MATERIAL ESSENCE
Studies in Tectonic Layering
a botanical research center

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MIT Level 2 studio Fall 2003
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Assignment 4: "Skin and Bones": Structural Form and Material Integration.

This assignment is intended to focus upon the development of both the material language and technological parameters of the project that further define the nature of the architecture. The intention is to further develop your work through investigating the:

> The "Language" of the form: the expression of the elements
> The technological framework of the design, especially the 'craft of the making'
> The typology of the structure and enclosure
> The materiality of the project and the means of construction / assembly

By focusing upon the structure and enclosure- the **skin and bones** of the project, you should develop a greater sense of the qualities of space and structure, and of the functionality, performance and visual nature of the skin. As always, while being in the realm of the technical, such issues are design issues and are critical to the realization of the architectural idea or part.

Bones: Structural Study

While the structure obviously performs the means to support space, it is primarily the means to create and ordering of space and to determine the qualities and perceptive aspects of space. On the basis that engineering can solve any problem (?), you have to start from the basis of evolving a structure that speaks to the **idea** of the project and the spatial strategies that you have developed to date. In evolving the appropriate structural typology you should be integrating an intuition about the form with an instinct about its performance. Questions to ask are:

> What is the nature of the system in a broad sense? Long span, short span, dense, minimal. regular/ orthogonal / irregular, lattice, grid, shell, tree, etc
> What is it made of? wood, steel, concrete, monocoque, - or a combination thereof.
> How does it behave mechanically? Wind forces, lateral stiffness, distribution of forces, dynamic loads etc
> What is it supporting- glass, panels, fabric etc

- Firstly, you may need to develop the plan of your project in order to define the spatial form and configuration.

- Develop the structural integration through drawings using overlays in both plan and section – define the nature of the system, it's profile and the elements: column, wall and roof beam, truss, ties and so forth.

- Final Product : Develop and model at 1/8th scale, a prototypical part of the project to show the resultant structural form (extent to be defined)

Skin: Enclosure Study

The skin is conceptually and technically integrated with the structure of the project – especially in support of the enclosure to resist wind forces. However, as our earlier studies in the study reveal, there are other criteria impacting the development of the skin, especially when seen as a boundary condition and layer related to environmental control. Criteria to consider:

> Environmental performance: control of air, light, heat, shade, color, transparency, opaqueness, layering, etc
> Visual Performance: image and quality, night and day, fixed or flexible, transparency though opacity
> Material and Assembly: how is it made – what is the form, what is it made of, how is it made and produced

- Firstly, develop diagrams in section to explore the functionality of the skin to determine it's parameters of performance. What does it need to do? How can it do it? How is it affected by the climate?
- Secondly develop sketches that explore the materiality of the skin in both section and elevation- what is the material, how does the material go together / be constructed? In this stage you should also revisit the ideas in the first investigation of the studio- working with glass and consider integrating with that study
- Final Product: model at ½" scale of a prototypical part of the skin (extent to be defined)

Schedule:

F 11.14   Introduction**:** proposal development
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T 11.18   Desk crits and mid project comments

TH 11.20   2PM Peter del Tredici = desk crits

F 11.21   Desk crits
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T 11.25   Pin-up and discussion