ARCHITECTURE AND MENTAL HEALTH IN CAMPUS BUILDING DESIGN

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INTRODUCTION

The spaces we inhabit shape our experiences. Our environment has "the power to restore and promote solidarity, mental and physical health, and be a source of happiness".[1] As architecture has evolved, buildings have fallen under typologies, both functional and formal. One example of such a typology is campus buildings, which are found among institutions of higher learning across the world. Mental health among university students is an increasingly urgent topic. The University of Toronto has been undergoing a mental health crisis in recent years, and student mental health has decreased among institutions around the world as a result of the COVID-19 pandemic. Many factors play into student mental health; resources (ranging from mental health support to financial assistance), academic stress, and culture regarding mental health are just some factors that impact mental health on campus. One such factor is the design of campus buildings. This paper will investigate the architectural features which impact student mental health in campus building design through examining the history of campus building design, advancements in design for mental health, a case study, and hospital design (which is designed to promote health in patients).

DESIGNING FOR MENTAL HEALTH

Architecture has been shifting from serving purely functional purposes to a focus on user-experience design. The design of a building can impact a user's experience in two ways - individually, and as a collective. The core finding from social psychology is that humans feel the need to belong. Isolation due to the COVID-19 pandemic is a key reason student mental health has decreased over the past 18 months. As discussed by the HRH, designing using the human scale and nature as the template would likely lead to a decrease in social isolation and promote connectedness.[2] Designing intentional spaces for student interaction is one possible solution to reduce feelings of social isolation. The circulation of a building, which involves designing staircases, hallways and passageways, dictates the flow of users through a space.

One way this could be implemented in campus buildings is by designing a central atrium in which all users must pass by in order to go to smaller rooms. This way, students have a designated "social" space which can act as the hub for student life. Another possible suggestion is having one central staircase which students must use to move between levels (which could connect central spaces). This could only be implemented in buildings with smaller amounts of students to avoid congestion. Beyond community buildings, libraries, and classrooms, campuses also house residences. As a core part of some students' university experience, residences are a students' home away from home. Many students choose to live in residence to make friends, and is home to many students' social lives. Many student residences feature "common rooms" as a part of their layout. However, the location in a residences' floor plan dictates how users will interact with the space. For example, in Victoria College located in the University of Toronto, Margaret Adison Hall, a traditional hall-style dorm, features its common rooms right outside of the elevators. It is an open space, with no doors needed to access the space, meaning that users tend

[1] Karl Johnson, "Place and Public Health: The Impact of Architecture on Wellbeing," The Guardian (Guardian News and Media, June 11, 2013), https://www.theguardian.com/sustainable-business/public-health-architecture-impact-wellbeing.

[2] HRH The Prince of Wales, "Facing up to the Future: Prince Charles on 21st Century Architecture," Architectural Review, July 21, 2020, https://www.architectural-review.com/essays/facing-up-to-the-future-prince-charles-on-21st-century-architecture.

to flow in and out of the space with less resistance. Students may see someone they know stepping off the elevator and strike up a conversation, leading to a group organically and naturally meeting. On the other hand, Burwash Hall is split into houses that span multiple floors. It's common rooms act like a residents' room, and although they are located on the first floor, they have a door. This means students are less likely to spend time in common rooms, as they must open the door to see if anyone they know is inside.

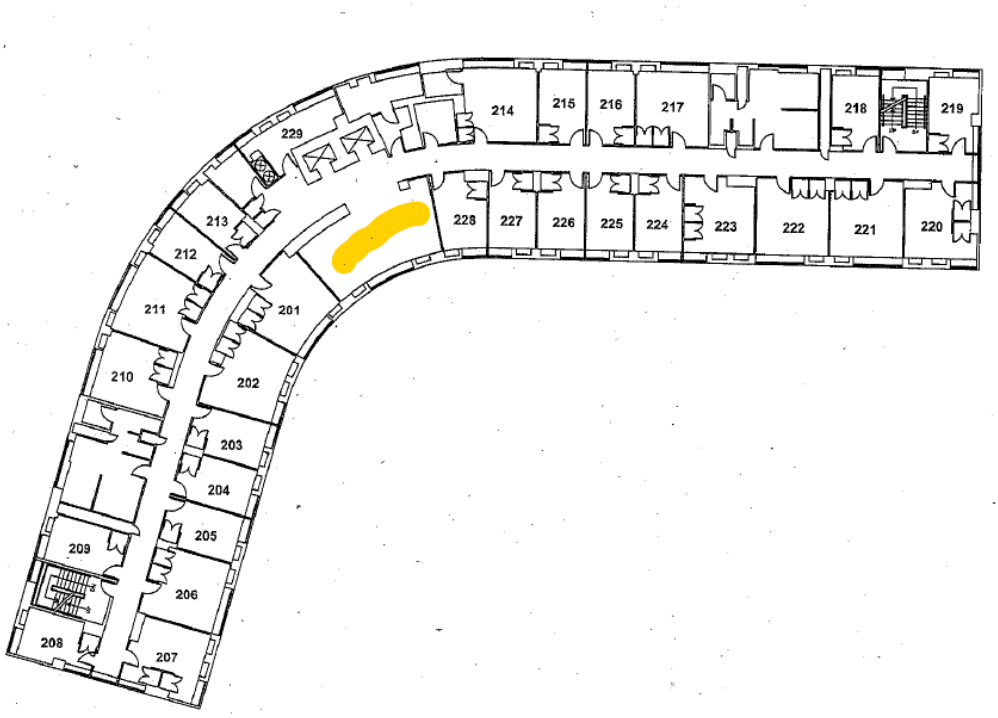

Figure 1: Margaret Addison Hall. Common rooms are highlighted in yellow, and are connected to the main hallway. Drawing taken from https://vic.utoronto.ca/current-students/residence-life/

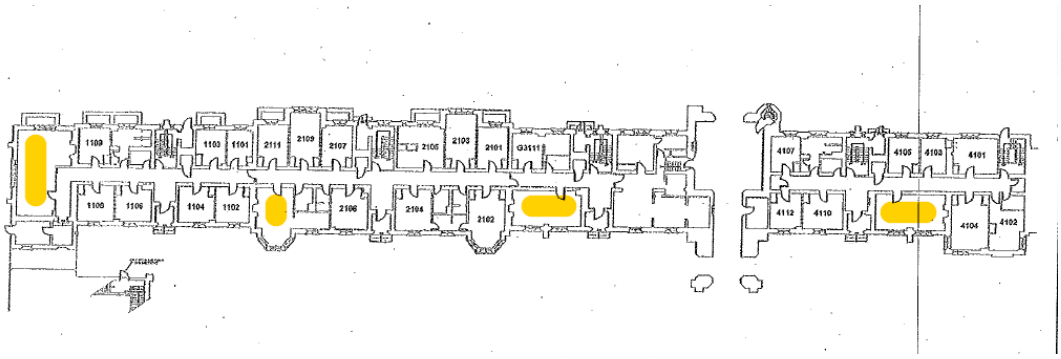

Figure 2: Upper Burwash Floor Plan. Common rooms are highlighted in yellow, and are accessed through a door. Drawing taken from https://vic.utoronto.ca/current-students/residence-life/

In addition to encouraging interactions within the university community, architectural design can impact mental health on the individual level. As will be later discussed when covering the hospital typology, lighting plays a huge role in an individual's mood. As stated in the Journal of Clinical Sleep Medicine, the findings from multiple studies have found that bright light (natural and artificial) especially in the morning positively impacts health outcomes including depression, agitation, sleep, circadian rhythms, and SAD (seasonal affective disorder).[3] This can be applied to campus building design through lighting design and building orientation. The orientation of a building and the placing of windows will result in different levels of light. Typically, south-facing windows receive the most light, with east and west facing windows receiving moderate amounts of light. North-facing windows receive very little direct sunlight. Taking into consideration a building's location and its landscape (surrounded by lower buildings vs high rises), architects can situate buildings for ideal lighting conditions. In addition to natural lighting, artificial lighting can positively impact a users' mood. For example, light therapy, a method of treating SAD (Seasonal Affective Disorder), occurs by sitting near a light therapy box which mimics natural outdoor light. This is thought to impact the chemicals of our brain that are responsible for mood and sleep, which eases SAD symptoms.[4] Light which imitates natural sunlight could be used in buildings to promote the moods' of students.

Biophilic architecture has been gaining popularity in recent years. Multiple environmental psychology studies have found that humans are aesthetically attracted to nature and certain arrangements of the landscape. For example, humans enjoy settings that resemble hills and caves. Our evolutionary biology prefers landscapes that allow us to look to the distance (such as hills), as well as settings that provide us shelter from the outside world (such as caves).[5] Through natural selection the trait of preferring such landscapes has been passed down to us now. There are limited opportunities in our manmade landscape for organically-occuring nature to flourish; however, architects and designers can implement key features of natural landscapes (content and landscape configurations) into our designed environment. This can be accomplished through implementing natural objects into our environments (such as plants and greenspaces, a trend with increasing popularity) as well as applying the fractal geometry found in nature to architecture and the design of buildings.

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[3] Mohamed Boubekri et al., "Impact of Windows and Daylight Exposure on Overall Health and Sleep Quality of Office Workers: A Case-Control Pilot Study," Journal of clinical sleep medicine : JCSM : official publication of the American Academy of Sleep Medicine (American Academy of Sleep Medicine, June 15, 2014), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4031400/.

[4] M.D. Michael Craig Miller, "Seasonal Affective Disorder: Bring on the Light," Harvard Health, December 21, 2012, https://www.health.harvard.edu/blog/seasonal-affective-disorder-bring-on-the-light-201212215663.

[5] Yannick Joye. "Architectural Lessons from Environmental Psychology: The Case of Biophilic Architecture." *Review of General Psychology* 11, no. 4 (December 2007): 305–28. https://doi.org/10.1037/1089-2680.11.4.305.

CAMPUS BUILDING DESIGN

For as long as universities and institutions of higher education have existed, their architecture has represented an idea. As the buildings where the elite learned, their architecture was a symbol of tradition and class. The earliest known universities were founded mainly in Europe, ranging from the UK to Italy. Founded during the Middle Ages, many of these universities took on architectural styles from buildings of worship, often in the gothic style.[6] Once institutions of higher education spread to the New World (namely the United States), they continued to follow traditional European styles of architecture. However, once the US was officially founded, architects and university directors decided that America should have its own unique identity of the campus. Some famous examples of American choices to create a unique identity include Yale's facade (acid-washed stone, an atypical material choice), and Jefferson's "village" in Virginia, which embodied classicism through its lawn surrounded by pavilions.[7]

Of course, universities are not a true typological type that can be defined by one function. They are comprised of libraries, dining halls, lecture halls, professors' offices, residences, and many more types of buildings. A university can be thought of as a small city that is contained within the campus borders. For example, looking at the University of Toronto as an example, students living on campus can live within the borders for the academic year. Students can learn, study, eat, sleep, dine, work, and more within a campus. Universities can be designed at a micro (building) and macro (urban context) level. The micro level impacts students at an individual level, whereas the macro level impacts how students interact with other students from different parts of campus and the infrastructure that is put into place.

[6] Tom Wilkinson, "Typology: Universities," Architectural Review, September 24, 2020, https://www.architectural-review.com/essays/typology/typology-universities.
[7] Ibid.

CASE STUDY: DANIELS FACULTY OF ARCHITECTURE (ONE SPADINA CRESCENT)

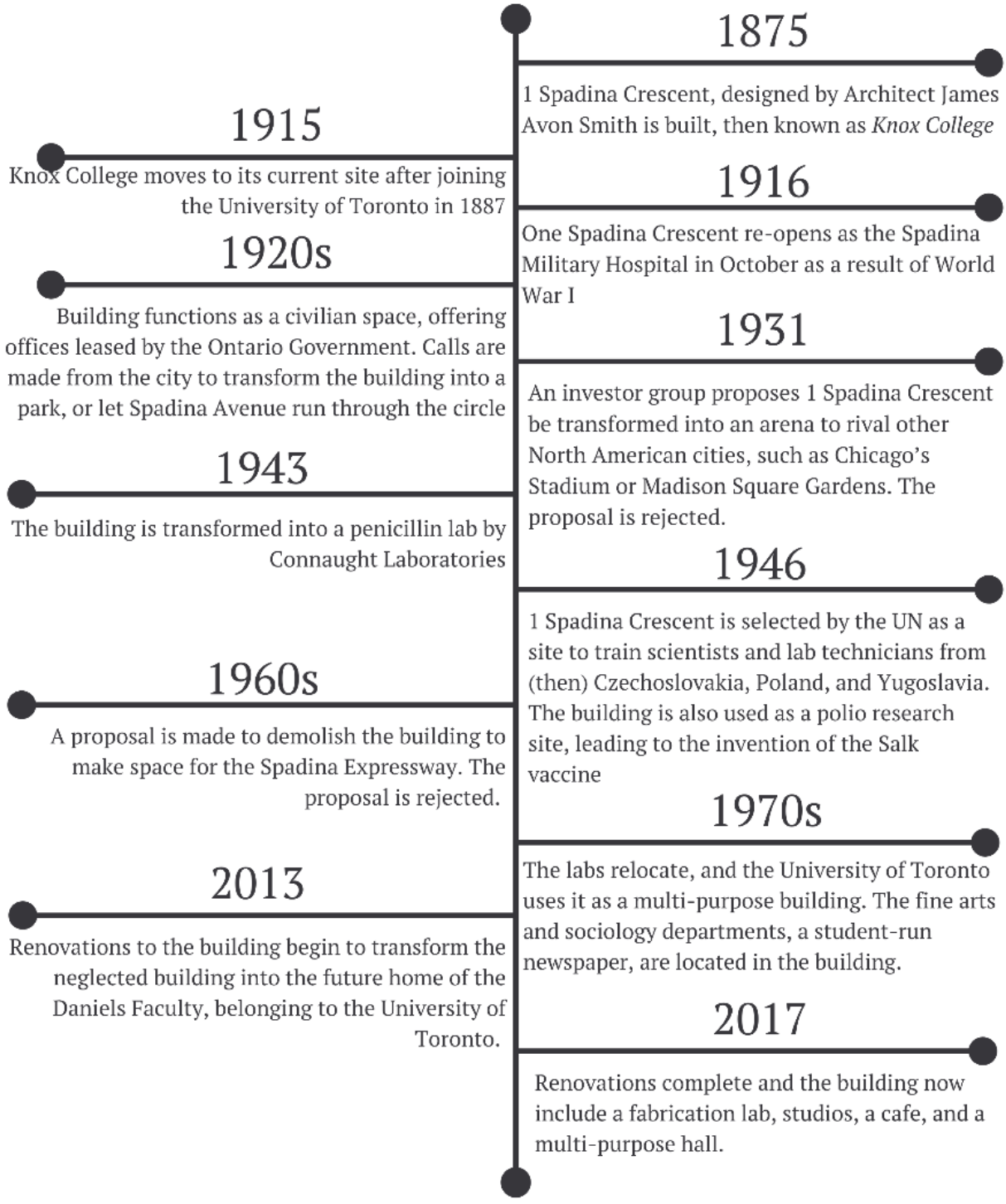

Figure : Timeline highlighting important historical events that took place at One Spadina Crescent. Image created by Julie Seeger

The Daniels Faculty, located at One Spadina Crescent in Toronto, is in a unique position due to its historical context. Built nearly 150 years ago, the building has existed for much of Canada's history and overseen the changes in Toronto's architecture. Originally constructed in the gothic revival style, which was quite popular at the time, the building is now a hybrid between old and new in a design completed by NADAA. It functions as the home to the Daniels Faculty, and is unique to the rest of the University of Toronto in the sense that architecture students spend 90% of their class and study time in this building. Intended to serve as a study/work space, lecture hall, practical space, and social hub for Daniels, the building uses its open-plan layout to serve a variety of purposes.

Figure _: Rendering of the Main Hall (LEFT) and the Grad Studio (RIGHT). Image by NADAA Architects from https://www.daniels.utoronto.ca/about/one-spadina.

The above image illustrates the intersection between three of the space at Daniels: the Main Hall (left), where lectures and events take place, the staircase (MIDDLE) which connects the first floor to the second and third floor and leads to the undergraduate studio in the center door, and the graduate studio (RIGHT) which is above and beyond the staircase leading to the right. One Spadina is home to the undergraduate, graduate, and doctorate programs in architecture and visual studies. This meant that the architects had to be intentional about creating spaces for each type of student and staff. However, architecture is not an individual field; students learn from their peers and get inspired by others. For example, reviews are held in the hallways of the older half of the building, and students and visitors to the building are encouraged to listen in. In addition, Daniels runs a public lecture series about topics regarding architecture and how they relate to other pressing issues, such as climate change and globalism. Through its open design, students are able to witness what is "on" at Daniels and invited to listen in on lectures.

Figure : Windows of the Graduate Studio. Image taken from https://www.utoronto.ca/news/u-t-celebrates-opening-one-spadina-crescent

When designing the new half of the building, the architects considered lighting in their placement of the windows. Due to the pre-existing design located in the south half of the building, east and west facing windows are limited. The majority of the windows are placed on the north facade of the building, as seen in this photograph. The windows not only provide bright indirect light into the studio, ideal for studying and working without causing strain, but also provide a view of the outside city. Daniels prides itself on being integrated into the city, both in its programming and its architecture. Students sitting on the north side of the window can witness UofT buildings in the distance and the streetcars and cars wrapping around the building.

In addition to studio space and lecture space, there are also professors' offices, a fabrication lab, a photoroom, a student cafe, reading room, library and presentation rooms located within the building. By allocating for so many purposes, the Daniels building houses everything an architecture student could need. This encourages and facilitates community by centralizing architecture students on campus. Although studio culture and mental health among architecture students may not be perfect, the Daniels building is one way students can be supported: through a mood-promoting and beautiful building.

HOSPITAL ARCHITECTURE AND DESIGN

Hospital architecture has long included doctors in the design process as much as architects; this is because the form of the typology must suit user needs at a large stake. It is seemingly obvious that the hospital, a building that is meant to take care of those who are ill, injured and require medical treatment, should be designed to promote user (patient) well-being and health. This is especially urgent as the majority of hospital users (patients) are impacted by various illnesses, diseases and injuries; it is crucial to promote user health, rather than patients becoming sicker from different diseases. However, exactly what contributed to patients' health and healing was not always clear. As technological advancements developed, the function of the hospital changed overtime. Before germ theory was discovered in 1861, exactly what made humans sick was unclear. Medical workers in the West believed that poor health was caused by "corrupted" (referring to dirty, cramped, and moist) environments.[8] It was also observed that many people who came to hospitals lived in denser, impoverished neighborhoods, and that people who were in close proximity to others who were sick became sick themselves.[9] It is also important to note that hospitals at the time did not have the technological and medical advancements it does today; a hospital was often where patients came to escape their poor living conditions and heal in a "clean" environment. This led to the common-held belief that "good air" promoted patient health, while "bad air" caused sickness.[10] As a result, many earlier hospitals in the West were designed with ventilation and light, mainly through the form of windows, as key architectural features that benefited health.

This led to the rise of the pavilion plan, which was invented in France during the 1700s, and became the design standard for hospitals in England in the mid-1800s. The main principle behind the design was that increased ventilation led to a lower mortality rate. The design focused on maximizing the amount of open air flow, and consisted of multiple smaller buildings which housed small narrow rooms. The rooms would contain at most two rows of beds, with each bed aligned to its own window, ensuring that each patient would be able to breathe "individual" air, as opposed to sharing it with other patients in the room.[11]

However, the pavilion plan could not fight off the disease found in the hospital, and "good air" vs "bad air" could not heal patients. When germ theory and antisepsis was discovered, the design of the hospital changed accordingly. Hospital design had been designed for maximum cleanliness, leading to minimal ornamentation as decoration, hard surfaces (such as marble) which were thought to be resistant to bad air, and no cracks.[12] With the discovery of germ theory, sanitation and cleanliness became key to hospitals, not only in medical practices but in design as well. Hospitals now required infrastructure such

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[8] Jeanne Kisacky, *Rise of the Modern Hospital an Architectural History of Health and Healing, 1870-1940* (Pittsburgh PA: University of Pittsburgh Press, 2017), 13.
[9] Ibid.
[10] Ibid.
[11] G C Cook, "Henry Currey FRIBA (1820–1900): Leading Victorian Hospital Architect, and Early Exponent of the 'Pavilion Principle,'" Postgraduate Medical Journal (The Fellowship of Postgraduate Medicine, June 1, 2002), https://pmj.bmj.com/content/78/920/352.
[12] Jeanne Kisacky, *Rise of the Modern Hospital an Architectural History of Health and Healing, 1870-1940* (Pittsburgh PA: University of Pittsburgh Press, 2017).

as sinks and cleaning facilities for medical staff to wash their hands before attending to a patient. This resulted in the need for more space, leading to hospitals to be built taller.

As medical discoveries and technological advancements were made, the hospital typology has changed. In-patient wards were once the focus of hospital design, but as time went on, outpatient and diagnostic departments, operating rooms, and servicing became equally important to wards.[13] In the mid 1900s, "patient centered medicine" became an increasing trend in the west, and led to "patient-centered design". Thus began a shift to design hospitals to create pleasant experiences for visiting patients. Light, acoustics, quality of spaces, and textures became key architectural factors in creating pleasant and easy to navigate hospital buildings. A study by Roger Ulrich investigated if a patients' view from their assigned room impacted their recovery process after cholecystectomy. 23 patients that were assigned rooms with natural viewing had shorter recovery periods, as well as fewer critical comments from nurses' notes than the 23 patients that had brick-facing windows. This led to the conclusion that natural light and nature has the potential to improve patients' recovery time.[14]

CONCLUSION

Through discussing topics in architectural design relating to mental health, the history of campus building design, looking at One Spadina Crescent and a historical survey of the hospital typology, key architectural features have been identified.

One feature that should be taken into consideration is lighting. While this is not a new discovery, perhaps more creative solutions can be taken to include either natural lighting or artificial lighting in architecture design. Through building and window orientation, and choosing specific types of light to be featured in a building, an architect has the power to boost mood and potentially alleviate symptoms of seasonal affective disorder, as well as aid in sleep. (Sleep, of course, is crucial to positive mental health).

In addition, circulation must be considered to promote community interaction. Although architecture will likely change as a result of the COVID-19 pandemic, designing spaces to intentionally bring students together is key to reducing feelings of isolation. In both community buildings and residence buildings, students have the opportunity to form their support and social network of like-minded individuals, and the architecture and circulation of a building can either foster this connection or prevent it from occurring.

Another key feature architects can use is mimicking our natural environment (through greenspaces), or using organic fractals found in nature in architecture. The former has been seen in multiple buildings on campus, with many students citing it as their favourite spot on campus. With parametric design and new architectural technology, it is likely that biophilic architecture which uses patterns found in nature as the basis for design will become a common trend in the coming years.

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[13] Sunand Prasad, "Typology: Hospitals," Architectural Review, July 16, 2020, https://www.architectural-review.com/essays/typology/typology-hospitals.

[14] Roger Ulrich, "View through a Window May Influence Recovery from Surgery," Research Gate, May 1984, https://www.researchgate.net/publication/17043718_View_Through_a_Window_May_Influence_Recovery_from_Surgery.

Bibliography

Boubekri, Mohamed, Ivy N Cheung, Kathryn J Reid, Chia-Hui Wang, and Phyllis C Zee. “Impact of Windows and Daylight Exposure on Overall Health and Sleep Quality of Office Workers: A Case-Control Pilot Study.” Journal of clinical sleep medicine : JCSM : official publication of the American Academy of Sleep Medicine. American Academy of Sleep Medicine, June 15, 2014. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4031400/.

Cook, G C. “Henry Currey FRIBA (1820–1900): Leading Victorian Hospital Architect, and Early Exponent of the ‘Pavilion Principle.’” Postgraduate Medical Journal. The Fellowship of Postgraduate Medicine, June 1, 2002. https://pmj.bmj.com/content/78/920/352.

Johnson, Karl. “Place and Public Health: The Impact of Architecture on Wellbeing.” The Guardian. Guardian News and Media, June 11, 2013. https://www.theguardian.com/sustainable-business/public-health-architecture-impact-wellbeing.

Joye, Yannick. “Architectural Lessons from Environmental Psychology: The Case of Biophilic Architecture.” *Review of General Psychology* 11, no. 4 (December 2007): 305–28. https://doi.org/10.1037/1089-2680.11.4.305.

Kisacky, Jeanne. *Rise of the Modern Hospital an Architectural History of Health and Healing, 1870-1940*. Pittsburgh PA: University of Pittsburgh Press, 2017.

Michael Craig Miller, M.D. “Seasonal Affective Disorder: Bring on the Light.” Harvard Health, December 21, 2012. https://www.health.harvard.edu/blog/seasonal-affective-disorder-bring-on-the-light-201212215663.

Prasad, Sunand. “Typology: Hospitals.” Architectural Review, July 16, 2020. https://www.architectural-review.com/essays/typology/typology-hospitals.

Ulrich, Roger. “View through a Window May Influence Recovery from Surgery.” Research Gate, May 1984. https://www.researchgate.net/publication/17043718_View_Through_a_Window_May_Influence_Recovery_from_Surgery.

Wales, HRH The Prince of. “Facing up to the Future: Prince Charles on 21st Century Architecture.” Architectural Review, July 21, 2020. https://www.architectural-review.com/essays/facing-up-to-the-future-prince-charles-on-21st-century-architecture.

Wilkinson, Tom. “Typology: Universities.” Architectural Review, September 24, 2020. https://www.architectural-review.com/essays/typology/typology-universities.

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