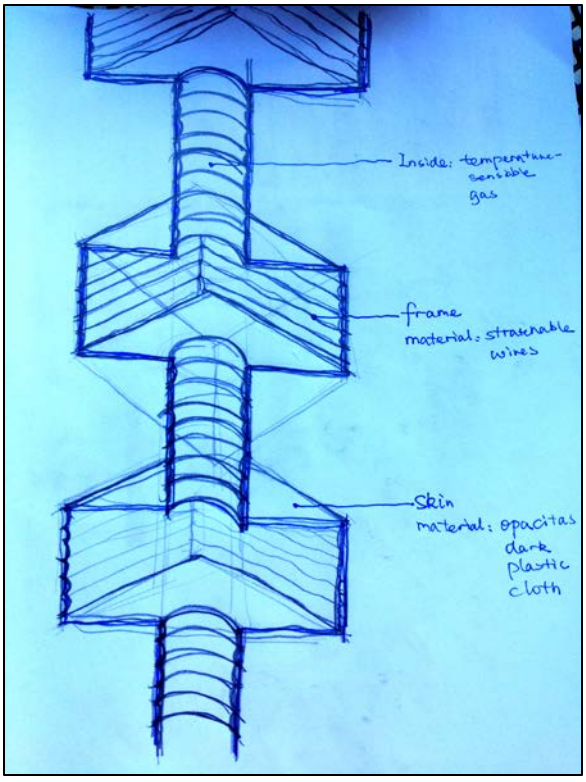

dreamstime.com

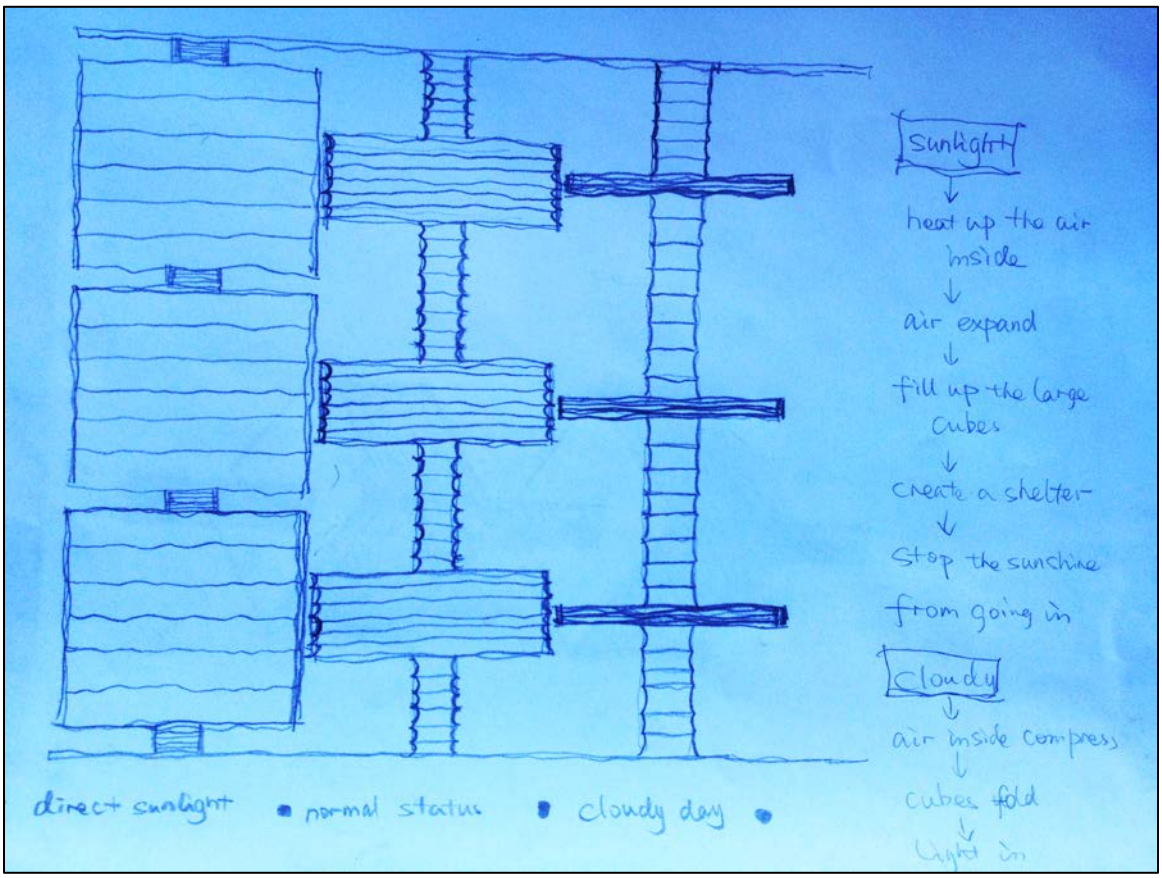
- Natalie and Moneer: Met today and talked about model ideas moving forward.

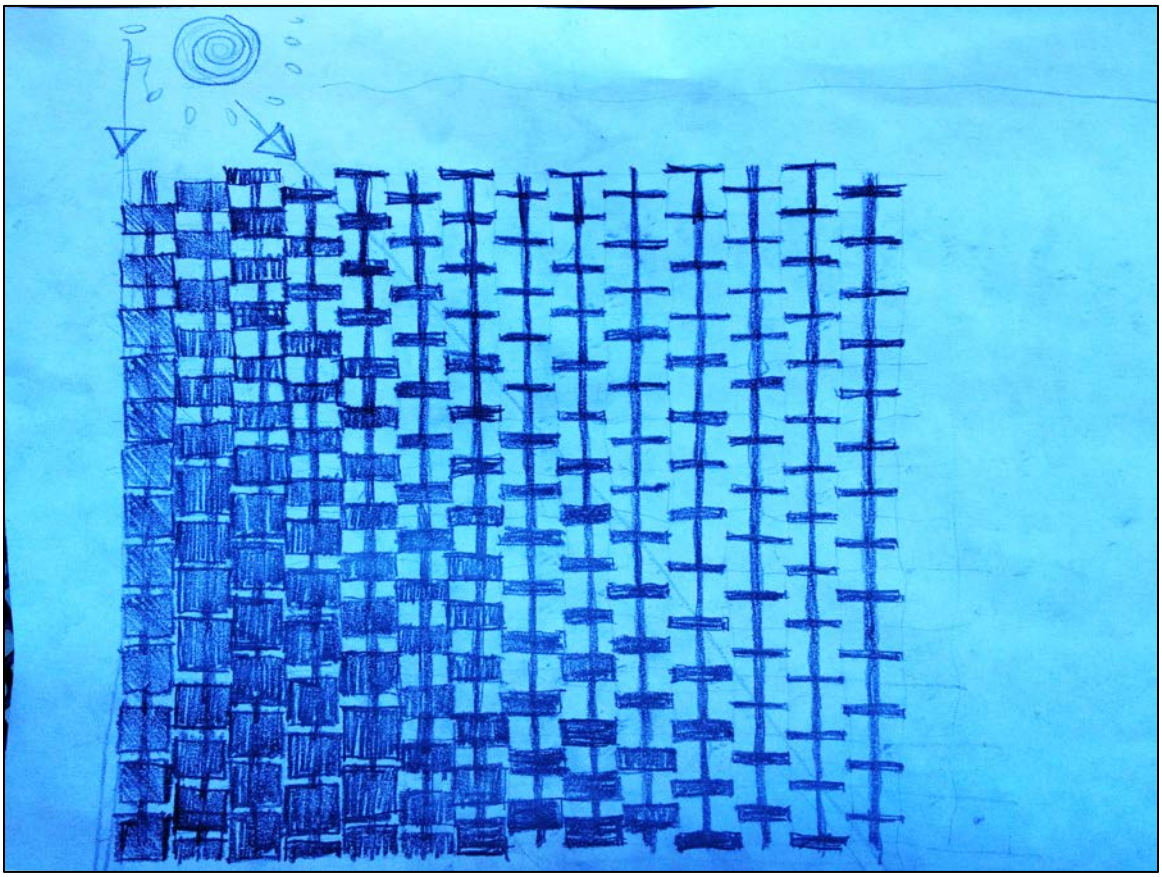
[Side Question: How many models does the Team want to proceed with? Group also needs to produce images/drawings/diagrams of the models. Currently model count is starting to creep up. Group to continue looking at options this evening and narrow down selection on which ones to pursue.]

- Coco: Sent the following model idea sketch. The model idea is based upon using tubes and cubes connected together and filled with temperature-sensitive air. When direct sunlight heats up the device, air expands and fills the cubes to shelter the sunshine. When light fades out, air compresses and the device folds up and lets faint light in. It can possibly be used as a second layer over transparent architecture skin later, to create shade when the sun is too fierce, and let light in when it fades out.




Inside: temperature-sensible gas
frame material: stretchable wires
Skin material: opacitas dark plastic cloth


direct sunlight
normal status
cloudy day
Sunlight
heat up the air inside
air expand
fill up the large cubes
create a shelter
stop the sunshine from going in
cloudy
air inside compress
cubes fold
Light in



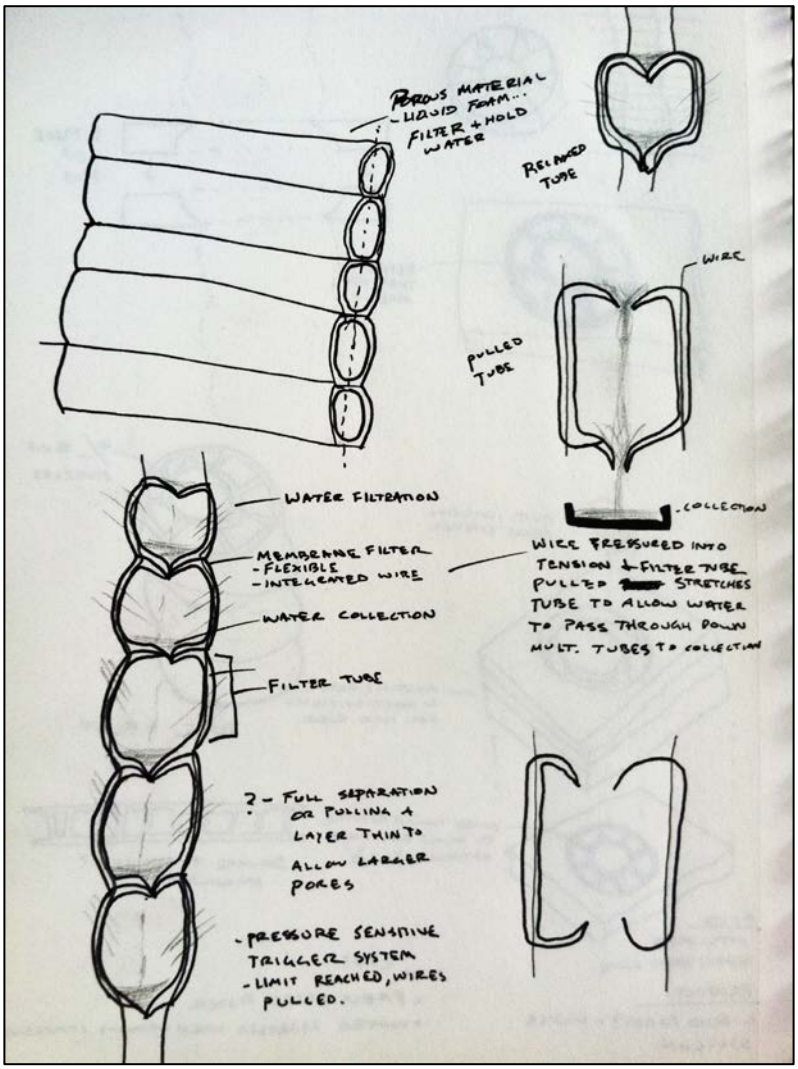
Team likes this model idea for further exploration. Discussion ensues. Goal is to start out with a small model that compresses. Experiment with the idea – small unit initially. Then perhaps expand to system application. What material would be suitable for the skin? Possibly paper. But the skin has to collapse. How to make this happen? Perhaps use a pleated material (reminiscent of the pleated threads used by the Tube Anemone). Could use thin acrylic for top & bottom and then wrap material around it. Natalie has an idea to possibly use plastic rubber – super-elastic plastic silicone sheet. She sent the following link: https://www.inventables.com/categories/hardware/plastic-rubber:

"This plastic is incredibly soft and stretches to about eight times its original size. It is a very durable material that stretches easily and can be injection molded to any shape….There are two types of thermoplastics used as substitutes for rubber. These synthetic rubbers are what you are probably familiar with as the "gel" material used in a lot of computer mouse pads, seat cushions, and bicycle seats. These "gels" are typically made using materials based on Kraton or Septon…. Within the basic formulations, the

stretchiness, softness, squishiness and strength can be customized for the application you need…"

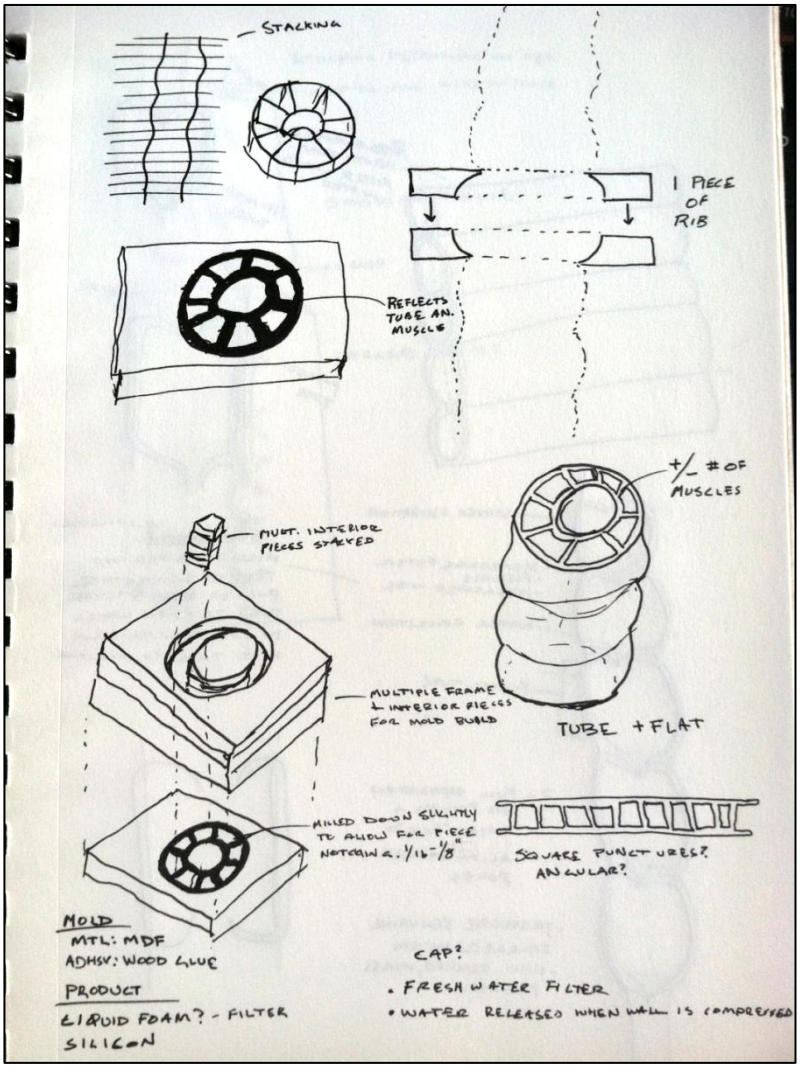
So how can this material be attached to the framework? Possibly use an outer and inner set of rings. Enclose the sheet on one side to seal it. Can this work? Yes with adhesive. Then can be refined later. Can use lamp to cause air to expand and contract. Or possibly boiling water. Should a small framework be built so it will be suspended? First have to figure out the size of the unit and how much it will stretch. Should be self-supporting – no framework needed. Strong idea. Team wants to pursue exploring this model.

- Natalie: Has two model ideas. Which one does the team want to explore? The "Tube/Muscle Form" or the "Foam" one? Some of Natalie's sketches from Wednesday night's meeting minutes have been included for reference.



The “Foam” one deals with milling out C-shapes that combine in a mold and are connected with a wire so that when the wire is pulled it causes a reaction in the material, causing the C-shapes to separate. Could possibly use a rubber gasket to create a seal to keep the water from seeping through when the wire is not pulled taut. Shapes will be made out of liquid foam. It is porous and retains the shape created.

The second idea is the “Tube/Muscle Form”.



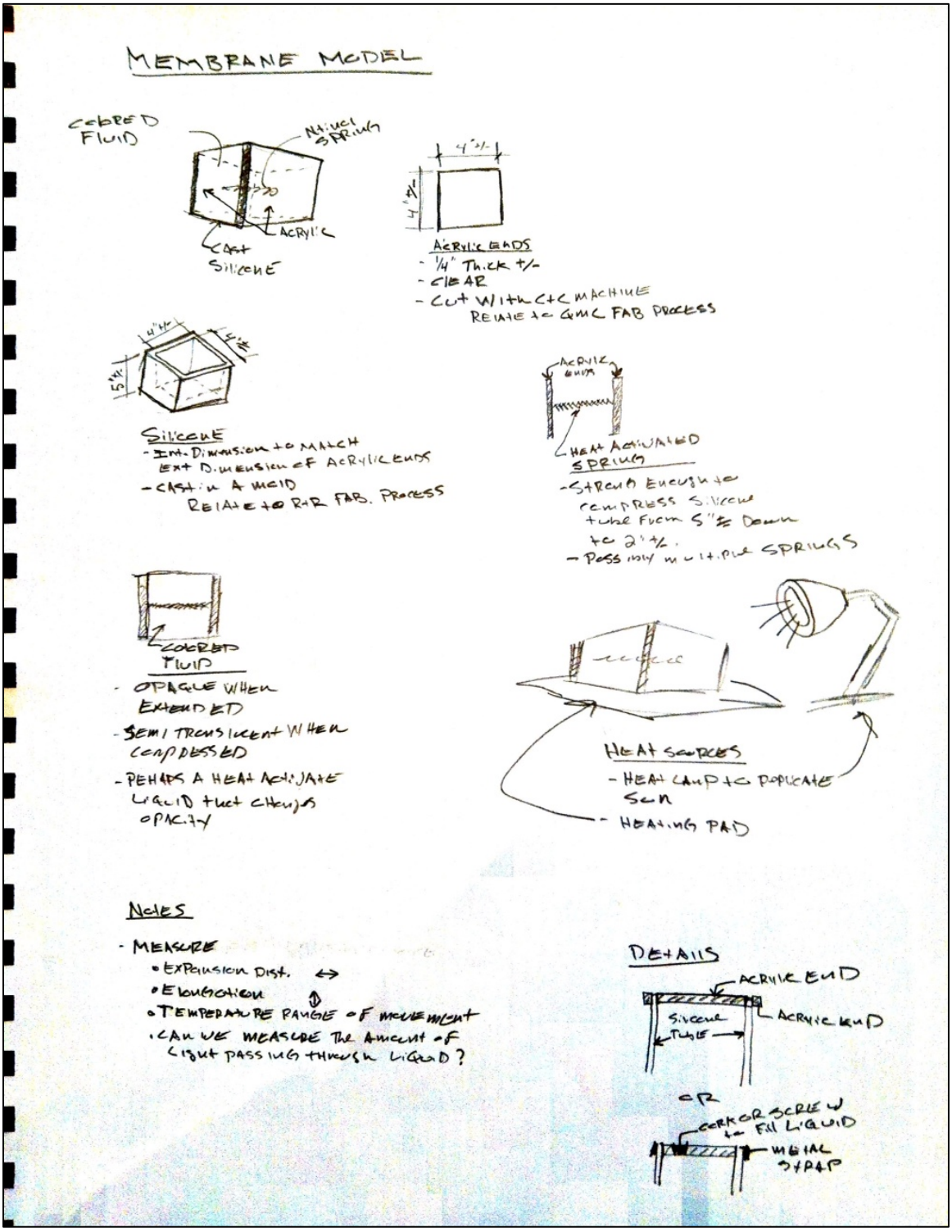
This model explores tube compression by using a double-membrane made of silicone. The goal is to look at how the muscle membrane reacts. Exercises include varying the spacing of the stacked units and variation of the shape – circular, square and rectangular. Could this be combined with fluid & heat activated wire? Perhaps hot water heats the water and provides movement. To illustrate model working video could zoom

in and show the wall expanding and contracting. Natalie can use multiple molds to see what form works best for the concept. Angele can play around with exploring the model's opacity as it contracts, just like the tube anemone's coloration varies from opaque to translucent when it is undergoing stretching. Scott is thinking perhaps a liquid that becomes more transparent as its density fluxuates would work. Scott is to sketch and figure out details of the model. Study the muscle and opacity of the liquid in between.

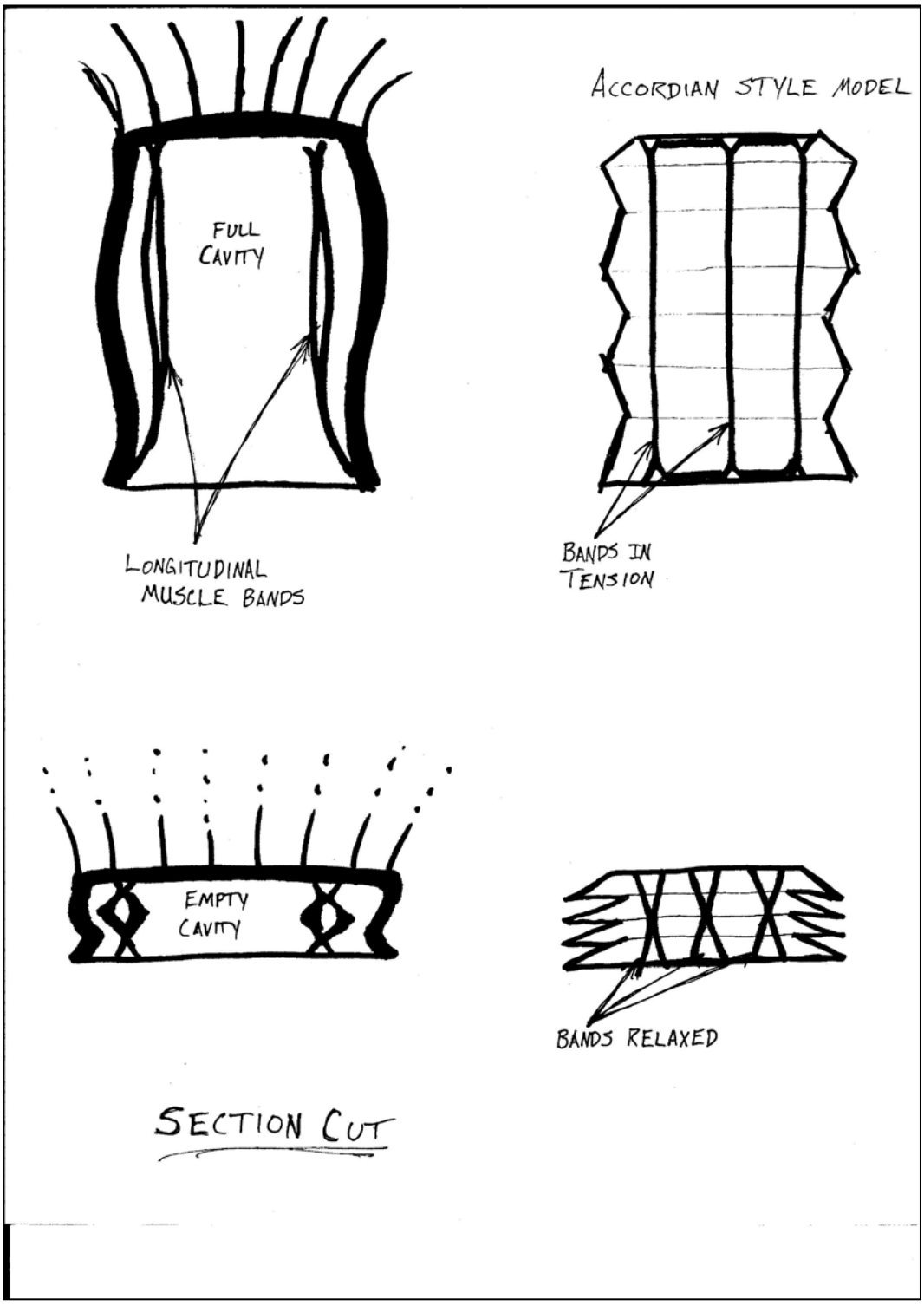
[Side Note: Discussion of size ensues – how big to make the model? Keep small and flexible. Team can always make larger, more complex model later. Goal is to get a functional unit created. Natalie will look at what materials are needed. Team will split the cost for the materials.]

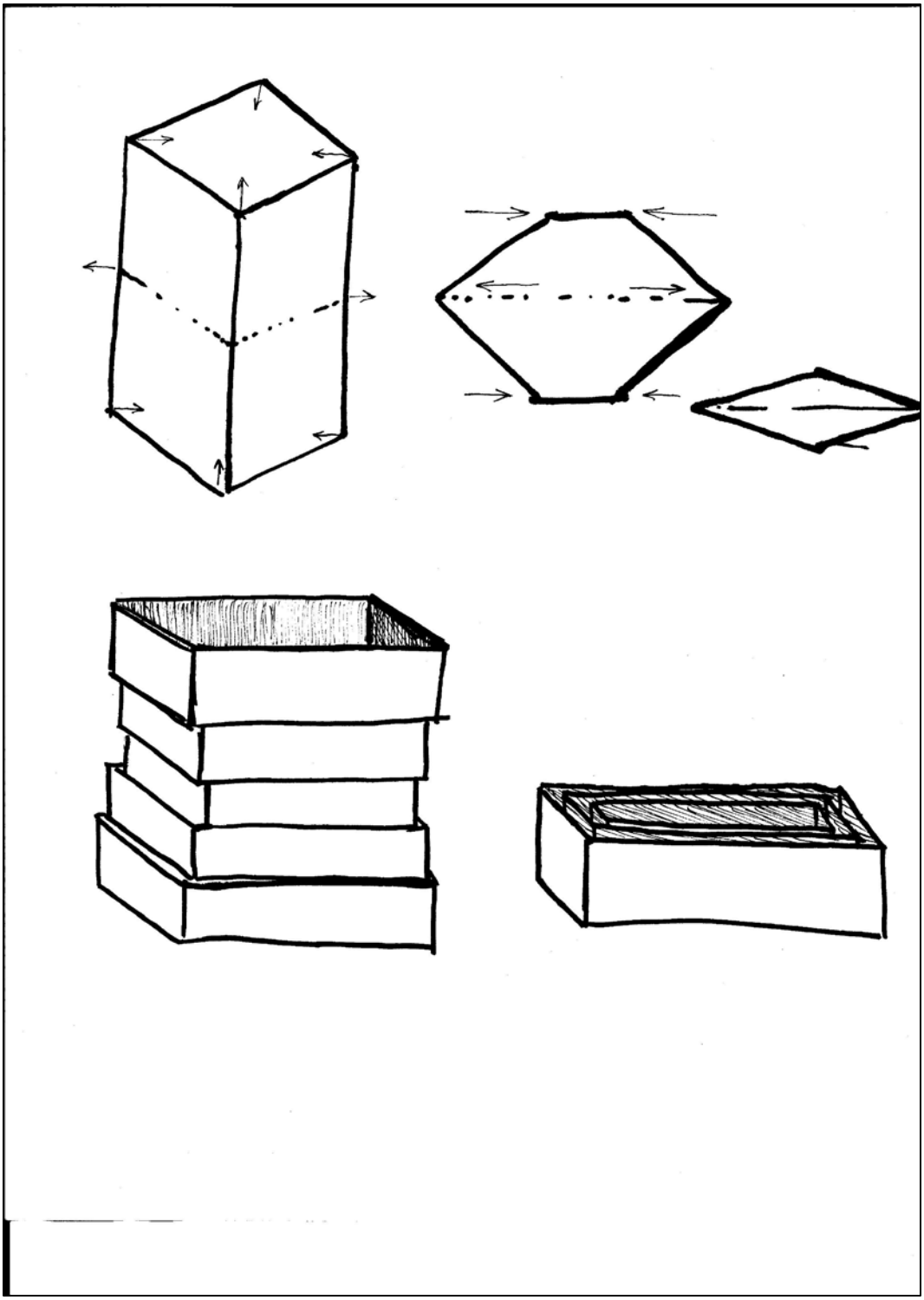
Possibly use pourable silicone membrane for muscle walls and stack. See if expansion occurs radially also. Scott is to work on additional sketches tonight and get them to Natalie tomorrow (Friday). It may be better to use a 3"x4" tube instead of a 4"x4" square so that opacity variations will be more readily discernible. Natalie can also experiment with the thickness of the walls. The goal is to show as much variation as possible so it is obvious to the observer. The sealant may be a problem. Perhaps using a rubber gasket may work. But another option is to create a plexiglass lip and seal it around the outside with a hose clamp.

[Update: Scott has provided the following sketches since Thursday night's meeting]



- Andrew: Posted model concepts on Blackboard Blog. Working on the mechanisms. Looking at making the models move with something other than heat:

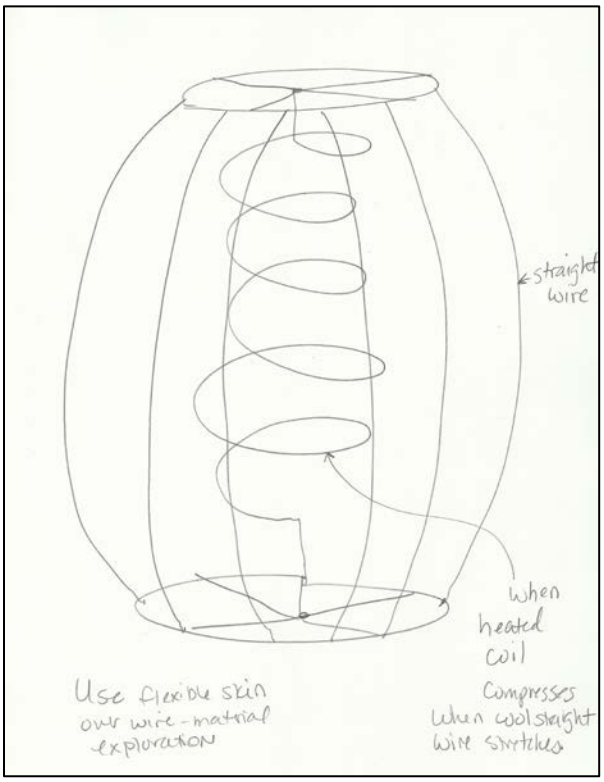




The accordion model uses thin wire and tensile fabric. Andrew can further develop mechanism of model over weekend and then present findings to group if it works okay. Goal is to keep the model simple. The model could be activated by wire. Andrew's concept is similar to Coco's except hers is activated by hot air. Tension and compression

would cause it to reset. A possible idea is to put in pool of water and see if strong current could trigger the model mechanism. Andrew and Coco will work together to come up with a model that combines both aspects. Scott asks if it would be possible to use horizontal action to cause vertical movement? Possibly. Model exploration will be documented for use later on down the line. Moneer will help also.

- Tatinia: Has an idea for a self-sustaining system that maintains an equilibrium by means of tension and compression. Basically the coil in the center of the model would compress when heated, pulling the outer layer of wires in tension. When the center wire is not heated, the force from the wires that form the outer shell would cause them to straighten out, pulling the center wire up and elongating the shell – resetting the model. This concept is similar to the longitudinal muscles of the tube anemone which are key to its contraction and expansion. The membrane used to wrap the outer skeleton could be composed of a material that is flexible and that exhibits variations in color and/or transparency/opacity. Since this model is so closely related to some of the other models that are already in the planning process it will not be used at this time.



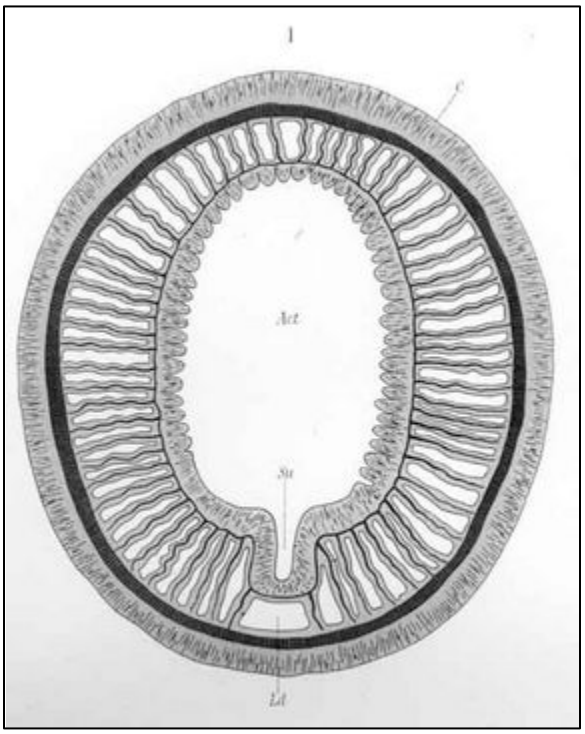
- Angele: Also had a model idea that was similar to the models already being developed. Model concept will be set aside for the time being to focus Team efforts on improving

the quality of a limited number of models and drawings rather than providing a larger quantity of materials.

[Update: Angele has provided the following to help with diagrams and sketches.]

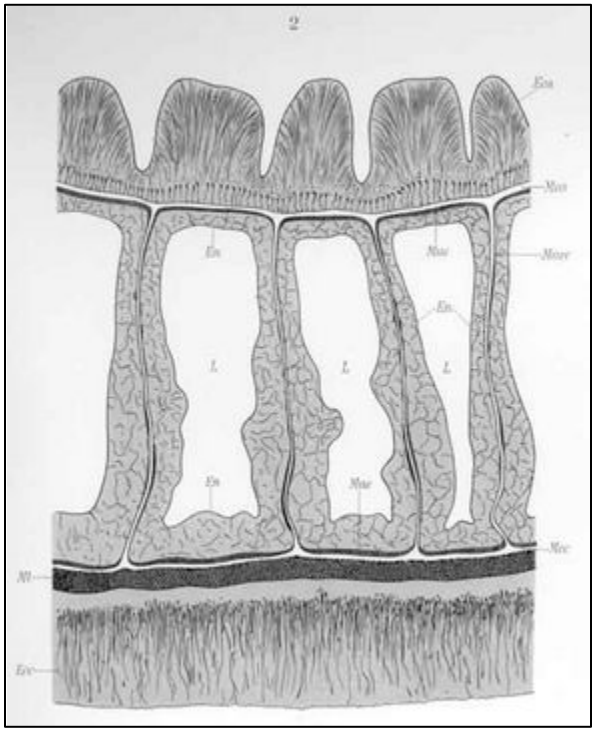
Muscle Structure:
The muscles of the body-wall consist of a heavy layer of powerful longitudinal muscles which decreases slightly in thick ness toward the aboral end. These are the chief muscles of the body, circular muscles being absent, and tentacles, disc and cesophagus possessing only a slight muscular development.
Inrolling of the margins and the closure of openings by contact of the inrolled margins is the result of the elasticity of the body-wall. This elasticity is greater in the inner portions than the outer portions. The mesogloea plays the most important part in this elastic contraction.

Description



Name: Cerianthus Lloydi
Reference: Roule L., 1905, Plate X , fig. 1
View: Cross section
Caption: "Fig. 1. Coupe transversale d'un individu, passant par l'actinopharynx, orientée de manière àplacer ventralement la loge directrice et le sulcus. Grossissement: 25/1." (Key to drawing: *Act*, Actinopharynx; *C*, Colonne; *Ld*, Loge directrice; *Su*, Sulcus.)

Description



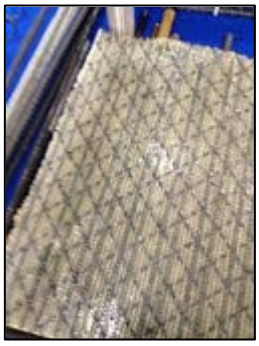
Name: Cerianthus Lloydi
Reference: Roule L., 1905, Plate X , fig. 2
View: Cross section
Caption: "Fig. 2. Portion grossie de la fig. 1, prise dans les régions latérales, et montrant quartre cloisons. Gorssissement: 100/1." (Key to drawing: *Eca*, Ectoderme actinopharyngien; *Ecc*, Ectoderme de la colonne; *En*, Endoderme; *L*, Loge; *Mea*, Mésoglée actinopharyngienne; *Mec*, Mésoglée de la colonne; *Ml*, Musculature longitudinale de la colonne; *Mue*, Musculature endodermique (en noir); *Muec*, Musculature endodermique des cloisons (en noir).)

3. Book Documentation
    - Contents to include some background research, plenty of diagrams, and model documentation, as well as information from tours, etc.
    - Discussion over whether binding should be permanent or is this more of a “living document”? Natalie to check on further requirements for book and let Team know.
    - Scott will create a “story board” and send to Nate and rest of Team this weekend for feedback.
    - Nate will develop book layout/format this weekend and incorporate Scott’s story board.
    - Tatinia to develop hypothesis, clear statement of direction and start organizing research and verbiage for book.

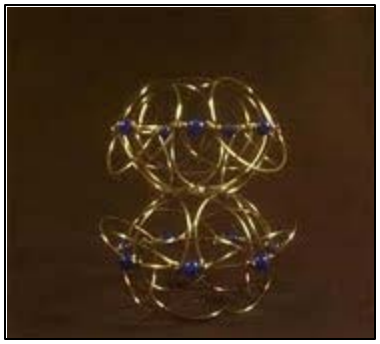
4. Wrap-Up
    - Nathan will be available Friday until 9 p.m. Eastern.
    - Scott will story board format for book and send to team. If everyone signs off can use as a format to start developing wording.
    - Angele will meet with Natalie to help complete model. Try to condense time on campus as much as possible.
    - Moneer will work with Coco and Andrew to help with models & send sketches.

[Update: Coco has discovered that the Civil Engineering department of LTU is currently running a series of tests on carbon fiber. This material can be used in bridge and building structure. It can also be used to help repair/reduce cracking in concrete. It is lighter and 10 times stronger than steel.



Andrew has sent the following pictures about an interesting wire ball that may possibly be incorporated into the model frame. There are a lot of joints so there is concern over dealing with a lot of friction in the mechanics of the model.


Coco and Andrew have agreed on stretchable plastic as the skin. The frame may possibly be wires and carbon fibers. Reducing friction may still be a problem but they will experiment to try and mitigate that potential.]

- Nate will do video. Installing Adobe Premiere now.
- Tatinia to do meeting minutes for team & send copy to Dale. Will help w/ wording for book & wherever needed.
- Angele can also help w/ book as needed.

5. Next Meeting: Monday 6:30 CDT/7:30 EDT.