

THE ARCHITECTURE OF WELL-BEING: CREATING
EFFECTIVE DESIGN FOR THE CARE AND
TREATMENT OF THE MENTALLY ILL

by

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ABSTRACT

This thesis synthesizes research performed by environmental psychologists, architects and medical researchers on the human experience of a specific architectural typology: the inpatient psychiatric hospital. These studies, as well as non-fictional narratives of life in a psychiatric institution, are used to demonstrate that the treatment of psychiatric patients is intertwined with the architecture of the facility, and that this patient group is therefore highly sensitive to architectural design. The conclusions drawn from the research described above imply that statewide agencies which fund architectural investments of this type can see, relatively clearly, how greater funding can result in better patient outcomes and shorter patient stays. The conclusions also imply that architects can use evidence-based design to clearly demonstrate that design is correlated with human health. Finally, the thesis implies that while architecture remains an artistic practice in many respects, certain typologies, such as the inpatient psychiatric facility, need to draw heavily from scientifically based sources.

Introduction

In the spring of 2001, the Committee on the Quality of Health Care in America issued its final report. The committee had been appointed three years earlier to identify strategies for improving the quality of health care delivered in the United States. In this report, one of the primary suggestions made by the committee is that systems should be implemented which facilitate evidence-based care. Evidence-based care is treatment founded on the best scientific knowledge available. It embodies the principle that care should not vary illogically from one physician or clinic to another because each caregiver should base their medical decisions on the same body of information.

Architects in the health care field have followed suit by using research correlating the physical environment of care facilities and patient outcomes for the purpose of planning and designing healthcare facilities. This type of architecture is referred to as evidence-based design. Evidence-based design essentially began with a study commissioned in 1995 by the Center for Health Design. In this study, Haya Rubin and Amanda Owens (a medical researcher and a lawyer, respectively) surveyed the state of research on how environmental design affects patient outcomes. Their survey was updated in 2004 in another report by four academics at Texas A&M and the Georgia Institute of Technology. This was also done for the Center for Health Design but this time funding came from the Robert Wood Johnson Foundation. Around this time, magazines such as *Healthcare Design* had already begun to publish the results of recent studies on "evidence based design research"¹. This research, linking the physical environment to patient (and staff) outcomes, is now disseminated through magazines and journals as well as through reports published by the Center for Health Design. Despite this, evidence-based care is often missing from the patient experience, just as evidence-based design is often missing from the process of health care design.

This thesis will synthesize existing research on a specific type of healthcare facility: the inpatient psychiatric hospital. First-person accounts of the experience of these facilities will also be used to describe their effects on visitors, patients and observers. The combination of clinical studies and personal narrative is intended to

fully communicate the impact of the architecture and its importance in the care, treatment, and well-being of psychiatric patients.



Desersted Children's Ward, Montana
State Hospital. January, 2008

Theoretical Position

If we proceed from technical functionalism, we shall discover that a great many things in our present architecture are unfunctional from the point of view of psychology or a combination of psychology and physiology. To examine how human beings react to form and construction, it is useful to use for experimentation especially sensitive persons...²

-Alvar Aalto

Psychiatric patients experience care and treatment that make use of specific architectural features. As a result, the treatment of patients in psychiatric facilities is intertwined with the architecture of the treatment facility. Evidence-based design could lead to substantial improvements in the quality and functionality of institutional psychiatric care because this patient group is highly sensitive to their architectural environment. The architecture of these facilities has great consequences for the life and health of its inhabitants.

There are specific ways that the architecture of these institutions effects the treatment, care, and well-being of mentally ill patients. First, outdoor spaces have a considerable role to play in patient treatment. There is significant information available on how patients respond to windows and gardens in non-psychiatric facilities. Some

of this can be applied to the psychiatric milieu. There exist also a great number of narrative accounts of psychiatric patient experiences outdoors and with views of the outdoors. These accounts will also be used to describe the relationship of nature to patient well-being. Second, seclusion rooms, or "behavior control units" have had an important place in patient treatment that is also reflected in narratives. I will describe these jointly with the discussion of comfort rooms which are increasingly used to diminish the use of seclusion rooms.

I will then discuss additional elements of psychiatric facility design. The role of the nurses' station is critical to the patient experience and to the treatment; it is a place where patients feel most safe, and also where medications - which are in many cases critical - are dispensed. It is also a place where the boundary between patient and caregiver is most clearly drawn. Common rooms, often adjacent to nurse's stations, are also critically important. Some patients are required to be supervised in these spaces all day, with the exception of meal time. Finally, the role of daylight will be discussed. Daylight has been shown to affect outcomes in many types of patients, especially those with depression. Narrative accounts of the psychiatric patient experience reflect a psychological need for sunlight as well as a heightened sensitivity to it.

Outdoor Spaces and their Role in Patient Treatment

Exposure to the outdoors often acts as a powerful experience in the life of psychiatric patients. This is partly because the access is highly controlled.

"...he was the "ward administrator" and the one who gave permission for "privileges" steps in similitude to the normal world - to get up and go out on the ward, to go to dinner, on the grounds, then out of the hospital itself to the movie or store. Each was a privilege and had a certain connotation of approval that seemed to be expressed in distances. To Deborah, he gave permission to walk unrestricted on the grounds, but not outside. Deborah said to the large girl, whose name was Carla, "Well, I'm a hundred square yards sane." If there were such things as man-hours and light-years, sure there was foot-sanity*.

* This reasoning continues throughout Joanne Greenberg's autobiographical novel. Near the end of the story, we read that "Bit by bit she regained the distance by which her doctors measured responsibility: Alone to Her Doctor's Office (100 ft. x 1 hr. sane);

- Joanne Greenberg, from her autobiographical novel, pg. 14³

It is only a two-block walk along Creedmoor's [state hospital in Queens, NY] Avenue A from the Clearview hotel to Building 20, a former staff residence that has been used since 1975 to house some of the clients in the transitional services program, but it meant a great deal to Miss Frumkin to be told that she could walk those two blocks.

-Is there No Place on Earth for Me?, pg. 278

Many clinical studies demonstrate that the presence of nature and exposure to the outdoors in a healthcare setting can provide a positive distraction from many sources of stress. For example, a study in a Swedish hospital finds that heart-surgery patients in ICUs who were assigned a picture of a landscape scene with trees and water reported less anxiety and needed fewer strong doses of pain drugs than a control group assigned no pictures (Ulrich, 1991). Two studies of cancer patients show that taking a virtual reality nature walk (through a forest with bird sounds) while in a hospital room reduced anxiety and symptomatic distress (Schneider, S. M., Prince-Paul, Allen, Silverman, & Talaba, 2004). More to the point, a study published in the *American Journal of Alzheimer's Disease and Other Dementias*, concludes that for patients with dementia, aggressive behavior associated with a stressful experience (in this case a shower bath) could be diminished by playing recorded nature sounds during the event (Whall et al., 1997).

Soon after my transfer to this ward I was permitted to go out of doors and walk to the business section of the city, two miles distant...These excursions into the sane and free world were not only a great pleasure, they were almost a tonic.

-Clifford Beers⁴

Doctors Bradley E. Karlin and Robert A. Zeiss, both with the Veterans Administration, wrote the paper *Environmental and Therapeutic Issues in Psychiatric Hospital Design* to create a resource for planning and designing inpatient psychiatric facilities. They state that numerous studies

Alone on Front Grounds (200 ft. x 3 hrs sane); Alone on Back Grounds (1 mi. x 5 hrs. sane)." It is also important to note, as Greenberg's account is used throughout this thesis, that she has a unique, somewhat conversational writing style that at some points could be easily misconstrued as a series of mis-typed sentences.

and authors have identified multiple windows with views of nature as an important design feature because these views can reduce psychological distress as well as recovery time. They go farther by saying that larger windows low to the ground have the potential to improve sensory abilities and reduce delirium and paranoia among patients. By reducing stress and fatigue, the authors conclude that exposure to nature may facilitate recovery.

A window...looked out over the lawn part of the hospital grounds, where there were trees and a thick hedge that concealed the wall - Deborah had named it the Preserve. The sun, ready to set, glittered beyond the hedge like a cold star, and the trees seemed bare and gray in the diffusing light. It was quiet...All the voices in all the worlds seemed stilled.

Slowly and steadily, Deborah began to see the colors in the world. She saw the form and the colors of the trees and the walkway and the hedge and over the hedge to the winter sky. If the sun went down and the tones began to vibrate in the twilight, giving still more dimension to the Preserve. And in a slow, oncoming way, widening from a beginning, it appeared to Deborah that she would not die.

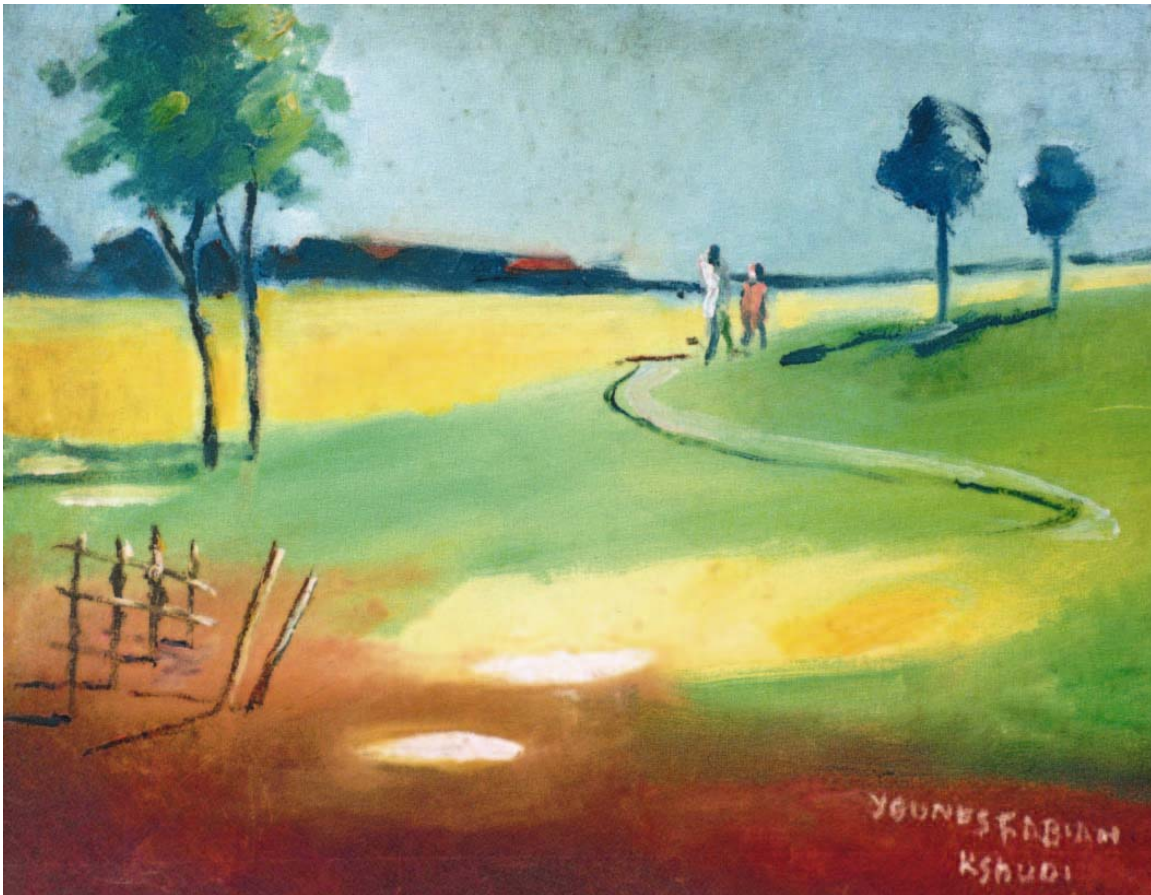
-Joanne Greenberg, from her autobiographical novel pg. 205

Naomi Alena Sachs, a landscape architecture professor at the University of California, Berkeley, writes in Healing Gardens that the history of the garden in a psychiatric hospital is linked to broader social and medical trends in psychiatric care. She mentions specifically that in the 1960's, doctor John Gray's statement that "mental patients were really physically ill with a brain disease" became a pervasive attitude in the field and from that point of view, patients could be cured with medicine and science and not with an improved relationship to the natural environment. It has only been in the past decade that this trend has reversed and researchers have begun specifically to study correlations between the use of the outdoors and mental health at psychiatric institutions.

Sachs describes a series of research studies at Homewood Health Centre in Ontario, a large 320,000 square foot psychiatric hospital. The results of the first study were summarized as follows:

The Manor Green, located a short distance from the busy social courtyards, was used primarily for passive, solitary pursuits such as sunbathing and reading. In general, the farther the setting was from

the hospital, the more passive and solitary were the behaviors observed. Although this was not particularly surprising, the observations substantiated a widely held assumption that patients and staff used the natural areas of the grounds, which were furthest away from the hospital, to "get away", "find some peace and solitude", and to "walk alone or with significant others".



Younes Fabian, patient, Antara Clinic, Calcutta⁵

The study finds that while most patients preferred somewhat enclosed settings outdoors (like wooded trails) for getting away from the institution, more open settings were favored for relaxing and simply being alone. A third finding is that patients liked a given setting for how it made them feel. Very few of the patients used place names or referred to the architectural or spatial qualities of the place.

For some reason, one of my clearest memories is of sitting on the lawn just outside the building, writing in my journal. It must've been pretty late in my stay, since I would have had to "earn" privileges to go outside by myself, unsupervised. At a certain

point it doesn't matter how nicely the ward might be decorated, it's still filled with people who are in a lot of pain and sometimes that was just as depressing as what I'd come in for! Going outside by myself was the best way to escape, to get a break from that. To smell the grass, feel the air, to be reminded that there was also beauty in the world that somehow counteracted all that ugly pain.

-Rachel, a former patient at Butler Hospital, Providence, RI as quoted in Healing Gardens, pg. 2.

At Homewood, many of the places that were special to patients were not in very accessible areas; a number were removed from the hospital and walking routes. Also, surprisingly, many places that the administrators of the studies had overlooked or thought uninteresting were identified by patients as places "meriting recognition in planning and design" (300). The studies generated slightly more predictable results as well: settings that were perceived as natural, enclosed and small in scale were described as generating "calm," "relaxed," "tranquil," feelings. Settings rated as complex and lacking unity or organizing form were said to elicit feelings of "coldness" and "discomfort". The studies at Homewood Health Center as a whole expertly detail the experiences that psychiatric patients derive from different sorts of outdoor spaces.

In the last section of Sachs's chapter on Psychiatric facilities in Healing Gardens, she gives several design guidelines that result from her experience as a landscape architect. The first of these is an encouragement to "bring the outdoors in" via plantings and windows (306). Sachs emphasizes that this is particularly important in settings such as psychiatric institutions where patients often feel trapped. This claim is in fact corroborated by a study performed in the early 1990's by Ann Sloan Devlin, a professor of psychology at Connecticut College. The study tracked the effectiveness of a ward renovation on patient behavior. The renovation included new paint, wallpaper, carpet, lighting, furniture, curtains and additional plants. She had patients rate the effects of these features on the ward environment. The most uniformly positive addition seemed to have been the plants. The most common comment about them was that more were needed. This study concludes that although plants need to be monitored and placed appropriately in the facility, they provide a small amount of natural diversity and "every attempt should be made to use live plants in psychiatric settings"⁶.

Naomi Sachs also writes in her conclusion that it is important to provide multiple experiences in the same garden setting. For example, if patients can choose to be alone, with others on a bench, or walking along a path, then the garden is better able to accommodate a variety of patients who will most likely have different needs at different times⁷.



Pond, Montana State Hospital, January 2008

The studies described above give us important information about how patients respond to experiences of nature and the outdoors. Even in the form of a photograph or a recording, natural features can reduce stress. Outdoor areas provided for patients should give them opportunities for solitude as well as places to be with others. Places outdoors that feel enclosed and small in scale are better than those that lack organization and form. From this evidence, we can further conclude that well-designed outdoor areas in a psychiatric setting would have gardens with satisfactory enclosure systems so that patients at all stages of treatment could benefit from them. The outdoor areas would also provide a variety of experiences for the user. Open lawn areas and more enclosed wooded areas should both be available. Research concerning outdoor elements and their relationship to patient treatment gives us important information as to how we can best design gardens or natural areas for a psychiatric facility.

The Role of Light in Treatment

Sometimes I can lie exposed to this
Huge bright. This is because light
Is a source of warmth, solace of the
Deprived. Outside my personal solarium

I can strain toward the electric bulb

Nicholas Lafitte (1943-1970) From his poem
*The Madman Compares God to a Great Light*⁸

From Darkness unto Life and Light he leaps,
To Life but once,--to Light as oft as God wills he should...
For Life depends on Light, and Light on God,
Who hath given to Man the perfect Knowledge
That Grim Despair and Sorrow end in Light
And Life everlasting, in realms
Where darkest Darkness becomes Light...

Clifford Beers from his poem *Light*^{9†}

Light plays such a critical role in human life that we can scarcely imagine an existence without it. It allows us to function on a basic level, and it also plays a central role in our physiological and psychological health. It so strongly affects our psychological health through the mechanical workings of the body's circadian rhythm; specifically the hormone, melatonin, is released into the body from the pineal gland in the brain when the gland is not being activated by light. Melatonin therefore determines a person's activity and energy levels¹⁰.

Numerous clinical studies demonstrate that artificial bright light can suppress the onset of melatonin and therefore reduce depression among patients with bipolar disorder. Furthermore, there is strong evidence that exposure to bright light in the morning is more effective in reducing depression than exposure to bright light in the afternoon¹¹. In a study published in 2001, five researchers at the University of Milan find that bipolar depressed inpatients in east-facing rooms (exposed to bright light in the morning) stayed an average of 3.67 days less in the psychiatric treatment facility than similar patients in west-facing rooms¹². Morning light has also been shown to reduce agitation. Three researchers show in a 1995 study that when elderly patients were exposed to 2500 lux for 2 hours in the morning for two 10-day periods, their agitation was reduced. The study also demonstrates that the patients were *significantly* more agitated on nontreatment days¹³.

[†] About this poem, Beers writes "These verses, which breathe religion, were written in an environment which was anything but religious. With curses of ward-mates ringing in my ears, some subconscious part of me seemed to force me to write at its dictation."

Through her closed eyes the light from the morning sun was red. The lucky ones by the windows got all the benefit of the sun, but every morning the day reached out for all of them for a little while at least, and this morning it made Deborah search in her mind for something that had changed in her[†].

-Joanne Greenberg¹⁴

While it has been proven that people's moods are affected by different lighting conditions, these mood changes are not consistent in every setting. Given the same lighting conditions, an individual's discomfort, preferences, expectations, and gender will determine how a given lighting condition influences their mood. These differences are essential to the design of a psychiatric hospital. While some patients - such as the bipolar cases in the University of Milan study above - benefit from bright morning light, manic-depressive patients are often highly sensitive to light and glare. In addition, antipsychotic and antidepressant medications have the side effect of heightening photosensitivity¹⁵. For this reason, designers should provide plenty of options for shading and the reduction of glare, and give patients as much control as possible over their experience of natural and artificial light.

It is indeed clear that all patients prefer natural light to artificial light¹⁶. At the Riverview Psychiatric Center in Augusta, Maine, which opened in 2004, the windows provide access to daylight while still giving patients the opportunity to control glare and lighting levels that might negatively affect them. As such, a well-designed mental hospital would provide patients with abundant opportunities to experience bright morning light and daylight while simultaneously providing significant control over the amount of light.

Occasionally during subsequent periods of disturbance there was some distortion of vision and some degree of hallucination. On several occasions my eyes became markedly oversensitive to light. Ordinary colors appeared to be much too bright, and sunlight seemed dazzling in

[†] The morning described here marks a turning point in the story of Deborah, a schizophrenic woman who is fighting to quiet the voices she hears from a secret, imaginary land. This is the morning after she has experienced reality for the first time and happily concludes in the next paragraph "The world was still there."

intensity. When this happened, ordinary reading was impossible, and print seemed excessively black.

-Anonymous, from An Autobiography of a Schizophrenic Experience¹⁷



The Nightmare, William Kurelek, patient, Maudsley Hospital, London¹⁸

The First thing I note is the peculiar appearances of the lights-- the ordinary electric lights in the ward. They are not exactly brighter, but deeper, more intense, perhaps a trifle more ruddy than usual.

-John Custance, from The Universe of Bliss and the Universe of Horror: A Description of Manic-Depressive Psychosis¹⁹

The control of light can be exercised on two levels. First, in patient rooms, blinds can be installed between panes of glass so that patients can control their own windows without risk of injury²⁰. Second, allowing lights in private rooms to be controlled by a dimmer switch rather than an on/off mechanism will allow patients more control over their experience. While such a function would require a community decision in dayroom areas, it is possible architecturally to allow patients a choice as to how much

natural daylight they would like to experience; both sunny and shaded areas can be designed within the same room.

From Seclusion Rooms to Comfort Rooms

A corridor led from the women's dayhall to the women's dormitory ... One of the rooms off this corridor - a room that measured seven feet by nine - had a metal door with a small plastic viewing panel; on the floor was a mattress, and there was a large window at the back, protected by a metal grille inside and by bars outside. This was the "seclusion room," in which a disturbed patient could be kept²¹.

-Susan Sheehan, observer at Creedmoor Psychiatric Center, Queens, NY

In a psychiatric hospital, a seclusion room is an area in which patients are locked when the staff deems it necessary. The process of placing patients in these rooms is almost always violent. A typical account follows:

...he came down the hall, supported on each side by an attendant. The task is by no means easy, but he was more frightened and passive than fighting. I unlocked the door of the seclusion ward for them. ...As the man on one side of the patient used one hand to get his keys and open the door, the patient struggled to the floor, pulling the other man down with him. By then a ward attendant arrived, quietly, quickly, his stance and body a message of assurance. The three of them were with him on the floor, trying to collect his flailing limbs for everyone's protection[§].

-Psychiatric Social Worker Alma Stone²²

The design of seclusion rooms has historically been guided by the idea that patients will try to exit or damage these rooms using the following means:

- 1) Their own physical strength, which may be considerable given that they have likely been forced into the room by staff and they may also be in an acutely psychotic state.

[§] This account is followed by a description of physical abuse inflicted on the patient by a fourth ward attendant. Descriptions such as this dominate accounts of life in psychiatric wards before the 1980's and 1990's when patients began to win civil and criminal lawsuits which have greatly reduced the rate of violence perpetuated by both individual aides and institutions. Even so, the process of placing a patient, involuntarily, in a seclusion room is often violent in nature, even without the use of excessive force.

2) Tools or other objects which they may have been able to hide from the staff upon entry.

3) Weak points or points of purchase at the edges or corners of the room.



The Hospital Ward at Night by Rosemary Carson, patient, Longrove Hospital, UK**²³

Morgan Daly and Thomas Gutheil emphasize the last point in a 1980 article. At the time of writing, Gutheil was the director at the Massachusetts Mental Health Center and Daly was a consultant in Environmental Design. They mentioned specifically that "Seclusion rooms share with medieval castles the quality of being vulnerable at corners and edges". They go on to claim that "one may object that the above view injects a siege mentality into the care of the patient. But we suggest that this nonclinical attitude should shape only the room design, not the alliance with the patient"²⁴.

As we have seen in the preceding pages, architecture and design can make a significant difference in patient treatment. The idea, as described above, that the patient will experience an attitude of alliance with their caregivers while being in a room fortified against them is completely unfounded. It is useless to create a "siege

** Carson describes this piece by saying that "The painting looks down a side corridor containing seven isolation rooms. These are small rooms that you could be locked in if you became violent or needed special attention, often you would only have a thin mattress on the floor. There would be a small window high up on the end wall through which you could see a patch of sky..."

mentality" using the architecture of a treatment facility and attempt at the same time to communicate a message of alliance with the patient. Architecture is important in these facilities precisely because it so effectively communicates to patients and indeed gives them opportunities for wellness or self-injury. In addition, it performs all of these tasks with a frequency and consistency that doctors and even nurses cannot match.

For his own protection, Rosenthal had to be kept in a glass-free environment...Since 1974, he had lived in a seven-by-nine-foot room near the Clearview chart room. His cell-like quarters contained a bed and a commode. He spent most of the day sitting on his bed or on the floor rocking back and forth silently. When he was upset, he banged for hours on the room's locked door²⁵.

-Susan Sheehan, observer at Creedmoor Psychiatric Center, Queens, NY

...During most of this time I was held also in seclusion in a padded cell. A padded cell is a vile hole. The side walls are padded as high as a man can reach, as is also the inside of the door ... while being subjected to this terrific abuse I was held in exile. I was cut off from all direct and all honest indirect communication with my legally appointed conservator - my own brother - and also with all other relatives and friends.

-Clifford Beers, *A Mind that Found Itself*²⁶

Until recently, patient advocacy groups and their professional collaborators have had to appeal to the conscience of doctors and nurses in their attempt to end the inhumane treatment of patients in the form of involuntary seclusion. This is no longer the case for two reasons. First, evidence-based medical reasons for the cessation of seclusion and violence have now come to light. This reasoning generally revolves around the fact that a high proportion of psychiatrically hospitalized patients are themselves trauma survivors. This means that in many cases, the process of seclusion represents a reenactment of trauma which can retrigger the survivors' experience with profound helplessness and lead to retraumatization. This situation can also be described with the phenomenon known as *sanctuary trauma*, defined as "expecting a protective environment and finding only more trauma"²⁷. The damaging implications of sanctuary trauma cannot be overemphasized. It is so detrimental to psychological well-being that it is simply unacceptable in a place whose mission is

psychological healing and whose doctors have taken the Hippocratic oath to "do no harm".



Sujith Rathnayake, patient, Colombo, Sri Lanka. Sujith developed post-traumatic psychotic illness after the Tsunami disaster of December 24, 2004.²⁸

The second reason that psychiatric care facilities are attempting to reduce or eliminate their use of seclusion is that it is becoming illegal. This is essentially because the tools needed to reduce the use of seclusion are well-established and inexpensive. As a result, it is quite difficult for a hospital or institution to prove that it is required in a given circumstance. These tools include developing a de-escalation plan with the patient, implementing meaningful and engaging treatment activities on a daily basis and making creative changes to the physical environment, including the creation of comfort rooms²⁹.

Padded Rooms were a firm favourite with nurses who lacked any understanding of patients. A patient who shouted, fussed and fought was the object of close attention and observation ... it was a commonplace for a student nurse to manhandle a patient into the pad merely because the man had stuck out his tongue or refused to clean a bed space.

-Paul Warr^{††}

The comfort room is a relatively new concept which lies at the intersection of architecture and psychology. It is not a simple substitute for a seclusion room, but rather a preventative tool designed to reduce or eliminate the use of seclusion. Comfort rooms are well-furnished, visually appealing rooms for people to voluntarily enter. Their two most critical purposes are to provide a sanctuary from stress while also providing a place for people to feel and

^{††} Paul Warr is a British journalist who took a job as an attendant in a large British mental hospital in order to write about his experience.

express a wider variety of emotions than they are able to on the ward³⁰.

A conscientiously designed psychiatric facility uses evidence-based principles, avoiding the use of seclusion rooms to the greatest extent possible. As seclusion rooms disappear, or are remodeled, comfort rooms will become more important as an architectural treatment tool. This presents an exciting opportunity from a design perspective. Indeed it is an entirely new spatial typology in the field of health care and architects now have the opportunity to truly understand its potential and to create a clinically important space for patients.

The Role of Nursing Stations in Patient Care

If I were the least bit uncertain as to whether it was all right for me to do something, I would go to the nurses' station and ask for permission or approval from one of the young women there, as if she were my mother. I think I was beginning to re-live the "good little boy" pattern that had characterized most of my childhood, when I lived in dread of my mother's disapproval.

-Lewis Killian³¹

The ward was suddenly silent. Sylvia had not said anything at all for over a year ... Lee Miller broke from inaction and went to the closed door of the nursing station. She pounded on it until the nurse opened the door and looked out in annoyance, as if confronted by an unfamiliar salesman.

"Call the doctor," Lee said tersely. "Sylvia talked."
"The ward report is not finished," the nurse said, and closed the door. Lee pounded again. After a while the door opened. "Well...?"

-Joanne Greenberg, from her autobiographical novel, pg. 14.

A 1999 Press Ganey Associates^{††} study of 139,830 former patients from 225 hospitals found that none of the top fifteen factors for determining patient satisfaction related to whether the patient's health actually improved while in the hospital. Rather, patient satisfaction was highly correlated with many factors which directly involve the quality of their interactions with hospital staff³².

^{††} Press Ganey Associates is a for-profit company that specializes in providing patient satisfaction surveys, management reports, and national comparative databases for the health care industry.

In the late 1960's, Rajendra Srivastava and Lawrence Good conducted a study at the Topeka State Mental Hospital which concluded that the most frequent interactions among patients and staff take place nearest to nursing stations and their frequency gradually decreases as the distance from the station increases³³. Nursing Stations tend to be the social center of the ward. As a result of this dynamic, there are often benches or chairs nearby to provide a place for patients to sit or socialize.

The appearance of this area and manner in which it is used by the staff are critical to the patient experience in a number of ways. In 1970, Joann Edwards and Marilyn S. Hults published a study which described the changes in patient and staff communication when the glass barrier was removed from two centrally located nursing stations at the Brecksville, Ohio, Veterans Administration Hospital. Some of their initial observations before the glass was removed demonstrate exactly how the design of the enclosed area influences the patient-staff interaction.

Some [patients] sat nearby and carefully observed the activity in the office; they even became proficient at upside-down reading of papers left on the counter. One patient frequently became upset when the change-of-shift report was held there and would stand in the dayroom and shout "Go ahead and laugh, you damn fools!"³⁴

Edwards and Hults found that when the window glass was removed from the nursing station, staff members actually spent less time in the (formerly enclosed) nursing station and more time in the dayroom interacting with patients. Patients came to the nursing station less often to interact with staff³⁵. A few weeks after the change had occurred, survey results indicated that 88 percent of patients and 84 percent of staff had a preference for the open station. Patients did not interrupt conversations between staff members as it had been feared they would and the requests they did make were met with less delay. Generally, it seems that after the change, patients felt less separated categorically from staff. One patient said "You feel reassured that you're not such a bad guy, that no one is afraid of you"³⁶.



Traditional Nurses' Station as depicted in the film Snake Pit, 1948.

An additional result of the study by Edwards and Hults is that patients were allowed, for the first time in the history of the hospital, to listen to the change-of-shift report. This report is a systematic way for the outgoing shift of nurses to communicate with the oncoming group. Many patients took advantage of this new privilege and began leaning on the now-empty window sills to listen. They began to contribute observations of their own and were often asked to validate or describe their behavior. Edwards and Hults found that this had in fact altered the change-of-shift report in that it described patient behavior more objectively and accurately after being heard and influenced by the patients themselves. Edwards and Hults claimed that the report had also become more relaxed and less judgmental in content. This is an excellent and very specific demonstration of how an architectural change can greatly impact the ward environment and allow patients to have more personal involvement in their treatment.

The nursing station has historically been the place where the boundary between patient and caregiver is most clearly drawn. It is also a place where patient information, medication and supplies are stored. It is of the utmost concern that these spaces be secure to protect patient confidentiality and safety. A well-designed psychiatric facility will balance these functions. It will be a place

where nurses are entirely visually and audibly accessible to patients and where patients can be heard, informed, and respected.

The Role of Dayrooms in Patient Care

Have you ever been here? A full
empty day high as a room,
grey, bland - a whole tall
square of air to inhale
before another bed-time.

Can you see our view?
Look at the little willow and the black
trees like hands, severe, cut back.
See the paint peel
on the pale disregarded gazebo.

Do you like jigsaws? This one's
all there, according to Gilbert. He's normally
an accountant, but I have my suspicions
about the big hole in the sky.
Still, it beats watching TV all day.
(Odd, how each day just one day's worth of new happens.)
The empty sky is grey, and the lawns:
sometimes people stroll there, walk
their dogs through the courtyard, or talk.
It's hard to keep making them all perform.
Did you see the corridor?
I don't much care for the décor:
mosaic mares can stare up from the floor
by the hatch where we wait for our medication.
In the wallpaper sometimes I see Buddhas or toads
Seeking satori.

-Charles Johnson (b.1942), from his poem *We Call This the Day Room*³⁷

Where cigarettes are the entire economy
Domestic policy is locker-love
Pink stones to arm the military,
White coats for the judiciary,
One hall in hell for all of the above.

-Kit Wright (b.1944), resident of Kendal Ward, Rainhill Mental Hospital, UK from her poem *The Day Room*³⁸

...[the psychiatrist] happened to be passing through the day room and was attacked by two vehement gentlemen whose proper place was on a political platform at a public meeting. They agreed that he was a reincarnation of Lenin and determined to do away with him at the first opportunity. When he escaped he rushed up to me and demanded: "Is it always like this?"

-Paul Warr³⁹

The women's dayhall...was a vast, high-ceilinged room, sixty-eight feet long and twenty-three feet wide. It had nine large, barred windows and a floor of linoleum tile in a gray-and-black checkerboard pattern. The fluorescent lights on the ceiling often flickered; they seemed to expose the dreariness of the dayhall rather than to brighten the room. The white paint on the ceiling was peeling. The walls, which had been painted a cheerful shade of yellow, were soiled ... The fans were in motion on summer days whenever their cords had been repaired by Creedmoor's small maintenance department after the latest troubled patient had cut them ... The television set was on a good deal of the time, except when Kiernan or another agitated patient had sneaked in behind a therapy aide who had unlocked the plastic shield in order to tune the set, switch channels, or turn the set off or on, and pulled the knobs off, leaving the patients with no television for the week or two it took for the set to be repaired.

-Susan Sheehan⁴⁰

...I was uncomfortable day in and day out. I can't stand being among a group for very long, and each meal meant sitting at a table with other patients; during the rest of the day there was literally no place to be alone, except when, later on, I didn't have a roommate - but they often forced me out of my room. Also, I didn't like many of the patients or staff, though I preferred the latter. Furthermore, if you wanted to watch TV, you had to sit in the TV room, where there were always lots of other people...

-Michael Wechsler⁴¹

In 1970, William Ittelson, Harold Proshansky and Leanne Rivlin published an article within the collection Environmental Psychology: Man and his Physical Setting. They had studied the influence of a renovation on the location and activities of patients on four very different psychiatric wards in three state and private hospitals. They found that by making one day room or common room more "pleasant and appealing", more patients were spending time in the area, thereby redistributing the patient population on the ward⁴². In their survey of the extant literature on the topic of Psychiatric hospital design, Karlin and Zeiss provide more specific recommendations. They list laminated safety glass as a product that can define boundaries between different patient group rooms on the ward⁴³. This strategy can create an environment that feels less confining. The recently designed main hospital building at Montana State Hospital in Warm Springs makes use of such a feature between the main dayroom and a television room. An advantage of this is that patients can see who is in the room, and what they are watching, before they decide to enter.

Zeiss and Karlin also recommend flexible dividers for common areas to allow patients to create space as they see fit for different activities. Just as the laminated glass lets patients know who is in the room they are entering, such a feature would similarly give patients more control over the degree to which they are in social contact with others. Creating an environment where this level of control is possible means that a number of different spaces need to be available. For example, not only do patients need to be able to participate in smaller group gatherings, they also should have the opportunity to participate in gatherings with the entire ward. They also need the opportunity to retreat into spaces where they can form personal relationships. Frank Pitts of architecture+ in Troy, N.Y., has a similar position. In an interview with *Psychiatric News* he referred to a movement that embodies Zeiss and Karlin's recommendations. He said that "The image of a village - houses, a neighborhood, downtown - underlies [this] new movement...The "house" in this case, is the patient's room, a place of comfort and familiarity...When ready, the patient can move from the bedroom to a seat just outside the door (the neighborhood), to places farther along the hall, and to more open shared spaces. The patient can emerge or retreat, as feelings dictate, while an observant staff can increase or decrease security as needed"⁴⁴. Pitts goes on to say that the village model allows patients to exercise more responsibility and control over their experience.

Frank Pitts' methodology is certainly not new. In their 1984 article *Objective and Subjective Evaluation of Psychiatric Ward Redesign*, Clay Whitehead and his colleagues refer to one of their guiding principles in design: "the value of designing many opportunities for staff and patients to make decisions in arranging the environment." Rooms were designed with the potential for flexible use, and space was divided to provide a range from private to public.⁴⁵ In this study, the redesign of the dayroom succeeded in creating more staff-patient contact. Because staff-patient contact has been correlated with a decrease in patients' psychopathological behavior, Whitehead and his colleagues have successfully presented a case in which an architectural alteration correlates directly with reduced psychopathology⁴⁶.

As a guide for the design of a common area or dayroom, these principles are powerful beyond their aesthetic character. They give patients choices and control over their own treatment. A well-designed psychiatric facility will have a dayroom which allows the patient to be in the company of others or to be on the periphery of the space, in solitude, if they wish. Community areas will have somewhat flexible boundaries and spaces where patients can see, in their social experience, a significant range of options.

Other Issues in Psychiatric Facility Design

A psychiatric facility is comprised of many architectural elements, only a few of which have been discussed above. Several others, however, have enough impact on the patient experience to be mentioned. Patient rooms are among them. In September 2004, five authors from Texas A&M and the Georgia Institute of Technology reviewed more than 600 clinical studies to create a guide to hospital design for architects. One of their most significant findings was that the use of single-bed rooms in standard inpatient hospitals results in lower nosocomial (contracted in the hospital) infection rates, fewer patient transfers and associated medical errors, far less acoustical disturbance for the patient, better privacy and confidentiality, better communication between staff and patients, better accommodation of family and consistently higher satisfaction with the overall quality of care⁴⁷. Although not all of these results can be carried over to the psychiatric milieu, clearly some correlations will occur. A study of the Mill View Hospital in the United Kingdom indicated that incidents of threatening behavior were dramatically reduced by the design of a new facility. When patients were surveyed about the new design, they were most particularly pleased with getting a single room or private area in which to sleep. This survey indicates that in a psychiatric facility, single rooms can substantially improve patient satisfaction and perhaps safety as well.



Sleeping room, as depicted in the film *Snake Pit*, 1948



Rene Vallejo Psychiatric Hospital,
Camaguey, Cuba. Photo: Stefan Ruiz

Abstract art has been shown to produce negative responses in patients. In a small-scale study of psychiatric patients in a Swedish hospital, the patients reported that while they had positive feelings and associations with the great majority of nature pictures, several expressed negative reactions to abstract artworks in which the content was indefinite and open to multiple interpretations. In the same hospital, several paintings and prints had been physically attacked by patients, all of which

displayed abstract styles and ambiguous content⁴⁸. By contrast, scenes of nature inspired no hostility and were left unmolested.

The cafeteria, or dining room, of a psychiatric facility is a place that explicitly gives patients the opportunity to socialize with one another in a structured setting. Michele McKinnie, a psychologist who has worked in the Montana State Hospital in Warm Springs, said in an interview that good food and an opportunity to celebrate the process of eating can be quite a joy for patients⁴⁹. The potential of the cafeteria as a generator of positive feeling in the patient's daily routine should be considered in the design of such an eating area.

A final issue in the design of a psychiatric treatment center is the concern, voiced by Michele McKinnie and others, that it is inadvisable to make the facility too home-like or comfortable for patients⁵⁰. It is often believed that while the facility should provide all of its services well, it should at the same time inspire patients to work diligently in their treatment so that they can leave the ward and return to their own more comfortable living situations. In their study *Objective and Subjective Evaluation of Psychiatric Ward Redesign*, Drs. Whitehead, Polsky, Crookshank and Fik⁵¹ explored this issue specifically. They found that although ward redesign and improvement was correlated with patient management policy and patient selection, it did not affect the length of patient stay. It will therefore not be necessary for this architectural project to concern itself with making the environment on the ward less pleasing than it could be in order to shorten the patients' length of stay.

Conclusion

...architecture is not a science. It is still the same great synthetic process of combining thousands of definite human functions, and remains *architecture*. Its purpose is still to bring the material world into harmony with life. To make architecture more human means better architecture, and it means a functionalism much larger than the merely technical one. This goal can be accomplished only by architectural methods—by the creation and combination of different technical things in such a way that they will provide for the human being the most harmonious life⁵².

-Alvar Aalto

The treatment of patients in psychiatric facilities is clearly intertwined with the architecture of the treatment facility. As a result, patients are highly sensitive to the architectural environment. Evidence-based design gives us critical information concerning the impact of architecture on patients. While the addition or redesign of specific architectural elements such as those mentioned above may only result in behavioral changes around certain architectural features, it is my position that all of these changes and features will cumulatively result in significant qualitative benefits which reflect the "harmonious life" Alvar Aalto spoke of in the quote above. The architectural features studied in the body of this thesis are discrete components that support a less tangible goal: a new culture, a new physical ethos, and a new underlying message for patients. This message reflects a series of positive expectations: that patients will use outdoor access, control of natural and artificial light, comfort rooms, accessible nursing staff and flexible group spaces to promote their own care, treatment and well-being.

There are two additional benefits to the implementation of evidence-based design. The first applies specifically to psychiatric facilities and the second applies to the field of architecture as a whole. First, the construction of public psychiatric facilities is clearly underfunded by many states in the U.S. In Montana, for example, the lone public hospital in Warm Springs is so overcrowded that patients are sleeping in spaces originally designed as conference rooms. Patients are also sleeping in overcrowded rooms with as many as three other people. If patient results can be more directly correlated with architectural features, funding agencies and legislators can see much more clearly how their architectural investments in this area will affect patient care. The hope is that this would result in greater funding for well-designed facilities. As I have shown above, incomplete or seriously flawed architectural facilities can be unhealthy or even dangerous and their use may even constitute negligence towards patients on the part of the State^{ss}.

^{ss} Negligence is defined by the National Disability Rights Network as "A Negligent act or omission by an individual responsible for providing services in a facility rendering care or treatment which caused, or may have caused injury to an individual served or which placed an individual at risk of injury, and includes an act or omission such as the failure to carry out an appropriate individual program plan or treatment plan, failure to provide adequate nutrition, clothing or

The second benefit of using evidence-based design concerns the architectural profession. Accessing and referencing decades of research concerning how people relate to the built environment directly augments the value of architectural design and creates an important meter through which to demonstrate architectural quality in a variety of building typologies. The knowledge of these tangible benefits (increased productivity among employees, less absenteeism in schools and diminished rates of depression for example) will help architects to promote architectural design through a new-found capacity to directly establish its relationship to human health and well-being.

The studies described in the body of this thesis present a challenge to traditional notions of architectural design as a process. Architecture has often been referred to as both an art and a science simply because the art forms created are physically engineered. However, evidence-based design and, by extension, other applied sciences such as medicine and psychology, are also highly relevant to architectural design. This thesis as a whole implies that while architecture remains an artistic practice, certain architectural typologies need to draw more heavily on scientifically based sources. These typologies are the ones which carry the greatest consequences for the life and health of their inhabitants. In these cases, the science behind the art of design is a critical generator of the environment's qualitative attributes. Architecture is a powerful force in the lives of hospitalized psychiatric patients. Its power needs to be wielded by careful practitioners who have the capacity to enact effective design: the highly informed art of encouragement, restoration and sanctuary.

This project will require an architectural solution that represents the integration of architecture as an art form and the science of evidence-based hospital design. This integration calls for a care facility that is both humane and technical. The beauty and intelligence of the facility should be entwined and inseparable.

NOTES

- ¹ Debra Levin. "May You Always Live in Interesting Times...". *Healthcare Design*, March 2003.
- ² Alvar Aalto. *The Humanizing of Architecture: Excerpts from an article in The Technology Review*, November 1940. *The Architectural Forum*, Vol. 73, December 1940. Pg. 506.
- ³ Joanne Greenburg. I Never Promised you a Rose Garden. New York: New American, 1964.
- ⁴ Clifford Beers. A Mind That Found Itself. New York: Doubleday, 1942. pg. 190.
- ⁵ British Journal of Psychiatry (2006), 189, A2.
- ⁶ Ann Devlin. *Psychiatric Ward Renovation: Staff Perception and Patient Behavior*. *Environment and Behavior* 24:66-84.
- ⁷ Naomi Sachs, *Psychiatric Hospitals in Healing Gardens*, pg. 309.
- ⁸ From Beyond Bedlam: Poems Written Out of Mental Distress. Eds. Ken Smith & Matthew Sweeney. Anvil Press: London 1997.
- ⁹ Clifford Beers. pg. 184
- ¹⁰ <http://www.britannica.com/eb/article-9051873/melatonin>
- ¹¹ *The Impact of Light on Outcomes in Healthcare Settings*. Anjali Joseph, Ph.D., Director of Research, The Center for Health Design. August 2006. Pg. 4
- ¹² F. Benedetti, Colombo, C., Barbini, B., B., Campori, El, & Smeraldi, E. (2001). Morning Sunlight Reduces Length of Hospitalization in Bipolar Depression. *Journal of Affective Disorders*, 62(3), 221-223.
- ¹³ B.B. Lovell, Ancoli-Israel, S., & Gevirtz, R. (1995). Effect of Bright Light Treatment on Agitated Behavior in Institutionalized Elderly Subjects. *Psychiatry Research*, 57(1), 7-12.
- ¹⁴ Joanne Greenberg. Pg. 207.
- ¹⁵ Naomi Sachs, *Psychiatric Hospitals in Healing Gardens*, pg. 314.
- ¹⁶ Anjali, pg. 8.
- ¹⁷ Bert Kaplan, ed. The Inner World of Mental Illness. Harper and Row: New York, 1964. Pg. 45.
- ¹⁸ British Journal of Psychiatry (2004), 184, A2.
- ¹⁹ Bert Kaplan, pg. 98.
- ²⁰ *Psychiatric News*, January 19, 2007. Volume 42, Number 2, page 9.

- ²¹ Susan Sheehan. Is There No Place on Earth for Me? Boston: Houghton Mifflin. 1982. Pg. 46.
- ²² Charles Steir, compiler. Blue Jolts: True Stories from the Cuckoo's Nest. Washington D.C.: New Republic. 1978.
- ²³ British Journal of Psychiatry (2003), 182, A14.
- ²⁴ TG Gutheil, M. Daly: Clinical considerations in seclusion room design. Hospital and Community Psychiatry 31:268-270, 1980.
- ²⁵ Susan Sheehan. Pg. 41.
- ²⁶ Clifford Beers, pgs 133-134.
- ²⁷ Sandra Bloom. Creating Sanctuary. National Technical Assistance Center for State Mental Health Planning. *Eliminating the Use of Seclusion and Restraint.* Summer/Fall 2002.
- ²⁸ British Psychiatric Journal (2006), 189, A2.
- ²⁹ Stephan Haimowitz and Jenifer Urff. *Restraint and Seclusion - A Risk Management Guide.* September 2006.
- ³⁰ Gayle Bluebird R.N., Comfort and Communication Help Minimize Conflicts. *Restraint and Seclusion - A Risk Management Guide.* September 2006.
- ³¹ Charles Steir, Pg. 147.
- ³² Susan B. Frampton, Laura Gilpin and Patrick A. Charmel. Putting Patients First: Designing and Practicing Patient-Centered Care. San Francisco: Jossey-Bass. 2003. Pg. 4.
- ³³ As quoted in Edwards, Joann and Marilyn Hults "Open" Nursing Stations on Psychiatric Wards. Perspectives in Psychiatric Care Vol. VIII Number 5 1970, Pg. 210.
- ³⁴ Joann Edwards and Marilyn Hults Pg. 210.
- ³⁵ Edwards, Joann and Marilyn Hults "Open" Nursing Stations on Psychiatric Wards. Perspectives in Psychiatric Care Vol. VIII Number 5 1970.
- ³⁶ As quoted in Joann Edwards, and Marilyn Hults pg. 216.
- ³⁷ From Beyond Bedlam: Poems Written Out of Mental Distress. Eds. Ken Smith & Matthew Sweeney. Anvil Press: London 1997. Pgs. 88-89.
- ³⁸ From Beyond Bedlam: Poems Written Out of Mental Distress. Pg. 91.
- ³⁹ Charles Steir, pg. 107.
- ⁴⁰ Susan Sheehan, Pg. 42-43.

⁴¹ As quoted in Wechsler, James A. In a Darkness. New York: Norton. 1972. Pg. 65.

⁴² W.H. Ittelson, H.M. Proshansky, and L. Rivlin, "The Environmental Psychology of the Psychiatric Ward," in *Environmental Psychology: Man and His Physical Setting*, Holt, Rinehart & Winston, New York City, 1970, pp. 419-439.

⁴³ Bradley Karlin and Zeiss, Robert. *Issues in Psychiatric Hospital Design: Toward Best Practices*. Psychiatric Services, October 2006, Vol. 57 No. 10. Pg. 1377.

⁴⁴ As quoted in Levin, Aaron. *Psychiatric Hospital Design Reflects Treatment Trends*. Psychiatric News, January 19, 2007. Volume 42, Number 2, Pg. 9.

⁴⁵ Clay Whitehead, Richard Polsky, Carol Crookshank and Edward Fik. *Objective and Subjective Evaluation of Psychiatric Ward Redesign*. American Journal of Psychiatry 141:5, May 1984.

⁴⁶ Clay Whitehead, pg. 643.

⁴⁷ Roger Ulrich, Xiabo Quan, Craig Zimring, Anjali Joseph and Ruchi Choudhary. *The Role of Physical Environment in the Hospital of the 21st Century: A Once-in-a Lifetime Opportunity*. Report to the Center for Health Design. September 2004.

⁴⁸ Roger Ulrich as quoted in Frampion, Susan, Laura Gilpin and Patrick Charmel. Putting Patients First: Designing and Practicing Patient-Centered Care. San Francisco: John Wiley & Sons. 2003.

⁴⁹ 2.10.08, Personal Interview with the author, at the office of Michele McKinney.

⁵⁰ 2.10.08, Personal Interview with the author, at the office of Michele McKinney.

⁵¹ Clay Whitehead, Richard Polsky, Carol Crookshank and Edward Fik. *Objective and Subjective Evaluation of Psychiatric Ward Redesign*. American Journal of Psychiatry 141:5, May 1984.

⁵² Alvar Aalto. *The Humanizing of Architecture: Excerpts from an article in The Technology Review*, November 1940. The Architectural Forum, Vol. 73, December 1940. Pg. 506.

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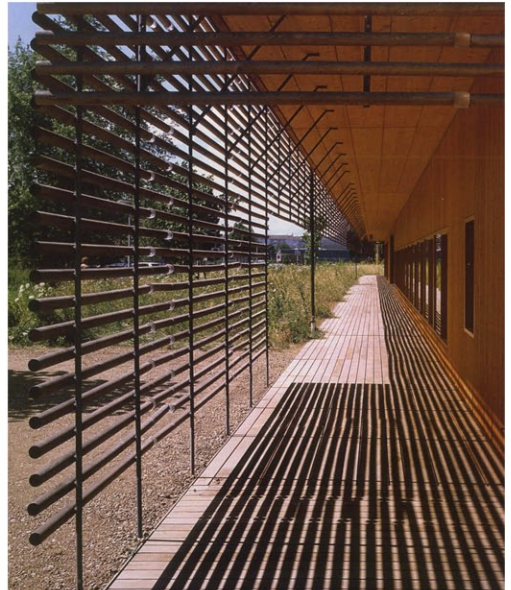
Whitehead, Clay, Richard Polsky, Carol Crookshank, and Edward Fik. "Objective and Subjective Evaluation of Psychiatric Ward Redesign." American Journal of Psychiatry 141 (1984).

Monastery of Our Lady of Novy Dvur. Bohemia, John Pawson.



This monastery, located in the Czech Republic, has a few specific commonalities with many psychiatric institutions. It includes both a dormitory and an infirmary and it features a courtyard, as many psychiatric institutions do. The wood finishes on the interior echo the building's natural surroundings while, paradoxically, the exterior honestly meets the surroundings by distinguishing itself from the landscape. Most importantly, this structure pursues its programmatic goals with an admirable minimalist approach which successfully places an emphasis on the mental and spiritual activities taking place within the structure.

REHAB, Center for Spinal Cord and Brain Injuries, Herzog & de Meuron Architects

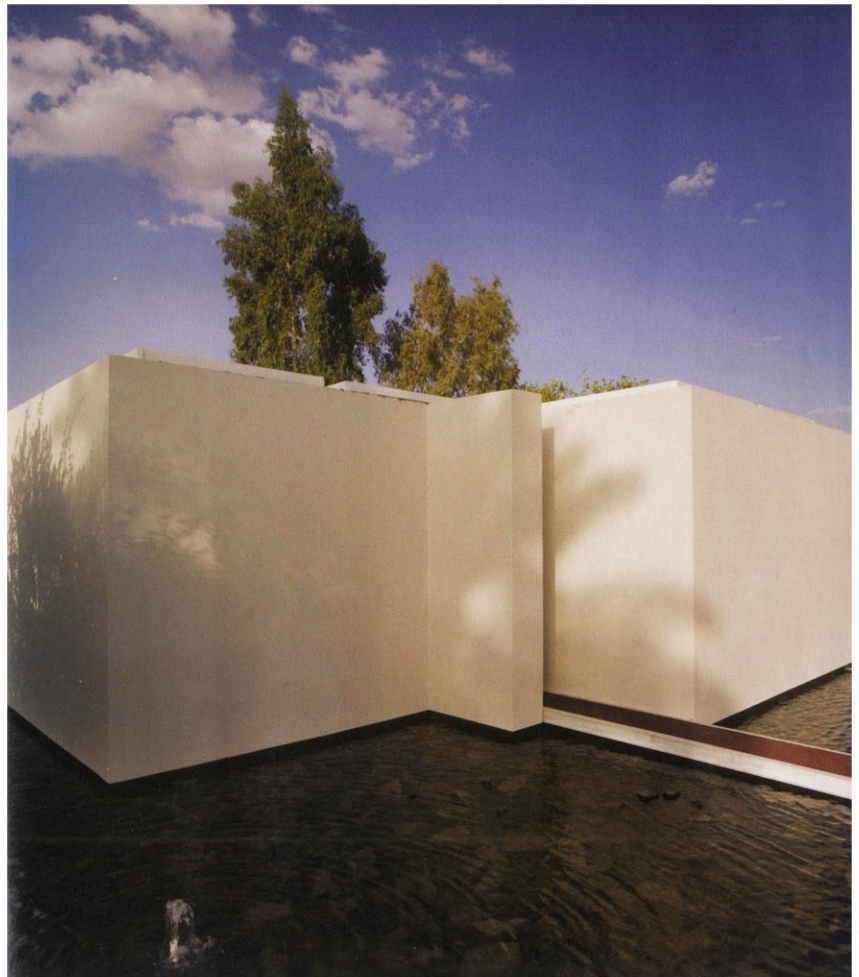


Although this project is not a psychiatric facility specifically, it does cater to patients who are mentally incapacitated. It includes medical facilities, conference rooms, rooms for patients to stay as long as eighteen months, and meeting areas for families. This facility is impressive because it does not have the institutional environment that has failed for centuries to improve patient outcomes. Oak, pine and larch provide a warm, natural environment and patients are connected directly with the landscape through big windows and open interiors.

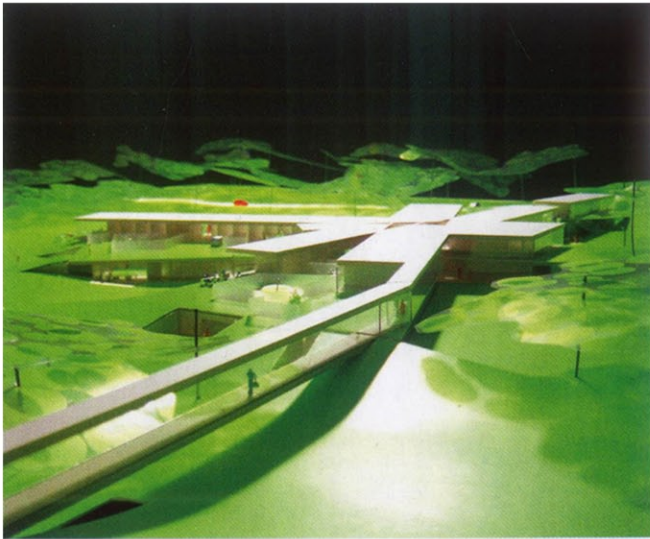
Sacred Space, Center for Cardiac Surgery, Khartoum, Sudan. Architect: Studio Tamassociati



This project is a precedent specifically for the comfort rooms that will be included in the facility. It is part of a cardiac surgery facility and gives patients and relatives a space to meditate or pray in a quiet, beautiful space. It is such a successful project given its function because the natural elements of plant life, light and water are used so carefully. These elements have been shown to decrease agitation and stress and to therefore increase comfort.



Helsingor Psychiatric Hospital. Helsingor, Denmark



This 64,500 sf facility is approximately three times bigger than the thesis project that I will undertake. Even so, it is an important precedent for this project because it has translated the traditional geometries of the psychiatric institution, which have long sight-lines, usually from the nurses' station, into a contemporary architectural language. In addition, it has numerous contained outdoor spaces. These spaces, because they are entirely observable, achieve the goal of allowing patients at all stages of therapy to spend time outdoors.



Site: Ellis Street

36

The Site is located on Ellis Street, on the eastern edge of Bozeman, Montana. It has been donated by the Bozeman Deaconess Hospital for the purpose of constructing a small inpatient psychiatric facility in the future. Dramatic views of the Bridger Mountains to the north, and the Gallatin Range to the south, dominate the landscape. The site is heavily contoured. It slopes downward, quite dramatically, from west to east and there is a particularly steep section near the north eastern corner. A creek runs through the eastern edge of the site, marking its boundary. On the other side of the creek there are a series of low income rental apartments and on the western edge of the site there are outpatient clinics and offices.



Bozeman, Montana



Site: Ellis Street



Site



Photo Key

1





2



3

4



6



5

7

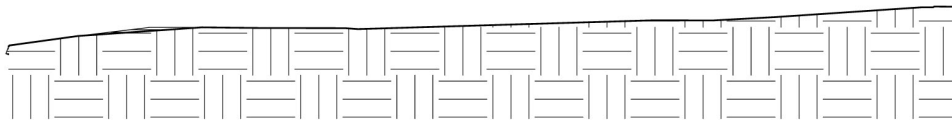




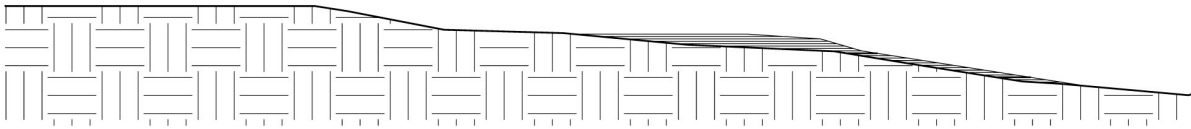
8



9



Section A 1"=80'



Section B 1"=80'



A

Topography



Size

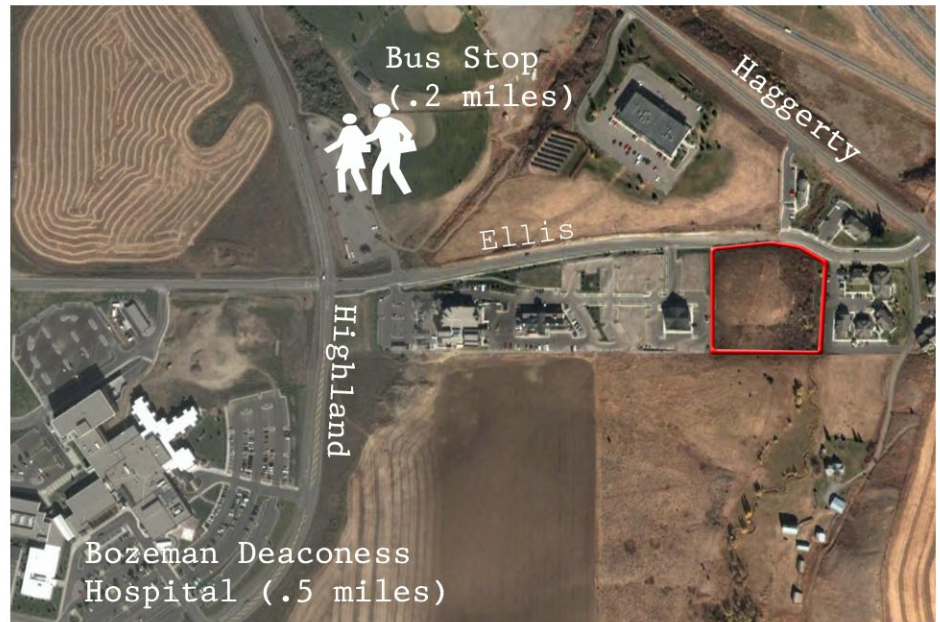


25' Utility Easement



Prevailing Winds

Public Library/Downtown
Bozeman, 1.1 miles

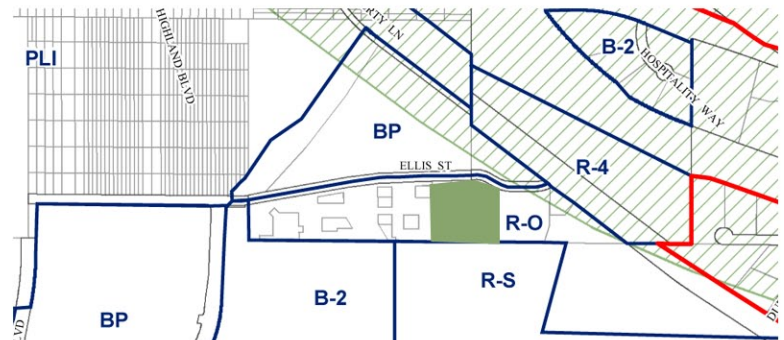


Traffic

Montana State University
Campus, 2.5 Miles



Bozeman Zoning Regulations



Weather Data: Bozeman

24-hr Average Temperature

	J	F	M	A	M	J	J	A	S	O	N	D
Fahrenheit	20.1	23.5	27.5	35.4	44.1	51.8	57.6	56.5	47.7	40.1	28.6	21

Average Maximum Temperature

	J	F	M	A	M	J	J	A	S	O	N	D
Fahrenheit	31.8	35.8	40.3	48.4	57.7	66.7	75.4	74.7	63.5	54	39.7	32.4

Average Minimum Temperature

	J	F	M	A	M	J	J	A	S	O	N	D
Fahrenheit	8.2	11.1	14.5	22.6	30.2	36.7	39.7	38.3	31.8	26.2	17.1	9.3

Average Rainfall

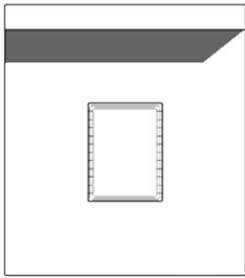
	J	F	M	A	M	J	J	A	S	O	N	D
Inches	2.7	2.1	2.6	3.1	4.4	4.5	2.1	2.2	2.9	2.7	2.6	2.5

Source: www.worldclimate.com

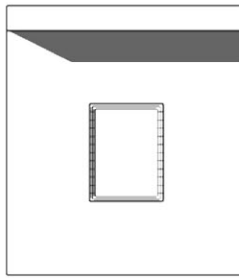
Bozeman Zoning Regulations

	Principal Uses	Conditional Uses	Accessory Uses	
R-O (Residential Office District)	Accessory dwelling units; apartments; assisted living/elderly care facilities; bed and breakfast; community centers; community residential facilities; cooperative housing; daycare centers; extended stay lodgings; family daycare home; fraternity and sorority houses; group daycare home; lodging houses; offices; public and private parks; manufactured homes on permanent foundations; medical offices, clinics and centers; single-household dwellings; two-household dwellings; three- or four-household dwellings; townhouses (5 attached units of less); townhouses (more than 5 attached units)	Home-based businesses; PUDs	Fences; greenhouses; guesthouses; home-based businesses; private garages; private or jointly owned community center or recreational facilities; private stormwater control facilities; private vehicle and boat storage; signs; temporary construction buildings or yards; temporary sales and office buildings; tool sheds	
	Lot Coverage/Floor Area	Lot Width	Yards	Building Height
	Not more than 40 percent for residential; Not more than 60 percent for nonresidential or mixed use	50 feet for single- or two-household; 60 feet for three- to four-household and ADUs; Width of interior units for townhouses	Front, 25 feet adjacent to arterials, 20 feet adjacent to collectors, 15 feet adjacent to locals; Rear, 20 feet, 25 feet adjacent to arterials; Side, 5 feet; Garage, 20 feet	34 feet roof pitch <3:12; 38 feet roof pitch 3:12 or greater but <6:12; 42 feet roof pitch 6:12 or greater but <9:12; 44 feet roof pitch 9:12 or greater

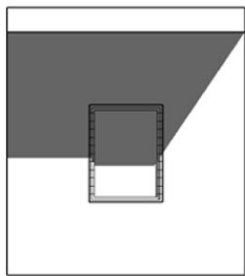
Sunpath: South Wall and Site



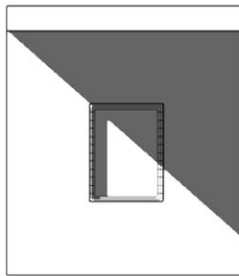
March 10am



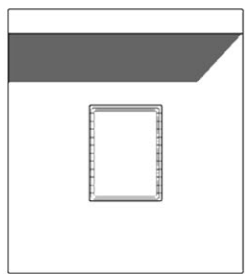
March 4pm



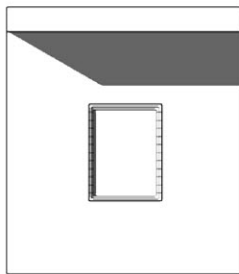
June 10am



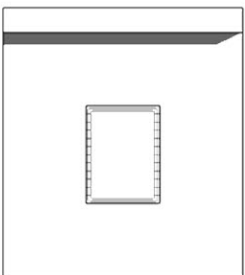
June 4pm



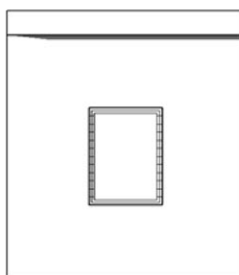
September 10am



September 4pm



December 10am



December 4pm



The general location of the site has several clear advantages and disadvantages. First, it has the advantage of being only one half mile from the hospital. Therefore, while some basic medical services can be included in the program, all procedural and emergency medicine can be easily and quickly administered off-site. A clear disadvantage of the site is its proximity and view of I-90. Although acoustically this is only a small issue, visually it is unpleasant. This is complicated by the fact that one of the best views from the site, that of the Bridger mountains, is also to the northeast. The solution to this problem may be in the landscaping or, more fundamentally, in a process of manipulating the site contours.

The contours on the site are indeed dramatic and they have to be carefully dealt with. The drop down to the creek on the east side of the site is precipitous in some places, and the most flat place on the site is not big enough to house the 18000 sf program. For this type of facility, a single story is preferable to a two-story structure so we can conclude that earth moving or a significant cantilever over the lower elevations may be necessary. Because of these contours, it is obvious that both the service and the main entry have to come in to the west side of the site. A great advantage of the steep drop is that the east side of the site, where patients can experience morning light, is entirely unobstructed. The creek, which defines the eastern boundary of the site, provides water for many types of wildlife and it is the opinion of this designer that disturbing it would risk destroying one of the more interesting visual elements on the site.

If the building were to experience some natural ventilation, it would have to be set diagonally on the relatively square site because the prevailing winds come from the northwest. This may be possible for some rooms and spaces, if not for the building in its entirety. Bozeman has relatively severe winters and the low temperatures documented in the weather chart are often made more uncomfortable as a result of the wind. Sheltering some outdoor spaces from the northwest and, occasionally, southwest winds is critical. It is also critical to prevent these spaces from accumulating snow in the form of drifts. Drainage on the site becomes an especially important problem in the spring when mud accumulates in any low-lying areas. The excellent drainage down to the creek that exists now can not be disrupted by earth moving or contour changes. Summer is an excellent season in Bozeman, but the light from the west in the afternoon and evening can be intense and unpleasant. Shading devices over windows or a roof with a significant overhang can help to mitigate this condition.

To summarize, the disadvantages of the site can be strategically offset. Its advantages, by contrast, present exciting opportunities: the creek draws interesting wildlife, the contours are relatively extreme and the mountain views are fantastic.

AREA	TOTAL (SF)
16 bedrooms Includes desk space, wardrobe space (should house 7 changes of clothes)	16x200=3600
Central Common Room Shared by all patients	500
Two "neighborhood" common rooms	2x500
Television Room Interior should be visible to patients outside of the room	250
Nurses Area for Patient Records Needs to be a secure area for the purpose of storing patient charts Shared by both nursing units Needs to also serve as a conference/treatment planning room	600
Supply Room (clean) Houses stretchers, wheelchairs, emergency equipment, clean linen supplies	100
Soiled workrooms and soiled holding rooms Includes work counter for processing bedpans and other wasteladen materials Allows for segregation of waste products	150
Staff Room Contains storage for staff belongings	600
Nurses Station: One for nursing unit A and one for nursing unit B Houses hand washing station, writing area, data entry area Houses Pharmacy room functions (storage, distribution, recording)	400
Kitchen with Warming Oven and Preparation Area Adjacent to an outdoor receiving service area	800
Exercise Room Contains treadmill, some weights, stationary bike	250
Admittance Area Includes Patient Storage Area	500
Reception for Patient Visitors	900
Visiting Area Enclosed for acoustic privacy	250
Seclusion Room located for easy supervision by nurses	100

Comfort Rooms (2) located for easy supervision by nurses	150x2=300
Two Doctors Offices/Consultation Rooms Acoustical and Visual Privacy are Critical	225x2=450
General Practitioner Exam Room Includes handwashing station, storage, counter space for writing	100
Bathroom adjacent to General Practitioner Exam Room	50
Staff Office and open workspace area for two Staff Members Should include storage for administrative supplies	750
Dining Room/ Movie Room/Meeting Room/Arts and Crafts Room Should include a handwashing station and equipment storage	1000
Bathrooms (1 visitor, 2 staff)	3x50=150
Bathrooms (8 Patient Rooms Include Shower)	8x75=600
Patient Laundry Facilities	2x75=150
Loading Dock Area for Waste Collection and Receipt of Supplies	150
Housekeeping Closet/Janitorial Supply	2x50=100
Mechanical Rooms	2x600
Circulation (35% of Above) Circulation spaces should be significant allowing for sitting areas, etc.	5250
Total	20250

Scope of Project

20,000 s.f. inpatient psychiatric facility on Ellis Road, East of Bozeman Deaconess Hospital.

Zoning Review

The facility is located in an R-O (Residential Office) zoning district. There is a 25' utility easement from the street lot coverage can be no more than 60 percent and the building height can be no more than 34'.

Code Review

Documents: City of Bozeman, 2006 IBC, State of Montana: Department of Health and Human Services
AIA Guidelines for the Design and Construction of Hospital and Health Care Facilities

Occupancy Classification

I-2: "buildings and structures used for medical, surgical, psychiatric, nursing or custodial care on a 24-hour basis of more than five persons who are not capable of self-preservation.

Construction Type

V-A with an automatic sprinkler system throughout

Allowable Building Area

Allowable Building Area: per table 503 of 2006 IBC; 9500 sf allowed for Type V-A construction for I-2 Occupancy. Area modifications per 506.3 (Automatic Sprinkler System) increases allowable square footage to 28500.

Occupant Load

Occupant Load of at least 46 as follows (IBC 1004.1.2)
Sleeping areas 3600 sf @ 120/occ = 30 occupants
Inpatient treatment Areas 3950 sf @ 240/occ = 16 occupants

At least two exits provided for each level, more than 1/3 the diagonal distance apart.
Exit Travel Distance = 200' per 1015.1

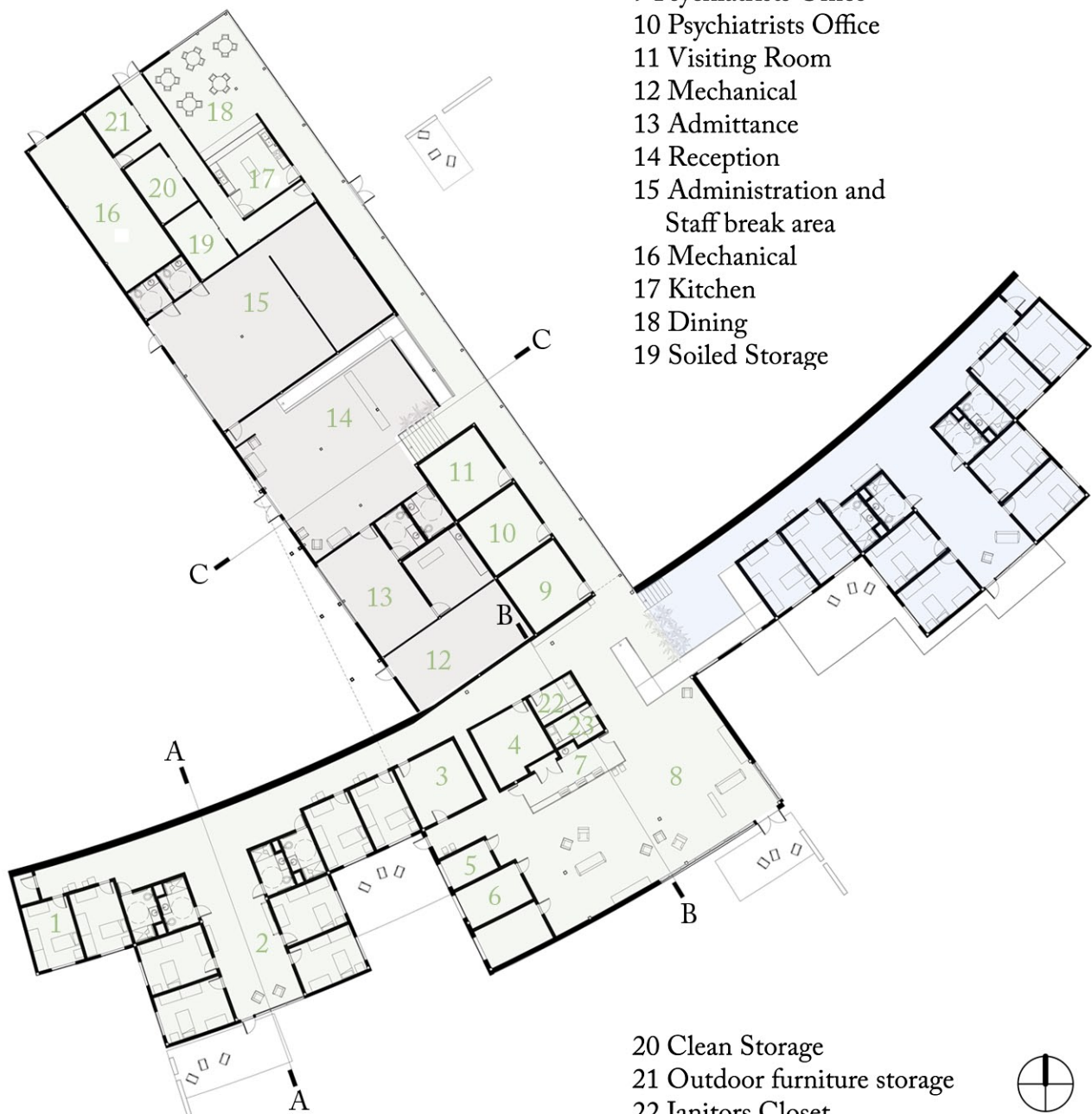
Parking Requirements

Per AIA Guidelines, 1 space required per employee and an additional space for every four existing beds.

Floor Plan

	Elevation 108'-0"
	Elevation 104'-0"
	Elevation 100'-0"

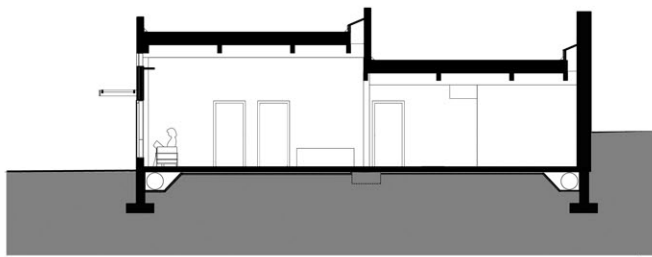
- 1 Patient Rooms
- 2 Neighborhood Common Room
- 3 Television Room
- 4 Exercise Room
- 5 Seclusion Room
- 6 Comfort Room
- 7 Nurses' Station
- 8 Common Room
- 9 Psychiatrists Office
- 10 Psychiatrists Office
- 11 Visiting Room
- 12 Mechanical
- 13 Admittance
- 14 Reception
- 15 Administration and Staff break area
- 16 Mechanical
- 17 Kitchen
- 18 Dining
- 19 Soiled Storage



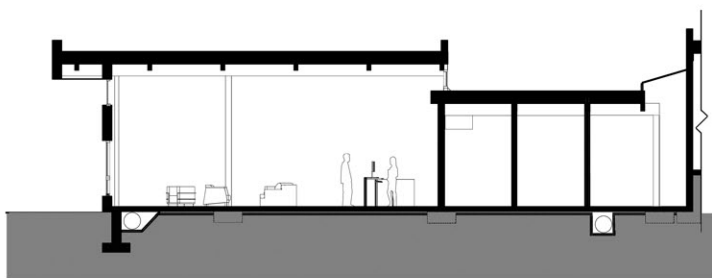
- 20 Clean Storage
- 21 Outdoor furniture storage
- 22 Janitors Closet
- 23 Patient Washer and Dryer



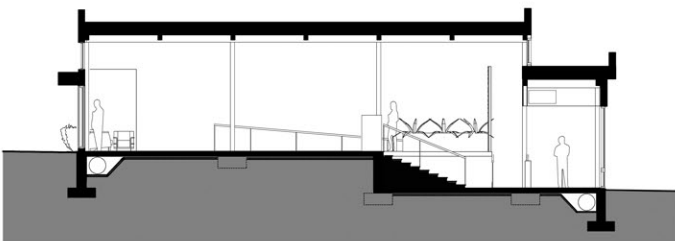
Sections



Section A



Section B

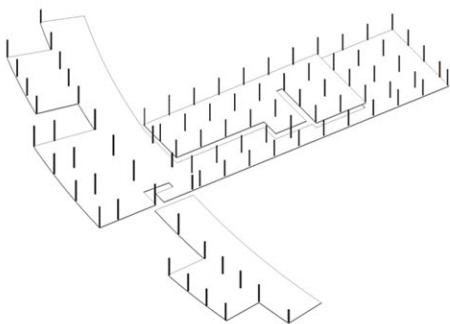


Section C

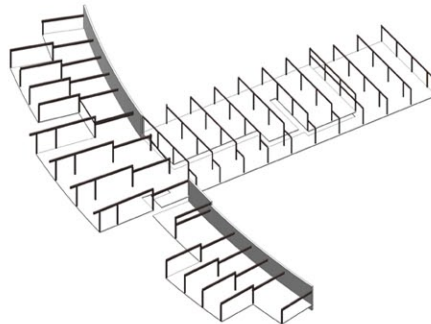


Primary Circulation for South Patient Wing with patient sitting areas outside of rooms

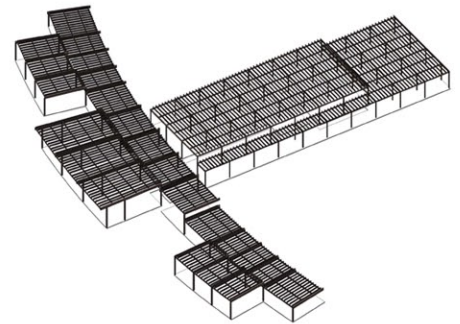
Structure



6x6 Glulam Columns on a 16' square grid and 8x8 Glulam Columns on a 24' radial grid



5x10 Glulam beams on a square grid and 7x18 Glulam beams on the radial grid. These are fastened to the load-bearing masonry wall.



Secondary Glulam beams on typical glulam saddle hangers and custom-fabricated saddle hangers for the radial grid.



One of two neighborhood common rooms is pictured on the left. Patients have the opportunity to sit just outside their rooms, to go to one of these larger spaces, or to go to the primary common room. These levels of social contact give patients more control over their experience in the facility.



A corner space in the primary common room is pictured above. Movable bookshelves and planters allow patients and staff to re-arrange the space as needed.

The walkway between the dining and residential areas is pictured on the left. This space allows patients to experience the natural world visually and acoustically.



An outdoor space for patients is pictured above. It is one of several types of outdoor spaces provided. The nursing station is pictured at left. It is more open and less fortified than most nursing stations of its type. A sitting area is provided in the facilities' central light well. From this point, patients have a view of the main common room.

