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Contagion and Inhabitation:

The Contemporary Medical Museum

By

Zhao Jin Feng, B.A.S.

A thesis submitted to
The Faculty of Graduate Studies
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Abstract

In the oldest record of architectural thinking, Vitruvius' *Ten Book on Architecture* reveals the ancient architect's preoccupation with health and illness in the making of architecture and the laying out of cities. The concern to set up conditions of health has persisted in architecture since then. Throughout architectural history, "spaces of contagion" as expressed in medical architecture and urban planning is a complex one. The meaning of architecture as "fundamental protector" is profoundly contradicted by the pervasiveness and force of contagious illnesses. In particular, in the event of an epidemic, the hospital that quarantines the infected becomes a source of contagion both literally and metaphorically. In the face of medical contagion, Architecture ceases to be a "protector." By examining the history of built spaces of contagion, and specifically the eighteenth century hospital, quarantine station, and medical museum, and the twentieth century microbiology laboratory, this thesis investigates the dynamics of quarantine exclusion and inclusion, with a view to rethinking the idea of medical contagion in contemporary architecture. Conclusions of this thesis are brought to bear on the design of a museum for contagious illness, on the site of Winnipeg's National Microbiology Laboratory. By presenting the world of contagion to an audience through the design of a museum dedicated to infectious disease, the public can begin to think about inhabiting the "space of contagion" in urban environments and in the contemporary city.

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Part I

Introduction

This thesis investigates the role that architecture has historically played in containing medical contagion within health institutions, and examines how built architecture has organized realms of safety amidst the threat of illness at selected historical moments. The work outlines the various architectural strategies architects have had recourse to in setting up protected domains that aimed to contain infected persons, preserve the healthy population, and, in the last instance, to safeguard the City. Architectural examples of how contagious illnesses have been represented and publicly displayed in medical museums are also considered here. The thesis examines both instrumental and metaphorical role of architecture in defining spaces of illness and of health and in calibrating the public's perceptions of these spaces. The work is organized into two parts, beginning with the analysis of historical precedents in medical architecture, and culminating in the design of a museum of infectious disease. The latter, an architectural proposition, is sited on a lot adjacent to the National Microbiology Laboratory (N.M.L.), in Winnipeg, Canada. This thesis examines the relationship between public health institutions intended for research and curing (hospitals and laboratories), and public spaces where the public may examine contagious illness on their own terms (the medical museum).

As a related theme, this study will question the experience of infectious diseases in terms of the disembodied character of contemporary medicine, through an architectural *mise-en-scene* of the experiences associated with contagious illnesses: fear and

misunderstanding of infection and death, curiosity about illness and about bodily processes of contamination, combating infection, and healing and dying. The design of a museum of contagious illness will thus provide a medium through which to explore these issues architecturally. This thesis will also question the manner with which the public – which often only knows illnesses in terms of their mysterious medical acronyms – is kept at a distance from a tangible understanding of illness.

Bodily disorders associated with epidemic diseases, and social unrest which accompanied and followed them, were perhaps the greatest catalysts to the changing perceptions, constructions, and experiences of the corporeal and the carnal.¹

As alluded to in this quote from *The Disordered Body: Epidemic Disease and Cultural Transformation*, the impact of epidemic disease on human history, on the shape of cities, and on architecture's formal language, is decisive. If infectious disease is the initial starting point for an architectural inquiry, architecture's fundamental task of sheltering and protecting society and the body (a task it performs with a play of boundaries and apertures), is made quite poignant. Furthermore, because architecture is inscribed in a primary way within our physical and corporeal world, a medical museum of contagious disease provides a rich venue within which to explore infectious illness as an embodied condition and to accentuate, at a crucial moment in medico-biological history, the physical manifestation of illness.

Finally, this thesis builds upon Michel Foucault's three-tiered spatial interpretation of disease as dimensions of imaginary classification, corporal reality, and

¹ Suzanne E. Hatty and James Hatty, *The Disordered Body: Epidemic Disease and Cultural Transformation*, p. 254.

social order.² This thesis re-examines Foucault's idea of imaginary, corporeal, and social layers as they become manifested in architecture. Also, the design component at the end of this thesis, a museum of infectious disease, refers to Foucault's tripartite spatial idea. My proposition for a museum of infectious disease, in particular, will refer to Foucault's idea by addressing the architectural expression of contagion at the body scale as well as at the urban scale. The work is organized into two parts. Part I of this thesis focuses on studies of eighteenth century health institutions and built space in order to uncover the architectural implications of contagion at the moment when many persistent concepts of modern science were first being formulated. Part II centers on a design project for a museum of infectious disease at the N.M.L. campus in Winnipeg. This project conceptually emerges from the conclusions drawn in Part I.

² Michel Foucault, The Birth of Clinic, pp. 14-15

Chapter 1: The Contemporary Landscape of Contagious Illness

It is a dangerous error to believe that disease and suffering can be wiped out altogether by raising still further the standards of living, increasing our mastery of the environment, and developing new therapeutic procedures. The less pleasant reality is that, since the world is ever changing, each period and each type of civilization will continue to have its burden of diseases created by unavoidable failure of biological and social adaptation to counter new environmental threats.

— Rene Dubos³

In March 2003, a worldwide outbreak of Severe Acute Respiratory Syndrome, also known as SARS, revealed our human vulnerability to infectious disease. This vulnerability is not only a physical and biological entity, but also a psychological one. Between March and July 2003, 8000 people were infected by SARS, and 900 died. SARS is considered to be the “first severe and readily transmissible new disease to emerge in the twenty-first century.”⁴ In outbreak countries, the damage SARS caused was not limited to biological destruction of the human body, but also involved human mental health. As Susan Sontag writes: “the idea of an organically contaminated, objectively pathogenic environment reappeared in the notion of psychologically contaminated ambiance that produced a disposition to mental illness.”⁵ Looking back at the SARS

³ Quoted from Rob DeSalle “Introduction: Natural History of Infectious Disease,” in Epidemic! The World of Infectious Disease, p. 3.

⁴ Health Canada, “Learning from SARS”, p. 15.

⁵ Susan Sontag, AIDS and Its Metaphors, p. 43.

incident, what we can remember now is not the virus's biological characteristics, but the fear of getting infected by the person coughing next to us.

Of the 52 million deaths recorded by the World Health Organization (WHO) in 1995, 17 million were reportedly caused by infectious diseases. Further, WHO estimated that up to half of the world's population was at risk of contracting, and perhaps dying from, epidemic diseases.⁶ Architecture and the built world, in this context were radically redefined by the space of contagion itself. For example, urban hospitals during the SARS outbreak were considered the most dangerous places to be in because the infected was concentrated there. Next to hospitals, places like airports, restaurants, hotels, where many different people met and interacted were seen as potentially dangerous places during the outbreak. The idea of architecture as a fundamental protector is profoundly contradicted by contagious illness. The spaces of hospitals became both healing and life threatening space. It is perhaps for this reason that the medical museum has, through history, appeared recurringly as a surrogate space in which to experience and metaphorically inhabit illness and contagion.

In today's social-cultural milieu, the idea of health is premised upon the principle of exclusion. The healthy body is a body "free of disease and sickness." With help from medical science, we can detect and prevent diseases such as cancers before they develop in our body. Immunization can protect us from contracting many previously known infectious diseases. The quest for order and rational medical treatments for illnesses or for preventing sickness dominates our contemporary health perception. We try to stop our

⁶ Suzanne E. Hatty and James Hatty, p. 245. The infectious diseases that killed the most people in 1995 were acute lower respiratory infections (4.4 million); diarrheal disease (3.1 million); tuberculosis (3.1 million); malaria (2.1 million); Hepatitis B (1.1 million); and HIV/AIDS (approximately one million).

body's porousness by using available medical technology to build a fortress and distance our bodies from unwanted microbes. The further we pursue such exclusive conditions of our bodies, the less we can tolerate the "otherness" implied by contagious illness. However, this exclusionary model is limited, as it does not recognize the necessary overlap of human life and the microbial world, and it does not acknowledge that the nature of microbes is ever changing. It is hard for our body to keep up with the pace of evolving infectious diseases. We need to reconsider our relationship with the microbial world.

Controversially, scientists point out that "proximity to illness" is not the primary issue in the contraction and spreading of contagious illness. Indeed, many social, political, economic and environmental factors are responsible for the appearance and dissemination of infectious diseases. These include: human demographics and human behavior; ecological intervention; technological change and development; reductions in the public health system and breakdowns in public health measures. Population growth, rapid urbanization, overcrowded and unhygienic living conditions, war or civil conflict, mass movement of people, deforestation and reforestation, agricultural practices, including the building of dams, globalization of the food industry, international air travel, and the contraction of funding for public health programs are all significant determinants of the emergence and spread of infectious diseases.⁷ For the public, thorough understanding of such issues (human-made factors) as contributor to new emerging infectious diseases is needed in order to fight off the threat they impose. Without getting

⁷Suzanne E. Hatty and James Hatty, pp. 245-246. The recent outbreak of SARS, the seasonal re-appearance of West Nile virus and occasional conform cases of Bovine Spongiform Encephalopathy or mad cow disease, have put us in a position to recognize that we are now contending with new emerging infectious diseases.

to the root of the problem, this narrow-minded pursuit of exclusive medical solutions won't solve the evolving biological problem completely.

The idea of exclusion is also apparent in many planning and architectural design strategies in modern cities. So often, the idea of exclusion in modern architecture is manifested by clear, definite boundaries, and neglects its own urban context to pursue the difference that it makes with the rest of its neighborhood. As a result, modern architecture distances itself from its surroundings. In many cities, the healthy dwelling condition is equated with homogenous zoning. For example, residential areas are located far away from industrial parks; commercial centers are not accompanied by public recreation spaces. Sometimes, such as with a laboratory, the idea of exclusion accompanies the program and function of architecture. The over-simplification of the logic of exclusion in architecture results in unpleasant spatial experiences and monotonous, even alienating urban settlements.

The exhibition: *Epidemic! The World of Infectious Disease*, that occurred in the American Museum of Natural History in 1999, provides us a useful recent example of staging the memory of contagion inside a museum. This exhibit interestingly underscored the architectural spaces associated with epidemics; the display went as far as constructing an architectural replica of the room in which the Hantavirus Disease epidemic originated, as a way of offering an intimate experience of the disease to the public.⁸ The epidemic

⁸ The Hantavirus occurred between June and August 1993, in the Four Corners region of America's Southwest. See *Epidemic! The World of Infectious Disease* by Rob DeSalle p. 140. This most interesting exhibit staged a rich journey through displays about contagious illnesses. It was organized in six sections: "the struggle for coexistence," "exposure," "infection," "outbreak," "epidemic and pandemic," and "action." Each part of the exhibit dealt with different aspects of human's relationship with nature and the microbiological world. The sections "outbreak" and "epidemic and pandemic" made the dissemination of epidemics and strategies to contain them especially clear to the visitors. Visitors were able to view models of viruses, peek into

had been traced to a person sweeping the floor of a tool-shed and thus kicking up dust filled with mouse feces, a carrier of the virus; an outbreak ensued. The display, in turn, staged that event for the public at a later time, as if to offer a way to experience and play out their concerns for physical vulnerability. The museum display, complete with astonishing models, dioramas and electronic displays, gave visitors a chance to inhabit that fateful room and to safely indulge their fascination for infectious disease.

In a sense, like sacred architecture, the architectural space of contagion sets up an experience of inhabiting “unknowable realms.” This exhibition’s popularity during its three-year tour of museums of natural history and science throughout the United States is a testament to human curiosity about contagious illness and to the desire to get close to that which can be dangerous, that which is most feared, that which threatens our mortal coils. The role of temporary architecture in supporting such experiences is noted. How, though, might a permanent museum be built? What is the contemporary language of “space of contagion” in architecture?

laboratories, view into microscopes, and understand the exposure of human to microbes, the process of infection and medical treatment of contagious illness. The exhibition concluded by emphasizing the importance of personal actions in the triggering and the halting of epidemics. An “action area” complete with interactive displays even connected the exhibition to the World Wide Web. For a more detailed account of this exhibition, please see Epidemic! The World of Infectious Disease, pp. 219-225.

Chapter 2: The Quarantine: A Limit State of Architecture

At the beginning of the SARS outbreak, scientists around the globe raced against time to identify the virus that was causing SARS. The first reaction by health authorities was to isolate victims and place them in a “secure” place away from the general public. The immediate action of quarantine became a matter of life and death and it was the only measure that could stop further dissemination of unknown infectious diseases among the general public.

During the SARS outbreak, Health Canada enforced its Quarantine Act in major international airports across Canada and initiated a voluntary quarantine program in the Toronto area.⁹ In Toronto, public health officials iterated warnings to thousands of people to put themselves under a voluntary quarantine. Those who might have come into contact with SARS patients at a Scarborough hospital were being told to remain at home and to keep wearing protective masks. Many people were quarantined in hospitals because of the order of isolating the outbreak hospitals.¹⁰ Some groups were quarantined in airports, hospitals and their homes. These quarantine spaces used for drying the SARS outbreak became mysterious places in the public’s perception, indeed, places of mysterious fascination.

The fascinating character of the space of quarantine and of contagion is often endured in films and in exhibits such as the exhibition, *Epidemic! The World of Infectious*

⁹ For more detail about the act please visit <http://laws.justice.gc.ca/en/Q-1/95936.html>.

¹⁰ CBC News, “SARS screening to be expanded,” http://www.cbc.ca/stories/2003/03/28/sars_ottawa030328

Disease. The public is compelled to conceive of such space because their survival could depend on the existence and effectiveness of it. The quarantine creates a “gap” in the public realm (ranging in size from a room to entire cities or countries). In contrast, the medical museum provides a space for public participation and the shared experience of illness. One exists, in a sense, because of the void left behind by the other.

The notion of quarantine has been much discussed in literature, not only in terms of its medical effectiveness to contain an epidemic, but also its political implication on social discipline. Among those scholars who have studied the political implication of medicine and disease is Michel Foucault. In his book, *Discipline and Punish*, in the chapter on Panopticism, he quotes extensively from historical documents to explain a city’s emergency plan in the event of an epidemic outbreak. Such restrictive health measures from the medieval period to the eighteenth century are worth studying. Five points summarize Foucault’s text:

[In the event of an epidemic]

1. All people must remain at home in order to be isolated in a particular place, even in a single room;
2. The Town is divided into distinct sectors or regions, inspectors patrol the streets, and a system of generalized surveillance is used to compartmentalize and control;
3. To accompany the detailed reports that come from these sectors, there should be a centralized information system;
4. People who do not show themselves to the inspectors at their windows will undoubtedly have contracted the plague and, therefore, must be transported to a special infirmary outside the town;
5. Houses must be disinfected and sterilized.¹¹

¹¹ Stuart Elden, “Plague, Panopticon, Police.” in *Surveillance & Society* 1 (3), p. 243.

Foucault argues that such restricted health measures, in the event of an epidemic, “give rise to disciplinary diagrams.”¹² These disciplinary diagrams require a strict spatial partitioning, careful surveillance, and detailed inspection and order. This way of dealing with infectious disease is not a “massive, binary division between one set of people and another;”¹³ it is rather one that involves “multiple separations, individualizing distributions, an organization in depth of surveillance and control, an intensification and a ramification of power.”¹⁴ It requires the minute control and division of space – the town into districts, districts into quarters, and quarters into isolated roads and individual houses.¹⁵ In Europe, before the modern period, these health measures imposed on population were mostly authority-led medical interventions.¹⁶ As a result, it was difficult to separate the debates of the political and medical aspects of quarantine, because the question of spatiality and surveillance of population were vital to its effectiveness.

¹² Michel Foucault, Discipline and Punish: The Birth of Prison, p. 198.

¹³ Elden, p. 243.

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Elden explains the authority-led medical intervention in the eighteenth century: “Between 1720 and 1800, medicine becomes an essential element for the maintenance and development of collective life, of society in Europe. For the capitalist society, it is the bio-political above all which is important: the biological, the somatic, and the bodily. As Foucault put it, “the body is a bio-political reality, medicine is a bio-political strategy.” The development of statistics, population profiles and monitoring and surveillance becomes important as there is a move to prevention and regulation—not only in site of exclusion, but in the society more generally. In this period, governments deal not just with a territory and the individuals or a “people” within, but with an “economic and political problem”—population. Before this time only exceptional circumstances—the regulations applied in times of epidemic, the measures used in a plague-infected towns, the quarantines imposed in large ports, along with the more mundane assistance shown to paupers—showed the constitution of these kinds of authority-led medical interventions.” p. 242

Today's authority-led medical interventions deal only with the authorities' territory and infected individuals in times of outbreak. Health authorities are blamed for not doing enough to protect the public from an outbreak because they focus only on their "jurisdictions" rather than on society as a whole. For example, during the SARS outbreak in Toronto, authorities of three levels of government were blamed for not communicating well to each other, and for not exercising the Quarantine Act soon enough, and for acting overly bureaucratically. In other outbreak countries, such as China, the government was blamed for not taking action in time to stop the dissemination of SARS, and for not disclosing information to the public. The public's daily business was halted by the fear of going to "strange" and crowded places. Unlike the seventeenth and eighteenth century's quarantine regulations enforced in ports and cities by authorities, during the SARS outbreak, people regulated themselves and kept away from outbreak areas. The authorities needed only to deal with their "jurisdictions" instead of regulating the population.

The fact is that these bio-political strategies of dealing with infectious diseases are too costly. The authorities are not willing to take the risk of creating fear and anxiety among the populace by declaring the city as an outbreak location. Today, the decision to exercise the Quarantining Act cannot be made by a unilateral political force, as it was during the seventeenth and eighteenth century. Instead, it requires social and economic justifications. Today's quarantine measures are similar to those described by Foucault. During the outbreak period of SARS, Health Canada required those people who had been in contact with infected patients, or had been to specific hospitals or other locations, to stay in quarantine either at home or in a hospital regardless of their current health

condition. People who showed symptoms similar to SARS patients were treated as infected cases and separated in hospitals. During the SARS outbreak, the public no longer perceived the hospital's function as a "curing machine", because hospitals contained SARS infected patients. Suddenly, the "curing machine" had become a dangerous place that treaded the boundary between life and death.

Metaphorically, our perception of hospitals during incidents such as the SARS outbreak resembles the historical models: the hospital in the eighteenth century was essentially an institution of separation and exclusion, the place where one went to die.¹⁷ In general, people go to hospitals because they have to. The hospital is a place for healing, curing and caring. It is an urban institution, mainly for medical professions and patients. Driven by its functions, the hospital excludes itself from its neighborhood. In contrast, the medical museum, as an urban institution, is a public place, and a place where the public can become acquainted with that which they fear. Unlike the hospital, people go to a medical museum because they are driven by their curiosities about medical knowledge.

If the question of the hospital in the eighteenth century is, as Foucault argues, "fundamentally a question of space,"¹⁸ then, the hospital not only requires internal organization and knowledge of contagion, proximity and crowding, ventilation and air circulation,¹⁹ but also of the spatial adaptation of the hospital, and, in particular its

¹⁷ Ibid., pp. 245-246.

¹⁸ Ibid., p. 245.

¹⁹ Elden explains the internal organization of the hospital, "The individuation of patient space, with the single beds, as opposed to larger dormitory beds of the past, the screens placed around the beds; and the constitution of modifiable environment, with changeable temperature and air cooling. These are intended to allow the individual control of patients' environment, and protect

adaptation to the urban space surround it. On the urban scale, within a larger community, planner must consider whether a hospital should be large and encompassing, located in or out of town where the risk of contagion is limited, or whether or not there should be a number of smaller hospitals spread throughout the community. In contrast, the medical museum is not a source for such concerns and can simply fascinate the public with non-contagious representations of fatal forces.

Technically, hospitals are built to keep contagious illness inside with negative air pressures which prevents airborne pathogens from leaking out. The risk of contagion is eased by modern technology. As such, the hospital's urban adaptation relationship to its context is alternated and often completely ignored. But the basic question still needs to be asked—could a hospital be “an instrument of the cure itself?” Paradoxically, the hospital's isolation from its surroundings contributes to the fear of those surroundings. Since today's spatial adaptation won't rid people of the fear of hospitals, the spatial practice and the logic of separation and exclusion of a health institution needs to be reconsidered.

Today, throughout the world, the scientific frontiers of the “curing machine” are replaced by high-end microbiology laboratories instead of hospitals. Since it is where the research relating to curing diseases takes place, safety and danger exist simultaneously. Inside a microbiology laboratory, where many infectious diseases are being investigated, the outcome of life and death could mean one simple mechanical procedure. Also, the microbiology laboratory is a place of struggle between the known and the unknown of the microbiology world.

them from infection. All of these changes showed the attempt to make the hospital not simply the place of cure, but also an instrument of the cure itself.” Stuart Elden, p. 242.

As an important public health institution, the National Microbiology Laboratory (N.M.L.) in Winnipeg must present itself as being absolutely confident about the unknown factors of a disease outbreak, in order to immunize the public against fear of the virus. The authority of this institution requires not only absolute authentic scientific knowledge of infectious diseases, but also demands a convincing architectural space. Foucault's argument that the scientific frontier of the eighteenth century's "curing machine" was the hospital and the essence of a hospital was its "question of space," is useful here. Indeed, the space of the eighteenth century hospital was intended to create conditions that would illuminate the truth about sickness, that would be a place of observation and demonstration, and that would also provide purification and proof of sickness.²⁰ More importantly, Foucault notes: "the medicine of the eighteenth century, by its use of space, is simultaneously a medicine of the individual and the population."²¹

Since the N.M.L. is doing exactly what Foucault saw the eighteenth century hospital having done—proving the truth of sickness in abstract biomedical science—its architectural expression and spatiality should not be interpreted as one of alienation, nor should the building exclude itself from the urban context. To be an effective medicine to both the individual and the society, this health institution's usage of the logic of inclusion and exclusion at the urban level needs to be crafted. The hospital, the laboratory, and the medical museum, are thus three intimately related constructs. While the hospital is a "curing machine," and the laboratory is its assistant, the medical museum appeals to the human need to delve into the source of the wound, and into the origin of the illness itself,

²⁰ Stuart Elden, p. 246.

²¹ Ibid.

without dying in the process. In this sense, it is a vital institution that exists alongside hospitals and laboratories in a myriad of forms, be they more informal or formal. This thesis proposes one vision of a medical museum in the present landscape of contagion.

In order to better understand the idea of a contemporary medical museum, it is useful to examine historical precedents. The eighteenth century hospital and medical museum in Europe are particularly relevant, as they were important institutions in the history of scientific medicine.

Chapter 3: Contagious Illness as Spatial Knowledge in the Enlightenment Period

Before the Enlightenment Period, medical practice was firmly rooted in a mixture of observation and religious belief. In the eighteenth century however, the body came to be perceived “not as a hollow container for the spirit, but as layers of membranes with different ranges of permeability and stability.”²² Scientific explanations of contagious disease (contagion theory and miasma theory) slowly replaced the more spiritual descriptions of contagion. Foucault’s study of this revolutionary change of power and knowledge in medical history—*The Birth of the Clinic*—clearly states that the importance of gaze in the eighteenth century medical practice contributed to the early development of modern medical knowledge. He analyzes the changing medical perception from religious belief to scientific knowledge, and describes in particular, the period before the eighteenth century, when the medical system had considered human being in a space of humours (medieval science and medicine’s reference to the four main human body fluids: blood, yellow bile, black bile and lymph) and harmonies. Widely known, in medieval period, disease was dominantly perceived as “a function of the environment and the mode of life,”²³ and the body was “merely the locus of these complex determinations.”²⁴

²² Paula Yong Lee, “Modern Architecture and the Ideology of Influence”, *Assemblage*, n.34, (1998), p. 14.

²³ Paul Hirst, “Foucault and Architecture”, *AA Files*, n.26, (1993), p. 53.

²⁴ *Ibid.*

In the eighteenth century, clinical medicine isolated and observed bodily states and processes. “Its observational “gaze,” the product of definite discursive and institutional conditions, was part of an order of statements that proceeds from observations in a clinical context to establish disease entities and etiologies.”²⁵ Foucault, in his *Archaeology of Knowledge*, considers the acts of observing, recording and presenting the observations as discursive activities. As is the case today, an important part of a physician’s training was the clinical observation of a patient. In the Enlightenment Period, however, the practice of recording observations was done to support the physician’s speculation about an unknown disease. Such practice stretched the limits of presence (observable symptoms) and absence (previously unknown disease) by presenting the previously recorded facts.

During the Enlightenment Period, diseases were recognized to “exist” only when they manifested themselves on the skin. The appearance of a person’s skin determined whether or not one was contaminated by contagious disease. At that time, the major medical diseases were thus the “spotted plagues,” such as smallpox, measles, and scarlet fever. Barbara M. Stafford describes the appearance of the diseased skin as: “indicating the breakdown of solid flesh, the shattering of somatic integrity, the destruction of pigmentation.”²⁶ A patient’s symptoms were examined according to how they were classified when observed. The notion of contagious illness as scientific fact has undergone enormous change. The proximities and hierarchies of the symptoms, which manifested on the skin, replaced the social differences and hierarchies among patients.

²⁵ Ibid.

²⁶ Barbara M. Stafford, *Body Criticism*, p. 292.

Today, scientific knowledge of infectious disease is far more abstract and less tangible. Instead of manifesting their presence through visible and communicative symptom descriptions, lethal infectious diseases sometimes can only be confirmed with sophisticated medical equipment. The confirmation of a disease often is a disembodied notification under modern biomedical science. Clinical observation has shifted from tactile body engagement to the abstract explanation of technological images such as X-Rays and MRI Scans.

The space of containing infectious disease has undergone a similar transformation. Before the modern period, most quarantine spaces were erected to separate and prevent physical contact between two different bodies. The breakdown of one's skin implied the absolute need to separate oneself from the public, in order to limit further damage by the disease. At that time, the space of quarantine had to be located away from cities. During the modern period, as infectious disease became more intangible and immaterial, the quarantine space extended its controlling domains to include the air, the modern urban fabrics, on the other hand, were less concerned with infectious disease as a spatial determinant.

Contagionism and Miasmatism

In the late Eighteenth century, there were two dominant theories of contagious illness, namely, contagion and miasma theory. According to Dutch health scientist, Henk A.M.J. Ten Have, in his article "Knowledge and Practice in European Medicine: the Case of Infectious Diseases," contagionism attributes epidemic disease to minute living

organisms. It postulates the conveyance of distinct germs between individuals. These so-called “contagia” reproduce themselves in the individual they have infected, and they pass from the sick to the healthy by directed or indirect contact. The emphasis, therefore, is on the individual person, while the environment is merely a passive medium. From this idea, clear directives for medical practice arise: the only effective measure against an epidemic disease is the most stringent isolation of all those afflicted. Medical health regulations were deeply inspired by contagionism throughout the sixteenth and seventeenth centuries: Quarantine laws, pesthouses, and leperhouses were intended to interrupt the dissemination of disease. During the sixteenth and seventeenth centuries, towns, provinces, and countries were sealed off by a cordon of troops in an attempt to keep out pestilence. The infected individual, as carrier of contagia, was the prime target of a policy of isolation.²⁷ They were immediately expelled from the urban area and society to pesthouses or leperhouses scattered outside of the city. The boundaries of pesthouses and leperhouses clearly separated the disorder from order in society.

Before the Enlightenment Period, infected patients in the hospital were not allowed to have any physical contact with the nurses. They were kept in separate cubicals. The accumulated medical knowledge of contagious disease demanded more paradoxical requirements to prevent the spread of disease. A set of restricted social conduct was often imposed on the patient to “counteract the agent (disease) of disorder and destruction.”²⁸

²⁷ Henk A.M.J. Ten Have, “Knowledge and Practice in European Medicine: The Case of Infectious Diseases,” in The Growth of Medical Knowledge, ed. Henk A. M. J. Ten Have, Gertrit K. Kimsma, and Stuart F. Spicker, p. 19.

²⁸ Barry Bergdoll, “The Architecture of Isolation”, *AA Files*, n.14, (1987), p. 4.

In contrast to contagionism, in the later seventeenth and early eighteenth centuries, miasmatism proposed that disease was produced by odors and emanations, i.e., by drifting unhealthy miasma. These miasmas were generated by a variety of sources in the human environment: dirt, bad drainage, crowded housing, lack of ventilation and polluted water. Generated under specific conditions of filth, temperature, and moisture, poisonous miasmas were propagated through the air, not through the patient. Disease was thus no longer an individual affair but, rather, a product of the environment. The presence of miasmas could be detected by smelling. In summary, it was not contagion from person to person that was responsible for the eruption of disease, but rather a widely diffused, atmospheric agent.²⁹ The idea of miasmatic propagation suggests that architecture and urban space play a role in contagion. The corollary of this is that architecture can “fight” contagion.

If the contagion theory can be read as internal regulation of the infected bodies in society, then, the miasma theory can be read as the external cause of epidemic disease. Miasma was omnipresent in society and asked to be controlled by improved physical conditions. The miasmatic theory therefore underscored architecture’s role in the fight against contagious illnesses. As described in “Knowledge and Practice in European Medicine: The Case of Infectious Diseases”, in *The Growth of Medical Knowledge*:

It is easy to conceive how incidental they [contagious diseases] must be, not only to all marshy countries after hot seasons, but to all populous cities, low and ill-aired; unprovided with common sewers; or where the streets are narrow and foul; or the house dirty; where fresh water is scarce; where jails, or hospital are crowded, and not ventilated or kept clean; when in sickly times, the burials are within the towns, and the bodies not laid deep; when slaughterhouses are within the walls; or when dead animals and offal are

²⁹ Ibid., p. 21.

left to rot in the kennels, or on dunghills; when drains are not provided to carry off any large body of stagnating or corrupted water in the neighborhood....³⁰

In the late eighteenth century, this miasma idea influenced Europe's urban reformists, and led to sanitation programs in the urban core. The creation of the public sanitary science, which included the widening and paving streets, erecting public fountains and constructing proper sewage systems, also resulted. Both concepts of contagion (contagionism and miasmatism) profoundly influenced the "hermetic sealing" and spatial separation of public health institutions in cities. The increasing awareness of contagion theories, in the eighteenth century, re-oriented medical practices toward more scientific and rational explanations of illness. New architectural spatial practices followed these changed medical perceptions.

Architecture of Health Institution

Today, the eighteenth century is referred to as the reform period for hospitals, asylums and prisons in France. Foucault's work on this topic refers to the clarification of function in each different institution as the product of the conception of "power-knowledge." This idea is at the root of modern functionalism in architecture. A hospital was built exclusively as a "curing machine." In major cities, like Paris, before the reform, hospitals were extremely crowded. Many different kinds of patient occupied the ill ventilated halls. Often, three or four patients shared a bed. In the eighteenth century, it was widely believed that stagnant air was the chief cause of contagion. While the perception was that a hospital was a place for illness and a source of contagion, many existing hospitals

³⁰ Henk A.M.J. Ten Have, p. 24.

created horrible conditions for its occupants and threatened the neighborhoods around them. Before the Reform period, hospitals “seemed to promulgate the diseases that they were supposed to cure; outside they seemed to be the center of epidemic, dangerous to surrounding neighborhoods and regions.”³¹ The authorities were under pressure to review and reform the hospitals.

In the Enlightenment Period, based on the miasma theory, the location for the “curing machine” was often situated on the outskirts of a city. For a reformist, when planning a new care facility, the task was not only to design in certain ways, as it was to improve the ventilation of the building according to the characteristics of local climate. In some cases, the design of hospital buildings would incorporate mechanical equipment, as to manifest the reformist’s improved medical knowledge about disease in relation to the living environment (Fig. 1). The exercise of such rational planning was to “counteract the terrifying uncertainties that surrounded the nature and transmission of epidemic disease.”³² As an echo of changed perception of body and illness, the hospital was

SECTION OF M. TENON'S PROJECT D'HOTEL-DIEU PAR LEROY, SCALE 1/100

Figure 1. M. Tenon, Project D'Hotel-Dieu Par Leroy, section, author's drawing.

³¹ Anthony Vidler, “Confinement and Cure: Reforming the Hospital, 1770-1789”, in *The Writing of the Walls*, p. 52.

³² Bergdoll, p. 5.

considered not simply a “passive container but an active instrument both in the treatment of patients and in the protection of society.”³³ Throughout this reform period, the planning of hospitals almost always unfolded “the paradigms of a combination of strict confinement and maximum openness to elements of purification.”³⁴ The clustering of a series of pavilion wards around a big open courtyard, connecting each ward with long corridors, was the norm of hospital design of the Enlightenment period.

The eighteenth century Saint-Louis Hospital (Fig. 2), founded in year three of the French Revolution era in Paris by architect Nicolas-Marie Clavareau (1757-1816), is in many ways a material record of the eighteenth century’s understanding of contagion. The hospital spatially represents the space of contagion itself. It was one of the earliest health institutions to adapt such scientific and rational planning to design in order to confront chaotic contagious illnesses.

Originally, the hospital was at the northern edge of the city when it was built. The design concept of

maximum openness was the prototype for the reform period, stretching the limit between solid and void. The Hospital was planned in four layers of space. At the center was a big open square courtyard. Surrounding the courtyard were multiple low-slung structures.

Figure 2. N. M. Clavareau, the Saint-Louis Hospital, plan, author’s drawing.

³³ Ibid.

³⁴ Ibid.

They were the main wards of the hospital. The outer layer was another open green space. The periphery of the hospital was formed by four disconnected isolated right-angle pavilions offset from the four corners of inner low-slung structures. As the plan reveals, the circulation of air, and the permeability of the design to provide natural light were innovative features, compared to its contemporaneous designs.

The hospital courtyard during the Enlightenment period, was considered an important space located next to the chapel (Fig. 3). The latter not only reflected the belief that the source of contagion was the stagnant air, but also the belief that increasing the body's exposure to natural elements such as fresh air and sun helped to cure diseases. Under the general mandate of

Figure 3. N.M. Clavareau, the Saint-Louis Hospital, courtyard, author's capture, <http://www.parispourvous.net/index.php?wpe=a156> (Oct. 10/2003)

confinement, the courtyard was, in some cases, the only space where infected patients were allowed to walk freely and do exercise during an epidemic period.³⁵

While there was separation of infected and uninfected patients in Saint-Louis Hospital, French architect Michel Robert Penchaud's quarantine hospital, on a coastal island near Marseilles, embodied the idea of separation on an urban scale (Fig. 4). The hospital's function was to filter out any contagious disease that might be brought along with the increasing sea trade in the Mediterranean Sea, in the eighteenth century. This is an early example of a building existing at a distance from an urban context. The

³⁵ Ibid.

hospital's sole role is to protect the city. At a distance from the city, this quarantine hospital recalled a temple, excluding itself from the urban environment and limiting access to the public. This quarantine station was not simply a mid-ground space between a prison and a hospital, but was a complex statement about controlling and healing unseen but imaginable contagious diseases.

The quarantine hospital was erected on an elevated rocky island and enclosed by a double wall. It contained three distinct precincts, each with a full complement of wards and a station for goods. There were places for the beds of the guards who tended to each group of patients or "suspects" in each precinct. In order to eliminate the inmate's uncomfortable feeling of being held as a criminal, the quarantine station had a commanding view of the distant city. There were spacious exercise grounds for each precinct. The inmates were allowed to move freely within the precinct, but not to have physical contact with inmates in other precincts.³⁶

In the hospitals of the past, during an epidemic, the patients' social hierarchies were often replaced by the hierarchies of their symptoms.³⁷ In Penchaud's quarantine station, however, "the separation of passengers by ship and by symptoms was further

Figure 4. M. R. Penchaud, view from the northeast of Penchaud's quarantine hospital in 1983, Marseilles, France, Bergdoll, 1987.

³⁶ Ibid.

³⁷ Barbara M. Stafford's term

refined by different classes of accommodation, which maintained the social hierarchies that had pertained on board.”³⁸ To confront such complex hierarchies of both disease symptoms and social interactions, Penchaud skillfully crafted out the relationship between solid and void, and obtained, from the overlapping of geometry, a plan order that manifested the containment and curing of contagious disease (Fig. 5). As described in the article, “The Architecture of Isolation”:

Each service was defined as a separate precinct within a larger walled precinct, creating a series of overlapping geometries of segregation and categorization.... The ten bed wards for the sick, with partition between each bed, were arranged around a central stair tower and set perpendicular to the wind, with generous fenestration on both sides. They overlooked enclosed courtyards, but with no communication between them.... The convalescents had no view of the chapel. Their wards were without individual cubicles, thus allowing more communication and freedom of movement. These formed the wing closing the complex to the east. This wing presents a blind wall to the sick wards but opens generously to the exercise yard, the upper storey commanding views of the Marseilles skyline five kilometers away. Despite the permeability of the precincts by air, the entries are limited and controlled, so that there could be not accidental intermingling of the zones of administration, sick, and convalescence.³⁹

Following this description, we can capture the idea that the walls of this quarantine station skillfully separated different groups of people

Figure 5. M. R. Penchaud, the Quarantine Hospital, plan, author's drawing.

³⁸ Bergdoll, p. 6.

³⁹ Ibid., pp. 9-11.

(suspected patients according to each ship and its staff).

Throughout history, quarantining and the act of erecting walls were proved effective way to contain contagious illness. The infected bodies were separated from society. The patient had to confront the solitude of illness in an isolated space. The notion of building a fortress to contain the infected and to protect the healthy was slowly winning acceptance with the general public. In order to fight contagious disease, isolation needed to be enforced by many layers, from societal to individual. The rational planning and rational spatial adaptation of architecture was seemingly the most reliable method to protect the public from chaotic diseases. This was a time when architecture as “building” could still protect the public because the most up to date scientific knowledge of contagious disease was then still limited to notions of contagionism and miasmatism, which both emphasized the importance of separation and control of contact.

Despite increasingly elaborate scientific explanation of diseases in the eighteenth century, the belief in spontaneous generation still had influence in medical practice. Toward the end of eighteenth century, the perception of contagious disease caused by “stagnant air” inspired a radical spatial reordering of hospitals. To allow air to circulate and to direct natural light to penetrate strategically, were strategies once thought to be the essence of curing contagious disease. But, in reviews of the policies, the nineteenth century hospital reformists realized that the reformed hospital’s mortality rate remained as high as in other hospitals.⁴⁰ The hospital reformists then tended to look for a more scientific explanation of what went wrong. In fact, there were many factors that caused the high mortality rate, such as lack of cleanliness, and sanitation in hospitals.

⁴⁰ David C. Sloane, “Scientific Paragon to Hospital Mall: The Evolving Design of the Hospital, 1885-1994”, *Journal of Architectural Education*, (1994) n. 48, v. 2.

Nonetheless, the major factor was non-architectural: the use of unsterilized operation equipment that caused cross infections.

In 1867, the germ theory was formulated by the works of Louis Pasteur, Edward Jenner and Robert Koch. Until that time, the public started to understand that “the problems of contagion and isolation had to be more finely dealt with than by mere building arrangement.”⁴¹ The germ theory brought infectious diseases into scientific realm, and demonstrated that it was not “bad air” or “bad blood” that caused diseases like malaria and yellow fever, but pathogens transmitted by mosquitoes. Germ theory, in turn, displaced architecture and the health-inducing qualities of urban space once again, with its proposal that the origin of contagion was non spatial, microscopic, and from the point of view of human perception, immaterial.

If contagion does not originate in bad air or bad blood, what can the built world do to counter it? Before the germ theory, the general question was—what is disease? After the germ theory was established, the questions were, which germ caused which disease? And how can they be controlled? Accordingly, architecture began to focus on its internal function as a “living machine,” in order to help inhabitants prevent contagion, externally, as a protector. It was here that medical architecture’s real limits first became apparent.

⁴¹ Robin Middleton, “Sickness, Madness and Crime as the Grounds of Form”, *AA Files*, n. 24, (1993), p. 21.

Contagious Illness and Fascination: the Medical Museum

In Western medical history, the notion of disease was strongly understood at a societal level. For example, the Black Death and leprosy in the medieval period were widely believed to be diseases of sin. As a result, every leper house had a chapel in the middle for patients to pray. These containment spaces were altered locations in cities, which people either avoided or regarded with consciousness and trepidation. Later, in the sixteenth century, the notion of disease as somatic illness was influenced by the recognition that the human body was porous, especially the female body. Diseases were believed to penetrate into the body through these “openings.”⁴² It was in the eighteenth century, that medical practice began adapting the observation-based clinical techniques. Diseases were then only recognized when they manifested themselves on a body.

When diseases could be observed on patients’ bodies, medical practice in the eighteenth century, focused on the physical, tactile, bodily engagement of the “medical gaze.” The appearance of the body gradually became an indication of one’s health status. Society was then becoming more aware of the importance of body shape as a manifesto of health.⁴³ From then on, the medical profession’s mandate was turned to the control and

⁴² Suzanne and James Hatty, The Disordered Body: Epidemic Disease and Cultural Transformation, in chapter 8: “The Danger of Touch: The Body and Social Distance.”

⁴³ Suzanne and James Hatty, p. 219. On discussion toward the Modern Body, Suzanne and James Hatty writes “The coincidence of these two factors—community responses to syphilis and the prescriptive moral ambience of the sixteenth century—reshaped all discourses on the body. One of the most enduring outcomes of this process was that the perceived association between sexuality and disease become firmly entrenched in discourses which informed both medicine and the community generally. In a wider sense, this reshaping of discourses on the body produced a range of body images that influenced the everyday lives of the whole community.”

curing of those observable diseases.⁴⁴ To preserve their health, people kept themselves away from other sick bodies. Gradually, their understanding of disease as an embodied experience had shifted because of their avid pursuit of the “body without illness.” The public increasingly relied upon staged representations and displays about illness in theatrical settings in order to gain an understanding of disease. A medical museum provided such a space for fascination with and imagination of disease. In the medical museum the danger has been removed, and the place becomes one of pure curiosity, knowledge, and even delight.

In the Eighteenth century, patients often suffered from chronicle skin diseases considered contagious (Fig. 6). In Paris, patients were admitted to the Saint-Louis Hospital for the treatment and study of their diseases. As an important health institution, Saint-Louis Hospital, had a mission not only to serve as a “machine of healing,” but also as a “machine of observation—the central institution facilitated for the clinical gaze.”⁴⁵

Figure 6. Jean-Louis Alibert, Pustulant Smallpox, 1833, B. M. Stafford, 1991, p. 296.

⁴⁴ In chapter 4 of “Making” of her book *Body Criticism*, B.M. Stafford illustrates the making of unseen contagious disease seen in eighteenth century. The medical professions were able to turn their focus on the manifestation of disease on the appearance of skin to diagnose the patient’s illness.

⁴⁵ Hirst, p. 56.

In the later eighteenth century and the early nineteenth century, under the directorship of Jean-Louis Alibert, the Saint-Louis Hospital was able to transform itself into an early modern center for the study of Dermatology. It established a medical museum in one of the hospital wards, which hosted over four thousand wax models of different

Figure 7. Saint-Louis Hospital's Dermatology Museum, interior, <http://www.chez.com/sfhd/musee/musee.htm> (June 5/ 2004)

kinds of skin disease (Fig. 7). Today, the mimetic artifacts still display the appearances of the infected corporeal fragments. This “cabinet of wonder” presents the public with a concrete taxonomy of progressing medical knowledge about the body. As a medical museum, it engages visitors in physical observations of the tactile body, and fulfills their fascination of skin diseases without any actual experience of contamination.

This vast medical encyclopedia of Saint-Louis Hospital was intended to present “lifelike simulacra” artifacts as teaching instruments to medical students (Fig. 8). They were unlike any other medical graphic artwork that depicted a disease on the body (the graphic artwork was a popular medium

Figure 8. Polychrome wax artifact, <http://www.chez.com/sfhd/musee/musee.htm> (June 5/2004)

for an institution to present well observed and recorded disease in the eighteenth century). The corporeal-like polychrome wax artifact was able to stimulate the observing student to imagine the absent pain of a patient. The student was “catapulted into a past when the sufferer nakedly wore his disgusting symptoms.”⁴⁶ The materiality of these artifacts accentuated the essence of the eighteenth century’s clinical gaze of a patient’s body. In general, a medical museum was able to bring its visitors back to the contextual understanding of disease. The encounter with the museum would clarify the unnecessary rumors surrounding disease.

Unintentionally, the pedagogic decision to create a medical museum for medical students within Saint-Louis Hospital created an interesting architectural proposition. In contrast to a hospital, a medical museum posed no threat to its urban neighborhoods. In an absolutely safe environment, the visitor can journey through the imaginary chaotic and dangerous diseases displayed in the medical museum. With the existence of an urban medical museum in the confines of a hospital, the metaphorical mental unrest created by both disease and the hospital was reconciled.

⁴⁶ Stafford, p. 283.

Chapter 4: Healing the Contagious City: Modern Architecture and the Display of Health

In 1882, Robert Koch successfully identified the bacteria which caused tuberculosis—*Mycobacterium Tuberculosis*—and clearly demonstrated it was an airborne pathogen. Around that time, the focus of public health started to change from being one of concern for the environment to one of concern for how the body could be infected or become diseased from exposure to the external world. Later, the notion of sanitary science was developed, which was primarily one of concern for the maintenance of a safe barrier between the body and the external world. In the late nineteenth and early twentieth centuries, reducing the body's exposure to the "unfavorable climate, sedentary indoor life, defective ventilation and deficiency of light,"⁴⁷ along with strengthening physical fitness and eating a proper good diet were ways believed to best fight off any infectious disease. The pursuit of a healthy body increasingly became a goal in life.

During the pneumatic plague in the later nineteenth and early twentieth centuries in Europe, health advocates were targeting the unhealthy urban housings of the industrial age, which often lacked adequate ventilation, sunlight, and sanitation. Recent microbiological study shows that there was one thing that the eighteenth century Europeans could have done to decrease their exposure to household tuberculosis—open the windows. "One good flushing of the air could have purged 63 percent of the suspended infectious particles exhaled each day by an ailing resident, and the sun's

⁴⁷ Beatriz Colomina, "The Medical Body in Modern Architecture." *Daidalos*, n.64 (June 1997), p. 63.

ultraviolet light would kill those organisms it reached.”⁴⁸ Prior to this scientific research, unhealthy houses were, if not places of contagion, at least contributors to the dissemination of contagion at an urban level.

Architecture has always followed medical thought, as Colomina argues. During the early modern period, architecture was influenced by the architects' preoccupation with ventilation, sunlight, hygiene and white walls. Colomina notes the importance of sanatoria in the history of modern architecture, stating that we cannot understand the early twentieth century architecture outside of tuberculosis. “The symptoms, if not the principles, of modern architecture seem to have been taken straight out of medical text on disease.”⁴⁹ In her book *Illness As Metaphor*, Susan Sontag writes that there was a notion that tuberculosis was a wet disease, a disease of humid and dank cities. Indeed for a long period of time after Robert Koch's discovery of the Bacterium, the idea that the patient was helped by a move to a rural area to escape the daily business of the city persisted. Wealthy people considered the industrialized cities as places of contagion, while they saw resorts in the less developed countryside as places of healing. As such, Colomina points out, modern architects offered health by providing exactly such a change of environment. She writes: “The nineteenth century architecture was demonized as unhealthy, and sun, light, ventilation, exercise, roof terrace, hygiene and whiteness were offered as means to prevent, if not cure, tuberculosis.”⁵⁰ In her analysis, the sun terraces, the light, the air and the openings were favoured by modern architects, not only because

⁴⁸ Laurie Garrett, “Microbe Magnets: Urban Centers of Disease.” The Coming Plague: Newly Emerging Diseases In a World Out of Balance, p. 241.

⁴⁹ Colomina, p. 63.

⁵⁰ Ibid.

advancements of modern construction made them possible, but more importantly, because such architectural devices were the manifestations of health at that time. Such design ideas were not only promoted for institutional sanatoria, but also embedded in domestic house design. "Modern architecture was unproblematically understood as a kind of medical equipment, a mechanism for protecting and enhancing the body."⁵¹

The knowledge that natural sunlight and fresh air play an important role in health still influences people's perception today. Architecturally, the paradigmatic space of health and of healing

Figure 9, Alvar Aalto, the Paimio Sanatorium, terrace, Colomina.

illness in modern architecture is the sun terrace. An interstitial space between the built and unbuilt, the sun terrace provides a protective shield to the dweller, and invites the traditional therapeutic forces (air and sun) into the patient's realm. The sun terrace expresses the idea of both prevention of illness and preservation of health and strength and is a recurring element in early twentieth century sanatoria. This type of building is a kind of museum in the sense that it displays the operation of healing in architecture. The modern structure, it could be said, is always a kind of museum for health.

⁵¹ Ibid., p. 61

Aalto's tuberculosis sanatorium in Paimio illustrates an early modern interpretation of such healing space (Fig. 9). It is located in a remote area surrounded by thick woods. The patient ward is a long, narrow seven-storey building block. The simple plan orients the window of every room to face the southeast. Also, to get maximum sunlight in each patient's room, each floor has an area of more than 70 cm in length tilted upward at the edge where it meets the curtain wall. Each double-glass window allows air to come in indirectly. Each floor has a large area designated as sun terrace at the less trafficked north end. The top floor is a roof terrace, where patients are wheeled out to take in fresh air and sun. If a patient in an eighteenth century hospital courtyard felt depressed because one could not see or go outside, then, Aalto's sanatorium could have eliminated the psychological discomfort by providing such an authentic view of the surrounding landscape. The theatricality of healing in this building created such moments of escape from pain to breathe fresh air for patients.

Figure 10. Alvar Aalto, the Paimio Sanatorium, section and plan, author's Drawing.

Up until the early twentieth century, nature, and the forest played an important role in the space of healing. The new establishment of modern medical science cannot replace the mystery of nature in healing. Fresh air and the beauty that nature offers enables humans to reflect on life, an experience modern medical science cannot provide.

The later development of sun and air therapy in architecture represents a pursuit of simultaneous healing spaces—the terrace and the patient's room. To eliminate the wheeling of patients to a designated space for air and sun, the modern building does away with the boundaries and distance between the terrace and patient's room. For example, in Richard Docker's Waiblingen Hospital (Fig. 11 & 12), patients can be moved smoothly from the room to the sun terrace when staff slide up the glass panels that separate the two spaces.

Figure 11. R. Docker, the Waiblingen Hospital, section, author's drawing.

Figure 12. R. Docker, the Waiblingen Hospital, terrace, Colomina,

Figure 13. Robert Mallet-Stevens, the Villa Noailles, swimming pool terrace, Colomina,

There is another important analytic component about tuberculosis in the early twentieth century, which directly pointed to the physical fitness of a body—fatigue could contribute to an easier contraction of an infectious disease. The obsession of a body without fatigue in the early twentieth century was thought to be a better way to combat disease like tuberculosis. Colomina points out that the widespread call for organized sports and exercises in the early twentieth century was ultimately expressed in modern architecture. The fear of otherness in the epidemic period was turned to the awareness of one's own body. To fight off contagious illness meant the building of a more physically fit body. The reconceptualization of the human body is, today, manifested in the incorporation of space for physical exercise within both domestic space and urban centers. The sun terrace now is also an exercise ground (fig.13). We can see this health statement in most of Le Corbusier's houses. Le Corbusier considered the house as a machine for living. In the health campaign against the pneumatic plague in the late nineteenth and the early twentieth centuries, the house was seen as a machine for health, a form of therapy. Colomina explains Le Corbusier's obsession with health in

architecture in the 1929 film *L'Architecture d'aujourd'hui*, which was made in collaboration with Pierre Chenal:

Le Corbusier argues that disease breeds in the city because in the twentieth century people still live as if in the Middle Ages. He explicitly equates disease with disorder in the city.... The film, toured through his villa of the 1920s, emphasizes, once again, the value of sunbathing and exercise. It culminates in close-ups, shot on diagonal from below, of a man and two woman excitedly working out on the roof garden of Villa Church.⁵²

Colomina forcefully argues: "Architects repeatedly use disease imagery to express concern for social order. Architecture's traditional role of imposing order takes on different meanings with different diseases. The reconfiguration of the medical body by new science leads to reconfiguration of architecture."⁵³

A medical museum of the early twentieth century was not an important social institution of the modern project since the latter aimed to "build health." The old city was a "museum of illness,"⁵⁴ while the whole modern world was a "display of health." If we follow Colomina's argument, the space of contagion and healing of contagious illness of the twenty-first century differs from previous periods. This is not only because our

⁵² Ibid., p. 64.

⁵³ Ibid., p. 63.

⁵⁴ On discussion of the eighteenth century urban condition as a source of contagion, B.M. Stafford writes, "To be sure, eighteenth century London or Paris far exceeded the challenges to traditional authority accompanying the waning days of the Roman Empire. Sprawling urban conglomerations raised inevitable hazards of faulty sanitation. Pollution expanded with an accelerated industrial growth unknown to the ancient polis. Pursuing the medical treatises on rampant contamination in the early modern period, the twentieth-century reader is struck by the increasing power of disease to permeate....No class was immune from the vision of outsiders parading their abject penury and deteriorating flesh in the street. The city, then, was the archetypal milieu of evil and death, the site of shocking squalor and sick air. The malodorous urban setting thus became the prime locus for posing the ancient problem of the barbaric invasion of a lethal and impecunious otherness, with all its ethical, metaphysical, and artistic dimensions." p. 291.

medical knowledge about contagious diseases is far more advanced, but also because the source of today's hybrid and emerging illnesses are far less tangible than they once were, and can seemingly come from anywhere. The social unrest accompanied with hybrid infectious diseases and today's meanings of social order have changed. We must therefore ask: what is the "space of contagion" in the early twenty-first century? How is the contemporary conception of contagion and fear that is associated with it, brought to bear on architectural space? In particular, what is the new medical museum in an era of "hybrid contagion?"

Chapter 5: The De-Materialization of Illness and New Concepts of Boundaries: Architecture Surpassed

The De-Materialized Illness

Today, the medical inability to produce cures or adequate treatments for diseases such as SARS, Ebola and AIDS leads the public to realize the limits of conventional medicine. As a result, there is a heightened sense of the vulnerability of the body. In Europe, since the late nineteenth century, the public has begun to take greater interest in their own bodies by realizing their vulnerability to diseases.⁵⁵ The body slowly “became a project as people sought to preserve good health and to enshrine this in a perfectly presented body shape.”⁵⁶ In today’s context, despite the limits of medicine, one of the forces in the shaping of this socially constructed body is the medical profession. Even though the public realizes there are limits to medical science, as the body has increasingly become the focal point of an individual’s self identify, people ask for medical help to maintain their health. The body with somatic illnesses thus becomes, little by little, a medicalized and machine-like body. The availability of a “wide range of scientific intervention now

⁵⁵ Suzanne E. Hatty and James Hatty, The Disordered Body: Epidemic Disease and Cultural Transformation, p. 22. According to Baudrillard’s new way of viewing one’s body, “It (the body) is the only object on which everybody is made to concentrate, not as a source of pleasure, but as an object of frantic concern, in the obsessive fear of failure or substandard performance, a sign and anticipation of death, that death to which no one can any longer give a meaning, but which everyone knows has at all times to be prevented.”

⁵⁶ Ibid., p. 5.

destabilizes preconceived ideas as to what the body represents and creates misgivings as to how far we should go in permitting such efforts to remodel or restore the body.”⁵⁷

Gradually, our perception of health is turned into a narrow understanding—the body without disease or sickness. Such a narrow-minded concept results not only in a loss of meaning of embodied experience of disease, but also in a loss of our intimacy with the body. As the body goes into the “curing machine,” it will be treated as a machine. In the age of the technologized body, we witness the retreat of the flesh, and the continual replacement of matter by machine. The body is now viewed by the medical ‘gaze’ as an intricate machine rather than as a social entity. “It is capable of being adjusted, replaced or reconditioned with spare parts, employing a variety of physical forces—electrical, chemical and mechanical.”⁵⁸ In their book, *The Disordered Body: Epidemic Disease and Cultural Transformation*, Suzanne E. Hatty and James Hatty explain this dematerialized medical experience by acknowledging that we are surrounded by a “palpable fear of death and annihilation from uncontrollable and spectacular body threats: antibiotic resistant virus, random contamination, flesh-eating bacteria; the advent of the technologized body could be viewed as strategy of denial: the popularization of new body technologies disseminates new hopes and dreams of corporal reconstruction of physical immortality, it also represses and obfuscates our awareness of new strains on and threats to material body.”⁵⁹ Furthermore, even though we understand contagious diseases scientifically, we don’t know what they mean to the body. Our modern medical

⁵⁷ Ibid., p. 22.

⁵⁸ Ibid., p. 249.

⁵⁹ Ibid., p. 253.

knowledge doesn't diminish our fear of infectious diseases. Again, the medical museum becomes culturally important as a place where fears can be assuaged.

Today, new emerging infectious diseases play an analogous social role. The sources of hybrid and emerging diseases are far less tangible than they once were, and seemingly come from anywhere. If contagious diseases are just somatic illnesses, in today's advanced medical technology, they will be treated, if not cured. But often, contagious diseases appear in mental form and psychological unrest created by the associations that surrounded them. Through disseminated information, we see infectious diseases more as virtual objects. Susan Sontag in her book, *AIDS and Its Metaphor*, explicitly talks about how the understanding of AIDS is influenced by our socio-cultural environment. She says: "If AIDS can eventually be drafted for comparable use, it will be because AIDS is not only invasive (a trait it shares with cancers) or even because it is infectious, but because of the specific imagery that surrounds virus."⁶⁰ Contagious diseases, in fact, exist at the social level as virtual objects.

Susan Sontag expresses her concern about the spread of HIV/AIDS, where she writes: "AIDS obliges people to think of sex as having possibly a direct consequence: suicide or murder."⁶¹ She also points out that the definition of virus is not limited to biological terms, but also contain the meaning of changing perception and social responsibility. Or simply, it is a synonym for change. She writes: "Viruses are not simply agents of infection, contamination. They transport genetic 'information,' they transform

⁶⁰ Susan Sontag, *AIDS and Its Metaphors*, p. 68.

⁶¹ Ibid., p. 72.

cells. And many of them evolve.”⁶² Although Sontag’s concept of virus as change is not yet widely accepted in our society, in the medical displays and representations of diseases, there are changes. Why go to a medical museum, one might ask, when the public’s fascination and knowledge of diseases can be fulfilled by browsing through medical websites? The somatic illnesses now can be perceived in digital format.

As the body increasingly becomes medicalized and dehumanized, the experience of disease is no longer an embodied condition. Many diseases like HIV/AIDS can only be detected with sophisticated medical equipment. The conformation of such diseases are no more than abstracted scientific notifications. With scientific backup, it seems that the public’s understanding of infectious disease could be free from urban folklores. Infectious disease could be explained in pure scientific terms.

But according to Dutch medical scientists Henk A.M.J. Ten Have and Stuart F. Spicker in their introduction to *The Growth of Medical Knowledge*, the advance in scientific knowledge was in many cases not directly related to therapeutic success, decreased mortality, or the improved health status of a given population. The availability of knowledge, as such, is not enough; to make it effective, it must be attuned to specific health care practices through the creation of a network of facilities, services, institutions, and regulations. The social and cultural context must be transformed in order to make bacteriological knowledge effective. The scientists believe that by focusing on the relationship of medical knowledge to changing socio-culture contexts, the concept of disease is considered not only as a representation of empirical reality, but also as a social construct: “What is experienced as illness, pain, or dysfunction, is given a meaning by

⁶² Ibid., p. 68.

constructing it into an object of therapeutic attention. Disease, therefore, is not a fact of nature but the result of socially and historically determined interpretive processes.”⁶³ For the public, the concept of disease can only be understood through representations according to existing socio-cultural contexts rather than pure scientific explanations.

New Concepts of Boundaries

The postmodern era was one of less optimism than the modern one in scientific medicine. The inability of the medical profession to produce adequate treatment and prevention of new emerging infectious diseases undermined the public confidence's in medical science. People couldn't understand why such chaotic and seemingly unstoppable infectious diseases (such as AIDS, and later SARS), could still threaten life when medical science and technology had progressed so much. During the SARS outbreak, people read newspapers daily and followed media coverage closely. To combat the fear of SARS, they gathered many different kinds of information (medical and non-medical) in the hope of warding off such a deadly disease. The modern media was the general public's major source of medical information about SARS. Compared this to “a kind of medical information-based” website and museum, a “medical museum” spontaneously occurred. In a sense, people read these kinds of material with fascination and curiosity, not just as “information.” Nonetheless, the public experienced confusion about the partial medical facts that they read about (how viruses are transmitted, what their consequences are, how long the incubation period lasts, etc.). And more often than not, discussion of contagious

⁶³ Henk A. M. J. Ten Have and Stuart F. Spicker, “Introduction”, in The Growth of Medical Knowledge, ed. By Henk A. M. J. Ten Have, Gertrit K. Kimsma, and Stuart F. Spicker, p. 6.

illness is cloaked in fear, because the public's general knowledge about contagious illness is usually "passive" in nature: the public is "fed" information, but is rarely an active participant in the biomedical landscape. It seems clear that there is room to consider creating a public institution to display and explain contagious diseases to the public more fully.

The idea of architecture being inadequate in the face of contagion is not new (as discussed in chapter 2). As we know, isolation is a traditional medical practice to contain infectious disease and is thought to be helpful in the curing of infectious disease. The current practice of isolation extends the controlled domain from the human body, to geographic regions, to air. In the medical research field, the mindset of isolation is deeper than ever. As medical science progresses, scientists are able to isolate and identify which specific micro-organism causes which disease, and which specific genome of a virus carries virulence that threatens human health. The further medical science goes, the more abstract the concept of infectious disease becomes, and the less architecture can perform as a "protector." Now, medical science is occupied by the mode of finding, isolating and killing the viruses that cause disease. The idea of exclusion leads us to a combat situation in dealing with infectious diseases. It is for this reason that the public's fascination and concern grows. So too, the medical museum takes on added meaning.

Today, some scientists realize the battle between our bodies and infectious diseases isn't efficient at all. In a sense, we are always a step behind those new (re)emerging diseases. Scholar Paul Ewald's, *Evolution of Infectious Disease*, puts forward an evolutionary theory about our view on virulent disease. Instead of continuing the tradition practice of isolating, then killing the virus, or inventing a vaccine for our

bodies to accept a non-virulent simulation of a specific virus before the contraction of the actual one, scientists could modify the genetic information of a virus to reduce its virulence and allow the human body to establish a mutual relationship with the virus as host and parasite.

In the past, our efforts have been focused on protecting individuals from pathogens that are imminently threatening, by using an armamentarium of antibiotics and vaccines. By using evolutionary tactics, we should be able to change the pathogens so that they will not be the terrible enemies that they once were, so that we will not need to invest so heavily in the “arms races” to deter them just before they attack us or to destroy them just after they have attacked. We shall, in a sense, domesticate them so that they can live with us in a less damaging way than they have throughout our history.⁶⁴

One major principle Paul Ewald is reinforcing in his book is that virus is ever-changing. We can't stop the mutation of diseases, but we can change their direction to make them less harmful to our bodies, so that the human body and disease are in a mutually interwoven relationship. Medical science may get break down the boundary between the two. The spatial representations of this interwoven relationship should prove to be quite interesting.

As mentioned earlier, the Saint-Louis Hospital's Museum, was trying to illustrate an intimate inclusive relationship between hospital, disease and medical museum. Influenced by the notion of exclusion, the public perceived these three parties (disease, hospital, and medical museum) separately. If the disease in the hospital was life threatening, the representation of disease in a museum was a source of fascination, and, perhaps, even delight. The placement of the museum within the hospital was to reduce the public's fear of the hospital and disease. But, if in contemporary perception the

⁶⁴ Paul W. Ewald, Evolution of Infectious Disease, p. 215.

human body can tolerate infectious diseases—in a mutual interwoven relationship with them, can the spatial adaptation of both hospital and medical museum be considered? Can one consider a combination of hospital and museum that is less restricted in urban context and more welcoming to the public? Can a new architecture of contagious disease invite a renewed engagement with illness's corporeal dimension?

If isolation means a definite boundary, forming a unique identity in architecture, then an evolutionary change might mean the breakdown of a clear boundary. In architecture, there are early examples of an interwoven relationship between the boundary of inside and outside. For example, Mies' Barcelona Pavilion inspires us to ponder what's inside and outside space through its dramatic design and material combination of opaque concrete in juxtaposition with immaterial glass. Inspired by Mies' Barcelona Pavilion, modern architecture tended to pursue the ambiguity of the simultaneous present of inside and outside.

Isolation means more than just mere boundaries in architecture. It can also be a critique of programs in architecture. For example, for a long time, the hospital has been viewed as an island of its own because of its homogenous functions—a place for illness and healing. "Even the word 'hospital' became synonymous with pain, isolation and death."⁶⁵ The creation of the Saint-Louis Hospital Museum, within the hospital, in this sense, profoundly changed the perception of a hospital. Rather than pain, isolation and death, the medical museum injects fascination, knowledge and confidence about contagious disease into the setting of a hospital.

⁶⁵ Sloane, p.96.

In Canada, health institutions like hospitals and research laboratories belong to the public. But often, they are perceived as belonging to the private realm, reserved for health care personnel and scientists. What is more, the invisible boundaries (such as fear and alienation) keep the public out of those institutions. These health institutions need to eliminate those boundaries (both literal and virtual) and open themselves up in order to serve as true public institutions.

Conclusion

Throughout this research and design project, I have attempted to present, architecturally, the perception of infectious disease as both scientific fact and social construct by focusing on the medical treatment known as quarantining. Quarantine is a concept that consists of many layers of inclusion and exclusion. It is heavily influenced by scientific knowledge, social concerns of contagious disease, and, at times, political power.

As mentioned before, in Western medical history, infected patients were separated from society. This occurred because the logic of contagion saw the infected one as responsible for the transmission of disease. Also, the separation of the infected by quarantining could sweep away societal fear of disease; finally, it must be said that the poor were often the preferred candidates for quarantining, and the target of isolation through political will. The domain of quarantine was not limited to the space of the imaginary classification of disease (infected organs), nor to the space of corporal reality (infected bodies), but extended to the space of social order (health institutions). Many hospitals were sited on the outskirts of urban centers to limit their contagion to surrounding neighborhoods, or, metaphorically, to eliminate the image that they were the sources of contagion.

Such analogies, however do not totally apply to the current medical landscape. Today, health institutions are situated within an urban center because they are for public health concerns and can be easily accessed. Advanced medical knowledge dictates that the source of contagion within a hospital is often the consequence of malpractice within the health profession. Today, the medical practice of quarantining has a new context

because advanced medical technology can draw out the exact boundary between order and disorder of a disease within the body, and within the hospital. The space of contagion can be clearly identified within the body and within the hospital. Yet, the medical museum can allow the public to experience the space of contagion without compromising their health.

At a time of increasing disembodiment of our medical experience, our understandings of infectious disease are more likely as a disembodied condition than an embodied experience. Under modern biomedical treatments, infected patients can hardly recognize their experiences of being infected by infectious diseases as somatic. The general expressions often are “feeling sick” and “lonely.” In quarantine space, patients have to confront the solitariness of illness. Because of our complete trust in biomedical science, our awareness of the physical body and the body as a social entity may be diminishing. Another factor which contributes to the current understanding of the new emerging infectious diseases is the dissemination of information by the media. Today, the broadcasting media changes the perception of contagion. Before an infectious disease spreads into communities, the public will already be “infected” by mediatic information. Contagion often exists as a fearful event in the media. We now see infectious diseases as virtual objects—we need only think of television coverage on Bovine Spongiform Encephalopathy or mad cow disease, the West Nile Virus, or SARS—capable of “infecting” people in places very remote from where we stand in space. The space of contagion is, now, more far-reaching, but also more abstract.

In this thesis, the concept of a “Museum of Infectious Disease” means to illustrate the space of contagion, from the corporal to the abstract, through simulacra casts, models,

dioramas, images, maps, and media. As a safe mid-ground between hospital, laboratory and disease, this museum is to allow people to get closer to the things they were afraid of. In the space of contagion, the intricate relationship between the body and the disease is mediated. The knowledge, fascination and delight the museum instills, allows people to reconcile their fearful perceptions of hospital and laboratory. This eased public impression of both institutions—the hospital and laboratory, provides a chance for them to return to their neighborhoods. It will then be possible for urban life to surround these institutions. Architecturally, this design project creates a dialogue between different components of the museum (the exhibitions halls, the laboratory and the green space), and describes the inclusive relationship between the neighborhoods—West Alexander Community, the Health Science Center and the National Microbiology Laboratory (N.M.L.) in Winnipeg.

This proposed design interweaves the N.M.L. with a park and a museum and re-establishes connections with the neighborhood. It is important to put an emphasis on the urban context surrounding the N.M.L., to understand the potential of reducing this institution's isolation and aura of fear. This thesis has tried to look for a more tolerant urbanism and a more tolerant idea of architectural boundaries. Today, we are all partially infected by contagion, yet, we still survive longer than previous generations; we may begin to think about inhabiting the space of contagion.

Part II

A Design Proposition: Intersecting The Microbiology Laboratory, The Medical Museum And The City

Site Analysis

This proposal of a “Museum of Infectious Diseases” is built as an addition to Winnipeg’s National Microbiology Laboratory (N.M.L.). The N.M.L. is located at the northwest corner of Manitoba’s Health Science Center in Winnipeg’s West Alexander Community.

It is situated in a transitional urban area. To the north, there are rundown industrial buildings and a C.P. rail yard. To the south, there are four blocks of residential houses to buffer the busy Notre Dame Ave. traffic. To the west, is the rundown Pacific Industrial Park manifesting itself with big empty lots. To the east, there are small houses filling out those previous unplanned vacant lots.

Figure 14. Winnipeg Aerial photo, the West Alexander community, from the National Air Photo Library of Canada.

Figure 15. Winnipeg City map, from MapArt Publishing.

Community in Transition

The idea of a healed and an ill district in cities is a persistent one. Winnipeg's West Alexander Community, for example, has been called Winnipeg's "forgotten neighborhood." This northwest downtown community is feared and perceived as an infected, if not contagious, area of the city. The district is squeezed between the

C.P. railway and the busy traffic corridor of Notre Dame Avenue, bounded by McPhillips Street, and is Winnipeg's poorest neighborhood, according to the recent census.⁶⁶ Across from the N.M.L. on Arlington Street, is the rundown Pacific Industrial Park. While many factories were moved out of the industrial park, what is left behind is not only assortment of empty lots and buildings, but also unemployment. The statistics show a third of the community's adult residents are unemployed. Over 80 percent of the residents are aboriginal people. A drive through the area reveals houses vandalized by graffiti and stores boarded up. The unemployment rate in Winnipeg

Figure 16. Vandalized house in West Alexander community, Winnipeg Free Press, Sec. B1, October 5, 2003.

Figure 17. Boarded-up store in West Alexander community, Winnipeg Free Press, Sec. B1, October 5, 2003.

⁶⁶ Patti Edgar, "Vision For a Neighborhood: Can Winnipeg Foundation Money Bring Hopes and Dreams to Life?" Winnipeg Free Press, Sec. B1, October 5, 2003.

is elevated among adult residents in this area. This district's social crisis is known in the broader community and recorded in the elevated rates of crime there.⁶⁷ The West Alexander community has become a neighborhood under socio-economic quarantine in Winnipeg.

An interesting aspect of this "forgotten neighborhood" is how the present problem of housing shortage is fought. Compared to the Daniel McIntyre community, immediately across Notre Dame Avenue, with its planned grid order and homogeneous residential homes, this community's mixed zoning manifests itself as a different neighborhood. As the factories are slowly relocated in suburban industrial parks, empty lots are being reclaimed for residential purposes. Rather than wait for the City to clean up the industrial land and layout city infrastructure again, the residents built houses into existing industrial infrastructure. A house with an empty or functional industrial building in the backyard seems normal in this neighborhood. Within a block of land, industrial zoning (for garages, storage warehouses, etc.) and residential usage exist side by side. Such mixed zoning has been seen to contradict long-standing ideas of healthful city

Figure 18. Urban conditions on the north side of the N.M.L., photo by author.

⁶⁷ Ibid.

planning in Canada. Yet, in an economically quarantined area such as the West Alexander community, this unhealthy zoning situation has gone un-noticed, and, as a result, has had the chance to flourish. Currently, the city official plan is to reclaim the empty lots in a systematic way.

In terms of zoning, if the northwest side of the West Alexander community is unhealthy for dwelling, then the southeast side might have one more important role to play—as a cover-up of such an unhealthy situation. The southeast side of the West Alexander community is a medical hub for central Canada. Since 1973, it has hosted Manitoba's central hospital—the Health Science Center (H.S.C.), as well as Winnipeg's Blood Centre, the University of Manitoba's medical college, and the N.M.L. The H.S.C. stretches over three city blocks. It is an enormous fortress-like mass that entirely takes over this part of Winnipeg. Buildings are connected in a confusing manner, and continuing expansion penetrates the neighborhood. The importance of all hospitals to a community is their association with cleanliness and order. As a prestigious health institution in Winnipeg, the H.S.C. presents itself as absolutely sanitary and highly organized (different patients, nurses, and workers going to different destinations)—a

Figure 19. Aerial photo of the Health Science Center and the N.M.L., photo collage by author.

contrast to the disordered neighborhood behind the hospital complex (where residential and industrial traffic share the same service road).

The site of the N.M.L. was reclaimed from Winnipeg City's old graveyard, which used to provide the city's road pavement needs. The N.M.L. 13000 square meter building is set back from Arlington Avenue with half of the 6-hectare site left empty. Except for the main entrance, the rest of the campus is fenced in and watched by surveillance

Figure 20. Aerial photo of Winnipeg's graveyard, previous site condition of N.M.L., photo from the N.M.L.

Figure 21. Aerial photo of the N.M.L., existing site conditions, photo from the N.M.L.

cameras. To its south, are residential homes behind a metal rod fence, as well as the backyard fence of the homes. The service road between these two neighbors becomes a no-man's land. The initial intention of the N.M.L. to serve as a neighbor to residential, medical research, teaching and other community facilities is contradicted by the large scale of the buildings and site, and by the security features (such as fence, and surveillance camera). Rather than being a location designed for the public's well-being, its isolation poses more of a threat to the neighbor. No urban life is possible around or near the

Figure 22. Existing boundary condition on the south of the N.M.L., photo by author.

N.M.L. due to fences, surveillance cameras and other regulatory devices. This site offers an ideal example in the re-examination of the spatial representation of contagion, in the present. The quarantine idea, here, acts on two dimensions: inside the building, and outside—the outlying neighborhoods are, in effect, quarantined by this building, an impenetrable institution.

Design Intention

This design project for a “Museum of Infectious Disease” built as an addition to Winnipeg’s National Microbiology Laboratory investigates two different aspects of the experiences of isolation as elaborated in this thesis. Isolation is indeed considered in two forms: the isolation associated with

medical knowledge and treatment of contagious diseases, and isolation associated with the issue of security and control of a place. I also explore the idea of contagion and miasma in representing the changing perception of infectious disease from somatic illness (seen and felt on the body), and invisible substance (molecular structures known only abstractly through science), to disease as a virtual object disseminated through modern media.

For security reasons, a fence at the edge of the N.M.L. surrounds the campus, distancing it from the neighborhood. Isolation, in this scenario, refers to the notion of attacking rather than of protecting. The N.M.L. is reserved for scientists, and their work concerns the public well-being. If the N.M.L. does not have a strong community liaison program to distribute the issue of safety, its public image will remain no more than that

Figure 23. Existing site conditions, author's sketch.

of a hardcore science center and a potential source of danger. The design project of this thesis reconsiders the exclusionary logic of the fence, and tries to present the image that the N.M.L is for public health and safety. As such, the first gesture in design is to open up the campus and let the public know it is there: how would a fence, often associated with isolation, encourage the public to engage with the constructive discussion on infectious disease and stitch the N.M.L. back into the urban fabric.

In history, a health institution was built on the outskirts of an urban center because of the possibility of contagion it poses. Although the concept is not consistently applied today, the concept of patients going out of city to experience nature for healing is still believed to work. In contrast, in the past, nature was used as a barrier between patients and the general public, and visitor had to pass through thick woods to reach the institutions.

Ironically, today's many infectious diseases are believed to come from nature, as a consequence of human interference with natural ecology. With the progression of medical science, what role can the natural environment play in the understanding of new emerging diseases? Is biomedical science the only answer to the increasing threat of new emerging diseases? Perhaps, in the foreseeable future, we will still be struggling between

Figure 24. Proposing urban strategy, author's sketch.

the two forces of nature and biomedical science. The design gesture of green, natural open space of the museum of infectious disease juxtaposes with the existing hardcore science building to promote biodiversity and reconsider our infinite quest in biomedicine. And, of course, on an urban level, considering the condition of the West Alexander community (lacking even a healthy communal park), and the history of the N.M.L. (reclaimed from an abandoned industrial graveyard), there is an obvious need for public green space.

With greater understanding of the biological, social and political issues surrounding the research and treatment, the public can participate more meaningfully in a dialogue on illness, contagion, and curing and caring. This project proposes a museum where the public would be educated as to contagious illness on two levels: illness in the body (exclusion and inclusion of our physical body); illness as social negotiation (exclusion and inclusion of our social context.)

Figure 25. Program analysis, author's sketch.

Figure 26. Proposing green/nature space, author's sketch.

To illustrate the idea of contagious illnesses as an embodied condition, artifacts such as wax casts, microscopes, medical displays are placed in underground exhibition areas, along with explanations of infectious diseases. By revealing the heaviness of earth, the embodied condition of diseases

Figure 27. Building mass strategy, author's sketch.

is accentuated. To illustrate the idea of contagious illness as social negotiation, artifacts such as maps of disease distribution, panel displays on the history of contagious illness, World Health Organization themes, Health Department policy on sanitization, and disease surveillance programs, are housed on the museum's edge with public space (periphery of building mass, near sidewalk).

Architectural Narrative: A Journey through the Museum of Infectious Diseases

Arriving at the National Microbiology Laboratory (N.M.L.) campus in Winnipeg from Arlington Avenue, one will notice a dense stand of pine tree bordering the sidewalk beside the main entrance of N.M.L. The trees are on land four meters below the level of the other grounds. Only the upper branches of the pine trees are visible from a distance. As one walks down a generous ramp at the south edge of the campus from Arlington Avenue, to the sunken plaza in front of the museum's entrance, a triangular water pool will gradually appear on the left, becoming wider and wider. The shape of the pool is the result of the imaginary extensions of the new building edges.

At the end of the ramp, on the right is an underground parking lot with perforated metal cladding. On the left, beyond the pool, is the pine woods bounded by a retaining wall, 30 meters away. On top of the retaining wall is the pathway to the N.M.L. entrance. The pool is a shallow thermal pool. During the winter months, the water temperature is kept at 15 degree Celsius. Depending on the season, one will see mist rising from the pool during the cold months or put in a hand to feel the cool water during hot summer days. If one continues on the path, another ramp 200 meters away will rise back up to ground level on the other end of the campus. Along the path, are a series of installations with images suspended between outdoor light structures that run along the edge.

Proceeding to the museum, one will notice a glazed "gap" between the existing stone-clad Laboratory building and the new addition. One will be able to catch a glance of a hidden enclosed garden behind the new addition mass. Past an enormous threshold,

consisting of three thin, high columns in line with the glazed “gap”, is the arrival hall. There is a ticket counter with a coatcheck room in a wall that separates the arrival hall from the rest of the museum behind.

After purchasing a ticket and checking in personal belongings, one may see the recommended introductory film about infectious disease, before proceeding to the exhibition space. The auditorium is located to the left of the arrival hall in the existing building behind the “gap.” Previously, this was for the N.M.L. functions only. Now, it has been modified to accommodate public functions as well. This first display of the museum shows brief clips of familiar media coverage and government health campaign ads about infectious disease. After the film ends, the light comes on, and the screen rolls up; a curtain behind the screen opens, and again, one is afforded a view of the sunken plaza with pine trees and water pool through the glass.

Continuing the journey, past the ticket counter, one will walk across a few large stepping-stones to cross a pond. Symbolically, this pond is for cleansing before moving on to the exhibition space (the imaginary space of contagion). Past the water, one arrives at the ticket checkpoint. The checkpoint counter is under an overhead ramp which starts from the south edge of the campus, cuts through the building, and stops at the inner edge of the museum’s building mass. On the right side of the checkpoint counter, is a reference room for the media and public. The public can find out more information on specific infectious diseases and, the media can access press releases. There is another separate entrance to this media and reference room on the south edge of this building. The public can access this reference room without buying a ticket. They can stop by from the path to find information that they seek.

Passing through the checkpoint counter, one will be guided by an offset wall to the entrance of the second exhibition area, which is carved into the earth. Here, through various simulacra casts as in the Saint-Louis Hospital Museum, one will find the struggle for existence between human and microbes--the evolutionary history of infectious disease as well as the evolution of ideas regarding infectious disease of the human body. The displays will show our human exposure to infectious disease, how the human is infected and how the human body fights infection. The exhibition is arranged according to our understanding of contagion over time, from contagionism, miasmatism, and pathogen theory to hybrid contagion. There are a series of dioramas and large display models of virus, such as the exhibition "Epidemic! The World of Infection," to illustrate the imaginary space of contagion.

Moving on, one will notice how a curvilinear space extends out from the wall, and separates the exhibition and circulation space. This is a unisex washroom, which tends to accentuate the theme of the body's biological process with its large and articulated space.

Figure 28. Electron micrograph of HIV, R. DeSalle, 1999, p. 178.

Figure 29. Non-Vector and Vector disease in dissemination, R. DeSalle, 1999, p. 60.

While moving between exhibits, to learn more about the animated virus structure and other scientific data, one can find a computer station along the circulation space on the first level. Deeper into the exhibition space, one will feel the space pressing as the walls get closer and closer together. At the last exhibition room on the first level, there is an installation of electronic microscopes in the middle of the room, allowing viewers to see magnified micro-organisms as they appears under the electronic microscope on a monitor, and to imagine the possibility of being killed by such a substance, which is invisible to the human eye. At this point, one is confronted with the loneliness of serious illness and the prospect of contagion and quarantine. Right here, the idea of exclusion of quarantine is expressed.

One now proceeds up a staircase to the next exhibit. Standing at the east edge of the museum's second level, looking out the windows on the east side, those who are observant will notice there is still a meter below ground level. Beyond the east window is an open space. Without entering the museum, the public can stand in that space to have a look at the interior of the second level. To the south, beyond the sunken path, on top of the underground parking lot, is a bicycle path running along beside the trees from one end of the grounds to the other. The tree line buffers one's view of nearby neighborhood fences which are on the other side of the bicycle path. The space of contagion now is changed from the underground exhibition halls to the space outside the windows, the neighborhood, across from the bicycle path.

Moving on to the exhibition halls on this level, one will encounter displays dealing with outbreaks of infectious disease in human society and learn more about Epidemics and Pandemics which are the result of the movement of people on a global

scale. The exhibit explains the relationship between infectious disease, culture, economics and politics, especially, how today's disseminated information is shaping our interpretation of infectious diseases. In a sense, the second level of the museum tries to portray infectious disease as a socially constructed concept, rooted in information rather than as a biological phenomenon. The disseminated information is capable of virtually "infecting" the public. Here again, the space of contagion switches back from outside the window to inside the exhibition halls. The presentation of contagion becomes more and more abstract as one proceeds from simulacra casts to models to computer images and to concepts and ideas.

Moving on to the museum, one might notice the washrooms on the second level are now gender separated. At the end of the exhibition halls, there is a landing area above the media and reference room. From the landing a ramp behind the exhibition halls, leads to a gallery space for contemporary artwork on infectious disease and health. Walking along the ramp, one can look out through the opening in the

Figure 31. Dark areas indicate African countries with high incidence of HIV infection in 1997, R. DeSalle, 1999, p. 183.

Figure 30. Global microbial threats in the 1990s, R. DeSalle, 1999, p. 56.

The stagnant water and the water plants and insects will evolve naturally with the seasons. Symbolically, the enclosed pond represents the eighteenth century miasmatism theory of the origin of contagion.

Moving on to the hallway of the laboratory building, one can stop at the indented window, to look inside the modern equipped lab or watch a science demonstration performed by one of the in-house scientists, and thus witnessing the demystification of infectious disease, through modern biomedical science. Past the corridor, and through the glass doors, one enters the terrace space beside the pond, for a closer look at the water life. Moving through this “interstitial” space between nature (the pond) and science (the lab space), individuals can speculate on their own theories of contagion. Metaphorically, this is the inclusionary space of the building--science as part of nature, disease as part of our body.

Further along, the pond becomes narrower and narrower before coming to an end. Just beyond is the museum’s cafeteria space located, above the arrival hall. Even here, one is reminded again that the “gap” separates old and new. Through the glass is a view of the pine woods in front of the entrance.

Behind the gallery, from the cafeteria, a grove of various kinds of trees is visible. At the top of the staircases behind the cafeteria stall, a landing area and door lead back to

Figure 33. Scientist at work in modern laboratories, R. DeSalle, 1999, p. 105.

the elevated ramp. To the south, the ramp leads to the bicycle path on the edge of the campus, and to the east, it leads into the woods. While walking down the ramp to the east, one is offered a good view of the scientists' offices on the other side. The elevated ramp inclusively ties the building back to the neighborhood. Now, the public's fascination of the space of contagion exists both inside and outside the museum.

This densely wooded area with different kinds of trees is on a hill which was created from the earth excavated to build the museum. The high side of the hill is right up against the gallery building mass, and gradually, slopes down to meet to the ground. This spontaneous woodland exists in order to illustrate the idea of contagionism theory--if one tree is contaminated by "disease," it will "infect" others through its "contact" with them.

On the south edge of the wood is a more widely paved ramp. Next to it is an eight-meter-wide ground plate. Next to the ground plate, from the sunken path that starts from Arlington Avenue, the ramp rises back to ground level. On the other side of the woods is the edge of the laboratory building. There is an open space cut out of the last two office cells. One can walk across the woods to the balcony and knock on the windows to have a chat with scientists.

At the bottom of the hill is the eastern edge of the campus. A visible short distance away, across the street, are the Health Science Center for Manitoba, the Winnipeg's Blood Center, and the Medical College of the University of Manitoba. To finish this journey, one will walk down the path that leads back to museum's entrance, for a better look of the images suspended between the light structures at the edge of the campus.

Figure 34. Site model at urban scale.

Figure 35. Photo collage, aerial view of "Museum of Infectious Disease."

Figure 36. Site plan.

Figure 37. Level one of "Museum of Infectious Disease."

Figure 38. Level two of "Museum of Infectious Disease."

Laboratory Corridor

Cleansing Elements

Enclosed Pond

Figure 39. Level three of "Museum of Infectious Disease."

Figure 40. Site model at building scale.

Figure 41. Cross sections one and two of "Museum of Infectious Disease."

Figure 42. Cross sections three and four of “Museum of Infectious Disease.”

Figure 43. Longitudinal sections one, two and three of "Museum of Infectious Disease."

Figure 44. View from south of "Museum of Infectious Disease."

Figure 46. View of the entrance of "Museum of Infectious Disease."

Figure 45. View of enclosed courtyard of "Museum of Infectious Disease."

Figure 47. View from the woodland of "Museum of Infectious Disease."

Figure 48. Vignette, view toward outside from inside of "Museum of Infectious Disease."

Figure 49. Section vignette.

Figure 50. Section vignette.

Figure 51. Section vignette.

Figure 52. Section vignette.

Bibliography

Primary Sources

Bergdoll, Barry. "The Architecture of Isolation: M. R. Penchaud's Quarantine Hospital in the Mediterranean", *AA Files*, n. 14 (Spring 1987), pp. 3-13.

Colonmina, Beatriz. "The Medical Body in Modern Architecture", *Daidalos*, n. 64 (June 1997), pp. 60-71.

DeSalle, Rob. Epidemic! The World of Infectious Disease. New York: The New Press, 1999.

Elden, Stuart. "Plague, Panopticon, Police." *Surveillance & Society* 1, no. 3 (2003), pp. 240-253.

Ewald, Paul W. Evolution of Infectious Disease. New York: Oxford University Press, 1994.

Foucault, Michel.

-- The Birth of the Clinic: An Archaeology of Medical Perception. New York: Pantheon Books, 1973.

-- Discipline and Punish: The Birth of the Prison. New York: Vintage Books, 1977.

Hatty, Suzanne E. and James Hatty. The Disordered Body: Epidemic Disease and Cultural Transformation. Albany: State University of New York Press, 1999.

Sontag, Susan. AIDS and Its Metaphors. New York: Farrar, Straus and Giroux, 1989.

Stafford, Barbara Maria. Body Criticism: Imaging the Unseen in Enlightenment Art and Medicine. Cambridge, Mass.: MIT Press, 1991.

Ten Have, Henk A.M.J., G.K. Kimsma and S. F. Spicker. The Growth of Medical Knowledge. Dordrecht: Kluwer Academic Publishers, 1990.

Secondary Sources

Aalto, Alvar. Alvar Aalto: Volume 1 1922-1962. ed. Karle Fleig, Basel: Birkhauser, 1963.

- Edgar, Patti. "Vision For a Neighborhood: Can Winnipeg Foundation Money Bring Hopes and Dreams to Life?" *Winnipeg Free Press*, sec. B1, October 5, 2003.
- Foucault, Michel. Madness and Civilization: A History of Insanity in the Age of Reason. New York: Random House Inc., 1965.
- Garrett, Laurie. The Coming Plague: Newly Emerging Diseases in a World Out of Balance. New York: Farrar, Straus and Giroux, 1994.
- Health Canada. "Learning from SARS: Renewal of Public Health in Canada", October 2003.
- Hirst, Paul. "Foucault and Architecture", *AA Files*, n. 26 (Autumn 1993), pp. 52-60.
- Lee, Paula Yong. "Modern Architecture and the Ideology of Influence." *Assemblage*, no. 34 (1998), pp. 7-29.
- Middleton, Robin. "Sickness, Madness and Crime as the Grounds of Form", *AA Files*, n. 24 (Autumn 1992), pp. 16-30.
- Sloane, David C. "Scientific Paragon to Hospital Mall: The Evolving Design of the Hospital, 1885-1994." *Journal of Architectural Education*, no. 48, v. 2 (1994), pp. 82-98.
- Vidler, Anthony.
- "The Building in Pain: The Body and Architecture in Post-Modern Culture", *AA Files*, n. 19 (Spring 1990), pp. 3-10.
 - "Confinement and Cure: Reforming the Hospital, 1770-1789", The Writing of the Walls: Architectural Theory in the Late Enlightenment. New Jersey: Princeton Architectural Press, 1987, pp. 51-72.