REHABILITATIVE ENVIRONMENTS

A COURTYARD AT THE WINNIPEG REHABILITATION

RESPIRATORY HOSPITAL

BY

GEOFFREY PAUL KERR

A Practicum
presented in partial fulfillment
of the requirements for the
degree of

MASTER OF LANDSCAPE ARCHITECTURE

Winnipeg, Manitoba

(c) 1988

Department of Landscape Architecture

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a courtyard at the Winnipeg Rehabilitation Respiratory Hospital.

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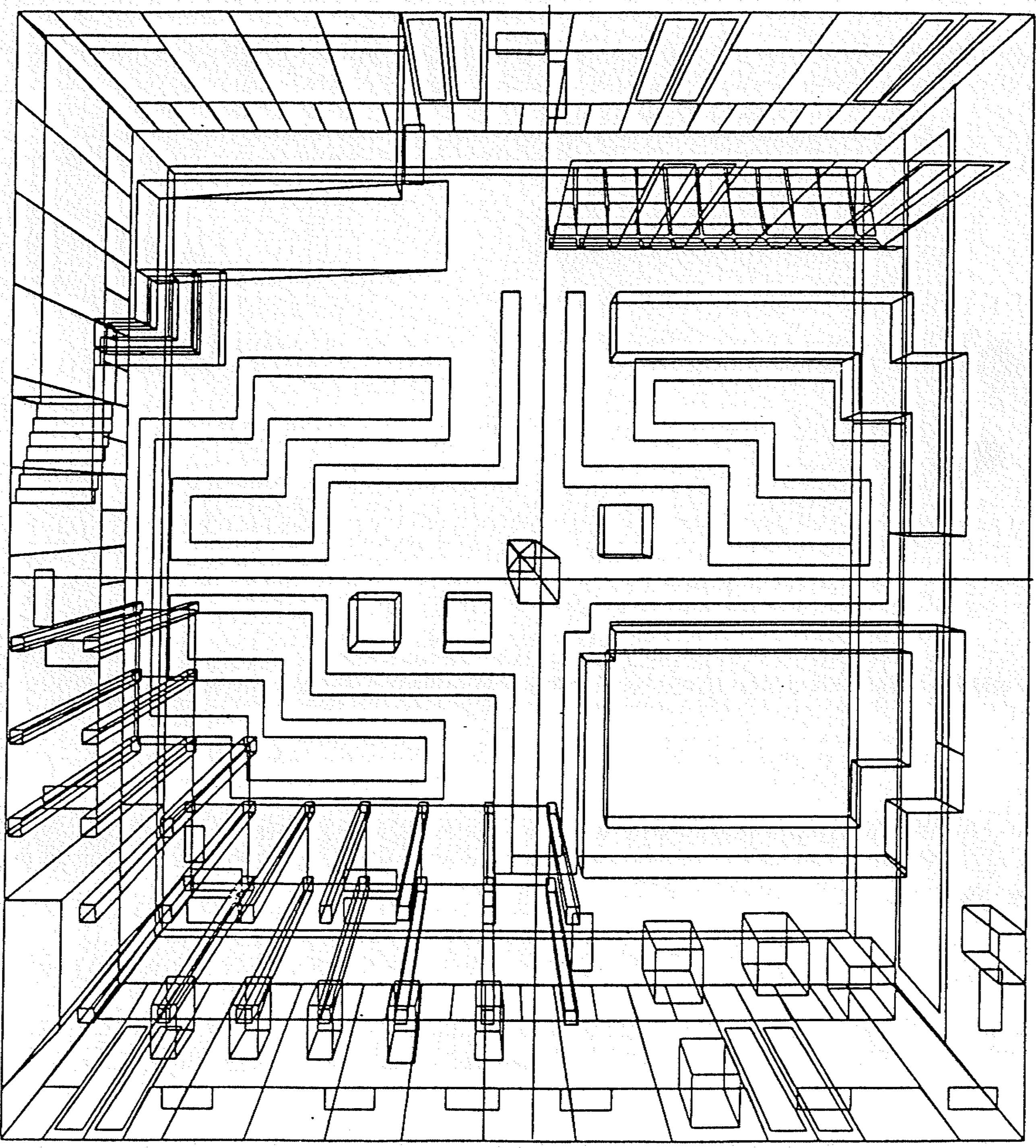
jeff kerr



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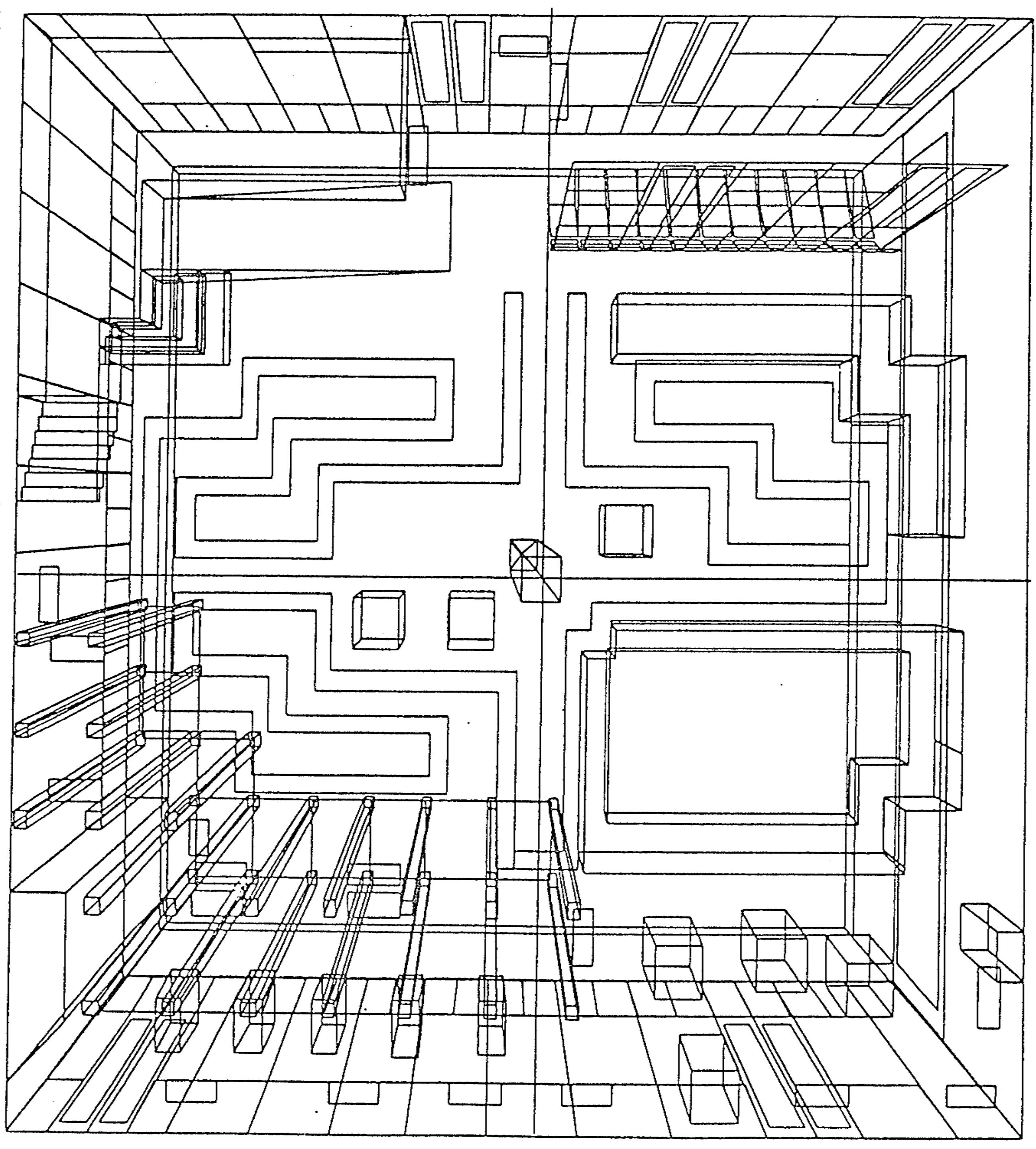

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A practicum submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements of the degree of

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Abstract.

The modern hospital complex functions more like a city than a single building through its many independent yet intrinsically related departments. A hospital is more than an efficient and sophisticated machine for the treatment of illness, it is an environment which acts on all the senses of all the people within it. Therefore, in order to most effective, open space design related to a hospital complex such as the Health Sciences Centre must be innovative, comprehensive, and adaptive.

This practicum identifies the effects of institutional environments on the rehabilitation process and explores the benefits of outdoor spaces for socially-related therapy. The relationships between various therapies and the environment are emphasized and their design implications are presented. A proposal for the Winnipeg Rehabilitation Respiratory Hospital courtyard overlays design responses in order to allow choice within an institutional setting, and to resolve such diverse program requirements as providing both quiet relief for families and stimulating therapeutic activity. The design reflects the social functions and form of historical hospital gardens. In concept, the scheme lays particular emphasis on the reintroduction of patients to society, and derives from the relationship between the acute-care hospital, the rehabilitation centre and the community at large. In layout, the design responds to the use of outdoor spaces within a hospital complex through its emphasis on stimulation, participation and rehabilitation.

Acknowledgements.

I would like to extend my sincere appreciation to the members of my practicum advisory committee, Ted McLachlan, Charlie Thomsen, Claude deForest and Carl Nelson for their guidance and support.

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Margaret Faber, Occupational Therapy
Linda Day, Occupational Therapy
Glen McMahon, Recreation Co-ordinator
Sharon Dandy, Physiotherapy
Pat Alexander, Speech & Hearing Therapy
Isabel Johnson, Director of Nursing
Dr. J.R. Bowie, Medicine
Mike Giffen, HSC Planning

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**drawings are constructed from a viewpoint 4' above ground level in order to simulate a patient's view from a wheelchair.

1. Introduction.

The Role of the Environment in Therapy.

The physical environment can set the boundaries of potential actions, and even define a system of social relationships. Institutionalized patients, by virtue of their limited power, are more greatly impacted by the physical environment than the rest of society. Success or failure of a patient within a setting often creates a feeling of incompetence rather than inappropriateness. The modern hospital is a complex and changing network of spaces and relationships rather than a benign supporting backdrop for activities, and therefore, new approaches to hospital design must recognize almost every aspect of the environment as being potentially therapeutic.

"Institutionalization" has many negative connotations. They include the separation of patients from society and activities of daily life, an ignorance of individuality, being grouped or herded in large numbers, drabness of surroundings, a lack of privacy, an absence of objects which can foster a sense of pride, and a monotone of surface materials chosen primarily for ease of maintenance. Rehabilitation is guided by the principle that patients are whole individuals and not to be treated simply as injured or diseased parts. The focus is on the person in the environment rather than on organs or parts within the body. Therefore, a rehabilitation centre must aid in the achievement of living goals, not simply the cure of disease or correction of malfunctioning parts of the body. As well, the rehabilitation hospital environment should be potentially therapeutic in itself through its design and provision of mental and physical challenge.

This practicum explores the improvement of the rehabilitation environment as a means to facilitate therapy and enhance the quality of life within an institution. These ideals are examined with an emphasis on sensory stimulation, participation and expression. Many of these attributes can be found in modern hospital design, but rarely as they apply to the unique environment of outdoor spaces within such an institution. Through the redesign of the Winnipeg Rehabilitation Respiratory Hospital courtyard, the practicum recommends an

increased emphasis on outdoor facilities to not only rehabilitate handicapped patients, but aid in their reintroduction to the community outside the hospital wards. The quality of environment which is offered by a hospital reflects the value placed on health care by society. For example, the symbolic role of the Victorian sanitorium, a large, austere building, set in a parkland and removed from the community, demonstrated society's attitude towards the inmates which it housed. While providing a relief from many urban ailments, the sanitorium typically mimicked a warehouse rather than an integral part of the community. Through systematic consideration of both the physical environment and the organizational structure of the Winnipeg Rehabilitation Respiratory Hospital, the environment can facilitate an improved socially related therapeutic process.

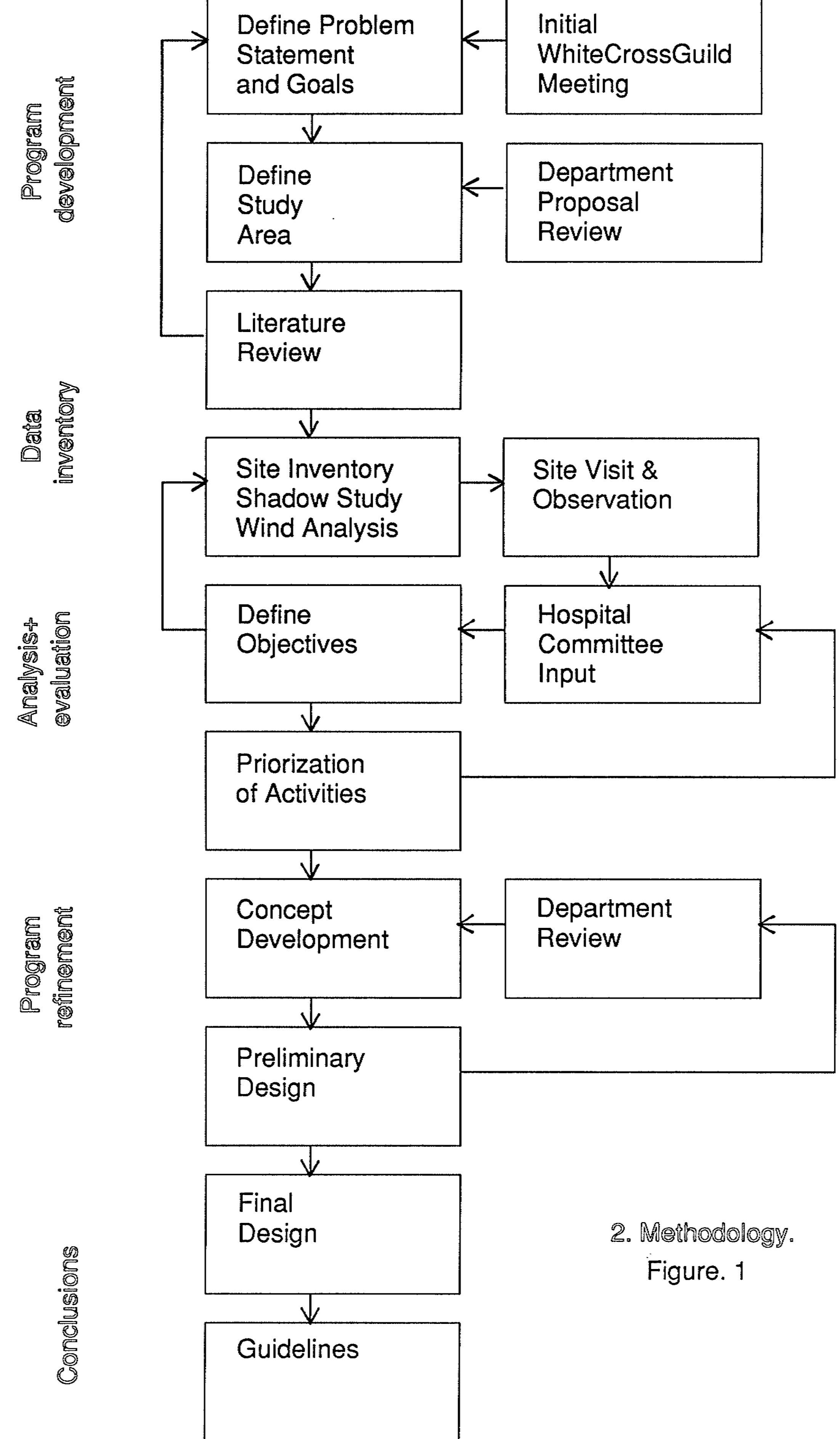
2. Methodology.

This practicum was written, edited, typeset, designed, drawn, and laid out entirely on a Macintosh computer.

A request by the White Cross Guild in July 1987, to improve the appearance of the Winnipeg Rehabilitation Respiratory Hospital courtyard and make the furnishings more useful to disabled patients, initiated the broader study of rehabilitation within an outdoor environment. Cosmetic improvements to the courtyard were augmented by the development of a design program based on the needs of the hospital staff and the therapeutic goals of rehabilitation patients.

Numerous meetings were held with representatives of the staff of the Rehabilitation Hospital in an effort to synthesize the best uses for an outdoor space located within an institutional environment. Options for such an exterior setting included providing relief from the institutional atmosphere of the hospital itself, providing a means to facilitate recreational activities, and forming an integral part of therapeutic programming. The objectives which were reached through repeated discussions with the hospital committee guided the priorization of outdoor activities suitable for a Rehabilitation Centre. At the same time, physical problems were analysed, including climatic factors such as wind and solar analysis. As well, design criteria were evaluated such as functional relationships, views and handicapped accessibility.

A concept based on historical forms, the analysis of physical factors, and the integration of background research and observations within the courtyard, formed the basis of the proposed design. The design description separates various elements with each component described according to its role in satisfying the objectives and its ability to facilitate therapeutic activity.



2. Methodology.

Figure. 1

3. Problem Statement.

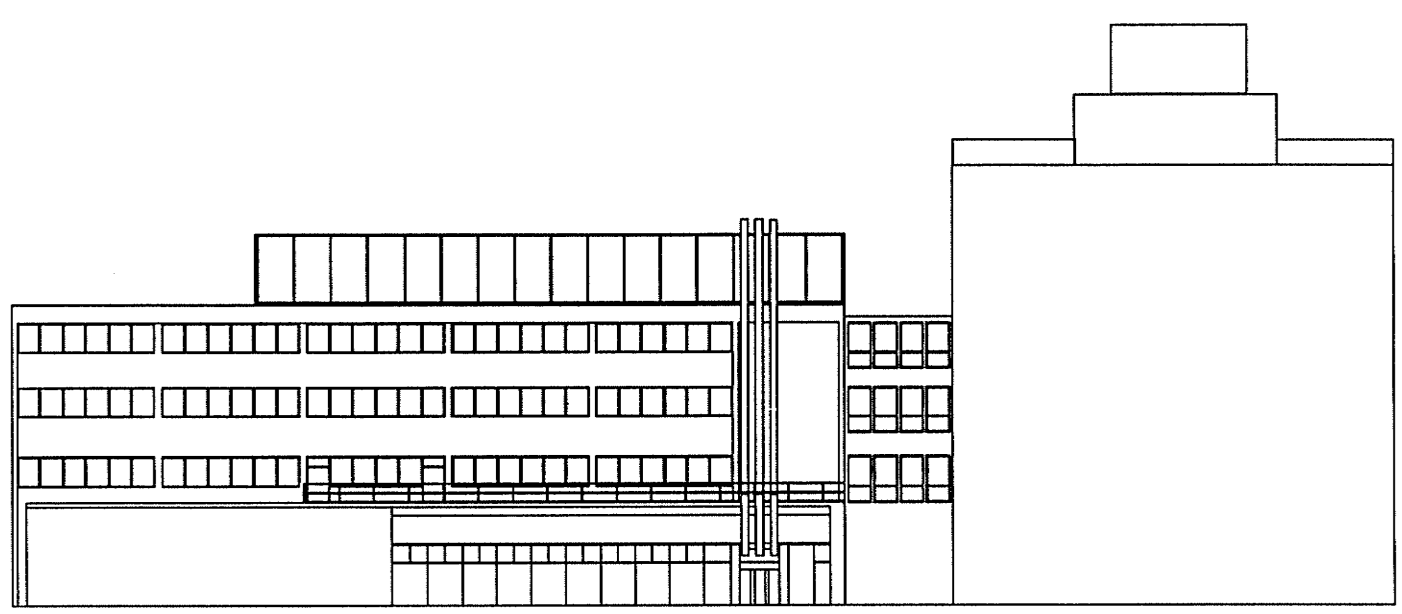
A hospital is more than an efficient and sophisticated machine for the treatment of illness, it is an environment which acts on all the senses of all the people within it. The Winnipeg Rehabilitation Hospital must fulfill the needs of not only the patients, but the visitors, staff and students who live and work there. The design of the hospital should alleviate some of the anxiety and degradation which is often experienced in an institution. Exterior space can help the patient to adjust if given a greater emphasis, and designed in a deliberate way as outside rooms which people will use for recuperating, working, relaxing, exercising, therapy or special events. The practicum addresses the requirements of staff and patients in rehabilitation in general, and the needs of the various departments and activities at the Winnipeg Rehabilitation Hospital in particular.

Design Requirements.

The design of outdoor spaces, such as the courtyard at the Winnipeg Rehabilitation Respiratory Hospital, can help the individual adjust to institutional life by offering a diversion from routine, and providing therapeutic relief both for patients and family members. The present courtyard is relatively barren, partially based on a perceived conflict in the programming of activities and their design requirements. The most apparent deficiencies in the existing courtyard are the lack of control over climate, especially sun and wind control. Aesthetic improvements providing psychological uplift for the patients recuperating at the hospital, greater handicapped accessibility through improved seating, and longer seasonal duration through greater use and the improvement of microclimate within the courtyard are also required. The design shall extend the usefulness of the courtyard by addressing rehabilitation activities suitable for exterior spaces, increasing the duration of the courtyard's daily and seasonal use, and by creating an environment which provides variety, flexibility and choice.

The Rehabilitation Hospital provides a community in the sense that the patients have a common bond in being treated for a debilitating condition. The average length of stay is 6 months and while nearly all patients are mentally alert, they are often emotionally devastated and are in fact, starting life over again. Their involvement in the improvement and maintenance of the courtyard would permit the patients to give something in return to the hospital.

Needs of the medical staff include creating an environment which will reduce restlessness and anxiety, especially for patients with head injuries. The courtyard should permit suitable patient observation, and actually promote the patient's recovery through sensitive design.



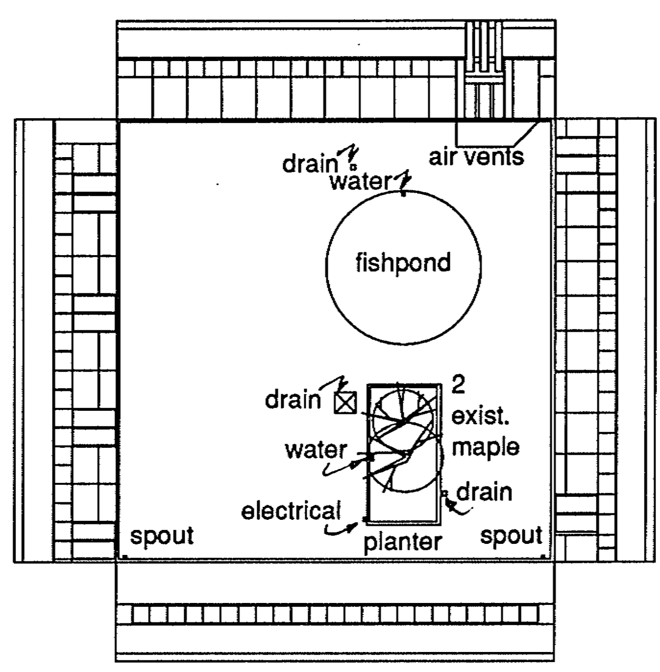
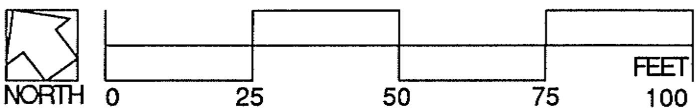


Figure. 2
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL COURTYARD
EXISTING SITE FEATURES



4. Background.

4.1 Hospitals.

In keeping with the monastic tradition of offering hospitality in the form of lodging to travellers of all classes, the medieval hospital had a wide range of social functions as well as caring for the sick. Standards of care varied greatly between institutions, but few patients would ever see a trained surgeon. The lack of professionally trained physicians was, however, the salvation of many invalids who had a greater chance of recovery if left alone in a clean environment than when weakened by the continuous rounds of purging and bloodletting which normally were prescribed.

Formal medicinal gardens were set in the courtyards of medieval cloisters, the predecessors of modern hospitals (figure. 13). The plots, which formed a simple overall pattern, were placed near the infirmaries as a pharmacy. Medieval medicine became largely the practice of drug therapy, relying heavily on medications derived from hospital gardens. Botany and medicine were linked together until the seventeenth century when each became a separate science. After that time, plant-based medicine came to be treated with the same disdain as *astrology-medicine*, which believed all maladies to be governed by the planets. With the demise of plant-based medicine, the relationship between hospitals and gardens weakened, although open space continued to be valued for epileptics and patients with mental problems. One example is the Saltpetriere, a hospital constructed near Paris in 1786, which was comprised of pavilions enclosing promenades and gardens. The melancholy, senile and agitated were each given a separate area of the garden in which to appreciate nature and console themselves through the changing scene. Florence Nightingale also endorsed the value of sunlight and ventilation. She believed that every hospital should have a central court which should be laid out as gardens with sheltered exercise grounds. Although hospitals remained as institutions to isolate the sick from the community, Florence Nightingale transformed it from a place to die in to a place in which to live.

Facilities in the past have been organized around a custodial model, separating individuals from the community, grouping them in large numbers for economies and efficiencies of management, and in a relatively non-debilitating environment. Discoveries in medical technology in the 19th century replaced the hospital as a place to die, with a place in which to recover. Medical discoveries identified that many illnesses had been a product of the hospital setting itself. Nursing procedures became based on improved hygiene and effective monitoring of the patient's state of health. However, the emphasis on a purely medical approach can be counteractive to the goals of a rehabilitation hospital. The medical approach is generally unconcerned with the patient as an individual, and thus, the design of hospitals has often created inappropriate environments as therapeutic settings.

Recent approaches have tried to overcome the debilitating effects of an institutional setting on participants in therapy. One rehabilitation philosophy argues that a therapeutic setting must imitate the community outside as much as possible in order not to become "a crutch", while others recommend environmental supports in the same way that prosthetics make up for physical deficiencies, and thus attempt to counteract the drabness characteristic of most institutional settings. Regardless of the model followed, it is important to have a clear spatial structure in any institutional setting in order for the patient to avoid confusion and to understand the organization within the space and his or her role therein.

4.2 The Health Sciences Centre.

The modern hospital complex functions more like a city than a single building. There are many independent yet intrinsically related departments that comprise a hospital such as the Health Sciences Centre. There are 160 beds at the Rehabilitation Hospital and more than 1000 at the Health Sciences Centre. The Health Sciences Centre is one of the largest hospitals in Canada and much larger than any other hospital in Winnipeg. According to a 1975 planning study, this results in the impression of being unwieldy and impersonal, with the hospital's aims tending to be diffused.[1]

A hospital can never be complete in its design because of the changing nature of modern medicine and research which will change the treatment and demands of the future user. The use of any space is definable for a relatively short span of time, but not for the total lifespan of the hospital. As illustrated in figure 4, the Health Sciences Centre occupies several city blocks, and is continuing to encroach on residential properties. Buildings range greatly in age, and many of the oldest are now obsolete. In order to keep up with expanding medical technology, numerous other hospital buildings have been adapted to uses for which they were not constructed. Long-term goals of the Centre include the creation of a more coherent shape and orientation of the complex. Reorganization of the Centre will result in a clearer segregation of functional relationships, replacing the present unwieldy mixture of buildings, support services and parking lots. The hospital itself, will be separated more clearly into diagnostic, treatment, rehabilitative and educational units, with fewer buildings containing overlapping functions.

Figure. 5 illustrates the lack of sizeable open spaces in close proximity to the hospital wards and suitable for patient activities such as outdoor recreation, as much of the hospital precinct is presently occupied by parking lots and roads. Continuing pressure to expand facilities and therefore, more efficiently use the hospital site, will place greater

[1]Clarkson, Graham et al. The Plan for the Redevelopment of the Health Sciences Centre Within the Context of the Hospital Services Needs, Medical Education Requirements and Research Activity Appropriate to Manitoba, J. Graham Clarkson Consultants Ltd, July 1975.

value on the remaining landscaped open spaces such as the Rehabilitation Respiratory Hospital courtyard.

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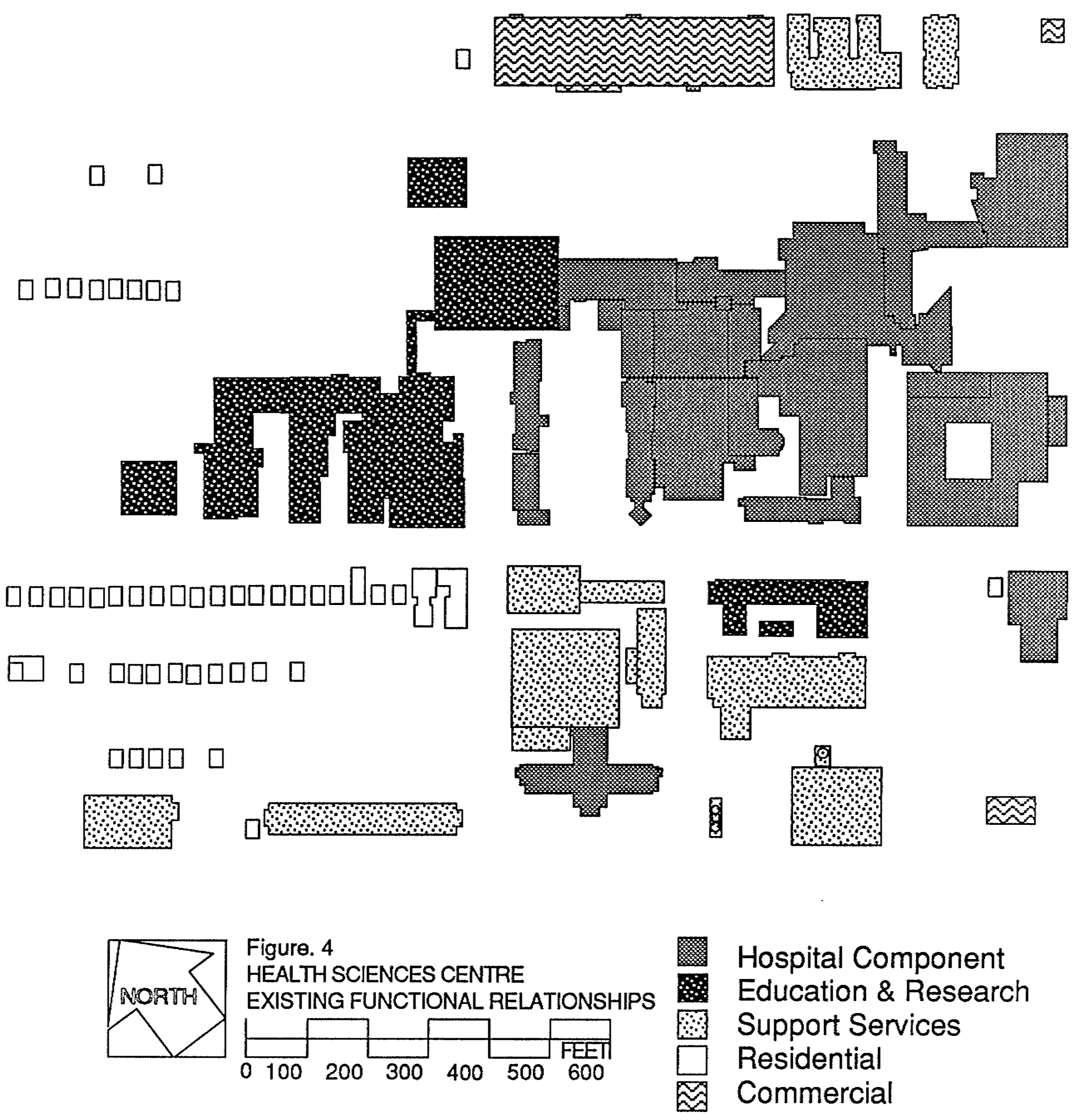

Figure. 4
HEALTH SCIENCES CENTRE
EXISTING FUNCTIONAL RELATIONSHIPS

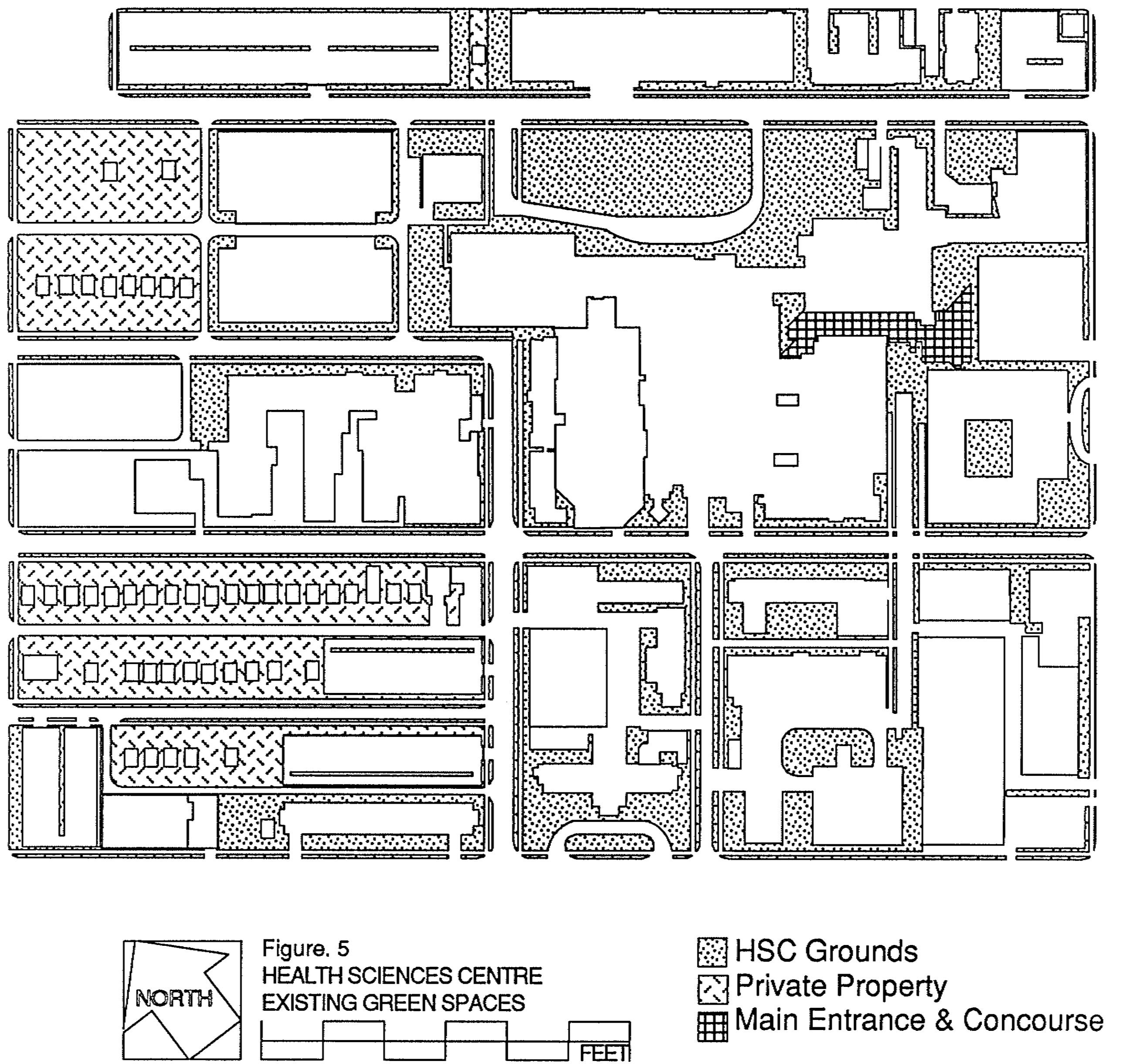

Figure. 5
HEALTH SCIENCES CENTRE
EXISTING GREEN SPACES

4.3 Rehabilitation.

Movement and interaction are the means by which rehabilitation emphasizes abilities and downplays handicaps. Rehabilitation is dependent on the patient's preferences, tastes and comfort, and can be limited by age, the fear of pain, separation from family and changes in lifestyle to which the patient must adjust.

"Rehabilitation has been a concept used in the care of the disabled since 1920, but it was limited to vocational rehabilitation at that time. World War II provided the impetus for the concept of rehabilitation to be expanded to include medical rehabilitation services. This concept views each individual as a total person with concern for both restoration of disability and enhancement of capabilities. It utilized a team approach for treatment, and required involvement of the client in the evaluation and treatment process. Since World War II this concept has been used in occupational therapy intervention with both physical and psychosocial dysfunction." [2]

Many predict the future will place a greater emphasis on specialization in hospitals, with a separation of acute care, out-patient, and custodial services. "Specialty centers will differ from most hospitals in that they will not try to be everything to everyone. Instead of providing some of every traditional hospital service, specialty centers of the future will focus only on doing what they do best." [3] The grouping of disabled patients within a separate centre not only provides more efficient care, it is psychologically advantageous. Social contact and the opportunity to observe the progress of others has a stimulating and therapeutic value, through competition, assistance and encouragement of other patients.[4]

The growing disabled population demands rehabilitation in order to become independent and productive. In the future, there will also be a

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[2]Gary Kielhofner, " Occupation". in Occupational Therapy, ed. Helen L. Hopkins and Helen D. Smith, Philadelphia: J.B.Lippincott, 1983. p.138.

[3]Mara Minerva Melum, ed., The Changing Role of the Hospital pp.321-322.

[4]William Hunt, ed., Hospitals, clinics & Health Centers New York: McGraw-Hill, 1960. p.160.

greater interaction between the hospital and the community such as an increased emphasis on out-patient care, on fitness and counselling services. The growing emphasis on rehabilitation centres is a result of society's increasing life expectancy which results in more elderly patients with disabling conditions, improved technology which saves more lives following accidents which previously would have proved fatal, and changes in family structure which makes home-care of the handicapped less common.[5]

4.4 The Winnipeg Rehabilitation Respiratory Hospital.

The design of rehabilitation facilities must be flexible and adaptable to a variety of needs and a rapidly changing field. Patients should feel appreciative of the varieties of spaces available, and stimulated by the environment which has been created for them. The design should not only help the patient to recuperate, it must motivate them to take an interest in their surroundings and the various forms of training available. Recreation and therapy areas seldom emphasize creativity within a hospital environment, yet the architectural quality of a rehabilitation centre can provide interest in itself as a form of therapy which will help reintroduce patients to the community outside the institution.

The design of the Winnipeg Rehabilitation Hospital is generally based on the character of the usual nursing unit. The Hospital employs the standard North American hospital solution of a service base with nursing towers providing rooms for patients above. The courtyard, 75' x 80' in size, dominates the main floor of the hospital which houses the Occupational and Physical Therapy Departments, a lounge, a gift shop and various support services.

While patients at the Rehabilitation Hospital need general nursing care, they will progressively require reduced medical services. A comprehensive facility such as the Winnipeg Rehabilitation Hospital must provide vocational training, recreation, social services, and therapy in addition to administering to chronic medical needs. The

[5] McRae, David C., Rehabilitation Centers and Models p.228.

staff of the Winnipeg Rehabilitation Hospital includes occupational therapists, physiotherapists, speech and hearing therapists, recreation therapists and medical personnel.

The Winnipeg Rehabilitation Hospital courtyard is located above a parking garage, and is one of the few places in the Health Sciences Centre complex which provides sunlight and fresh air to the patients. It is used for some forms of occupational therapy on a regular basis, and has occasionally been used for physiotherapy. Barbecues and special events regularly take place in the courtyard during the summer, and involve large numbers of patients and staff. Through the foresight of the architects, the courtyard has been able to provide some variation within an institutional environment, yet it offers very little visual stimulation in itself. The value of this resource will continue to be largely unrecognized unless fully exploited.

Patient Drop Off

RESPIRATORY HOSPITAL

Out Patient Entrance

OCCUPATIONAL THERAPY DEPARTMENT

Kitchen

Sherbrook Street Entrance

Patient DropOff

OCCUPATIONAL THERAPY WORKSHOP

COURTYARD

REHABILITATION HOSPITAL

Patients' lounge

PHYSICAL THERAPY DEPARTMENT

HYDROTHERAPY POOL

GYMNASIUM

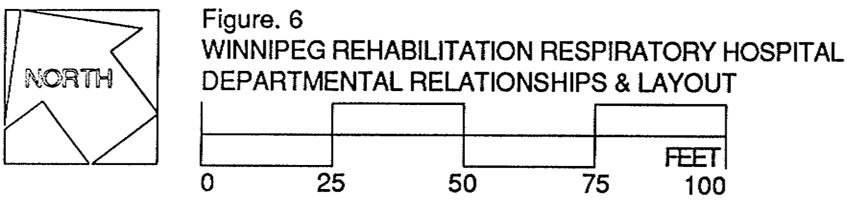

Figure. 6
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL
DEPARTMENTAL RELATIONSHIPS & LAYOUT

4.5 Occupational Therapy.

Occupational therapy employs purposeful activities to promote and maintain health, prevent injury or disability, and help clients with a wide range of physical or mental limitations to develop or redevelop needed abilities and skills in order to maximize their independence and maintain their health.[6]

The occupational therapist teaches the patient to live independently by improving functional capacity. "Occupational therapists are managers of space (to promote stimulation), people (to encourage social interaction), and tasks (to develop skills). In functioning in this role, the therapist analyses the effects of the surroundings on a person in terms of the individual's response. Deficits found during the initial interview and evaluation cue the therapist to appropriate changes in the environment, either to stimulate or to inhibit the person's behavior or adaptation. The therapist must assist the patient in gradually adjusting to the challenges of the environment by increasing appropriate performance within it.[7]

Therapy involves goal oriented activity and achievement through productive pursuits. Today, there is a greater emphasis being placed on more creative involvement of the patient in purposeful, motivating and constructive tasks based on individual behavioral evaluations and treatment.[8] Although activities such as gardening or crafts are often viewed as quaint, childish, or primitive, they offer a highly flexible, easily controlled means of exploration and achieving perceptual, physical, and cognitive skills. They also give tangible evidence of one's actions.

---

[6]Definition of occupational therapy for licensure from Minutes of the 1981 Representative Assembly. *Am. J. Occup. Ther.* 35:798-799, 1981.

[7]Elinor Spencer, "Functional Restoration." in Occupational Therapy, ed. Helen L. Hopkins and Helen D. Smith, Philadelphia: J.B.Lippincott, 1983. p.364.

[8]Representative Assembly minutes, April 1979, Detroit, Michigan. *Am. J. Occup. Ther.* 33:785, 1979.

Occupational therapy includes work (productive activity in the form of a service or commodity, or which adds new abilities, ideas, knowledge, artistic objects, or performances to society), daily living tasks (self-care, cleaning, cooking, maintenance of one's living space, shopping, travel), and play (exploratory, creative, competitive activities; hobbies, socializing, sports, cultural celebrations, ritual; leisure). Occupation is also an effective means of restoring biological, social and psychological health after illness or trauma.

Treatment.

Treatment involves assessment of the disease process and the effects of external factors which impinge on the patient. The "eye-hand-brain complex" is used to explore and master the environment and learn skills and behaviors. Skills to enhance functional performance and manage activities are elaborated upon by adapting the environment and by designing, fabricating or applying prosthetic devices, adaptive equipment and tools. Occupation is a central feature in human activity and the loss of occupational capabilities results in the loss of much of an individual's social and cultural life, development and maintenance of physical and neurological functions. It is theorized that purposeful activity not only has positive effects on the muscles and circulation, but that goal-directed occupation directly affects the brain's physiology through the release of the body's natural antidepressants. Play, daily living tasks and work are critical activities in the formation and advancement of the mental health of the individual because they provide the opportunity for growth, self-esteem, satisfaction and interest. The lack of meaningful activity can lead to alienation from society, deviant behavior and unhappiness.

Department Needs.

The environment is an aid in adjustment and adaptation through:

1. adjusting the setting for appropriate and effective evaluation of the patient's functional level,
2. adapting the level of stimuli for tolerance and interaction,
3. adjusting for successful and satisfying daily living activity, and
4. insuring self-worth through productive and social activity.[9]

[9] Spencer, p.354.

Facilities should encourage independent functioning, but should also be in proximity to others who could provide an incentive to increased activity or have a therapeutic effect on the patient's treatment. "Family members and friends can have varying effects on the patient; some may be encouraging and may stimulate functional recovery, while others may be patronizing or pitying and thus may retard progress. The objective of stressing environmental interaction is assisting the patient to adjust to returning home and to use skills to adapt to the environment for maximum function and minimum stress." [10]

The patient must be able to adapt to the unfamiliar in order to become independent and socially adjusted in the community. A non-institutional or an exterior setting permits the therapist to evaluate and instruct the patient to overcome architectural barriers, solve problems and be flexible, interact with others, manage adaptive equipment or prosthetics, and judge safety factors to become increasingly independent.

4.6 Physiotherapy.

Physiotherapy is directed primarily toward the prevention or alleviation of movement dysfunctions altering effective or efficient body performance. Dysfunctions may be due to pain, congenital abnormalities, diseases, accident or injury, enforced inactivity, aging, or psychological or social stress.[11]

Learned abilities enable people to meet environmental demands. The therapist assesses the levels of adaptation on which the patient is functioning, and provides specific exercises for muscles and joints, and general exercises which coordinate the movements of the affected parts within the body as a whole.[12]

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[10] Spencer, p.365.

[11] "Physiotherapy; Scope of Practice" Canadian Physiotherapy Association pamphlet, Toronto, 1986.

[12] A.C Mosey, Three Frames of Reference for Mental Health. Thorofare, NJ: Charles B. Slack, 1970.

Treatment.
Physical capacities are based on ability, endurance, speed, safety, and strength. A rehabilitation hospital provides opportunities for the patient to experience success and explore higher levels of adaptation under professional supervision. Challenge, surprise and novelty can foster a sense of competence and wholeness because each new gain in functional ability affects the physical, sensory, perceptual, cognitive, social, and emotional state and the further development of the individual.

Treatments include heat, ice, hydrotherapy, electrical stimulation, ultrasound, and exercises. Specific exercises consist of the patient moving freely, assisted by the therapist, or resisted through various techniques used to achieve progression. Frequency of rest periods, amount of pain or discomfort, and emotional reactions are noted.

Department Needs.
The Rehabilitation Hospital employs 55 physiotherapists who provide services to both in-patients and out-patients. Between 400 to 450 patients attend daily with approximately 35% attending as out-patients. The Centre includes a hydrotherapy area, a pulley room and cubicles for individual treatment of back injuries, arthritis, and fractures, a small gym used for patients with neurological disorders, and a large gym used for spinal cord injury and amputee patients and all group activities.

Interior and exterior exercise areas should be flexible enough to accommodate a variety of crutches, wheelchairs, canes, and equipment such as steps, floor mats, and weights. Layout should allow maximum circulation for people with limited mobility.

4.7 Client profiles.

Unlike acute care institutions, the Winnipeg Rehabilitation Hospital deals with problems which are not as life-threatening but are seldom curable. The reasons for admission are often a combination of social, physical, and medical problems. Typical examples are victims of trauma, often with resultant communication problems, and arthritics with limited physical functions. Such patients are admitted to the Rehabilitation Hospital to regain function, to learn to adapt, and to improve social and mental skills. Because the patient is often hospitalized for a relatively long period of time, the impact of the environment is increased. While recovering, the patient will experience an increased awareness of the physical environment. Adjusting to a handicap and regaining control following illness or trauma amplify noise, colour, light, odors, the lack of privacy and other stimuli. Environmental factors should promote the patient's recovery without causing anxiety. The lack of privacy and control over the environment can cause a decline in self-esteem and adversely affect the rehabilitation process. A long-term care institution must provide opportunities to offset boredom by encouraging patients to experience a variety of spaces for social interaction. Spaces should vary from intimate to those large enough for group discussions or a large group activity.

The users of the Rehabilitation Hospital courtyard comprise:
1-those patients requiring rehabilitative therapy only, and
2-those which require custodial nursing care.

The variety of physical, emotional and intellectual disabilities affecting patients at the Rehabilitation Hospital hinders detailed descriptions. The most common conditions referred to the hospital are back problems, chronic obstructive lung diseases, rheumatoid arthritis, stroke, and musculo-skeletal disorders as a result of injuries and amputations. The degree of illness or trauma also varies greatly, with varying implications for activities and their design needs. "In many cases, the physical disability is an excuse for, and not the cause of, psychological maladjustment. The main problems which occur are resignation and feelings of inferiority, self-pity, fear, and hostility...Hence, there is the potential for good adjustment with a severe physical disability and widespread emotional handicaps with only slight physical defects." [13]

Zones within the hospital for nursing and for formal therapeutic activities are separated, although patients interact in common areas and therapy departments. In such a long-term care facility, there is a greater proportion of ambulant patients than in an acute care hospital. While all invalids benefit from looking at and enjoying their surroundings, long-term patients especially require spaces in which to move around, exercise, visit and relax.

3-The immediate family are seriously affected by the disease and trauma of the patient as well. The hospital environment can be emotionally draining on the family which, to some extent, usually helps nurse the patient as well as meeting emotional needs.

4-Staff include nursing personnel, who interact with the patient mainly in the same location on a shift basis, therapists, who run programmes during a morning or afternoon from Monday to Friday usually in a single location, doctors, social workers, clinical psychologists, and speech therapists, who interact with patients in many different locations throughout the day, and other groups such as volunteers who are often mediators between staff and the patient.

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[13]Jane G. Kay, Crafts for the Very Disabled and Handicapped. Charles C. Thomas: Springfield, 1976. p.4.

5. Goals & objectives.

The objectives were formulated through a series of discussions held with an advisory committee comprising members of the White Cross Guild and representatives of each department of the Winnipeg Rehabilitation Respiratory Hospital. The objectives are intended to provide parameters for the programming of activities within the courtyard, and generally guide the design process to successfully achieve the goal which was set out early in the practicum research.

The Goal.
The hospital environment should be potentially therapeutic in itself through its design and activities. The courtyard should relieve the uniformity of institutional architecture, lack of aesthetic stimuli, and the scarcity of means for identifying time, weather, and place.

Objectives.
To help the patient adjust to the institution by bringing some meaning into his/her life, providing a diversion from routine, and encouraging a broader interest in the outside world by establishing a link with life outside the hospital ward.

To provide therapeutic relief for family members as well as patients.

To ensure that development gives priority to long-term patients and their families.

To extend the duration of the courtyard's use by improving comfort, providing a variety of spaces, and maximizing flexibility through the encouragement of spontaneous activities requiring a minimum of supervision and equipment, as well as structured activities.

To create a social environment where patients can relearn social skills.

To stimulate competition, communication, leadership, cooperation, and encourage interaction between patients and staff.

To stimulate and aid in the building of cognitive skills, basic motor skills, and adaptive skills through the promotion of independence in bed and wheelchair activities.

To provide a supporting structure for rehabilitation by promoting competence in ability to function outdoors or by providing an opportunity to assess the patient's potential and performance. The design should also aid the therapist in discovering any behavior disorders, assessing the patient's attention span through complexity and repetition, testing the application of previously learned skills and problem solving, or evaluating movement and coordination.

To provide activities which will help to reduce anxiety, relieve aggression in an acceptable manner and reduce restlessness. Activities should be purposeful in order to build self-confidence, encourage participation, and motivate patients to be creative by providing challenge and gratification.

6. Preferred activities.

Preferred development activities are those in which the Health Sciences Centre advisory committee have expressed interest. The program must consider not only the suggested activities, but their associated circulation patterns, location requirements, the number and types of users, the types of relationships to be encouraged, the sensory qualities of the space, air movement problems, desired control or informality, the physical requirements of materials, future needs, and the time span of the courtyard's use and supervision. The physical, spatial, and qualitative requirements of the design are based on the desires, judgements and needs of the users as stated by the individuals who work in each area of the Rehabilitation Centre. Although preferences may be coloured by the backgrounds of those being questioned, they are invaluable if isolated from preconceptions and prejudices.

general activities.
quiet sitting
visiting
entertainment (concerts, dog shows)
eating

recreation therapy.
Bingo
shuffleboard
card games
games tables (chess, checkers, backgammon)
speakers/lecturers
discussion & reading groups
large video screens
pet therapy (visitation, therapeutic use)

Occupational therapy.
cooking
crafts
gardening
cleaning
carpentry
painting
metal work
table exercises
using adaptive equipment (wheelchairs, prosthetics)
reeducation/reintroduction (everyday obstacles, teaching aids)
Workers' Compensation Board (scaffolding & construction assembly)

Physiotherapy.
walking on a variety of surfaces
climbing stairs & curbs
stooping, lifting & carrying
pushing & pulling
therapeutic exercises

Rehabilitation programs vary with the nature of each physical dysfunction. Treatment plans include activities aimed at "the restoration or improvement of functional abilities, the maintenance of a client's abilities at an acceptable level, the prevention of further disability, the improvement of the client's ability to function...the exploration of the client's vocational or avocational potential, and resumption of a work role. Goals will vary with the nature of the illness or injury, the stage of recovery, and the client's developmental level and personal circumstances."[14] For example, a patient's age makes a great difference in not only their disability, but in the therapy program which will be prescribed.

The American Occupational Therapy Association has defined purposeful activity as:

> tasks or experiences in which the individual actively participates. Engagement in purposeful activity requires and elicits coordination between one's physical, emotional, and cognitive systems. An individual who is involved in purposeful activity directs attention to the task itself, rather than to the internal processes required for achievement of the task. Activities may yield immediate results or may require sustained effort and multiple repetition. They may represent novel and singular responses or be part of complex, long-standing patterns of behavior. Purposeful activities, influenced by the individual's life roles, have unique meaning to each person.[15]

Purposeful activity involves interaction both with people and with the environment. Activities must be sufficiently interesting to motivate patients. They must lead to functions performable outside the institution which will be of value in the patient's daily environment. Group situations help members learn to relate to others, have their individual needs met, and aid other group members.

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[14]Alice J. Punwar, Occupational Therapy: Principles & Practice. Baltimore: Williams & Wilkins, 1987. p.108.

[15]J. Hinojosa, J. Sabari & M. Rosenfeld, "Purposeful Activities", *Am. J. Occup. Ther.* 37:805-806, 1983.

According to Hopkins,[16] therapeutic activities should be goal-directed, have some meaning to the patient, require mental or physical participation, prevent or reverse dysfunctions, develop skills, be adaptable and be gradable. Activities must be broken down by the therapist into the motions required to perform each step. To effectively select and apply a therapeutic activity, the therapist must be familiar with the activity, the tools required, and the processes involved. A sample general activity analysis outline is provided below as described by Punwar.[17]

General Activity Analysis Format.
1. Activity Identification
2. Sensory Qualities
3. Physical Abilities Required
4. Psychosocial Characteristics (eg. passive/aggressive)
5. Cognitive Characteristics (eg. problem solving, attention required)
6. Interpersonal Characteristics
7. Perceptual Skills Required
8. Adaptability
9. Gradability

Therapeutic activities must be individually planned for each patient. Despite similarities in ability, each client differs in attitude, interests, goals, life circumstances and even in physical needs for the design of activity programs. Although group therapy is used to enhance certain goals, treatment activities cannot be routinely applied to individual clients.

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[16]H.L. Hopkins, H.D. Smith & E.G. Tiffany, "The Activity Process" in Occupational Therapy, ed. Helen L. Hopkins and Helen D. Smith, Philadelphia: J.B.Lippincott, 1983. p.226.
[17]Punwar. p.18.

7. Site Analysis.

7.1.1 Wind Analysis.

Repeated anamometer readings were sampled at predetermined points within the courtyard under a variety of wind conditions, velocities and directions (see Appendix A). Measurements were taken 6' above the ground at 21 points, and the readings interpolated to graphically show areas of greatest calm and turbulence.

When the leeward sides of the Respiratory and Rehabilitation buildings face the courtyard, there exists a shadow area of reduced wind speed which forms eddies. The length of the leeward eddy is greater than the area of the courtyard due to the relative height of the two buildings. The effect is greatest when the wind direction ranges from the northeast to southeast.

When the windward facades of the Respiratory and Rehabilitation buildings face the courtyard, a noticeable portion of the wind descends toward the ground and is deflected up as it hits the courtyard floor, creating turbulence and wind eddies. The formation of eddies is lessened by the setbacks of the two buildings and by the canopies which run the lengths of the windows of each storey, although this effect can create even greater turbulence, especially at the windward corners. The phenomenon of downward air movement creates zones of greatest turbulence when the wind direction is perpendicular to the building face. This condition occurs in the courtyard when northwest and southwest winds are present. As shown in Figure. 7, such winds are common in Winnipeg, and are critical to the wind conditions within the Rehabilitation Respiratory Hospital courtyard.

Because of the cell effect created by the courtyard, being bounded on four sides by walls, the wind conditions are generally very calm unless the wind velocity is unusually strong. Although this effect buffers light winds, strong or gusty conditions are increased in intensity and turbulence, especially across the floor of the courtyard. In general, the wind conditions are most calm in the center of the courtyard, and most turbulent around the perimeter. Winter wind shadows, which create

warm air pockets, are most noticeable in the corners of the courtyard, especially on the leeward side. In addition, summer winds, which are generally cooling, tend to be captured within the configuration of tall buildings, especially next to the planter due to its location, its relationship to the Rehabilitation and Respiratory buildings and the presence of trees.

The placement of wind deflectors along the bases of the Rehabilitation and Respiratory buildings would reduce turbulence within the courtyard by redirecting air movement away from the floor. Deflectors can redirect downward air movement but should be set back from the courtyard in order to minimize their obstruction of views from the hospital wards above. Trees and structures within the courtyard can also have a noticeable effect on reducing unpleasant wind.

RESPIRATORY HOSPITAL

WIND DEFLECTION

predominant
winter winds

Turbulence

warm
air
pockets

Calm

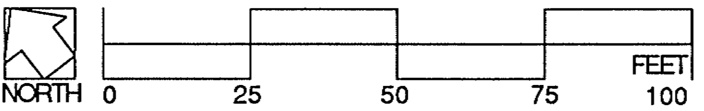
Calm

summer
cool air
pockets

REHABILITATION
HOSPITAL

predominant
summer winds

Figure. 7
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL COURTYARD
WIND PATTERNS

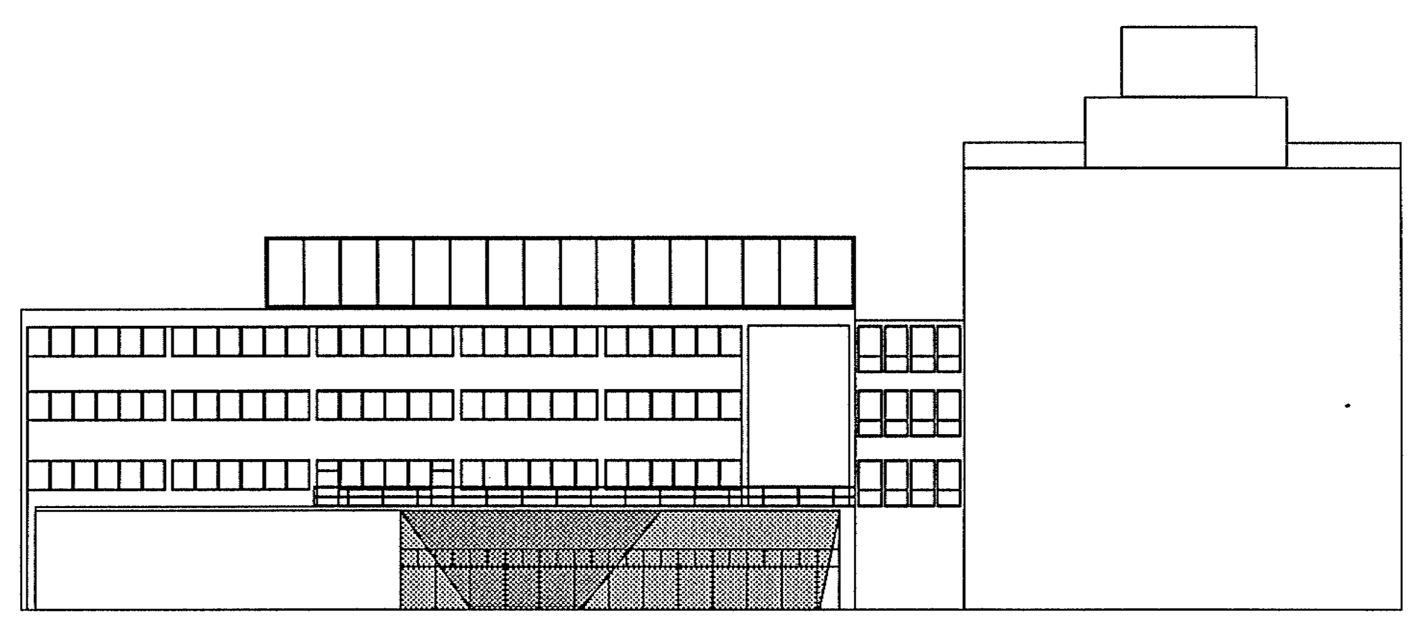


7.1.2 Sun Path Analysis.

Shadow diagrams were drawn for each season at 8am, 10am, noon, 2pm and 4pm (see Appendix B). Two tones were used to emphasize the effect of the Rehabilitation and Respiratory Hospital towers on the courtyard environment. Only the 10am and noon studies for winter were included as no other winter periods cast direct sunlight into the courtyard. The shadow configurations for each season were then overlaid in order to illustrate the areas of greatest heat build-up. The sun path summaries, illustrated in Figures. 8, 9 and 10, show the areas which receive the greatest amounts of sunshine, represented by increasingly darker tones.

During the winter, primarily the southern exposure of the courtyard receives the benefits of the sun, with little sunlight actually striking the floor. In summer, the east, south and west exposures all receive direct sunlight, and nearly all of the courtyard floor receives direct sunlight at some time of the day. The exposure is greatest in the center of the courtyard and along the north side, although heat build-up tends to occur later in the day, making the northeast corner hottest and driest. During the spring and fall, the east, south and west exposures all receive direct sunlight, but much less strikes the floor of the courtyard.

The location of the Respiratory building to the northeast of the courtyard has a minimal role in casting shadows on the courtyard. The Rehabilitation building to the southeast generally shades the courtyard in early morning, and portions of the courtyard until noon. Thus, the Rehabilitation building adds to the shade and cool temperatures found within the courtyard in the morning, yet provides no relief from the extreme heat build-up in late afternoon, especially during the summer.



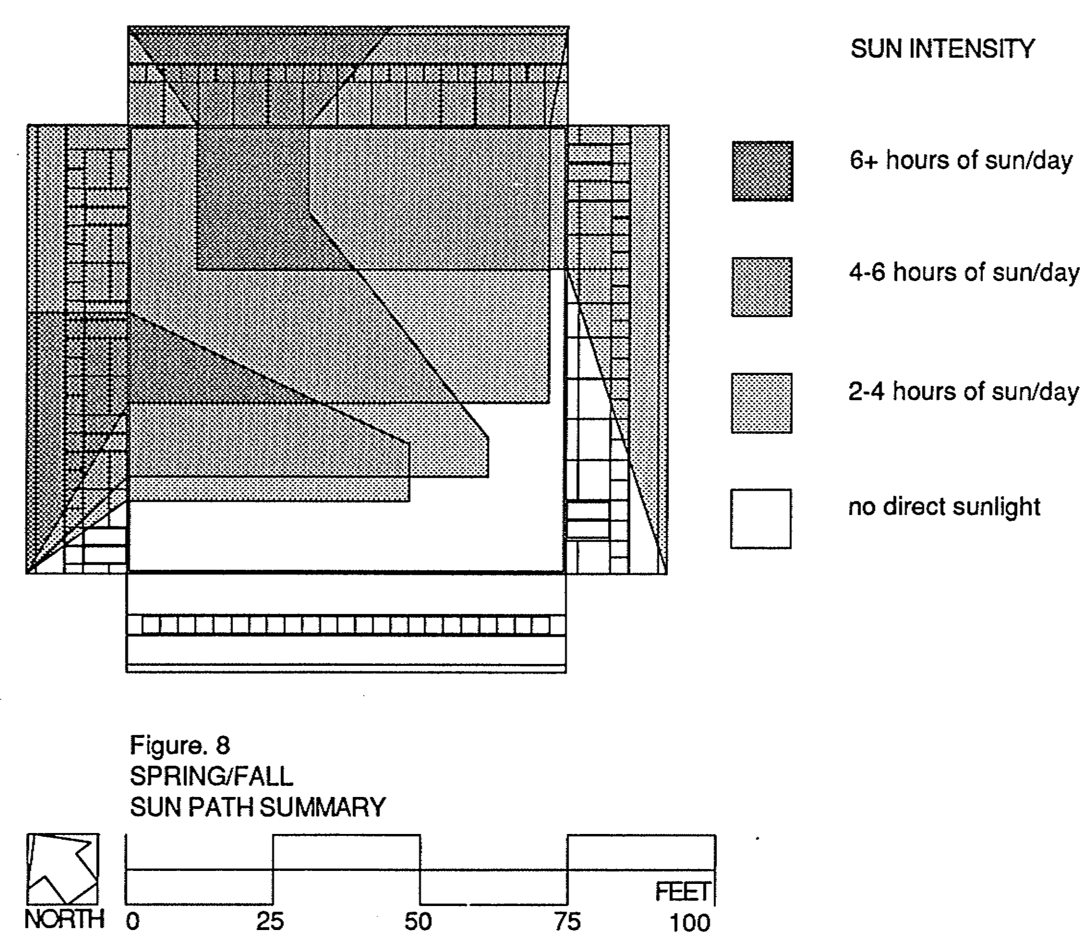
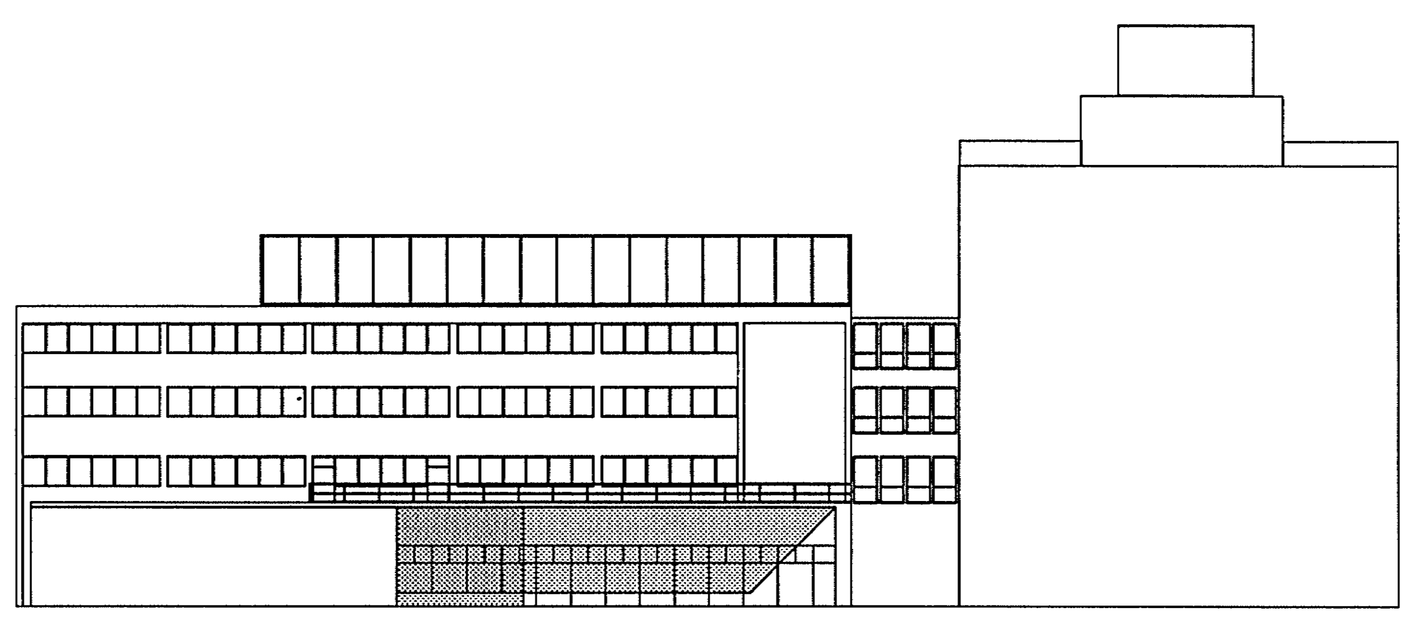


Figure. 8
SPRING/FALL
SUN PATH SUMMARY

NORTH 0 25 50 75 FEET 100



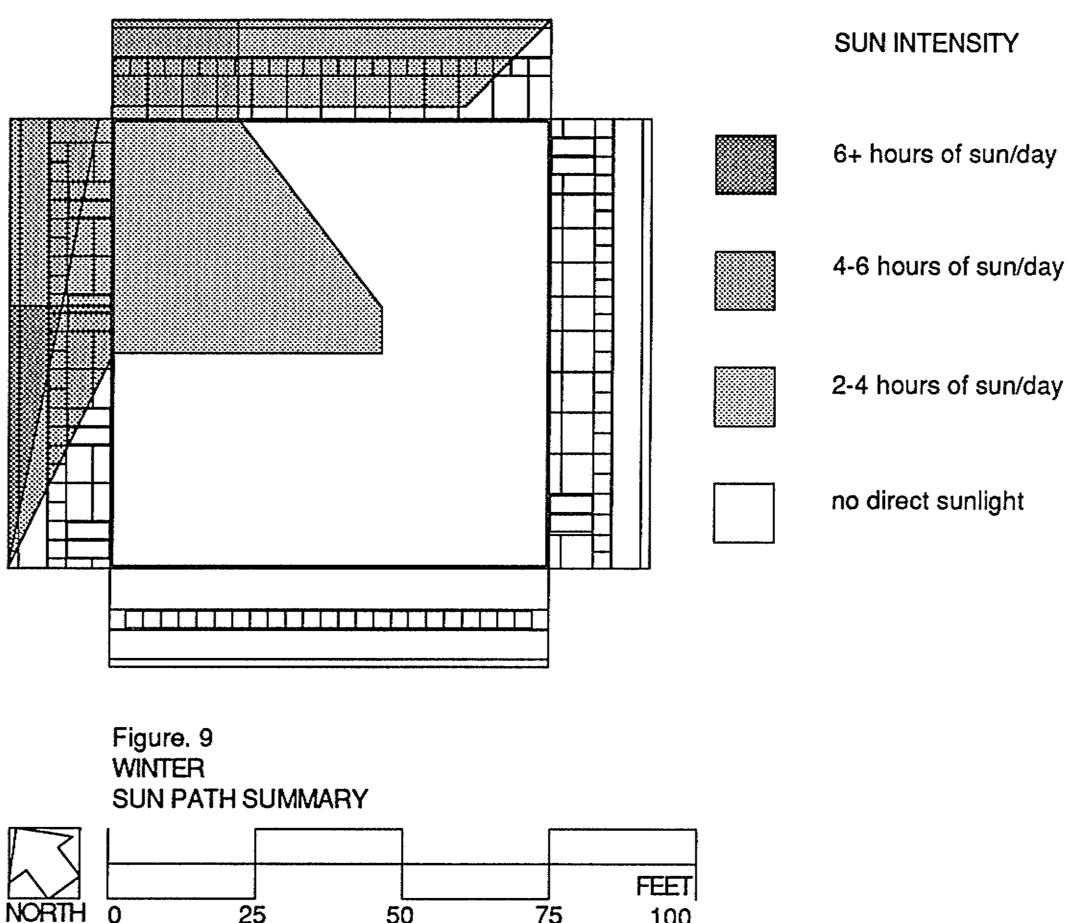
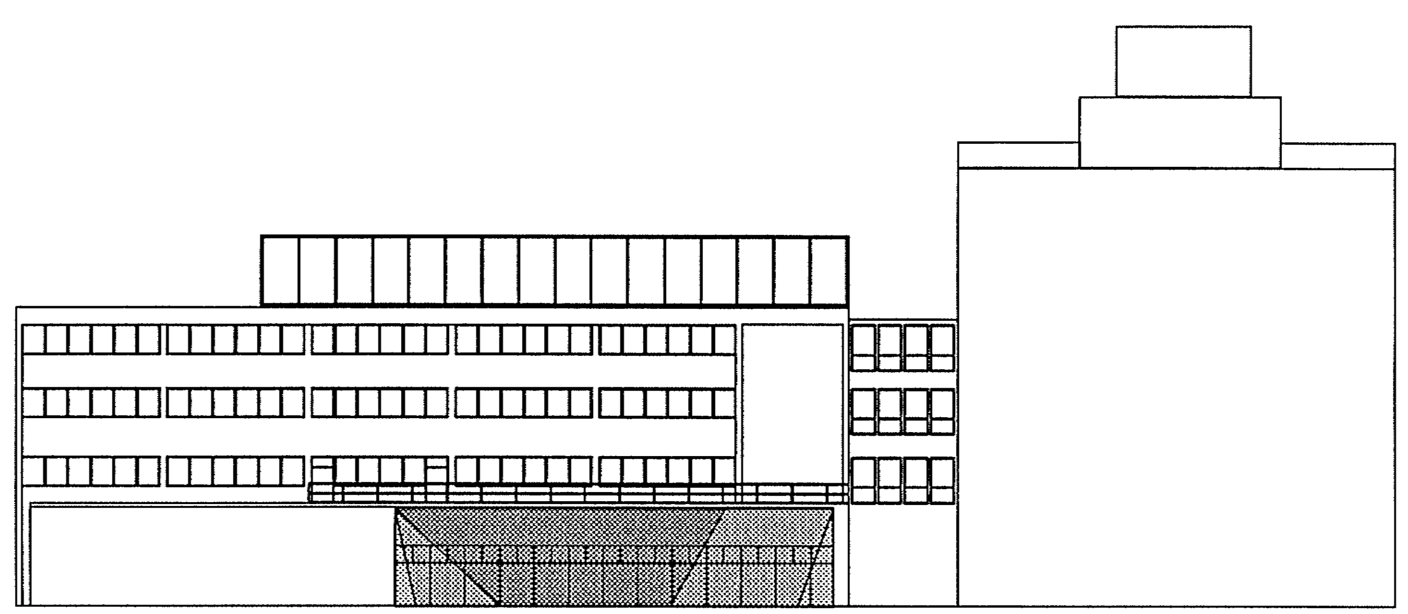


Figure. 9
WINTER
SUN PATH SUMMARY



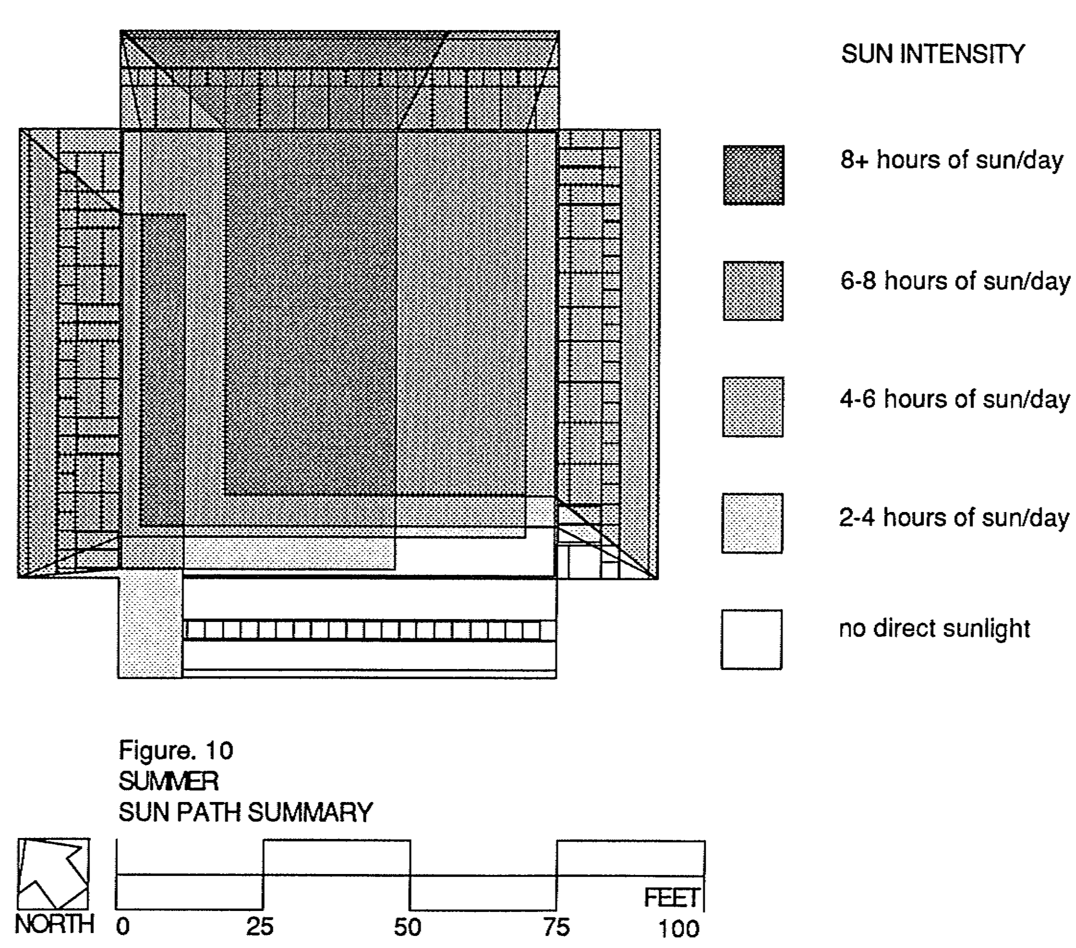


Figure. 10
SUMMER
SUN PATH SUMMARY

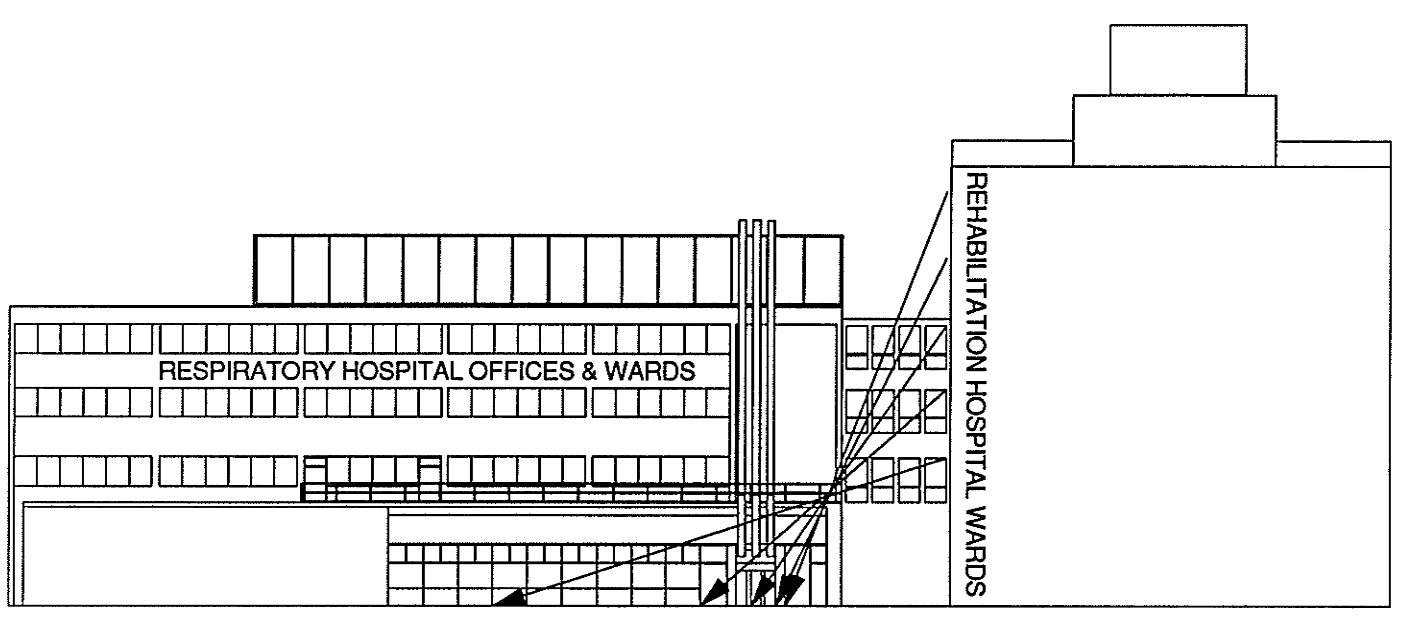
7.2.1 Views & access.

Over the years, various additions to the Rehabilitation Hospital have encroached on and changed the original courtyard. The wall between the courtyard and the Physical Therapy Department was reconstructed approximately 20' into the courtyard in 1970. For reasons of privacy, only clerestory windows are located along the wall, as it separates the Physical Therapy treatment cubicles from the courtyard.

The Occupational Therapy Department, to the northeast of the courtyard, forms an open work area which receives large amounts of direct sunlight through its large windows. Much of the Occupational Therapy Department along the northeast side of the courtyard is separated from the outside by a large air vent which was added in 1982. Large windows exist along the Occupational Therapy workshop and staff offices to the northwest of the courtyard. Of the four entries along the northwest wall, only the two corner workshop doors are presently used.

A lounge faces the courtyard from the southeast. The lounge links the Physical Therapy Department to the rest of the hospital, forming an important corridor and link to the courtyard. An office occupies a large portion of the original patients' lounge which is now relegated to its southern end. Patients continue to enter the courtyard through both doors of the southeast wall, but only the southernmost entrance has direct access to the lounge. The most heavily used entrance to the courtyard is aligned with the Sherbrook Street doors which comprise the front entrance of the Rehabilitation Hospital. This entry is used by both out patients and patients residing at the Rehabilitation Hospital. None of the courtyard doors require ramps or stairs as they were designed for a variety of abilities, mobility aids and roller beds.

The windows of the Rehabilitation Hospital wards afford good views of the courtyard, especially from those rooms above the second floor. The second storey windows yield views only of the courtyard walls opposite the Rehabilitation Hospital. The Respiratory Hospital tower is set back farther from the courtyard, but views of the court are possible from the rooms on the third and fourth floors. Doors on the second floor of the Respiratory Hospital lead to the rooftop surrounding the courtyard.



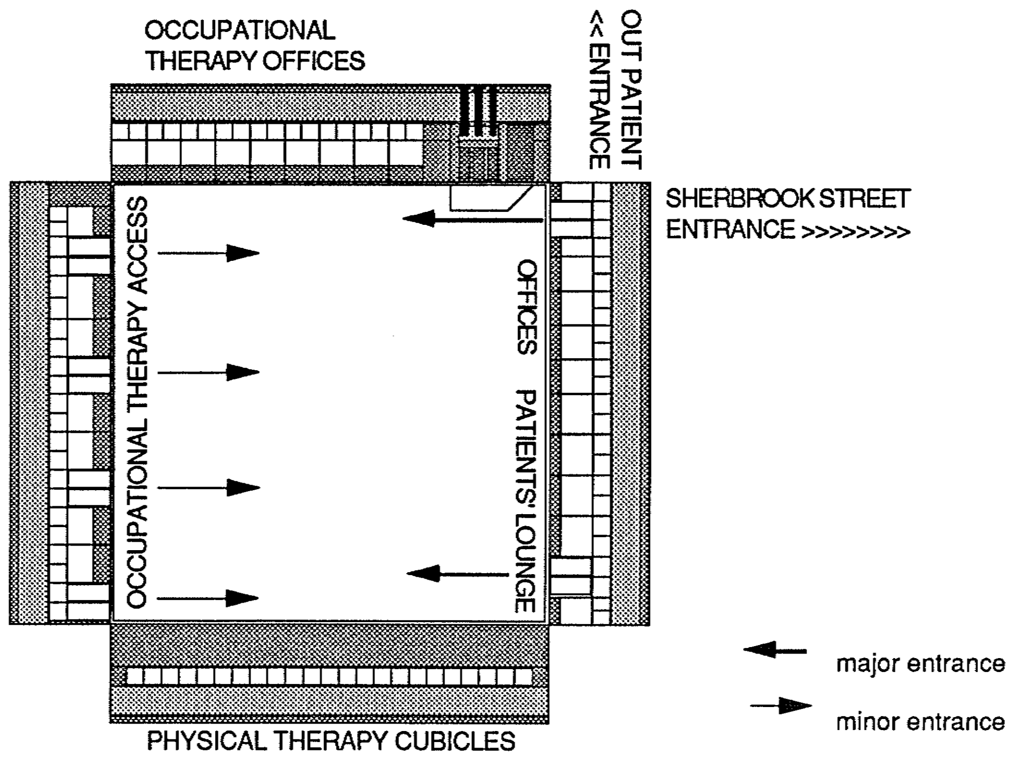
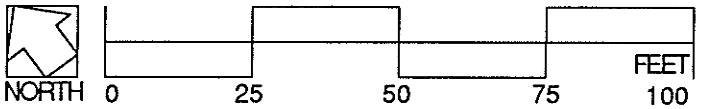


Figure. 11
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL COURTYARD
COURTYARD ACCESS & VIEWS



7.2.2 Dimensioning.

The dimensional data on ambulant disabled people and independent wheelchair users employed in this practicum are largely based on Selwyn Goldsmith's Designing for the Disabled. As well as provisions for the dimensions of circulation spaces, the author includes requirements by the disabled for surfaces, ramps, chairs, tables, raised flower beds and greenhouses. Other sources include Barrier Free Site Design which also provides dimensioning for outdoor seating groups, provisions for the increased comfort of ambulant disabled people, and recommendations for exterior planting. Design data regarding details such as handrails, ramps, staircases, floor finishes, furniture and planters can also be obtained from these sources.

The design of the courtyard must be responsive to the needs of the mentally and physically handicapped in order to facilitate their integration with the rest of society. A broad spectrum of abilities exists at the Rehabilitation Respiratory Hospital and the courtyard design must insure that a disability does not handicap a patient's development. The environment must be flexible enough to allow all patients to use it competently, despite their reliance on many forms of crutches, walking aids, canes, braces, wheelchairs or artificial limbs.

In size, sitting areas must acknowledge that wheelchair users space themselves relatively far apart in a conversational group. Moveable tables and chairs will permit interaction by ambulatory patients and patients using beds or wheelchairs. Seating arrangements can be modified according to need, allowing participants to come and go without creating a disturbance and rearranged in conjunction with patterns of sun and shade. A typical sitting group is comprised of 4 to 6 patients and visitors. As many as 10 patients will sit together on a pleasant afternoon.

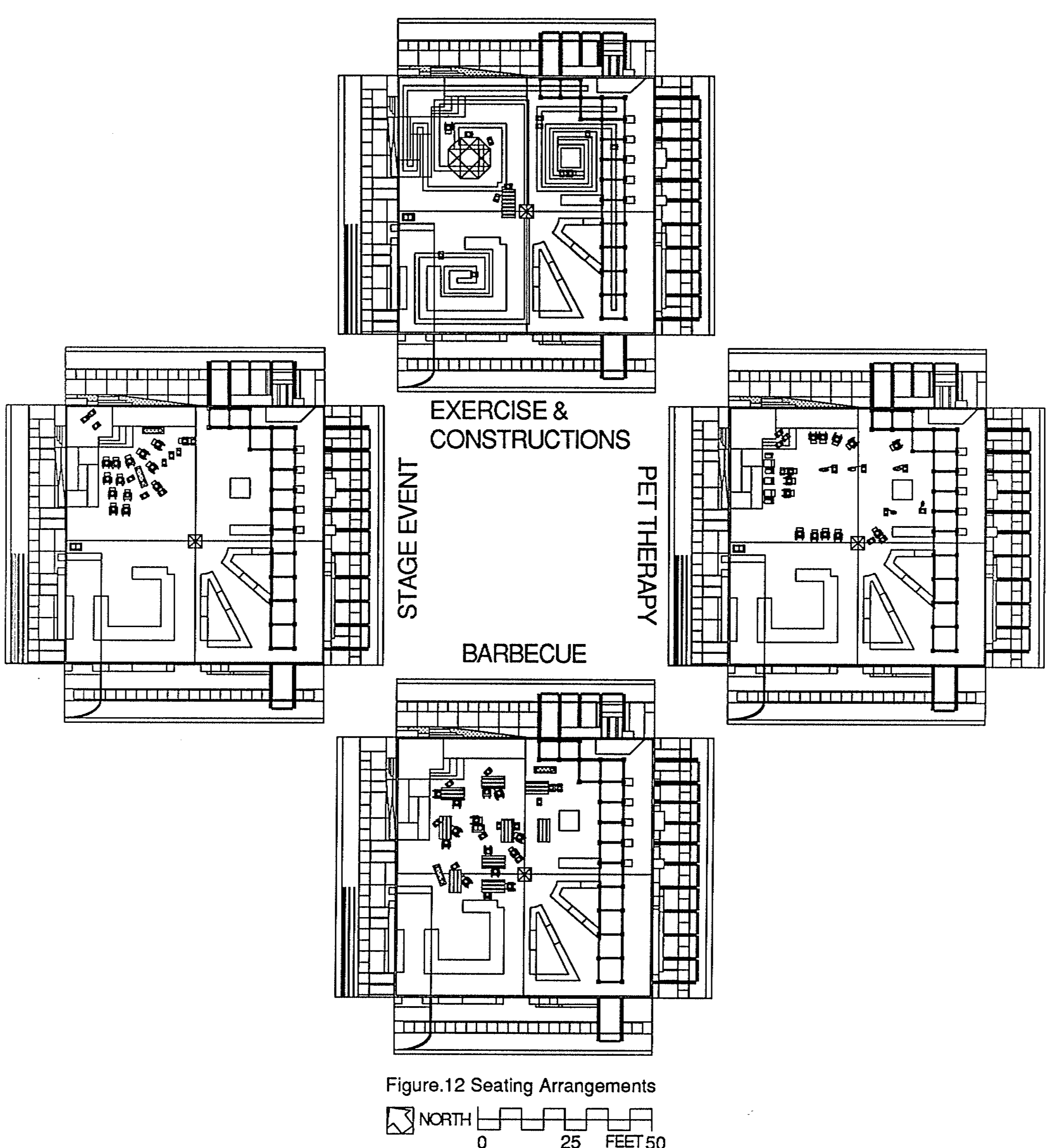


Figure.12 Seating Arrangements

Anthropometric design determinants.
Each individual has particular needs and requires activities to be adapted accordingly. For example, a mosaic tile project can be positioned at various distances from the patient in order to affect the range of movement needed to reach the materials. Tools can be adapted for many activities and are used when grasp strength is inadequate, when only one hand can be used, when the user cannot bend, and for those with difficulty in standing. Tools and techniques can be selected to be operated from a sitting position for the ambulant hemiplegic who is unstable, or for the wheelchair participant. Patients who require a walking stick or support may have to use one-handed tools. Patients who are unable to bend can try working from a sitting position or use tools with extended reach. Tool design is dependent on the ingenuity of the therapists and the Occupational Therapy workshop. For amputees, prostheses are individually designed, fabricated and fitted by the Rehabilitation Engineering Department of the Health Sciences Centre. Prosthetic design is based on assessment of the needs of the amputee, and range from conventional to battery powered electronically controlled limbs.

Space requirements of a wheelchair are approximately fives times that of a standing person.[18] In general, large spaces are justifiable in an institution where the volume of traffic dictates large circulation spaces. The posture of the wheelchair user requires that equipment such as planting beds, tool benches and wash basins have a lower height than that which is most comfortable for the ambulant disabled. Design criteria of both sitting and standing populations can sometimes be accommodated while others require separate resolution. The narrow range of reach of the wheelchair user sometimes makes the adaptation of tools more feasible than a design compromise determined by reach criteria. Strength is limited in many rehabilitation patients. Severe arm limitations can be aided by physical improvements such as the installation of automatic doors and the sensitive design of furnishings.

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[18]Selwyn Goldsmith, Designing for the Disabled. London: RIBA, 1976. p.24.

Table 7.1 lists a selection of disabling conditions and their associated impairments to locomotion. The values are only generalizations, as handicapping effects vary widely between individuals having the same disabling condition.

Table 7.1 Rehabilitative Criteria of Selected Disabling Conditions.

	impairment of mental faculties	incontinence	day-to-day condition unpredictable	communication difficulties	impairment of vision	bodily deformity	pain	progressive deterioration	sensory impairment	lack of coordination	impairment of sex functions
poliomyelitis	○	○	○	○	○	◔	○	○	○	○	○
lower limb amputation	○	○	○	○	○	◔	◔	○	◔	○	○
brittle bones	○	○	○	○	○	◑	◔	○	○	○	○
muscular dystrophy	○	○	○	○	○	◕	○	◕	○	○	○
motor neurone disease	○	◔	○	○	○	◑	○	●	○	○	○
syringomyelia	○	○	○	○	○	◑	○	◕	◑	○	○
osteoarthritis	○	○	◔	○	○	◔	◑	◑	○	○	◔
Parkinson's disease	○	○	○	◑	○	◔	○	◑	◔	◔	◔
Friedrich's ataxia	○	○	○	◔	○	◔	○	●	○	●	○
paraplegia and tetraplegia	○	●	○	○	○	○	◔	○	●	○	◑
hemiplegia	◑	◔	○	◑	◔	◑	◔	◔	◑	◔	◔
rheumatoid arthritis	○	○	◕	○	○	●	●	◕	○	○	◔
spina bifida	◕	●	○	○	○	◔	○	○	●	○	◑
cerebral palsy	◕	◔	○	●	○	◕	○	○	◑	◑	◔
multiple sclerosis	◕	●	●	◔	◑	◑	○	●	◔	◕	◑

The values signified by the circles are as follows

○ No directly associated effects.

◔ Directly associated effects in some cases, or slight associated effects in general.

◑ Commonly associated effects, particularly prevalent where the disability is severe.

◕ Associated effects in the majority of cases, general where the disability is severe.

● Associated effects in all cases, with exceptions only where the disability is minimal.

source: Goldsmith, Selwyn. Designing for the Disabled RIBA: London,1976

8. Concept.

Many illnesses may be traced to psychological tensions, anxieties and fears, especially for persons who have suffered loss or trauma. While therapeutic activities may be held in a variety of settings within the Rehabilitation Hospital, the influence of the environment should be an important consideration in their programming. Outdoor spaces can improve physical and mental health, largely by providing greater sensory stimulation and variety within the institutional environment. The presence of birds and plants for example, not only provides a source of interest and pleasure, but opportunities for the satisfaction of creative drives and the development of skills. Sunlight is very important to disabled people. According to Lifchez and Winslow, "the sun has the psychological effect of putting one in touch with nature, a particularly important consideration when other contact is difficult...One disabled person described the sensation of sun and light as 'not hiding in the shadows,' an important dimension of emerging independence." [19]

The conceptual foundation for the design of the courtyard is based on the premise that such a space can form a bridge between the generally sterile layout of the institution, and the complexities of the environment outside the hospital. According to White, "with the onset of a severe physical disability, a person's environment suddenly becomes formidable, intimidating, and in some cases, insurmountable. Thus the central problems of rehabilitation cluster around performance and environment. Rehabilitation comprises programmatic arrangements designed to restore or substitute as much as possible in a person's lost repertoire, to teach him new forms of performance and new kinds of relations to the environment." [20] Rehabilitation is dependent on competence-building settings and motivation, and therefore, the design of a rehabilitative environment must foster achievement through successful exploration.

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[19]Raymond Lifchez & Barbara Winslow, Design for Independent Living. London: The Architectural Press, 1979. p.102.

[20]Willems, Edwin P. & Lauro S. Halstead. "An Eco-behavioral Approach to Health Status and Health Care". In Roger G. Barker & Associates, Habitats, Environments, and Human Behavior. San Francisco: Jossey-Bass, 1978. p.170.

The development of spatial cognition is a function of space negotiation, sensory reception abilities and memory. It is a process of ordering space in order to cope and manoeuver within a new environment.[21] White argues that environmental competence is achieved through exploration and manipulation, and that one constantly seeks the limits of one's competence.[22] When there is too much of a gap between a patient's environmental competence and an effective relation with the environment, exploration is discouraged. However, although frustration results from too great a discrepancy between one's competence and one's attempts to adapt to the environment, boredom results from a lack of challenge and exploration in one's relation to the environment. Thus, the proposed design, in response to its role as a rehabilitative setting, must be straightforward in order to reduce confusion and restlessness, assisting the patient to adapt easily to the unfamiliar with a minimum of anxiety and stress. At the same time, the layout should be stimulating and complex enough to encourage the patient to explore increasing levels of adaptation in preparation for reintroduction to the community outside the institution.

The conceptual labyrinthine form used in the courtyard design is based on the expressive power of the labyrinth as a symbol of rebirth. Historically, many mazes have been allegories of the course of human life, symbolizing the path from birth to death, and the complexities of modern existence which require decision making. The labyrinth, a series of interweaving structures, is an ancient form, based on exploration, discovery and reward, and providing a formal test of optimism and perseverance. The overall courtyard layout is loosely based on a typical labyrinth, through its interlocking spaces and paths arranged around a central focus. The formality of the design provides a simple and

[21] Edward Steinfeld, James Duncan & Paul Cardell, "Towards a Responsive Environment: The Psychosocial Effects of Inaccessibility." In Barrier-Free Environments. ed. Michael J. Bednar, Stroudsburg, Penn.: Dowden, Hutchinson & Ross, 1977. pp. 10-11.

[22] R.W. White, "Motivation Reconsidered: The Concept of Competence." In Environmental Psychology. eds. H.M.Proshansky, W.H.Ittleson & L.G.Rivlin, New York: Holt, Rinehart & Winston, 1970. pp. 125-33.

recognizable spatial arrangement which serves to organize the forms and their associated activities. Reinforcing the labyrinth at a more intimate scale, the maze consists of a pattern inlaid on the courtyard floor. The maze, a network of convoluting paths, must be perceived and understood in order to be successfully followed, providing the patient with a sense of accomplishment through the attainment of a goal. The maze is also one of the oldest of garden forms, possessing multiple levels of meaning. Its illusionistic visual potential increases its traditional use as a puzzle to be solved within a rehabilitative context.

One of the major components of the courtyard redevelopment involves the inclusion of a garden, which could provide many of the intellectual, social and psychological benefits which other forms of therapy lack. The traditional herb garden form is also loosely based on the labyrinth, and its reintroduction to the modern hospital setting will enhance the courtyard's intellectual and emotional appeal. Before psychiatry became a science, physicians prescribed garden work as a remedy for ills of the mind and nervous system. As early as 1806, hospitals acknowledged the value of agricultural activities to mental patients, by making use of their grounds. The hospital garden is an ancient tradition which vanished with the advent of modern medicine and synthetic drugs. However, herbs continue to have historical associations, particularly with medicine, as many are practical remedies and more were once thought to be.

Form generation within the courtyard is largely based on the historical link between hospitals and gardens. Medicinal herb gardens employed formal geometry because of the necessity to arrange the different species in distinct beds, as separating the herbs in such a way reduced the risk of administering an incorrect prescription. The use of raised beds and the separation of beds by interlocking paths facilitated the collection of herbs and made labelling unnecessary. The medicinal garden was often enclosed within a courtyard in order to restrict access, as protection of the plants was important since the collection and subsequent preparation of medicinal herbs required that certain portions of the plants be collected at specific times of the year.[23]

The plan of the Abbey of St. Gall in Switzerland (Figure. 13) is an

[23]Medieval Gardens and their Plants, p.50.

idealized drawing showing how a major monastery should be laid out as a self-contained community. The infirmary herb garden has sixteen labelled beds. The plan depicts enclosed areas holding a pattern of regular beds, raised and flat, and set in grass or gravel.[24] One of the most famous herb gardens to evolve was that established in 1545 at the medical school of the University of Padua in northern Italy (Figure. 14). The cemicircular plan is filled with beds laid out in concentric circles and in terraced checkerboard patterns. The simple geometry used in the two examples persisted until the end of the fifteenth century when herb gardens became more ornamental, placing as much emphasis on form as on plants. Such architectural usage of plants with contrasting textures formed elementary "knot gardens" which further employed labyrinth imagery by weaving bands of herbs within the planting beds into brocaded ornaments, making plants completely subservient to patterns.

[24] Allen Paterson, Herbs in the Garden, Dent & Sons: London, 1985. p.17.

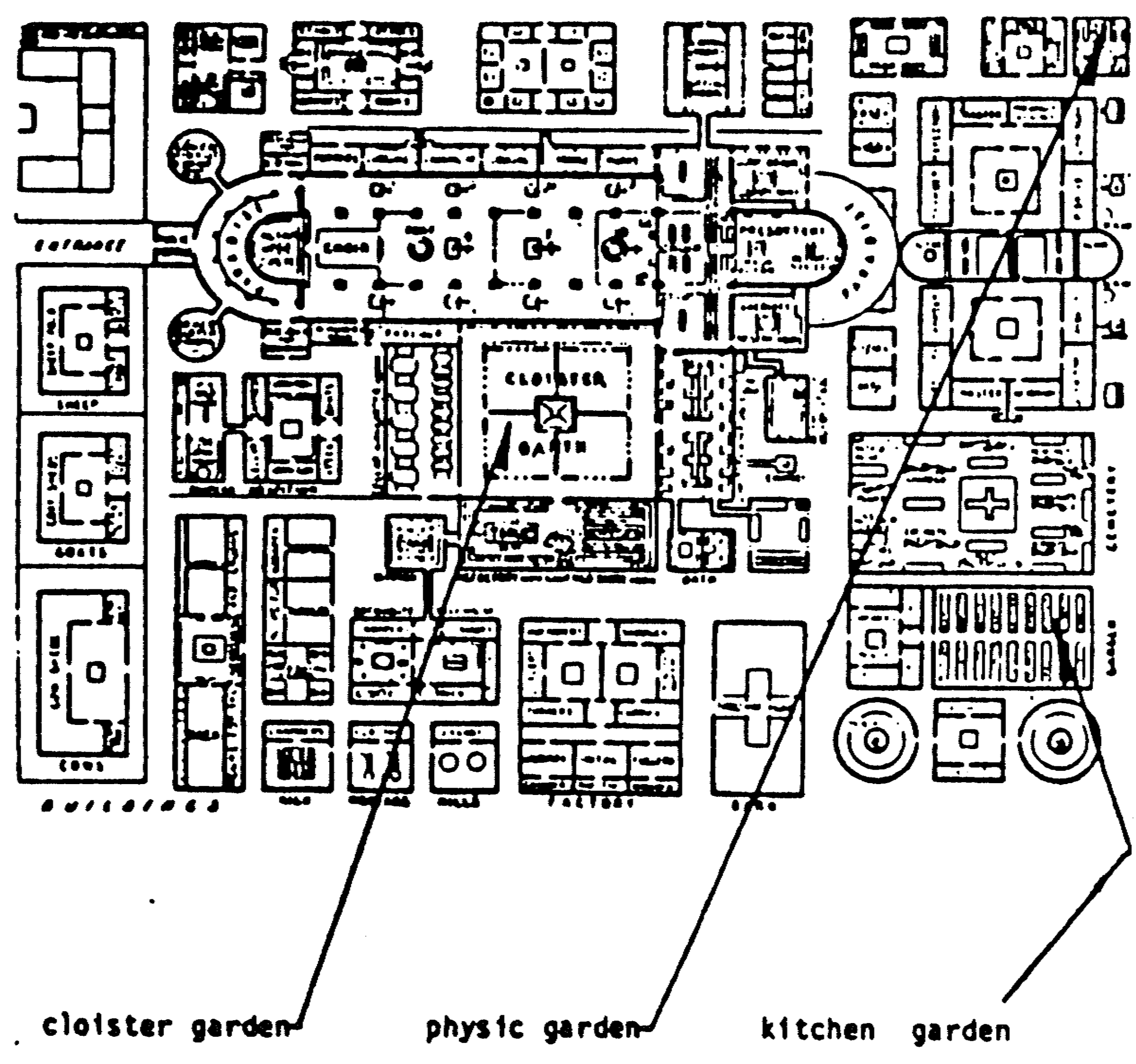

Figure. 13.1 Gardens of the Benedictine Monastery of St. Gall, 820-830
source: Hyams, Edward. A History of Gardens & Gardening Praeger: New York, 1971.

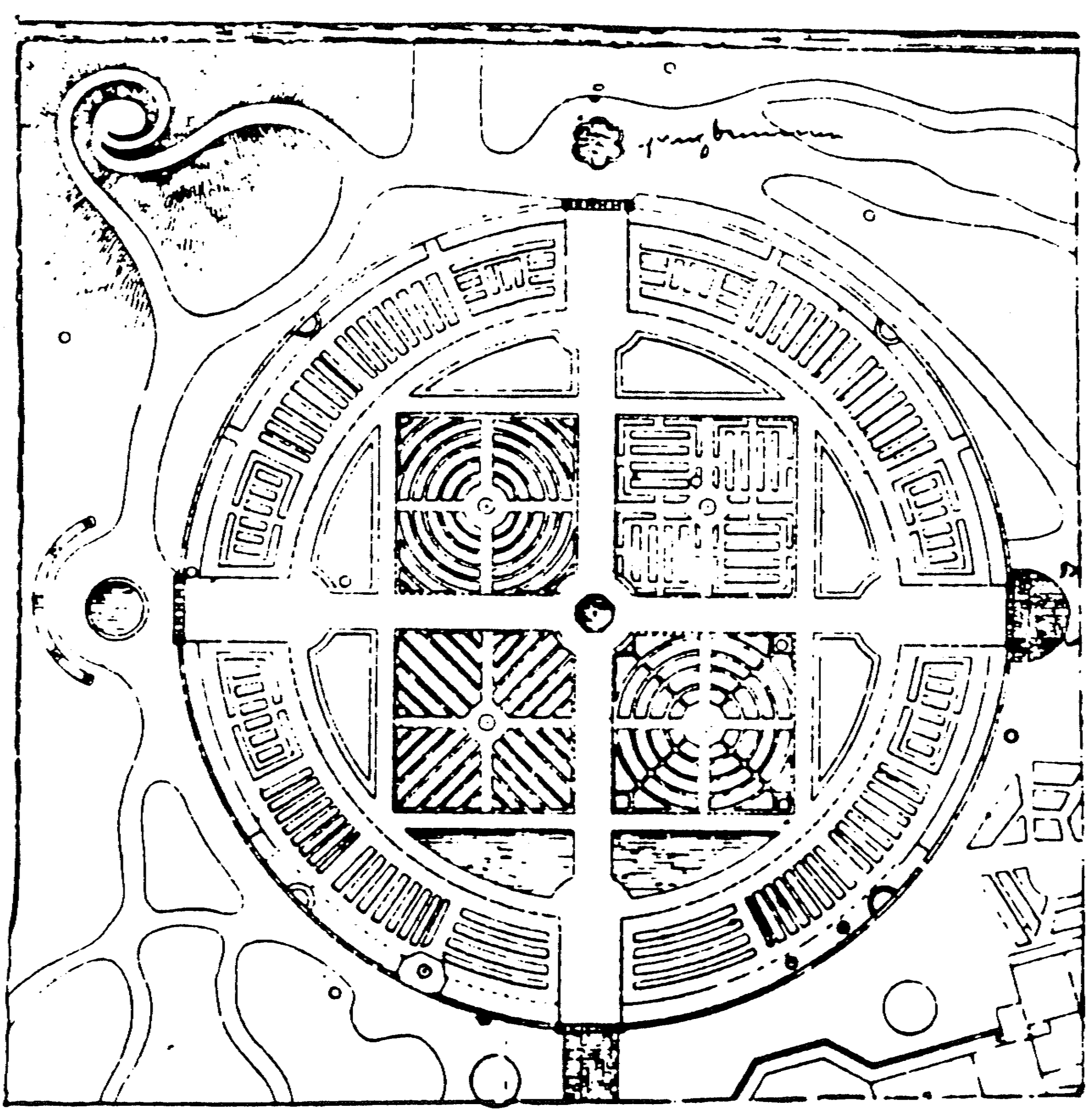

Figure. 13.2 The Botanical Garden of Padua
source: Wright, Walter P. (ed) A History of Garden Art Hacker: New York, 1966.

Through its unfolding path, the labyrinth is a form used to symbolize a rite of passage and a place of transformation. The reintroduction of such a garden to the modern hospital requires that it be an essential part of the design concept, and play an integral part in the motivation and stimulation of patients. The herb garden as an historical artifact will benefit the patients who not only will be involved in the physical maintenance of the garden, but can also appreciate creative and intellectual activities which can be associated with it.

9. Design Description.

The design of the Winnipeg Rehabilitation Respiratory Hospital courtyard consists of a configuration of interlocking spaces based on labyrinthine forms and historical hospital garden models. The "labyrinth" is easily comprehended from the windows of the hospital wards above yet, upon entering the courtyard, forms a complex sequence of activity settings. Through this duality of meaning, the conceptual labyrinth overlays forms which allow choice and resolve such diverse program requirements as providing both open space for exercise while ensuring comfort and security through the provision of separate areas for intensive group therapy and quiet activities.

The design balances a highly structured environment with spaces which are flexible and responsive to changing needs. Conflicting program requirements are resolved through the provision of an overall conceptual framework which structures the location of activities and controls the size of groups within the courtyard, yet allows flexibility through the inclusion of moveable furnishings responsive to multiple uses. Many activities are assigned to specific areas in order to facilitate observation, maximize their potential and reduce conflicts. For example, pet therapy and group exercise take place away from quiet sitting and plant therapy areas. Moveable seating permits large or small groups of patients to play games, eat or visit in a variety of locations with less chance of conflicting with group therapy or public events taking place simultaneously. Flexible seating arrangements are also able to more easily incorporate a variety of wheelchairs and beds within a group, allowing disabled patients to come and go without creating a disturbance.

Interaction with nature and participation in the construction and maintenance of the courtyard will psychologically motivate patients to improve their condition through involvement and accomplishment. The desire to be independent may be inherent in one patient's character, but others require motivating factors such as the challenge of achievement, enjoyment of activities, or emotional and social gains. The use of outdoor areas will aid the patient to be motivated toward rehabilitation.

Motivation problems are common in rehabilitation. Fordyce[25] points out that marginal motivation is largely due to insufficient reinforcement and that patients fail to produce disability-appropriate behaviors because the environmental responses are poorly reinforcing. Reinforcers occuring within the rehabilitation environment itself, offer advantage over more remote reinforcers provided by a therapist. The opportunity to exercise one's new skills in a natural setting will influence those abilities greater than in the treatment environment within the institution.

For the patient who is unmotivated by the final goal of functional improvement, short-range immediate rewards are important. The courtyard provides an opportunity to experience not only the outside world, but to experience colour and design unhampered by the architectural requirements of the hospital wards. The courtyard provides a more informal atmosphere than the hospital, and a more social setting which encourages activity and patient interaction.

Sculptural elements will involve mosaic panels created by the patients and will form a maze on the courtyard floor. While fabricated individually, the assembly of these components into a single entity is representative of the patients as a community giving a part of themselves back to the hospital. The use of components will permit individual expression and enable the removal of the precast concrete flooring and installation of the mosaic tiles to be phased. As an ongoing project, components will continue to be created as patients are admitted and discharged. Eventually, the mosaic installation will encompass the area which runs along the courtyard walls above the windows and which are presently faced with prefabricated mosaic tile. The materials chosen will be determined by the patients' capabilities, and will influence the design because fabrication of the components will be a form of occupational therapy. More importantly, creation of the installation will be a form of mental therapy, allowing the patient to be expressive within an institutional setting. Participatory sculpture

[25]Wilbert E. Fordyce. "Psychological Assessment and Management", in F.H. Krusen, Handbook of Physical Medicine and Rehabilitation, Philadelphia: W.B.Saunders, 1971. pp.181-190.

involves the public either in the manipulation or operation of an artwork, or through the contribution of laypeople in the creation of the work. The value of participation, even in the form of touching, climbing or moving, is that it permits the viewer a more intimate experience with the artwork, reduces the potential for alienation, and broadens the channels of communication between artist and public.

Besides arresting any further decline in functional capacity, therapy strives to bring out a patient's latent potentialities. Art can aid adjustment problems, as patients often cannot express or understand their problems, fears or frustrations without the assistance of a psychologist or social worker trained in art therapy. The artwork is a tool of rehabilitation which allows the patient to communicate, and the therapist to understand them and deal with any behavior disorders.

"The craft leader's purpose is two-fold: first, to work with the medical and therapeutic staff to help the patient improve and maintain a healthy outlook on life while at the same time seeing that the unaffected parts of the body remain in good condition; second, to give the person some craft or activity training that he will be able to use for his own enjoyment after leaving the institution...The craft and activity program also serves as one means to help the individual adjust to institutional life, to help bring some meaning into his life, and to help bring him some enjoyment and social relationships with other patients." [26]

Mosaics are adaptable to all age groups and ability levels, and allow for individuality in design, size, material, and scope, as each component can be individually designed instead of produced as assembly-line crafts. Cement can be poured in a box and then tiles pressed into it, or the reverse-set method can be used, permitting tiles to be placed upside down in sand and then covered in cement in order to avoid contact of cement with the skin. This method requires backwards visualization, but allows unlimited time for manipulation. Mosaics require the continual use of pinch-grip, which is especially useful for patients suffering from burns, upper limb injuries, head injuries, neurological conditions,

[26]Elaine & Loren Gould, Arts and Crafts for Physically and Mentally Disabled, Charles C. Thomas: Springfield. 1978. p.x.

arthritis, or strokes. Mosaic pieces vary in size so patients can progress from coarse actions to finer manipulations. Cutting shapes out of glass and tile requires strength and coordination, while grouting the spaces between the mosaics requires gentle movements useful for sensory training.

The cooking and serving of food also offer opportunities for patient involvement in purposeful and constructive activity. A portable barbecue will contribute to such daily living skills as the preparation, cooking, serving, and eating of food, by motivating patients through the creation of a social activity focus and a diversion from routine institutional feeding. The open area in the north quadrant of the courtyard permits varying numbers of tables and chairs to be arranged as necessary, and provides clear access to the barbecue and serving areas.

The role of the environment in speech and language disorders is to increase the exposure of the patient to the speech models of others. Children raised in institutions have been found to show more speech disorders than those with sufficient and adequate stimulation. The ability of the listener to monitor one's environment, and at the same time, attend to a single stimulus such as a voice is important to the development and maintenance of verbal performance. As well, the desire to communicate is largely dependent on emotional status, the improvement of which is one of the major objectives of the courtyard redevelopment. [27]

Exercise areas are provided within the courtyard for the more advanced patients who require the challenge of a variety of spaces and surfaces on which to walk than is offered within the hospital itself. Conducting therapy in an outdoor public area demands concentration because of the added distractions. Rather than duplicating the rehabilitation services within the hospital, the courtyard offers more independent and more challenging activities. For example, the staircase maintains the dimensions of a standard exercise staircase tread and riser, yet the width of the stairs varies, and only one handrail is useable at one time.

[27] F.H. Krusen, Handbook of Physical Medicine and Rehabilitation, Philadelphia: W.B.Saunders. 1971. pp.145-150.

After a patient has mastered the use of parallel bars within the hospital, ambulation can be improved in an outside environment with the aid of a railing provided along the courtyard walls. Railings are located along all ramps and stairs, and shall provide support both at a 900mm height, necessary for ambulatory patients and at a 750mm height, for wheelchair use. Handrails should extend at least 300mm beyond ramp terminals and bend 150mm from the terminus to signal that they are ending. A lower guard rail will aid patients to safely manoeuver wheelchairs.

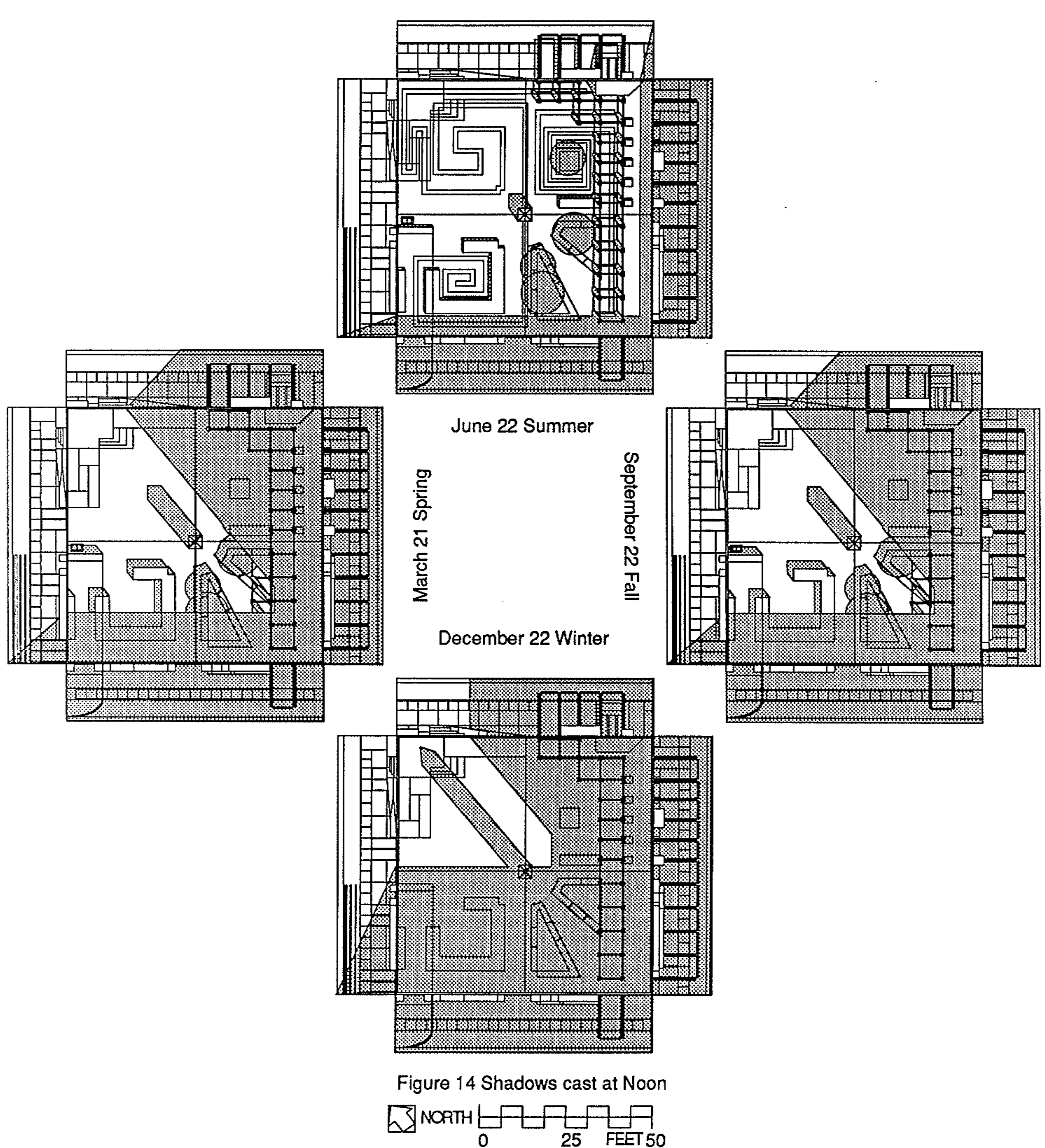

Figure 14 Shadows cast at Noon

Lighting design will play an important role in assisting the perception of space, distance, orientation and surface. As noted in section 7.1.2 and illustrated in figure 14 which shows the shadow configurations cast at noon during each season of the year, the courtyard environment experiences great periods of shadow. In order to extend the courtyard's duration of use and create a safe environment for disabled users, sensitive treatment of lighting must be included. The design will manipulate light through reflections as well as the design of lighting fixtures. Reflectors and reflective mosaic tiles placed on the courtyard walls are of great value to light quality, especially during early spring and late fall when evenings are dark. Reflectors can enhance the existing surface mounted lights which presently run along the top of the courtyard walls and cast beams directly towards the floor. Instead of an even pallor, lights will accent entrances, paths, steps and important features, transforming the daytime courtyard. A composition employing indirect lighting will reduce glare and will contribute to the character of the courtyard environment through contrasting reflections from distinct objects. Patient anxiety is reduced by minimizing adaptation to glare and excessive brightness which can cause discomfort and loss in performance of vision. Glare and unwanted contrast will be reduced by retaining fixtures above eye level and directing light beams away from reflective surfaces such as windows, more directly toward surfaces with subtle luminance such as mosaics and plants. Circulation routes and entrances should be highlighted as adaptation to darkness takes up to forty minutes for visual discrimination by an average viewer. Strings of white lights on the trees will provide a decorative accent and can be changed in colour at Christmas or other festive times of the year. Patients requiring exercise in ladder climbing, scaffold assembly, hand grasp and turning of small objects will carry out the necessary maintenance of string adjustment and bulb replacement. The variety of lighting sources will assist the movement of patients through destination and route definition. The play of light on the mosaics which form the maze will create a visual event within the courtyard. In this way, the night environment will contribute to the emotional and sensory rehabilitation of the patient.

Remotivation requires socialization, activity, and a sense of worth. Motivation is one of the main problems which face therapists, and crafts and recreational activities provide goals to be pursued within the patient's ability. The patient often needs to succeed in a task before venturing toward a more difficult form of therapy or group activity. Projects such as mosaics or gardening, which have a general appeal and a low level of difficulty, can build self-confidence and higher morale. The diversion provided by pet therapy and recreational activity gives the patient an interest outside himself and helps to cope with the boredom which accompanies life in an institution.

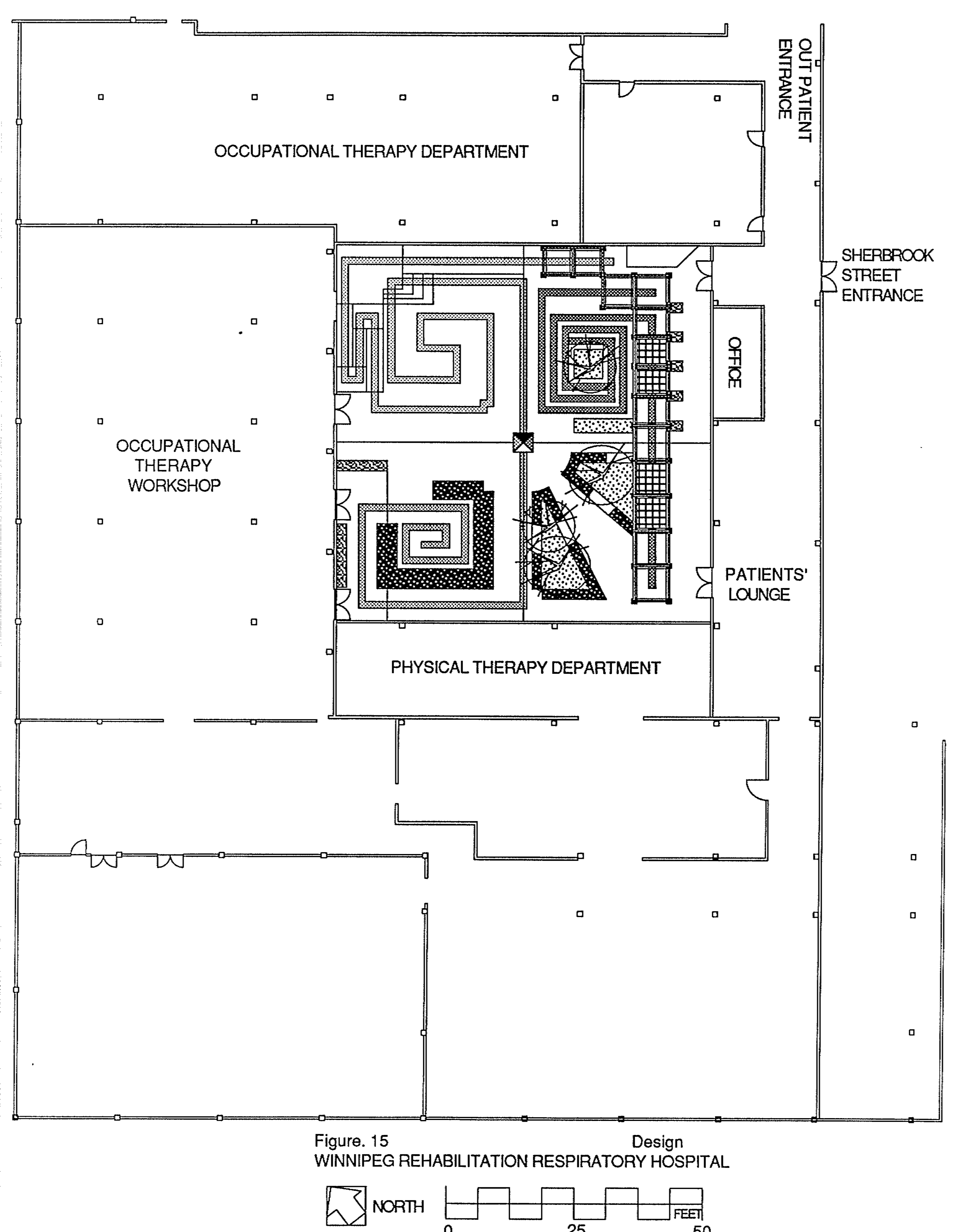

Figure. 15 Design
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

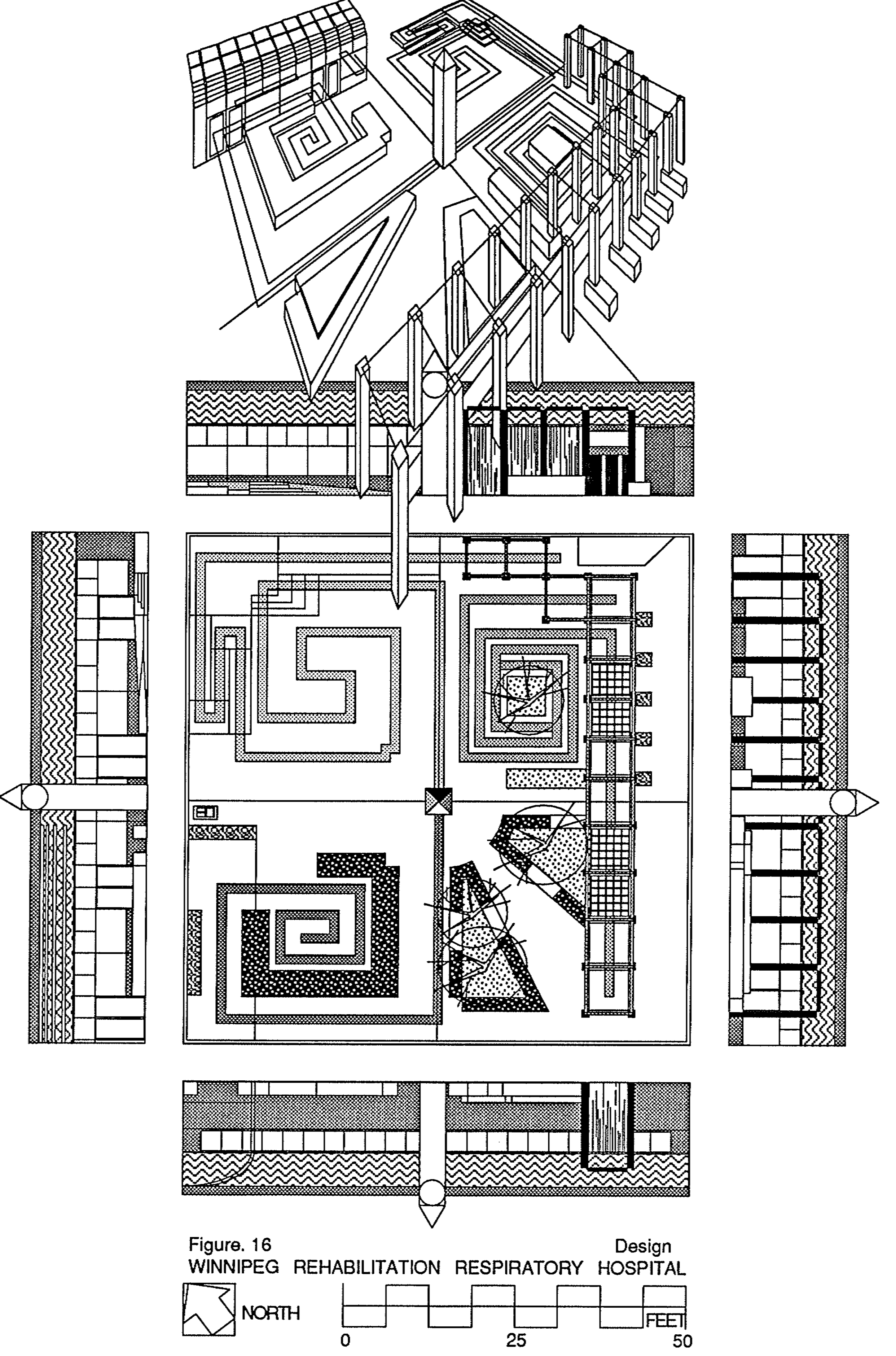

Figure. 16 Design
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

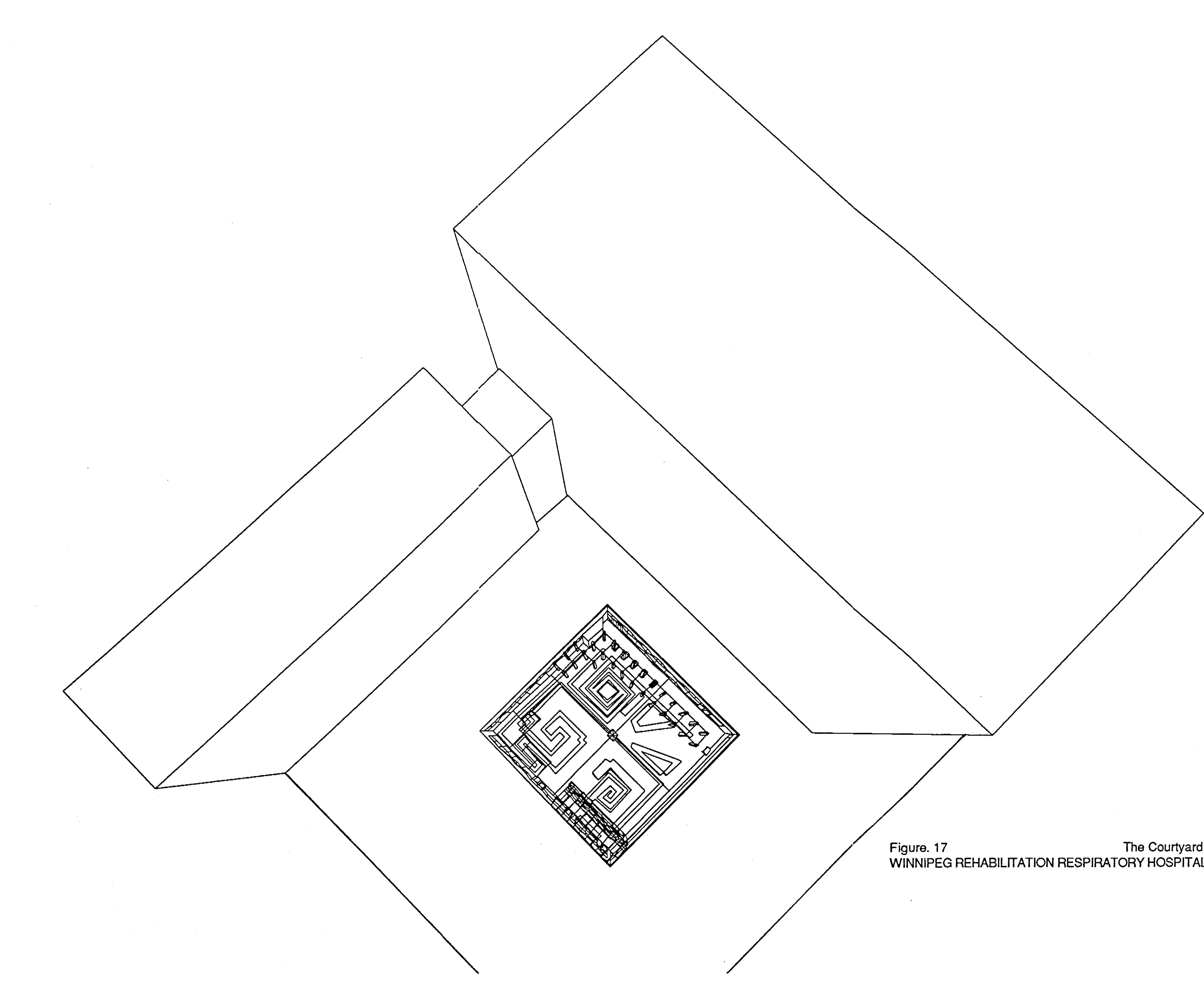

Figure. 17 The Courtyard
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

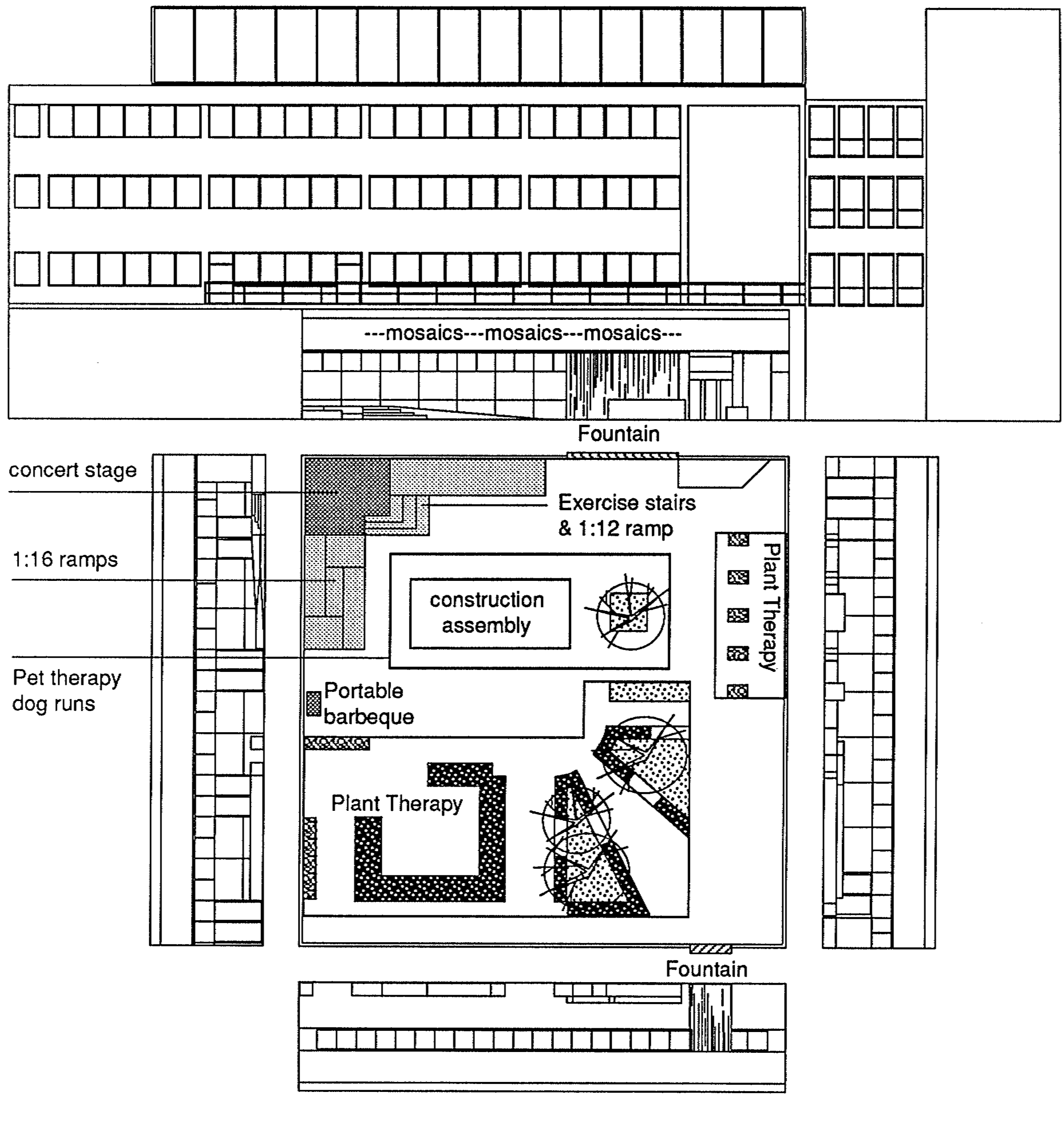

Figure. 18 Key Plan
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

The maze.

The maze will aid in the patient's reintroduction into the complexity of the urban environment through the provision of an organized complexity within the rehabilitation centre. Tracing the route can help reeducate patients to walk, or aid them to regain mobility through the use of adaptive equipment. The maze can be a tool for assessing a patient's attention span and ability to solve problems. Such a "game" creates a social environment, stimulating competition and communication through the provision of challenge and gratification.

Secondary disabilities often arise as a result of the inactivity of a disabled person. If a stroke victim is neglected, disorders such as bed sores, painful joints, and deformities will likely develop. Depression and a lack of motivation, in all likelihood, will accompany the physical deterioration. Active exercise is one method used to prevent such disuse syndromes. Exercises need only last for several minutes, but should take place several times daily. [28]

A typical example for the use of the maze is given by Minor and Minor.[29] Patients requiring walking aids typically have a decreased ability to place weight on the legs due to structural damage of the skeletal system, muscle weakness or paralysis, and poor balance in upright posture. Assistive devices increase the base of support, allowing a redistribution of weight and a larger area within which the center of gravity can shift without losing balance. When learning a new sequence of walking, a patient tends to fatigue rapidly as the energy cost of ambulation when using assistive devices can be very high. Concentration in learning the proper gait pattern will interfere with the patient's ability to respond to other inputs such as normal conversation. However, while extraneous stimuli around the patient should be avoided during initial training, such additional inputs can later be used to test the degree to which the patient has learned the new skills.

[28] G. Hirschberg, L. Lewis & P. Vaughan, Rehabilitation: a manual for the care of the disabled and elderly, Philadelphia: J.B.Lippincott, pp.27-33.

[29] Mary & Scott Minor, Patient Care Skills, Reston, Va.: Reston Publishing, 1984. p.137.

The variety of mazes permits graduated therapy. The mazes vary in their complexity of path as well as the physical demands which they require such as the use of stairs, ramps and doors. The maze provides an opportunity to teach families how to aid a patient with stairs and ramps. After a patient has regained the ability to walk, the mazes can be used to master the problems of maneouvering in public areas, or improve balance and coordination through such exercises as walking precisely between the parallel lines, emphasizing correct foot placement. The comprehension of routes improves the ability to be independent, to plan trips and to move out in the world with confidence. A typical example would comprise 8 to 10 patients and 3 therapists in a walking class actively using the maze. During the winter, snow can be mounded along the maze to emphasize the paths. The snow can be shoveled by patients as part of a therapy program or it can be manipulated simply as a recreational and a creative medium.

A patient may begin ambulation through the use of parallel bars in order to learn proper patterns of gait, but must be progressed away from them in order to avoid dependency. Once competent in independent mobility on a variety of level surfaces, the patient is instructed in many other skills such as the use of stairs, ramps, curbs, and getting in and out of chairs and bed correctly. Wheelchair activities including transfers and sitting tolerance are taught at the Rehabilitation Hospital. The patient should be able to negotiate level surfaces, inclines, and various turns with a wheelchair before returning home. Ability to manipulate a wheelchair can be improved within the courtyard in order to prepare the client for a variety of surfaces under outdoor conditions. For example, the hemiplegic patient, commonly a stroke victim with partial paralysis, should be able to use the uninvolved leg as well as their arms to move in a straight line. "In a sense the wheelchair becomes an extension of the self of the body. The user must learn to manage the wheelchair skillfully, safely, and efficiently, learn to measure space and judge speed and distance with the wheelchair, adapt to viewing the world from a different eye level, and cope with the symbolic meaning of the device to himself and society."[30]

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[30]Pedretti, Occupational Therapy: Practice Skills for Physical Dysfunction, St.Louis: C.V. Mosby, 1981. p.163.

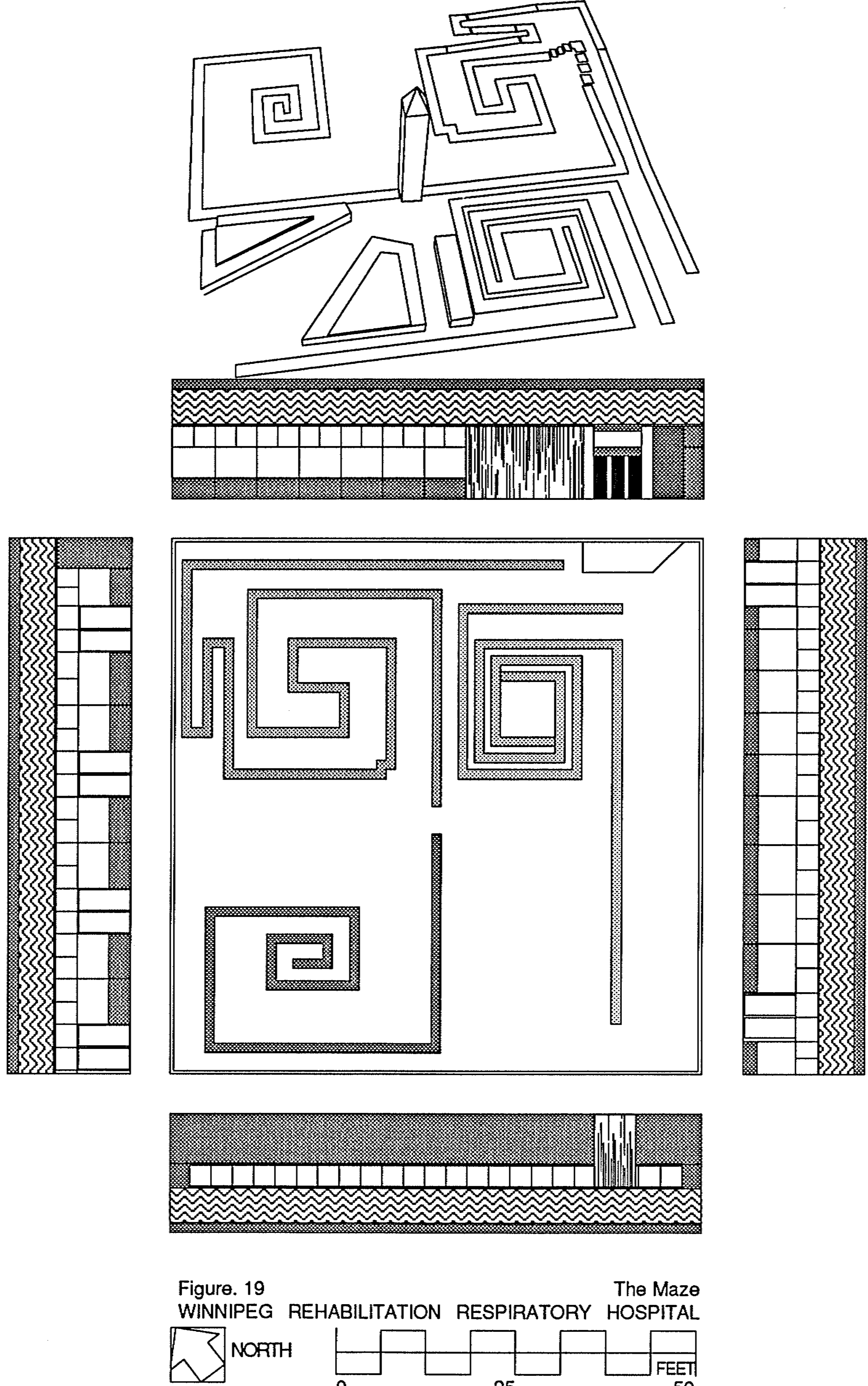

Figure. 19 The Maze
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

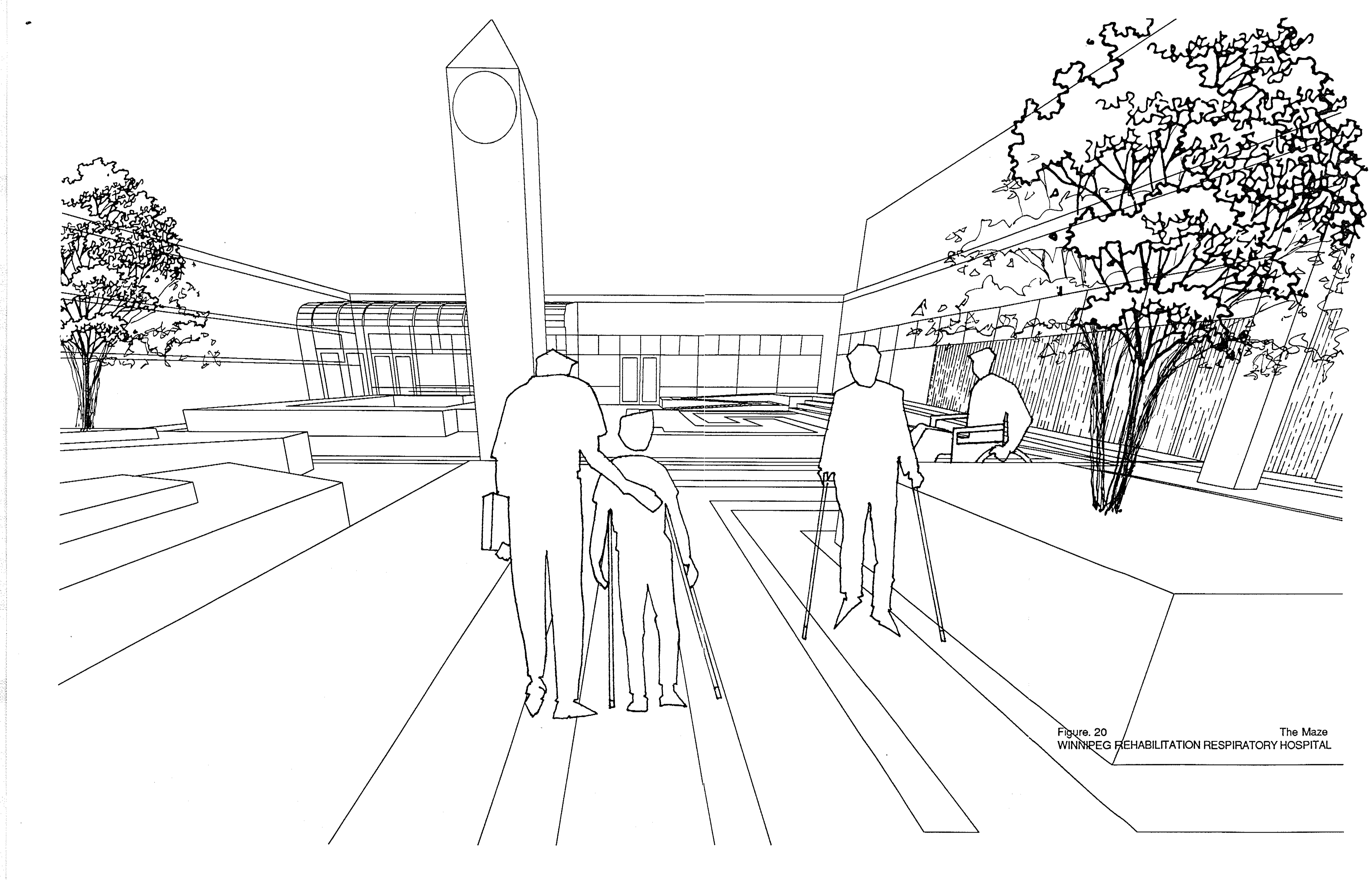

Figure. 20 The Maze
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

Plants and plant therapy.
Gardens not only have an historical link with hospitals, their adaptation would provide a good means of therapy today. Herb gardening's usefulness as a rehabilitative aid stems from the great demands which such forms of topiary require, providing goal oriented activity, purposeful achievement and physical benefits. Plant therapy encourages hospital patients not only to develop a broader interest in their surroundings, but also in the outside world. For example, arthritic patients often require novel means of relaxation, and such creative forms of therapy provide distraction from a painful condition. Plant therapy not only will aid in rehabilitation within the hospital, but can offer ideas for continuing therapy at home.

Horticulture can be used in occupational therapy, in physical therapy, in recreational therapy, and for vocational training and is especially useful for arthritics and amputees. Horticultural activities can be tailored to meet a patient's specific needs, ranging from manipulative finger exercises to adapting to artificial limbs. Gardening can be a demanding yet productive form of therapy, raising motivations and renewing confidence for the physically and mentally handicapped. Gardening allows the patient to set goals and to work in a group, and permits the patient to easily continue such therapy at home, once discharged. It is widely accepted that the psychology of using plants for therapy and rehabilitation stems from the challenge, responsibility, gratification, discovery, and social interaction which the growing of living things fulfills. Kaplan (1972) was one of the first researchers to undertake a scientific analysis of gardening. Her study produced three groupings of benefits. They are *primary gardening experience* which includes the satisfaction gained from elementary factors such as being creative, successful and productive; *sustained interest* which derives from enthusiasm for the future, aesthetic pleasures and diversion from routine; and *tangible benefits* which involve such dividends as improved skills, vocational training, being outside and producing food.[31]

Herbs are invaluable for their fragrance. They lend themselves to

[31] R. Kaplan, "Some Psychological Benefits of Gardening", *Environment and Behavior* 5(2), (1972) pp.145-162.

elaborate patterning and pruning because few bear spectacular blossoms. Many have a habit of spreading below ground and sprawling above ground, requiring the use of imposed geometric layouts and planters in order to retain structured plantings. The intensive maintenance required by an herb garden would develop hand functions such as grasp, pinch and dexterity through specialized tools adapted to each patient's disabilities and devised by the occupational therapy department workshop. Tools must be adapted for patients who have difficulty in standing, who can only free one hand at a time, who do not have a strong grip, and who are unable to bend. Such work would be mentally beneficial since plants provide something which is dependent on the patients, who often have no interest in the future because of the extent to which they have to depend on an institution for care. The work would improve the patients' coordination through exercise, as well as providing relaxation and a sense of achievement, anticipation and creativity within an institutional setting. Because plants are always changing, gardening is not a static activity. "Gardening is a link with seasonal changes, something often missing from urban or institutional living. Gardening can be graded to fit a wide range of abilities, no matter what their circumstances."[32] Patients at the Rehabilitation Hospital would be involved in the layout of plants, preparation of soil, fertilizing, planting, weeding, edging, transplanting, watering and trimming of herbs.

The design retains remnants of the existing planter with the addition of lower planters which are more accessible to patients in wheelchairs. The low planters are 2' in height in order for patients in wheelchairs to see and reach them, and the higher ones are 2'6" in height in order to be reached by ambulant patients who have difficulty bending. The low planters are 4' wide where accessible from two sides, and 2' wide if only reached from one side. Low maintenance plants are grown in the taller planters because of their inaccessibility to many handicapped patients, and high maintenance plants such as herbs are cultivated in the low planters in order to provide strong scents, a variety of textures and a demanding form of therapy within a wheelchair user's reach. An irrigation system is included because of the problems associated with

[32]Gardening as Therapy, Vancouver: Friends of the Garden Hortitherapy Committee, 1978. p.1.

organizing a changing clientele for such essential tasks as watering. Small platforms are included along the planters as tool benches and as seats. Tool benches are especially helpful to disabled patients who have difficulty bending and lifting. The seats can be between 18" and 21" in height, 12" wide, and with an overhang which permits the heels to be placed under a patient's center of gravity in order to facilitate standing up. The seats provide spots for intensive sensory appreciation of the plants and their impact on the quality of the environment.

Amur maples are small, multi-stemmed trees which can be successfully pruned to meet specific requirements and shapes. One of the first trees to leaf out in the Spring, they are known for their Fall coloration. Amur maples are regularly used as specimen trees either in above-ground containers or within patios, as they are easily transplanted, adaptable to a wide range of soils, and grow in full sun or shade.

Herbs are an evocative group of plants, connected with many tales and traditions. Some of Man's earliest written material refers to herbs by recording drugs made from plants and based on ancient practices. Nearly every herb has a story connected with it which adds to its interest. Table 9.1 lists plants which may be used in the courtyard planters and includes many herbs because of medicinal associations. Most herbs are valued for the subtleties of their foliage, which often persists until winter and even then provides an elegant texture in the snow. Herbs can create a fragrant place especially when touched or brushed against. As well as making the herb garden accessible to disabled patients, raised beds bring the subtle ornamentation of herbs closer to eye level, encouraging the touching of plants and enhancing their fragrances.

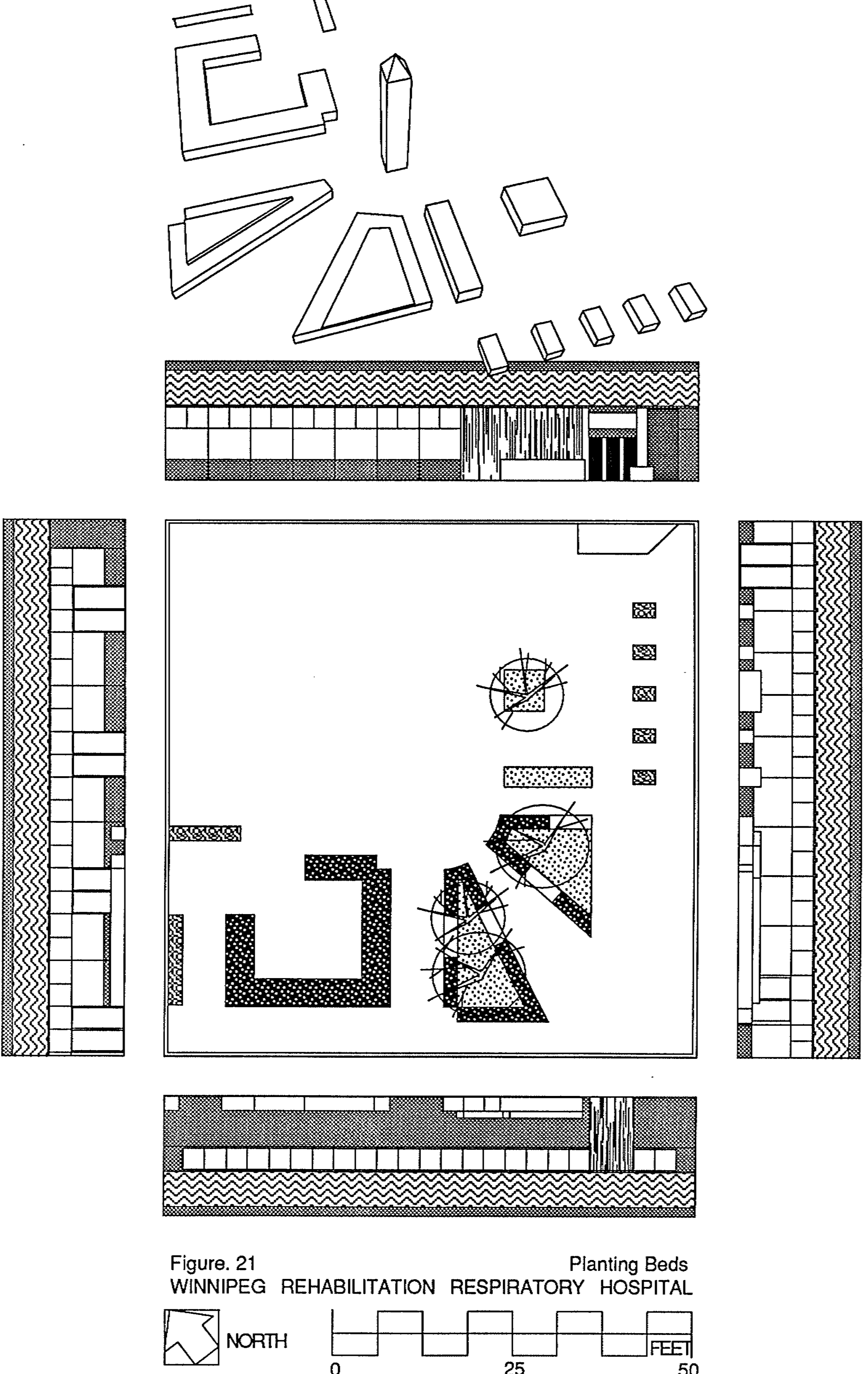

Figure. 21 Planting Beds
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

Table 9.1 Suggested Herbaceous Plants.

NAME	SCIENTIFIC NAME	NOTES
Basil	*Ocimum basilicum*	1'-2' height in full sun.
Calendula	*Calendula officinalis*	*Officinalis* means medicinal and the florets were once used for healing wounds and preventing illness.
Cinquefoil	*Potentilla fruticosa*	Used to cure toothache, dysentery, liver and lung diseases, poisoning and wounds.
Germander	*Teucrium chamaedrys*	Named after Teucher, a Trojan prince who was the first to use it medicinally.
Hollyhock	*Alcea rosea*	2'-9' staked in full sun *Alcea* originated from "altheo" to cure, due to medicinal properties.
Lily	*Lilium candidum*	Believed to remove wrinkles.
Peony	*Paeonia lactiflora*	*Paeonia* derived from the physician Paeon who according to Greek myth, was changed into a flower by Pluto in gratitude for a successful cure.
Rosemary	*Rosmarinus officinalis*	Used by Roman legions as a salve for wounds, a love potion, and an ingredient of embalming fluids.
Rue	*Ruta graveolens*	Said to cure poisoning, snakebite, chest pain, coughing, worms, stones, poor vision, headache, nosebleed and pains.
Sage	*Salvia sp.*	*Salvia* derived from "salveo", to save, in reference to medicinal value ascribed to it.
Thyme	*Thymus sp.*	3"-6" height in full sun.

sources: Crockett, James & Tanner, Ogden. Herbs
Time-Life: Alexandria, 1977.
Still, Steven. Herbaceous Ornamental Plants
Stipes: Champaign,1982.

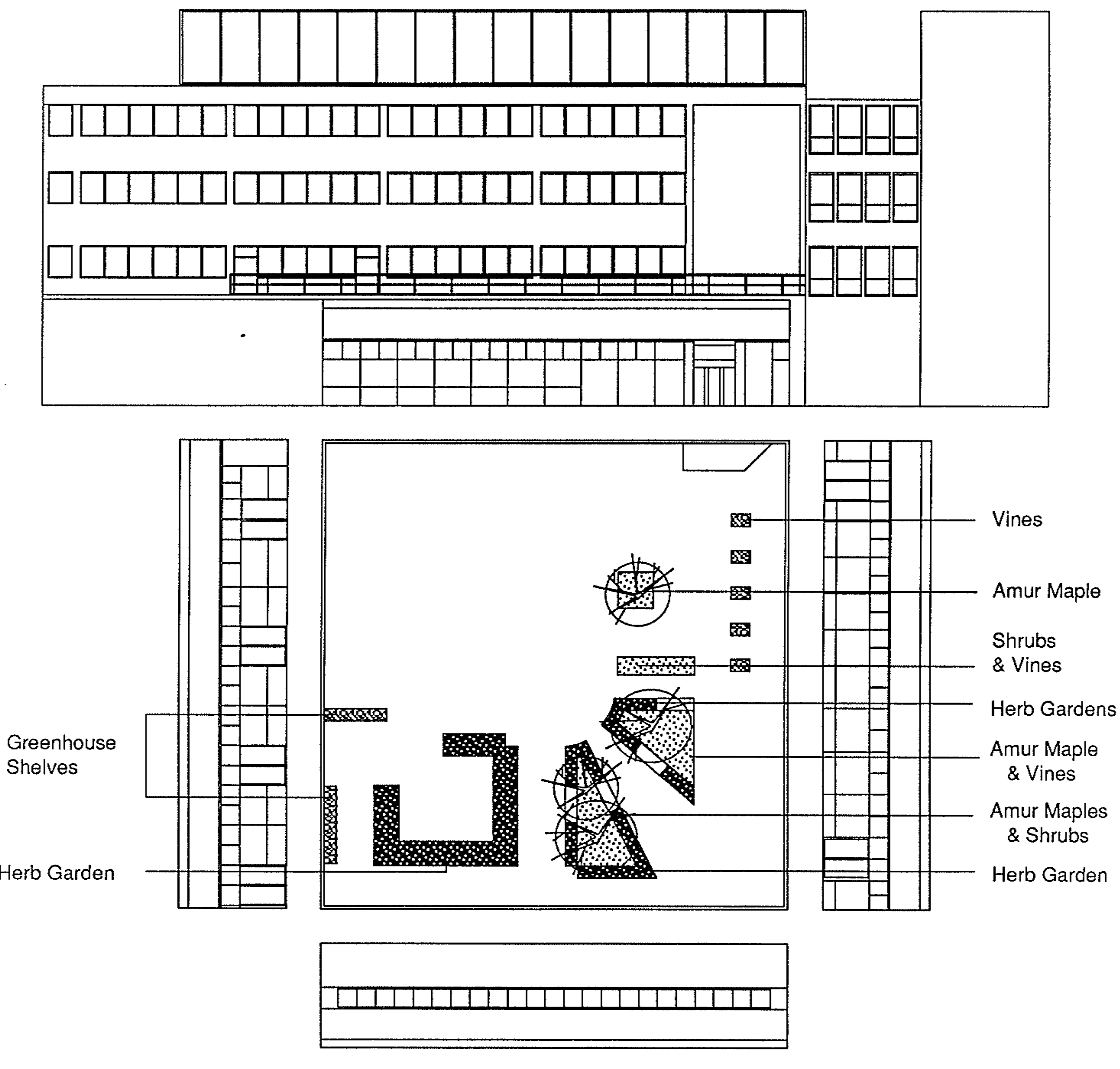

Figure. 22 Plants
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

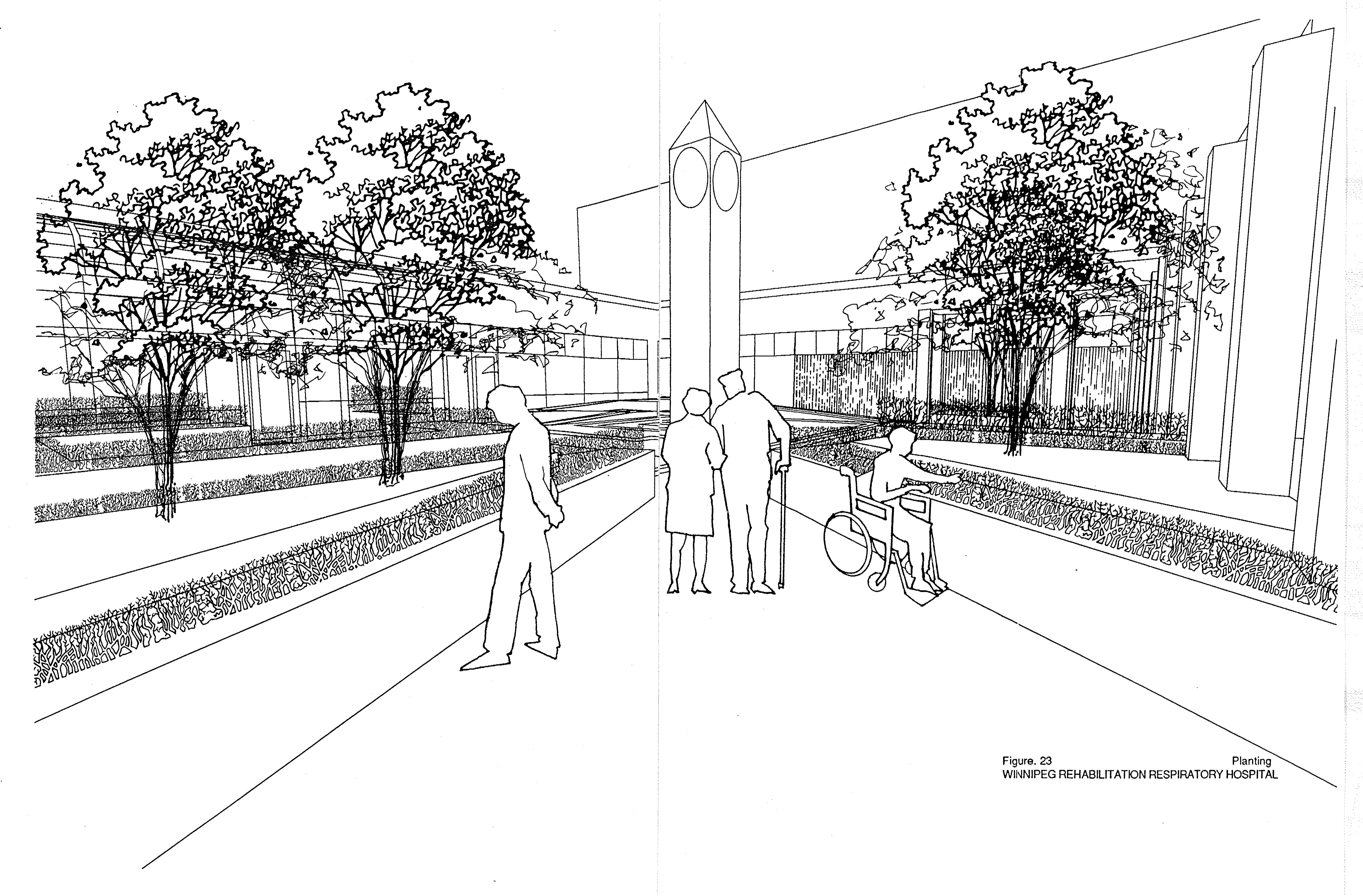

Figure. 23 Planting
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

A greenhouse.

A greenhouse provides a year-round link to the outdoors and will act as a nursery for herbs, requiring patient input for plant propagation, watering and digging. Its location receives some direct sunlight during every season of the year, yet only in the morning during the summer, away from the areas of intensive heat build-up. Although environmental controls and some grow-lights will still be required in this location, the controlled climate of a greenhouse is particularly suitable for the handicapped gardener as heating, ventilation, humidity, watering and shading controls can all be automated. Like the garden, the greenhouse will provide an opportunity for creative therapeutic activity. It must be handicapped accessible and easy to work in, requiring a 5' square manoeuvering space outside the doors. Access from the Occupational Therapy Department to the courtyard will extend through the solarium, providing continuity between interior and exterior space and a psychological link to the outdoors during the winter.

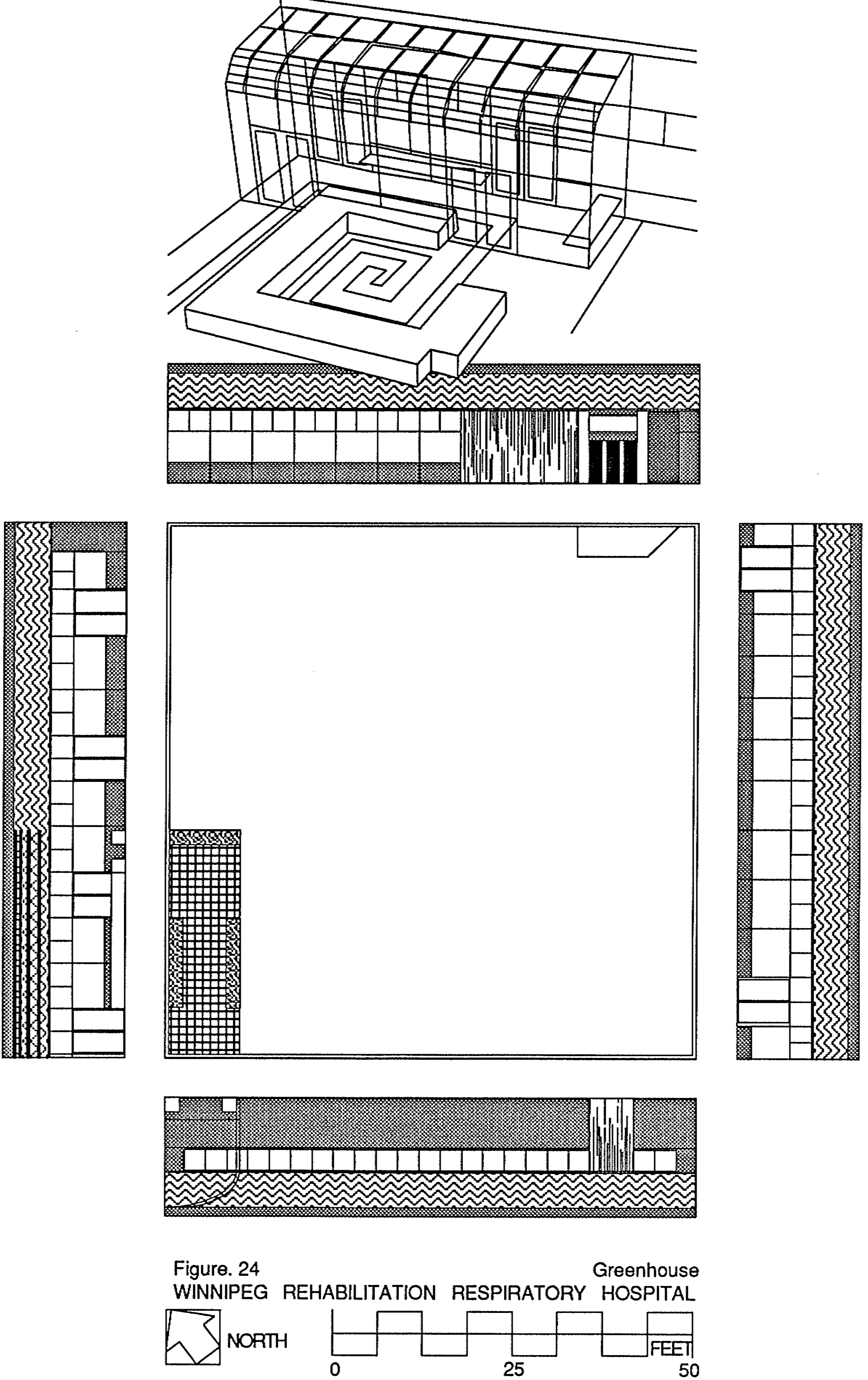

Figure. 24 Greenhouse
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

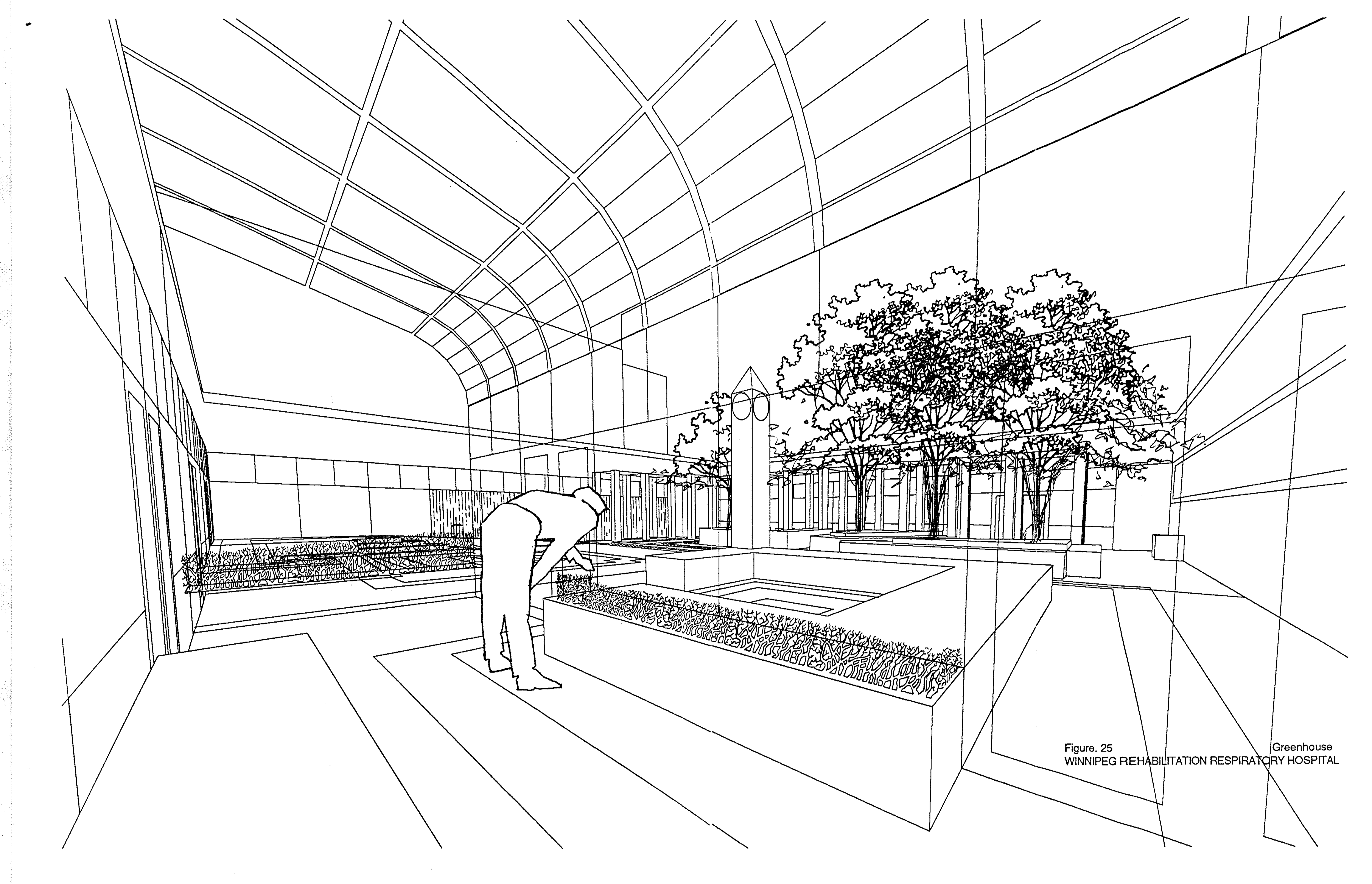

Figure. 25 Greenhouse
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

The arbor & fountains.
The geometry of the arbor is a projection of the courtyard's proportions, unifying the hospital and the open plaza. The arbor is located in the area of greatest heat build-up and provides a shaded sitting area, important to rehabilitation patients who are often susceptible to dehydration and the effects of heat. The semi-shaded area created by the arbor creates a transition between the hospital environment and the bright open spaces within the courtyard. This transition is most apparent upon entering the courtyard from the two southeast entrances, or when the courtyard is viewed from the patients' lounge.

The arbor helps to break the courtyard into smaller, more intimate spaces for visiting, quiet sitting or observing other patients. Passive activity is important to rehabilitation patients, and includes sitting in areas that are comfortable, easily reached, away from areas of conflicting activity, yet promotes the observation of active areas. A degree of privacy is especially necessary for family interactions such as birthday parties for long-term patients. Ivy increases the cooling provided by the structure and furnishes a pleasant and shady area for sitting beneath. Until vines have matured, the frame can be covered with *shade cloth* panels, available in a number of different weaves that provide 20 to 90 percent shade, can be removed during cooler seasons when more light is favorable, and which will help to reduce the velocity of wind eddies within the courtyard.

A fountain is provided within the arbor along the northeast wall of the courtyard and on the wall opposite the southern terminus of the arbor. Water is essential for the attraction of birds, as well as providing humidity, sounds and reflections of light. Water affects the sensuous qualities of sound, smell, touch and sight through improved air quality, cooler air temperatures and stimulation for both the ears and eyes. The constant splashing of the fountain provides *white noise* which masks distracting or unpleasant sounds for people seated close to the water. A fountain suggests coolness and life. Through their continual luminous play, the "walls" of water interact with the courtyard lighting and the sun, and come alive through the changing of the seasons and their own moving reflections which cast light across the courtyard floor.

The arbor acts as a channel which defines the form of the falling water. Because the fountains are recessed into the walls, water will be less prone to splashing onto the courtyard floor. The lip of the falls are undercut so that the entire volume of water will visibly flow through the air, striking a trough in the ground. Water, light and motion combine to create a visual focus. Lighting enhances the three-dimensional quality of the water as well as highlighting its movement. Animated lighting placed behind the water will add to the sense of expectancy and convey a sense of depth. A sculptural surface and animated lighting will continue to provide a focus of attention when the water is turned off during the winter.

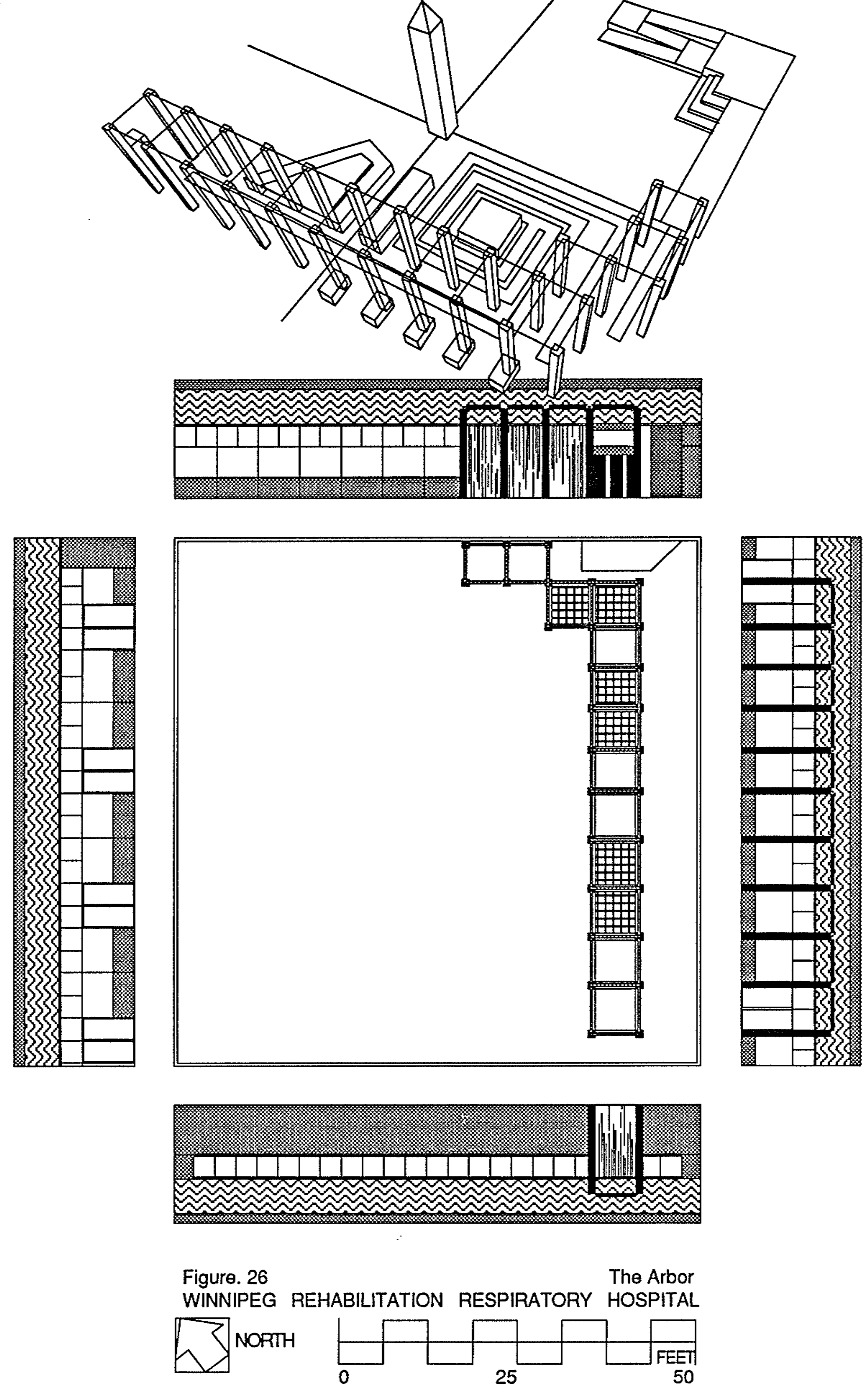

Figure. 26 The Arbor
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

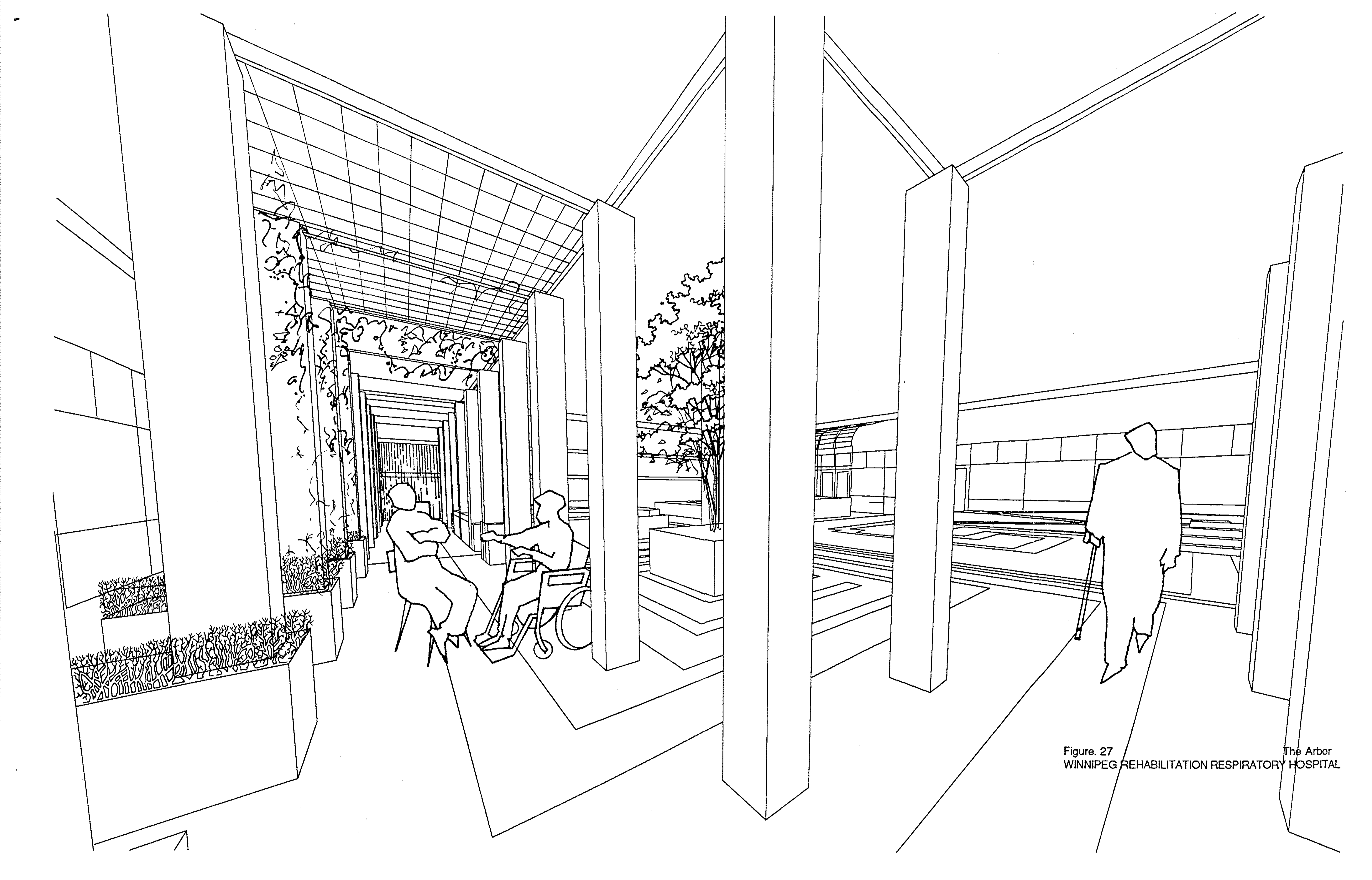

Figure. 27 The Arbor
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

Stage & constructions area.
A stage and open area for moveable seating are provided for events such as concerts, films and lectures. The stage also functions as an exercise staircase, used by physiotherapy patients to adapt to climbing a variety of stairs and walking on a variety of surfaces. Included are four 12"x6" steps, four 24"x6" steps, and ramps with the standard gradient of 1:12 and a more easily negotiated gradient of 1:16 with intermittent landings. The open area and moveable furniture in front of the stage permit rehabilitation activities such as table and mat exercises to take place. A geodesic dome construction comprised of 8' segments, and a standard 4' wide by 8' long scaffold can be assembled in this area as part of the Workers' Compensation Board rehabilitation program. One or two patients can construct the dome or the 16' high scaffold alone or under the supervision of a therapist. The Workers' Compensation Board programs are designed mainly for out-patients returning to the workforce and also include such activities as the use of wheelbarrows on ramps. Group activities which require relatively large spaces such as barbecues, Bingo games, reading groups and badminton games will also take place in the area next to the stage. Because of the variety of mobility aids used by patients, long tables and folding chairs are commonly brought in during barbecues by the Housekeeping Department and arranged in rows to accomodate up to fifty people.

Therapeutic exercise may vary from selected movements for specific muscles to general physical conditioning of the body. An individual exercise program is developed according to the medical evaluation of each patient's disability. Many types of exercise can be applied and used in conjunction with purposeful activity. Therapists conduct formal exercise programs as well as teaching patients to individually apply newly gained strength, range of movement and coordination. The client may passively have joints manipulated by the therapist, may exercise with the assistance of the therapist, have resistance applied by the therapist, the client, an assistive apparatus, a wall or a table, or may exercise actively and independently. Strengthening exercises on mats and in an upright position often precede ambulation for many patients. Group exercise stimulates a patient's efforts in active exercise while performance is guided by the therapist. Small groups of 5 to 15 patients

with common disabilities learn to work together, gain independence from the therapist, gain confidence in the treatment and his abilities, and are able to participate in games and activities with an element of competition.

An example of basic functional movements which are used in mobilization and re-education is offered by Colson and Collison. [33]

> To ascend stairs, the patient stands on the floor facing the stairs with one hand holding the banister rail; the toes are close to the riser of the first step. To ascend the stairs the sound leg is raised and the sole of the foot placed well forwards on the first tread by flexion of hip and knee. (During this movement weight is taken on the affected leg, and the hand on the banister provides additional support.) The body is then inclined slightly forwards, the weight being taken principally by the flexed sound limb, while the hand on the banister continues to provide support. The sound limb is then straightened fully and the trunk raised to the erect position. At the same time the weak leg is lifted and the foot placed on the first tread alongside the other foot. The same basic pattern is followed when walking aids are used.
>
> To descend, the patient stands at the head of the stairs with the toes close to the edge; he holds the banister rail with one hand. To descend the stairs the weight of the body is taken on the sound leg, and the weak leg is carried forwards so that the back of the heel is close to the top of the first riser. The hand on the banister provides support during this movement. The body is then lowered downwards, by controlled flexion of the hip and knee of the sound leg, and the foot of the weak leg is placed on the first stair tread. The weak leg is now straight and fully extended at the knee. During this stage it is advisable for the patient to incline the body backwards a few degrees to counteract any tendency to tip forwards. Full body weight is then transferred to the weak leg, with the hand on the banister

[33] J. Colson & F. Collison, Progressive Exercise Therapy. Bristol: Wright PSG, 1983. pp.57-58.

offering support, and the trunk is held erect. Next, the flexed sound leg is carried forwards, extended, and the foot placed alongside the other foot on the stair tread. The same leg-placing technique is used to negotiate the rest of the stairs.

Stair-climbing has greater exercise value than walking on level grade because coordination and control of gait are automatic and the disabled limbs are actively involved. The rise of steps gives a patient the sensation of being closer to the ground, reducing apprehension, especially with an adjustable bannister.[34] Individual attention should be given to patients when the surfaces of ramps and stairs are wet or snowy. Such conditions will benefit patients who have mastered simple mobility and require more advanced or challenging rehabilitation than can be offered in the hospital itself.

[34] Hirschberg, pp.231-232.

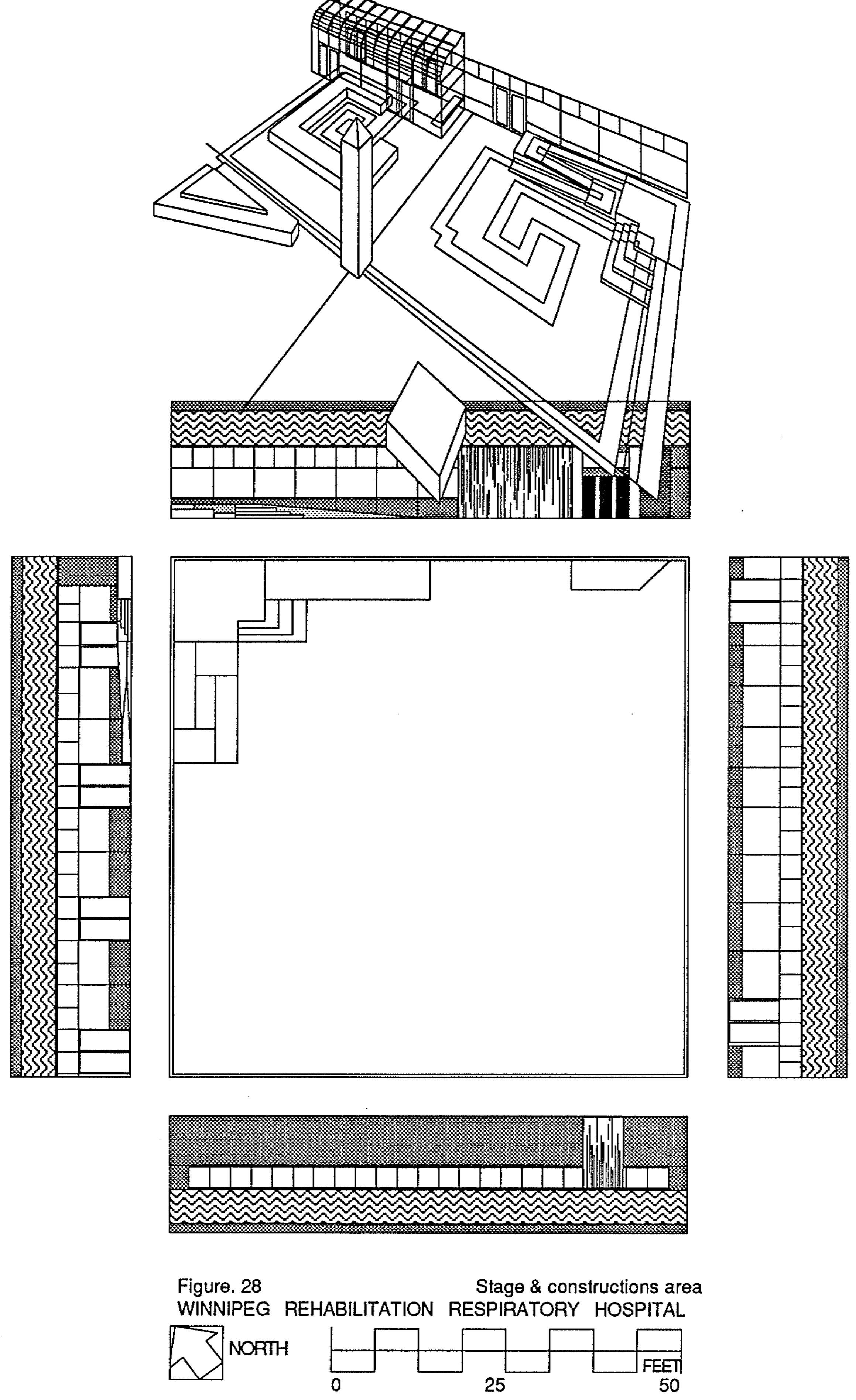

Figure. 28 Stage & constructions area
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

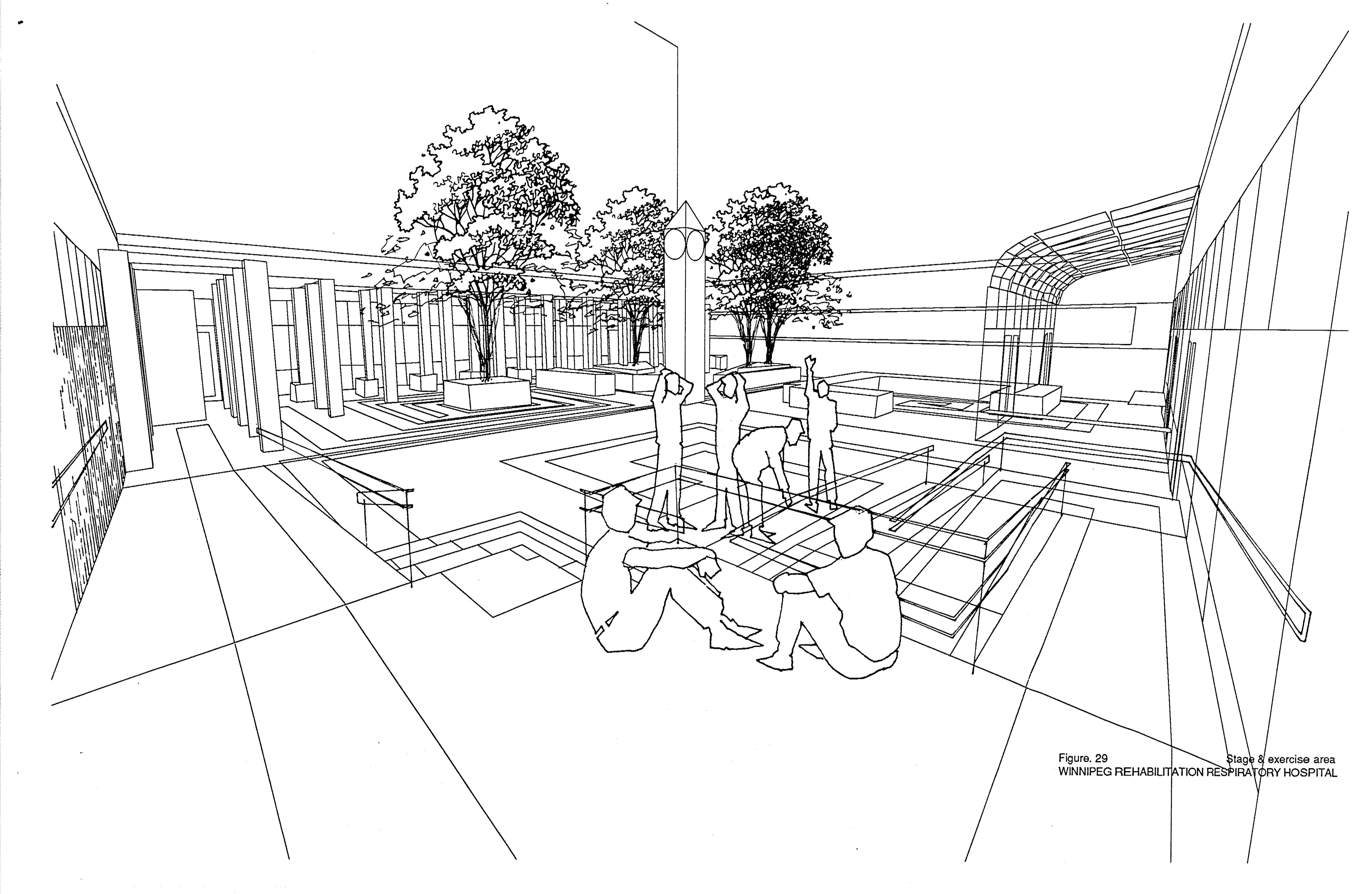

Figure. 29 Stage & exercise area
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

Pet Therapy area.
Pets provide companionship, a source of exercise, and often relieve depression in patients by offering a distraction from one's condition. Canine Associations regularly hold demonstrations for patients of the Rehabilitation Respiratory Hospital. The demonstrations require enough space for viewing, and a long, unobstructed strip or circuit for walking animals. Pets are also used therapeutically in Rehabilitation Hospitals to arouse patients who relate well to animals to be become more active.

A dog run approximately 150' in length is provided by the open area to the north of the courtyard and can be roped off without interfering with circulation or activities simultaneously taking place elsewhere in the courtyard. A sizeable area is required not only for walking and play, but for easy observation by therapists and other patients around the perimeter during pet therapy sessions. Design needs include room for the storage of kennels during demonstrations, and enough space to feed, water and relieve animals. Hose bibs incorporated in the planters enable the floor to be hosed down immediately and easily. Trench drains with concrete grates are located around the perimeter of the courtyard in order to facilitate the prompt removal of bird and dog droppings. Grating must be fine enough to not pose a hazard by catching canes and other walking aids in their openings.

Birds are integral to the design's emphasis on the unique qualities of an exterior space within an institutional setting. Birds are attracted by diversity in their habitat such as the vertical stratification of plants and the provision of a variety of sun and shade conditions. Birdhouses and feeders provide wind and rain protection and are located along the southern end of the courtyard in warm air pockets in close proximity to a variety of plants.

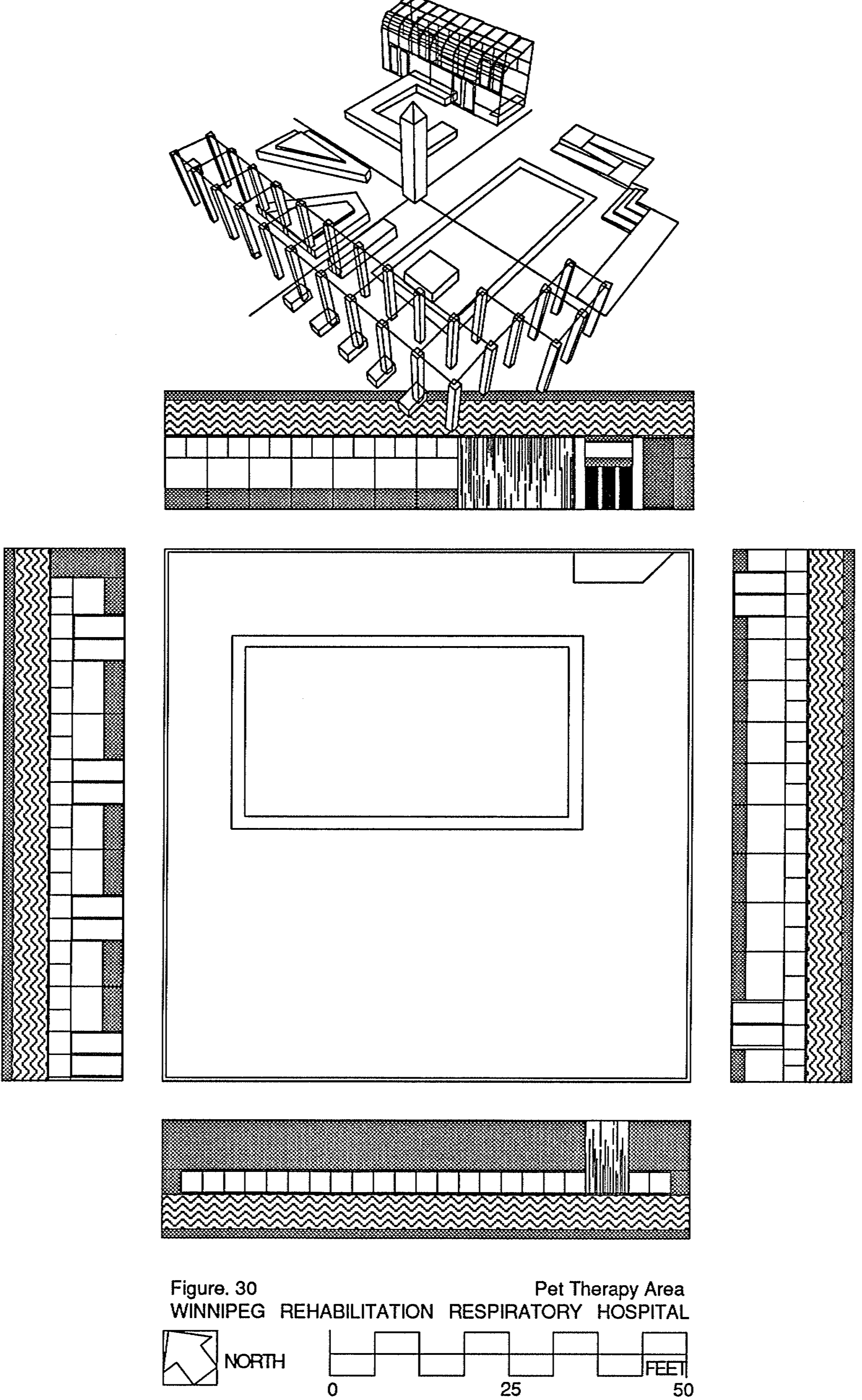

Figure. 30 Pet Therapy Area
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

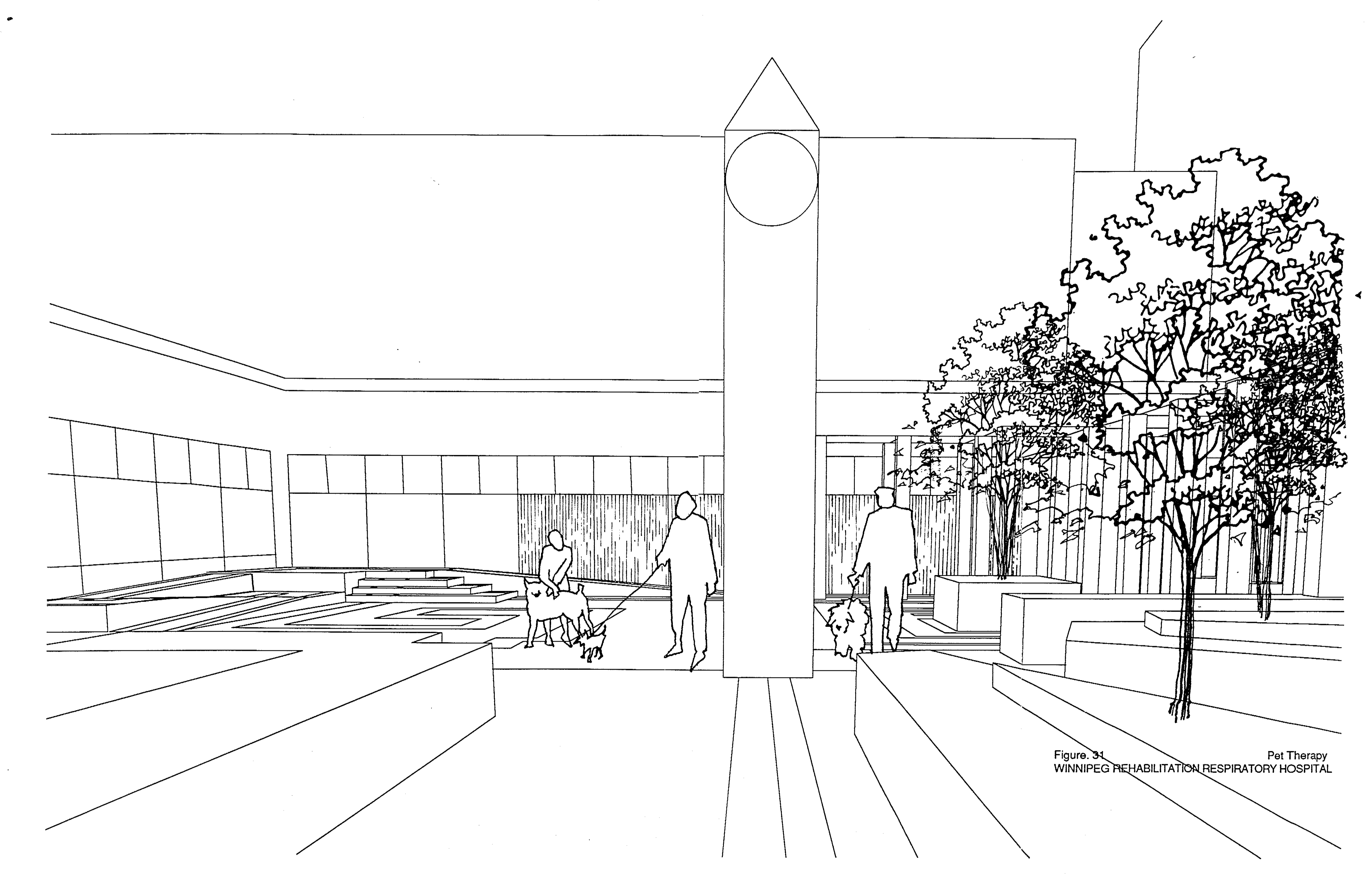

Figure. 31 Pet Therapy
WINNIPEG REHABILITATION RESPIRATORY HOSPITAL

10. Conclusions.

The design of a courtyard within an institution, such as that at the Winnipeg Rehabilitation Respiratory Hospital, must consider not only the disabilities of patients, but those parts of their lives which are not disabled. According to Maxine Wolfe, "In the balance between normalization and special treatment, our institutions give more of a message of special treatment...and certainly can be seen to create some disabilities -that is, institutionalized behavior."[35]

Wolfe's research indicates that many of the negative connotations of "institutionalization" are based not only on the size of a facility, but intricacies in the arrangement of space and its relationship to the goals and experiences of the patients. Although a large facility such as the Winnipeg Rehabilitation Respiratory Hospital is able to protect patients from risks through greater supervision by specialist personnel, and provide more intensive facilities than a less institutional, community-based hostel or independent home, its design appears contrary to rehabilitation concepts which seek to accommodate the needs of the handicapped without conspicuous adjustments to design. The Winnipeg Rehabilitation Respiratory Hospital courtyard provides the opportunity to humanize such an institution functionally, socially and architecturally.

Institutional scale is a factor in normalization because it generally depersonalizes. The redesign of the courtyard will provide a variety of spaces for numerous activities and types of interaction. The design's success is dependent on staff/patient involvement in carrying out a diversity of programmed activities involving both group interaction and passive behaviors. Because environmental messages are not the same for all persons, the courtyard design's emphasis on participation will permit change, the freedom of choice, and the formation of a relationship between the patients and the physical environment, increasing the use of the courtyard as part of a therapeutic program. Through the provision of

[35]Maxine Wolfe, "Environmental Stimulation & Design", In Barrier-Free Environments, ed. Michael J. Bednar, Stroudsburg, Penn: Dowden, Hutchinson & Ross, 1977. p.171.

flexibility without ambiguity, the program strives to alleviate the loss of control prevalent in an institution, and encourages motivation through activity focuses.

The courtyard design is based on various sensuous criteria as well as a conceptual, historical foundation evoking past hospital garden forms. Comfort is paramount for clients who are so intensely affected by their environment as rehabilitation patients. Motivation of patients to take an active role in therapy is an equally important criteria. Patient motivation will be encouraged through the balance of a simple framework within the courtyard and a diversity of more intimate spaces, activities and sensations. Legible structure provides a source of security for the patient, while the environment facilitates intellectual, emotional and physical development through variably demanding activities.

Recreational activities may be used for exercising, establishing or maintaining one's physical and psychosocial functions. According to Pedretti,[36] activities can help an individual to adjust to a physical dysfunction, but the rehabilitation hospital should also aid in restructuring the client's life-style to achieve maximum independence through therapeutic relationships, structuring a therapeutic environment, and group interaction. Social, recreational, special interest, and activity groups facilitate participation in rehabilitation tasks. In the context of occupational therapy, purposeful activity must have a goal beyond the motor function required to perform the task. Thus, a patient concentrates on the ultimate objective of the task rather than on the movement itself. Experiments have shown that muscles controlled by focused attention fatigue more rapidly than those used to accomplish activities which require concentration and have more subtle therapeutic objectives.

Evaluation of patients is carried out through observation in real or simulated environments to determine abilities such as independence, speed, skill and vocational potential. Among evaluation methods are manual muscle tests, joint range of motion measurements, hand function

[36] Pedretti. pp.5-10.

evaluations, coordination tests, and motor and sensory evaluations. Activities such as gardening and crafts can be used to assess such factors as the use of tools, manual dexterity, work quality, computation, perceptual skills and work speed. During the performance evaluation, the therapist takes note of the methods that the patient uses to accomplish the task and determines causes of performance problems. Performance is then modified and corrected until the patient is able to act independently.

In terms of rehabilitation, the courtyard will help keep patients interested, motivated and cooperative through the availability of specifically outdoor activities, through the reintroduction of the patient to the environment outside the wards of the institution, and through progressively greater demands on the patient's newly learned abilities. The courtyard will help bridge the gap between the institutional setting and the environment outside the hospital by enabling the patient to adapt to many demands including distractions, new surfaces, seasonal changes, and variations in light and temperature.

The courtyard design addresses the physical, functional and social integration between patients and the rest of society. The concept of emphasizing environmental stimulation in order to achieve the mainstreaming of disabled patients, must take into account the goals and expectations of the clients. Besides providing a support structure for therapy, the courtyard will be rehabilitative in itself through its provision of activity, stimulation and opportunity. In this practicum, the courtyard is approached as a transition between the hospital and the outside world. Such a threshold is significant to a rehabilitation centre, and to a philosophy of rehabilitation based on successful adaptation to environmental challenge.

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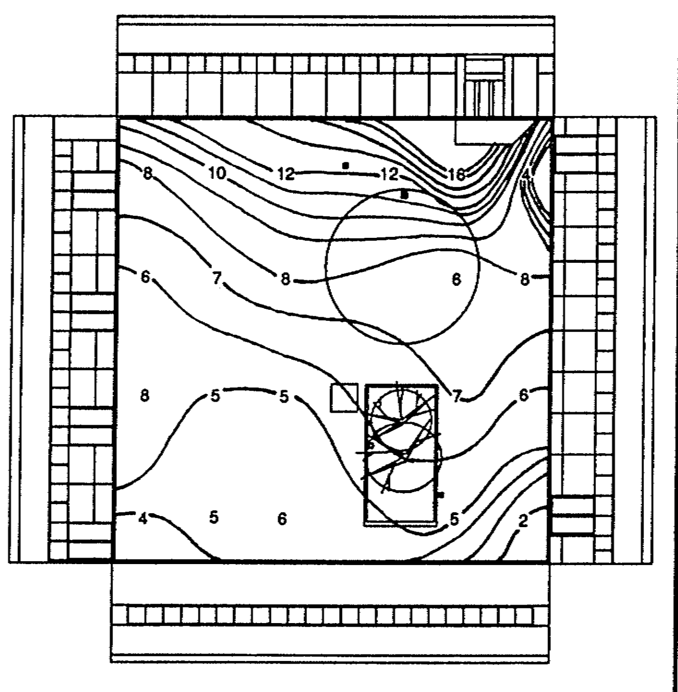
12. Appendix A. Wind analysis.

RESPIRATORY HOSPITAL

REHABILITATION HOSPITAL



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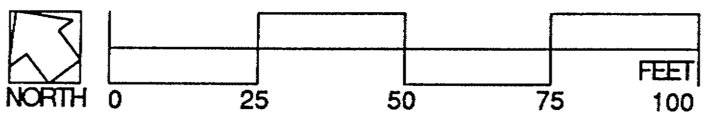
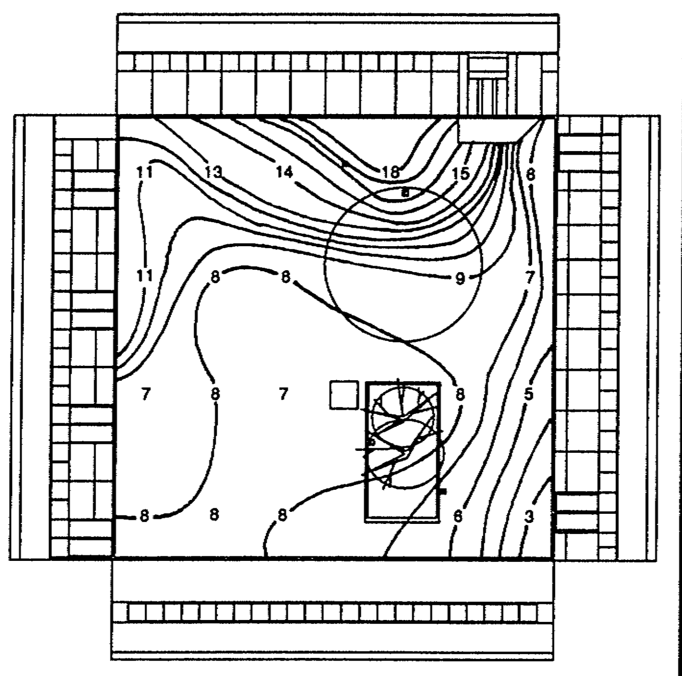


REHABILITATION HOSPITAL



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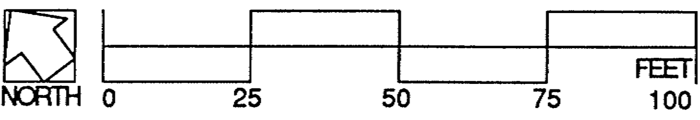
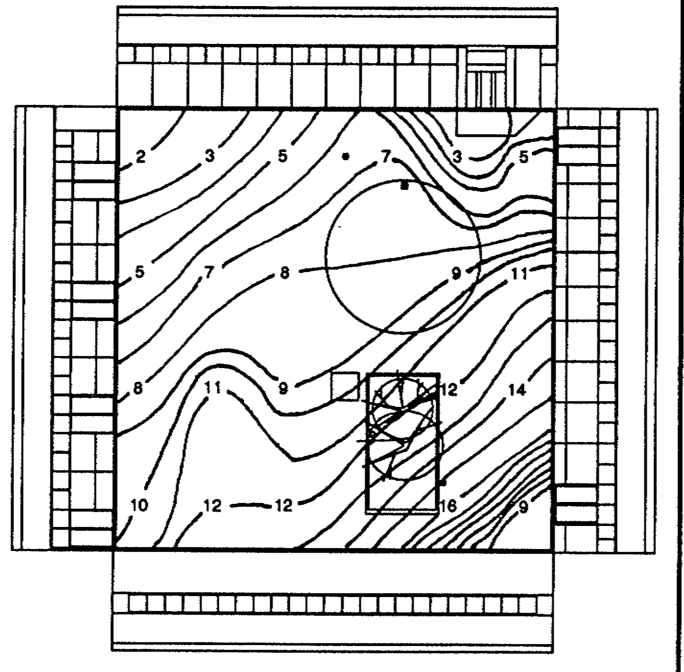


RESPIRATORY HOSPITAL

REHABILITATION
HOSPITAL



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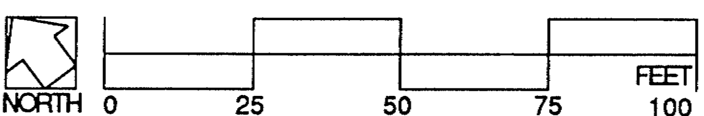
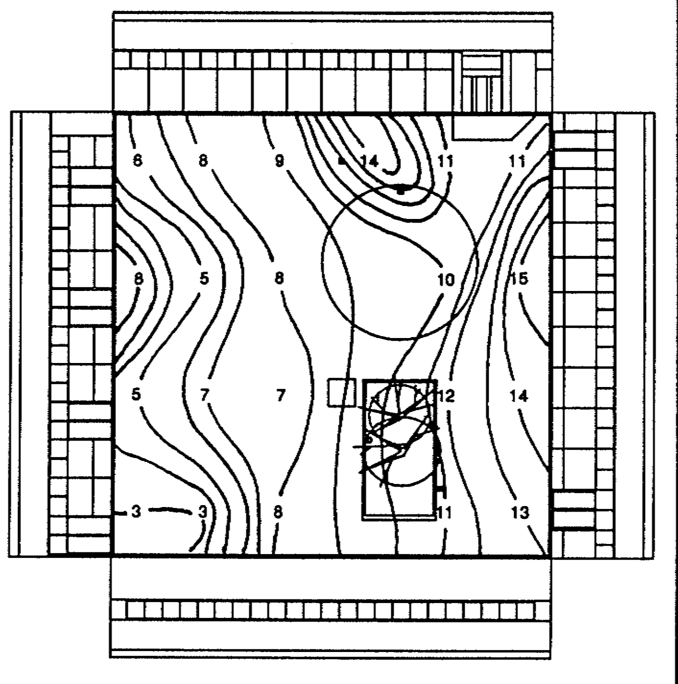
Wind NW 28G35

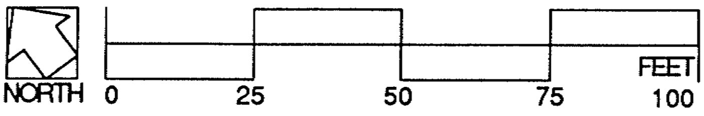


RESPIRATORY HOSPITAL

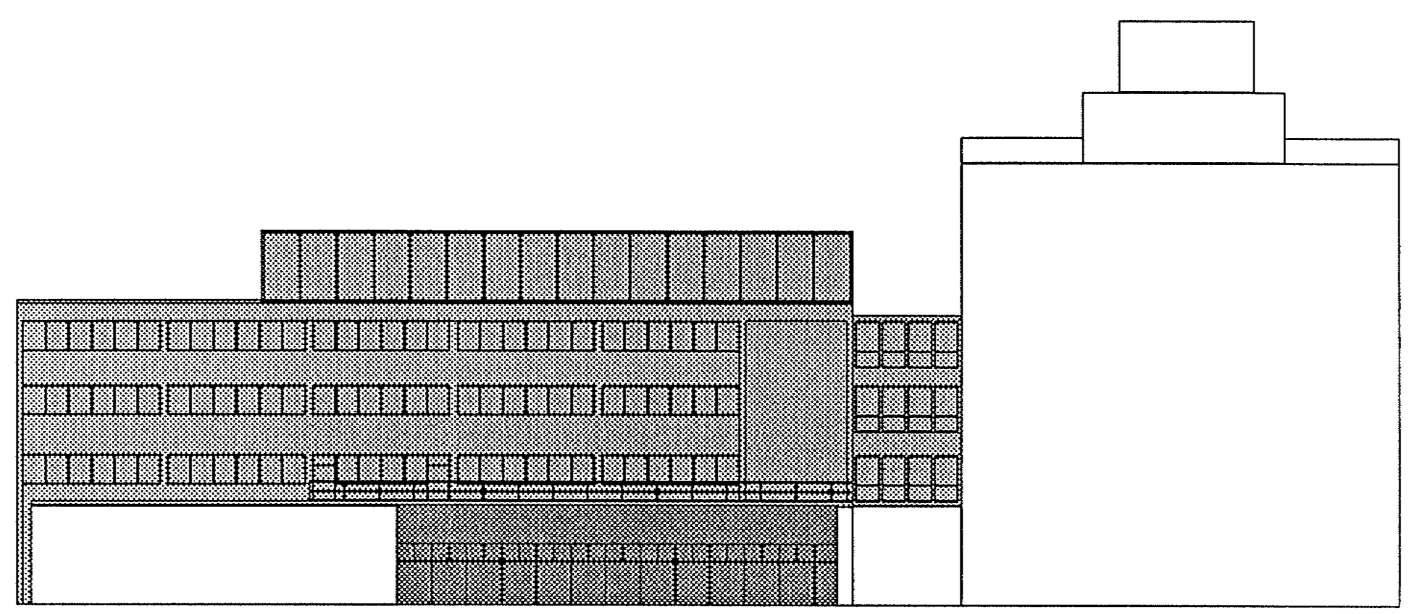


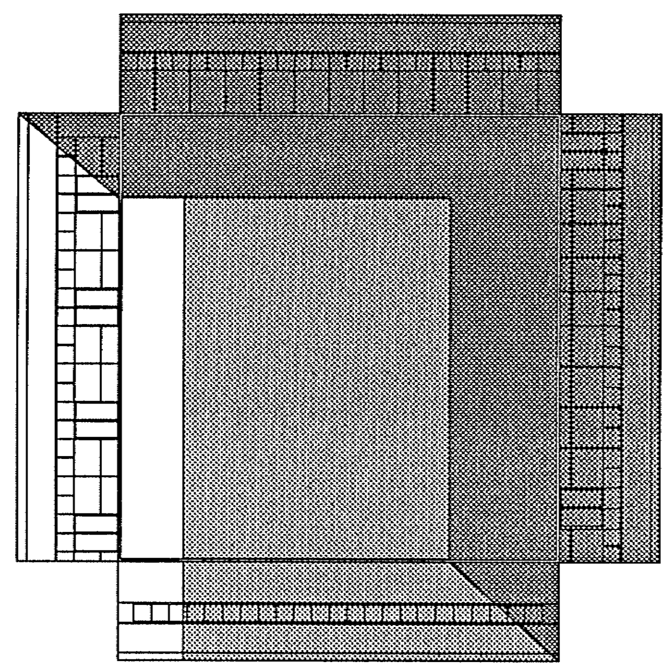
REHABILITATION
HOSPITAL

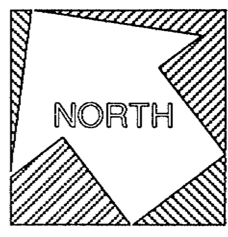
WIND ANALYSIS JUNE 13
WIND W 32G40



Appendix B. Shadow studies.







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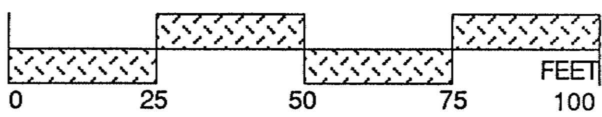

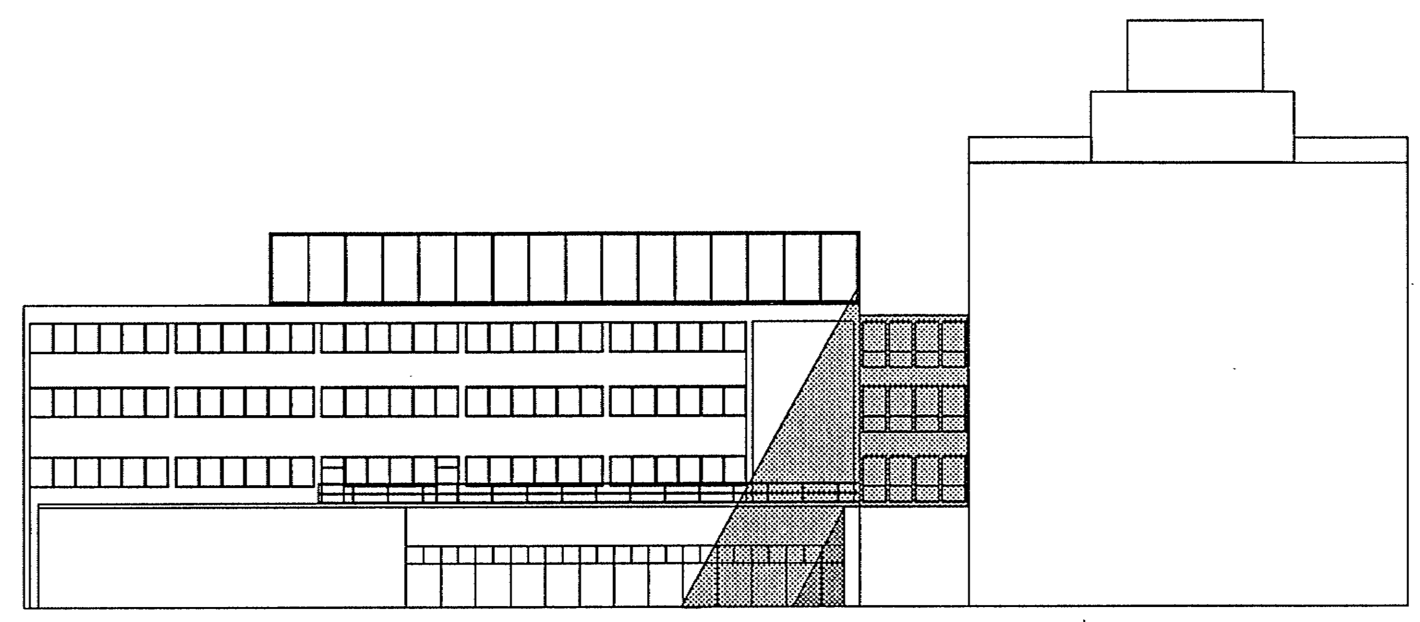

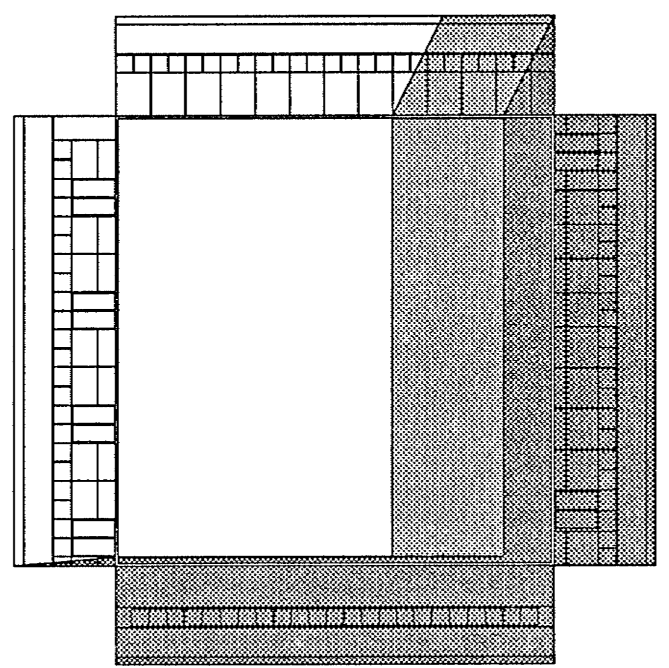

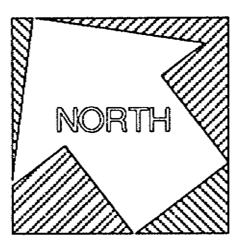

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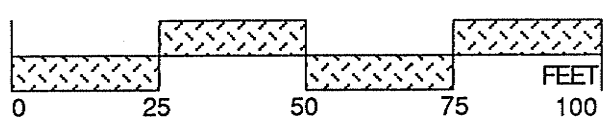

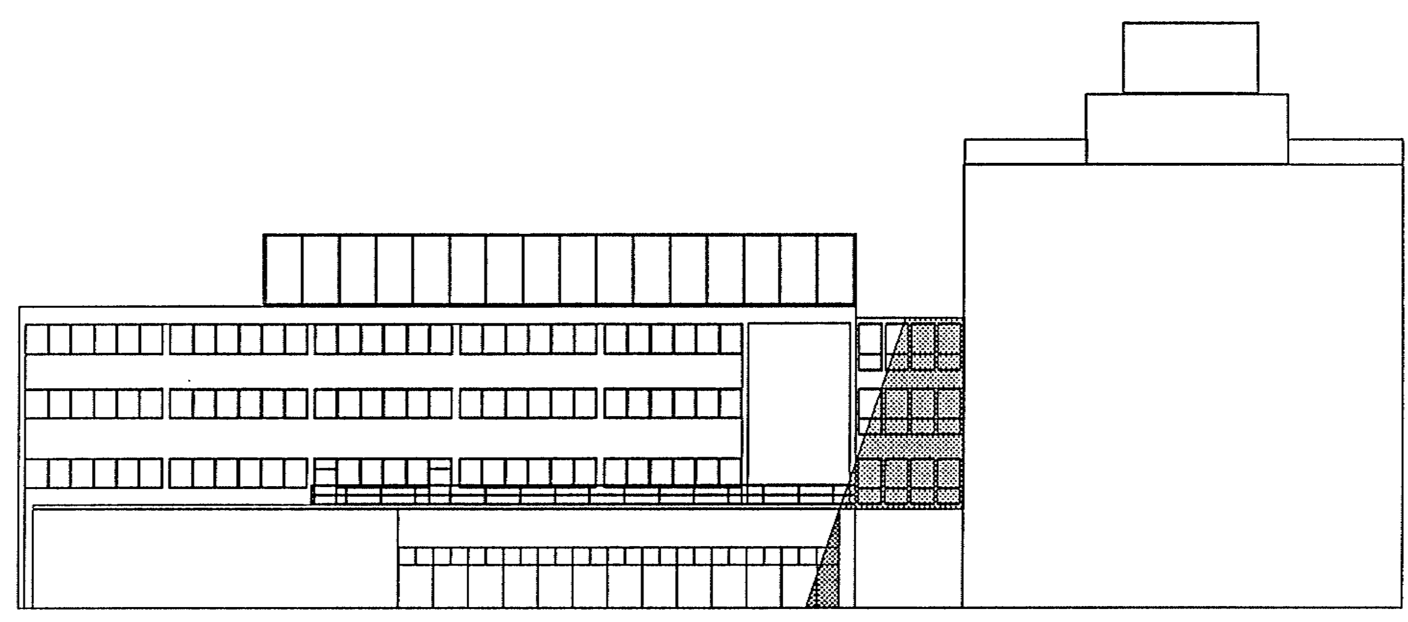

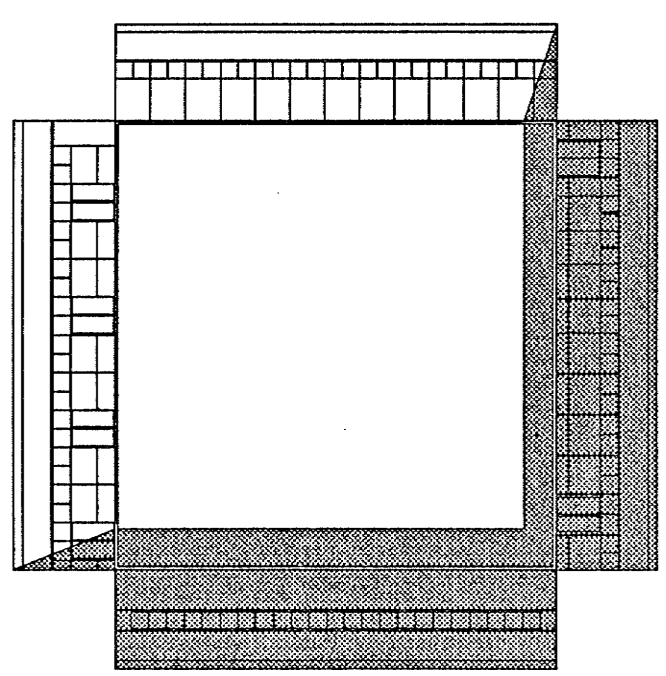

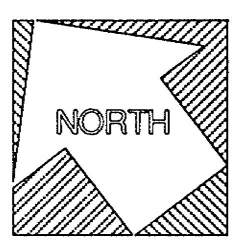

JUNE 22 noon
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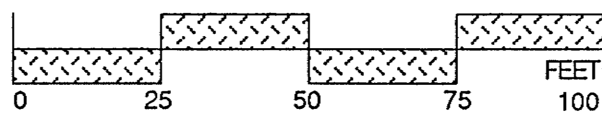

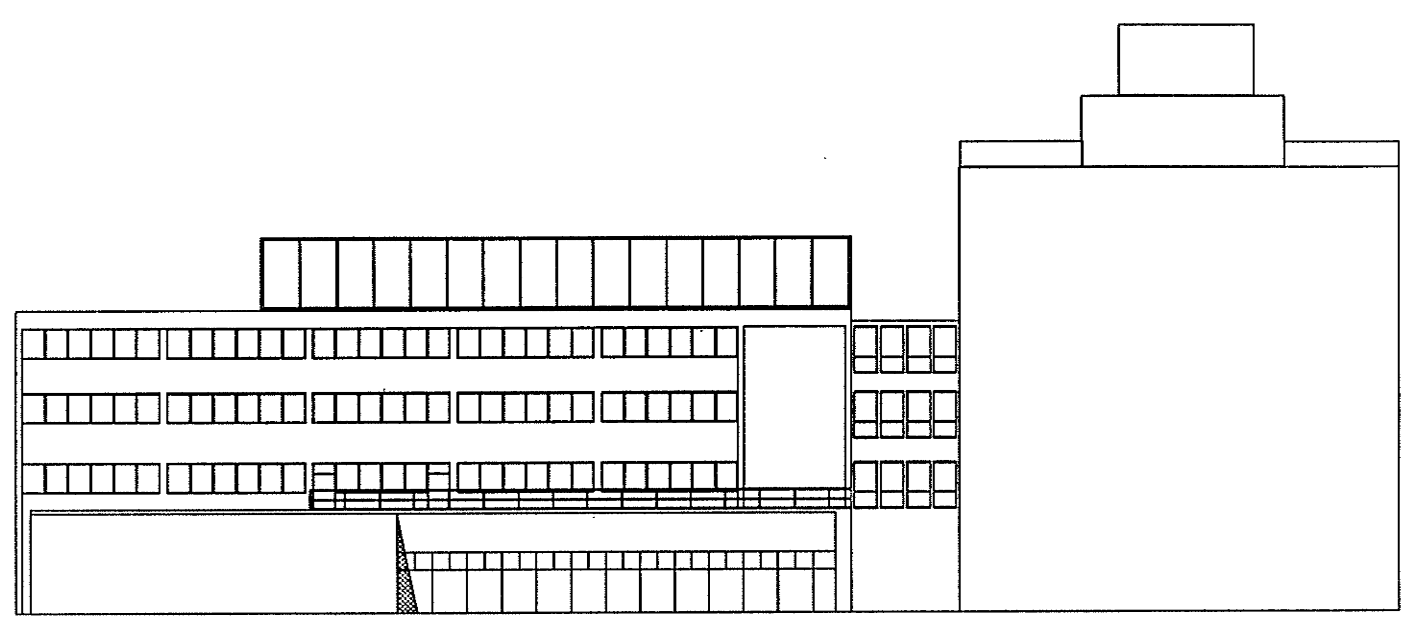

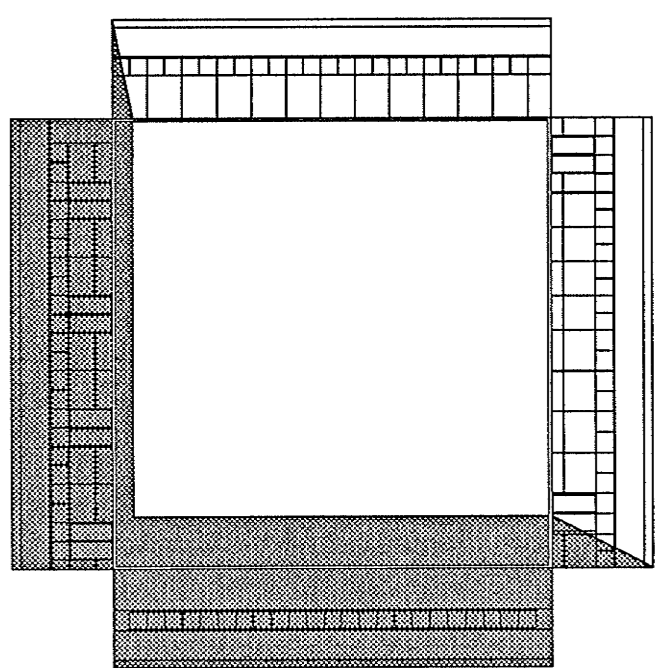

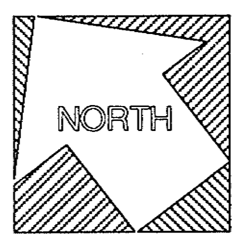

JUNE 22 2pm
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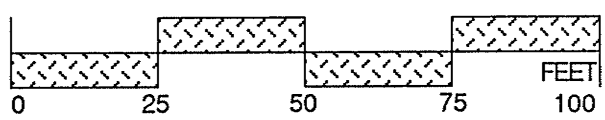

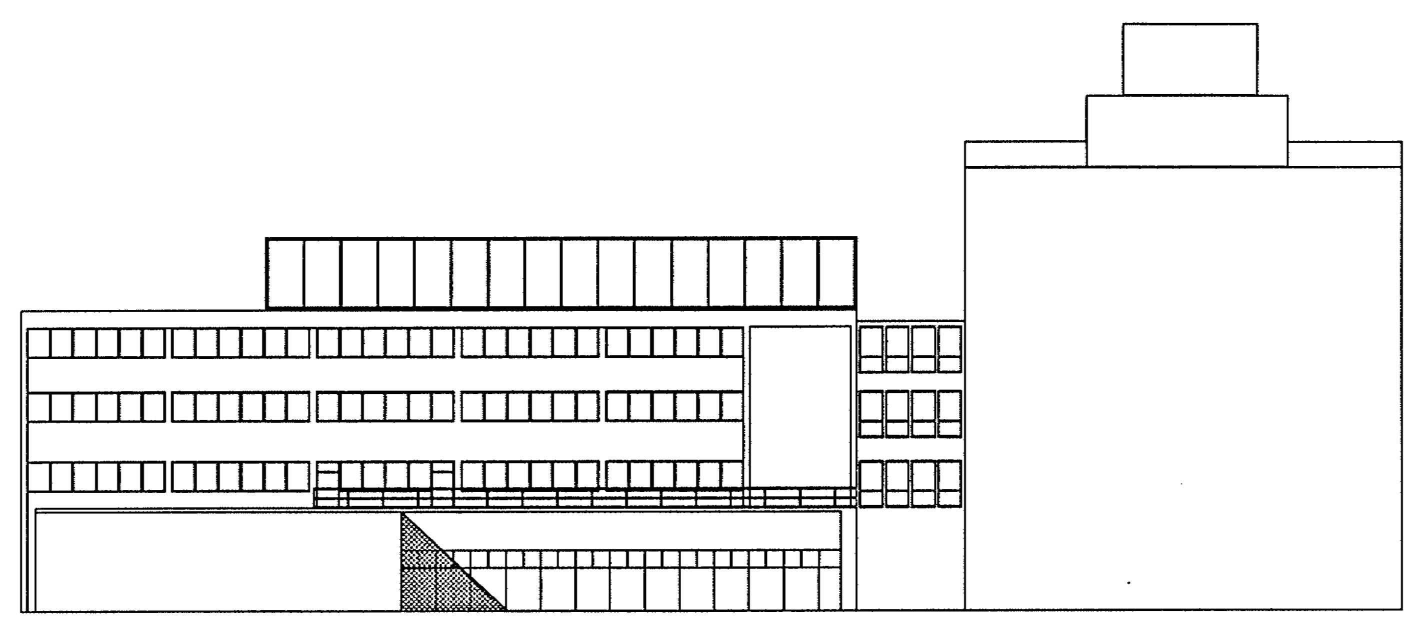

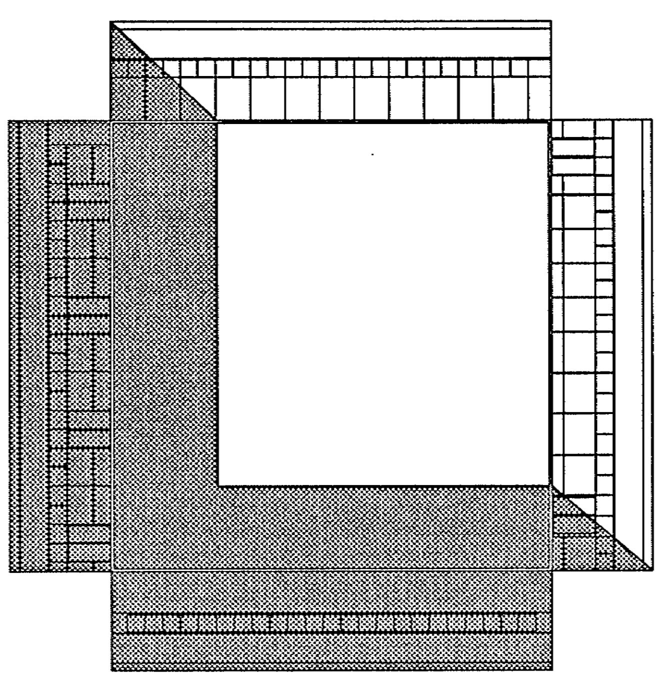

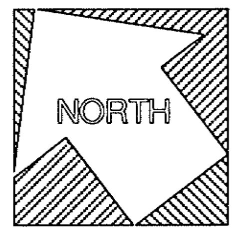

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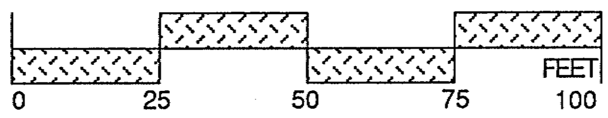
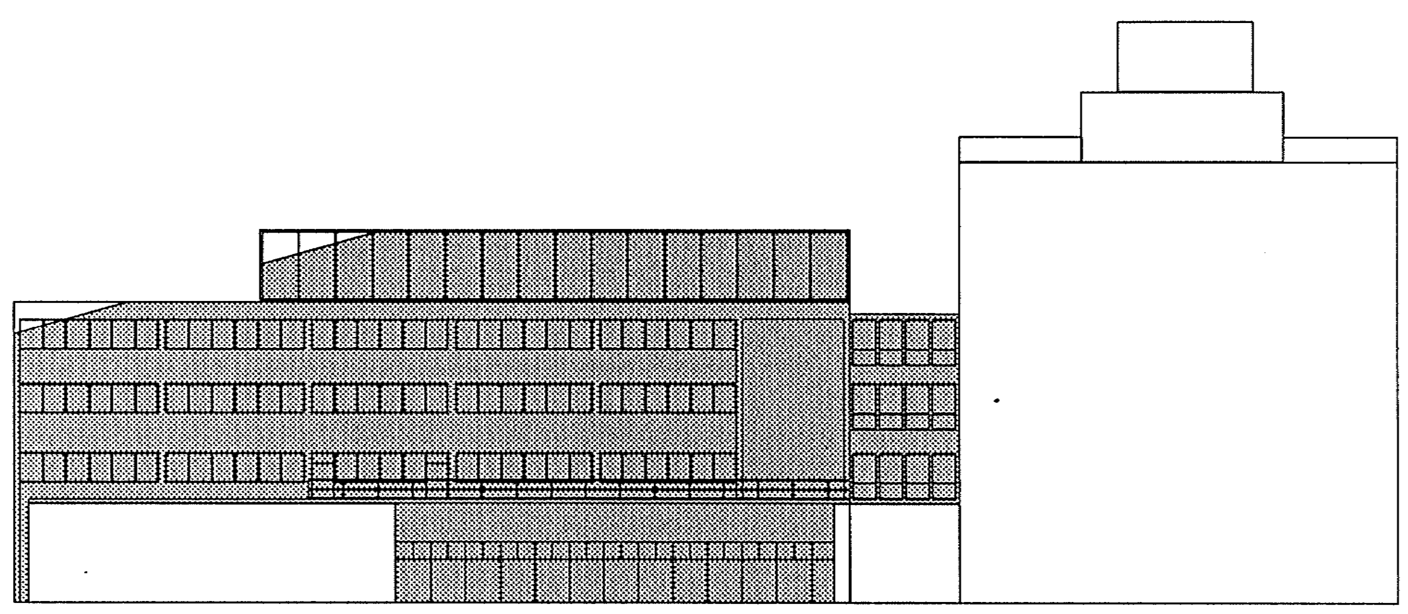
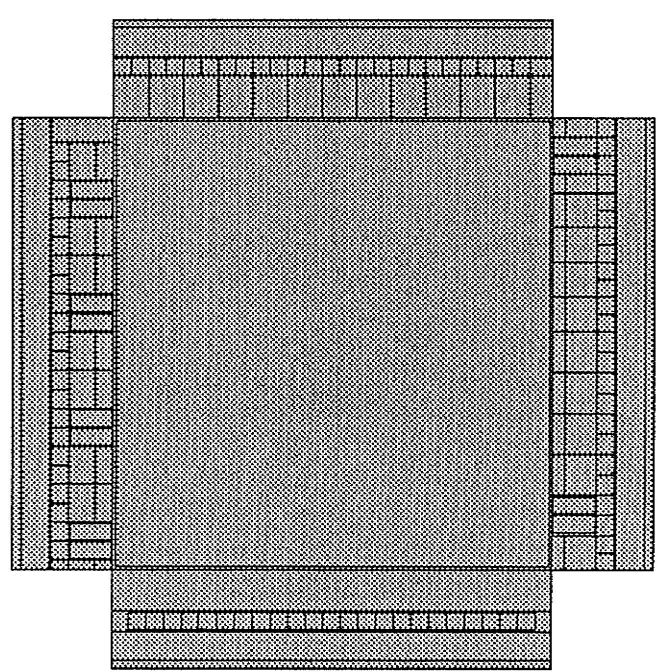
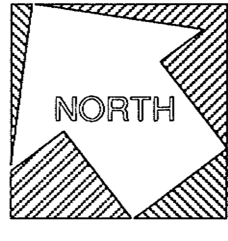
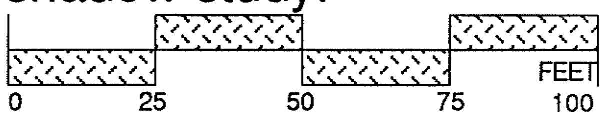


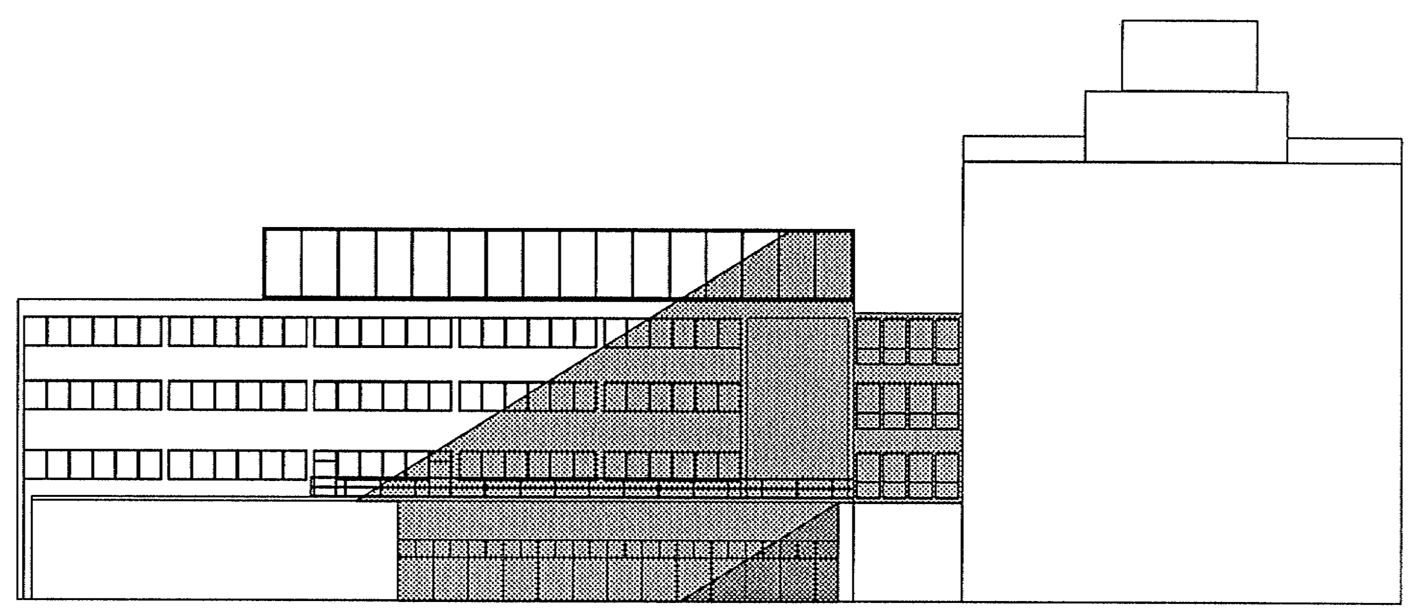


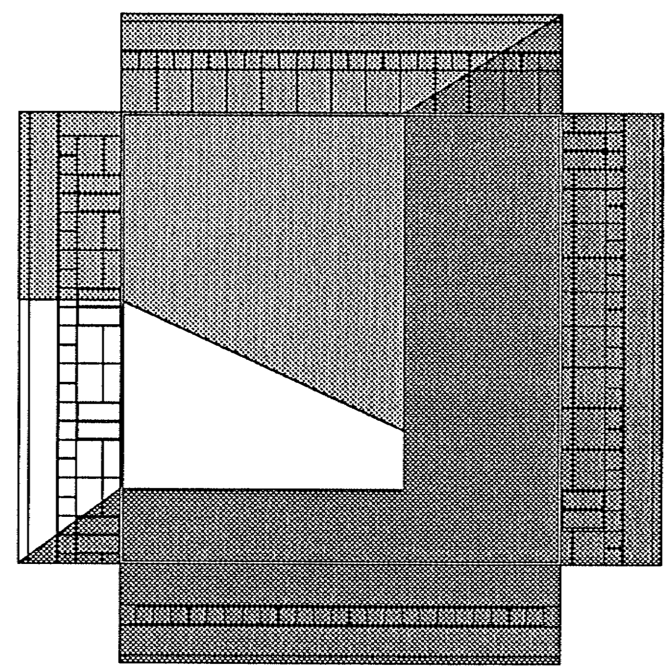


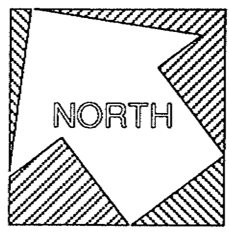


MARCH 21/
SEPTEMBER 22 8am
shadow study.









MARCH 21/
SEPTEMBER 22 10am
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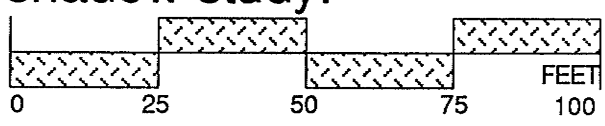

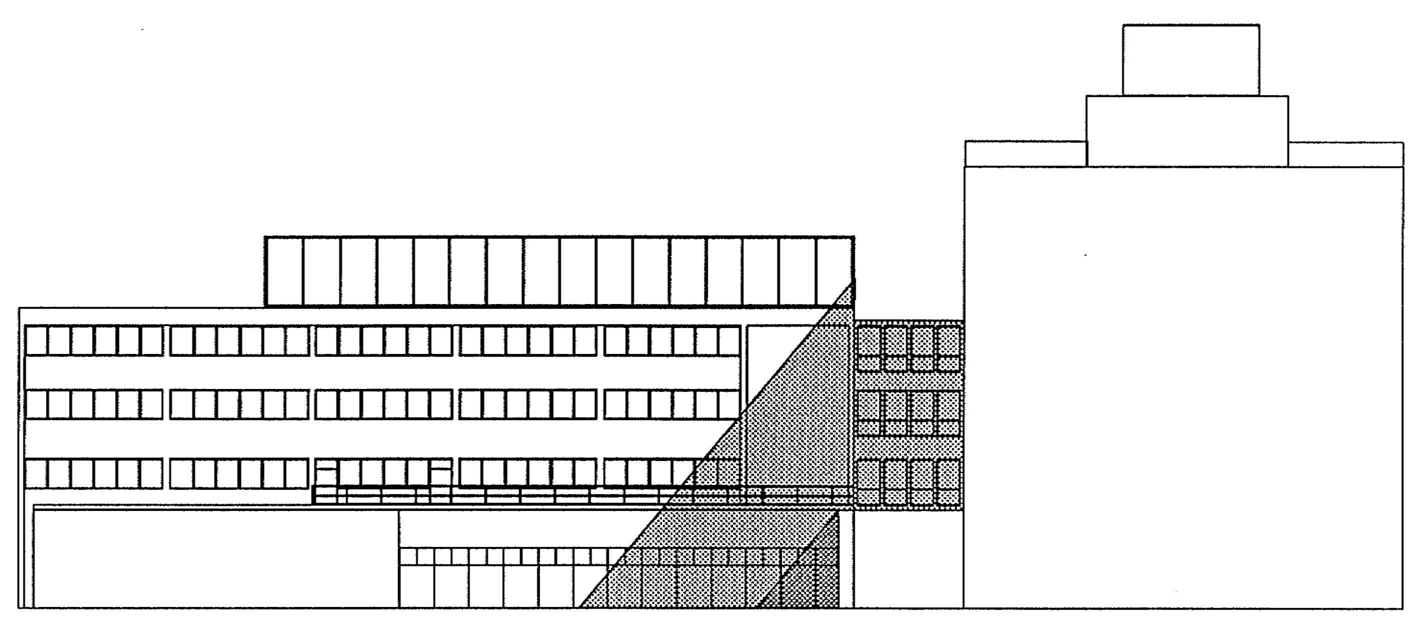

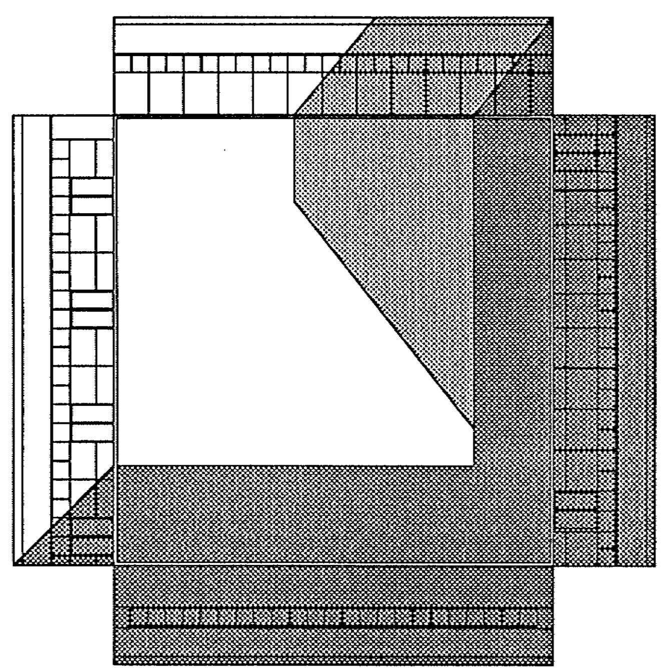

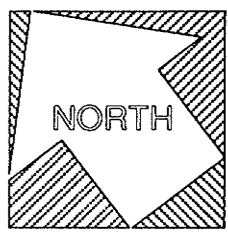

MARCH 21/
SEPTEMBER 22 noon
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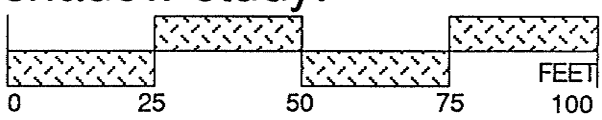

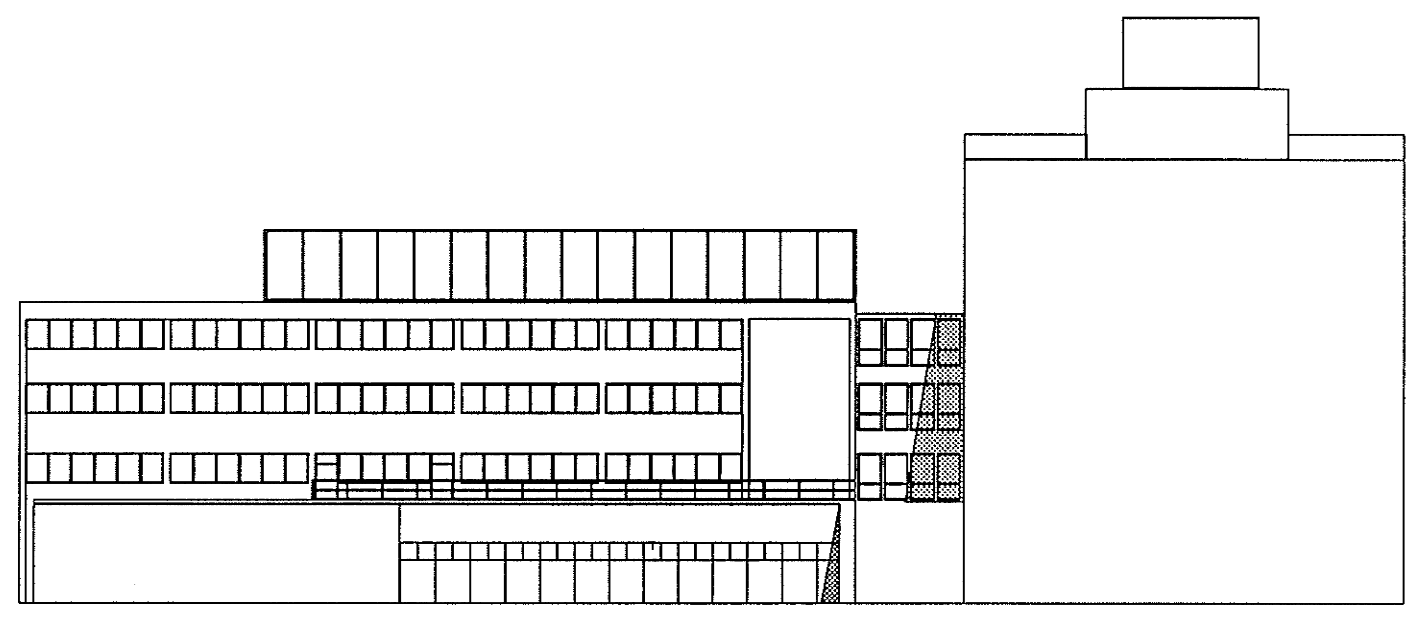

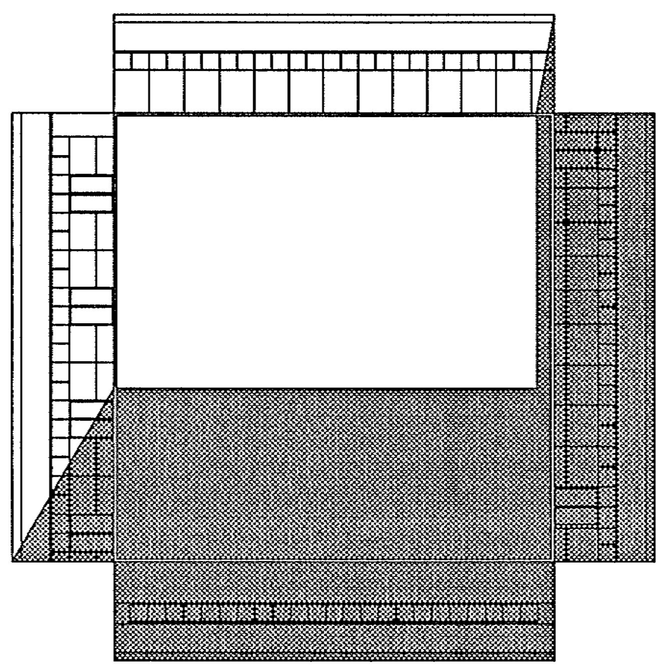

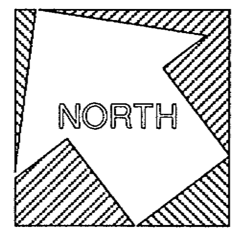

MARCH 21/
SEPTEMBER 22 2pm
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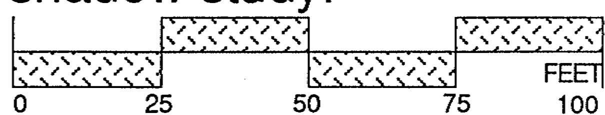
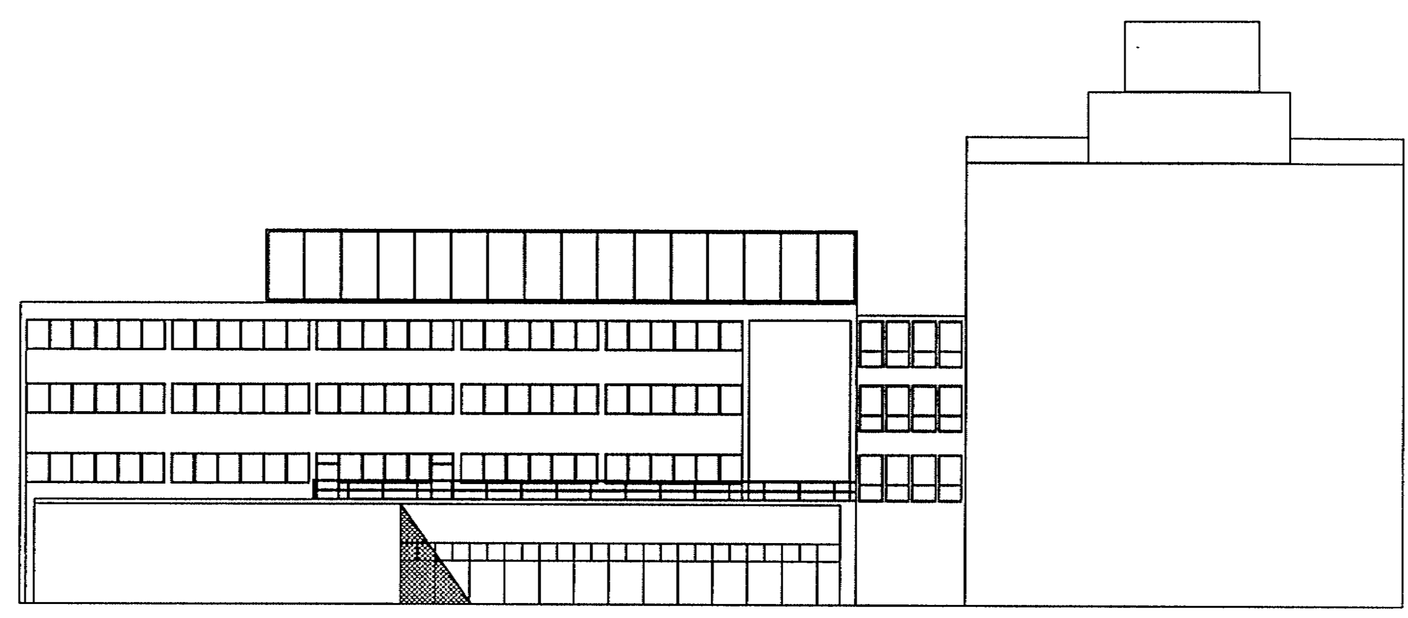
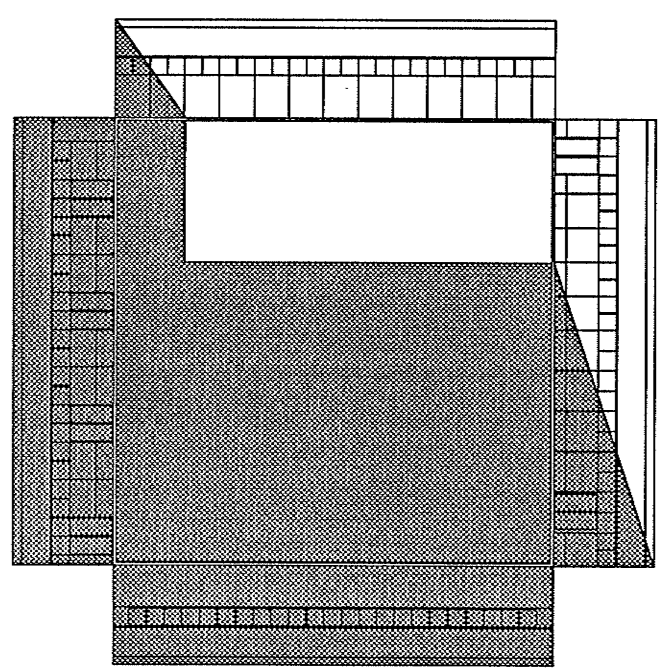
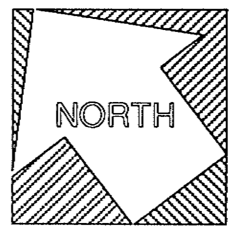
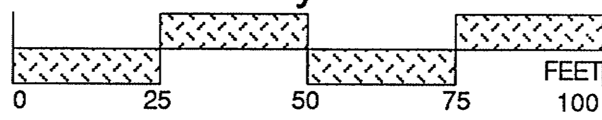


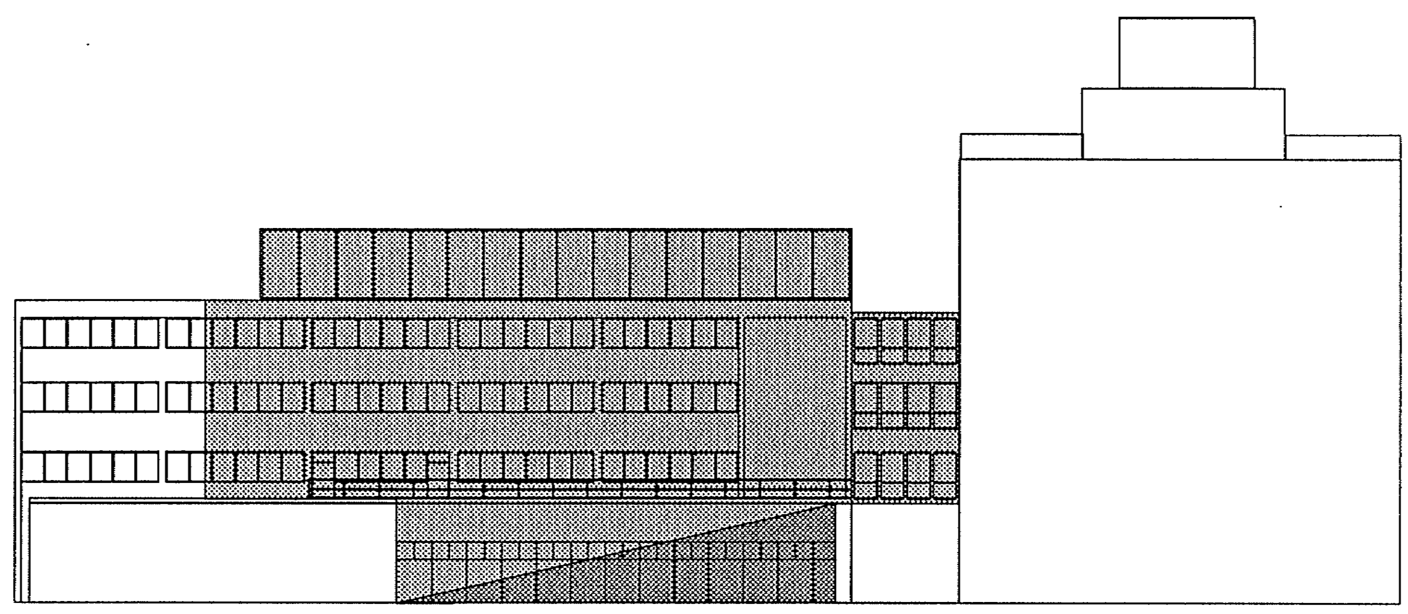


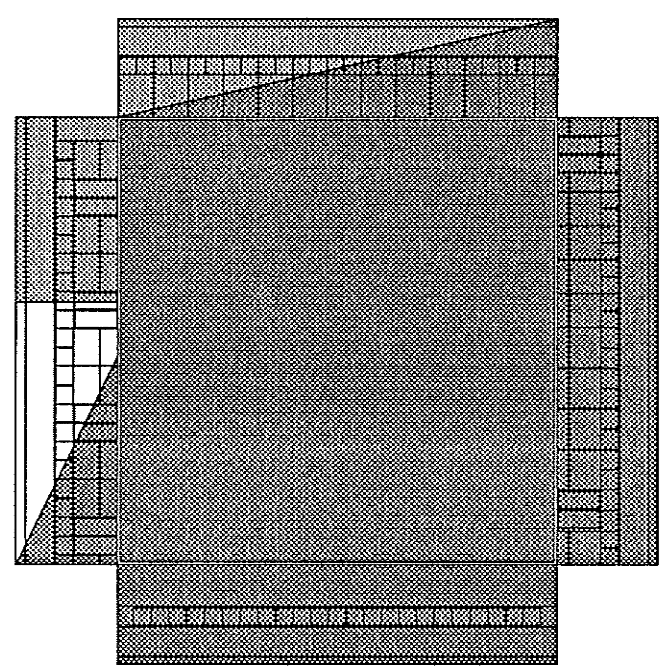


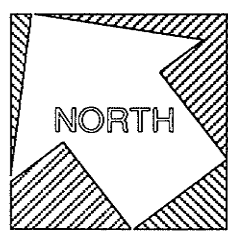


MARCH 21/
SEPTEMBER 22 4pm
shadow study.

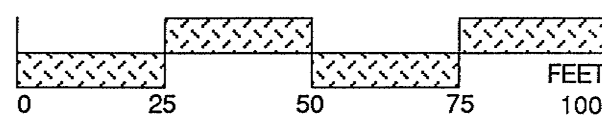


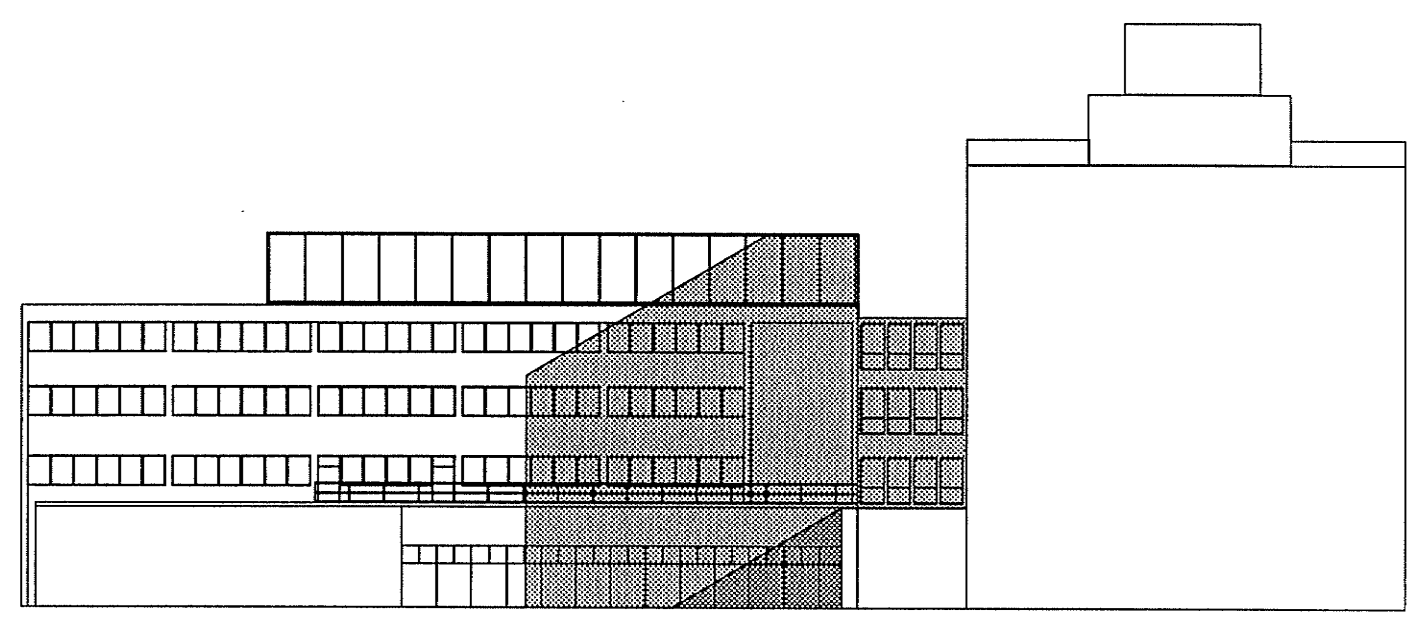


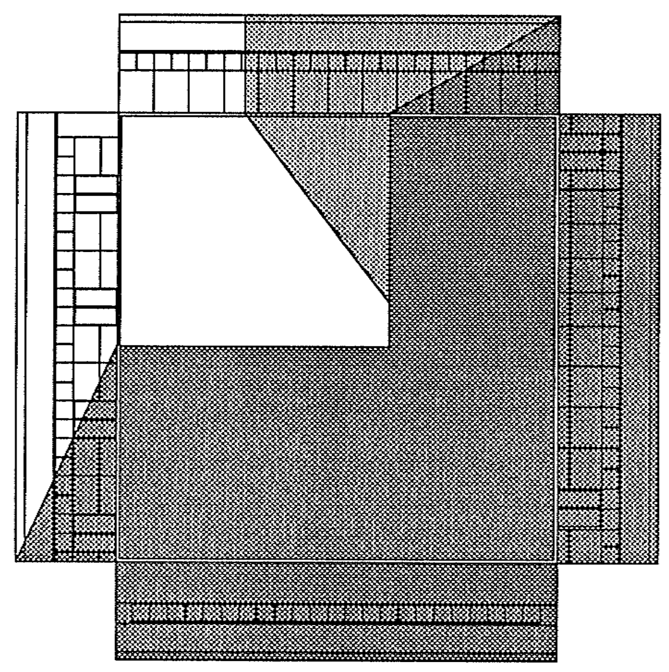


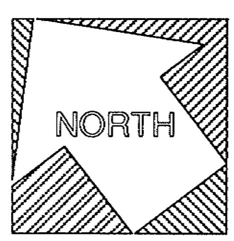


DECEMBER 22 10am shadow study.

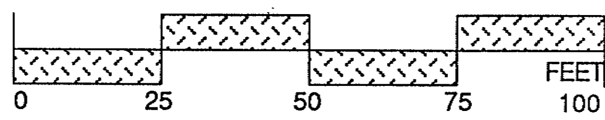


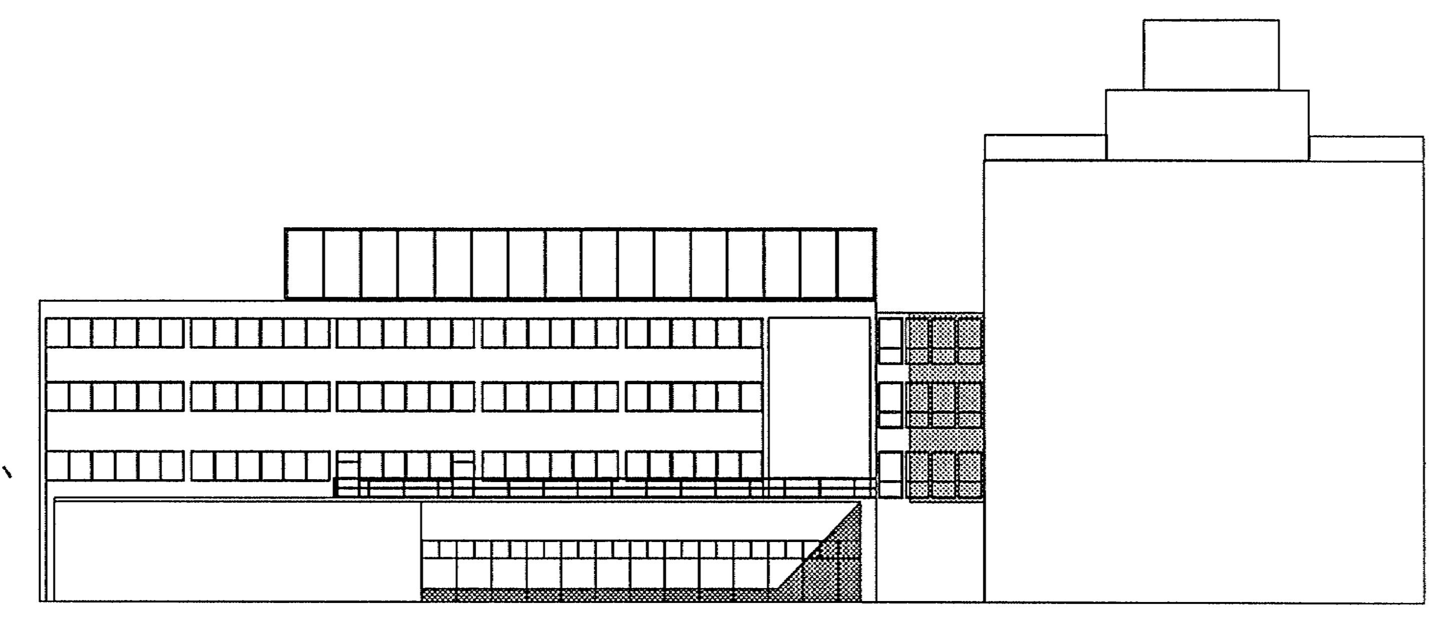


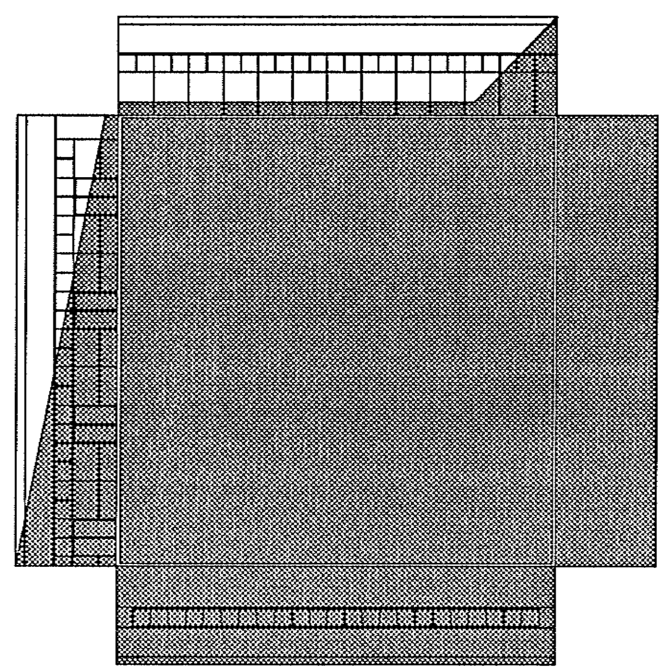


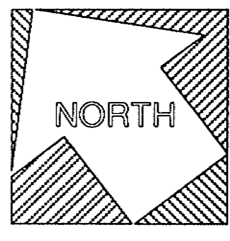


DECEMBER 22 noon shadow study.

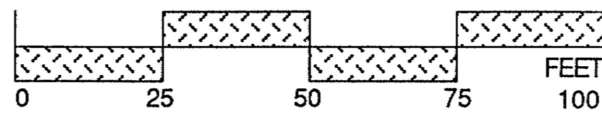






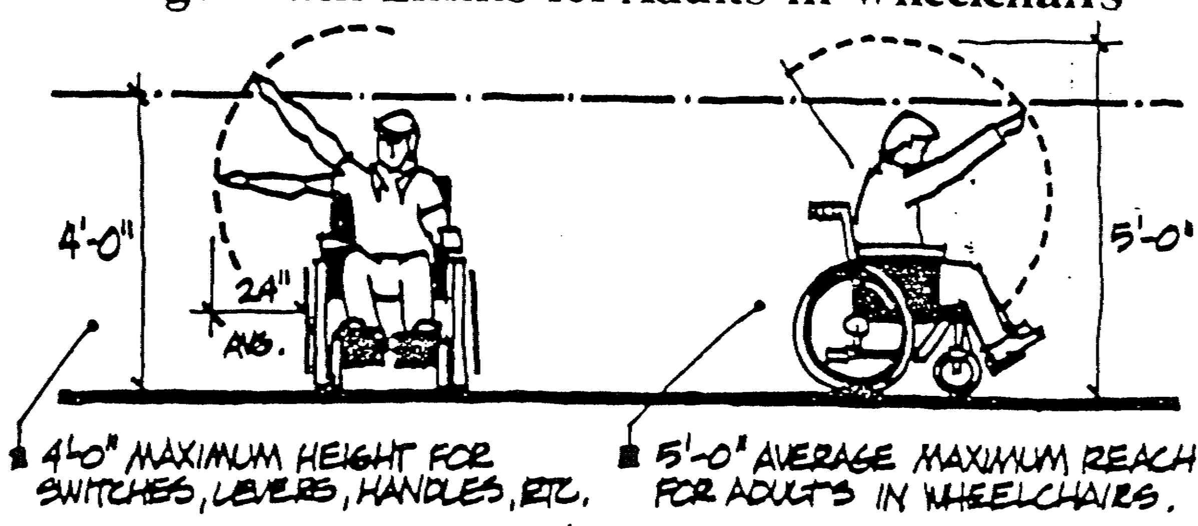


DECEMBER 22 2pm shadow study.

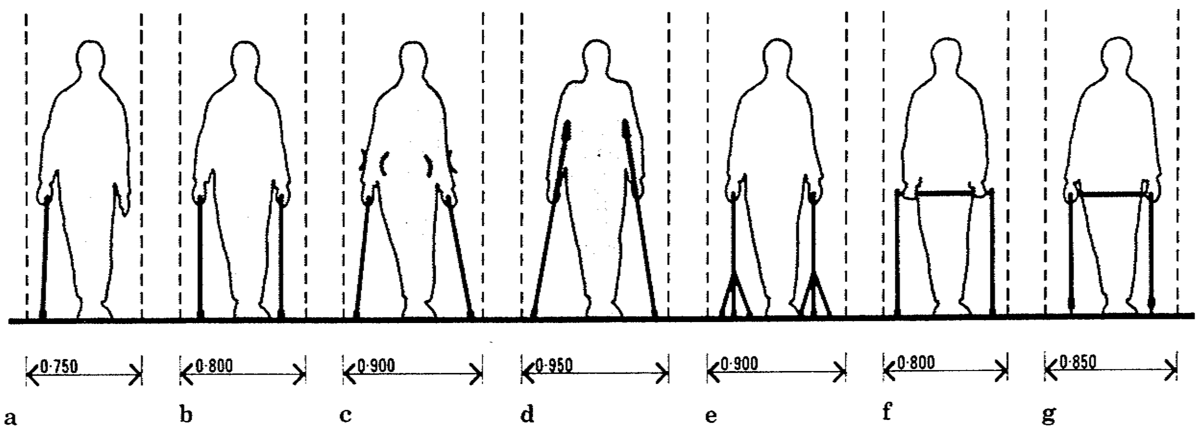


Appendix C. Dimensions for mechanical aids.

Average Reach Limits for Adults in Wheelchairs

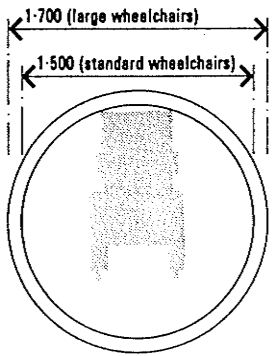


source: ASLA & U.S. Dept. of Housing & Urban Development
<u>Barrier Free Site Design</u>

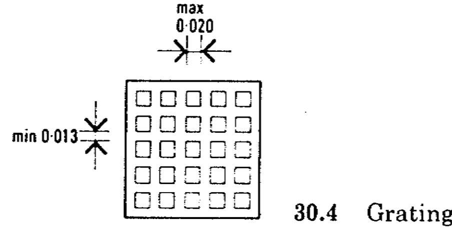


Gratings can be a hazard to stick, crutch and wheelchair users.

Parallel bar gratings should be avoided; where installed, bars should run at right angles to the direction of travel. Cast iron and similar gratings should have apertures not larger than 0·020 square, with bars minimum 0·013 wide (diagram 30.4).

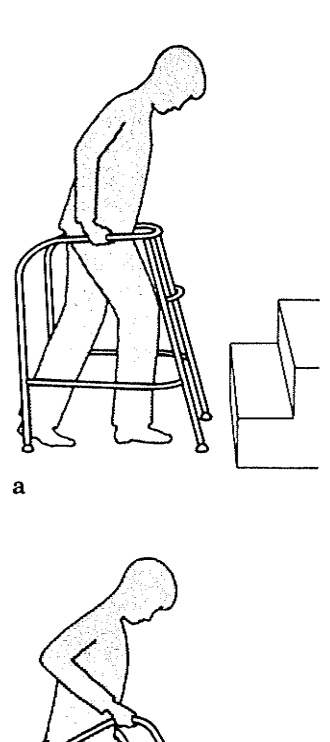


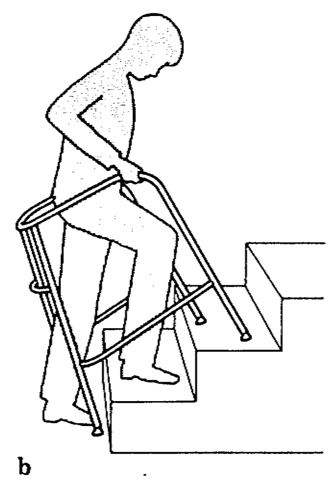
24.7 Planning rule for unobstructed space for wheelchair turning (1:50)

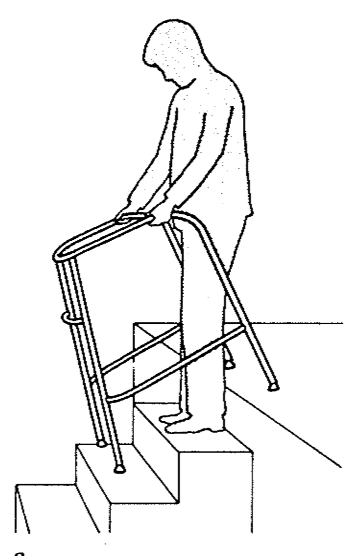


30.4 Gratings

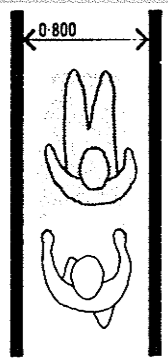
source: Goldsmith, Selwyn. Designing for the Disabled RIBA: London, 1976



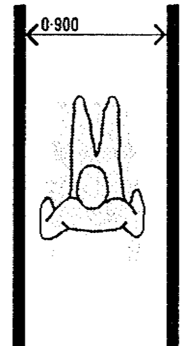




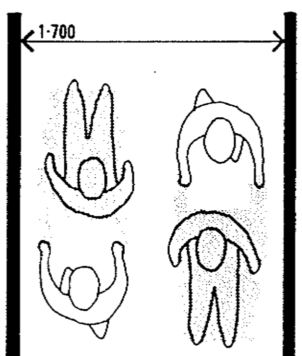
25.3 Stair climbing frame



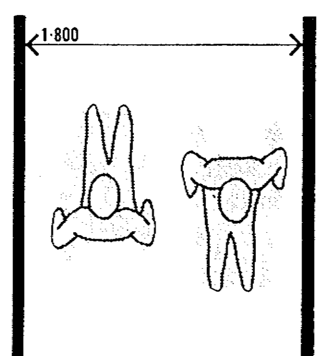
24.1 Straight line movement: Wheelchair with attendant (1:50)



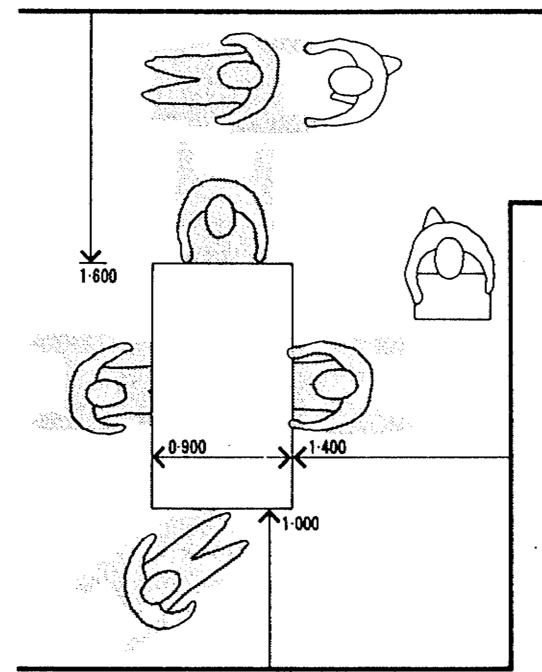
24.2 Straight line movement: Self-propelled wheelchair (1:50)



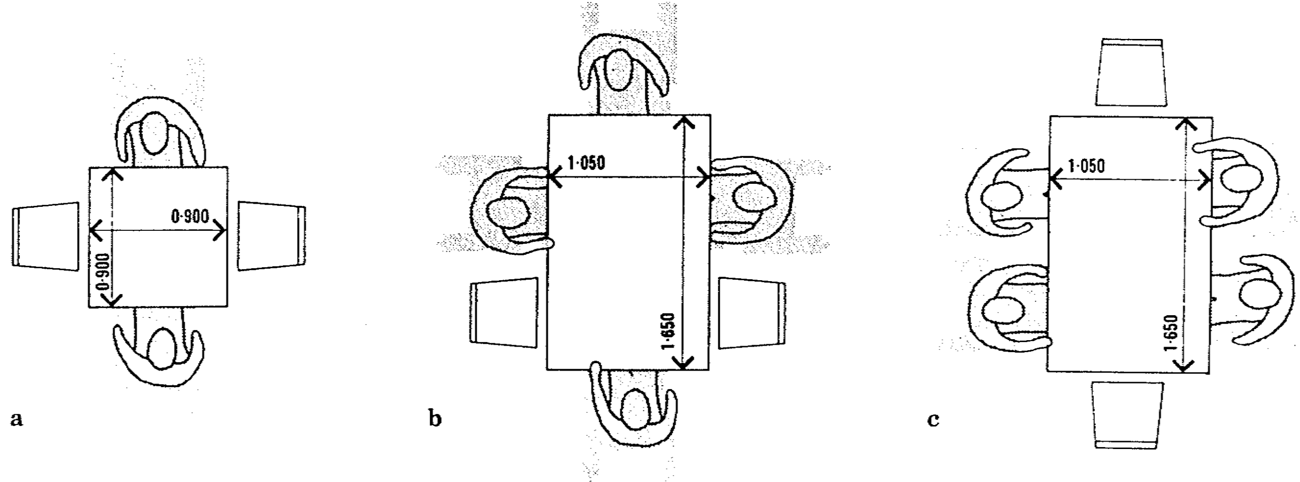
24.3 Passing space: Two wheelchairs with attendant (1:50)



source: Goldsmith, Selwyn. Designing for the Disabled RIBA: London, 1976

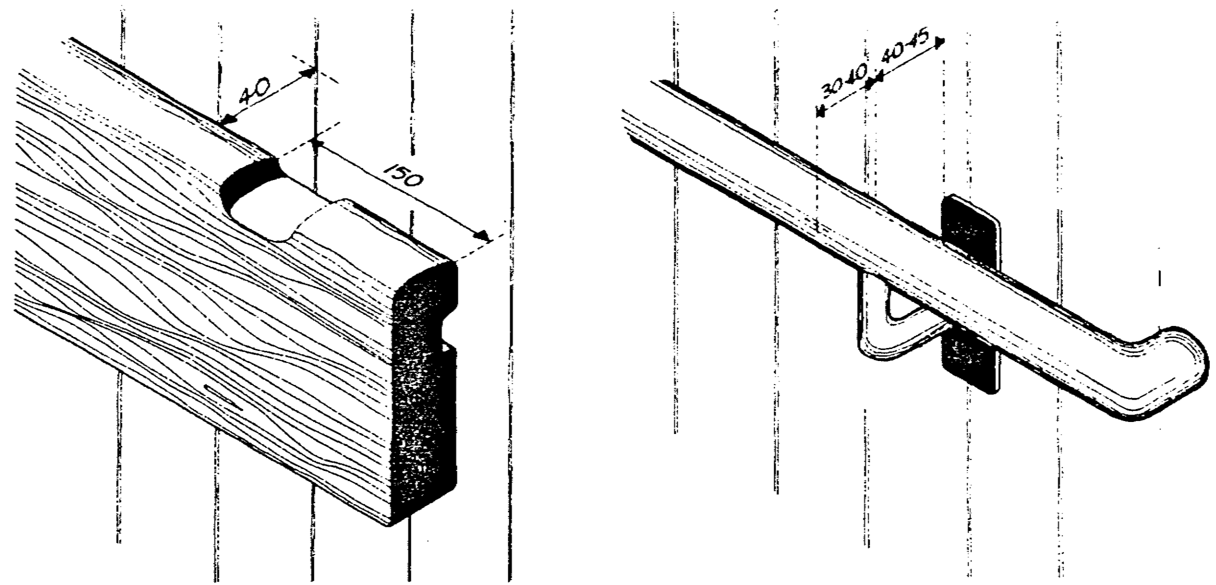


52.1 Dining areas: Space requirements (1:50)



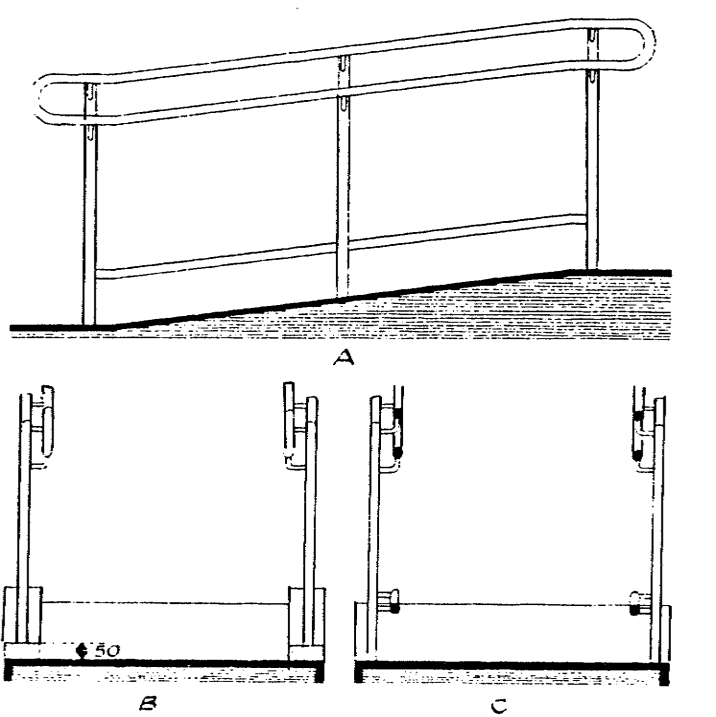
52.2 Dining tables (1:50)

source: Goldsmith, Selwyn. Designing for the Disabled RIBA: London, 1976



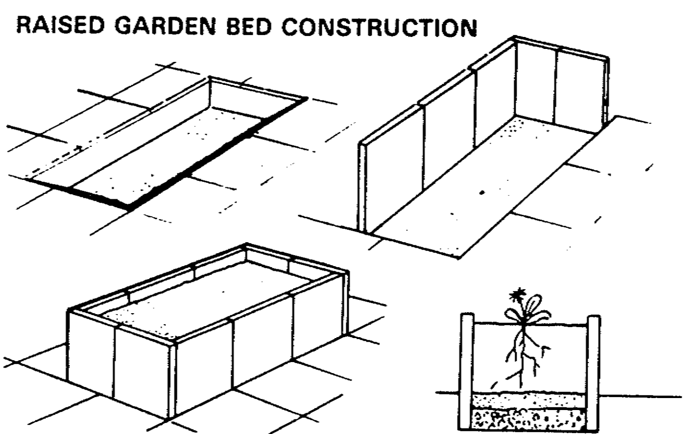
A groove near the end of this handrail signals that it is ending.

Round-section handrails provide the best grip. This one turns into the wall to indicate that it is ending.



A and C show a ramp with a lower guard rail. Note that the handrail provides support at two heights — for people walking and for those in wheelchairs. B shows a curb in place of the lower guard rail.

source: CMHC Housing for Elderly People: Design Guidelines Ottawa, 1987.



The walls of raised beds can be constructed from a variety of materials, pre-cast concrete paving slabs 914 × 610 × 51mm (36 × 24 × 2in) obtainable from builders' merchants, or fencing panels, are particularly suitable. It is important that the walls should be as narrow as practicable. A raised garden bed made in this way must be surrounded by a paved area to support it. A 1.2m wide by 1.8m long (4ft × 6ft 4in) space should be left for the bed when the paving is laid. To construct the bed, the 'long' 914mm (3ft) side of each slab should be sunk 305mm (1ft) into the ground leaving a 610 × 610mm (2 × 2ft) area of slab exposed. The area enclosed by the slabs should be forked over, drainage material such as rubble or stones added, and then filled with soil, slightly higher in the centre as the soil will consolidate as it settles.

source: Wilshere, E.R. Equipment for the Disabled: Leisure & Gardening Oxford Health Authority, May 1983.