GAME-SPACE
Master of Architecture
Thesis
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GAME-SPACE
Student Game-Hall
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Abstract: Game-Space presents the development of a student game-hall on the campus of Virginia Polytechnic Institute and State University in Blacksburg, Virginia. The architectural theory that guided the development asserts that an intelligent translation of a building's physical and conceptual needs into a matrix of well defined layers provides a strong foundation for the creation of a cultivated space.
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Layers, Boundaries, and Architectural Distinction

An initial attraction to the task of designing a game-hall, besides a love of games, was that game-spaces do not have formal architectural archetypes from which direction should or could be drawn. Rather, this design project would require considering and addressing a variety of types of spaces in which one might enjoy the personal, and more often than not, leisurely pursuit of game-play.

Besides looking at the particular nature of a few choice games, several different player and spectator relationships were considered. As the design evolved, I began to think of these various arrangements as both physically and conceptually distinct layers or primary, secondary, and tertiary spaces. Interestingly, these layers changed from game to game and with the varying relationships of the players.

My goal however was not simply to create a design formula for translating programmatic requirements or social behavior patterns into spatial definition. It was to establish a conceptual outlook that differentiated and developed the types of spaces that comprise a game-hall. The particular nature of the games and the relationship of the participant(s) to the game and to each other guided this response. After establishing this framework however, it was my responsibility as a discriminating designer and game-player to form a cultivated space.
Analogous to the task of design, Bob Fancher in his seminal book *The Pleasures of Small Motion- Mastering the Mental Game of Pocket Billiards* explains, “Even when you must use ideas, how well you play depends on how well you get beyond the ideas into the sensuous imagination. Ideas never cease to be more than blueprints; you must always use them in service to, not instead of, the sensuous imagination.” The use of a conceptual thesis in design must only serve as a springboard for the designer’s imagination.

As a starting-point, the procedure of looking at and analyzing games and their surrounding circumstances in terms of distinct layers and hierarchical spaces proved to be well suited to my design sensibility and goals. Buildings that I admire and aspire to design have clarity of structure, both formal and conceptual. They have clearly defined spaces, if only subtly, and there is a clear expression of their parts with an articulate resolution of the intersection of the pieces- elegant joints.

In defining the gamehall’s layers, it proved more useful in many instances to articulate the nature of the boundary between two layers- describing types of vessels rather than the innumerable contents they may hold. Throughout the design process I intentionally utilized several different types of boundaries.

The boundary most fundamental to the construction of buildings literally divides spaces. A building’s envelope allows for a conditioned space and gives shelter from weather. Interior partitions further divide a space allowing for differentiation within.

Through architectural means, a change of space can also be implied without actually physically isolating an area. A column line, an over-head beam, or a change in floor level or material can signify a new space with a differing function.

Non-physical boundaries also define space. A focused light, such as a spotlight on a performer or a street lamp over a passing pedestrian, sharply defines an area to which the darkness becomes a boundary. Likewise, a shadow cast from a porch roof or beach umbrella defines an important space on a hot summer day. As the sun moves we slide our chair within the shade-line to avoid the direct rays and increased temperature an arm’s length away. Acoustical boundaries
are another form of non-physical boundary. Churches for instance often have isolated 'sound chambers' with glass walls functioning as boundaries. The voice of the officiant is allowed in and the cries of very young parishioners are kept from reaching out.

Theoretical boundaries are also very common. A building site's property line often does not have an actual physical relationship with the earth. An exception is urban buildings that hug their site lines, giving the property lines actual physical definition de facto. More often, however, land is divided by means of a grid or a developer's marketing scheme as opposed to following a stream or mountain line. And the buildings which follow are often sited according to regulated setbacks rather than taking their inspiration from the physical world.

The conceptual frame for the proposed game-hall consisted essentially in the reading and translation of boundaries into intelligible inhabitable spatial layers. The architectural success of this endeavor can be measured in both how well the integrity of a theory of spatial boundary was maintained under the weight of the site's and building's physical demands and perhaps in a projected enjoyment of the pursuit of game-play in this hall.
Site-Work

The game-hall’s site (1) is a central location among the campus’ athletic, residential, and dining facilities. It is an in-fill site and is tightly flanked by two dormitories (2 & 3), Dietrick Dining Hall (4), and Cassell Coliseum (5). The site’s primary use is passage. Students coming from the drill-field (6) traverse the site making their way toward the sports, recreational and health facilities and Washington Street (7) transit. Locating the game-hall here creates an in-line string with Cassell Coliseum and Lane Stadium (8) and requires the hall to function as a gateway to the university’s major athletic events. Designing the site and building to promote and enhance this passage was a primary concern.
The most utilized entrance to the site (opposite) brings pedestrians from the vicinity of the drill field into the site oblique to Dietrick Dining Hall. The current design also has placed the site’s two primary paths running adjacent to the dormitories, an unnecessarily circuitous path through the site in many instances.
The photograph on the left illustrates that the site’s layout has resulted in dirt paths crossing the it diagonally - the shortest distance from point A to point B in many instances.
This series of photographs above was taken from Dietrick Dining Hall, a tall two-story, monolithic concrete building whose courtyard extends into the site. Diners on the second floor look out into the quad. The two neighboring five-story dormitories are faced with rough-cut stone. Washington Street passes through the site and Cassell Coliseum is on its far side. Dietrick Dining Hall and Cassell Coliseum are two of very few buildings on the campus that are not Collegiate Gothic in design and faced with rough stone.
Besides its routine passage use, on game days the site functions as a crosswalk for thousands of Hokies as they parade from the parking lots on the far side of the drill-field to Lane Stadium. The photograph (left) depicts the parade upon entering the site—just before the stadium comes into view. The inadequacy of the current site’s paths and landscape design is clear on game-days as the parade digresses from the walk-ways through the plantings.
The game-hall addresses the site physically through the design of its massing and structure and conceptually through the geometry of its layout. A large cylinder anchors the logic of the building’s and site’s layouts. Running through the cylinder, a dominant axis connects the entrances of Dietrick Dining Hall and Cassell Coliseum. It is dominant because the body of the game-hall follows it. Crossing this axis, at the cylinder, a curvilinear path connects the primary entrance of the site, nearest the drill field, to the west end of the coliseum, which leads to Lane Stadium. This axis will serve as the most trafficked pedestrian path through the site. All entrances to the site are orientated directly toward its center and from this point, beneath the cylinder, one could easily change direction toward their destination.

The quad’s physical boundary of four buildings is redefined by a double band of trees. This boundary clearly delineates the building’s environment, hints at the building’s layout, and makes entrance into the immediate site unmistakable. This geometric forest reduces the scale of this outdoor space both vertically and horizontally. Washington Street is excluded from this layer and the trees soften the sharp edge of the five-story dormitories. The building’s geometry bleeds into this layer in the form of concrete paths and terraces further reducing the scale of the area and creating local spaces.
Early studies (opposite) show the design challenge of locating and proportioning the game-hall in relation to the existing structures. The over-sized massing of the game-hall in these studies created cavernous outdoor spaces between it and its neighbors and the initial attempt to work with the mirrored condition of the two dorms created a volume that overpowered the site. The solution (above), a scaled back version, allows the hall to both formally and conceptually agree with, yet not simply accommodate, this challenging site. The building stands as a very distinct form in the space and while it visually has a dominant presence, its addition is a great improvement in terms of pedestrian passage.
The final design is streamlined and low in profile. It creates two primary outdoor spaces in the site: a courtyard between it and Dietrick Dining Hall and a terraced field through which a path cuts. The cylinder and main body of the hall are each given platforms that both structurally and visually support them. From these platforms the design logic of the building bleeds into the site, geometrically articulating the landscape while addressing the site’s sloping grade.
The building is radial in its organization and combines very distinct centralized and linear elements. The cylinder is its dominant center and a large rectilinear hall extends from it. It also has very distinct auxiliary components. Each of the two main bodies has its own entrance and there is an intermediate bridge connecting the two, which helps each maintain its strong identity.
Responding to the concentric nature of the university’s master plan and the dominant pedestrian path, the entrance structure breaks with the building’s primary axis and is re-orientated toward the drill field. A single column supports an extended roof that announces the point of entry and provides shelter. The game-hall will function as a gateway to stadium here and as a landmark it will announce ‘near-arrival’ for the parading fans.
Elevating the building significantly facilitates pedestrian traffic through the site while allowing the building to maintain a strong physical presence. The path beneath it offers 300’ of shelter from the sun and rain for those crossing the site and reveals the building’s under-side, another face to further the architectural understanding of the structure. Two sets of distinct columns, round supporting the cylindrical form and rectangular supporting the linear body, form a colonnade beneath the hall. The columns, along with the ceiling and overhead beams, reveal the structure and basic composition of the building, allowing people the opportunity to map out in their minds the building’s overall configuration.
1. Drillfield Entrance
2. Washington Street Entrance
After an overview of the game-hall’s layout, this chapter will present four spaces within the building with which I explored and developed this thesis. They are an arena for billiards tournaments, a billiards hall for social play, a hall for board and computer play, and an arcade. Each of these spaces with different programmatic needs, both conceptual and physical, interestingly pushed the matrix of distinct layers in different directions.
1. Drillfield Entrance
2. Washington Street Entrance
3. Courtyard Bridge
4. Arena
5. Intermediate Bridge
6. Billiards Hall
7. Kiss-back Lounge
8. Courtyard Balcony
9. Birds-eye Lounge
10. Veranda
11. Board Room
12. Arcade
Within the arena the spectators’ layer physically dominates the space and has a very well defined, not casual, relationship to the players’ space. I chose pool as the game of choice for exploring the possibilities of a space suited for competitive play. The relationship between competitors in this game is particularly interesting because each player is given the “spotlight” until they surrender it- as opposed to most games in which a player could rely on the fact that she will have the next move- if she wants it or not. Here the opponent sits helplessly, sometimes through an entire game.

Each layer in the space is clearly defined in the diagrams (opposite). The tables are primary. The player’s space at each table is secondary and is defined by a finished concrete floor, which contrasts with the surrounding cut-stone. The sitting player is relegated to this space. The spectators are removed from the game floor entirely and are given the remainder of the arena including the 3rd floor mezzanine that gives the spectators a birds-eye view of the action.
An early physical model (above) studied a potential relationship between the columns and windows and the scale of the wall panels. Windows of uniform width were chosen for the final design.

Rather than creating a great distance between the players and the spectators, which would not be appropriate for a game of this scale, the spaces were differentiated by differing floor elevations and materials. The game floor is finely finished cut stones in a strong geometric pattern while the spectators’ area is monolithic concrete.
In section the arena is developed vertically as the ceiling above the game floor is open and continues into the clerestory—strongly defining the presence of this spatial field and clearly distinguishing the players’ and spectators’ respective spaces. The game floor has an inward focus and theatrical feel. Its floor is 4’ beneath the main floor, giving the competitors a specific introverted domain within the room and keeping visual distractions above eye-level. This also allows the spectators a great vantage point of the action, as they are free to circle around the sunken floor for a preferred view.
The details (above) depict the assembly that suspends the game-floor. The perimeter of the void in the main floor is reinforced with a 2' thick band of concrete. In it, eight threaded rods are cast in pairs. They support a pair of steel C-sections, the two primary structural members, on which rest the steel joists and floor deck. At game-floor’s perimeter, windows join the floor and concrete band.
Viewing the game floor from the stair landing (opposite above) we see our opponent warming up at the table. The hierarchy of layers is clear. The table is primary and the floor beneath is secondary. The remaining area of the game-floor is tertiary. The windows at floor level break continuity between the player’s and spectator’s spaces and a glass rail helps to quietly further differentiate the layers without impeding vision. From the player’s perspective, the 2’ think band of concrete between the rail and the windows creates a very strong visual boundary for this space. As a spectator (opposite bottom) we are allowed to move around the perimeter of the game-floor (within the fourth layer) to choose a preferred view. The space here is bounded by the glass rail and the exterior walls, which are fabric covered acoustic panels that assist in reducing the volume in this large space. From the lounge above (top), spectators enjoy a privileged view of the action (the fifth layer).
The second space is a recreational billiards hall on the 2nd floor of the hall. It contains 12 billiards tables and is joined by a curvilinear lounge. The lounge is elevated 2’ above the game-floor and serves for retreat from activity as well as a platform for viewing the scene below.

In this space, the boundaries that separate the player’s and spectator’s respective layers, are understated. This room’s layout is more democratic than the arena’s as it promotes free movement about it, encouraging the spectators to walk among the players. Boundaries are implied through material changes more than from distinct three-dimensional forms. Columns and intermediate overhead beams differentiate spaces, but allow the space to remain open.

In terms of layers, the game tables are primary. The floors beneath both the billiards tables as well as the spectators’ benches define the secondary layer. Although not actually adjoining one another, due to their similar material, proximity, and shared dimensional width, these two spaces have more in common than not. The tertiary layer is the remainder of the game-floor, which is given to passage as it makes its way to each and every table and bench. The final layer is the curvilinear lounge on the perimeter of the hall.
The grid, created by the columns and overhead beams, is spaced 24’ inside of column to inside of column. This increment was derived by the space needed for two pool tables. This grid supplies a geometric pattern of regularly spaced points and regularly shaped fields that are used to define a series of smaller spaces properly scaled for small group play. Although visual continuity is evenly maintained throughout the hall, each game table is given its own domain and groups of four delineated by way of the grid.
The large frosted window assemblies function as boundaries on several levels. They minimize distracting views, keep attention focused inward, and control glares and heat gain. They create a subdued light and warm surface effect and serve as backdrops for the scene below as viewed from the lounge. The section (opposite) shows the depth of the columns and overhead beams, which along with the floor definition are the primary architectural elements that define this space and its different layers. This section also depicts the players’ bench, which rises from the floor slab through the raised floor.
As the bottom row of glass panes is clear, those sitting have view of the site and passer-bys below. The floor beneath the benches in these studies (opposite) was not yet developed- supporting the assertion that differentiation, even when subtle, assists in creating a more articulate and interesting space. The studies (above) depict the aluminum slip-joint that joins the wood bench with the precast concrete posts. This design allows for joining misaligned elements. They also depict the notched ends of the bench, which hold players’ cues in waiting.
From the vantage point of a spectator standing in the elevated lounge, all the layers are apparent. The game tables are primary. The wood floors beneath the tables and benches are secondary. Their slight separation proposes different spaces while simultaneously allowing mingling at the tables. The tertiary layer is the remaining common floor that is given to passage. The column and beam system which helps reduce the scale of the room by differentiating local spaces is also apparent. The final layer is the lounge that is clearly defined by its elevation change and glass rail.
This hall is designed for traditional board and computer games. Because the playing field, that is the space between the player and game as well as the space between the opponents diminishes with board games, the number of layers diminishes as well. Spectators sit shoulder to shoulder with players in games of this scale resulting in personal space shrinking to a more intimate scale.

This space offers a range of types of places to play solitary computer games, games with one other person, or with a few friends—indoors or out. Various small table groupings, differentiated by the type of table as well as the flooring beneath them, create local secondary and tertiary spaces.
The third floor of the hall is a similar space to the billiards hall below but is manipulated in layout and scale to create a very different room. An opaque volume is inserted directly into its center, which reduces the scale of the space significantly. The windows are the same as those on the second floor, except that here it is the top tier of glazing that is clear—further limiting distractions to only the occasional passing cloud. The floor beneath the game tables is wood and the reminder, for passage, is steel. The ceilings over the tables are suspended wooden lattices, which reduce the scale of the space as well as the acoustic volume.
The table is incomplete, unusable essentially, without the game. Similar to the billiards benches in construction, a pre-cast concrete post passes through the raised floor and an aluminum joint mediates it and the wood carcass that holds the game-board. After selecting a game from the board storage and display racks, which are located between the columns near entrance to the game floor, a player would carry the board and piece box to their table and assemble it by placing the board within the frame and suspending the piece box from the table by means of a pinch-cleat.
The final space developed for the exploration of the thesis is an arcade. The design intent was to create a space isolated from the rest of the building, one that neither allows light and sound in nor out. In terms of layers the game-screens are primary and the players furniture is secondary. After that, the room becomes the tertiary layer that contains and absorbs the busy flicker of lights and cacophony of noises created by the eight game stations.
The room’s engineered wood frame is exposed and in-filled with dry stacked brick at the shared interior walls, which absorbs the room’s significant noise. Skylights, functioning as an implied boundary outside of the room, run the exterior perimeter of the room emphasizing its isolation from the rest of the building and washing its copper skin with light.
Inside visibility is low as the only light supplied is from the game-screens. Darkness edits the players’ surroundings, promoting concentration on the screen.
A final layer is created as game-play is literally projected from the arcade into the site. Games being played within the arcade will be randomly sampled and projected on the outdoor JumboTron that is part of the room’s exterior wall assembly. The spectators are removed from the players’ view all together- out of sight, out of the immediate space, out of the building all together.

The players’ game screens are primary. The players’ seating is secondary. The room, as an isolated chamber is tertiary. The JumboTron is the fourth layer and the site is the fifth and final layer.

Benches along the path and a constellation of stone slabs are provided for seating. The JumboTron could also be used as a live feed for projecting billiards tournaments from the arena, basketball games from the coliseum and football games from the stadium.
To accompany my thesis at the scale of object design I chose to try my hand at the art of the cue-smith.

Cue-making is an applied science with the specific end of making a functional tool. It is a design challenge like architecture in which performance and durability cannot be second to aesthetic preferences. It is an endeavor that requires an in-depth knowledge of materials including woods, metals, synthetics, adhesives, and finishes, as well as wood and metalworking skills to meet the labor-intensive building process that demands exacting tolerances- to the hundredth of an inch. It is also a design/construction process that offers the opportunity to work at a 1:1 scale.

The performance and durability of a cue is derived from its structural design and construction and material choices. The greatest challenge in building a jointed cue is to have it simulate the hit transmission and weight distribution of a quality one-piece cue. The wood-to-wood contacts of my designs enhance its hit transmission- the vibration that moves up the cue to the player’s hand to give her feedback on each shot. The sensitive choices and combinations of materials in these designs result in cues that are both aesthetically pleasing and play well.
As even properly seasoned wood has an internal tension, that is a tendency to orient itself in a particular direction, incremental turning (opposite top) allows for the gradual stress relief necessary for shaft wood. Each cut yields a smaller and smaller amount of movement in the wood so that by the final cut, the shaft’s natural orientation is straight. I averaged a week between cuts, taking off approximately 50/1000 or .50” per pass-.25” when the cues were near completion. The work was accomplished on a cue-smith wood lathe that is outfitted with a router, which is mounted on a carriage that runs the length of the lather bed and is controlled with a taper-bar.

Accurately tapping the shaft (opposite middle) is accomplished by securing the shaft in the lathe’s head-stock (the part of the lathe that does the turning) and securing the tap in the lathe’s tail-stock (the part of the lathe that moves up and down the lathe bed). The shaft runs through the mechanical “heart” of the lathe and the tip of the shaft is secured beyond. This operation is done by hand to allow for feeling the progress and not advancing so quickly as to crack the wood.

Shaping the tip (opposite bottom) is accomplished with a razor while the shaft is secured within the head-stock as well- it orientated in the opposite direction from the above mentioned procedure. The tip of a cue actually contributes more to a cue’s performance than any other part. When choosing a cue at the local hall, make your choice based on the integrity of the tip. A well-groomed tip has straight burnished sides and a curvature between that of a dime and a quarter. When pressing your fingernail into the tip it should make little or no impression.
The wood was purchased as 30" square stock from a reputable cue wood dealer to ensure it was properly dried. The pieces were joined with in-line hidden dowels and a two-part epoxy. The only other materials used were leather tips, synthetic ferrules, and rubber bumpers. One of the butts is made of Ebony and Birdseye Maple. The best pieces of Black Ebony (Western Africa), also called Gabon Ebony, are jet black. Because it is a heavy wood I used it only for rings and threads. It finishes beautifully to a mirror black. Birdseye Maple (USA) is figure grained and named because of its small to large eye like markings. It is not as stable as Hard Rock Maple so I reserved it for the butt of the cue. The other butt is made from Bubinga and Purple Heart. Bubinga (Africa), also called African Rosewood, is medium brown with a red tint with lighter red to purple streaks. Purple Heart (Central America and Tropical America), also called Amaranth, is a deep purple violet. Hard Rock Maple (USA), also called Sugar Maple and White Maple, was used for cue shafts because of its straight grain, high strength, and fine and even textures.
Design, like game-play, is a process of inquiry that proceeds without the next best step as a given. Unlike drills and puzzles, which are problems with existing solutions, games and designs, while having specific goals, have nearly innumerable paths to their attainment. A strong understanding of the principles of play, a sound strategy, and cultivated judgment are requirements for success for game-players and designers alike as each of their endeavors evolutionary processes- moving and counter-moving.

In conclusion, while game-spaces may not have architectural archetypes- that is, architects throughout the ages have not designed game-halls, great game-spaces definitely do exist all around us. Throughout history, and in all cultures, people search out spaces with particular qualities for game-play. These facts, in conjunction with my belief in great architecture, have produced my thesis- the game-hall as well as the theory: by translating the particular nature of a game and the particular relationship of the players and spectators into a matrix of well defined layers, an architect will be well equipped with a very strong conceptual foundation with which to proceed in the design of a cultivated space for game-play.
Bibliography

All work is by the author unless otherwise noted.

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Curriculum Vitae

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