ARCH 1110-FUNDAMENTALS OF REPRESENTATION AND DESIGN

Fall 2011

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Course Description

The freshman foundation studio introduces students to architectural representation as a form of documentation, experimentation, and communication, through a series of exercises in orthographic, axonometric, and perspectival projection as well as physical modeling.

Course Goals & Objectives:

*to introduce students to architectural representation as a form of documentation, experimentation, and communication

*to develop orthographic, axonometric, and perspective projection skills

* to develop physical modeling skills

*to introduce students to basic digital media

* to develop an iterative design methodology

Course Policies

Attendance - Class will meet two times a week, on M/W, or Tu/F. Class attendance and completion of all assignments are mandatory. Four absences will constitute an automatic failure, three will result in a full letter grade penalty for the course, and two may result in a partial grade deduction.

Grading - In accordance with Northeastern School of Architecture grading policy, grades will be distributed according to the following scale:

A superb quality work.
The student: *demonstrates one of the best performances on projects the instructor has seen at Northeastern or any other accredited school of Architecture *demonstrates true intellectual passion, curiosity, initiative, and exploration *consistently brings strong ideas to fruition with a high level of craft *conveys a strong affinity for design culture

A- high quality work.
The student: *demonstrates one of the best performances on projects within the studio *demonstrates true intellectual curiosity, initiative, and exploration *consistently brings ideas to fruition with a high level of craft *conveys strong interest in design culture

B+ good quality work.
The student: *demonstrates a strong performance on projects within the studio *consistently brings strong ideas to fruition with a good level of craft *conveys broad interest in design culture
B above average work.
The student: *demonstrates good initiative and above average craft *conveys interest in design culture

B- average work.
The student: *demonstrates average effort and craft and initiative *meets attendance requirements

C+ below average work.
The student: *demonstrates below average effort and craft and initiative *meets attendance requirements

C well below average work.
The student: *demonstrates well below average effort and craft and initiative *engages in excuse-making, tardiness, and absence

C- minimal work.
The student: *demonstrates minimal effort and craft and initiative *engages in chronic excuse-making, tardiness, and absence

D+, D, D- marginally acceptable work.
The student: *demonstrates unacceptable effort and craft and initiative *engages in chronic excuse-making, tardiness, and absence

Assignment grade breakdown is as follows:

Project 1 – Notation/Representation/Projection: 20%
Project 2 – Museum Plaza: 25%
Project 3 – Museum Stair: 35%
Portfolio: 10%
Class participation: 10%

Schedule

Project 1 - Notation/Representation/Projection
Assigned – 9.08/9.09 Due/Presented: 10.06/10.07

Project 2 - Museum Plaza
Assigned – 10.10/10.11 Due/Presented: 11.03/11.04

Project 3-Museum Stair
Assigned – 11.07/11.08 Due: 28.11/29.11 Presented: 01.12/02.12

Portfolio
Due: To be determined

Additional Information

RESOURCES - The student is responsible for completing each assignment in a timely manner and is also responsible for the output of the work and the costs involved. The instructors rely on email as a form of communication with the class. Important information about class events, assignment hand-ins, and general queries will be handled in this manner. As such, the student is required to check their email accounts at least once a day for such information.

USE OF ONLINE RESOURCES - All research done for the course should be through the various libraries that Boston has to offer. Any research done on the internet—unless explicitly encouraged by the instructor—will not be accepted in this course. Also, Instant Messaging (IM) during class time will not be tolerated, nor will viewing any kind of media that falls outside the content of the class. The time spent in class is intensive and should be spent on class assignments. If the instructor observes any IM sessions, or the like, in class, the student will initially be warned, any further reprimand will result in a grade deduction for that
particular assignment. In order to facilitate this, each session will be instructed to disable their wireless connection to the NUWave system 15 minutes into class, or after an introductory lecture.

SOFTWARE* - Students are responsible for purchasing the Adobe Creative Suite, Parallels or Bootcamp (if using a MAC), Windows 7 and AutoCAD 2011. John S. Ho, the freshman studio teaching assistant, will be holding weekly workshops introducing AutoCAD, Adobe Photoshop and Adobe Illustrator on Monday and Tuesday evenings. You are encouraged to attend on the day of your studio unless there extenuating circumstances. More information on these sessions will be posted in studio.

DIGITAL STORAGE - Any information that you create on the computer is susceptible to erasure. It is therefore in the students best interest to invest in at least two methods of backup. Northeastern’s MyFiles offers 2 GB for this use. In addition, the purchase of a USB flash drive for the storage of digital files, and transfer to the printers is recommended. Image files can be large, so the more storage space on the drive, the better. It is also advisable to keep a backup copy of your files on a CD or DVD. Loss of information relating to a project due to lack of backup will not be considered an acceptable excuse.

PRINTING - For each assignment, you will be required to submit both paper and digital files. This course relies on a number of output options for final hand-in, but also as an ongoing requirement during the assignments. The student is responsible for the printing of your work and the costs involved. Small inkjet printers are a good option for day-to-day prints. Sharing the cost of a printer with fellow classmates can be a cost-effective solution to output. There is an 11 x 17 color laser in the Ruggles Studio. You may use it on a first come, first serve basis. See the instructions here for printing information. Plotting for final presentations is highly recommended.

File Naming - You will be required to submit files along with prints for each assignment. These files should be named as follows: assignment number-lastname.filetype (for example: 01-yourname.pdf). Files named incorrectly will not be accepted.

Academic Honesty - Northeastern University is committed to the principles of intellectual honesty and integrity. All members of the Northeastern community are expected to maintain complete honesty in all academic work, presenting only that which is their own work in tests and assignments. If you have any questions regarding proper attribution of the work of others, contact your professor prior to submitting work for evaluation.

Recommended Reading:


THE MOVEMENT-IMAGE

The Carpenter Center for the Visual Arts at Harvard: a late realization of the modernist dream of movement in continuity, or a new kind of movement? Thirty years before, Le Corbusier had written: "A stair separates...a ramp connects." At the Carpenter Center, the ramp traces the mobile section drawn by the observer in motion. Its path moves the spectator through the building, opens interior up to exterior, and connects the building to the life of the campus. The visitor is drawn into the structure on the oblique, lifted up assertively from the ground plane, and allowed to view the campus before being drawn inside. The line does not go from one point to another, but runs between points...the line has become the diagonal. In this movement, two conventional expectations are contravened. The first is the building's frontality, the polite face maintained in every other building on the Harvard campus. Instead of producing a facade that separates itself from the surroundings, Le Corbusier brings the negative space of the context into the spatial force-field of his own building. The second is the possibility of entering the building at all. The ramp does so much penetrate the building, as slip between, making visible the openness of the structure. You do not enter the Carpenter Center so much as pass through it. It is possible to enter at the landing of the third floor, where the ramp touches, but even here, entry...
is delayed. Inside the door the first sensation is of internal transparencies. You look from inside through outside to inside again. Big chunks of exterior space seem to be lodged inside the building, which further delays the sense of having entered. This effect is present throughout the Carpenter Center. One of the building's most striking passages is the long interior window from the first floor lobby that looks down into the auditorium, connecting that usually dark space directly to the exterior. Transparency codes all the public spaces of the building. The building is a shell-like space, lightly protected without but radically opened within, not penetrated at its periphery, but unfolded from inside.4

The ramp, which at first appears to be a device limited to the entry sequence in fact conditions the entire spatial organization. Robert Slutzky has noted that, typical of Le Corbusier's late work, the ramp allows the observer to enter the building as the eye enters a painting, at the center of its visual field, as opposed to the hierarchical stacking of a classical facade.5 John Hejduk extends this, noting the importance of the diagonal in the Carpenter Center: "The ramp is a three-dimensional torque... Like a bicycle pedal, when pressure is brought down upon the terminal ends, the whole building starts to revolve and spin." Yet this is not a simple dialectic of movement and stasis. What is astonishing about the Carpenter Center is the almost total absence of fixed points of reference. To say that an object is destabilized implies a distortion from a prior stable state; such a prior condition is difficult to identify at the Carpenter Center. If the ramp, for example, is the most obvious measure of movement, it is equally important to note that the entire ground plane swells downward as the ramp moves up in space. As you move toward the center of the site, the ground drops away, front and back. Just as there is no facade as a stable vertical datum against which horizontal movement is registered, there is no fixed ground plane as horizontal datum. This is evident in even the detail of the ramp itself, which slopes asymmetrically in cross section to accommodate a drainage channel.

Hejduk's analysis delves deeply into the orders of the building, showing how even the column grid participates in the mobile dynamic. His highly metaphorical yet exacting formal reading signals the presence of the 'ghosts' of cubism and neo-plasticism: Juan Cris, Piet Mondrian, "... all the known protagonists and ancestral impregnators." But he begins with a cinematic reference: "... the eye is like a camera; the moment the same image is clicked twice and interposed on the same frame an interesting affect can be obtained although in the process the initial form becomes blurred and might be irrevocably lost." There is a clear parallel here with film maker Sergei Eisenstein's definition of montage: "When the tension within a movie frame reaches an climax and cannot increase any further, then the frame explodes, fragmenting itself into two pieces of montage." Montage, by Eisenstein's definition, is not so much a synthetic mounting of one image on top of another, as it is an analytic that releases a multiplicity of dimensions and simultaneous meanings from a given figure. Hence, a fluidity of form: "At the basis of the composition of the architectural ensemble... lies that same unique dance which is the basis of the creation of works of music, painting and film montage."6

Eisenstein has elsewhere developed an even more exact parallel between the sequential movement of the observer in architectural space and cinematic montage. When speaking about cinema, he says, "the word path is not used by chance".7 The mobile camera, and the virtual movements suggested by
montage, condense and extend the movements of the architectural observer. It is not surprising that Eisenstein’s model—Auguste Choisy’s analysis of the spatial sequences of the acropolis of Athens—is a point of reference shared also by Le Corbusier. Eisenstein writes:

Painting has remained incapable of fixing the total representation of a phenomenon in its full visual multi-dimensionality. Only the film camera has solved the problem of doing this on a flat surface, but its undoubted ancestor in this capability is—architecture..."

Le Corbusier for his part had written in 1934: “Arab architecture has much to teach us. It is appreciated while on the move, with one’s feet, it is while walking, moving from one place to another, that one sees how the arrangements of the architecture develop.” Choisy script the movement of the observer through the spaces of the Acropolis, charting the parallax effects of the spectator in motion, and the unfolding of space in time. Here it might also be noted that simultaneity in architecture, as in film, consists not only in the superposition of views, but in the recall and comparison of the parts experienced along the way. The subject assembles a whole out of discontinuous fragments of experience. Eisenstein thus re-reads Choisy’s description of the Acropolis as a shot by shot montage sequence composed by the passage of the viewer through the monumental assemblage. Unlike Dziga Vertov’s “creative geography” which consists in assembling new wholes out of disparate parts, the idea of montage developed by Eisenstein has to do with setting in motion a hidden complexity within a given architectural sequence. While Vertov emphasizes the mobile camera, Eisenstein constructs movement through montage. This is a capacity specific to cinema, but an effect available in architecture: “Cinematic montage is, too, a means to ‘link’ in one point—the screen—various elements (fragments) of a phenomenon filmed in diverse dimensions, from diverse points of view and sides.”

Le Corbusier returns to the idea of movement again in his late work, but not as a simple repetition of his earlier work of the 1920s. In the later work, movement goes beyond the parallax views of the promenade architectural or cubist-inspired simultaneity. Movement is at once more local, atomized—and larger, rolling off the curves and ruled surfaces. Instead of Juan Gris, a more significant point of reference would be Etienne-Jules Marey, whose experiments with chronophotography anticipated aspects of the cinema. Marey worked with fixed and regular sections, not in an effort to freeze time but to make visible (and measurable) the invisible interval of motion, to recuperate movement through division and transduction. Gilles Deleuze in Cinema I: The Movement-Image, has similarly described the functioning of the movement-image in cinema. Beginning with Henri Bergson’s theses on duration, he notes that movement cannot be reconstituted by the simple addition of “immobile sections” (cuts) according to an abstract idea of succession (of time as mechanical and homogeneous). To do so is to miss the movement in two ways:

On the one hand you can bring two instants or positions together to infinity, but movement will always occur in the interval between the two, in other words behind your back. On the other hand, however much you divide and subdivide time, movement will always occur in a concrete duration (duration); thus each movement will have its own qualitative duration.”
Deleuze qualifies his analysis with a second concept, which concerns the nature of movement as it unfolds in time. The pre-modern world conceived movement as a regulated transition from one ideal form to another, an order of “privileged instants.” With the modern scientific revolution (Descartes, Newton, and Leibniz) the “mechanical succession of instants” replaced the “dialectical order of poses.” This mechanical succession of instants produces what Deleuze calls the “any-instant-whatever.” “The any-instant-whatever is the instant equidistant from another. We can therefore define cinema as the system which reproduces movement by relating it to the any-instant-whatever.” An architectural reference is suggested here as well in Deleuze’s substitution of “sections” for “poses.” Movement, Deleuze notes, is still recomposed, but “it was no longer recomposed from formal transcendental elements (poses), but from immanent material elements (sections).” The “any-instant-whatever” does not imply a flattening or homogenizing of experience but rather maintains the possibility of producing the extraordinary out of the ordinary. In architecture, as in cinema, “the any-instant-whatever can be regular or singular, ordinary or remarkable.” The indiscernibility of the material itself is registered in the infinitesimal interval of differential calculus.

Film is here linked unambiguously with mathematics: differential and integral calculus function with sections brought infinitely close together, Pynchon’s pornographies of flight: “At approaching zero, eternally approaching, the slices of time growing thinner and thinner, a succession of rooms each with walls more silver, transparent, as the pure light of the zero comes nearer...” But in film there is no need to literally bring the sections together; the collapse to infinity is already implied in
the process of division into selfsame parts. The subject constructs the bridge in perception. There is precedent for this higher mathematics in architecture as well. In *Principles of Architectural History*, Paul Franks writes that:

In the third phase [c.1700-1760] the whole space, or its subdivisions, or at least some of them, are infinitesimal. I mean by this that they are forms of higher geometry the calculation of which was possible only by infinitesimal calculus.

Significantly, for Franks, this is not simply an aspect of the viewer's experience: "Even if such calculation is not the observer's task, we can define the essential feature of ecclesiastical architecture in this third phase by saying that it could have been achieved only with the help of higher mathematics." In the late works of Le Corbusier, the infinitesimal interval also makes its appearance. The calibration of the curves, laid out, by necessity, as a series of "immobile sections" becomes, in the realized building, the movement-image: a series of mobile sections tied to the passage of the observer through space and governed by the tectonics of flat-slab construction and the geometries of ruled surfaces.

Now it might be argued that these effects are evident, but immaterial. In an essay which sets the tone for much of his late work, Le Corbusier speaks of these "ineffable" qualities: "Action of the work (architecture, statue, or painting) on its surroundings; vibrations, cries or shouts... arrows darting away like rays, as if springing from an explosion." He refers to the "magnification of space" undertaken in the early part of the century, and a line of flight: "The fourth dimension is the moment of limitless escape evoked by an exceptionally just consonance of the plastic means employed... a boundless depth opens up, effaces the walls, drives away the contingent presences, accomplishes the miracle of ineffable space." These "flights" need to be taken seriously. Before even beginning to draw the image of the building in Cambridge, Le Corbusier had imagined a richly choreographed scenario of movement and sound:

OBJECT: Visual Arts Center
It will be necessary to prepare a route across the building for the students between times of courses.

A tourist route perhaps in a spiral if we make the building go up.

Electric ringing sounds will be composed and emitted once, twice, three times a day, at fixed times, emission of a formidable nature of softness and power.

These emissions will be according to a sonorous, stereophonic route,
- in a spiral, going up, coming down
- in a vertical going up, coming down
placing the sound in the ground and sky.

This description traces a direct line from the Carpenter Center back to the Phillips Pavilion (1958). But even without the literal realization of the sound emissions, it is possible to see a continuity with the building as realized. Note that Le Corbusier had spoken of the chapel at Ronchamp as an architecture acoustique. The capacity of the built work to initiate a whole series of sensations beyond what is given as structure—implied movement, sound, light and limitless space, has to be seen as one of Le Corbusier's most significant accomplishments in these late works.

...be light like a bird, and not like a feather.
Paul Valéry

THE KEY TO THE SOLUTION FOR REINFORCED CONCRETE

Buckminster Fuller's well known statement, "If you want to determine the degree of development of a building, just weigh it," defines one trajectory for a light architecture. This is of course valid if one imagines that a nomadic population needs a mobile architecture, but is it the only way to achieve lightness in architecture? Are the properties of materials always fixed, for example? Movement as mobile sections, according to Bergson and Deleuze, coincides with the qualitative change of matter. Lightness could be one effect produced when the inert matter undergoes a change of state. The lightness of Le Corbusier's late works is a lightness having to do with direction, mobility and precision. It is a lightness that works not against the hardness of technical laws, nor gives in uncritically to the technological imperatives for lightweight construction, but instead works tactically to achieve effects of lightness by the close calibration of available technical means.

Kenneth Frampton has observed that in Le Corbusier's early work an unresolved contradiction exists between the machinistic precision of the forms and finishes, and a crude and approximate means of realization. In the villa at Garches, for example, a rough concrete frame and terra-cotta block infill is rendered in stucco to appear seamless. Now this contradiction is apparently resolved in the post-war work, where beton brut is employed. A weighty, plastic material is rendered as weighty and plastic. But in some of his last works, something distinct and more complex happens: there is a return to the light planarity of the early purist work, now rendered in cast concrete. The heavy is made light. Concrete construction is made to behave with the taut precision of aircraft engineering. As with parallel works by Pier Luigi Nervi or Eduardo Torroja, an astonishing effect of lightness is achieved with a material not intrinsically lightweight. And at the same time, and parallel to this, movement is integrated into structure itself. This is achieved in large part through the use of figures formed by ruled surfaces (the roof of Ronchamp, for example, or the hall of the Palace of Assembly in Chandigarh). In the case of the Palace of the Assembly, for example, movement is not simply a metaphor, but a concrete instance
of incorporated movement: a diagonal line rotated through space creates a hyperbolic paraboloid. A ruled surface is a moving line, line becoming plane, or volume. The pragmatics of construction here coincide with formal expression (the formwork for ruled surfaces in concrete may be built with straight members) but the experiential effect is one of lightness and movement.

There is some evidence that Le Corbusier himself was not completely satisfied with the conventional definition of béton brut. In a letter written to Josep Lluís Sert during the course of the construction of the Carpenter Center, Le Corbusier notes that:

Béton brut was born at the Unité d'Habitation at Marseilles where there were 80 contractors and such a massacre of concrete that one simply could not dream of making useful transitions by means of grouting. I decided: let us leave all that brute. I called it 'béton brut'. The English immediately jumped on the piece and treated me (Ronchamp, the monastery of Le Tourette) as 'Brutal'—béton brutal—all things considered, the brute is Corbu. They called that the new brutality. My friends and admirers take me for the brute of the brutal concrete.

At the Carpenter Center on the other hand, the concrete was specified as "lisse"—"béton brut but smooth," in a spirit of perfection. By this he intended the use of steel formwork to attain a precision finish, and curved forms to be made of plywood or wooden strips of small dimensions, as had been employed by Nervi at Unesco: "Those forms for the concrete are extremely elegant and very clean." Concrete starts off as a fluid material. It can function in a more primitive state, as a sculptural and tactile material, as at Marseilles. In this case its realism is primary; it functions as a crude and immediate index of the process of construction. But concrete can also perform as a mobile, plastic material, capable of abstract transformation and formal exactitude. At the Carpenter Center, Le Corbusier proposes a new stereotomy for reinforced concrete, signaling the fundamentally abstract idea of the material as it is used here. He is simply not interested in a realist idea of the "nature" of the material. "Béton brut," he says is not "béton d'une brut" but simply "the concrete coming directly from the formwork."

Le Corbusier paid close attention to the pragmatics of concrete construction, sending Sert detailed sketches of different kinds of joints and specifying the finishes on the plywood forms to achieve the smoothest finish. He objected to the use of cardboard Sonotubes because of the roughness of the finish and the spiral joint left on the surface. Le Corbusier instead speaks of the "softness" of the columns desired, and encloses a "confession" regarding the seductiveness of the smooth finish obtained from steel forms. "Columns of reinforced concrete called "women's thighs" poured in half forms of metal (with crossed joints) the concrete is so smooth, so seductive that one puts one's hand there. The above designation, he adds, is "not official."

Now all this may seem counterintuitive, inasmuch as Le Corbusier's late works are often characterized as heavy and sculptural, a kind of late-modern primitivism. But the "primitivism" attributed to some of Le Corbusier's late works is at least a partial effect of the predominance of a single material. The government buildings constructed in Chandigarh or Ahmedabad in the late 1950s and early 1960s, for example, are nearly monolithic constructions of reinforced concrete. This is largely the outcome of a simplified construction and minimal enclosure consistent with the climatic conditions and available construction technology. But Le Corbusier exaggerates this. Glass and steel, the details of window mullions or mechanical equipment (unlike the rough concrete frame) are markers of technological modernity. Le Corbusier has strategically recessed all of the visible evidence of such technical accommodation. In this way a timeless effect is achieved, and the building almost appears to be an inhabited ruin, where only the most durable materials have been left standing. If the buildings of the early period are by preference photographed with contemporary automobiles, those of the late period are often photographed with local inhabitants in traditional dress.

In the case of the Carpenter Center, this esthetic preference came into conflict with the demands of the program. Even in 1961, construction practice in the United States implied the assembly of fabricated elements and the integration of mechanical systems, more than the construction of an elemental structure. Hermetically sealed by an envelope of thermal glass, insulation, and rubber gaskets, the interior air
In other aspects, Le Corbusier and his collaborators exhibited an ingenuity and flexibility that managed to accommodate the realities of modern mechanical systems with the directness of constructional expression desired. Typical of these is the “airfloor,” a layer of lightweight concrete poured over the structural slab into which channels were cast to accommodate the air circulation and floor grilles. Not only did this allow the spaces to be free of the mechanical clutter of ducts, more importantly, it allowed the structural engineer to invert the required shear caps at the column heads, thus maintaining the smoothness of the slabs both above and below. Elsewhere, in the workshop or sculpture studios, ductwork is exposed, consistent with the warehouse aesthetic of the building as a whole. In places where interior finishes are applied (the plywood panels in the stairs or the curved walls of the studio, for example) the delicacy is all the more apparent for functioning in contrast to the roughness of the concrete texture. The same is true of the other details, such as stairs, scuppers, built-in benches or even the curtains. In each case, industrial materials are used in a direct manner, usually attached directly to the concrete without elaborately designed intermediary. Overall, transitions are smoothly modulated; locally, transitions are direct and unmediated.

This is especially evident in the treatment of the glazing. Large glass panes are let directly into the cast concrete so that the eye moves without transition from the slow, textured density of the concrete to the quick reflectivities of the glass. Intermediate mullions are rarely employed. Knowing that in the climate of New England the glass skin could not be made to disappear, Le Corbusier actively incorporates it into the formal definition of the building mass. He accommodates the necessity of protection from the climate without reinforcing a metaphysics of shelter. At strategic moments, for example, the glass is brought directly out to the building’s edge. Here the glass becomes the space-defining material, constructing the spatial envelope as a delicate, volumetric membrane. Where glass is co-planar with concrete, the weighty, sculptural quality of the concrete is denied. It may be reasserted again immediately above or below, but this only serves to reinforce the tension created by this material slippage. Note, for example, his insistence that the verticals of the ondulatoires be cast in concrete, rather than rendered as wood infill, as Sert and others suggested. By establishing material continuity between the two horizontal slabs, he allows the exterior to read as a heterogeneous but continuous membrane, rather than as paired concrete slabs infilled with distinct materials. The skin is defined in places by concrete, and in places by glass; sometimes glass seems to support, and concrete is used to enclose and protect, as if these materials had exchanged properties.

More than a singular response to an immediate problem, Le Corbusier understood the propositions of the Carpenter Center to be definitive: “It is the key to the solution of reinforced concrete . . . the building is made of slabs, their ceilings smooth, without capitals and without beams.” Why should this particular detail be the key? It is not the first example in Le Corbusier’s work of a flat slab without beams or capitals. The 1914 Dom-in-o frame—another highly specific invention with generalizable implications—shares with the Carpenter Center the absence of beams and capitals. In both cases the monolithic character is the result of complex artifice. In the case of Dom-in-o, concrete is poured over hollow tiles supported on temporary steel beams, and the reinforcing follows the rectilinear geometry of the tiles, allowing can-
tilevers only in one direction. At the Carpenter Center, a more complex result is achieved by the use of the airfoil, multidirectional steel reinforcing, and the inverted shear caps. Both solutions exploit the plastic capacities of concrete more fully than the treatment (c.f. the work of August Perret or Françoise Hernéme) of concrete as an assembly of beams and columns. In flat-slab construction there is no visible trace of the movement and transfer of tectonic forces. The logic of support and transition is more complex, and largely invisible. In this sense the Carpenter Center moves radically beyond Domino. The round columns signal a more fluid tectonic at work. Space flows around the columns, much as load flows through the slabs to the columns. This contrasts to Domino where the square columns and directional bays recall the post and beam tectonics of wood or steel construction. At the Carpenter Center, after the columns were placed, the slabs were poured all at once, giving them a continuous plastic and monolithic character. The curved slab recalls the once liquid state of the concrete, woven together internally by the steel mesh reinforcing, and monadically continuous in its grain.

Le Corbusier takes full advantage of the flexibility of flat-slab construction, which allows multidirectional cantilevers and does not require the columns to be placed in a regular grid. He modulates the internal spacing of the columns according to an elastic interval, stretching the grid precisely in the center where the ramp falls, resulting in a complex interplay of enclosure and punctuation. The distinction between movement and stasis is blurred at the Carpenter Center. The grid of columns is not a stable counterpoint to movement, but itself participates in the movement dynamic.  

One final episode might serve to sum up the theme of “smooth” construction. As was the usual practice in Le Corbusier’s late work, the curves of the studio and gallery blocks were not generated according to the standard practice of specified center points and fixed radii, but instead drawn out at scale, and later dimensioned with an overlay of coordinate grid. (It is perhaps important to note that the building throughout is anything but systematic, and that Le Corbusier’s design method was highly intuitive.) This presented difficulties in the realization at full scale. In Le Corbusier at Work, the construction of the curves is described as follows:

A grid was laid out on the floor of a large warehouse at full scale, and the curve was then “plotted.” At full scale it was found to have some kinks and waves, so Tucker [the concrete contractor] laid out a long length of rubber hose between the points, which he and Krueger then adjusted an inch or two to give an even though irregular curve. Next templates were cut to fit the curves. Formwork was then made by Nova Scotia shipbuilders specially taken on for the job.  

The ingenuity of the solution lies in bridging of the necessary segmentation (i.e., the drawn curve and the coordinate grid), which are the traces of the graphic apparatus of the architect’s studio) with a material supply to make a smooth passage from one point to the next (one “any-instant-whatever” to the next). These in turn undergo additional material transformations: first a rubber hose, then templates, wooden formwork and finally concrete construction. The translation from drawing to building is complex and indirect.
Then we have computer science. It is true that software cannot exercise its powers of lightness except through the weight of hardware... The second industrial revolution, unlike the first, does not present us with such crushing images as rolling mills and molten steel, but with "bits" in a flow of information traveling along circuits in the form of electronic impulses. The iron machines still exist, but they obey the orders of weightless bits.

_Italo Calvino_

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**THE LATE LE CORBUSIER**

There is often a moment in the late career of an artist when the youthful pressure of constant innovation wanes, and those who have not digressed into a facile parody often return to consolidate and complete the unfinished projects of an earlier career. The lateness of the late Le Corbusier can therefore be variously interpreted. Fred Koetter, for example, calls the Carpenter Center a "contextual grotesque" and smugly suggests that it is nothing more than a museum piece, "the last of a magnificent and dying breed." For Koetter, its lateness corresponds to a project that has outlived its usefulness.⁴⁰ John Hejduk, on the other hand, sees in this return a belated rediscovery of the primary motivations of the early work, and a refiguring of the teleologies of history and interpretation:

Le Corbusier... returns to some of his earliest triumphs with a more poignant commitment to expanding space. If the Harvard Visual Arts Center had arrived prior to Villa Garches, all the armchair historians could rest unmove, for "was this not the natural order of events?" The fact that it postdates Garches by some 30 years can only prove the quirks of time. Whereas Garches heralded the promise of things to come, the Center postpones them.⁴¹

Hejduk, (perhaps marking out his own dilemma), describes the double bind of the late modernist. The better world promised by Garches has in fact failed to materialize. That project can be abandoned, but to do so is to refuse the modernity of the present. So instead of retreating into the crude historicism of Koetter, Hejduk, like the late Le Corbusier, seeks to delay, or postpone the closure of the modernist project. It is a more difficult, but more hopeful project. And it does not seem accidental that much of the most interesting and important work of the intervening thirty years—including Hejduk's own—has in some ways continued to work out of the paradox of belatedness defined by the late Le Corbusier. Le Corbusier rejected his early machine age enthusiasms, but without losing the light, optimistic spirit of the modern. In the late work, he recuperates and extends the formal sophistication of the early works without the polemics of a machine style.
But perhaps there is an additional significance to the thirty-year lag. In a post-industrial culture, when architects are again looking for alternatives to an exhausted oppositional culture of negation, themes of continuity, smoothness and lightness find an increased resonance. The political necessity of engaging (and cultivating) new programmatic complexities has also provoked a rethinking of this work. Projects by Rem Koolhaas and younger architects return to themes of the late Le Corbusier not previously explored. In his late works—The Carpenter Center, the complex of buildings in Ahmedabad and the monuments of Chandigarh, in unbuilt projects like the Congress Hall in Strasbourg, and the Rho-Milan project for Olivetti—Le Corbusier loops back on himself, regurgitating form, structure and program in ever more complex paradoxes. These late works present a kind of chant that is not the result of reduction, but of distillation and condensation. Contradiction is internalized, reworked, and dissolved in unexpected and powerful syntheses. These buildings do not set out to achieve closure as much as they keep fundamental questions open. Rather than looking backward, making incremental adjustments to known solutions these buildings look forward: they propose new projects, and they hold out the possibility of as yet unrealized solutions.

1993

NOTES


Le Corbusier is said to have spoken of the north wall of the Fogg Library as 'the wall.' Seiler and Curtis 50.

See, for example, Rudolf Arnheim, "Notes on Creative Invention." "The second type of building is conceived as an aggregate of volumes, which reach all the way through its interior and whose nature can only be inferred from the partial views that they exhibit on the outside. Overriding the distinction between inside and outside, this sort of conception strains spatial imagination. The Carpenter Center belongs in this category. It involves a fully three-dimensional complexity, which can not be identified by either plan or section." Seiler and Curtis 264.

This observation, made much earlier, and often repeated in classes and lectures, found its way into print in Slavoj Žižek's "Aqueous Humor." See, for example, "Notes on Creative Invention." "The second type of building is conceived as an aggregate of volumes, which reach all the way through its interior and whose nature can only be inferred from the partial views that they exhibit on the outside. Overriding the distinction between inside and outside, this sort of conception strains spatial imagination. The Carpenter Center belongs in this category. It involves a fully three-dimensional complexity, which can not be identified by either plan or section." Seiler and Curtis 264.

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Eisenstein, "Montage" 17.


Eisenstein, "El Greco y el cine" (c. 1937), cited by Bois in the introduction to Eisenstein's "Montage and Architecture," Assemblage 10 (December 1983): 118.

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Hejduk, Mask of Medusa 75.
The Permeation of Projection – Robin Evans

In the introduction I suggested that the geometry in architecture has always had a projective cast to it. I shall now try to say why in greater detail. The first thing to do is to define the different fields of projective transmission that concern architecture. A diagram is, I think, the most helpful way to do this. Projection operates in the intervals between things. It is always transitive. In the diagram, ten fields of projection are shown joining five types of target. Four of the targets are almost always thought of as pictures or picture like. The one exception is the designed object, and that too can be endowed with picture like qualities. I am attempting to portray the extent of projection and its metaphors, so the
The diagram treats varieties of real and imaginary spaces as if they were all the same. The part behind the dotted line cutting (2), (6), and (7) represents the observer—someone who is looking. As we shall see, the status of these lines as they pass across the border into consciousness is not at all clear. The diagram is intended as a freely traversable guide to projective and quasi-projective transactions. All ten routes can be traveled in either direction. There is no necessary starting point, and no necessary sequence. Four of the targets—orthographic projection, designed object, perspective, and observer—are symmetrically joined. Each is connected to all the others. The designed object is put in the center for convenience, although the diagram is best thought of as a tetrahedron, so that the center disappears. The fifth target, the odd one out, is imagination. The question arises as to why it has such a peculiar relation to all the rest.

There follows a brief itemization of the ten transitive spaces numbered in the diagram:

1. **Graphic projection (two-dimensional)** correlating the several orthographic images of the object. The third dimension is imaginary within the drawing. This interaction between pictures was dealt with in chapters three and four.

2. **Perspectival space (three-dimensional)** defining the optical route between a mobile, perceiving subject (observer or author) and an orthographic design. This route is fairly straightforward from the design drawing to the observer, but in the reverse direction it is far more complex. Designing is a performance during which vision maintains a constant interaction between manual movement and resulting inscriptions. But there are also "ideas" informing the performance. Somehow these are transferred from mind to page in a combination of visual and motor activity. In this direction, therefore, projective space is inextricably bound up with mobility and imagination. Sketching, which may be perspectival, orthographic, or indeterminate, can play a part here.

3. **Non-projective space (three-dimensional)** between the orthographic design and the designed object. The transmission of information between drawing and building is effected by scaled measurement and fabrication. No projection is involved; the result will nevertheless be projectively related to the design. This can solicit a pictorializing of the architectural object; see (8), below. The direction is reversed when measured drawings are taken from buildings.

4. **Graphic projection (two-dimensional)** deriving perspective pictures directly from the orthographic design drawings, independent of the designed object's existence or realizability. The third dimension is imaginary within the picture. It is also possible to reverse direction along this line, as when plans and elevations were derived from Piero della Francesca's paintings and from G. B. Piranesi's perspective engravings.

5. **Perspectival space (three-dimensional)** between the object and its derived pictures (photographs or drawings made on site). The viewpoint is undetermined and its choice involves what we call judgment, creativity, or imagination. The direction from object to picture can be reversed, although when that happens the route is usually diverted. Photographs have often been used to aid reconstruction and reproduction, but in such cases the journey from picture to object has mostly been via (4) and (3).
(6) Perspectival space (three-dimensional) between derived pictures and any perceiving subject. An increasing proportion of our information about architecture arrives along this path in journals, books, slides, and videos. Reversal would make the observer the manipulator/creator of the picture. This is the case when setting up a perspective or taking a photograph, as described in (4) and (5).

(7) Perspectival space (three-dimensional) between the object and any mobile observer (7a). This may seem the most dependable route. I hope to have shown in the chapter on the centralized churches that, with regard to design, it is the least predictable, the hardest to foresee, and therefore usually the most interesting. It is also more difficult to envisage how it is reversible (7b). The building is projected toward the observer, but what is projected toward the building? The building does not see us, unless we accept the mysterious tale told by Lacan, where a tin floating in the sea looks at him. The answer has to be that the building presents itself to us as a field of action, as does a sheet of paper or a view finder in the context of designs and pictures. When we look at the building and imagine it otherwise, then decide to alter something about it, the building becomes as irresistibly impressed with us as we have been with it. Another instance would be a building erected without preliminary representation.

(8) Imaginary space produced within the object, so that its depth appears dilated, collapsed, or distorted. Such effects are sometimes obtained by transferring the implied depth of pictorial projection onto the modeled surfaces of buildings. This may involve a degree of collaboration on the part of the observer—another instance of (7b). Thus far, I believe my diagram provides a reasonably good rough guide. But behind the dotted line, which represents any observer, it is not so dependable. My purpose here is to show how projection—or rather quasi-projection—breaches the boundary between world and self, the objective and the subjective. There are two further targets, the perception and the imagination belonging to the observer, and two further projective spaces behind them, (9) and (10). Imagination and visual perception are shown as pictures, because that is how they are normally described. They are not pictures, but the very fact that both are thought of in that way is very significant.

ARCH 1110-
FUNDAMENTALS OF
REPRESENTATION AND DESIGN
le dehors est toujours un dedans / the outside is always an inside

Ca rue à Rio-de-Janeire est célèbre.

Aurour de lui se dressent des montagnes échelées; la mer les baigne.

Des peintres, des baigneurs; la splendeur tropicale anime la rue. On s'arrête, on y installe son fauteuil.

64 - 65

C'est un endroit tout autour.

C'est l'heure obligée d'une perspective! Votre chambre est installée face au site.
Le paysage entre tout casser dans votre chambre.

Le poste avec la nature a été scellé! Par des dispositifs d'urbanisme, il est possible d'insérer la nature dans le bâti.

Rio-de-Janeira est un site célèbre. Mais Alger, mais Marseille, mais Ouan, Nice et toutes la Côte d'Azur, Barcelone et tant de villes maritimes ou continentales disposent de paysages admirables!
Systematized Elements: human body + possible dance poses

Systematized Elements: structure, circulation, program

partner notation for possible dance sequence

column network notation for possible deployment
STUDIO-WORKSHOP

TYP

EXHIBITION

OPEN AREA OVER TERRACE 210

FLOOR GRILLE

STUDIO-WORKSHOP

Curtain Wall Showing Limit of Insulation

V160.0.001
EXERCISE: CUBE – In class assignment

We will explore the relationship between two dimensional drawings and three dimensional constructions. By transitioning from one media type to another a better understanding of the possibilities and limitations of each will be uncovered. The three dimensional construction will be used to further explore the translation from 2D to 3D in later assignments. You will be producing a 3-dimensional construction from a few simple 2 dimensional parts and rules. You will then transfer the 3-dimensional information into a set of 2-dimensional orthographic drawings: plan, section, and elevation. Using the drawings as a means of addition you will make additions to your original construction so that a number of states objectives are achieved.

Steps:

1. given - 20” x 30” foam-core
2. Begin by dividing your foam-core sheet into 4, 5inch x 5 inch squares. Then subtract the shaded area of each square as one piece so that you end up with four subtracted pieces and four originals.
   (note: carefully and with precision transfer the dimension information above to the four foam-core squares using a T-square and triangles + using a T-square and triangles draft each division onto the squares before cutting + using a metal ruler carefully cut out each shaded area so that each square yields two pieces - the subtraction and the original)
3. Next subdivide each of the originals using your straight edge / ruler and a sharp exacto blade in the following manner:
   a. Divide the original A into two parts
   b. Divide the original B into three parts
   c. Divide the original C into four parts
   d. Divide the original D into two parts
   (note: no curved cuts are allowed + following these directions will yield 15 parts from an original four squares)
4. Last, glue together at least 7 of the parts together so that they meet the following requirements:
   a. Fits within an imagined 6 x 6 x 6 inch cube
   b. Defines at least three edges of the imagined cube
   c. Contains at least two distinct spaces defined by at least four planes
   (notes: you should save the pieces you have not used for the next part of the assignment)
In this exercise you will produce a basic set of architectural projections of the CUBE you designed. The drawings should first be sketched out by hand on trace and the drafted using Autocad and printed to a scale defined by your instructor. You will later use the Autocad files to prepare a set of more complex drawings in Adobe Illustrator.

Steps:

1. Identify the basic formal logic of your CUBE (remember the discussions we had about hierarchy, symmetry, asymmetry, proportion, and rhythm at the carpenter center. Does your CUBE have a datum for example?)
2. Measure the basic dimensions of your CUBE.
3. Sketch out the drawings you plan to make by hand.
4. Draw two plans, two sections, and two elevations of your CUBE using AutoCAD and Illustrator. (you should document the two spaces you generated in the design phase of this projects)
5. Print the drawings for consultation with your instructor.
NE.ARCH.1110 _FUNDAMENTALS OF REPRESENTATION

PROJECT 1 – NOTATION, REPRESENTATION, PROJECTION

EXERCISE: CUBE – Isometric

Your instructor will go over basic isometric technique in studio.

After you have completed the axonometric drawing of your construction add at least 4 pieces of the remaining 6 to the construction in the drawing so that it meets the following criteria:

1. your intervention breaks two of the six planes of the implied 6” x 6” x 6” cube
2. your intervention defines at least one additional space
3. your intervention follows a logic already defined in the original construction.
## EXERCISE 1.A.1 – DOCUMENTING THE CARPENTER CENTER – IN CLASS ASSIGNMENT

In this exercise you will learn to quickly measure an architectural space using two methods:

1. **Triangulation** – Triangulation is a method used by surveyors to measure distances in the field. The first step of any triangulation is to define a base line using any two points in space, whether they are trees, columns, stones, or mountain peaks. Once a base line is established other points can be located.

2. **Proportion** – With the basic measurements derived from field measurements and from triangulation you will infer other dimensions using the architectural logic of the structure you are examining.

Both methods will be demonstrated in detail during the site visit.
Using these methods you will then collect the basic dimensions of the following elements of the Carpenter Center:

1. **The Column Grid** - Our investigation of the CC’s design logic begins with observing and documenting the spatial rhythm of its column grid. The drawing one the next page provides some initial clues to help you in this process. The letters suggest that many of the dimensions repeat and that there is a general logic to the project. You do not have enough time to measure the distance between every column, so you will have to discover this logic in order to expedite the documentation process. (note: your drawing may not match this example exactly)

2. **The Ramp** – Once you have completed the documentation of the column grid you will turn to the buildings ramp. The ramp has a particular relationship to the grid which will assist you in the documentation process. The drawing bellow suggests some of the possible relationships between the grid and the ramp. You may have to document the dimensions of other objects and relationships to successfully document the ramp itself. (note: your drawing may not match this example exactly)

3. **Two implied Volumes** – Your final subject of documentation and analysis includes two volumes *implied* by the elements of the Carpenter Center. The drawing bellow gives you some hint of what they might be. We will also discuss them during the site visit. Like the ramp in the previous step, you may need to document other elements and relationships in order to fully document the ramp itself. (note: your drawing may not match this example exactly)

Collaborative measuring is encouraged. Each student will be responsible for producing their own drawings in subsequent phases of this assignment.
**PROJECT 1 – NOTATION, REPRESENTATION, PROJECTION – Schedule:**

<table>
<thead>
<tr>
<th>Tuesday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.13  Carpenter Center Visit - In class</td>
<td></td>
</tr>
<tr>
<td>Project 1A.1 Assigned</td>
<td>9.16  Plan / Section Presentation</td>
</tr>
<tr>
<td></td>
<td>Project 1A.1 Due (Survey)</td>
</tr>
<tr>
<td></td>
<td>Project 1A.2 Assigned (Plan / Section)</td>
</tr>
<tr>
<td></td>
<td>9.20  Axonometric Drawing Presentation</td>
</tr>
<tr>
<td>Project 1A.2 Due (Plan / Section)</td>
<td></td>
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<tr>
<td>Project 1B.2 Due (Plan / Section/Elevation)</td>
<td></td>
</tr>
<tr>
<td>Project 1A.3 Assigned (axonometric)</td>
<td></td>
</tr>
<tr>
<td>Project 1B.3 Assigned (axonometric)</td>
<td></td>
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<tr>
<td></td>
<td>9.23  Drawing Review</td>
</tr>
<tr>
<td></td>
<td>Project 1A.3 Due (axonometric)</td>
</tr>
<tr>
<td></td>
<td>Project 1B.3 Due (axonometric)</td>
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<tr>
<td></td>
<td>Project 1A.4 Assigned (C.C. Quadrant Model)</td>
</tr>
<tr>
<td></td>
<td>9.25  Project 1A.4 Due (Quadrant Model)</td>
</tr>
<tr>
<td></td>
<td>Project 1A.5 Assigned (Learning Space)</td>
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<tr>
<td></td>
<td>9.30  Project 1A.5 Study Model Due</td>
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<tr>
<td></td>
<td>10.04  Project 1A.6 Final Model Due</td>
</tr>
<tr>
<td></td>
<td>10.07  Project 1A.6 Final Drawings Due</td>
</tr>
<tr>
<td></td>
<td>10.04  Group Review - Project 1A + Project 1B</td>
</tr>
</tbody>
</table>

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Collaborative measuring is encouraged. Each student will be responsible for producing their own drawings in subsequent phases of this assignment.
EXERCISE 1A.3 – Carpenter Center – Axonometric Drawings

You will draw two axonometric drawings of the C. C.:

1. The ground level.
2. The northeastern face of the building

These drawings should first be sketched out by hand, then drafted in AutoCAD, adjusted in Adobe Illustrator, and then printed according to your instructor’s directions. (Note: your drawing may not match this example exactly.)
EXERCISE 1A.4 – Carpenter Center – Model of C.C. Quadrant

In this exercise you will construct a 1/4" = 1' scale model of the northeastern quadrant of the Carpenter Center. You should include the site elements that define the northern and eastern portions of the quadrant in your model.
You will design an outdoor classroom space between the northeastern edge of the Carpenter Center and the Fog Museum.

You should provide for at least three educational formats within your intervention:

- independent study
- small informal group meetings
- more formal outdoor learning space/classroom for a seminar.

In all three cases consider what other uses could occupy these spaces when they are not being used for the intended purpose as well as their relationships to each other and the existing programs of the Carpenter Center and other neighboring buildings.
PROJECT 2 – SUBJECT / OBJECT RELATIONS (MUSEUM PLAZA)

In this project you will be designing a series of spaces that relate a series of objects of the disparate scales: these objects include a series of buildings, sculptures, as well as the users of your own intervention. In this project you will also learn at least three new techniques, model photography, the site section, and the perspective. Project 1 introduced you the basic tools of architectural design; Project 2 will focus on the design process itself, with an emphasis on ‘looping’. This concept will be elaborated on in studio.

SCHEDULE:

10.10.
COLUMBUS DAY / NO CLASS

10.17.
Perspective Tutorial In Class
Project 2.1 Due
Project 2.2 Assigned (Site Analysis Drawing/Model)

10.20.
Project 2.2 Due
In class design charrette - Aperture
Project 2.3 Assigned (3 Light/View Filter Models)

10.24.
Project 2.3 Due
In class design charrette - Sequence
Project 2.4 Assigned (Pavilion Model/Drawings/Photos)

10.27.
Project 2.4 Due
Project 2.5 Assigned (Pavilion Model/Drawings/Photos)

10.31.
Desk crits

11.03.
Project 2.5 Due – In class review

Project Scenario:
The administrative board of the Christian Science Center Plaza has decided to redesign this entire urban space through the addition of a single temporary pavilion. This pavilion, which will also house two sculptures borrowed from the Museum of Fine Arts down the street, should reorganize the spatial relations of the various buildings and landscapes that define the C. S. C. Plaza through its own internal logic.

Project Site: Christian Science Center Plaza (white bar in image represents 100 ft – source: Google Maps)
Design Sequence:

2.1 SITE VISIT/DOCUMENTATION:
Step 1: You will first visit the C. S. C. Plaza with your studio. Working in groups, you will document the particular buildings and landscapes of the Plaza as well as their spatial relationships to one another. These relationships can be thought of in the same way as the components of the Carpenter Center that you measured in Project 1. An interpretation of the proportional relationships between the objects is key to this documentation process. You do not have the time or the information for exact measurements of these spatial relationships – you will have to be resourceful. Sketch out these relationships in you sketchbook. Use Google Maps for further assistance in the basic dimensions of the plaza.
Step 2: Each student should choose a position within the Plaza for their own intervention. You should document that position using existing elements of the site for reference.
Step 3: Each student should complete a Site Plan, Site Sections, and a Site Axonometric indicating the position of their intervention in AutoCad. This will be due on the following studio meeting day.

2.2 SITE ANALYSIS:
Step 1: You will be introduced to one point and two point perspective drawings during studio.
Step 2: Using your Site Plan you will construct at least three perspective drawings of the site from the position you choose in the previous assignment. These three perspectives should each have at least one overlapping element (building or landscape element).
Step 3: You will construct silhouette models of your perspective views using museum board. You will calculate the approximate size of these models using the Site Axon and a technique your instructor will demonstrate in studio. These models are not to a particular scale, they will be used to approximate the site when you develop your own intervention.
2.3. APERTURE STUDIES:
Step 1: During our analysis of the Carpenter Center, we encountered a number of architectural aperture strategies, methods for filtering and framing light and view. You will develop three aperture strategies. These apertures should be constructed at ¼ " = 1' scale. Your instructor will provide examples of aperture precedents.
Step 2: You will then take these aperture models to the C.S.C. Plaza, stand at the position you that you have chosen, and photograph the light and view conditions that your aperture generates. These views should be similar to the perspectives you developed in 2.2.
Step 3: You will prepare a layout of your photographic studies for the next studio meeting. You should also construct at least one section through each of your aperture studies.

2.4. PAVILION MODEL:
Step 1: Using your site documentation and your aperture studies, you will design a pavilion for the C.S.C. Plaza. This pavilion should relate the views and light qualities you have developed as well as exhibiting two of the sculptures on loan from the MFA. This model should be constructed at 1/2" = 1' scale and include scale figures of the sculptures as well as users. The model should be constructed from foam core while the figures should be cut from museum board.

Step 2: Draw a floor plan, roof plan, and at least two sections of your pavilion proposal.
Step 3: Photograph at least three composed views of your model using a digital camera. You may need to cut your model in such a way as to allow ease of photographing.
Note: Your model should not exceed the following dimensions: 27’ X 42’ X 18’

2.5. PAVILION MODEL 2: You will be asked to repeat the steps in 2.4, responding to your own as well as your instructor’s critiques of the earlier pavilion proposal.
In this project you will be designing a series of spaces that relate a series of objects of the disparate scales: these objects include a series of buildings, sculptures, as well as the users of your own intervention. In this project you will also learn at least three new techniques, model photography, the site section, and the perspective. Project 1 introduced you the basic tools of architectural design; Project 2 will focus on the design process itself, with an emphasis on ‘looping’. This concept will be elaborated on in studio.

SCHEDULE:

10.11.
10.18.
Project 2.1 Due
Project 2.2 Assigned (Site Analysis Drawing/Model)

10.21.
Project 2.2 Due
In class design charette - Aperture

10.25.
Project 2.3 Due
In class design charette - Sequence
Project 2.4 Assigned (Pavilion Model/Drawings/Photos)

10.28.
Project 2.4 Due
Project 2.5 Assigned (Pavilion Model/Drawings/Photos)

11.01.
Desk crits

11.04.
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Step 3: Photograph at least three composed views of your model using a digital camera. You may need to cut your model in such a way as to allow ease of photographing.
Note: Your model should not exceed the following dimensions: 27’ X 42’ X 18’

2.5. PAVILION MODEL 2: You will be asked to repeat the steps in 2.4, responding to your own as well as your instructor’s critiques of the earlier pavilion proposal.
PROJECT 3 – MUSEUM STAIR

Part 1

In this assignment, you will begin to explore the spatial implications and types of perspective drawing. You will study two paintings and carefully analyze the spaces created by each artist:

Rogier van der Weyden, *St. Luke Drawing a Portrait of the Virgin Mary*, Flemish, ca. 1400-died 1464
Oil and tempera on panel; 54 x 43 in.

Oil on canvas; 87 x 87 in.

Using those perspectives as a base, you will create a series of analytic diagrams that illustrate the spatial and perspectival concepts that you have discovered. These diagrams can address any of the following concepts—singularly or combined.

LIGHT
OVERLAP
FRAME
DIRECTION
MATERIAL
ELEMENTS
POSITION

SURFACE
LAYERING
PATTERN
FORM
GEOMETRY
SCALE
PROPORTION

Part 2

SITE - The attached plan and section diagrams represent three spaces in a small university art museum.

DESIGN PROBLEM – You have been asked to convert these three spaces into a painting gallery. The elements will include:

Stair - A new stair will be added to connect the spaces and serve as the major vertical circulation route for the museum. The stair should connect the two levels depicted in the drawings. The stair must be a subtractive spatial volume that runs up into either of the upper level galleries.
**Fenestration** - You will need to locate the various openings, windows, and skylights that will allow the only light into the rooms. Parameters for the placement of these elements are included in the attached drawings.

**Paintings** - You will also need to locate two paintings in the spaces linked by this stair.

**Entries** - An important decision that will need to be made is the location of the two (or more) entries into this particular sequence of spaces (other galleries exist on both levels of the museum that are not included in this design assignment).

Pay attention to the intended ‘perceptual performance’ of your design proposal. For example, ‘how does the stair first present itself to the visitor,’ ‘how can light be used as a design tool,’ or ‘how do views of the paintings unfold as I move through the stair and rooms.’ Precise decisions linked to movement and views should be emphasized over symbolic or metaphorical narratives. Decisions about the arrangement of spaces and the elaboration of elements will build from a single (but not simplistic) story line.

**General Rules**

Minor transformations to the plan and section are possible if they are supported by decisions that grow out of development of the design. The following rules apply:

1) The volume of the stair can penetrate spaces on the first floor that are not included in the plan and section diagram (within the zone qualified in the attached drawings).
2) The design of the thresholds between the three spaces is a matter of design interpretation (i.e. you can design these connections).
3) At least one door must be provided ‘out of the system’ on each level of the project (therefore at least two doors must be provided).
4) The main entrance to the museum is on the first floor.
5) All new architectural elements should be primarily organized on the rectilinear grid of the existing spaces.
6) Assume that a handicap accessible elevator is located in a space immediately adjacent to the double-height space depicted in the attached drawings.

**Stair Rules**

1) The rise of the stair should be between 4” and 6”, the tread width should be between 12” and 17”.
2) Stairs that transverse more than 12'-0” in elevation require an intermediate landing. Landings typically need to be at least as deep as a stair is wide (for example, a stair that is 4’ wide should have a landing that is at least 4’ x 4’). For stairs that are wider than 5’, landings do not need to be deeper than 5’.
3) Handrails on stairs need to be 34” high. Guardrails at stairs, landings, and balconies need to be 42” high.
4) Guardrails must meet the ‘baby-head rule’, which means that a 4” diameter ball cannot fit through any opening in the guardrail. In addition, guardrails cannot create a ‘ladder effect’, ruling out horizontal railings.

**Methods of Investigation**

You will continue to work in a combination of media including model, drawing, and model photograph. Your models will be constructed at $\frac{1}{2}”=1’$ using foam core as well as white museum board.