504

Patient Control Mechanisms in the 19th century Asylums of England: A Comparative Space Syntax Analysis of Asylums Based on Patient Holding Capacity

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ABSTRACT

Using the justified-graph techniques of space syntax, this study aims to understand if patient control mechanisms changed when the patient holding capacity increased in the 19thcentury asylums of England. The processes of producing social relationships with the help of spatial configuration are unconscious and complex. Different concepts of space syntax describes these complex, unconscious processes (Rashid,2019). For example, Hillier and Hanson (Hillier et al.,1984)used the concept of strong and weak program buildings and reversed building types to explain the processes of generating control over users. Markus (Markus,1993)further explored the concept of generating control over a group of users in institutional buildings. This research uses some of these previous concepts for its purpose.

For this research, nine 19thcentury English asylums were selected from a British journal and analysed using the justified-graph method of space syntax. Case studies were divided into two-groups based on patient holding capacity (Bigger-asylums (BA): Asylums containing more than 1000-patients & Smaller-asylums (SA): Asylums containing less than 1000-patients). Various mechanisms for controlling patients' movement, surveillance, and interface were compared to find out if the controlling mechanisms changed when patient holding capacity increased in the asylums. In the case studies patients' accessibility was controlled by strict zoning, using security-gates, administrative buildings as gatehouses, walled gardens, labyrinthine plans, and deep spatial structures. Circulation routes used by caretakers were more ringy in the BAs compared to the SAs. In both categories, the administrative blocks occupied the central position between male and female patient-zones to facilitate supervision. In these BAs, a pre-decided up-hill location of the administrative blocks and the downhill location of patient areas supported constant surveillance from the up-hill. The caretakers (inhabitants) occupied shallow spaces and controlled access towards the deep patient (visitors) zones. All the asylums provided shortcuts using gated corridors, which were used and controlled by caretakers. Therefore, caretakers could

control the interface between different visitors (male and female patients) and the interface between the inhabitant (caretakers) and the visitor (patients).

KEYWORDS

Space syntax, Movement Control, Surveillance, Supervision, Interface

1 INTRODUCTION

Space Syntax is a research program that investigates structures of spaces (buildings, settlements, cities) with the help of some general theories to understand how space can be used as a key resource to organize the relationship between users. The spatial layout of a building works as a mechanism to organize this relationship between users. Bill Hillier and Julienne Hanson, introduced the space syntax methods in 1984 to understand how the spatial layout can influence human interactions that then produce the social relationships between users (Markus, 1993, p. 13). The process of producing social relationships with the help of spatial configuration are often unconscious and complex (Rashid, 2019, p.33). Different concepts are also used in space syntax to explain these complex and unconscious human relations in existing buildings (Rashid, 2019). Among the various concepts this paper investigates the spatial depth of buildings through the standard methods of graph analysis to identify whether and to what extent the spatial organization of asylum buildings demonstrate patient control mechanisms.

2 THEORY

This section discusses the space syntax measures used in this paper. The space syntax measures to quantify control and spatial hierarchy from graphs representing spatial layouts are discussed in the second half of this section.

2.1. Spatial Configuration

Space syntax converts the continuous spaces of a building into connected sets of detached units. How these set of units in a layout are related to each other is described by a network. In space syntax, the network of spaces and the possible relationships among the units of this network is known as ‘configuration’. Converting spaces into specific configurations helps the designer to designate different labels to individual spaces, assign different groups in individual parts of the building, and associate different conventions with individual parts of that building (Bafna, 2003, p.17). Similarly, space syntax helps to map out the prevailing social structure of the users in an existing building. Space syntax reveals the fundamental social logic of configured spaces (Bafna, 2003, p.17).

2.2. Justified graph:

Justified graph analyses how the spaces of a layout are related to each other and to the whole network of spaces using standard methods of graph (Rashid, 2019, p. 03). Justified graph or J-graph starts with drawing a Convex Map from a building plan. The Convex Map is a process of mapping a given spatial configuration by partitioning the spaces into fewest and fattest convex spaces (Bill Hillier, 1984, p .97,98). In general, a convex space represents a well-defined room, or any other spatial unit within which every position can be seen from every other position. In J-graph, nodes represent the convex spaces or rooms of a building plan, whereas the lines that link these nodes represent the connections between these spaces (Bafna, 2001, p.20.1).

For the purpose of this research, J-graphs were analysed using the asylum exterior as root (0) or starting point. They show the links between each individual building within the asylum complexes. In other words, J-graphs are used to demonstrate building-to-building connectivity rather than space-to-space connectivity inside buildings. Therefore, buildings with clearly differentiated functions were represented by a circle in the J-graph. The graphs are then arranged in layer with the root node at the starting layer, demarcated as 'layer 0'. Any buildings directly connected to the root node (0) then are placed in the next layer, demarcated as 'layer 1'. Any buildings connected to 'layer 1' but were not already included in the graph are then placed in 'layer 2', and in the same way the method continues until all the buildings are connected. Among many configurational properties of space syntax this study used depth, asymmetry, and choice. Depth and asymmetry are the essential components to understand power relations in buildings. In ordinary buildings (house, church, shopping mall) increasing depth signifies increasing power. But in an institutional (uncommon) building the normal relationship of depth and power structure is reversed (Markus, 1987, p. 14).

The depth of a space from another specific space can be measured by counting the intermediate spaces/layers in between the two spaces in a J-graph. When from a given space two other spaces are at the same depth level, this relationship is mutually symmetrical. In contrast, when from a given space two other spaces are at different depth levels, this relationship is mutually asymmetrical (Bafna, 2003, p.21). The graph looks deep with more layers or if the nodes are poorly connected with other nodes. The graph looks shallow with less layers or if the nodes are well connected with the other nodes in the graph (Rashid, Boyle, & Crosser, 2014, p.494). Choice describes the number of movement options one would have in a spatial layout. Choice is defined by the presence or absence of circulation rings in a layout (Khan, 2014, p.36). A layout with more circulation rings is a layout with more choices for movement. The opposite of a ringy circulation layout is the tree type circulation layout. A tree type layout lacks circulation rings therefore provides fewer choice for movement when compared to a ringy circulation pattern. In a tree type layout, the movement is highly regulated as well as predictable. Spaces lying on the former category have at least two routes, whereas those lying on a tree have no alternative routes or no choice of movement (Markus, 1987, p. 14). According to Hanson (1998), tree type layouts generate “highly framed social interaction”. A person of high professional rank or in a controlling position occupies the tip of a tree type configuration, example: bank managers, school principles. To reach the tip of a tree like spatial structure one needs to travel through the corridors, stairs, internal office areas and waiting rooms (Markus,1993).

Figure 1 shows four similar floor plans and their Justified graphs. These plans are identical but the entrance and interconnection between spaces are different. Each space of these plans is demarcated as nodes and justified in the graphs of 2nd row considering the outdoor space as root (demarcated by cross in a circle). The J-graphs are different because the spatial interactions are different. In graph (a) spaces (2,3,4,5,6) are shallow as they are in a symmetrical relationship with the root therefore, they represent same status. Whereas space number 7 and 8 are in the deepest level when compared to other spaces in the graph, therefore, hold the hierarchical positions. In graph (b) spaces (3,5) are deeper than space (2) as they are in an asymmetrical relationship with the root. Graph (c) is ‘ringy’ because it offers many choices of movement from the root point where as graph (d) is tree type because it offers only one movement route, no alternative routes, or no choice of movement.

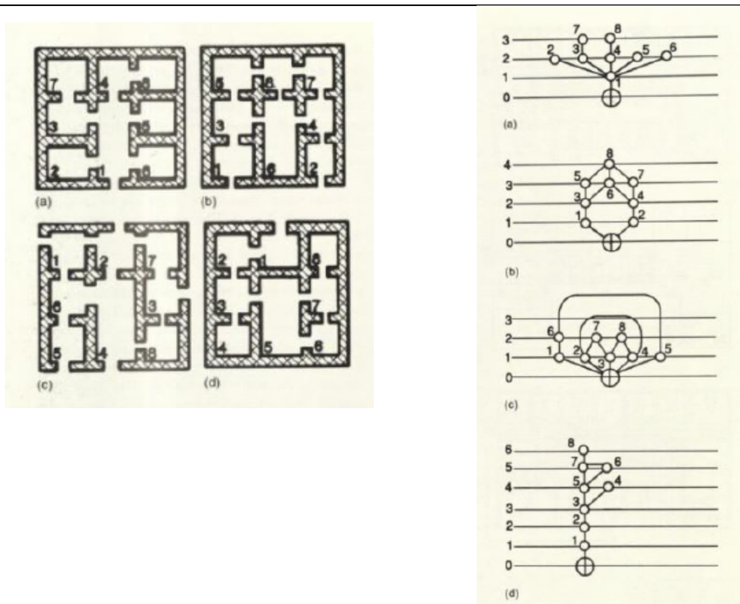


Figure 1: J-Graphs representing floor plan (a,b,c,d)

J-graph technique assumes that spaces within buildings or buildings within complexes are continuous and structured (Markus, 1993 , p. 13). Buildings incorporate two categories of users: i) the inhabitants: who contain the right over the space and controls the space and ii) the visitors: who contain temporary right over the space use. Inhabitants are in command of the social knowledge assigned to the space, examples: family member in dwelling, doctors in hospitals, caretakers in asylums, teachers in schools. Whereas, visitors are subject to social knowledge assigned to the space by the inhabitants, examples: guests in dwelling, patients in hospitals, students in school (Hillier, Hanson, & Peponis, 1984 , p .65, 66). Hillier & Hanson (1984) proposed that arrangement of spaces in a building can produce two kinds of interfaces: interface between the inhabitants, and interface between the inhabitants and the visitors. Designers can control these interfaces by configuring the spaces of buildings. For example, in a hospital building, spaces are usually configured ensuring more visibility and accessibility of nurse stations to encourage better interactions between nurses and patients, but less visibility and accessibility of the surgery area to confirm fewer encounter between surgeons and patients. Based on the discussion, the caretakers are the inhabitants of these case study asylums, whereas the patients are the visitors.

2.3. Interface in an Ordinary vs. Uncommon building

In ordinary buildings (ex: residence, office building, shopping centers, libraries), the depth of a space indicates status of the user and the level of privacy associated to that space. Inhabitants with higher status control other spaces from their deep space. The hierarchical position can be quantified from the depth level or layer number assigned to that space. Mutual asymmetrical relationship of spaces can also represent hierarchical position of spaces.

On the contrary, in uncommon buildings (ex: any institutional buildings, disciplinary buildings, hospitals, prisons, asylums), spatial hierarchy cannot be determined from the relationship of mutual asymmetry. The depth structure of these buildings is inverted. Visitors occupy deeper spaces of uncommon buildings since inhabitants occupy shallow spaces and control deep spaces. For the ease of control, a limited number of inhabitants (supervisors in prisons, caretakers in asylums, doctors in hospitals) occupy the shallower spaces, whereas a large number of visitors occupy the deeper spaces that have the least connectivity with the rest of the spaces. In these buildings, control is operationalized by inversing the depth structure and controlling interfaces between different user groups. The asymmetrical relationship of spaces cannot be determined from the of spaces because here the equivalent classes do not occupy same depth levels. For example, in an asylum different patient ward can occupy different depth level depending on their class. It is possible that patients with higher status can occupy shallow spaces whereas patients with lower economic status can be in deep spaces. Different depth levels of the patients facilitate the uneven distribution of resources and connectivity. Although equivalent classes hold different depth levels, they occupy the same depth from their controlling spaces (example: supervisors' room, observation tower). In uncommon buildings, spatial hierarchy is determined by the identification of control points, users of those points, and the relationship of the control points and the deepest spaces of the building. Hiller and Hanson (1984) referred these buildings as the 'reversed type' (ex: institutional building) (p.67).

3 DATASETS AND METHODS

All the case studies are analysed using the J-graph methods to quantify the abstract concepts of control, supervision, and interface. The process of quantifying abstract concept of control, supervision, and interface from the concrete material spaces will be discussed in this section. As an example, two case studies one of the smaller case studies (The Essex County Lunatic Asylum) and one of the bigger case studies (Middle Sex County Lunatic asylum) will be analysed below.

3.1. THE ESSEX COUNTY LUNATIC ASYLUM

The Essex County Lunatic Asylum was a walled complex with two main entrances; one from the administrative block (6) and the other was from the chapel (9). The administrative block (6) was directly accessible from the exterior point (0) therefore occupied depth 1 (Figure 2 & 3). All the other buildings were accessible through the administrative building (6). The kitchen block (7) was directly connected with the administrative block (6) therefore occupied the 2nd depth level. The kitchen block (7) connected the administrative block (6) with the patient side through a corridor (C15). As indicated in figure 01 the whole complex was also connected through the outside walkways. The outside connections formed by the walkways made the layout more ringy and provided more choice of movement. For these outdoor connections, the asylum was shallow from the main entrance. Inside the asylum complex, access to individual buildings was also managed with locked gates (marked on the drawing by double bar). Since the outdoor circulations were probably not used frequently in the cold English climate, this discussion is more focused on interior connectivity patterns.

Surveillance and Supervision:

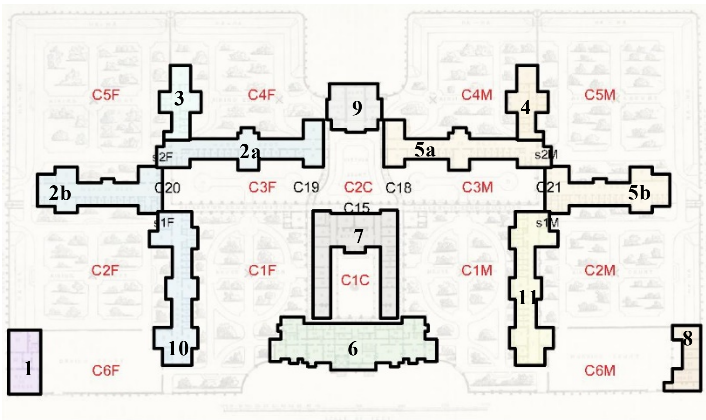
In the Essex County Lunatic Asylum, four reasons can help explain the surveillance situation in the working zones. From the administrative block (6), both male and female patient residential blocks (5a,5b,2a,2b) were three steps away, whereas both male and female working blocks/workshops (8&1) were only two steps (Figure 02). Usually convalescent patients worked in workshops, therefore both male and female convalescent patients' residential blocks (11 & 10) were closer to the administrative block (6) when compared to the other patient blocks (5a,5b,2a,2b). Both working blocks (8 & 1) direct outdoor connections and one step away from the administrative block (6). No other patient blocks had such direct outdoor connection with the administrative block (6).

Both male (8) and female (1) working zones had direct visual connections from a tower located inside the administrative block (6). Therefore, both accessibility and visibility were used to define surveillance in the layout of the complex.

Control of People and Movement:

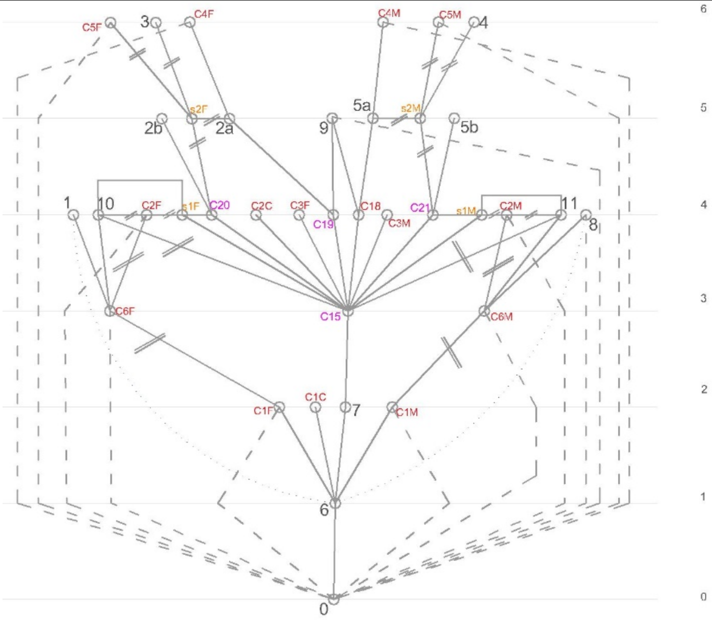
The administrative block (6) was the main entry point that connected the asylum complex with exterior (0). The administrative block (6) worked as a control point between the inside and outside of this asylum. In this ‘E’ shaped asylum complex, the administrative block (6), kitchen (7) and chapel (9) occupied the central wing, whereas the male and the female patient units occupied the peripheral wings. Therefore, the administrative and service section was a physical barrier between the male and the female side. Both the patient sides were (internally) connected through a central circulation (C15). Two gates, one at the male side another at the female side, divided the corridor (C15) into three segments. When the gates were closed, the male and female sides were completely isolated from each other, as well as the central kitchen zone (7). Therefore, this corridor was the control point between the male and the female patient sides. In brief, the administrative block (6), and kitchen block (7) along with the corridor (C15) worked as control points and ensured controlled movement of patients.

Patient wards assigned to different patient classes had adjacent courtyards separated by high fence to control patients’ interactions. For example (figure 1) in the female side, courtyard for residential patients (C5F) and courtyard for infirmary patients (C4F) were separated by high wall and to control patient interaction. The male airing courts had similar controlling mechanisms.



	C Corridor Number (ex: C15)		C Number (M/F) (ex: C15F) Garden		S Number staircase (M/F) (ex: S3F)
F	Working Block (1)	Residential Block (2a)	Residential Block (2b)	Residential Block convalescent patients (10)	Infirm Block (3)
M	Working Block (8)	Residential Block (5a)	Residential Block (5b)	Residential Block convalescent patients (11)	Infirm Block (4)
	Entrance Block (6)	Chapel (9)	Kitchen Block (7)	Coal Store	

Figure 2: Exeter Lunatic Asylum (1857)



	Direct connections		Visual connections
	Connection to the carrier space		Lockable gates

Figure 3: J-graph _ Essex Lunatic Asylum (1857)

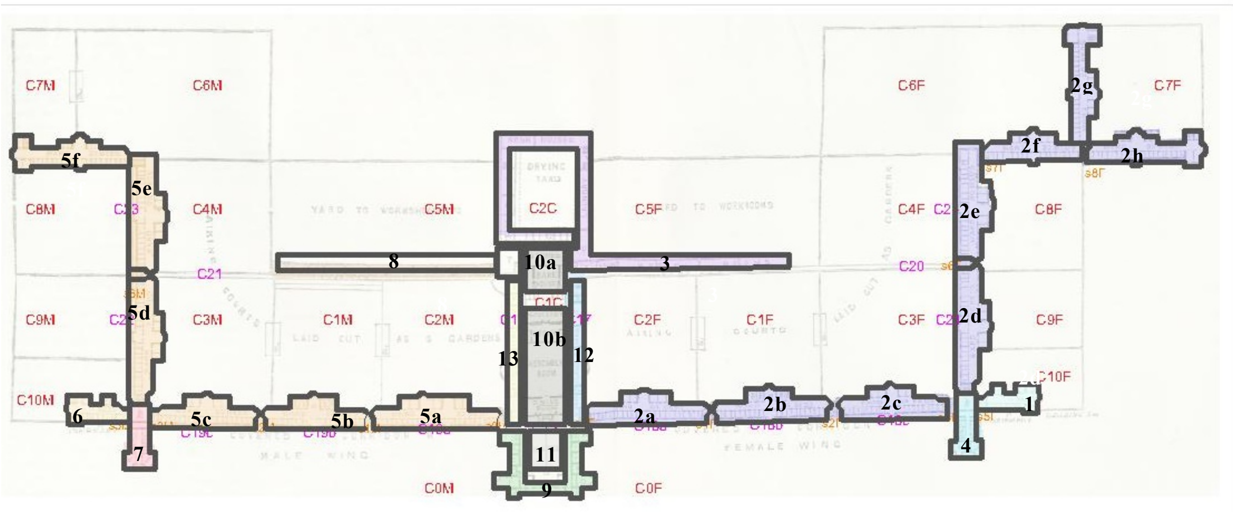
Interface:

Like the depth structures of most institutional buildings, the depth structure of this asylum was also reversed. Patients (visitor) occupied the 4th and the 5th layer (patient residential blocks 5a,5b,2a,2b and infirmaries 3,4), and caretakers (inhabitant) occupied the 1st and the 2nd layer (administrative block 6 and kitchen block 7). Put simply, a small number of caretakers occupied the shallow spaces, and a huge number of patients occupied the deep spaces. Then again, the shallow spaces were the also the control and access points of this asylum as described in the previous paragraph. Therefore, the caretakers occupied the shallow spaces of this asylum and controlled access to the deep spaces of the patients' residential zones.

The corridors (C19, C18 and C15) between the administrative block and the patient blocks were gated. Caretakers had the right to regulate these gates as needed. For them, this asylum was shallow, and the circulation was ringy as they were allowed to use these corridors and operate the gates. In contrast, for patients the asylum layout was a tree-like graph as the shortcut corridors were restricted for them. The asylum was deep for the patients, but it was deeper when the corridors were locked up. The gates of the corridor allowed caretakers to control the interface between the male and female patients (visitors) as well as the interface between the caretakers (inhabitants) and the patients (visitors).

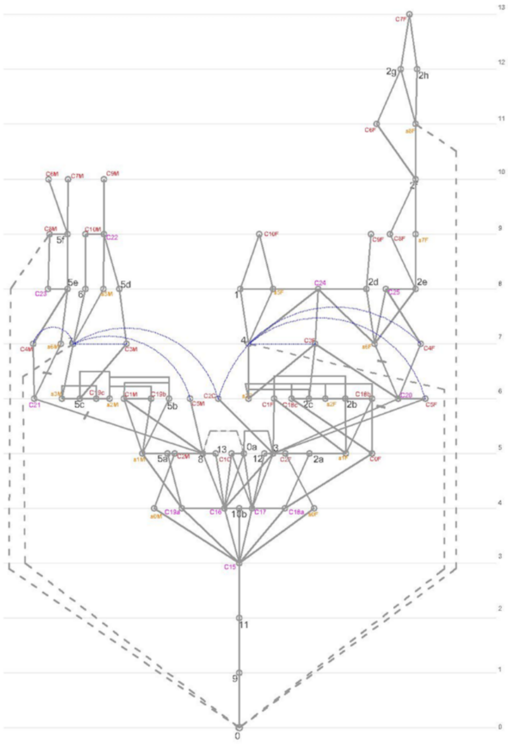
3.2. THE MIDDLE SEX COUNTY LUNATIC ASYLUM

The Middlesex county lunatic asylum was laid out in the form of an ‘E’ with enclosed courtyards and gardens for 1200 patients on 119 acres of hilly lands (The Builder Vol. 9 July 5 1851 Page 415, 1851). The floor plan and J-graph of the Middlesex County Lunatic Asylum are shown in figure 4 & 5. The primary entrance was from uphill through the administrative block (9) located at the central wing of the ‘E’ shape. Apart from the main entrance, four areas had direct outdoor access: two attendants’ blocks (7 and 4) located on the uphill, one of the male courtyards (C8M) and one of the staircases on the female side (S8F).



	C Number (ex: C15)	Corridor	C Number (M/F) (ex: C15F)	Garden	
	S Number (M/F) (ex: S3F)	Vertical Stair+ staircase			
F	Infirm Ward: 1	Residential Ward: 2a-2h	Working Block:3	Attendant’s Residence:4	Multi-purpose use: 12
M	Infirm Ward: 6	Residential Ward: 5a-5f	Working Block:8	Attendant’s Residence:7	Multi-purpose use:13
	Admin Block:9			Chapel :11	
	Kitchen and miscellaneous service Block: 10a-10b				

Figure 4: Middlesex County Lunatic Asylum, Colney Hatch (1851)



	Direct connections		Visual connections
	Connection to the carrier space		Lockable gates

Figure 5: J-graph _ Middlesex County Lunatic Asylum, Colney Hatch (1851)

Site and Surveillance:

The site had a north to south slope. Due to the slope, the side wings of the asylum were 15 feet lower than the middle wing. This slope ensured uninterrupted supervision some of the airing courts, working yard (C5M, C5F) and drying yards (C2C) located on the downhill from the uphill administrative (9) and attendants' zone (7,4) (Figure 4 & 5, blue dotted lines represent the visual links). In the 119 acres site physical supervision was not possible so, the attendant use visual supervision as an alternate tool.

Control of people and movement:

1. Both caretakers (inhabitants) and patients (visitors) had only two choices to get inside the building complex, either through the administrative block (9), or through the attendant blocks (7 and 4). Both the blocks worked as control points for access inside the asylum.
2. In this 'E' shaped asylum, the administrative section occupied the central wing, creating a physical barrier between the male and the female sides that occupied the peripheral wings. Both the patient sides were connected through two gated circulation corridors (C15 and C20+C21). Caretakers were able to control the gates of the corridor as well as the movements between the two patient sides. When the corridor gates were closed, the male and

the female sides became completely separated from each other, as well as from the central kitchen zone (10).

3. Similarly, male and female patient wards assigned to different patient classes had adjacent courtyards but were separated by high fence to control patient movement.

Interface:

Spaces for caretakers (inhabitants) were shallow (administrative block (9) was one step away and the chapel (11) was two steps away), whereas spaces for patients (visitors) were deep from exterior space (0) (patient blocks were minimum 5 steps and maximum 13 steps away). The attendant blocks (4 and 7) were on layer 7 of the graph, however, both these spaces were connected with the exterior space (shown in dotted line), so both the spaces were in the shallow outer zone. The caretakers (inhabitants) occupied the shallow spaces of this asylum and controlled access towards the deep spaces which were the patients' residential zone. Therefore, the depth structure follows the convention of institutional buildings.

Both the patient sides were connected with the administrative zone through two shortcut gated circulation corridors (C21: male side and C20: female side). Caretakers were able to control the gates of the shortcut corridors as well as the movements between the two patient sides. When the corridor gates were closed, the male and the female sides became completely separated from each other, as well as from the central kitchen zone (10). Patients were not allowed to use these shortcut connecting corridors, instead they used the main 1350 ft long corridor, therefore for them the asylum was deeper. Caretakers (inhabitant) controlled the interface between the male and female patients (visitors) and interface between the caretakers (inhabitant) and the patients (visitor).

4 FINDINGS OF J-GRAPH ANALYSIS

Using the methods described in the previous section, the findings of J-Graphs are discussed in this section. The case studies area discussed under the same titles: Surveillance and supervision, Control of people and movement, Interface. The findings for the smaller and bigger asylums are addressed separately as the mechanisms for controlling interfaces, conducting supervision, and access regulation pattern were different in these asylums.

4.1. Smaller Asylum:

Among the nine case studies, seven asylums were smaller in size and patient capacity. The Norwich Asylum (1877) was designed as pavilion plan asylum, therefore was exceptional out of the seven case studies. As a result, the findings of all six smaller case studies (Essex County Lunatic Asylum, Exeter City Asylum, Carmarthen Lunatic Asylum, Lunatic Asylum

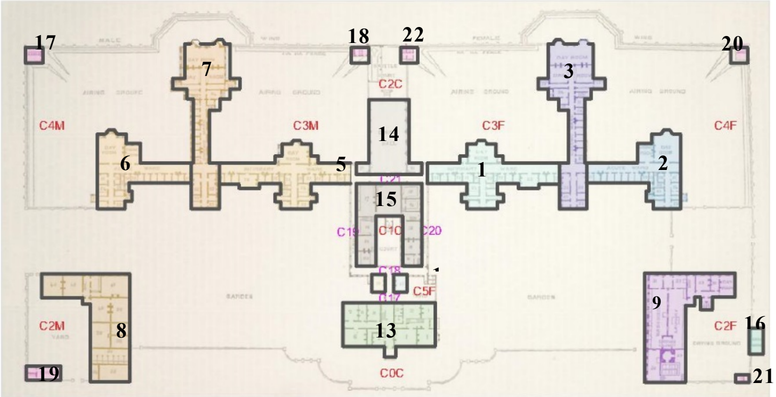
Abergavenny, Eglinton Lunatic Asylum, Bethlem Hospital) are enlisted together in Table 1. Findings of the Norwich Asylum is described separately.

Six Smaller Asylums			
		Analysis	Example
Surveillance and supervision	administrative block	Central position of administrative block in between male and female sides facilitated supervision	All six asylums
	architectural components	The working courts (C6F, C6M) were under visual surveillance form watch tower located in administrative block	Essex County Lunatic Asylum
		Courtyards under visual surveillance form administrative block (7) which was taller than other blocks	Carmarthen Asylum
		Caretaker moved through shortcut corridor that connected administrative zone to working zone	Essex County Asylum, Exeter City Asylum, Carmarthen Lunatic Asylum
Control of people and movement	Control point	main entrance through the administrative block. Administrative block was control point that connected the exterior space. Administrators in-charge of this block and controlled patients' access from asylum exterior space.	All six asylums
	Control gates of connecting corridors	U/E/ H shaped asylums administrative block occupied central zone and patients occupied peripheral zone. Patient zones were connected to each other by gated corridors that go through administrative block. Administrators control the gates and manipulate patient movements.	Lunatic Asylum Abergavenny, Eglinton Lunatic Asylum, Essex County Asylum, Carmarthen Asylum, Exeter City Asylum
	Walled courtyard control patient interaction	adjacent courtyards were bounded by high fences to control the interaction between different patient classes	Lunatic Asylum, Abergavenny, Essex County Asylum, Exeter City Asylum, Bethlem Hospital
Interface	Reversed type buildings	caretakers (inhabitants) were in shallow spaces, whereas the patients (visitors) were in deep spaces	All six asylums
	Access control	From the shallow administrative zone small number of caretakers controlled the access toward the deep patient spaces	All six asylums
	Shallow for working patients block	In three asylums the working blocks had a direct connection to asylum exterior point, as a result, asylum was shallow for the working patients compared to the other patient groups.	Exeter Asylum, Essex County Lunatic Asylum, Eglinton Lunatic Asylum
	Shallow for working patients yard	In three asylums the working yard had a direct connection to asylum exterior point, as a result, asylum was shallow for the working patients compared to the other patient groups.	Essex County Lunatic Asylum, Eglinton Lunatic Asylum, Lunatic Asylum at Abergavenny
	secondary shortcut corridors	only direct connection between the male and the female patient sides through corridor of administrative block. For the shortcut corridors caretakers had many movement options; for them the asylum was shallow. Without the shortcut corridors patients had less movement options for them the asylum was deep.	All six asylums
	Walled courtyard control patient interaction	adjacent walled courtyards controlled the patient-to-patient interface	Lunatic Asylum, Abergavenny, Essex County Asylum, Exeter City Asylum, Bethlem Hospital

Table 1: Findings of J-graphs of smaller asylums

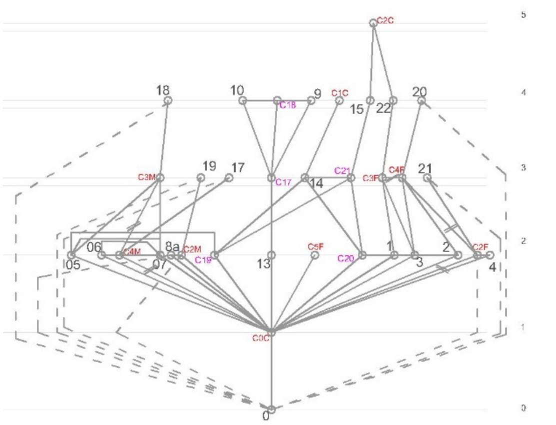
4.2. Exception in Smaller Asylums (the Norwich Asylum):

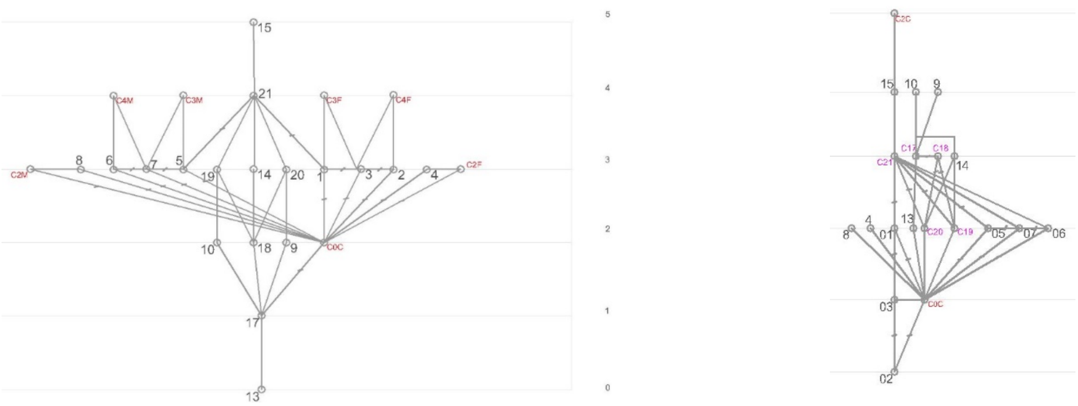
The control, supervision and interface of the Norwich Asylum differed from the six other small sized asylums. Constructed in 1877, this asylum was designed as an earlier example of the pavilion asylum. Figure 6 shows the J-graph for The Norwich Asylum, whereas figure 7 show the J-graph from admin section to the patient wards and opposite respectively. Findings of the J-graph analysis of Norwich asylum is presented in Table 2.



F	Infirm Ward (1)	Acute Ward (2)	Chronic Case (3)	Working Block+ working patient residence (4)	Reception and Visitors room (9)	Control Point (20-22)
M	Infirm Ward (5)	Acute Ward (6)	Chronic Case (7)	Working Block (8a)	Reception and Visitors room (10)	Control Point (17-19)
	Admin Block (13)			C Number (ex: C15)	Corridor	
	Kitchen Block (14)	Dinning Block (15)	Dead house (16)	C Number (M/F) (ex: C15F)	Garden	

Figure 6: Master Plan _ The Norwich Asylum (1877)





	Direct connections		Visual connections
	Connection to the carrier space		Lockable gates

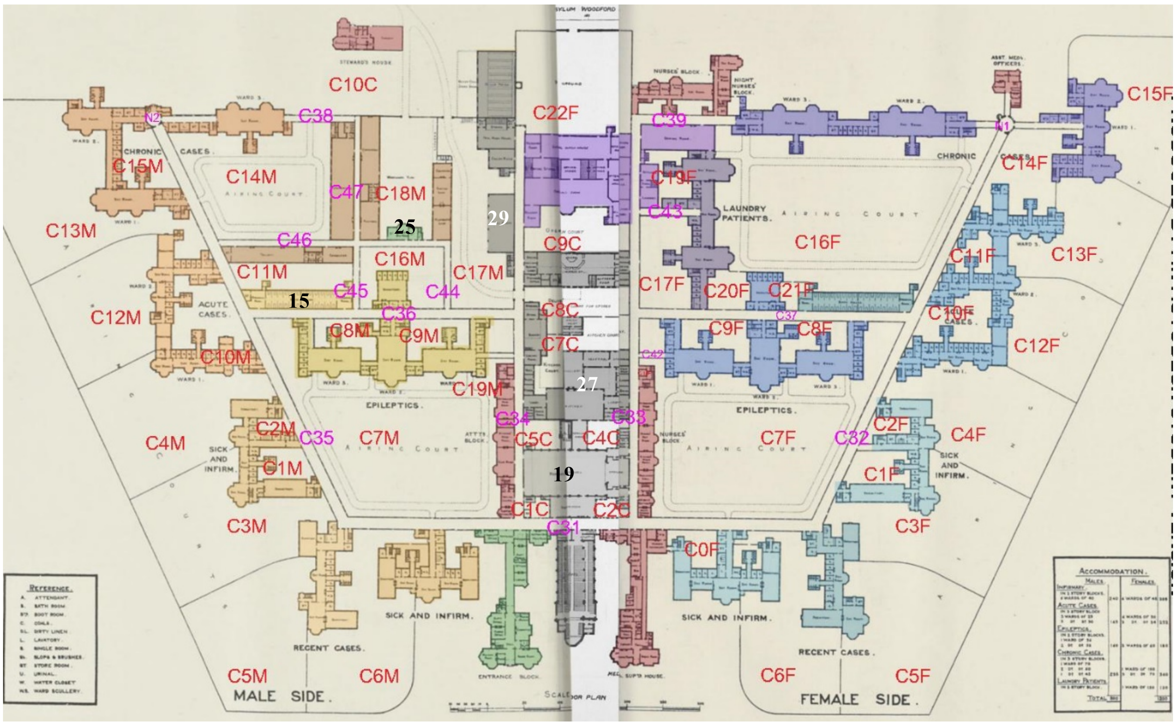
Figure 7: The Norwich Asylum (1877)
Left image: J-graph From admin block to patient ward (Partial J-graph)
Right Image: J-graph From patient ward to admin block (Partial J-graph)

Exception in Smaller Asylums (the Norwich Asylum)		
	Use of Design Elements	Description
Surveillance and supervision	Multiple security control point (17,18,19,20,21)	asylum complex was divided into seven walled segments where each segment had individual supervisors or caretakers. Six gate houses accommodated additional supervisors, who could control patient access in-between these seven segments.
Control of people and movement	Entrance through unconfined garden (COC)	The entrance of this asylum was through garden (COC). All the patient wards (1,2,3,5,6,7), the working blocks (8,4) including the administrative block (13) were in the same layer of the J-graph, one step away from the garden (COC).
	Control at the gates (hidden controlling in garden)	The asylum had six segments and six gate houses regulated visitors' entrance inside each segment.
	Gated entry at each patient ward	Individual patient wards were designed as self-sufficient pavilions. Access to each pavilion were controlled by gates.
	Walled courtyard control patient interaction	adjacent courtyards were bounded by high fences to control the interaction between different patient classes
Interface	Apparently shallow for both caretakers and patients	This asylum was shallow for both caretakers and patients, since they could use pathways in the gardens to get to different buildings.
	Deep for the patients when landscape connections omitted	In cold English weather outdoor pathways might not have been available for use throughout the year. When movement became confined within buildings, patient spaces were deeper than caretaker spaces in this asylum. The caretakers had many choices in their movement route from the administrative block to the patient wards (figure 8.8). In contrast, the patients had limited choices for movement as the wards were gated and for them the asylum layout was tree type (figure 8.8).

Table 2: Findings of J-graphs of Norwich Asylum

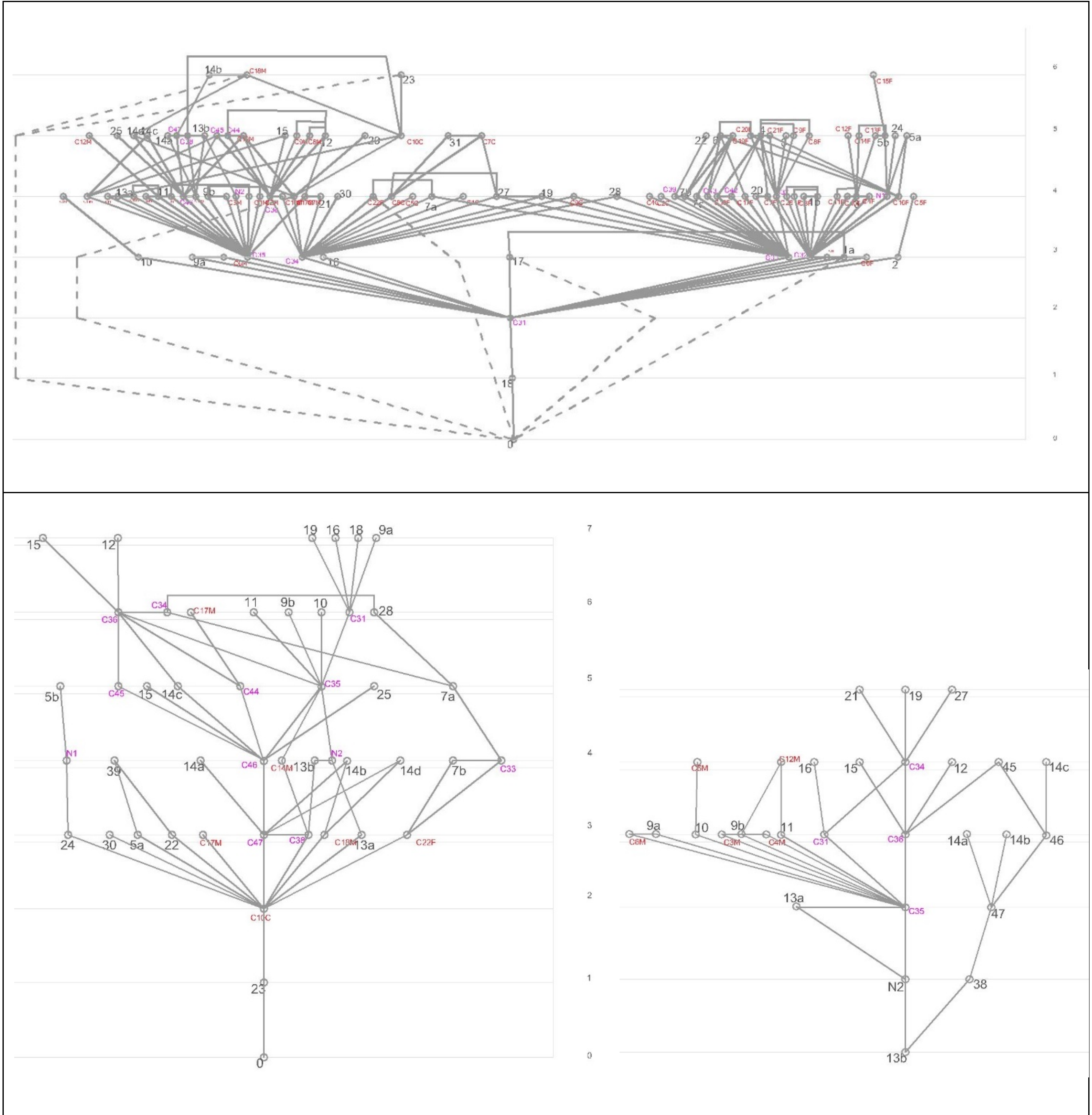
4.3. Bigger Asylums

Among the nine case studies, two asylums were bigger than the others in size and patient capacity. I Findings of Middle Sex County Lunatic asylum has been discussed in the half of this chapter. Findings of the Middlesex Fourth Asylum, Clay Bury Essex (1889) are addressed in Table 3. Figures 8 and 9 show the J-graphs of the Middlesex Fourth Asylum, Clay Bury Essex.



F	Sick & Infirm (1a)	Sick & Infirm (1b)	Recent case (2)	Acute Cases (3)	Epileptics (4)	Chronic Case (5a)	Chronic Case (5b)	Laundry Patients (6)	Work Zone (7a)	Work Zone (7b)	Work Zone (7c)	Bath House (8)
M	Sick & Infirm (9a)	Sick & Infirm (9b)	Recent case (10)	Acute Cases (11)	Epileptics (12)	Chronic Case (13a)	Chronic Case (13b)	Work zone (14a)	Work zone (14b)	Work zone (14c)	Work zone (14d)	Bath House (15)
	Entrance Block (18)	Chapel (16)	Recreational Block (19)	Medical Superintendent block (17)		Attendant Block (21)	Night Nurse Block (22)	Stewards House (23)	Small Office (25)	Asst. Medical Officer Block (24)		Nurse Block (20)
		Kitchen Block (27)		Stewards Block (28)		Coal Store (29)		Boiler house (30)		Kitchen Block 1 (31)		

Figure 8: J-Graph _ Middlesex Fourth Asylum, Clay Bury Essex (1889)



	Direct connections		Visual connections
	Connection to the carrier space		Lockable gates

Figure 9: J-graph _ Middlesex Fourth Asylum, Clay Bury Essex (1889)

Left image: J-graph of from stewards' block to male patient block (Partial)

Right Image J-graph from male patient block to chapel (Partial)

Middlesex Fourth Asylum at Clay Bury Essex (1889) (Bigger Asylum) (Figure 8 & 9)		
	Use of Design Elements	Description
Surveillance and supervision	Constant surveillance from uphill to downhill	The asylum was built on hilly site where administrative buildings (16,17,18) occupied the uphill position and patient zones the downhill location. This hilly arrangement helped constant surveillance from uphill to downhill.
	Distributed Attendant' offices in Multiple locations	The asylum complex was divided into segments, where each segment had spaces for individual attendants. Attendants surveilled their designated zones from their small office spaces (23,22,24,25) that were distributed in various locations to ensure proper supervision.
	Shortcut corridor+ Ringy circulation for caretakers	The asylum had shortcut corridors (33, 34), controlled by the caretakers. The circulation was ringy. When the asylums grew, the circulation became more connected to remain efficient. Caretakers used shortcut corridors and reached to the patient spaces quickly.
Control of people and movement	Entrance block (18) as control point	The entrance block (18) and linking corridor (C31), created the only connection between the asylum exterior point and interior. The caretakers (inhabitants) were in-charge of the entrance blocks and controlled patients' (visitor) access inside asylum.
	Shortcut corridor (31, 33, 34)	only direct connection between the male and the female patient sides through corridor of administrative block. For the shortcut corridors caretakers had many movement options; for them the asylum was shallow. Without the shortcut corridors patients had less movement options for them the asylum was deep.
	Walled courtyard control patient interaction	adjacent courtyards were bounded by high fences to control the interaction between different patient classes (Ex: C3M and C5M).
Interface	Corridor controlled by Administrators	The administrative blocks were at the centre in between the male and the female sides. Circulation corridors connecting both the patient sides (34, 33) were controlled by the administrators. The administrative block did not link the two sides rather prevented communication between caretakers (inhabitants) to patients (visitors) as well as male and female patients (visitor).

Table 3: Findings of J-graphs of Middlesex Fourth Asylum

4.4. Over time changes in the Spatial Relationship of Asylums:

Findings of the J-graph analysis illustrate that all the case studies were laid out to support patients' movement control, patient supervision, and patients' interface control. The control mechanisms of the smaller asylums were almost similar in the case studies. The Norwich Asylum (1877) had very different spatial relations that results to more structured way of patient control. According to the journal, this asylum was built as a pavilion plan asylum. Each patient ward was self-sufficient and did not depend on the central asylum functions like kitchen, dining. The Norwich asylum was divided into seven segments where each segment was bounded by wall. All patient wards were one step away from the main garden area at the entrance (C0C), that means shallow for both caretakers and patients. According to the structure of institutional building not where patients (visitors) are supposed to be. Six gate houses controlled the entrance points of each segment, whereas each pavilion had entry gates controlled by the care takers. Patients had to use the landscape pathway and pass through the gate houses as they were not in charge of the gates. As a result, for the patients the asylum was deep.

Among the two bigger case studies the latter one Middlesex Fourth Asylum (1889) had more structured patient control mechanism than the other bigger asylum. The administrative building was at the central location but asylum attendants were distributed in several locations within the asylum complex and supervised the patient locally. When asylums grew in size the central supervision system probably was not efficient to supervise the increased patient number. Both the caretakers (inhabitants) and the patients (visitors) all were in the shallow zone. According to the structure of institutional building not where patients (visitors) are supposed to be. But in Middlesex Fourth Asylum (1889) all patient wards were in the same depth level from administrative block. The apparent easy access was only for the administrators who were traveling from the administrative zone to patient zone using the shortcut corridors or outdoor connections. Administrators were at the shallow areas with ringy circulation because they had many choices of movement. Patients took longer routes as they had no access to the shortcut corridors, no choice of movement and for them the asylums were deep. Attendants located in the deep position had direct connection to the asylum exterior point, as a result for them the asylum was also shallow. Both Norwich asylum and Middlesex Fourth Asylum were constructed in the last half of 19th century, distributed the attendants for localized, constant, and rigorous supervision. In both asylums the buildings were spread out in various locations.

5. CONCLUSIONS

In all the sample asylums, patients' movement was controlled within and beyond the physical boundary of the complex. Patient accessibility was controlled using security gates or using administrative buildings as gate houses. Inside the complex restricted zones based on patient classes, walled gardens and courtyards, labyrinthine plans, and deep spatial structures restricted patients' movements. At the same time, ringy circulation pattern and shortcut corridors accelerated caretakers' supervision process. Pre-decided uphill location of the admin block on slopy sites as well as the watch towers in administrative zones supported constant surveillance. More importantly, in the surveillance situation patients were unable to see the observer; therefore, were under a constant panic of inspection even if no one was watching them from the uphill locations or from the tower. The architectural arrangement as well as the design elements stimulated the demonstration of power to discipline patients.

The case study asylums were the perfect examples of the 19th century institutional buildings designed to exercise power using the tools of control, surveillance- supervision, and interface. The abstract idea of power became concrete through architectural design components. In institutional buildings, control was performed through space and by rules to discipline individuals. As an example of institutional building, asylums became the pathology of society for 'restoration and purification' of patients. Asylums were not the place to cure lunacy, but they were places to cure patients' rational thinking process through discipline and control. In asylums, order was imposed by categorization of patients, objects and activities along with a set of rules. In asylum design rules were built into spaces in such a way to govern their movement and interaction. With architectural design, patients' locations were defined, and their movement paths and choices modified. Patients were segregated in designated spaces according to their classes, bound to live within their ward, and were always under surveillance. In brief, in these asylums, the caretakers (inhabitants) determined who does what, when, where, with whom and by whom who would be observed.

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