252 Columns

The Development of an Archetypal Form

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This thesis submitted to the Faculty and Staff of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of Master of Architecture.

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With much love and gratitude, I thank my family
Mom, Dad, Andy, and Mimi
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A good urban space must fulfill the promises of complexity and variety. This thesis investigates how to define an urban plaza in terms of universal elements employed to achieve that complexity. An alternating grid, a, b, a, composed of squares of five and ten feet provides an order for all the elements on the site. Each element is generated and organized from this grid. The dominant elements are thirty-foot tall concrete columns. These columns and their subsequent structural armature define the structure of buildings and an underground parking structure. The columns form a continuum which ties together every aspect of the thesis. Visually, they are present everywhere in the plaza and define very specific views of the plaza and the surrounding city. Together with an intricate mosaic floor pattern created from overlapping ellipses, also based on the grid, the massive columns and fine-grained floor define the extremes of the plaza's scale.

The development of a number of potential elements always failed when put together to form a cohesive idea of a contained plaza. A clear order was necessary to bring together different elements into a cohesive whole. This led to the definition of a plaza as a sensibly apparent and rationally knowable outdoor public building contained within a city or town.

For an area which previously lacked any structural cohesion, the ordered plaza now defines a strong structural element within the city. The grid and columns define space but do not force a single usage. They define how the plaza is used as it weathers the continual change of an urban environment.

The plaza does not exist as an independent element within the city. The many framed views offered by the columns create new perspectives of the surrounding city. The universal elements, the columns, reference the site specifically in their scale and proportion. Applicable in a wide range of projects, the grid of columns in this project orders a pedestrian environment connecting downtown and a baseball stadium. Three buildings which derive directly from the grid create additional small openings to the city beyond. While focusing toward the center, the buildings define a permeable edge which allows interaction.
Study and Comparison of Urban Conditions
The thesis study of urban conditions and architecture's role in the city began in Europe. Together with classmates, many hours were spent walking the streets of European cities: Barcelona, Bilboa, Nimes, Rome, Venice, Verona, Chambery, and Paris and others. Sketching and photographing revealed many of the elements which create a strong place. Discussion of these places naturally led to comparisons with cities in the United States. A comparison with York, Pennsylvania, my hometown, pointed out some very interesting differences and similarities. Upon returning home, I spent time walking the streets of downtown York, photographing the urban conditions and doing a direct comparison. These studies informed both the beginnings and the final direction of the thesis project.

Carre de Art and Maison Carre (foreground)
Nimes, France
Sketch, Riva San Vitale, Switzerland
The comparison of a downtown York map with those of Barcelona and Bilboa, Spain and Chambery, France reveals the differences of overall city scale and arrangement.

Specifically, the Barcelona map shows both the old medieval section of town with its winding narrow streets and the much larger scale Cerda grid. The Cerda streets are much wider than York's even though the grid size is smaller than a York block. However, the York blocks are divided into four equal quadrants by bisecting alleys and are not nearly as dense at an average of about four stories tall compared to Barcelona’s eight. The medieval section streets match very closely in width to the bisecting alleys of York. These alleys are currently used by pedestrians in a number of detached instances but provide a well-scaled framework for additional connections through town.

The other two comparisons reveal the irregular grid of Bilboa and the lack of apparent order in Chambery. Both match York fairly closely in scale.
A study of Renaissance and Baroque European plazas revealed the use of strict geometries to both reconcile site conditions and impose a new order. Two centralized examples are the St. Peters plaza and the Campidoglio, both in Rome. At St. Peters, Bernini created a huge public square along a longer axis leading to the cathedral. The four rows of monumental columns which surround the plaza, together with a centralized floor pattern, create a beautiful place.

Michelangelo used an ellipse and its flexibility to reconcile three different facades in the Campidoglio. Lines drawn from the buildings key points combine to create a centralized pattern. The strong pattern defines the place.
Both the Piazza San Marco in Venice and the Piazza della Signoria in Florence delineate linear spaces. The interlocking pattern of San Marco’s floor, together with the vertical pattern formed by the arced edges, accentuates the length of the plaza and defines a line ending at the cathedral. In Florence, the long arcaded path frames the tower in the distance and defines the place. The line of columns directs the eye forward and creates a layered edge.
In addition to slides and plans, section and perspective sketches from Europe were studied. Shading in the visible sky and ground provided a graphic means of discerning what proportions controlled the view. How much sky does one actually see when walking down a narrow street? How much ground? The slides provided the details of how the walls of buildings define the spatial boundaries in the cities. These studies informed decisions on how to define a plaza edge.

Nîmes, France (top); Verona, Italy
Nîmes, France
Florence, Italy
Venice, Italy
Venice, Italy
Studies using a site model and various scales of massing explored some of the possible section proportions for the plaza edge.
a. Public Parking Garage

b. Strand Capital Theatre

c. Cherry Lane Park

d. Central Market

e. St. John’s Episcopal Church

f. Proposed Minor League Baseball Stadium

g. Old Cigar Factory, currently Offices

h. Service Side of Retail and Warehouse Facilities

i. Church

j. Row Houses

k. Full Site - Parking Lot
Defining Order
A series of axonometric sketches used basic architectural elements in order to define a center and an edge. The plaza must serve as both path and locus within the town fabric, much like the plazas studied in Europe. The sketches attempted to create sectional spaces which allow this happen.

These drawings were made without a specific program. Ideas for use included restaurants, cafes, housing, offices and parking, but the eventual form of the plaza was allowed to ultimately control these programmatic determinations.
Initial studies of the site conditions focused on two key ideas. First, the creation of a new locus in York: the space between four disconnected urban walls transformed into a cohesive place. Second, the establishment of a new pedestrian connection between a proposed minor league baseball stadium and the center of town. Currently, a block wall interrupts an old path, Cherry Lane. One block towards town this alley has been made into a beautiful downtown park but it is restricted to only one block. A new path expands the central business district two blocks further and facilitates pedestrian activity.

Slowly, the realization was reached which identified the plaza typologically as inherently both locus and path. However, a number of different ideas were tested and rebuked to make this determination.
Bilboa Stair Project,
Watercolor Plan and Ink/Pencil Axonometric Collage
The north edge of the site developed into a two-story wall with stairs cascading down toward the plaza center. Blocking the least favorable site facade, the wall formed a new edge and transition alley between the plaza and the existing buildings. The stairs provided both access to the wall and a place to sit and enjoy the plaza.

A precedent for the urban stairs had been established with a project I designed for Bilbao, Spain. (opposite) A long stair winding two stories up through the medieval quarter of town was redesigned to create a public place. Varied scales of landings and elements created new focal points and defined places for people. However, in York the elevation change had to be built. With stairs rising ten feet, the plaza quickly enclosed and completely blocked out an edge of the city.
One scheme explored the possibility of physically combining a contained plaza and a definitive path. The path cut through the center forming part of the plaza surface while providing a direct route through the site. While integrated into the stepped edge, the path remained separate and contrary to the idea of what a plaza should be. A plaza should be both sensibly apparent and rationally knowable to its users, providing options within a defined order. The path defined a singular route, dividing the open plaza and removing the element of choice for the pedestrians. There was a lack of cohesion. The columns, the stairs, and the path independently defined parts of the plaza. An element or order was needed to bring each aspect of the plaza together into a cohesive whole. The difference here is two different methods. Initial concepts approached the project in a behaviorist manner. Elements were designed to facilitate a behavior or solve a problem. Of the European plazas studied, not one approached the design in this manner. Rather, they imposed an order on the site which created a beautiful place. This order both defines the place and opens it to a wide range of possible uses.
The multiplying of the columns across the site according to a tartan grid provided a common element from which to work. The ideas of this model without the field of columns remained but each aspect of the project was re-invented based on the grid.
The columns start at thirty feet tall on one end and drop incrementally to eleven feet in height on the other.
The left perspective views the field from the tall end and the right perspective views it from the short end.
Parc de la Villette in Paris's nineteenth arrondissement, designed by Bernard Tschumi, provided a valuable precedent. In his competition entry and later in built form, he formulated a new definition of the ‘urban park.’ No longer an attempt to create an image of nature in the city, as was prevalent in the 1970’s, he is “proposing that the juxtaposition and combination of a variety of activities will encourage new attitudes and perspectives” (Tschumi 1). The project is about urbanity, not the masking of it.

Tschumi uses a point grid as his organizing structure, “independent of use, a structure without center or hierarchy, a structure that would negate the simplistic assumption of a causal relationship between a program and the resulting architecture” (Tschumi IV). Searching to define an architecture that carries no meaning, he defines a composition which is open to each individual’s interpretation of it. Each ‘folie,’ a 10 x 10 x 10 meter red cube placed according to a point grid at 120 meter intervals, can be manipulated to serve a specific programmatic need. Without carrying a signified meaning, the folies develop a clear symbol for the park while serving as an orientation device on the huge site. Superimposed within this grid is also a series of lines and a series of surfaces which define other park functions. The only meaning these elements achieve is an individual interpretation by a visitor.
Aldo Rossi, in *The Architecture of the City*, 1982, speaks of what he terms “urban artifacts” in the opposite sense. He notes when talking about ‘urban artifacts’ that certain major buildings in European cities have contained a multitude of functions over time yet “…these functions are entirely independent of the form. At the same time, it is precisely the form that impresses us; we live it and experience it, and in turn it structures the city” (Rossi 29). Then, contrary to Tschumi he is quick to add that artifacts develop in both ‘space and time.’ A new building cannot “…yet present us with that richness of its own history which is characteristic of an urban artifact” (Rossi 29). The experiences of everyone who has had contact with an artifact combine to define the city for Rossi. Over time a structure that was originally identified with a function will acquire its own quality, an aspect of its location and originality. He refers to amphitheatres to prove his point. The amphitheatre in Nimes, France was converted from a theatre to a small walled city for two thousand people. The value of the ‘primary element’ goes beyond the function by virtue of its form. (Rossi 87) That form, the signifier, signifies something else. Rossi describes cultural structures within a city whereas the plaza in York attempts to reconcile a current lack of structural cohesion. The grid and columns do not conjure inherent memories or reference a particular history much like Tschumi’s Follies do not carry a signified meaning. Rather, the York elements are the result of a universal method, a rigorous investigation about how to order varied elements and conditions. The resultant complex order references specific site conditions but is not site specific. A grid of columns is a universal order, not specific based on the history of a place. Density, scale, and materiality are variable factors but both the grid and columns are universal archetypal forms.
Hertzberger explains his definition of an archetypal form in “The Public Realm,” published in 1991. He also uses an amphitheatre as his example: a form strong enough to allow adaptation to functions as varied as fortress and plaza yet still be known by the form. “...[T]he same form could therefore temporarily assume a different appearance under changing circumstances, without the structure itself essentially changing” (16). The grid and subsequent field of columns provide this strong order for the thesis. They define a scale and a proportionality that will determine all future usage. Hertzberger speaks about “the paradox that the restriction of a structuring principle (warp, spine, grid) apparently results not in a diminution but in an expansion of the possibilities of adaptation and therefore of the individual possibilities of expression. The correct structural theme does not restrict freedom but is actually conducive to freedom” (18).

The grid of columns provides this framework within which many urban activities are possible.

In the modern city certain kinds of change are constant, this is the nature of urbanity. The plaza will provide a path for people walking to work in the morning, a place to buy and eat lunch at noon, and a place to meet a group of friends in a crowd of thousands before a baseball game in the evening. In the winter it may be flooded for ice skating or even enclosed and heated as a banquet hall. Fifty years from now the columns may serve as pilings in the case of an unusual flood. Through all of this change the grid and columns will remain establishing the order. The field is complete in itself at every moment in time. The plaza has an identity that remains regardless of how it is used. (18-20)
An Archetypal Form for York, Pennsylvania
Sun angle: 3:00 P.M. September 15th
A new typology was developed to create a permeable edge along Cherry Lane. Small units were developed which delineated both a definite edge to the plaza and a defined entrance and exit. Multiple small openings between buildings form a dense connection to the surrounding city. The Cherry Lane edge meets the back service side of retail and warehouse facilities. Early iterations tried to hide this edge but the plaza as a locus also serves as a generator of activity for the city. A permeable edge encourages new pedestrian oriented development thus increasing the density of the central business district. The nature of this locus is to be able to approach from all sides and provide a unique experience of the column grid and in the opposite direction of the town.
A clear intellectual order and hierarchy had to be developed which specified how individual elements could be used. The first decision was the creation of a structural armature which carries all loads and defines the grid within the buildings. The two foot diameter square column is the physical expression of the grid. It cannot be altered. The four armatures which extrude up from the subtracted space between the square and inscribed circle define a joint. Rules were established which state how the armature can be met. Most importantly, the four armatures, which make one column, are primary within the hierarchy of the building.

Second Level
The raised walkway creates an arcaded path beneath and a new perspective of the columns.
The study of Frank Lloyd Wright's manipulations of a tartan grid yielded new possibilities within the grid. For Wright, the grid was used to develop a plan which served as the 'generator' for a building. Within a strict grid he made both axial and pinwheel configurations which developed with the room as the primary form.

For Wright the 'room is a small building' where he sought to expand his formal choices to enrich the space. (McCarter 266) He manipulated the plan so as to create layers and define interlocking spaces. The corner serves as the primary definition of the space, often in the form of massive piers. The four column combinations (armatures) that compose the plaza building's grid work in a similar fashion. The heavy nature of the poured concrete armatures clearly marks the corner and all other elements depend on this strong corner. Directly connected to the column armatures, the roof forms a secondary element in the hierarchy. Within this structural frame of column and roof the floor and walls acquire a freedom to move out of the strict grid. Also secondary elements, they depend on the armatures for support. Similar to the manner in which Wright created individual elements, the columns, roof, floor, and walls are all independent. A direct hierarchy exists yet they remain separated.

15. George Barton House, Buffalo, New York, 1903, Frank Lloyd Wright
16. Analysis and modulation to create tartan grid, Frank Lloyd Wright
Manipulation of the grid and the addition of new elements used to develop the section.
(top down) Section, Elevation, Plan
The joint between these elements, the column armatures, offers the possibility of a lightwell or space for services. Wright developed the idea of ‘served and servant’ spaces which was later furthered and coined by Louis Kahn. The generosity of space found in a Wright pier, the physical manifestation of the small square within his tartan grid, provided room for mechanical necessities and secondary functions. The larger spaces served as the primary areas of activity. (McCarter 255-6) Kahn studied similar concerns in the bathhouse that was part of the Jewish Community Center in Trenton, New Jersey. Furthering previous study of a pavilion plan begun with the unbuilt homes for Adler and Weber DeVore the bath is noted for the “...visual clarity of the building, for each functional unit is distinctly defined by its own structural volume” (Brownlee 66). The small units serve as toilet facilities or vestibules and define the public space. In his notebook, Kahn defines “Compartmented Spaces: Space made by a dome then divided by walls is not the same space. ... A room should be a constructed entity or an ordered segment of a construction system” (Brownlee 66). A pyramidal roof defining the singular volume caps each of Kahn’s units.
The grid manifests itself in the roof in the form of a layered plate construction. Circles cut out of the roof plates form an interior dome which defines a room within the grid and the larger building. From the outside the horizontal plates break up the strong verticality of the columns and emit a soft light at night. The interior light emanating from the roof illuminates the buildings and the back edge of the plaza at night.
The next version of the three plaza buildings began to clarify the ordered yet not regular spaces contained within them. An idea about what encloses the building between the columns arose. Steel framed projections replaced tentative walls to define the space between the columns as a small room, part of a larger room defined by four columns. Within the hierarchy, they form another secondary element directly dependent on the columns. Connection to the columns is always made parallel to one of the wide sides. The five foot diameter circular inside of the four column armature remains connection free. These spaces serve a number of functions including both light well and vertical service corridor. The connection of a projection unit to a column never completely hides the column. The columns are always present to define a corner. Kahn uses a similar order in the Richards Medical Building at the University of Pennsylvania. Huge brick cores define the exterior façade and between them, projecting from a concrete frame, brick and glass projections create the corner. These projections frame a smaller more personal space on the edge of a large room. Within the plaza buildings, particularly the restaurant and coffee house, the projections enter the plaza physically and mark a place for one or two tables, which open on to the plaza. The steel frame is infilled with wood, the place where people inhabit the window and touch the building.

In section and plan, the combination of projection and column form a layer surrounding the central space. The entrance space between two columns compresses space even further. From this tight space, the interior opens up a step at a time, first with an edge unit and then to the open center atrium. The center space is revealed one step at a time.
The Corner Building
A Coffee House/Bar
Perspective, The Corner Building
Perspective, from the Old Cigar Factory
Toward the New Buildings
Plan, Section, Axonometric
Restaurant on left, Mens and Womens
Public Restrooms, center
Cherry Lane Park

Central Market

Parking Garage

Entrance to Underground Parking

Main Entrance, Proposed Minor League Baseball Stadium

Right Field, Proposed Minor League Baseball Stadium
To begin looking at the plaza surface and smaller nodes within the entire plaza, a small sandbox was built where different materials and conditions could be tested quickly. Texture, reflectivity, proportion, and a wide range of ideas were experimented with and photographed. (opposite)

The sandbox images led to a series of sketches exploring the plaza surface. However, the missing element for the surface was a successful pattern which could both tie the different elements together and also delineate separate places.

In addition, the top sketch shows a section through the center of the plaza where a pool of water with a glass bottom allows light into the parking structure below. The columns sink into the earth here to define the structure of the garage but are still present on the plaza.
Composed of different size ellipses, the pattern is based directly on the grid. Constructed in AutoCAD based on the major and minor axis length, the ellipses provide a dense surface texture. However, when they become solid and not lines, the pattern improves. A mosaic surface composed of four inch square pavers, the scale contrasts sharply with that of the monumental thirty foot tall columns. A dense cobblestone or paver surface often defined the best plazas in Europe, the patterns of which are evident on the plaza plans. The dense pattern makes the plaza a place for people. Uniform colors throughout create a singular surface yet various different patterns delineate specific places in the plaza.
The Initial AutoCAD line construction and subsequent shading to make solids
Perspective,
From the Raised Platform in Front of the
Old Cigar Factory Toward the Center
Section, Cut on a 45 degree angle to the grid, from the Parking Garage on the left to Right Field of the Stadium on the right
Section, Cut Perpendicular/Parallel to the Grid
The thesis provided a basis for an investigation into architecture. The project, a public plaza and path, necessitated a wide range of exploration. Initial studies of scale, proportion, and order informed the direction and development of the project. Early behaviorist concepts were refuted and replaced by a universal method. An archetypal form, the grid of columns, resulted. The columns, the buildings with each of their respective elements, and the pattern, all derive from the grid and create a cohesive and rationally knowable construction. They define every aspect of the project from the parking garage below the surface to the section of the buildings. Within the enclosed buildings, the order of column, roof, floor, and projection increases the overall level of complexity. Together, all the elements define an understandable form which serves as both plaza and path.
1. St. Peters, Rome, Italy

2. Campidoglio, Rome, Italy
Ibid

3. Piazza della Signoria, Florence, Italy
Ibid

4. Piazza San Marco, Venice, Italy

5. Sports Facilities Design Network Rendering

Ibid

7. York City Plan
City of York, Pennsylvania.

8. Parc de la Villette Folies

9. Parc de la Villette Plan

10. Registry Map of the Amphitheatre, Nimes, France, 1782

11. Registry Map of the Amphitheatre, Nimes, France, 1809
Ibid

12. Arena, Paysage de Provence, Arles

13. Engravings by J.B. Guilbert, 18th Century, Amphitheatre, Arles
Ibid

14. Arena, Lucca
Ibid

15. George Barton House, Buffalo, New York, 1903, Frank Lloyd Wright

16. Analysis and modulation to form tartan grid, Frank Lloyd Wright

17. Plan, Adler House, Louis Kahn

Ibid

19. Plan, Bath House, Trenton, NJ, Louis Kahn
Ibid

20. Bath House, Trenton, NJ, Louis Kahn
Ibid

21. Model, Jewish Community Center, Trenton, NJ

22. Plan, Jewish Community Center, Trenton, NJ
Ibid

23. Plan, Richards Medical Building, Philadelphia, PA,
Louis Kahn

24. ‘Projections,’ Richards Medical Building, Philadelphia, PA, Louis Kahn
Ibid

25. Ceiling Mosaic, San Marco Cathedral, Venice, Italy

26. Floor Mosaic, San Marco Cathedral, Venice, Italy


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