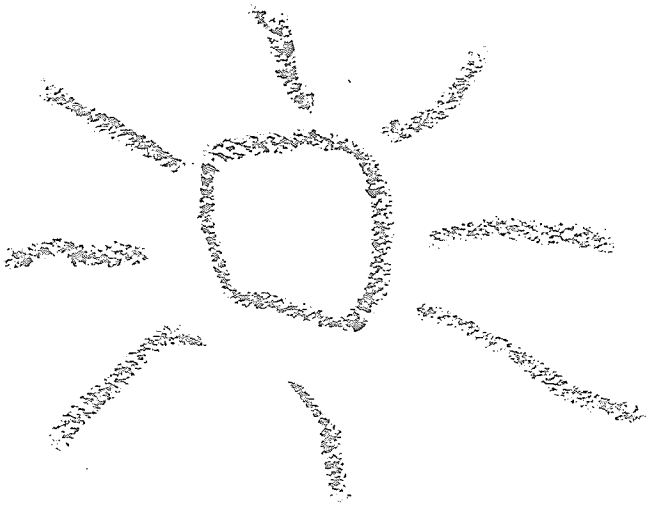

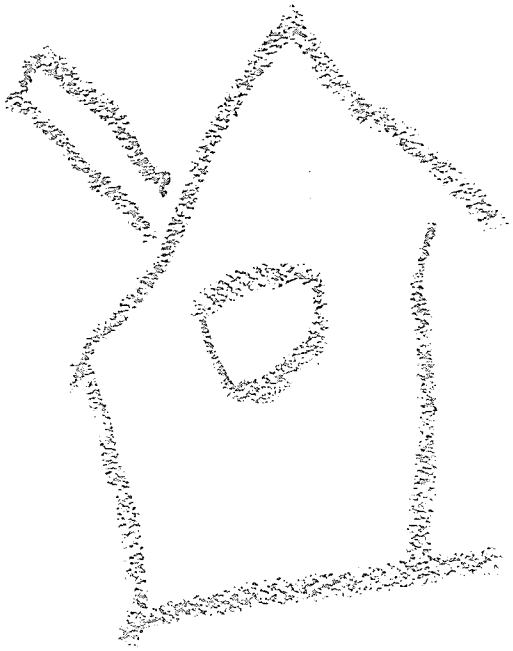

The Educative Neighbourhood

Theory and Principles for Enhancing Children's Experiential Learning

A Thesis Submitted to the Faculty of Graduate Studies
In Partial Fulfillment of the Requirements for the Degree of Master of Landscape Architecture

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Abstract

This thesis is an investigation into the processes by which we learn from our surroundings, so that environmental designers conscious of these processes might assess, enhance and direct the educative qualities of their creations. Most of the research is aimed at understanding 8 to 12 year-old children's experiences in their neighbourhood, based both on current theories and on field work in the Windsor Park area of Winnipeg.

The study begins with an introduction to the topic and the terms of reference for the study, followed by an extensive review of existing theory on how children come to know their environment, their developmental needs, and the factors which encourage and limit their explorations. The study then shifts from normative to site-specific research, describing and analyzing the results of an investigation into the perceptions and patterns of place use of children in Windsor Park. The result of these two bodies of research is a set of design principles for evaluating and improving the educative capacity of residential districts. A preliminary plan demonstrating the translation of these design principles into form is included in the Appendix. The final chapter provides a summary and commentary on the findings, and suggests directions for further research.

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We lie in the lap of immense intelligence. But that intelligence is dormant and its communication are broken, inarticulate and faint until it possesses the local community as its medium.[1]

John Dewey

[1] John Dewey, *The Public and Its Problems*, (Chicago: Gateway Books, 1946).

Preface

This thesis is about learning from experience. It grew out of a concern that the neighbourhood experiences of children between the age of 8 and 12 are particularly influential in the development of their knowledge, skills and values. Given the importance of personal development to all our future, it is a responsibility of environmental designers to understand what is being "taught" by the places they design and to ensure that those places offer educative opportunities of the highest quality. The goal of this thesis is threefold: first, to alert readers to the need for more educative neighbourhoods and the opportunities they provide; second, to assist designers in making the necessary changes both through design principles and a review of current theory in experiential learning; and finally, to outline a process of field study which can be the first step in the delicate task of uncovering young residents' educational needs.

The research component of the study is a combination of findings from scientific literature and a series of more explorative investigations into one group of children's interactions with their neighbourhood. These two sources of information, one normative and well-tested, the other specific and inconclusive, complement one another, each providing different insights into the process of learning from experience.

The review of current theories in environmental psychology, information theory and developmental psychology constitutes the largest portion of the study. Rather than an impartial account of competing theories, the review is selective, focusing on widely-accepted theories which help explain the role of the neighbourhood in a child's intellectual development, and which are complementary and consistent with each other.

Most belong to the body of research which uses an "information processing" model of the mind, which is particularly illuminating in the areas of environmental perception and cognition. It operates on two general assumptions: that a group of distinct mental processes are invoked between a stimulus and its response, and that those processes occur in a particular sequence, with information transformed by one process before it is passed on to the next.[2] The model can be visualized as a flow chart, with boxes indicating each process, and arrows indicating the sequence (Fig. 1.1). Many of the diagrams in the thesis take this form.

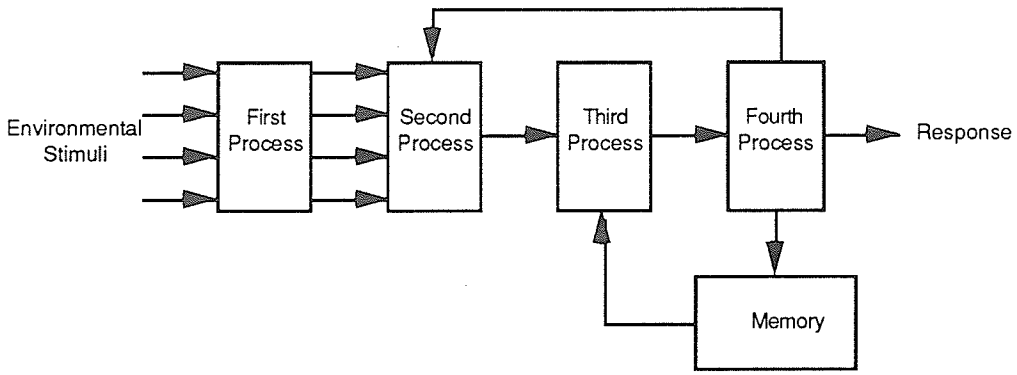

Figure 1.1. An information processing model of the mind. The information entering from the environment undergoes a series of individual transformations before it triggers a response. Though some feedback is required, transformations occur one after another in a set sequence. Most of the theories reviewed in the thesis follow this model. Adapted from Massaro, *Experimental Psychology and Information Processing*, p. 260.

In addition, because this thesis is intended to guide action in the design of communities, the theory is prescriptive: it goes beyond description and prediction of phenomenon toward the formation of rules for optimizing experiential learning. For the designer, an experimentally-verified theoretical model such as information processing minimizes contradictions, and

[2] Dominic W. Massaro, *Experimental Psychology and Information Processing*, (Chicago, Rand McNally, 1975), p. 599.

translates data into a form useful for determining a course of action. Thus each section of Chapters 2 and 3 contains both a description of the theory, and a discussion of the prescriptive implications of that theory on design. These implications are the foundation of the design principles of Chapter 5.

Even as the thesis was being completed, the intention was to include a plan of a rehabilitated neighbourhood so that the entire design process was represented: from general principles to site-specific inventory, to concept, to form. It became clear, though, that the bulk and detail in the research overshadowed the design, an it might best stand on its own. The design process remains fully represented, however the demonstration plan has been relegated to the appendix, as a supplement to the conclusions.

The decision to focus on children's sense of their neighbourhood occurred in the early stages of planning the study, primarily to reduce reliance upon generalities. Environmental perception is interactive; its analysis must specify not only the particular features of the environment in question, but also the "capabilities, values, and situation"[3] of the perceivers. While some general information is presented, the detailed particulars in the thesis relate to the outlook and needs of children.

Why children? Given the goal of enhancing development, it is logical to focus on childhood: the period in which most development occurs. Further, research in developmental psychology has shown that as direct dependence on adults fades, children's desire for engagement with the environment grows.[4] This urge to investigate, explore, and try new things peaks around eight to twelve years of age. At this time the child develops a deep and

[3] Kevin Lynch, *Managing the Sense of a Region*, p. 9.

[4] Roger Hart, *Children's Experience of Place*, p. 343.

romantic connection to the environment, marked by a fascination for areas which are not explicitly designated childhood domain: empty lots, woodlands, alleys, industrial sites, etc.. Edith Cobb calls this the "middle age of childhood:"

> . . . a special period, the little understood, prepubertal, halcyon, middle age of childhood, approximately from five or six to eleven or twelve, - between the strivings of animal infancy and the storms of adolescence - when the natural world is experienced in some highly evocative way, producing in the child a sense of profound continuity with natural processes and presenting overt evidence of a biological basis of intuition.[5]

The child's mind is thirsty for new experiences and adventure, and she is now permitted to strike out and explore an expanding range of accessible places. By age eight, fundamental distinctions between the world of people and the impersonal processes of nature can be drawn. Children begin to make connections and frame an individual place within the human/environment system, as a"person among persons."[6] Past the age of twelve, there is a tendency to withdraw from environment, and express less interest in exploring and transforming it. Some researchers suggest that by this age, children have gained a sense of competence in understanding and relating to the environment, and their attention turns to cultivating a similar competence in the social sphere.[7] It is only during this critical middle period that the environment is a primary influence on development.

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[5] Edith Cobb,*The Ecology of Imagination in Childhood*, (New York: Columbia University Press, 1977), pp. 122-123, quoted in Robin Moore, *Childhood Domain*, (London: Croom Helm Ltd., 1986), p. 11.

[6] A. Gesell, R. Ilg, and L. Ames, *The Child from Five to Ten*, (New York: Harper and Row, 1946), p. 168, quoted in Roger Hart, *Children's Experience of Place*, p. 429.

[7] P. Shepard, *The Tender Carnivore and the Sacred Game*, (New York: Charles Scribner's Sons, 1973).

I would like to express my sincere gratitude to the Canadian Mortgage and Housing Corporation for financing this thesis, and a special thanks to my parents for their relentless support and encouragement throughout my studies. This thesis is dedicated to them.

I would also like to thank the staff and students of Frontenac School for their cooperation, particularly vice principal Mr. Andy Bell, Mrs. Arlene Keller, and her Grade Five class. Their enthusiasm made the field studies a pleasure.

I benefited greatly from the guidance of my thesis committee: Professor Ted Mclachlan, Professor Mario Carvalho, and Professor Charlie Thomsen (chairman). Our meetings were always engaging and bright with optimism, and I am indebted for their generous contribution of time and care. Thanks also to Margaret White, for her support, patience,and assistance, Florence Strom, for her help with the photography, and Dr. Sue Weidemann and Helen and Jennifer Lees for their advice on the survey. Finally, I would like to thank Professor Alexander Rattray, who launched me on the investigation of landscapes and learning nearly seven years ago.

Glen Manning
November, 1989.

Chapter 1
Introduction

A. The City as Educator

This thesis is an investigation of the kind of learning that occurs outside schools, during day-to-day contact with the urban environment. There we witness working examples of natural and artificial processes, human relations, commercial strategies, political messages, and a vast range of other activities and structures which describe and collectively define our culture. These examples are seminal in the formation of concepts about the world and our place within it. Some would suggest that most learning, or at least our most important learning, results from casual encounters with the city in general and the neighbourhood in particular,[1] and that it occurs whether it is planned for or not.

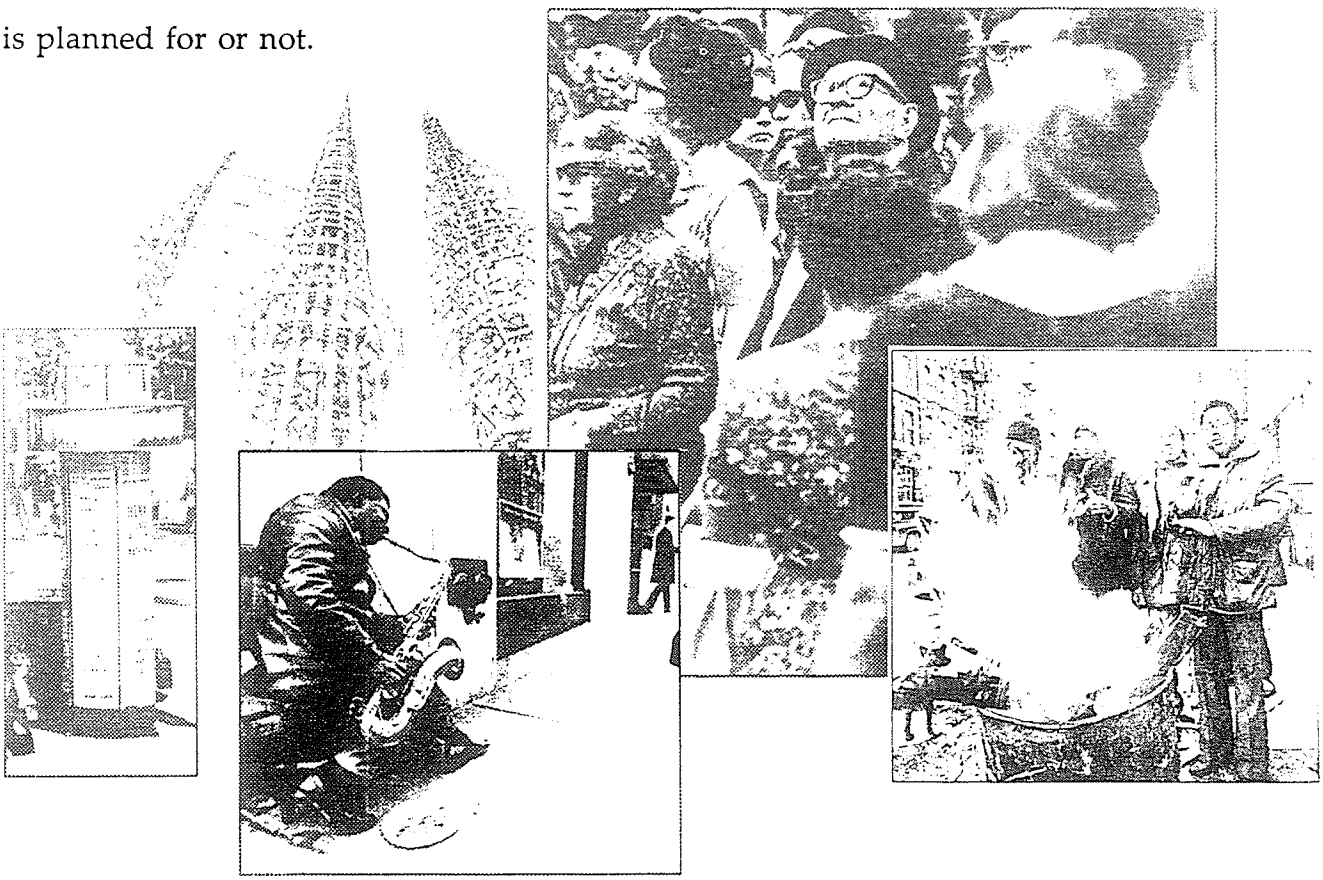

Figure 1. The city is a rich source of information in almost all spheres of human activity.

[1] Richard Saul Wurman and E. Berkeley, "The Invisible City," in *Architectural Forum*, May, 1972, p. 41; and S. Carr and K. Lynch, "Where Learning Happens," in Daedalus, Vol. 97, no. 4, (Fall 1968), pp. 1277 - 1291.

Yet as the city grows more complex, it becomes less accessible to inquiry, less inviting and legible. Anxiety over privacy, security, and liability has rendered urban architecture impenetrable, concealed behind walls and mirrored glazing, while "corporate imaging" veils the instructive inner workings of factories and offices with marketable but empty facades. The automobile is a chief culprit -- impoverishing tthe pedestrian environment, and freeing developers to scatter attractions throughout the city, thereby reducing urban density and its resultant vitality and diversity. As crime rates and transportation expenses rise, comfortable access narrows to fewer and fewer congested paths and districts, leaving vast areas of the city unseen by the bulk of its inhabitants. These factors, combined with the growth of specialized thinking within the work force, result in communities which, far from being educational, are increasingly incomprehensible and alienating.

The problem is aggravated by the media, which provide a highly appealing alternative for non-academic information.[2] Over the last decade, advances in television and motion picture technology have endowed producers with new tools to catch the eye of fickle viewers. Precise and rapid edits, changes from black-and-white to colour, high fidelity sound, music, and exaggerated motion are no longer "special" effects, but are employed everywhere from children's programming to orange juice commercials. So effective is this approach that many educators now relate to media as "the competition," and are introducing multi-media video technology into the classroom to cope with inattentive students and rising drop-out rates.[3] Despite the many criticisms that have been levelled at the educational applications of electronic

[2] Non-academic information is information gleaned from non-academic sources, such as friends, family, and the environment. Some researchers call it "common sense information."

[3] From the Conference on Education and Technology, in Winnipeg, March 22, 1989.

media,[4] the crucial issue is that people prefer to learn that way. If we are becoming a generation who choose to experience the world vicariously, preferring the large screen instant replay to the actual event in the ball park, what is the new role of the city as educator?

The city's attraction is unique. Whenever someone pauses to peer through the hoarding at constructions sites, or cranes their neck to see window washers ascending an office tower; whenever we hear street musicians, or catch the exotic aromas of an ethnic community; whenever children trail behind garbage trucks, fascinated by the mysterious and violent collection process, we see a glimmer of the educative and experiential potential of urban areas. A high quality pedestrian environment, such as that found in many European cities, can incorporate sufficient mystery, detail, density, and activity to invite exploration among tourists from all over the world, and sustain it for residents. The wonder of cities comes from simultaneous sensations of human potential, of productivity, cooperation and competition, of danger, power, and need; in short, "the rumble of the tremendous human mill."[5] Properly formed, the urban environment endures as a compelling experience.

Because of their restricted mobility, most urban children spend their formative years close to home, somewhat removed from the "human mill." The richness of their experience of the real world is dependent upon the quality of experience offered by their neighbourhood.[6] Whether it nurtures

[4] For instance, it threatens to yield lazy learners; it is too abstract, leading to impotent theoretical know-how; it cannot represent the richness of real experience, but the illusion that it can is dangerous; or the shrinking attention span of voters is affecting their ability to comprehend complex issues, and is thus jeapordizing the democratic process. A thorough treatment of this issue can be found in Jerry Mander, *Four Arguments for the Elimination of Television*, (West Caldwell, NJ: William Morrow Publishing, 1978).

[5] Henry James, quoted by Mark Girouard, *Cities & People* (New Haven: Yale University Press, 1985), p. v.

or inhibits the mental growth of its residents, the neighbourhood plays a crucial role in rebuilding the city as educator.

This thesis focuses on improving the neighbourhood as a learning place, with special emphasis on the needs of children. It aims to do so not by ignoring the influence of media, nor does it attempt to counteract that influence; rather, it seeks to supplement media information with a more vivid and accessible reality. Information and experience are not the same thing. The further formal education slips from real life, the greater the value of informal opportunities to learn from direct experience. This might even entail borrowing techniques from the electronic media to enhance the natural interest of neighbourhood places. By reorganizing patterns of urban residential development to provide access to its educative resources and to engender wonder, the prime attraction of yesterday's city, learning, can be restored for future generations.[7]

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[6] This thesis uses Rachel and Donald Warren's definition of neighbourhood: "Neighbourhood is really always a dual concept: an image in the minds of those living there or the way outsiders view the area and secondly, the resources and physical dimension that characterize it." From Rachel and Donald Warren', *The Neighourhood Organizer's Handbook*, (Notre Dame, Indiana: University of Notre Dame Press, 1977), p. 12.

[7] John Dyckman, quoted in Jim Zien, "Children in Transit, The Open City Project," in Gary Coates (ed.), *Alternative Learning Environments*, (Stroudsbourg, Penn.: Dowden, Hutchinson &Ross, Inc., 1974), p. 257.

B. Education and Design

The overlap between education and environmental design has been formally recognized in the United States through a number of educational resource materials designed by the American Institute of Architects, and projects such as The National Endowment for the Arts' "Architects-in-the-Schools Program," which supports temporary residency of design professionals in primary and secondary schools.[8] The aim of these programs is to further students' understanding of the built environment, and in turn to instill some sense of responsibility in professionals for the educational content of the places they design.

David Raphael, a landscape architect actively involved in the Architects-in-the-Schools Program, believes that the interdisciplinary nature of landscape architecture makes it ideally suited to bridge the gap between education and design.[9] Just as we have a responsibility to provide safe and satisfying spaces for people, it should be a professional obligation to recognize that most learning occurs outdoors, to gain an understanding of how it happens, and to maximize the benefits which might accrue through its enhancement and direction. The goal of this thesis is to provide information which will ease the fulfillment of those obligations.

There are other reasons why landscape architects should concern themselves with education. Public attitudes and values are an important component in the equation that determines environmental quality; both directly, through

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[8] For a more complete list of resources for studying the built environment, see Education Facilities Laboratories and the National Association of Elementary School Principals, *Learning about the Built Environment*. New York: E.F.L. Ltd., 1974.

[9] David Raphael, "Public Education Starts with Kids," in *Landscape Architecture*, Vol. 75, Sept./ Oct. 1988, p. 172.

personal interventions and control, and indirectly, through supporting or opposing relevant legislation. Through education in the environment, landscape architects possess an opportunity to inform those attitudes and values, so the decisions made by clients and users may be more environmentally sound.

Furthermore, if education can be viewed as a process of "enhancing the development of individuals", then assisting in this process is clearly a worthy goal in itself. According to Steven Carr and Kevin Lynch, it is the highest goal of city making:

> To our minds, the single most important endeavor for city planning and design is to understand the developmental function of environment and to find ways to improve it.[10]

Though controversial (in that autonomous, motivated individuals will be capable of disrupting the status quo), Carr and Lynch argue that the threat is outweighed by the numerous social benefits such education promises, including a broader range of competence in individuals, better communication between people, and more cooperation and tolerance of difference.

These designers' arguments suggest that learning from the environment is more than just another method of acquiring knowledge: it can be a powerful tool in determining the quality of our lives and our communities. It is an opportunity to expand the basis of planning beyond the primitive neutralization of negative conditions toward the activation of variety, intricacy, and delight.[11]

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[10] S. Carr and K. Lynch, "Where Learning Happens," p. 1280.

[11] Kevin Lynch, *Managing the Sense of a Region,* (Cambridge, Mass.: the MIT Press, 1976), p. 15.

C. Experiential Education and Environmental Education

Educators in the seventies made similar enthusiastic claims about the potential benefits of formal education in and about the environment. They saw it as a means of creating informed and dedicated agents of change, capable of enforcing sensitive and rational environmental practices and able to communicate those skills to others (refer to Appendix B for a detailed account of the formal environmental education movement). Yet despite two decades of global effort to increase awareness, people's attitudes toward the environment today are practically as ill-informed and unconcerned as they were twenty years ago.[12] Formal "environmental education" has apparently failed, and as a result, the term stirs up negative images of the ecology fad, or is seen as another unsuccessful alternative developed during the 1970's "crisis in education."[13]

Thus one must exercise caution in using the term "environmental education". There are some critical differences between the type of learning that arises from casual encounters with the urban environment (which we shall now refer to as "experiential learning") and the formal environmental education that occurs in conjunction with schools. The following operational definitions are offered for the sake of clarity:

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[12] Trudi L. Volk, et. al., "A National Survey of Curriculum Needs as Perceived by Professional Environmental Educators," in *Journal of Environmental Education* 16, No. 1, Fall 1984, p. 11; Beth V. Goldstein and Linda G. Lockwood, "Experimental Education: Ahead to Basics," in *J.E.E.* 12, No. 1, Fall 1980, p. 27; Julie A. Honnold, "Age and environmental concern: some specification of effects," in *J.E.E.* 16 No. 1, Fall 1984, p. 9; and "Hollywood's Favorite Heavy, The Business Man,"(Illinois Educational Television, PBS, 1986): all suggest that environmental issues are poorly understood and of low priority.

[13] See Gary Coates (ed.), "Introduction," in *Alternative Learning Environments*, pp. 2-4.

Formal environmental education is a style of education which investigates the relationship between humanity and the biosphere, and aims at providing the facts, skills and values necessary to improve that relationship. Though experience-oriented learning is a component of many programs, it consists primarily of structured, institutional studies, occurring indoors and in all cases based on a curriculum.[14]

Experiential learning: the incidental learning that occurs spontaneously in an environment. It is entirely self-initiated, and occurs at unexpected times, in no coherent sequence, and with no guarantee that the information will be comprehensible in itself. Usually, more information (or experience) is necessary to fully appreciate the message.

Experiential education: a program of environmental interventions aimed at encouraging those aspects of experiential learning which may contribute to development and awareness. Though experiential education could occur in any environment, we will concentrate on exterior settings in this thesis. Typical interventions might include directing attention to details, increasing environmental diversity, and improving accessibility to remote portions of the community.

The notion of guidance is a critical distinction in the above definitions. The word "education" comes from the Latin *educare,* which means, "to lead out." In formal environmental education programs, the learning is guided (or "enforced") by an instructor, who is responsible for communicating lessons, each building on the foundation of previous lessons, according to the overall

[14] Sean Carson, *Environmental Education: Principles and Practice* (London: Edward Arnold Ltd. 1978), p. vi.

curriculum. Experiential learning has no explicit intent, no guide, no curriculum. This thesis is an exploration of ways to direct experiential learning within the neighbourhood so that it supports individual development; to give it intent without turning it into a formal environmental education program. Such directing, however, is not necessarily limiting. It will be argued that the best way to enhance learning in the neighbourhood is to increase its diversity, to offer more choices to the residents.

There are several advantages to this approach. Experiential learning reduces the artificial separation between "what is taught" and "the way it really is". Even signs and interpreters can be barriers between the observed and the observer. They tend to abstract, to remove the observed from everyday (real) experience. Experiential education looks for ways to diminish that remoteness, so the learning is more direct, and is seen as legitimate, verifiable, and concrete.

Experiential education also calls more upon the resources of the observer, and is thus more engaging. It will be shown that a higher personal involvement in the process of learning will make the experience more enjoyable, more effective, and more rewarding.

This approach is discrete enough to allow a high density of learning situations without fear of cluttering the neighbourhood or overloading its residents with information, and it promotes skills of sorting and searching, which may make us more perceptive, and perhaps more creative, since pattern recognition is a fundamental component of mental agility.

One of the most valuable by-products of experiential education is a more sensuous neighbourhood environment. Since it works directly with the fabric of the neighbourhood, it can add variety and interest to common features, and new life to neglected areas. All aspects of the sensible environment can contribute to its communicative potential: sight, sound, odour, texture, etc. The neighbourhood becomes full of sensations. And since the perceived degree of involvement and intelligibility are critical components in determining landscape preference,[15] a neighbourhood environment which accommodates discovery and provides information at a variety of levels is likely to enhance the satisfaction of its residents.

Another way to illustrate the advantages of the experiential approach and clarify it is to see how it can overcome the problems encountered by formal environmental education programs. A detailed comparison of the two approaches can be found at the end of Appendix B. Generally, it appears that by taking environmental education out of the school's exclusive control and placing more responsibility on the designers and planners who shape the community, the major difficulties of incorporating it into the curriculum, instilling values, encouraging holistic thinking, and increasing environmental competence are remedied.

Enhancing development and awareness are worthy goals which fall within the realm of landscape architecture, and the neighbourhood promises to serve the original intentions of formal environmental education better than an institutional setting. Through a cooperative effort, the educational institutions and design professions can create a rich network of informal educational experiences within the community, supplemented by structured

[15] Stephen Kaplan and R. Kaplan,*Cognition and Environment*,(New York: Praeger, 1982), p. 80.

classroom lessons. The interventions proposed in this thesis are intended to stand alone, but could be elaborated with little effort to become the physical component of a network uniting the classroom and the community.

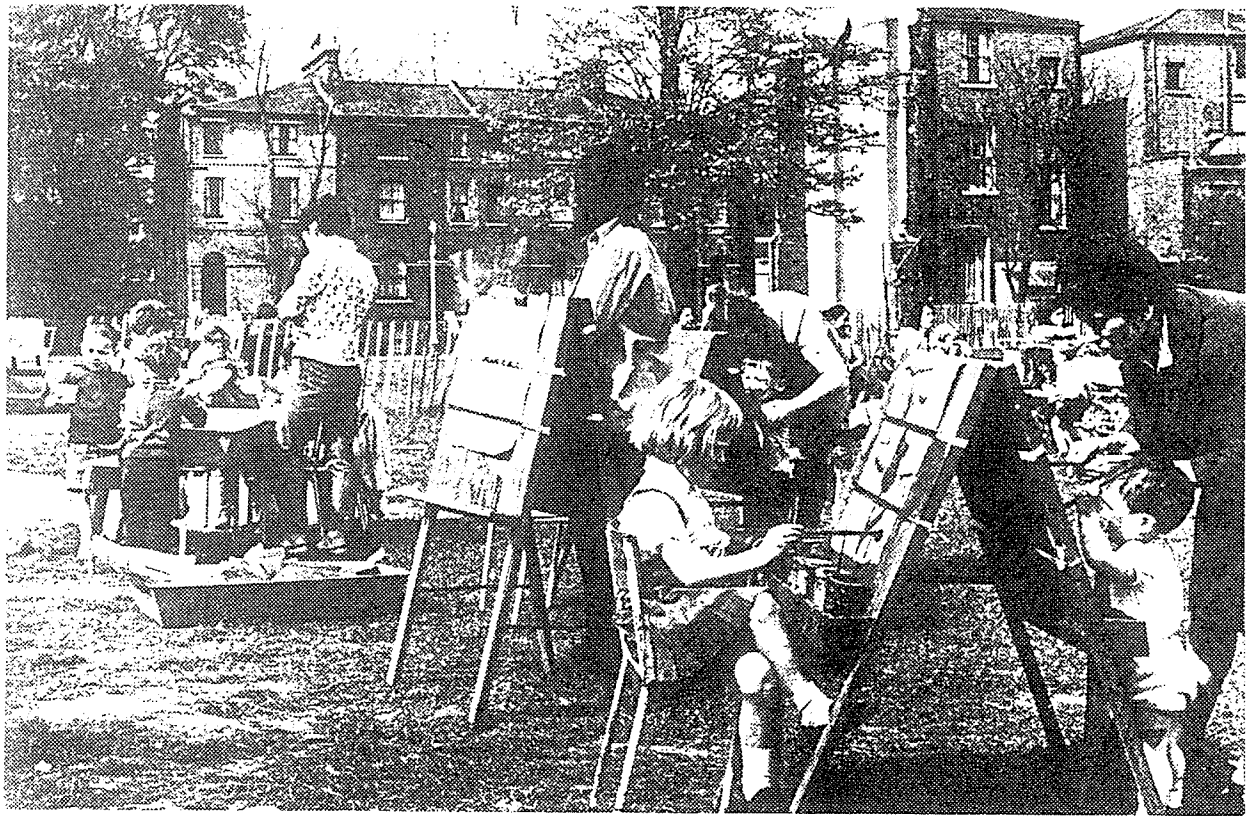

Photo from Lady Allen Hurtwood, *Planning for Play*, (London: Thames and Hudson, 1969), p. 53.

The communicative environment is the ground for individual development. It stunts or drives that growth by the richness of the information it affords, the challenge of its contrasts, the room it gives for experiment and self-expression, the response it makes to any flowering. One important way of evaluating an urban landscape therefore, is to see how it functions as a stimulus and a setting for education and self-development.

Kevin Lynch

Chapter 2
Learning

A. The Roots of Human Environmental Cognition

There is a primordial bond between people and the physical environment. The processes by which we perceive and interpret the city today are the product of the environmental conditions in which our species arose over a million years ago.

Two discreet settings had the greatest impact on what we are today. The forest canopy occupied by our earliest primate ancestors was an unusually comfortable and secure environment, but it demanded sophisticated three-dimensional vision, agility, and rapid information processing. In response, the evolving brain enlarged and devoted more of its volume to the eye and the hand, resulting in a new way of acquiring and representing information about the world. Because our hands enable us to pick up things in the environment and examine them in detail, we developed a unique understanding of the environment as a collection of discreet "objects" rather than a "continuum of events in a world of pattern."[1] Most of a child's first knowledge of the world is acquired through motor manipulation. Vision based on an object-oriented interpretation of reality relies heavily on memories of past experience in order to assist in the complicated task of recognizing objects from any angle. The tendency to perceive figure-ground relationships in abstract patterns is a manifestation of this way of thinking - an involuntary attempt to discern which elements stand as objects, and which are background.

The perceptual apparatus of the human mind advanced to the present state as our ancestors came down from the trees to occupy the open savannah.

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[1] Bernard Campbell, *Human Evolution* (Chicago: Aldine Publishing Company, 1974), p. 197, in Stephen Kaplan and Rachel Kaplan, *Humanscape* (North Scituate, Mass.: Duxbury Press, 1978), p. 25.

Neither stronger, faster, nor more prolific than most predators, early humans capitalized on their larger brains to meet the challenges of the diverse and dangerous ground environment. We survived by learning from experience. New hazards had to be recognized quickly or avoided through anticipation for our species to survive, requiring a large and rapidly accessible memory in addition to the sophisticated perceptual skills acuired in the arboreal environment. The mind achieved this through two main adaptations, both of which are central to this study: the construction of mental models, which boosts learning; and the equilibrating needs for cognitive clarity and involvement, which direct our desire to explore.

B. Learning: Mental Models

We always begin the act of perception with the narrow assumption that the environment we probe is not random, but somehow ordered and sensible. Mental models are the record of that perceived order. They are simple, coherent representations of reality in the mind: simple in the sense that they reduce the vast complexity of the world we experience, and coherent in that the order of key relationships remains intact - in other words, they work. The "cognitive map" an individual develops to navigate through the city is an example of a mental model. It contains detail about routes and areas that are familiar and important to that individual, while unused places may not be represented at all. It abstracts and condenses experience into a useable form.

Mental models appear to be constructed through a hierarchical system of *induction*: the process of drawing general conclusions from the particular instances (Fig. 2.1).

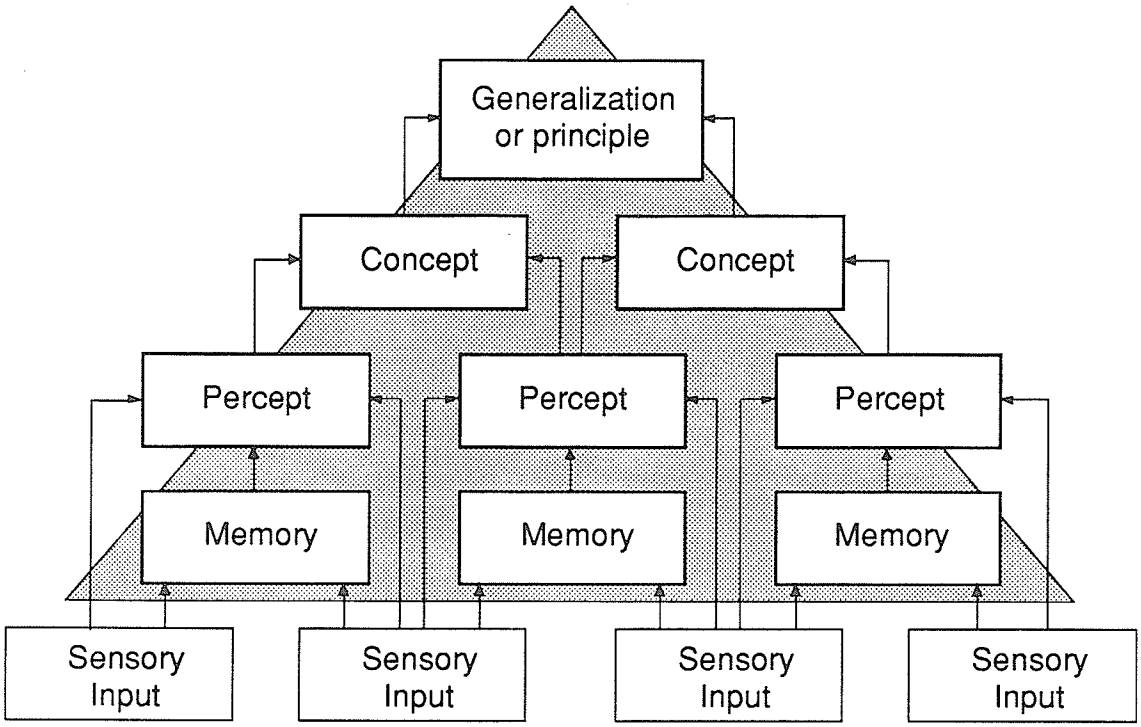

Figure 2.1. The pyramidal structure of learning. Experience is represented in the mind as a hierarchy of percepts, concepts, and generalizations. The diagram is simplified, and does not reveal how generalizations feed back to influence memories, or how concepts can be built from concepts. From Larry Sale and Ernest Lee, *Environmental Education in the Elementary School*, p. 22.

A **percept** is a mental image of the environment, a synthesis of sensory input and information from memory. The sensory input is a spatial impression in three dimensions, built up from motor investigation and visual patterns, and integrating auditory, olfactory, and tactile sensations. Memory is not only based on an experiential record of events, but also some generalizations about spatial relationships achieved through motor manipulations in childhood. Thus the memory component of a percept is pre-processed by the cognitive biases developed in the tree canopy environment.[2]

Concepts are assembled through abstraction of percepts from particular to class. We recognize certain associational patterns of information as classes and understand them as "things" or "relationships." Concepts are the building blocks of all knowledge. While other animals have a limited capacity to generate concepts, human conceptual thought is characterized by being conscious, allowing people to think well beyond the immediacy of life, to solve abstract problems, and to dream. Imagination is "the consciousness of sets of concepts."[3]

Percepts are the product of perception, and concepts are the product of cognition. According to Piaget, perception is primarily *figurative,* dealing with patterns, features, and locations of the information received through direct and immediate contact with the environment, while cognition is *operative,* invoking a series of mental operations (processes) to recode the information into schemas which can be recalled or reconstructed in the mind. Together, perception and cognition are responsible for our knowledge of the world. Werner has suggested that a reciprocal relationship exists between the two: first, perception determines cognition by providing the raw material to process; then, cognition redirects the sensory apparatus to attend to specific stimuli in the environment, thereby redefining perception[4] (Fig. 2.2).

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[2] Bernard Campbell, *Human Evolution,* in Stephen Kaplan and Rachel Kaplan, *Humanscape,* p. 25.

[3] Stephen Kaplan and Rachel Kaplan, *Humanscape,* p. 29.

[4] From Roger Hart and Gary Moore, *The Development of Spatial Cognition: A Review,* (Worcester, Mass.: Clark University Press, 1971).

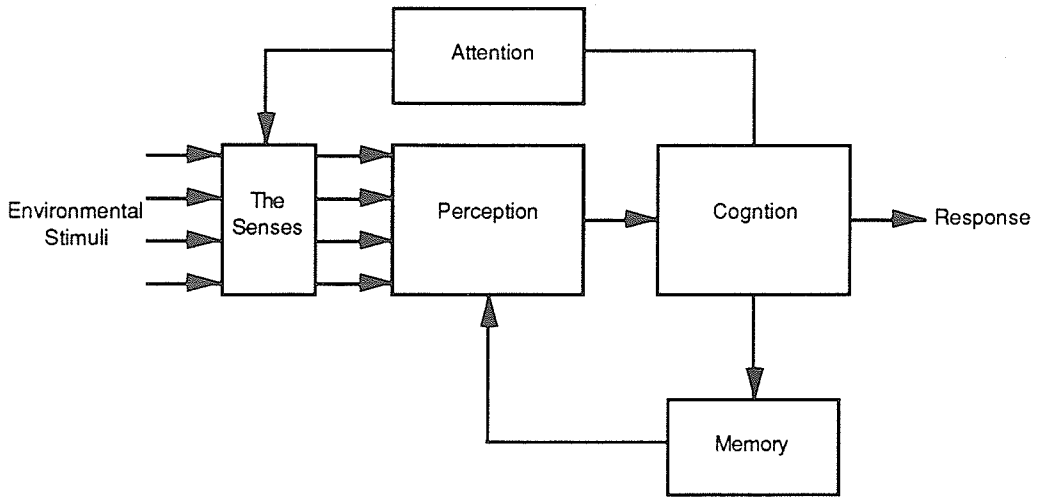

Figure 2.2. Perceptual/cognitive reciprocity. Perception determines what is processed by cognition, and cognition, through directing attention, determines what is perceived.

The highest level of cognitive modelling is **generalization**, in which we formulate the principles which guide our most complex decisions in life. Generalization is an act of sensing high-level similarities, which, according to Marvin Minsky, is largely responsible for the constructive reshaping of thoughts known as "learning."[5] Our models retain those concept elements which appear useful in a number of generalizations, while those which show no promise, are eventually dismissed.

Let us take for example how we learn about streets. No one takes the time to teach us what a street is, or how it works, or how we can tell them from sidewalks. From observation and memory, we begin to recognize that among the mental images (percepts) of all those paved surfaces we encounter daily, certain similarities allow us to classify them into different types. We form the useful concept of "street" and apply it to one of those types: the network of

[5] Marvin Minsky, *The Society of Mind* (New York: Simon and Schuster, 1986), p. 120.

directional surfaces which cars use to get from place to place. In time, we will observe the behavior of streets, and differentiate between highways, lanes, cul-de-sacs, and other variations. Generalizations will emerge, like "intersections are the most dangerous parts of streets," or later, "a system of parallel streets creates fewer traffic problems than a network pattern."[6] Earlier generalizations, like "streets cannot be crossed" will disappear with age and experience, changing our understanding of streets and the environment as a whole. But without the initial concept of street, without the recognition that a number of those paved surfaces belong to a class, these generalized principles would not be possible. The modelling of environmental information relies on the pyramidal structure from percept to concept to generalization.[7]

One of the most useful features of modelling is that it allows a person to make predictions about the future based on present knowledge. Generalization offers one method of prediction: we expect conditions common in the model to hold true in new environments of the same type, and can thus predict with some confidence the nature of unfamiliar places. If intersections in our neighbourhood are dangerous, then our cousin's neighbourhood probably has dangerous intersections too. Another method involves more specific knowledge about the environment, so that we can mentally test alternatives, to anticipate problems and avoid them. This is a

[6] This generalization is drawn from a book devoted to high level generalizations about the human environment: Christopher Alexander, et al., *A Pattern Language* (New York: Oxford University Press, 1977) p. 127.

[7] Although the percepts are not necessarily based on direct contact with the environment. In fact, most environmental information today comes from media sources, such as television, newspapers, and radio. See J. M. Richmond, "A Survey of the environmental knowledge of fifth year students in England," doctoral dissertation, the Ohio State University, 1976, quoted in A.W. Murch, "Public concern for environmental pollution," *Public Opinion Quarterly* 35, 1971, pp. 100-106.

common technique in selecting the most efficient route through town. As K. J. W. Craik puts it, the general and specific information mental models provide allows us "in every way to react in a much fuller, safer, and more competent manner to the emergencies which face [us]."[8]

Sequences in Learning

A prominent issue in formal education programs is the function of sequence in the development of knowledge and skills. Curriculum planners strive to present information in the order which most efficiently facilitates the pyramidal structuring of facts and principles. Jerome Bruner writes, " . . . the sequence in which a learner encounters materials within a domain of knowledge affects the difficulty he will have in achieving mastery."[9]

For experiential education, the question arises whether sequence is important in the formation of mental models about the neighbourhood. There is reason to believe it is not. Sequence is so important in formal programs because the student has little choice or control over the subject matter that is presented. Because of the diverse backgrounds of all students, lessons have to be generic, overlooking past experiences of the students or individual differences in learning styles. A well-structured curriculum builds upon itself, substituting earlier lessons for individual experience as the common foundation of more complex generalizations.

In casual learning from the environment, the learner is free to explore and

[8] K. Craik, *The Nature of Explanation* (New York: Cambridge University Press, 1943), p. 61.

[9] Jerome S. Bruner, *Toward a Theory of Instruction* (Campbridge, Mass.: The Belknap Press, 1966), p. 49.

attend to only those things which are comprehensible and compatible with the intellect and existing mental model. The model is updated through two alternating processes: *assimilation* and *accommodation*. In assimilation, compatible new experiences are fit into and support an existing image of the world, until that image is no longer adequate to encompass them all, and a new idea of the world emerges to accommodate them.[10] There is little danger of an environment "talking over the heads" of its inhabitants, because the more advanced information it contains can either be ignored, or if it is compelling enough, it can trigger a new accommodation. Only when we are bombarded by a mass of complex signals does the setting become overwhelming. An infant lost in the heart of an urban centre, or a tourist in a busy foreign marketplace can be traumatized by an overload of incomprehensible information. But such situations are uncommon, and nearly non-existent in the familiar neighbourhood. The ideal configuration is an environment which provides a number of levels of information, some complex, others straightforward and clear.

The problem of sequence is confounded by the tendency, explained in detail in Chapter 3, for children to explore intensively and adults to concentrate on an extensive model of the neighbourhood and its city context. This suggests that the impulse to have more complex ideas hidden, and the simpler elements obvious ought to be reversed. By highlighting complex elements, like hydro poles and transformer boxes, adults can be drawn to look in more detail at the neighbourhood, and children can begin formulating hypotheses about the function of those things. As John Holt points out, a feature of children's relentless curiosity is a remarkable capacity to wait for

[10] Robin A. Hodgkin, *Born Curious: New Perspecitves in Educational Theory*, in Robin Moore, Childhood Domain, p. 94.

understanding to arrive.[11] The sequence of environmental learning, which must be addressed in the plan, is therefore determined by the attentional biases of each age group that lives and grows up in the neighbourhood, and their tolerance for uncertainty. Optimizing this sequence requires altering the level of information available to each age group so that those places and elements of interest to that group are sufficiently challenging to maintain interest without overwhelming them.

Language in Concept Formation

The ability to form concepts is greatly enhanced by language. When looking at a landscape, we assign words to the objects we recognize. Kenneth Clark suggests that in visual perception, the initial "pure aesthetic sensation" is quickly replaced by a linguistic interpretation of the situation, providing the mind with a new intellectual framework to perceive the scene afresh.[12] This transition from raw perception of stimuli to a verbal elaboration is central to the shaping of thought , especially in higher learning. As Luria writes:

> The word has a basic function not only because it indicates a corresponding object in the external world, but also because it abstracts, isolates the necessary signal, generalizes perceived signals and relates them to certain categories; it is this systematization of direct experience that makes the role of the word in the formation of mental processes so exceptionally important. [13]

Words fix ideas, enabling us to more firmly grasp the concept and hold it in our minds, and to connect it to others.

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[11] John Holt, *How Children Learn* (New York: Dell Publishing Co., 1983), p. 287.

[12] Kenneth Clark, *Looking at Pictures* (New York, Holt, Rinehart and Winston, 1960), p. 16, in John A. Jackle, *The Visual Elements of Landscape* (Amherst: the University of Massachusetts Press, 1987), p. 13.

[13] A. L. Luria, "The Directive Function of Speech in Development and Dissolution," in *Word* 15, 1959, p. 12, quoted in Jerome S. Bruner, *On Knowing* (Cambridge, Mass.: The Belknap Press, 1979), p. 91.

Unless we are using proper names, words imply certain categories and levels of abstraction for the objects. For example, we will call one landscape a "pasture" and another a "romantic garden," each label denoting its own specific class of semi-natural environment. The pasture will be grouped in the mind with other agricultural concepts, while the romantic landscape will be categorized with other gardens, and the entire romantic movement. It operates at a deeper level of abstraction - there is more there than meets the eye. The labels we assign lead us to see these two very similar landscapes as different things.

One of the difficulties in conceptualizing landscape is that it is often hard to find words to describe such a complex and rich experience. Its simultaneity resists the linear, sequential structure of verbal description. The danger lies in a tendency for people to ignore that which they cannot express. "If an experience resists communication, a common response is to deem it private, even idiosyncratic, and hence unimportant."[14] Those aspects of the landscape which cannot be verbalized may slip from memory.

This observation would seem to have serious implications for a program of experiential education, limiting the depth of comprehension for those components of the environment which we cannot describe in words. Fortunately, there appear to be some powerful non-verbal modes of communication which we learn to rely upon when interpreting the environment. These will be discussed in the next section. Nevertheless, the program would benefit from better verbal skills among children and adults, and from the invention of words and place names which reduce the

[14] John A. Jakle, *The Visual Elements of Landscape* p. 13.

complexity of landscape by more fully accommodating verbal categorization.

Models and Meaning

A mental model not only is a representation of environmental form, it also incorporates *meaning*: the practical and emotional associations which are evoked by a place. Meaning has been shown to profoundly influence image-making in the city.[15] According to Rapoport, people form their first impression of environments from an emotional reaction to the whole situation before they analyze them and evaluate them in more detail. That response "governs the direction that subsequent interactions with the environment will take."[16] He argues that the reaction is based on the "meaning" the place holds for the individual.

Harrison and Howard developed a system useful for differentiating between people's impressions of an environment's form and impressions of its meaning. According to his research, people evaluate places according to physical attributes, such as location and appearance; and cultural (or meaningful) attributes, such as religious or economic significance and personal affinity. Some image elements, like paths, are most often described in terms of their physical location; others, particularly districts, are characterized by meaning; while landmarks, which function as symbols and orientation guides, tend to be described by a combination of appearance, location, and meaning.

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[15] James D. Harrison and William A. Howard, "The role of meaning in the urban image," in *Environment and Behavior* Vol 2, No. 6, Dec. 1972; Amos Rapoport, *The Meaning of the Built Environment: A Nonverbal Communication Approach* (Beverly Hills, Calif.: Sage Publications, Inc., 1982); and John A. Jakle, *The Visual Elements of Landscape.*

[16] Amos Rapoport, *The Meaning of the Built Environment* p. 14.

Overall, their findings indicate that meaning plays a more significant role in people's image of their city than its physical appearance, and is of equal importance to the components of location and appearance combined. The most common components of urban image were found to be the location of elements for purposes of orientation, the function of those elements, and the ability of elements to serve the individual's needs; that is, an assessment of the element's utility, effciency, or convenience. The researchers caution that their sample was small, and that such superficial and negative assessments of the city may not be generally true. Deeper levels of understanding, association and appreciation might emerge in a more engaging environment.

For Jakle and Tuan, meaning is the ingredient that turns "space" into "place." A place is a locus of meaning and behavioral cues, an area which people recognize as significant, and which has appropriate behaviors associated with it. Tuan distinguishes space as open, free, and supportive of movement, and place as bounded, secure, and conducive to pausing.[17] Norberg-Schulz agrees, noting that places are more tangible (albeit atmospheric), described by nouns, while space is a matter of relations, described by prepositions like "behind," "over," and "under."[18] "Space is a problem of orientation, place is a problem of expectation."[19] Space forms the framework for experiential learning, and place provides content.

Learning to the read environmental cues that designate a place begins in early childhood, and involves the same process of generalization outlined earlier

[17] Yi-Fu Tuan, *Space and Place: The Perspective of Experience* (Minneapolis: University of Minnesota Press, 1977), p 15.

[18] Christian Norberg-Schulz, *Genius Loci* (New York, Rizzoli, 1979), p. 16.

[19] John A. Jakle, *The Visual Elements of Landscape*, p. 31.

in this chapter, but it operates on a level of communication higher than that used in simple physical modelling of the environment. It is a symbolic realm, which varies between cultures and is open to a wide range of individual interpretations. While the generalizations which make up a physical (i.e. spatial) model of the world are constructed through a pseudo-scientific method of hypotheses and multiple tests, symbolic associations can occur spontaneously when one thing simply reminds us of another. Any pattern of information is subject to unintentional associations, capable of altering opinions and changing behavior in a manner both profound and unpredictable.

Because it is inconsistent at the group level, difficult to predict and even harder to control by manipulating city form, meaning seems to defy planning. As a result, Lynch and others have avoided lengthy discussion of it in their work on urban perception.[20] Yet failure to recognize the associative dimensions of built form have resulted in such well-publicized disasters as the Pruitt Igoe housing project and the lesser known case of the Dutch seniors housing project whose exposed structure reminded its residents of coffins between graveyard crosses.[21] Rapoport argues that because we live in a non-traditional society, there is a greater need for clear, meaningful cues than traditional cultures, where the subtlest cues are part of the common heritage, and easily recognized by all its members.

Today's urban environment has such a complex and chaotic spatial organization that meaning must be superimposed through signs and other

[20] Kevin Lynch, *The Image of the City* (Cambridge, Mass.: The MIT Press, 1960), p. 8.

[21] Amos Rapoport, *The Meaning of the Built Environment* p. 20.

icons.[22] The situation is further complicated in twentieth century culture by an aggressive opposition to tradition and custom: the basic safe guards of conventions in meaning.[23] Consider for instance the reduction of entrance articulation in modern buildings (Figure 2.3).

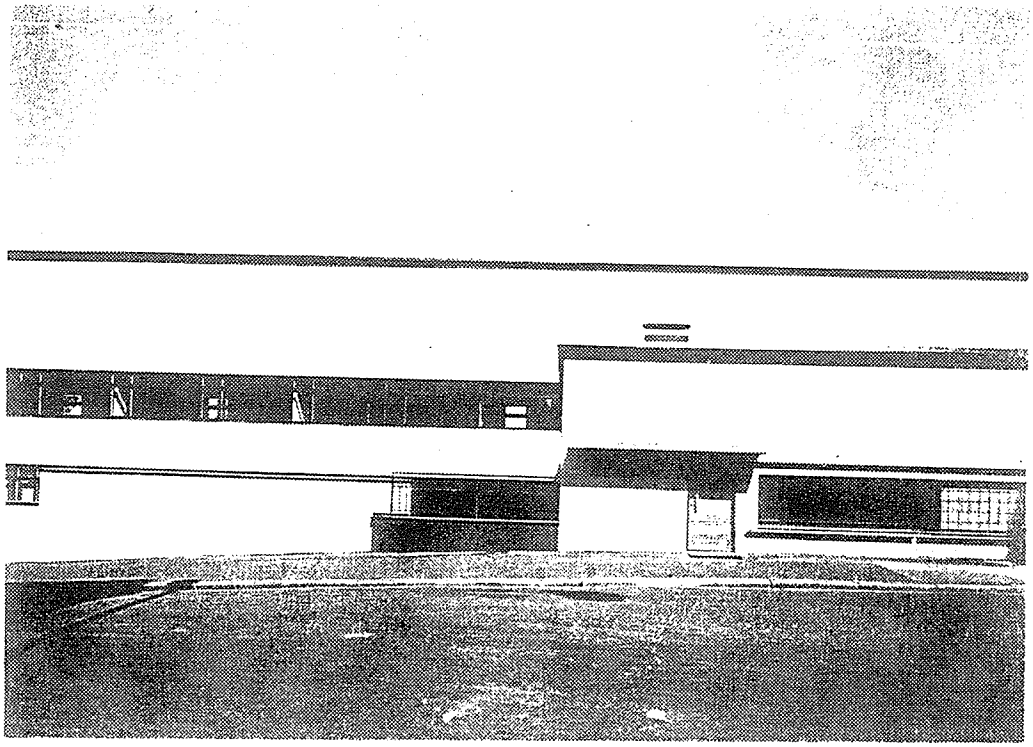

Figure 2.3. Modern architecture relinquishes cues. The main entrance of this Finnish building by Aulis Blomstedt is indicated by a simple canopy alone. Annexe to the Workers' Institute, Helsinki, 1959. From *Finnish Architecture* (Helsinki: the Museum of Finnish Architecture, 1979), plate 47.

This appears to be a deliberate contradiction of the tendency found throughout history and across most cultures to emphasize the entrance. While postmodernism is to some extent a return to tradition, its capricious use of meaningful elements leads to unconvincing buildings which lack

[22] Robert Venturi, Denis Scott Brown, & Steven Izenour, *Learning From Las Vegas* (Cambridge, Mass.: the MIT Press, 1977), p. 9.

[23] Amos Rapoport, *The Meaning of the Built Environment* p. 46.

integrity.[24] Such buildings are "over-cued," and the cues are juxtaposed in a way that the result is nonsense (Figure 2.4). Even those architects who are venturing directly into the jargon-based study of **semiotics**, are having difficulty developing a useful understanding of meaning in built form.[25]

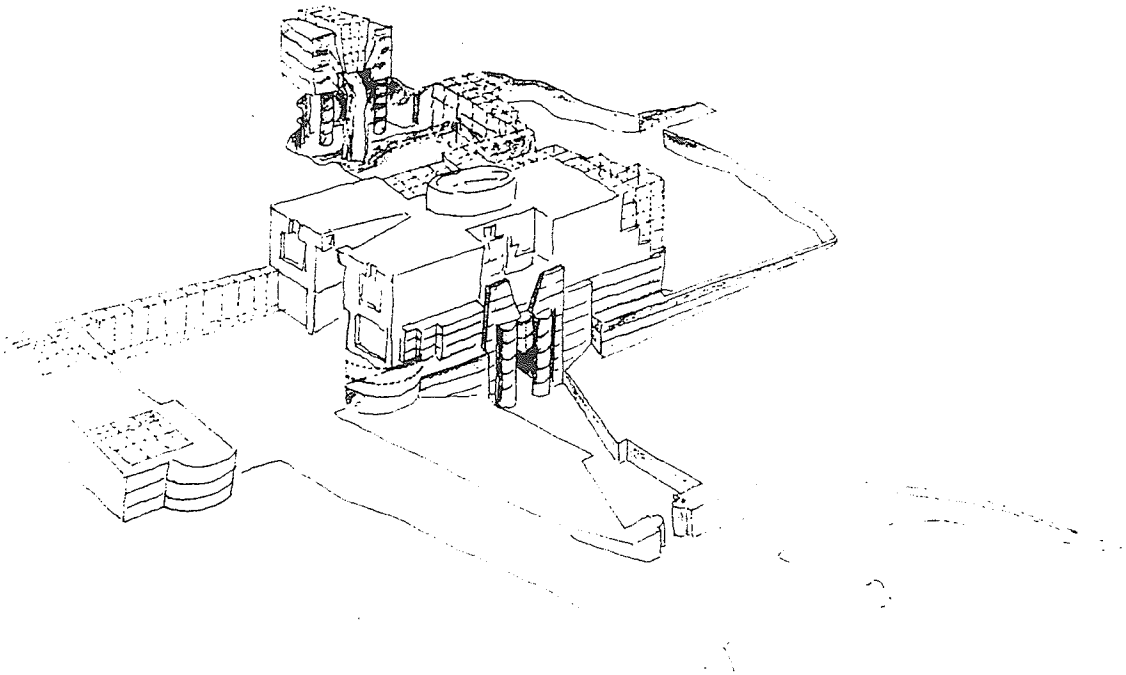

Figure 2.4. Postmodern architecture misappropriates cues. Michael Graves, Plocek House, bird's eye sketch. From William Hubbard, *Complicity and Conviction: Steps Toward an Architecture of Convention* (Cambridge, Mass.:The MIT Press, 1986), p. 217.

The reliance on signs and symbols in our cities may affect the expectations of residents when we try to improve of the neighbourhood as a communication medium. How well will people perceive non-verbal communication?

Rapoport maintains that non-verbal communication is still the major channel for environmental information, and he offers some guidance as to

[24] William Hubbard, *Complicity and Conviction: Steps Toward an Architecture of Convention* (Cambridge, Mass.: The MIT Press, 1986), p. 7.

[25] Amos Rapoport, *The Meaning of the Built Environment* p. 42.

how meaning can be incorporated in the planning repertoire. First, we must understand how cues work and how they can be strengthened. Unlike verbal communication, which is denotative and linear, environmental communication is a form of coding, and has no sequential structure or grammar. In order to decide what a place means, we must make judgements, directed by the strength and clarity of its cues, our willingness to act on weak cues, and the context of the communication. Clear, redundant cues in an appropriate context will reduce the required degree of inference.

What constitutes a cue? Yi Fu Tuan defines a place cue as "whatever stable object catches our attention."[26] The first step in all communication is the recognition of difference, and information is "any difference that makes a difference."[27] The cue must stand out from the environment, whether through colour, form, noise or other means. Once noticed, we can look for indications of meaning in the cue: does it present danger, does it look expensive, does it remind you of a situation, or foretell of a future event? Its significance might be characterized by any of the cultural components of meaning and association described by Harrison and Howard.

Deciding if the difference "makes a difference" requires some cultural knowledge, which is acquired either through enculturation for residents, or by simple observation and inquiry for visitors. In most North American cities, a six-foot tall impenetrable hedge in someone's front yard would be interpreted as an offensive antisocial affront to the neighbourhood. The same neighbours, while travelling through Denmark, might discover that such hedges are the norm, but have little to do with privacy. Instead, they are

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[26] Yi-Fu Tuan, *Topophilia: A Study of Environmental Perception, Attitudes, and Values* (New Jersey: Prentice-Hall, Inc., 1974).

[27] Gregory Bateson, *Mind and Nature* (Toronto: Bantam Books,1980), p. 250.

analagous to our suburban lawns: carefully nurtured as an public indicator of status, identity and values.[28] The same planting configuration is a cue with negative associations in one culture, and positive associations in another.

Thus in order to clarify cues, a designer must develop a sensitivity for those cues which have fairly stable and widely held associations, and look for ways to make them more noticeable. Play structures are highly visible, and unless opposed by obvious cues of private property, they indicate to children that this place is open to them. Anita Green, in her recent thesis, suggests that such cues can be effective in attracting children to areas such as woodlots which may not be typically childhood domain, but offer great potential for exploration and learning.[29] The play structure says, "It's okay to be here."

Redundancy is a term used in information theory to indicate the additional messages contained in a communication.[30] These are not essential, but serve to buttress the principal message and compensate for errors in transmission. When environmental cues add up, they are considered redundant. A single bit of graffiti in a neighbourhood is less informative than a series of large graffiti paintings, littered alleys, vacant buildings, and vagrants on the street. One can more quickly and accurately assess an area if redundant cues are present. In our play structure example, other cues like pedestrian paths, bike racks, and a generally high level of maintenance will contribute to the child's impression of this as a safe and proper place to be, (and at the same time

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[28] Amos Rapoport, *The Meaning of the Built Environment* p. 130.

[29] Anita Green, unpublished thesis, (Winnipeg: Department of Landscape Architecture, University of Manitoba, 1988).

[30] Jeremy Campbell, *Grammatical Man: Information, Entropy, Language and Life* (New York: Simon and Schuster, 1982), p. 69.

clarify the lack of adventure, repelling as many children as it would attract!)

Context also influences the interpretation of cues. A hedged yard among a row of hedged yards means something different than solitary hedged yard (Figure 2.5)

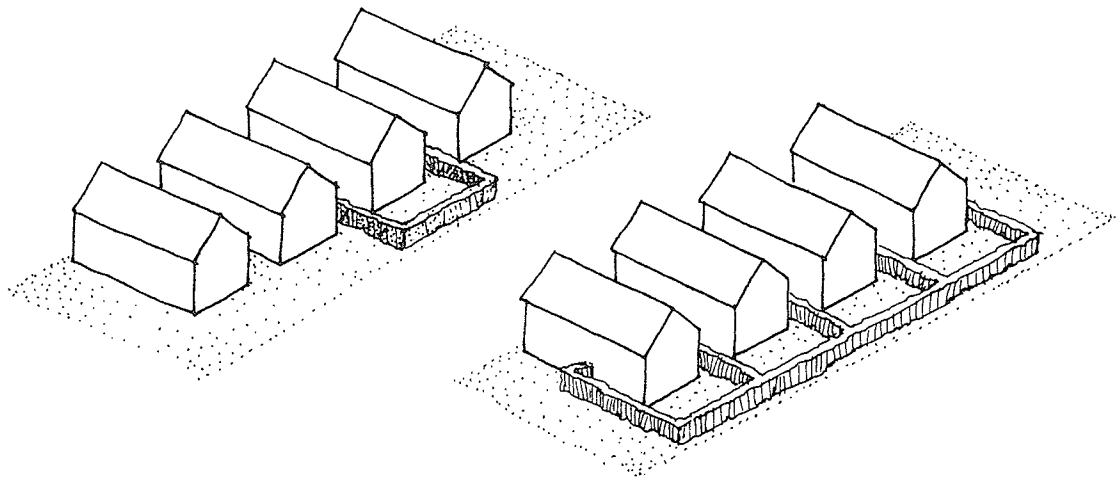

Figure 2.5. The effect of context on meaning. The solitary hedge communicates attitudes of privacy, interaction, and boundary control. The hedge among others merely implies conformity.

For maximum legibility, the cue must make sense in its context: it must appear to belong. However, a strong contrast between the cue and the context (for example, a tree on a bridge) can also be highly evocative, even though the exact content of the message it evokes may be unclear. Information is a matter of predictability: the less we know or can guess about an incoming message, the more information it will contain. A message which is entirely predictable contains no information at all; it is telling us nothing new.[31] Like a detective's clue, the tree on a bridge contains more information than a tree along a road, because we would not expect to find it there.

The technique of context mismatch shows great potential for the experiential education. Not only is it highly noticeable, but because there is the promise of

[31] Ibid, p. 68.

greater information, it arouses curiosity. One does not expect to find a play structure in the middle of a woodlot. Why is it there? The appeal of this approach is dependent on the degree and nature of the mismatch (some may be disturbing), and on the viewer's willingness to suspend understanding in favour of involvement. This dialectic will be discussed in detail in the next chapter.

Rapoport's second method of addressing the need for meaning is to plan urban environments which gain associational significance through facilitating change, personalization, and involvement, rather than trying to portray fixed meanings for all aspects of city form. The city should be a framework which encourages the formation of individual associations. This, like complex and mysterious form, contributes to the resident's sense of engagement in the environment.

The adventure playground, which provides the tools to create places, instead of just occupying them, is a unique opportunity for children to invest personal meaning in the environment. And it is meaningful on a number of levels, including the associative links to urban form, role playing in the structures, and cues to denote territory.[32]

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[32] Sam Nicholson, "The theory of loose parts," in Gary J. Coates (ed.), *Alternative Learning Environments*, (Stroudsburg: Dowden, Hutchinson & Ross, Inc., 1974).

Models in Cognitive Development

Our competence in dealing with diverse environments relies on the extent, power and accuracy of our mental modelling. But models are not just a matter of experience, for while we have shown how the experiential bond with the environment that exists during middle childhood surpasses that of any other age group, children's models of the environment are generally less extensive and accurate than those of adults, and children are generally less capable of functioning in an unfamiliar setting. This is because their sense of the world springs from a complex matrix of emerging innate abilities and modes of representing experience. The tools necessary to construct a powerful model and extrapolate from it are not all in place until most children are teenagers.

Piaget has found that intellectual capacity increases as we pass from infant to adolescent according to a genetically-determined sequence of stages. Each stage provides a set of core skills which dictate the sorts of mental activities the child can perform, built upon the foundations of the previous stage. In the earliest stages we discover (primarily through motor manipulation) core concepts useful in understanding reality: space, time, laws of conservation, constancy, and order, for example. These are pan-cultural concepts, apparently wired into us at birth.[33]

As this process of cognitive development proceeds, the modes of acquiring information from experience and representing that information in the mind are also undergoing change. Experience cannot be directly translated into knowledge. Physical energy emissions from objects in the environment are

[33] Yi-Fu Tuan, *Topophilia*, p. 8.

raw stimuli, which are filtered by the child's immature perceptual apparatus before its image is represented or its meaning interpreted. The mode of filtering also influences the way in which experience is acquired; that is, the kind of inquiry the child is engaged in, such as exploration, role-playing, or imitation. According to Hodgkin, there are four such modes, which correspond to the staged development of core skills as described by Piaget (Figure 2.6).

Jerome Bruner clarifies these modes using the example of a see-saw:[34]

-**interpersonal**: things can be understood in reference to other people, particularly the parents: the see-saw is a social device, requiring cooperation.

-**enactive**: things can be understood through manipulation, use, and play: the see-saw moves if pushed, but only up and down.

-**iconic**: children begin to understand the world as models, simplified versions of reality: the see-saw is a lever with a central fulcrum, which can be represented as a scale model or diagram.

-**semiotic/symbolic**: things can be understood verbally or mathematically: the see-saw can be described verbally in detail, or its behavior predicted using Newtonian mechanics.

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[34] Jerome Bruner, Allison Jolly and Kathy Sylvia (eds.), *Play: Its Role in Develoment and Evolution* (Harmondsworth, Middlesex: Penguin Books, 1976), in Robin Moore, *Childhood Domain*, p. 12.

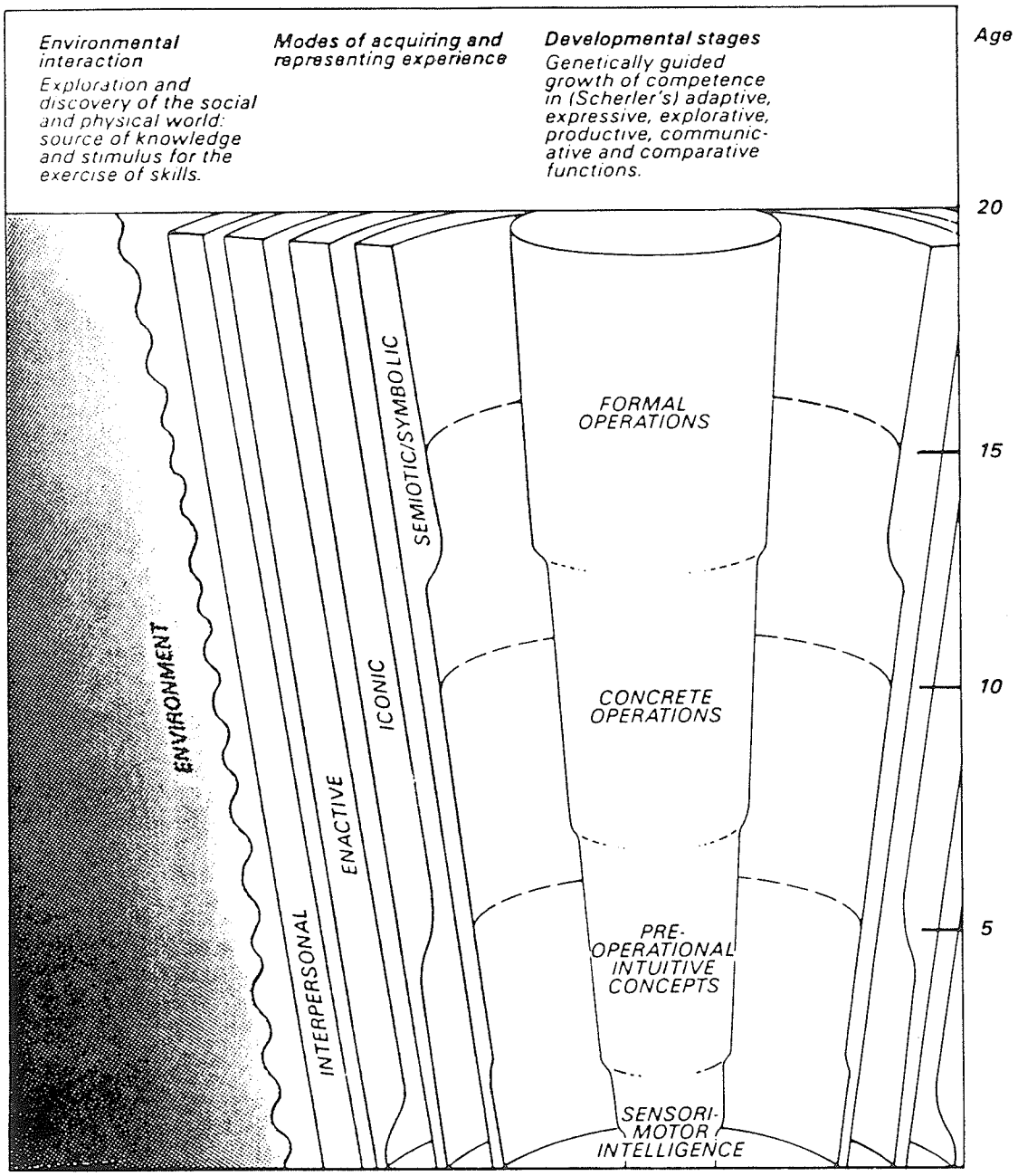

Figure 2.6. Hodgkin's model of the development. Core skills develop according to a genetically determined stages, while corresponding changes occur in the modes of interaction with the environment. As children mature, they develop increasingly powerful tools to perceive and interpret the world. The middle age child is able to relate to the world through interpersonal, enactive, and iconic modes, and has acquired all of the core skills except abstract, formal operations. Adapted from Robin A. Hodgkin, *Born Curious: New Perspecitves in Educational Theory*,(London: John Wiley and Sons, 1976), p. 96, in Robin Moore, *Childhood Domain: Play and Place in Child Development* (London: Croom Helm Ltd., 1986), p. 13.

It is important to note that previous modes of interaction are not replaced, but are subsumed by the new mode, so that an older child has a variety of different ways of investigating and describing the world, just as she is capable of a variety of mental operations (core skills) to find meaning in the experience. Different situations will require the child to switch modes and employ different operations.

By age eight, the child has usually acquired concrete operational competence, which allows all the operations of logical thought, but limits them to real objects; and she is capable of interacting with the environment at the iconic level. In light of Hodgkin's findings, it is little wonder that children's mental models are less precise than those of adults, since the ability to formulate higher level abstractions does not fully emerge until most are eight years old. At earlier ages, the child becomes familiar with and models a limited range of space, but has trouble generalizing about the conditions that exist outside of experience. The investigations in Chapter 5 were designed in accordance with this general level of cognitive development and the modes of representation acquired by the sample of children.

In each mode, children gain knowledge from their interactions with environment according to a process of assimilation and accommodation described above. New accommodations are far more frequent in childhood than for adults. This allows their models, however primitive, to become increasingly complex and accurate, nourishing a growing level of environmental competence.

C. Environmental Competence: Skills

Virtually any problem will be easier to solve the more one learns about the context world in which that problem occurs. No matter what one's problem is, provided that it's hard enough, one always gains from learning better ways to learn.[35]

Robin Moore asserts that the "loss of the capacity to experience for its own sake" lies at the root of the educational crisis, and is behind the impression of most adults that the world is too complex for them to understand, that they are incapable of doing things for themselves, and that experts are required for everything from raising a child to dealing with death.[36]

These are problems of environmental competence: people's ability to deal with their immediate surroundings in a confident, effective and stimulating manner.[37] One of the primary goals of experiential education should be increased environmental competence: that is, knowledge, skills, and attitudes which can be applied to solve problems in real situations. It has been theorized that competence comes from two sources: it is acquired during the conscious striving to acquire new skills and knowledge, or arises naturally through performance and practice during childhood play.[38] Pearce writes:

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[35] Marvin Minsky, *The Society of Mind*, p. 177.

[36] Robin Moore, *Childhood Domain*, p. 232. For a discussion of the "culture of life by proxy", see the final chapter of Michel Ragon, *The Space of Death*, trans. Alan Sheridan, (Charlottesville: University of Virginia, 1983).

[37] Fritz Steele, "Defining and developing environmental competence," in C. P. Alderfer and C. L. Cooper (eds.), *Advances in Experimental Social Processes* 2, pp. 225-244, quoted in Robert Gifford, *Environmental Psychology, Principles and Practice*, Newton, Mass.: (Allyn and Bacon Inc., 1987) p. 293.

"Through interaction, the mind grows in its ability to interact."[39] Interaction with the environment during the formative years provides the essential basis for creativity, abstraction, and insight.[40]

The motivations for playful behavior are unclear, but the prime driving force behind the much of the development of competence seems to be self interest. After infancy, children require certain skills to get what they want -- they need to learn to interact appropriately with their providers and their environment. But soon the acquisition of skills for their own sake becomes the goal.

Marvin Minsky explains this transformation using as an example a baby who forms the subgoal of engaging another person's help to bring it a drink. In so doing, the baby finds itself (quite unintentionally) concerned with understanding and predicting the motives and dispositions of others. "A relatively modest goal can lead to a larger competence . . . an initially simple concern with personal comfort becomes transformed into a more ambitious, less self-centered enterprise." He calls this the principle of **functional autonomy**: "In the course of pursuing any sufficiently complicated problem, the sub-goals that engage our attentions can become both increasingly more ambitious and increasingly detached from the original problem."[41]

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[38] Robert W. White, "Motivation Reconsidered: the Concept of Competence." *Psychological Review* 66, 1959, pp. 297-333, quoted in Robin Moore, *Childhood Domain*, p. 15.

[39] Joseph Chilton Pearce, *Magical Child: Rediscovering Nature's Plan for Our Children*, (New York: E. P. Dutton, 1977), p. 25.

[40] Stephen Kaplan and Rachel Kaplan, *Cognition and Environment*, p. 93.

[41] Marvin Minsky, *The Society of Mind*, p. 177.

> Many of us would like to believe that our intellectual enterprises lie on higher planes than our everyday activities. But . . . when we get right down to it, our most abstract investigations can be seen as having origins in finding enough functional autonomy to put their roots aside. In the end, our initial goals matter scarcely at all, because no matter what our original objectives, we can gain more by becoming better able to predict and control our world. It may not even matter whether an infant was initially inclined to emulate or to oppose a parent, or was first moved primarily by fear or by power. Whatever one's goals, they will be easier to achieve if one can become wise, wealthy, and powerful. And these in turn can best be gained by understanding how things work.[42]

Because the home and neighbourhood are the first source of knowledge, and the primary stimuli for exploration and play, the degree of competence acquired is directly dependent upon the quality of those environments. What happens if they fail to provide opportunities to understand how things work?

> . . .we know now that the early challenges of problems to be mastered, of stresses to be overcome, are the preconditions of attaining some measure of our full potentiality as human beings. The child is father to the man in a manner that may be irreversibly one-directional, for to make up for a bland impoverishment of experience early in life may be too great an obstacle for most organisms.[43]

Bruner describes an experiment in which experimental rats raised in an environment of sensory deprivation produce chemicals in their brains associated with dullness. A child restricted by an unstimulating, inaccessible neighbourhood environment may develop a lower motivation toward

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[42] Ibid.

[43] Jerome S. Bruner, *On Knowing*, (Cambridge, Mass.: The Belknap Press, 1979), p. 7.

competence. A lack of environmental competence, unless compensated by other abilities, can contribute to those feelings of inferiority and lowered motivation and self-esteem, which are among the most pervasive problems of today's youth.[44] As Moore suggests, the population that emerges from this background will consider itself under-qualified for the task of living.

Thus children of age 8 - 12 comprise a special group. Not only are they extraordinarily well tuned to the environment and hungry to discover all it has to offer, they also have the most to lose if the environment fails to satisfy them. We must ensure that opportunities for diverse experience, observation, and manipulation abound in the neighbourhood. But what specific skills does a child need to acquire to develop a well-rounded competence?

Karl Scherler has identified six developmental functions of play as a means of gaining competence, described here by Robin Moore:

1. The *adaptive* function - the biological adjustment of the child, development of strength, stamina, speed and pliancy;

2. The *expressive* function - evoking such emotions as tension, inquisitiveness, fury, hate, pleasure, joy and annoyance;

3. The *explorative* function - learning how to distinguish high, low, small, large, before, behind, soft and hard; to distinguish social roles and to learn how the adult world works;

4. the *productive* function -learning how to make things and how to

[44] Robin Moore, *Childhood Domain*, p. 14.

alter them;

5. The *communicative* function - learning how to behave in relation to other people, to cooperate, to accept rules, to protect the weak, to empathize and relate to the points of view of other people;

6. The *comparative* function - learning to measure one's strength against others and to win and lose.[45]

Translating Scherler's functions into environmental terms, we see the need for opportunities to build athletic ability, express emotions, explore, make things and change things, meet with others and cooperate, and compete.

Another function which serves competence indirectly is solitude. The value of opportunities to be alone in the neighbourhood is as much spiritual as practical. It allows an escape from the influence of others, a chance to think, to be silent, to observe, or engage in introspection. In short, the option of solitude helps us to cope with problems. Such places offer the neighbourhood equivalent of a privacy - much prized in our society, but often hard to obtain, especially for children.

Though not exhaustive, these seven functions encompass competence goals in the creative, social, physical, and contemplative realms of being, and might be seen as a primitive sort of curriculum for a program of experiential education.

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[45] Karl H. Scherler, "Umwelt als Bewegungsraum,"*Sportpadagogik* 1979, 6, 16-25, (German) quoted in Moore, p. 15.

D. Environmental Ethics: Values

Mere "know-how" is not enough to constitute development. The ultimate task of any education must be to assist students in gaining the wisdom to properly apply their abilities. E. F. Schumacher has warned that the emphasis on "know-how" without a clear system of values to guide its use is among the most dangerous developments of the twentieth century. To him, the assimilation of values is the "essence of education."[46]

Yet teaching values is a difficult task, especially in our pluralistic society, where the most influential ideas -- among them evolution, entropy, Marxism, positivism, and relativity -- deny that any particular thing is intrinsically better than another. Everything is relative, temporary, and amoral. Given this confusion, if you try to instruct values directly, objections arise as to the particular values you teach. Others will assert that values are the jurisdiction of parents and the Church. If you decide instead to let students discover their own values, then you are promoting a philosophy of ethical relativism, which offends those who hold that values transcend personal preference, that there are inalienable rights and absolute goods. There is no neutral method to teach values. It is destined to be controversial.

The position taken on values in this study is that they are a vital component of development, and that the neighbourhood should act as an "informational support" to assist residents in making value decisions, whatever their source of values. This is drawn from the Chadwick and Meux model of value decision-making, in which information is used to support movement from a general, widely-accepted value criterion (i.e. "rare things are worth keeping")

[46] E. F. Schumacher, *Small Is Beautiful*, (London: Sphere Books Ltd, 1974), p. 72.

to a more specific and personal value judgement ("I should protect endangered wildlands").[47] The neighbourhood can provide facts, concepts, and alternative solutions, illustrate the pros and cons of various interventions and behaviors, and reveal the inter-connections that make things work, but it does not indoctrinate residents with a particular point of view, thereby avoiding most of the controversy.

Research supports the claim that engagement with the exterior environment can influence value judgements, though the studies are far less conclusive than those which investigate its influence on the cognitive domain. Kohlberg has described how moral standards develop in close association with environmental experience over the middle childhood period.[48] Other studies have shown that formal outdoor educational experiences facilitate "positive" changes in children's attitudes - better self image, broadening of friendships, and a substantial improvement in racial relations. The latter findings may be a reflection of the camp setting's relaxed tone, isolation, or activities which require cooperation and communication, rather than a direct result of the exterior environment.

Julie Honnold found that information presented during childhood does show an immediate effect on the students' values, but does not necessarily maintain its effect on values in later life, suggesting that concentrating on educating the young may not be the best strategy for affecting environmental change.[49] It is no doubt true that a campaign for environmental awareness

[47] The Chadwick-Meux is described in Kinsey and Wheatley, "An Instrument to inventory the defensibility of environmental attitudes," in *Journal of Environmental Education* 12, No. 1, Fall 1980, p. 31.

[48] L. Kohlberg, "Moral stages and moralization," in *Moral Development: Current Theory and Reasearch*, (York: Holt, Rinehart & Winston, 1976), quoted in Trudi E. Bunting and Larry R. Cousins, "Environmental dispositions among school-age children: a preliminary investigation," in *Environment and Behavior*, Vol 17, No. 6, Nov. 1985, p. 757.

would be more effective if aimed at a broader audience. But research has shown that instilling a sense of personal efficacy and responsibility are a critical and often missing ingredient in attempts to communicate values and motivate action.[50]

It follows that the instability of environmental values with age occurs because children have a lower sense of efficacy than adults. The period in which they are most sensitive to the environment as an informational support is temporally removed from the period in which as adults, they are powerful enough to do something about it. So to some extent, the stability of childhood values can be increased if we also increase their sense of competence and *immediate* control and responsibility.

Thus a more engaging neighbourhood environment can influence the formation of values in two ways. First, through increased competence and participation, the sense of personal responsibility and confidence may be increased. The neighbourhood must be "influenceable:" it must let children know that they can make a difference. Second, and as a richer source of information, it will assist in making value decisions. The key to this second result is wider accessibility.

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[49] Julie A. Honnold, "Age and environmental concern: some specification of effects," in *J.E.E.* 16 No.1, Fall 1984, p. 9.

[50] James Swan, "On values clarification," letter to the editors, in *Journal of Environmental Education* 12, No. 2, Winter 1980/81, p. 42.

Chapter 3
Exploring

A. The Motives to Explore

In addition to the construction of mental models, the ground environment inhabited by our ancestors led to a motivational adaptation: a thirst for cognitive clarity. We have a desire to know much, but to know it in a way that facilitates rapid action. We enjoy prompt decisions, and seek out environments which are coherent and legible - easy to model in our minds. Confusion is an unpleasant, potentially hazardous state. When confronted with uncertainty, people tend to guess rather than wait for more information, in order to be prepared for appropriate action when more information arrives. As William James stated at the turn of the century, "Perception is of probable and definite things:"[1] we tend to perceive what is likely, and familiar; and we tend to perceive clearly, even when the stimulus is vague.

But cognitive clarity is not enough to satisfy the human mind. Steven Kaplan argues that along with intelligibility, the other central quality which people require to achieve a healthy relationship with their environment and which motivates them in their preferences is **involvement**.[2] People prefer environments that challenge them, make them practice using their sorting and sensing apparatus, and by encouraging them to explore, extend their general and specific model of the world. The seemingly opposing qualities of involvement and intelligibility help to balance the dangers of exploration with the dangers of apathy.

Kaplan's notion of preference is useful for studying how and why people explore unfamiliar environments. To him, preference can be considered an

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[1] William James, *Psychology: The Briefer Course* (Collier 1962), as quoted in S. Kaplan and R. Kaplan (eds.), *Humanscape*, p. 31.

[2] Stephen Kaplan and Rachel Kaplan, *Cognition and Environment* (New York: Praeger, 1982), p. 80.

expression of the evaluation of one's possibilities. People evaluate a new landscape on the basis of the degree of involvement and sensibility it *promises*. Anticipation is a critical aspect of preference.

Anticipation and The Character of Explorable Landscapes

There are two degrees of anticipation relevant to the discussion of preference: First, we look to the present or immediate future, asking of an unfamiliar environment: Can I understand this situation? Is there enough information to make sense of it? This is an evaluation of the **coherence** of the environment. Redundancy (the similarity of elements) and identifiability (the ease of recognizing major elements) are important aspects contributing to coherence. It is the quality that makes an environment easy to organize and model in one's mind.

Also for short term anticipation, we wonder: Is there enough interest, variety, and diversity that it is worthwhile getting involved? This is a measure of a situation's **complexity**. Complexity can occur at the expense of coherence, but is most preferred when it is complementary, when a place's richness does not interfere with its order.

The next degree of anticipation takes us further into the future, concerning whether an environment will be able to sustain its intelligibility and involvement: If I spend more time there, will I still be able to make sense of the place, keep my bearings, and find my way around? **Legibility** is the characteristic of the environment that makes it seem one could explore extensively without getting lost. Openness and distinctive landmarks are most effective qualities for achieving this. Garling (et al.) found that a better sense of orientation assisted in learning new information about a place.[3]

Kevin Lynch goes further: "Orientation in space (and time) is the framework of cognition."[4]

Finally, one can ask: Would I be able to discover new things by exploring? Is there evidence of promising, hidden things in this landscape? This is an evaluation of the **mystery** of a setting: the characteristic which suggests that by further investigation, travelling deeper within the scene, more information will be available. Mysterious settings provide partial information about what lies ahead. Though both mystery and surprise are engaging, mystery is unlike surprise in that it has a strong element of continuity, as in the fluid shifts of scenery along a winding road. In the surprising case of the tree on the bridge, the process of imagining possible reasons for it being there is engaging. On a winding road, there is no context mismatch, but the explorer is engaged by the process of guessing what will be revealed as the landscape unfolds. The continuity allows the explorer to imagine several hypotheses for what will come next, based on what has come before. Also, the revelation is self-paced, offering still more involvement through choices of rate and path direction.

An issue related to mystery by several researchers is the perception of environmental hazards. Mysterious landscapes can appear dangerous. Appleton found that while extreme and immediate hazards evoke fear and avoidance, mild environmental hazards are fascinating and generally attractive.[5] Some degree of danger is appealing, and adds to the

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[3] Garling, T. A. Book, and E. Lindberg, "Cognitive mapping of large scale environments: The interrelationship of action plans, acquistion, and orientation," *Environment and Behavior* 16, pp. 3-34.

[4] Kevin Lynch, *Managing the Sense of a Region* (Cambridge, Mass.: MIT Press, 1976), p. 23.

[5] J. Appleton, "Prospect and refuge re-visited," in *Landscape Journal*, Vol. 3: 91-103.

involvement promised by a situation. These four characteristics deeply influence our preferences for particular patterns of information: books, paintings, and people as well as places (Fig. 3.1).

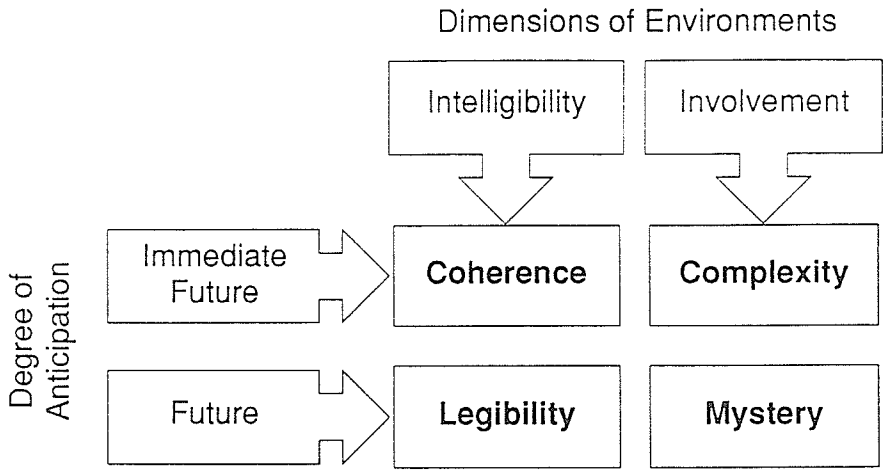

Figure 3.1. The characteristics of explorable environments. This diagram illustrates how the environmental characteristics of coherence, complexity, legibility, and mystery relate to the two degrees of anticipation we use when evaluating an unfamiliar setting, and the basic dimensions of intelligibility and involvement. From Stephen Kaplan and Rachel Kaplan, *Cognition and Environment* (New York: Praeger, 1982) p. 79.

Anticipation serves another important function. As Edmund Penning-Rosewell remarks, we evaluate landscapes in the context of other landscapes, which set up expectations: ". . . Landscape contrasts, even within cities, are of paramount importance in raising consciousness. Anticipation likewise heightens awareness, experiences and perception. The contrast between dramatic landscapes and everyday environments also heightens appreciation: it provides the drama of surprise."[6]

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[6] Edmund C. Penning-Rowsell, "Themes, speculations, and an agenda for landscape research," in Edmund C. Penning-Rowsell, (ed.), *Landscape Meanings and Values* (London: Allen and Unwin Ltd.), 1986.

B. Limiting Factors in Children's Explorations

While adults may be willing to exchange some clarity for increased involvement, it appears that for children, the need for clarity is almost entirely overridden by a consuming passion for experience. John Holt describes this as the "natural learning style" of young children:

> The child is curious. He wants to make sense out of things, find out how things work, gain competence and control over himself and his environment, do what he can see other people doing. He is open, receptive, and perceptive. He does not shut himself off from the strange, confused, complicated world around him. He observes it closely and sharply, tries to take it all in. He is experimental. He does not merely observe the world around him, but tastes it, touches it, hefts it, bends it, breaks it. To find out how reality works, he works on it. He is bold. He is not afraid of making mistakes. And he is patient. *He can tolerate an extraordinary amount of uncertainty, confusion, ignorance, and suspense.* He does not have to have instant meaning in any new situation. He is willing and able to wait for meaning to come to him - even if it comes very slowly, which is most often the case.[7]

This is not to suggest that children don't require meaning in their interactions with the land. The essential difference is children's tolerance for incomplete meaning, or even false meaning. For this reason, context mismatch may prove fascinating for children, but disturbing to adults. According to Holt, one of our greatest crimes in educating the young is the failure to recognize this difference and work to nourish their natural curiosity, instead of training it away through passive and abstract modes of instruction.

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[7] John Holt, *How Children Learn* (New York: Dell Publishing Co., 1983), p. 287.

For adults, the opposing needs for intelligibility and involvement control the desire to explore. Without the limits set by the need for clarity, what moderates and directs a child's desire to explore? What characterizes the sorts of environments that are most inviting, and those that repel children? Do coherence, diversity, legibility, and mystery appeal to them? Do they base their preferences on anticipation of involvement? The answers to these questions will direct how the neighbourhood should be formed to support learning and exploration.

Holt would have us believe that children are fascinated by all aspects of the environment, even the familiar neighbourhood, which tends to fade as a source of involvement for most adults. Roger Hart has found, on the contrary, that children's knowledge of their everyday surroundings is based on a highly selective engagement, partially due to their immature intellectual capacity, but also a result of place access, fears, and attractions.[8] Hart's work supports other research presented in this chapter, claiming the primary force which motivates children's exploration of their environment is an urge to comprehend and extend their understanding of the diversity of the world and thereby gain a sense of their own place within it. But opposing this drive is fear of certain kinds of places, and physical and social restrictions determining the range in which children are free to roam. The remainder of this section will be devoted to understanding how access, fears, and attractions in the neighbourhood influence that selective engagement, and how these dimensions can be altered to enhance learning.

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[8] Roger Hart, *Children's Experience of Place* (New York: Irvington Publishers, Inc., 1979), p. 13.

i. Access

As a child matures, more and more of the world becomes available to observe and manipulate. The manner in which range and access to the community's learning resources evolve is determined through interactions between the child's changing physiology, social factors, and the characteristics of the natural and built environment. The following sections are directed at understanding how the range expands, and acquiring a general sense of the places and elements in the Windsor Park neighbourhood which are available to the child at each stage in the range's development.

Physiological Factors

The physiological basis of range evolution from infant to adult has been outlined in some detail by developmental psychologists. The following review is based on a section from Yi Fu Tuan's *Space and Place*:[9] Up to the fourth month, babies can see quite well, but pay little attention to the world beyond the first three feet. They become familiar with their own bodies, then the parents'. At eight months, awareness swells beyond the immediate visible and tactile sphere to include noises emanating from other rooms. The infant now is capable of attending to things which are not immediately visible or of pressing biological concern. Crawling brings new opportunities to explore, but also new dangers. Accordingly, this is the stage when the "natural," instinctive fears emerge, such as fear of strangers and fear of falling, and when the ability to differentiate between the new and the familiar develops.

When a child begins to walk, the first expeditions tend to be centred on the

[9] Yi Fu Tuan, *Space and Place: The Perspective of Experience*, (Minneapolis: University of Minnesota Press, 1977), p. 20-25.

mother or guardian. She is the point of orientation, from which the one-to-two year-old child will make short journeys, spending most of its walking time either approaching or retreating from her.[10] Children of this age show interest in the immediate foreground and remote features of the landscape but have little concern for the middle ground. At this stage the range which a child may freely explore rarely extends beyond a few hundred feet from home.

The bicycle opens a new world to the child. This freedom, and the new experiences created upon attending kindergarten result in the most rapid expansion of a child's cognitive map of the neighbourhood.[11] For the first time, range begins to be a matter of conscious choice and negotiation. Up until this point, the model evolved according to a highly predictable and controlled pattern, extending from simple body schema and rooms to the home and adjacent properties, each schema highly detailed and built upon the previous layers.[12] By kindergarten, entire sections of the neighbourhood are accessible, and some destinations are remote enough that the interstitial territory is not fully known. Gaps now appear in the cognitive map.

Moore suggests that throughout a child's development, range evolves according to two interconnected processes, one assimilative, the other, accommodative. The first is *range growth*, in which new areas are discovered and assimilated with existing model. Through assimilation, the cognitive map grows, and its gaps are slowly filled. Second, *range development* occurs whenever places within the existing model are

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[10] Yi Fu Tuan, *Space and Place*, p. 24.

[11] Robin Moore, *Childhood's Domain*, p. 18.

[12] Terence R. Lee, "Do we need a theory?" in D.V. Canter (ed.), *Architectural Psychology* (London: RIBA Publications, 1969), pp. 20-25.

revisited, or play episodes re-enacted. New discoveries are made, deepening the child's knowledge and understanding of the environment. If the insights are sufficiently profound, the model may be revised to accommodate them.[13]

However intensive, these early maps lack generality. They are organized with little conceptual depth; that is, they consist primarily of sequences of route-specific actions (rather than abstract ideas) to get from one important place to another. The overall structure of the neighbourhood cannot be described, nor can landmarks or surrounding districts be related. In such cases, range is not truly spatial, but linear in form, described by Barbara Stanton as an "experiential network,"[14] with home replacing mother at the centre. In terms of the inductive model of learning (Fig. 2.1), the child's possesses a learning pyramid truncated at the top.

Perceptual Access & The Senses

There was a time when meadow, grove, and stream,
The earth, and every common sight,
To me did seem
Apparelled in celestial light,
The glory and the freshness of a dream.
It is not now as it hath been of yore; -
Turn wheresoe'er I may,
By night or day,
The things which I have seen I now can see no more.

William Wordsworth,
"Ode on Intimations of Immortality"

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[13] Robin Moore, *Childhood's Domain*, p. 18.

[14] Barbara H. Stanton, "The Incidence of Home Grounds and Experiential Networks," in *Environment and Behavior* 18, No. 3, May 1986, p. 299-329.

The senses develop rapidly: a six month old infant's acuity in hearing, taste, smell, and touch equals that of a teenager. Vision is fully developed by age seven. By the twenties, hearing and taste have already begun to deteriorate.[15] There is thus some physiological basis for Wordsworth's lament. During childhood, the senses perform at their peak, vivifying our experiences. Edith Cobb observes:

> It is significant that adult memories of childhood, even when nostalgic and romantic, seldom suggest the need to be a child but refer to a deep desire to renew the ability to *perceive* as a child and to participate with the whole bodily self in the forms, colours, and motions, the sights and sounds of the external world of nature and artifact.[16] [italics mine].

Each sense has its own implications for design. Jan Gehl in his teachings emphasizes familiarity with our sensory apparatus as a prerequisite for responsible urban design.[17] Because he concentrates his study on those situations which inhibit or enhance contact between citizens, many of his discoveries are applicable to experiential education, which seeks to enhance contact between citizens and learning resources.

If we draw the distinction between physical access, which provides a way to get to the learning resources, and perceptual access, which allows information to be gathered without physical contact, then the most important senses for perceptual access are what anthropologist Edward T. Hall terms "distance receptors:"[18] the eyes, ears, and nose.

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[15] Grace J. Craig, *Human Development*, Third Edition, (Englewood Cliffs, New Jersey, 1983), p. 162.

[16] Edith Cobb, *The Ecology of Imagination in Childhood*, (New York: Columbia University Press, 1959), p. 546.

[17] Jan Gehl, *Life Between Buildings* (New York: Van Nostrand Reinhold Co., 1987), p. 65.

Olfaction

In the arboreal environment, the enlargement of our ancestor's visual centres in the brain occurred at the expense of the sense of smell. Two consequences of this shift are relevant. First, it has redefined what we recognize as information. Most other life forms, from ameobas to higher mammals, use chemical information as their *primary* form of communication.[19] Humans are unique in communicating through primarily visual and auditory channels: that is, most of our information about the world comes through sights and sounds. We have lost the ability to "read" nuances of odour; now only the presence or absence of an odour carries meaning, given we can identify its source. According to Hall, this has "completely redefined the human situation:"

> Man's ability to plan has been made possible because the eye takes in a larger sweep; it codes vastly more complex data and thus encourages thinking in the abstract. Smell, on the other hand, while deeply emotional and sensually satisfying, pushes man in the opposite direction.[20]

Chemical information as a stimulus is relentless and pervasive, and organisms generally react to it directly and spontaneously, without any intervening interpretation. Visual and auditory sources must be interpreted, or read, before they elicit a reaction. This has altered our experience of the environment. In trading smell for vision, we have traded an immediate and

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[18] Edward T. Hall, *The Hidden Dimension* (New York: Doubleday & Company, Inc., 1969), p. 41.

[19] A. S. Parkes and H. M. Booth, "Olfactory Stimuli in Mammalian Production," in *Science*, Vol. 134, October 13, 1961, pp. 1049-1054, quoted in Edward T. Hall, *The Hidden Dimension*, p. 46.

[20] Edward T. Hall, *The Hidden Dimension*, p. 40.

emotional involvement for an experience which by its nature conditions us toward a reductive and rational interpretation of reality.[21]

How might our remaining capacity to detect odours be accommodated within an educative neighbourhood? Not long ago here, and still in many European towns, a city street might smell of coffee, spices,clean laundy, vegetables, spices, newspaper, fresh bread, ale from outdoor cafes.or fruit and fish markets blocks away. Higher density, outdoor restaurants, and a measure of stillness in the air can all contribute to the olfactory richness of a place. Hall writes, "Olfaction of this type can provide a sense of life; the shifts and transitions not only help to locate one in space but add zest to daily living."[22]

Further, many researchers have recognized odour's ability to trigger vivid memories and complex sensations, perhaps because the cortex, where the bulk of our memory is stored, evolved from the ancient portions of the brain which control the olfactory function.[23] This triggering can be instructive in itself, as one imagines the source of the smell, and develops creative associations between the experience and memory. Another application of is to make use of odour's evocative power to enhance pattern recognition in the neighbourhood and encourage relational thinking. Fragrant materials, particularly plants, can be located to reinforce less obvious patterns, especially those which are widely spread.

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[21] Edward T. Hall, *The Hidden Dimension*, p. 40.

[22] Edward T. Hall, *The Hidden Dimension*, p. 50.

[23] Yi Fu Tuan speculates that other senses, particularly sight, are selective and influenced by experience, so they change. "We cannot recapture fully the essential feel of a visual world belonging to our past without the help of a sensory experience that has not changed, for instance, the strong odor of decaying seaweed." See Yi Fu Tuan, *Topophilia*, p. 10. See also Carl Sagan, *The Dragons of Eden*, (New York: Ballentine Books, 1977) p. 69; and Edward T. Hall, *The Hidden Dimension*, p. 45.

Vision

Our impressions of the world are dominated by visual information. The eyes gather up to one thousand times more information than the ears, the next most powerful receptor.[24] Vision also has the greatest range -- the Andromeda galaxy, 2.2 million light years away,[25] is visible with the naked eye. Visual impressions are more focused and precise than auditory or olfactory impressions, but are therefore more easily interrupted by barriers. One cannot see through a wall, but one might hear or smell through it.

So much of today's neighbourhood lies invisible, purposely hidden for reasons of privacy or a passion for tidiness. Kevin Lynch, Stephen Carr, and Saul Wurman have called for greater "transparency" in our cities, allowing the residents the option of seeing behind the scenes: how factories operate, what trucks are carrying, how escalators work, where power lines are headed.[26]

The most direct approach to achieving transparency is to provide an extensive network of pedestrian paths through the neighbourhood. Our eyes were made for walking: they process information most efficiently at walking speed: 0 - 5 kilometres per hour, and they are directed horizontally and forward because this is the direction we most often move.[27] Thus, encouraging

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[24] Edward T. Hall, *The Hidden Dimension* (New York: Doubleday & Company, Inc., 1969), p. 42.

[25] This is equivalent to 13,000,000,000,000,000,000 or thirteen billion billion miles. From Norris McWhirter and Ross McWhirter, *The Guiness Book of World Records*, 15th Edition (New York: Bantam Books, 1977), p. 162.

[26] S. Carr and K. Lynch, "Where Learning Happens," in Daedalus, Vol. 97, no. 4, pp. 1282.

[27] The ears, too, are oriented horizontally and forward to intercept information while walking. From Jan Gehl, *Life Between Buildings*, p. 65.

pedestrian travel is a most simple and effective measure to improve the neighbourhood as a learning resource. As Jan Gehl writes, "Only on foot does a situation function as a meaningful opportunity for contact and information in which the individual is at ease and able to take time to experience, pause, or become involved."[28] Specifically, paths should provide a clear view of important and complex places, and any situation which is undergoing change. Roads and bike paths, to a lesser degree, can also serve as platforms for seeing the city, but the criteria governing their design is different. The configuration of paths and roads to direct attention and stimulate curiosity is discussed further in the "Attractions" section at the end of this chapter.

Another technique to improve visibility is to provide windows to as many diverse activities, places, and elements as possible. Using the idea of the gap in construction site hoarding as a prototype, these "windows" can be imaginatively interpreted and widely incorporated into the everyday workings of the city. Examples might include sewers or ventilation shafts in sidewalks enhanced by illumination, transparent containers on trucks and trains, or sunken playgrounds with the utility pipes exposed.

A third method, which must be employed sparingly, is labelling. While the original conception of experiential education was "interpretation without signs," it has become clear that *simple* labels are too effective to ignore. By labelling the parts of a grain processing plant ("storage bin," "separator," "receiving bays,") a building that is impossible to understand from the outside (and impossible to gain access to) is rendered comprehensible at a passing glance.

The effectiveness of this technique depends on its sparse use. Otherwise,

[28] Ibid, p. 74

labels will no longer be read and will simply add to the visual clutter of an area. Labelling should be employed if three conditions are met. First, only those elements and places which defy comprehension by exploration or other means should the labeled. Second, the label must be well "rooted,"[29] that is, it must correspond directly with its location. Remote labels clutter the neighbourhood, and are less effective communicators. Finally, the label must be concise. If one or two words cannot describe an element, then it should not be labeled.

Hearing

Auditory information is also part of perceptual access. The useful orienting messages carried by urban sounds are often overlooked in discussions of urban perception.[30] In most cases, the variety of simultaneous urban sounds result in noise, the majority of which comes from traffic sources, which mask more meaningful and interesting sounds, such as wildlife, water, hydro lines, or people working outside. Cul-de-sacs and residential bays have the advantage of reduced traffic volumes and noise, allowing residents to sample "the language of environmental sounds."[31] Those that live on busy streets should be given opportunities to listen to the neighbourhood in locations sheltered from the blanket of traffic noise.

Some night clubs pipe the sounds from inside to exterior speakers, in hopes of attracting patrons. The same technique could be used to give pedestrians closer contact with the restricted areas, such as industries, orchestra rehearsals,

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[29] This term is used by Kevin Lynch to describe signage in *Managing the Sense of a Region* (Cambridge, Mass.: the MIT Press, 1976), p. 30-32.

[30] James A. Ballas, and J. H. Howard, Jr., "Interpreting the language of environmental sounds," in *Environment and Behavior* 19, No. 1, Jan. 1987.

[31] Ibid.

or stock exchanges. The sonic environment can also be enhanced through orientation cues, such as a noon hour horn, and rich sonic experiences, from playable sound sculptures to the delicate music of an aspen grove.

Social Factors

The three most important social factors affecting range development and growth are the interactions with parents in defining boundaries, the supportive role of friends in exploration, and differentiations based on sex. Parents are not as great a limiting factor as one might assume. Roger Hart has found that by the grade five level, children show little desire to go beyond their "free range," i.e. the places they can go alone without permission, because their free range is so extensive.[32] Nor do parents usually impose strict boundaries on the child's range. Boundaries are rather a matter negotiation, and are often expanded to allow access to specific destinations, like a new friend's house. Since "range with permission" is based on specific routes, it too is best described as a network, rather than spatial pattern.

The presence of friends has a great impact upon range, leading children to challenge defined boundaries. Usually, parents allow their children to go further from home if they are accompanied by another child, probably for reasons of perceived safety. Hart found that the groups of children will venture twice as far on average as single children.

The graphs in Figure 3.2 and 3.3 summarize Hart's findings with regard to parent defined range in his 1978 study of 35 boys and 29 girls in Inavale, a small New England town. The data is drawn from diaries and direct observation of the children in their neighbourhood.

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[32] Roger Hart, *Children's Experience of Place*, p. 62.

It is presented here to illustrate the how parent-defined range can be affected by age, sex differences, and forms of consent. "Free range" is the average distance the child can go without obtaining permission. The "range with consent" is more flexible: a matter of negotiation in most cases. "Range with others" is the average distance a child is allowed to travel in the company of friends. Note the consistent decline in range between grades five and six. This is attributable perhaps to the shift in attention Shepard observed in this age group from the physical environment to the social environment.[33] Also, the influence of sex on range is quite pronounced. Not only is range less restricted for boys, but as Hart observed from parental interviews, it is also more ambiguously defined. Parents assume that boys will venture regularly outside the permitted range, and only if they are caught red-handed will they be punished.

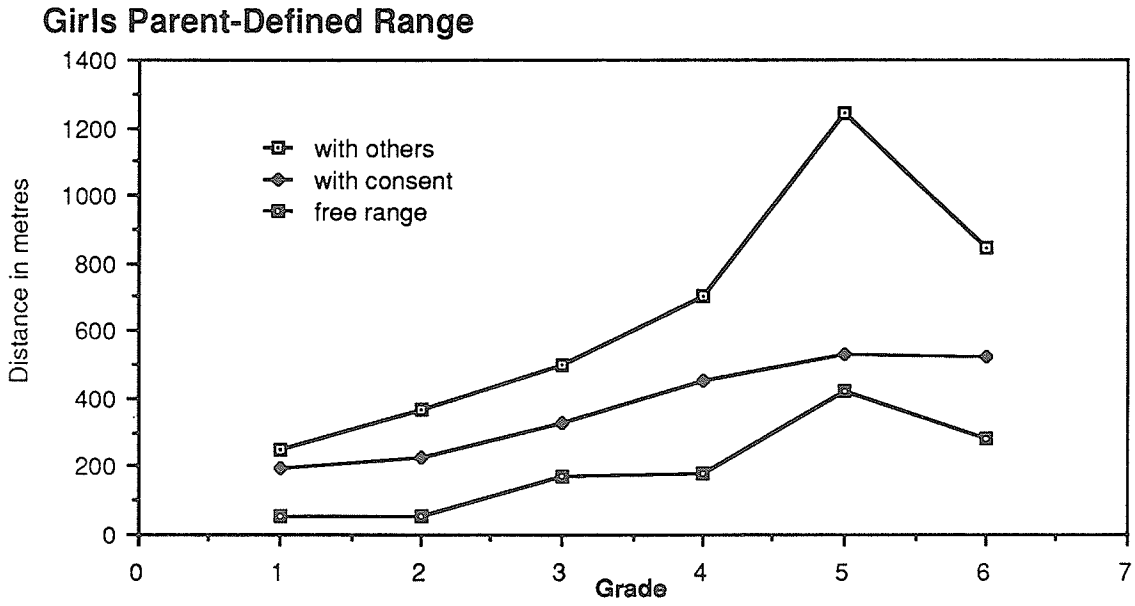

Figure 3.2. Girls parent-defined range.

[33] P. Shepard, op. cit.

The smaller range of girls is common throughout our culture, and probably others.[34] There is no apparent biological basis for this, suggesting that range restrictions are a tool of socialization, reinforcing women's connection with the home, and men's role as provider.[35] Since exploration during childhood is strongly correlated with cognitive development and environmental competence, Hart suspects that the restrictions contribute to poorer performance averages on spatial ability tests among females.[36]

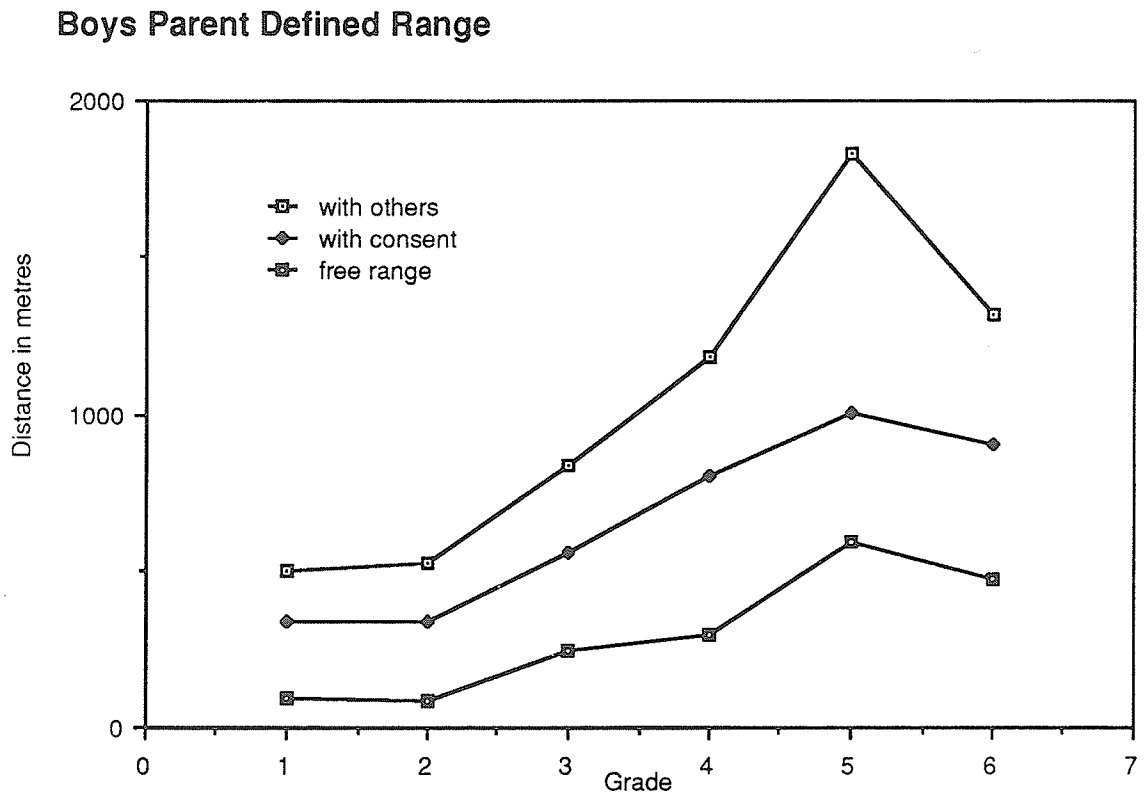

Figure 3.3. Boys parent-defined range.

[34] S. B. Nerlove, R. H. Munroe, and R. L. Munroe, "Effect of environmental experience on spatial ability," *Journal of Social Psychology* 84, 1971, pp. 3-10.

[35] Roger Hart, *Children's Experience of Place*, p. 66.

[36] Roger Hart, *Children's Experience of Place*, p. 66.

Environmental Factors

Children are also limited in their explorations by the physical accessibility of places. These limitations can be more easily influenced by the environmental designer than those resulting from physiology or social factors. In order to isolate factors in the natural and built environment that affect exploration, Moore and Young have identified three range categories based on required effort (Fig. 3.4).[37]

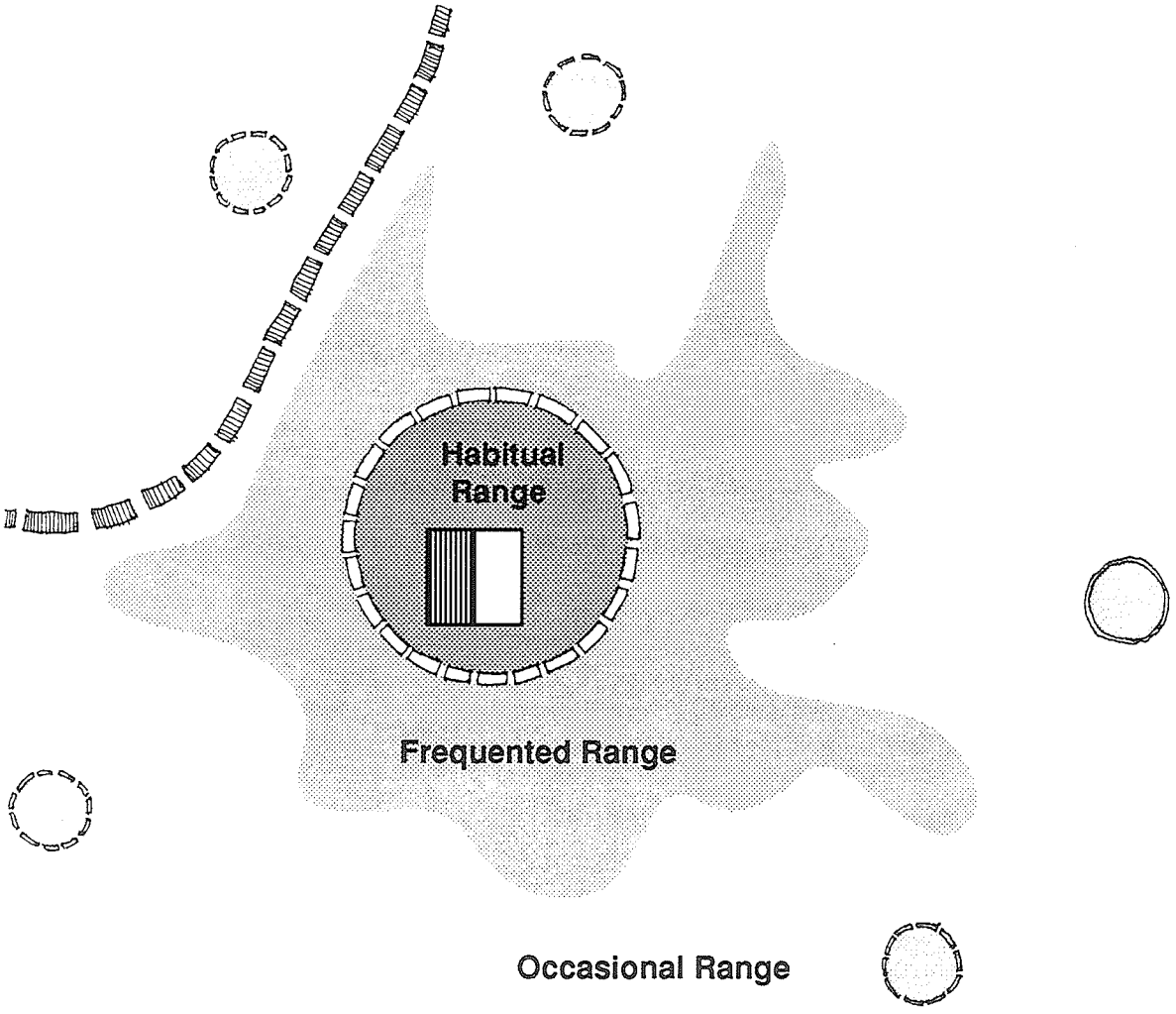

Figure 3.4. Range categories based on effort.

[37] Robin Moore, *Childhood's Domain*, p. 18.

Habitual Range

The first category is "habitual range," which is defined not so much spatially as temporally. For many children, the day is quite rigidly organized by school, meals, and bedtimes. Play becomes a scheduled event, occurring in the hour or so after school, or between supper and dusk. This temporal limitation dictates the distance a child may travel to play. Places like the front street, which are accessible in short periods of time, become central weekday play environments for this reason. Most parents require that young children remain within sight when playing for short periods of time, so vertical barriers like fences or stands of trees affect the habitual range. Older children usually remain within yelling distance.

Good supervision by neighbours and a high population of children of similar age in an area are crucial for safely extending and diversifing the habitual range of a child. Another factor which has great potential for range growth is topography. In Hart's study of spatial activity of children, many of the houses were situated around the base of a hill, which not only provided many play opportunities for the children, but allowed them to roam further from home while still being within sight and earshot of home. A corollary of this is that depressions in topography can reduce the extent habitual range by reducing visibility.

Frequented Range

The second category is the "frequented range," which consists of those less accessible places which require more time and effort to reach. Local parks, playgrounds, stores, and friends houses are part of this category. The frequented range is similar to the free range in Hart's study, well defined and bounded by physical barriers, particularly by busy roads. While this range

category arises out of a pattern of destinations, it is important to keep in mind the gamesome, exploratory manner in which children travel when they go beyond the habitual range. Getting there is part of the play experience.

For many children in their middle years, crossing roads is no longer a concern, and travel is bounded primarily by actual physical barriers, such as fences and rivers. Other than these limitations, the children tend to go where they want to go, and the frequented range is defined by the location of the neighbourhood's most desirable destinations.[38]

Occasional Range

Beyond the frequented range we find the "occasional range," which is composed of uncommon destinations outside normal experience, including remote sports fields, downtown destinations, and places outside the city. This is the child's "ultimate territorial frontier" and usually requires special transportation.[39] Over time, the frequented range will grow to encompass previous occasional destinations, and a new horizon is defined.

Many of the radical education programs proposed during the seventies concentrated on increasing the child's occasional range. Perhaps the most famous and successful of these is the "Philadelphia Parkway Program," which used the public transportation system to put students in contact with some of the remote learning resources in the city, including professional offices, libraries, industries, and historical sites.[40] There was no school building in

[38] Roger Hart, *Children's Experience of Place*, p. 62.

[39] Robin Moore, *Childhood's Domain*, p. 18.

[40] Leonard B. Finkelstein and Lisa W. Strick, "Learning in the City," in Gary J. Coates (ed.), *Alternative Learning Environments*, (Stroudsburg: Dowden, Hutchinson & Ross, Inc., 1974), p. 253.

this program, only a network of people and places spread throughout the city. "Metro Montreal" is another example. It used the subway system as a spine for an extended urban laboratory, where children can investigate a number of topics by stopping at various locations along a defined route. The subway stations themselves provided maps and workshop areas as part of the program.[41]

While these examples are primarily curriculum based, the emphasis on upgrading public transport for children is of interest to this study. Michael Southworth, a planner dedicated to increasing the educative potential of the city, recorded in his doctoral dissertation a desire among ten- to twelve-year-old boys to travel more extensively beyond the neighbourhood. The reasons cited were mostly related to orientation: the boys wanted to know what the city looked like, where they lived within it, how to describe it and give directions to others, and how to find their own way within it.[42]

Travelling is an essential method of learning in the city. "The system of paths along which people move . . . is their observation platform for seeing the city, their principal means of comprehending it. It is from the path network that the city dweller . . . becomes familiar with the city's landmarks and develops a sense of being at home instead of lost in the city's immensity."[43] Southworth found that students who participated in educational programs using public transportation not only faired better on examinations of

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[41] Richard Saul Wurman, *Making the City Observable*, Design Quarterly 80, special issue, 1971.

[42] Michael Southworth, "An urban service for children based on analysis of Cambridge boys' conception and use of the city," Ph.D. dissertation, MIT, 1970, quoted in Coates, op. cit., p. 259.

[43] Kevin Lynch, "The City as Environment," *Scientific American*, Sept. 1965, pp. 209-219, quoted in Coates, op. cit., p. 258.

curriculum knowledge, but showed a more integrated understanding of the structure of the city than those who studied in a school setting. Their drawings of "known places" were generally more accurate, detailed, and extensive, and showed some insight into urban pattern and structure. The neighbourhood itself will be better understood if the city context is clear.

Hours of Operation and Seasonal Effects

The hours of operation affects access to destination facilities in both the habitual and frequented range. While commercial establishments generally are responsive to their patrons schedules, (i.e. swimming pools and movie theatres stay open evenings, weekends and holidays), most office and institutional buildings, which can be highly educative, are closed after school. Summer holidays thus become an valuable time to see the city in business, to sense the rhythm of the work day, and observe its associated activities.

All seasons offer new opportunities and difficulties for play and learning. Winnipeg's extreme winter climate limits outdoor activities, allowing fewer organized games, fewer chance meeting between friends, and less simple exploratory play. Winter also creates new destinations in the neighbourhood. Snow mounds in parking lots and along ditches become attractions for sliding and mock battles, the rivers and golf course for cross-country skiing, and community club rinks for hockey and pleasure skating.

Spring on the prairies is noted for the often lengthy period of thaw, in which standing water transforms the landscape. While this is a temporarily obstacle for walking, much can be learned by observing the flow of water along curbs, (or participating in it with "toothpick races") the pattern of puddles, the effects of weather upon evaporation, the location of remaining snow. These

changes, and the end of plants' dormancy make spring the season in which the forces of nature are most clearly visible.

Summer, as has been mentioned, offers the child the greatest freedom in exploration. No longer is the habitual range constrained by the demands of school, and the longer days provide a larger chunk of useable time in the evening. The weather makes outdoor activities the dominant and preferred form of play in summer, especially of the type Moore calls "adventure play:" climbing trees, making fires, collecting things, etc.[44]

Fall means returning to school for middle age children, at which time attention turns to formulating new friendships or re-instating old ones. Hart noted an increase in the level of spatial activity and range of children during September, which he attributes to trips to more distant friends' houses.[45] Since children are all entering a new grade, he hypothesizes that the range growth is a function of the urge to redefine its limits in keeping with the higher level of responsibility and expectation at school. Leaves turning in colour and dropping is perhaps the most dramatic of regular natural events in the neighbourhood, at once exciting, beautiful and instructive. The process can be observed changing daily, slowly revealing differences in species by colour and time of drop, and also revealing parts of the community which were hidden by masses of leaves.

Thus range expands from spring to fall, only to narrow again in winter (Fig. 3.5). This pattern of range growth may lead to some "loss of ground" as one starts over in spring, if the territory uncovered in the fall is not frequented

[44] Robin Moore, *Childhood's Domain*, p. 278.

[45] Roger Hart, *Children's Experience of Place*, p. 86.

during winter. One might therefore search for ways to hold the range size stable over winter, to provide the shelter and attractions which will encourage children to explore as freely as they did in the other seasons.

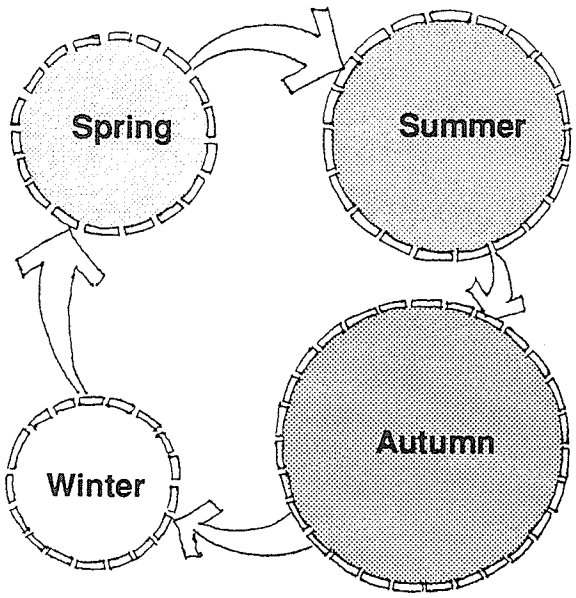

Figure 3.5. Seasonal effects on range growth. In areas with harsh winters, gains in range extent made in autumn may be lost over the winter months, when free exploration is less comfortable. Thus methods should be devised to encourage winter exploration.

ii. Fears

In humans, the advanced development of the large cortex enabled us to attain a level of comprehension and anticipation superior to all other animals. However, this adaptation also means that we are generally more susceptible to emotional disturbances, including fear.[46] Fear is an emotional response to anticipated danger, or from the potential danger of a disorienting discrepancy between expectations and reality. Most fears are learned, but there are some which appear to exist independent of learning, such as fear of the unknown, and fear of intense stimulus.[47] Fear of the unknown is a defense mechanism, probably a function of the motivation toward cognitive clarity, and the anxiety we experience when reality appears ambiguous. Related to fear of the unknown is fear of strangeness: things which contradict our convictions that the world is an orderly, comprehensible place. The inexplicable is always frightening. Fear of sudden and intense stimulus (such as a loud noise) is part of a general biological tendency to be attracted by weak stimuli and withdraw from strong ones, since weak stimuli are generally safer and more desirable than strong ones. This response is evident from the time of birth, while fear of the unknown emerges in infants after about the fourth month, as soon as they are able to distinguish the strange from the familiar.[48]

Other "natural" fears include falling, animals, darkness, rapid approach, height, and being alone. Withdrawing from these clues is a genetic response of high survival value. Bowlby argues that the natural fears of being alone

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[46] D. O. Hebb, "On the nature of fear," in *Psychological Review* 53, pp. 259-76.

[47] Henry Gleitman, *Psychology*, (W. W. Norton and Company, Ltd.), p. 70.

[48] Roger Hart, *Children's Experience of Place*, p. 424.

and strangeness figure strongly in our explorations of the world throughout life, holding us to seek companionship and familiar situations, and leading us to avoid situations in which those needs are denied.[49]

If fear is a function of intellectual capacity, then one should expect that children, with lesser powers of understanding and anticipation, would be less fearful than adults. This counter-intuitive conclusion has been supported by H. E. and M. C. Jones in 1928. Four age groups of city dwellers were presented with a languid specimen of snake, proven to be harmless. Some caution in the youngest members of the sample was almost entirely replaced by fascination in the intermediate ages, while teenagers and older subjects showed marked avoidance. Moreover, children are far less disturbed by description of violence or graphic depictions of surgery than adults. Yet most of us would claim to be less excitable as we age, more in control of our fears - thus the age restrictions for explicit horror movies.

Hebb believes that culture helps explain this discrepancy. The invention of culture has sheltered us from most of the causes of fear - creating cities which help us avoid strange and unsettling situations, and guiding behavior so that we know what to expect from the urban environment and from each other. Horror movies are not truly unsettling because we expect to be frightened, and understand that in the culturally-defined context of a theatre we are safe. Since culture dictates what we should expect in our day to day encounters with other adults and the environment, Hebb suggests the emotional outbursts of children may be reactions to the frightening strangeness of the adult world, which diminishes through enculturation, not maturity.

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[49] J. Bowlby, *Attachment and Loss* (New York: Basic Books, 1975), as quoted in Roger Hart, *Children's Experience of Place*, p. 427.

Certain fears are passed on by enculturation as well. Hart suggests that many of the commonly held place fears among children are learned from literature and films which use a kind of place mythology to support the narrative. In movies, we expect abandoned buildings to be haunted, and that caves, cellars, attics, woods will harbour all sorts of hideous creatures and hidden dangers. A child's capacity to discern fact from fiction develops slowly, so those mythical fears tend to be generalized to real situations. Children have also proved a sensitivity to some implicit cultural fears, such as fear of another race, or more recently, fear of nuclear war. Other fears are highly personal, derived from an individual's experience with a hazardous place, (such as a near traffic accident) or from threats and stories of parents and friends.

In general, we gain control over the natural fears as we mature, but become more prone to culturally acquired fears. According to Hart, by the age of five we begin to discriminate between fears grounded in real danger and those which are false, and as we mature, we are increasingly motivated by the desire to become less fearful. The prime instrument for reducing fear is knowledge of the world.[50]

Of particular interest in this study is the child's fear of getting lost. Rachel Kaplan has found urban children are deeply afraid of becoming lost in the woods.[51] While it is not clear that the cause of this fear is solely the need for orientation, the experiment concluded that exercises designed to increase

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[50] Roger Hart, *Children's Experience of Place*, p. 425.

[51] Rachel Kaplan, "Way finding in the natural environment," in G. T. Moore and R. G. Golledge (eds.), *Environmental Knowing: Theories, Research, and Methods* (Stroudsberg, Pa.: Dowden, Hutchinson and Ross, 1976), pp. 46-57.

skills in way-finding and interpreting natural terrain made the children more confident and adventuresome in unfamiliar forest settings.

Lynch, too, cites several cases in which profound disorientation proved to be terrifying, either by some mental inability to organize space in the mind, or by a deficiency in legible cues in the environment. He goes on to show that places with which we feel well-oriented and familiar encourage fond, often poetic associations.[52]

Let us look the sources of fear in more detail. The following discussion is hindered by the fact that even though we may share natural and learned fears, our ability to cope with them differs greatly between individuals. So a fear of strangers may be expressed in one child, but controlled in another. With this in mind, we ask: what sorts of places and elements would we expect middle age children to find *most* frightening, and how specifically would the fears influence their explorations?

Natural Fears

Animals

Of the natural fears, the possibility of a vicious dog in a yard is likely to be the most powerful factor limiting a child's free exploration of the neighbourhood. It will definitely reduce trespassing through unfamiliar private property (especially through yards with "dog" cues like high fences), and likely influence the choice of some paths over others. The fear of wildlife might cause some children to avoid the most dense and isolated portions of woodlots. This too might be enhanced by cues like tracks or unidentifiable

[52] Kevin Lynch, *The Image of the City*, p. 125.

sounds, though these might also spell adventure for some and provoke exploration instead.

Strangeness

Unfamiliar aspects of the neighbourhood are a matter of personal exploration, but we can expect those areas which lie outside the range of most child residents and away from the paths they commonly use to be a subtle source of fear. They will be avoided by some, especially at night, while others may find the mild hazard associated with such areas fascinating. Research has shown that urban children with limited exposure to their city tend to have a greater fear of unfamiliar places and people.[53]

Orientation

Among the areas lying just outside the neighbourhood proper, those which are organized on an unfamiliar pattern of streets and paths may be approached by children with caution. This is most likely supplementary to stronger sources of fear, tipping the scales for two equally interesting places in favor of the one that is more legible, or that contains recognizable elements from the known neighbourhood as a datum for orientation. It seems likely that any attraction within an unfamiliar area would override this fear. Further research in this area would be valuable.

Strong Stimuli

While it is difficult to isolate all the sensations in a neighbourhood which might frighten a child, some are predictable: the booming and grinding noises from industry, heavy machinery used in road clearing and construction,

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[53] Michael Southworth, "An urban service for children based on analysis of Cambridge boys' conception and use of the city," Ph.D. dissertation, MIT, 1970, quoted in Coates, op. cit., p. 275.

emergency vehicles, train whistles, lightning and thunderstorms all offer stimuli which are startling, mysterious or violent. Most of the them are noises. Sudden barking or yelling from a neighbour's yard might also be included in this category.

Learned Fears:

Territorial Fears

Any child that has been confronted by a hostile landowner will quickly come to realize the need to respect private property. Because inadvertent trespassing is very rare, one can conclude that children possess a sophisticated ability to recognize a range of subtle territorial cues in their encounters with the neighbourhood.

There are some interesting implications of this fear. An effective program would find ways to utilize both private and public lands to communicate ideas. However, private property is clearly differentiated by children from public lands, inviting them to draw distinctions between proper, public learning and mischievous private. Hands-on experimentation would also be limited by fear, even if the landowner was happy to have children on his property.

Another territorial fear with fewer substantive cues is the fear of older children's places. These are indicated either by direct observation of crowds of youths in repose and rowdy noises, or by cues which Rapoport calls "non-fixed features," such as cigarette butts and beer bottles. Trespassing through older children's turf is serious, posing a real threat of harassment or physical injury. In Moore's study, "rough kids/big boys/violence" topped children's

list of dislikes about the outdoors.[54] The problems of violence and racial tension in many neighbourhoods can be fueled by indiscriminate alteration of patterns of use and territory. It is important to locate the more permanent domains of youths and teens in the neighbourhood, and avoid placing children's attractions in conflict with them.

Mythical Fears

Most neighbourhoods contain places which typically are feared because of mythical associations, but present little true danger. Cemeteries top this list, which also includes deserted industrial buildings, derelict machinery, and dense portions of woodlots throughout the neighbourhood. Some houses, empty or not, are considered "haunted" because of their appearance, or through local folklore about the inhabitants. It is valuable to uncover these places when developing an experiential education program, not so much for instructive purposes, but for their evocative potential; as a safe source of fear mythical places can round out the spectrum of experiences offered by a neighbourhood.

Parents' Fears

As we have seen, parental fears are an important factor in defining children's range by restricting access to certain perceived hazards. It has also been observed that parental fears, especially those of the mother, are extremely influential in the formation of children's fears, resulting in self-imposed range restrictions. In addition to legitimate dangers, parents may harbour unfounded fears, such as the fear of bridges, which can affect the child's interactions with the environment. These are unpredictable, but we can

[54] Robin Moore, *Childhood's Domain*, p. 284.

assume with some confidence that Windsor Park's obvious hazards (busy streets, railroad tracks, bodies of water, etc.) will be feared and avoided by many children despite their inherently fascinating qualities, and will be off limits to most others.

iii. Attractions

The Process of Attention

The mind requires some mechanisms to cope with the relentless barrage of information streaming from the environment and from our own memories. There is a limit to the amount of information it can process at one time. It needs to sort the continuum of stimuli into separate strands or channels, isolate its components, and rank them in order of importance. For visual and auditory stimuli, the sorting processes begin with a search for objects in a figure-ground relationship, and meaningful groupings which appear to be based on Gestalt principles such as proximity, similarity, continuance, and closure (Fig. 3.6).[1]

After the mass of stimuli have been grouped and reduced to more meaningful components, those components must somehow be ranked so that the brain's processing capacity is allocated to the most important information. This allocation is more commonly called "attention." Attention is a controversial topic in psychology; researchers manage to fully agree on little more than a loose definition: "selective perception." Most of these debates, however, centre on precisely determining the point in the process at which information is filtered, which would not appear to significantly affect the detection and selection of environmental stimuli.

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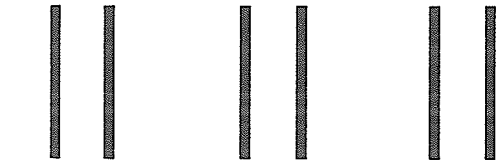
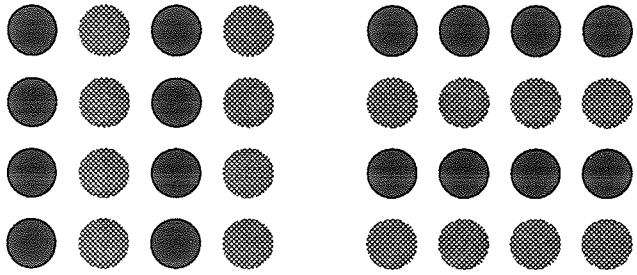
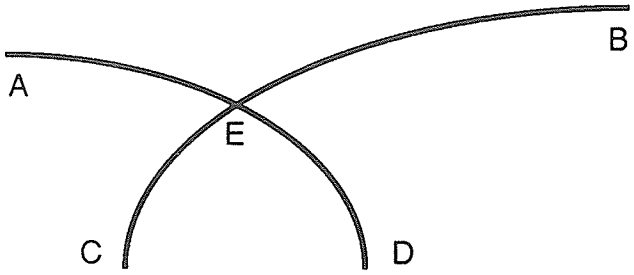
[1] James A. Ballas and J. H. Howard Jr., "Interpreting the language of environmental sounds," in *Environment and Behavior* Vol. 19, No. 1, Jan. 1987.



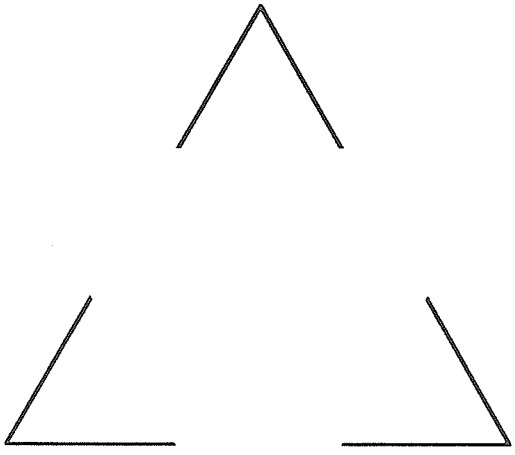
Proximity: A person will generally group the six lines into three pairs of lines by virtue of their proximity to each other.



Similarity: Perceptual grouping by similarity will lead people to see columns in the left figure and rows in the right.



Good continuation: Line segments will generally be grouped so that they continue smoothly: AE will be grouped with ED, and BE with EC.



Closure: Most people perceive such figures as this as a triangle with gaps in it, rather than a set of three angles.

Fig. 3.6. The gestalt principles of perceptual organization, by which we define preliminary groupings from patterns of stimuli. From Gleitman, p. 249.

A general model of attention in information processing developed by Broadbent in 1958 is presented in Figure 3.7. While several other models have been proposed since, this one has survived extensive testing intact, with only minor modifications.[2]

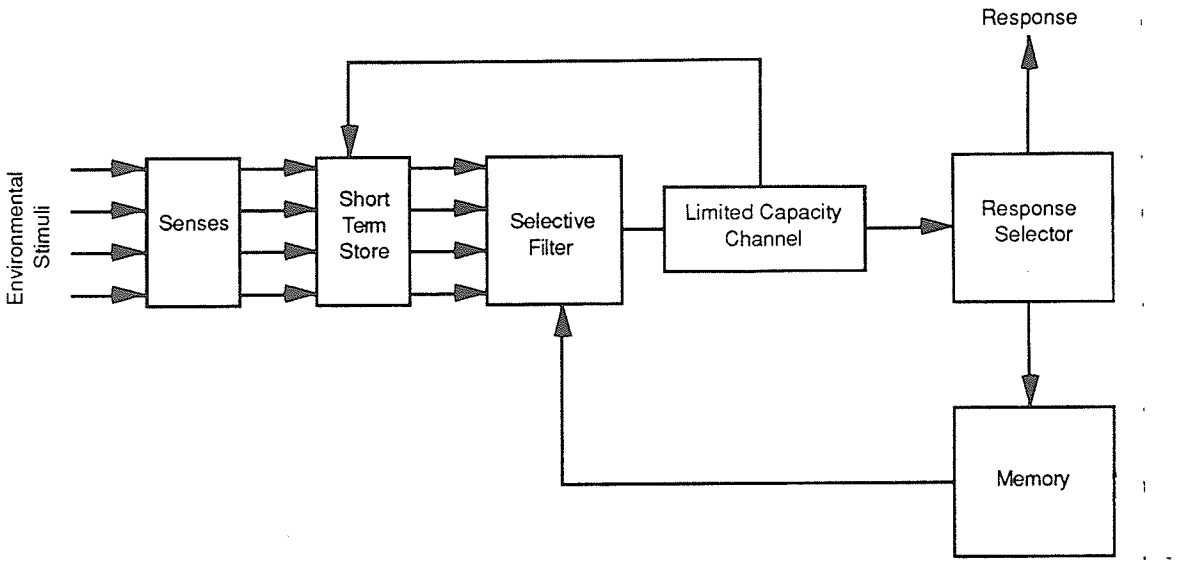


Figure 3.7. Broadbent's model of attention, 1958.[3] Stimuli are partitioned into a series of channels, only one of which can be fully processed by the brain at a time.

According to this conception, environmental stimuli are detected by the senses, sorted into meaningful pieces, and carried to the brain along various *channels*, that is, sensations with the left hand are carried on a different channel than those on the right. Broadbent assumed that these channels are discretely preserved in a short-term buffer memory. The filter, then, functions by selecting one channel over another to send for higher level processing. Massaro compares the limited capacity channel to the central

[2] Broadbent's model is compared favorably with other attention models in Dominic Massaro, *Experimental Psychology and Information Processing*, (Chicago: Rand McNally Publishing Co., 1975), pp. 294-297.

[3] D. E. Broadbent, *Perception and Communication*, (New York: Pergamon Press, 1958), mentioned in Dominic Massaro, *Experimental Psychology and Information Processing*, (Chicago: Rand McNally Publishing Co., 1975), p. 260.

processing unit of a computer: it is where the bulk of the processing that constitutes consciousness and awareness occurs, where information from the buffer memory is abstracted into more meaningful and useful form. He writes, "The processing of the limited capacity channel was equated with the process of attention; that is, to the extent a channel of information is being processed here, it is being attended to."[4]

While the limited capacity channel can operate only on one channel of information at a time (serial processing), the short term store is capable of processing and storing several channels at once (parallel processing). In the case of a gathering where two conversations are going on at once, the listener's short term store is processing both, but only one can be attended to at a time, only one can be understood and trigger a response.

Suppose, however, that our name is mentioned in the unattended conversation. The selective filter is sensitive to certain patterns of stimuli, like our name, and attention shifts to the other channel. The short term store will hold information from all channels for a few seconds before it decays, allowing us to "back up" and respond to another conversation when something there catches our ear. We can thus attend to two simultaneous channels if the first can be processed before the second decays and is lost. This ability depends upon the complexity of the information processing task: listening to two conversations in a second language is next to impossible.

Broadbent believes that the physical features of a channel of information are the key to shifts in attention. Thus, we can voluntarily listen for a certain voice in a crowd, or a certain word in a phrase, filtering out all others; and we will involuntarily attend to conversations containing our name, or other

[4] Dominic Massaro, *Experimental Psychology and Information Processing*, (Chicago: Rand McNally Publishing Co., 1975), p. 260.

loaded words. Both are assisted if the channel is distinctive: having a higher pitch than the others, or more volume, for instance.

William James drew a distinction between these two types of attention almost one hundred years ago. "Involuntary attention" occurs when an information source is difficult to ignore, which we commonly call "fascination" or, when it is dysfunctional, "distraction." "Voluntary attention" is perception focused by an act of will, which is also called "concentration." They are both relevant to the development of a casual environmental education program. The principles governing involuntary attention can be applied to draw out details in the environment, and other signalling functions. Voluntary attention is of interest in understanding what maintains a child's involvement in a learning situation. In short, we must determine the properties of a stimulus which attract attention, and those which hold it.

Involuntary Attention

Soon after birth, infants will focus on "novel and moderately complex patterns and at human faces." Infants look at things which excite the most neural activity: they attend to pure colours over mixed ones, perpendicular lines over slanted ones, moving objects over stationary ones.[5] The tendency to attend to those stimuli which would appear to offer the most information remains throughout adulthood(Fig. 3.8).

How do we decide at a glance what is most informative? The first criteria is difference: "in all cases, ones attention is first drawn to elements that differ from the context. "[6] Those differences which are most visually striking will

[5] Grace J. Craig, *Human Development*, Third Edition, (Englewood Cliffs, New Jersey, 1983), p. 162.

[6] Amos Rapoport, *The Meaning of the Built Environment*, op.cit. p. 41.

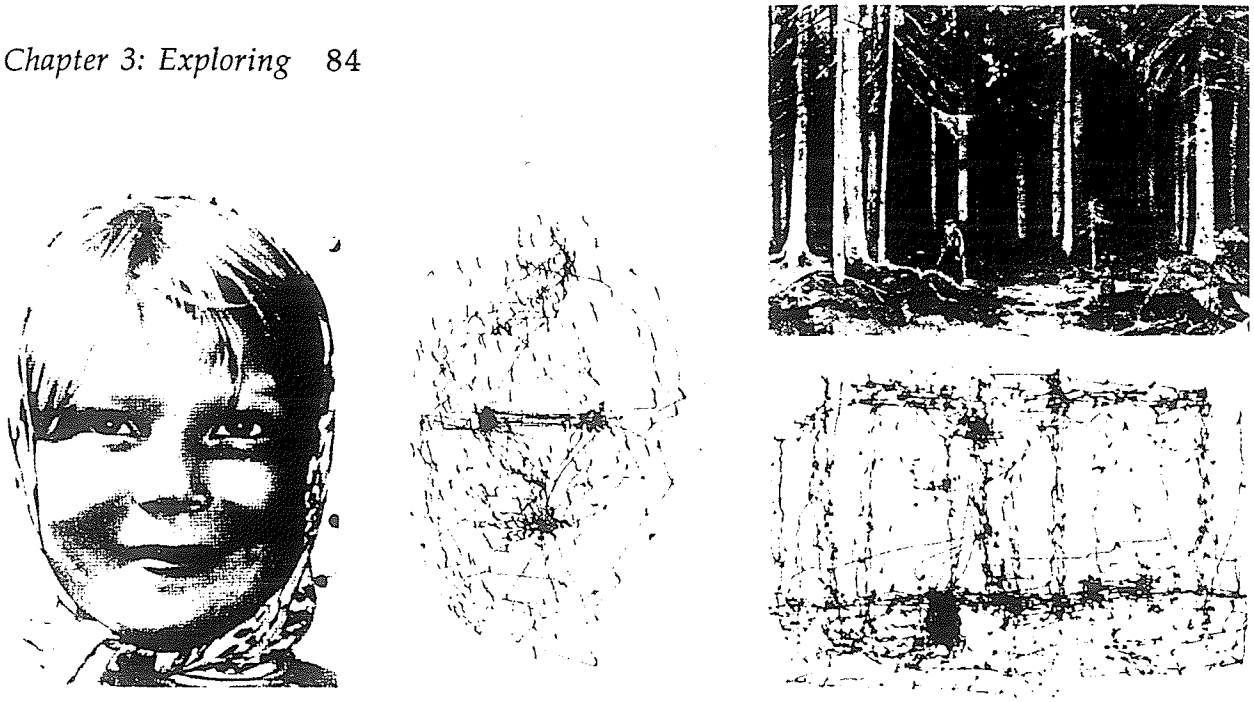


Figure 3.8. Eye movement records. The eye is drawn to the most complex and informative regions of each photo.

be hardest to ignore. Difference can be expressed in many ways, as advertisers have discovered. In a complex setting, they advocate large, simple, bold signs. Flashing or moving signs, illuminated signs, signs with distinctive silhouettes all exploit difference to attract attention.

Some features in the environment are involuntarily attended to because they are obviously informative. Highly detailed objects, with more differences per square foot than the rest of its context promise more information than simple forms. Speech, signs and recognized symbols too are difficult to ignore. It takes great effort to look at a billboard without reading it. In a study of envrionmental stimuli by Lynch and Rivkin, one subject commented on signs: "They sort of reach out and grab you by the throat."[7] But once the message is obtained, the words are no longer attended (unless the text is calligraphic or otherwise of interest). Fascination in textual information does

[7]Kevin Lynch and Malcolm Rivkin, "A walk around the block," in *Landscape*, v. 8, no. 3, Spring 1959, p. 25.

not go beyond the message it holds. This is probably because the information it contains is coded denotatively: there is an agreed upon set of meanings which gives the reader some assurance that her interpretation of the words corresponds with the intentions of the author. There is no reason to keep studying the words because once read they have been sapped dry of meaning.[8] Most of the messages in the neighbourhood are less obvious, less certain, and therefore subject to sustained interest and study.

Perhaps the most attention grabbing of all elements in an environment are people. Jan Gehl writes,

> A summary of observations and investigations shows that people and human activity are the greatest object of attention and interest. Even the modest form of contact of merely seeing and hearing or being near to others is apparently more rewarding and more in demand than the majority of other attractions offered in the public spaces of cities and residential areas.[9]

Human activities function as involuntary attractions and invite sustained involvement, making them an invaluable instrument for casual environmental education. Opening everyday activities to the street, and gaining exposure to other cultures can be a most enjoyable form of learning, made even better when punctuated by festivals, market days, parades and other participatory events.

Perception and Involuntary Attention

The horizontal bias in our visual field is quite pronounced, extending nearly 180° from left to right, but only 60° in the vertical dimension The vertical

[8]Poetry is an noteable exception. In poems, the message is vague; often too complex to be expressed as a single idea. Poems, like environments, can be pondered at length. They too are subject to sustained interest.

[9] Jan Gehl, *Life Between Buildings*, op. cit., p. 31.

axis of vision is oriented about 10° below the horizon, so we see practically nothing above the first storey of a building while walking (Fig. 3.9). This helps explain Lynch and Rivkin's finding that changes in the paving pattern were among the most often noticed features of the city. People literally "watch where they're walking."

Why then are so many buildings and most of our monuments located above this height? Height has impact in three different ways, related to the viewer's vantage point. From a distance, the tallest objects are those which are seen first, because they can most easily be discerned from the horizon. They are thus valuable as landmarks. Second, tall structures have a psychological impact as we approach. Mass, particularly vertical mass, is one of the central metaphors for importance in all human cultures. Finally, vertical structures at close range have a mysterious quality that makes them engaging. Like the winding road example, they offer continuity as they lead the eye upward, but still cannot be perceived all at once. Rooftops and ledges remain hidden from view.

The configuration of paths can deeply influence the pattern of information we take in, not only in denying views to certain areas, but in directing involuntary attention. Carr and Schissler concluded that while distinctive elements in the landscape will command the most attention, it is also "determined partly by the configuration of the road and its immediate surroundings which will tend to 'pull' [us] into curves, 'release' [us] for active looking around after enclosures and 'repel' [us] by confining cloesup obstructions to the view. The amount of attention accorded any element, on the average, will be a matter of how long that element is in view, modified by head orientation and by its degree of dominance over its surroundings."

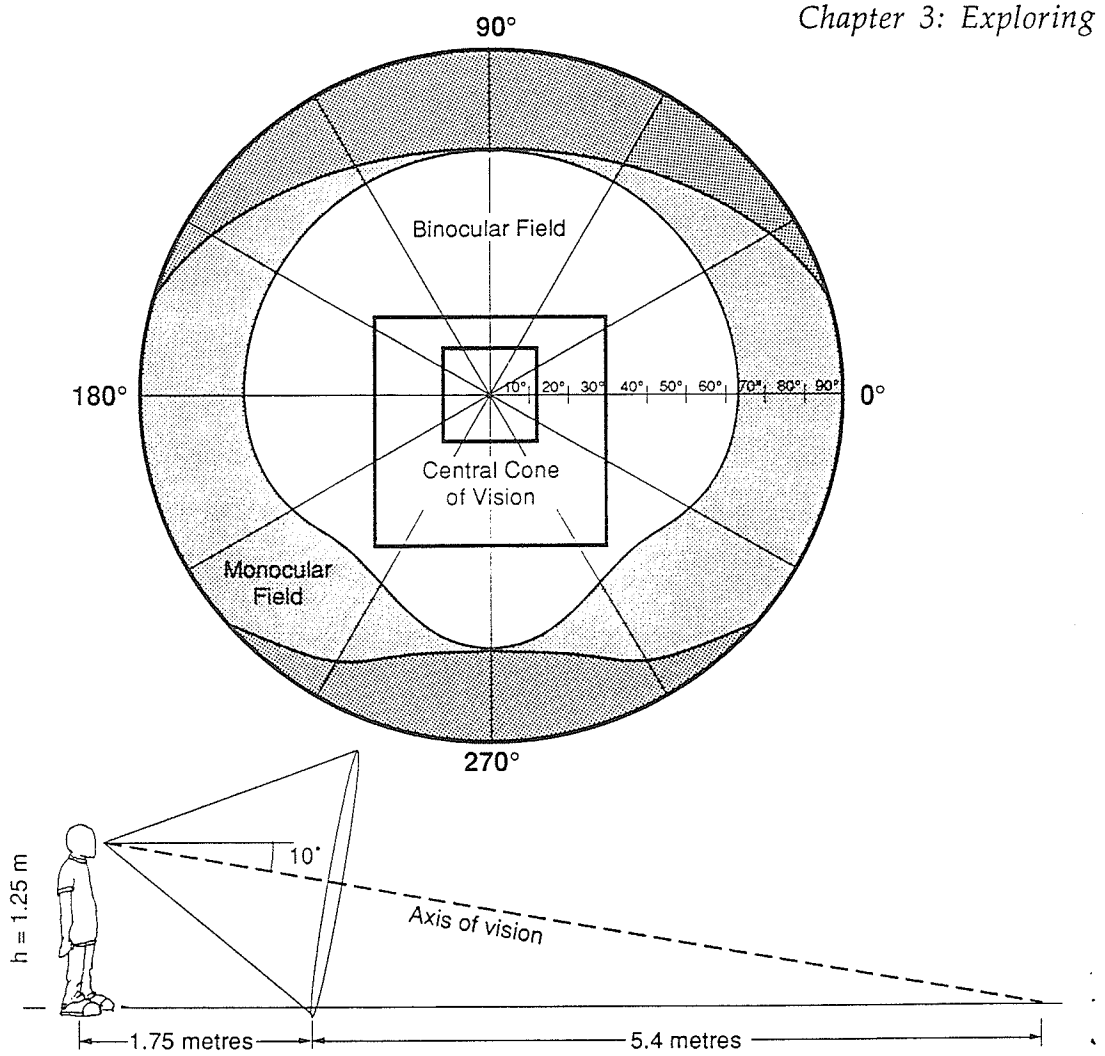


Figure 3.9. The cone of vision. Visual information above the first storey of a building might be missed by pedestrians. The optimum location is directly in front of the viewer or lower.

Thus the terminus of a long, straight or gently winding path is a natural focal point of attention, while turning a corner encourages a sort of "scanning"or generalized observation. The power of an axial configuration is enhanced when the element at the terminus is perpendicular to the path, and gives the appearance of facing the viewer.[10]

[10] Jackle uses the term "faceness" to describe a situation where a building with a face-like front (symmetrical, with windows as eyes, doors as a mouth) is seen from the axis of symmetry. Because it is slightly confrontational, faceness creates a more intense relationship between buildings and people than can be offered by any other view. John A. Jackle, *The Visual Elements of Landscape* (Amherst: the University of Massachusetts Press, 1987).

Voluntary Attention

Listening to the lecture, reading, studying, writing: most formal education tasks rely on the student's ability to voluntarily focus their attention on subject matter, though educators expend surprisingly little effort to cultivate that ability.[11] Because it is enhanced through training, voluntary attention may seem like an acquired skill, but it is in fact a prerequisite for survival. People unable to select and concentrate on a single channel of incoming information will be powerless to act, because the higher processing agents of the mind can only effect a response to one channel at a time. Even newborn children have very rudimentary attention skills, which allow them to respond to the mother's gestures and visually track her movements only minutes after birth.[12] Marvin Minsky describes the way this capacity may develop from infancy, using the term "IT" to denote the mental representation of an object of attention:

> The ability to focus attention could start with some machinery for keeping track of simple [mental representations] for object-things. In later stages, an IT could represent more complex processes or scripts that keep track of entire transactions with their various [descriptors] for Objects, Origins, Destinations, Obstacles, Trajectories, and Purposes. Eventually our ITs develop into complex systems of machinery that represent the things that are on one's mind at the moment. In later life, we become more able to maintain several ITs at once. This enables us to construct comparisons, predictions, and imaginary plans, and to begin to construct explanations in terms of chains of causes and reasons.[13]

Voluntary attention, in such a case, is an integral skill in the process of conceptualizing. When Minsky speaks of the ability to maintain several

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[11] Thus the demand for study skills courses at the university level.

[12] Grace J. Craig, *Human Development* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1983), p. 95.

[13] Marvin Minsky, *The Society of Mind* (New York: Simon &Schuster, 1985), p. 224.

objects of attention at once, he is likely referring to either the cycling of stimuli channels out of the short term store, or the more sophisticated technique of *chunking*, in which several channels are synthesized into one meta-channel. Orchestral conductors do both: they switch attention rapidly between the visual stimuli (the score) and the auditory stimuli (the music); and they scan the score so that notation for each instrument is woven in the mind into a single, manageable conception of the music. The unified conception becomes the object of attention. Similar chunking must lie at the core of a learned social geographer's ability to "read" the landscape.

The task of focusing attention takes much less effort if the object of attention is of interest to the viewer. A child who has no trouble concentrating on a video game screen for hours, may find it impossible to study from a textbook with the same intensity. Bruner suggests that a central technique for maintaining interest is to balance the perceived challenge of a situation with the perceived chances of success. In learning situations, information which is too advanced will be very difficult to attend to, as will that which is fails to challenge the student. One reason video games are so compelling is that they incorporate skill levels to increase the challenge as the player's skill and experience increases. Reaching the next skill level is an incentive to play, which is supported by the perception that reaching it is possible. This model of internalized goals in acquiring skills is an ideal in education, which, as Bruner laments, is inadequately realized.[14]

Another factor in maintaining interest is personal meaning. Those aspects of the environment which are meaningful to the viewer are more easily given attention. Teachers are using this principle when they relate a new topic to one which a student is familiar with and cares about, such as introducing the

[14] Jerome S. Bruner, *Toward a Theory of Instruction*, p. 47.

concept of ratios by listing batting averages. The process of thinking about the new in terms of the familiar is called *contextual learning*. New ideas are presented in a manner that makes them easy to link into existing cognitive models. In other words, contextual learning boosts assimilation.

Contextual learning works by easing assimilation. This not only diminishes the perceived challenge of grasping a new idea, but it invests new ideas with nuances of meaning. Recall that meaning is a set of practical and emotional associations a person holds for an experience. When a teacher ties the concept of ratios to batting averages, ratios inherit a portion of the cluster of associations the child holds for baseball, and sports in general, as well as for mathematical concepts, and schoolwork in general. The vital aspect is that the associations are different for each individual, so for one child, the baseball link would be very powerful, while for another, interest rates would be a more emotionally charged association.

The need for individual treatment makes contextual learning difficult to implement in classroom situations, where instruction is homogenized to serve the group. The scholastic version of contextual learning uses concepts taught in previous lessons as the context for new ideas (see the discussion of sequences in curriculum planning in Chapter 2). The attention-holding power of personal meaning is absent, and students are left with few reasons to care about the abstract subject matter. For many, the motivation to learn becomes fear of failure, rather than interest.

When learning from the neighbourhood environment, children are able to pattern their investigations after their interests, and they can relate new discoveries to existing framework of knowledge because they occur within a

familiar setting. In fact, the notion of contextual learning was inspired by the accretive process by which cognitive maps are formed.[15] All environments, regardless of their quality, have this advantage over formal educational settings. Once we try to optimize and increase an environment's interest, we risk negating that advantage by channeling the young toward what we think should be generally interesting instead of what is personally meaningful. This is a serious obstacle for casual environmental education. Michael and Susan Southworth, explaining their proposal for a similar program in the city of Lowell, write, "The greatest danger is that the environment might become over-explained, and much of the mystery and pleasure of discovery would be lost. Some might worry that the city would become a vast dull school."

Part of the solution to hold interest through personal meaning is to provide a closely intertwined pattern of familiar and new things in the neighbourhood, things which are variations on the theme of familiar elements, such as a spectrum of coloured light standards. Such interventions are to be ambiguous in intent, so the children develop their own explanations for the change.

William Hubbard has proposed something similar in his theory of architectural criticism which he calls, "an architecture of convention." It is based on the idea that broad agreement about the value of a building can be achieved if, among other things, it allows the public (and professionals) to invent their own reasons for wanting it to be the way it is. He advocates a number of techniques to make places more receptive to personal meaning, among them the technique of *slippage*: a purposely ambiguous link between form and function. "Because of slippage, we are given the grist for constructing reasons as to why that form is the way it is, but we are not bound

[15] From the seminar, "Contexts for Learning", at the Technology in Education Conference, Winnipeg, March 22, 1989.

forever and only to that reason."[16] Sydney Opera House has excellent slippage, because it could comfortably house several different functions (yacht club, museum, etc) and its forms are rich with metaphorical possibilities: wings, sails, organic growth? Two other promising techniques are *contingency*: the opposite of axiomatic thinking, it reflects idiosyncrasies in the designer's judgement which result in differences which might be seen as meaningful; and *resonant analogies*: which occur when one thing reminds us of another in an informative way, such as fire trucks and fire hydrants painted the same colour. A more difficult challenge is the creation of an ingratiating environment which gives form to ideals. Hubbard feels most strongly that people are responsive to ideals, and the depth of their response will lead them speculate about the reasons that the environment is created in that way. For him, speculation is a stepping stone to appreciation and acceptance. For this thesis, speculation is its own reward.

Hubbard's techniques, if applied to a program of casual environmental education, require that children have a good eye for detail. An earlier study of children's perception of their neighbourhood found that some of the most mundane elements of the neighbourhood- crosswalk stripes, gravel shoulders, chain link fences, telephone lines - were represented in high detail in children's drawings, suggesting that even subtle applications of Hubbard's techniques have a good chance of being noticed.[17]

Another method to hold interest is to follow the advice of Rapoport, allowing people to invest personal meaning by altering and creating parts of the neighbourhood. Just as labour-intensive gardens are fascinating to their

[16] William Hubbard, *Complicity and Conviction*, op.cit. p. 181.

[17] G. Manning, "Children's perceptions of their neighbourhood environement," (unpublished paper,Winnipeg: Department of Landscape Architecture, University of Manitoba, 1985).

creators, a part of the neighbourhood that was created through community effort is bound to be hold the interest of those involved as they watch for daily and weekly changes, how it is used, who uses it, and evaluate its success to learn how it should be done next time.

Involvement and Voluntary Attention

Closely allied with Bruner's conception of interest is Kaplan's dialectic between clarity and involvement in selecting environments to explore. However, Bruner's notion of success does not apply to environmental learning situations in the same sense that it does in formal educational settings, where it is a matter of achieving the goals of the curriculum. Success in environmental learning is more a matter of deferred rewards and intrinsic goals, of accumulating experience so that in time, we may deal more competently with the environment. This is reminiscent of the video game, in which the player is motivated to acquire skills so that more difficult levels of play can be mastered.

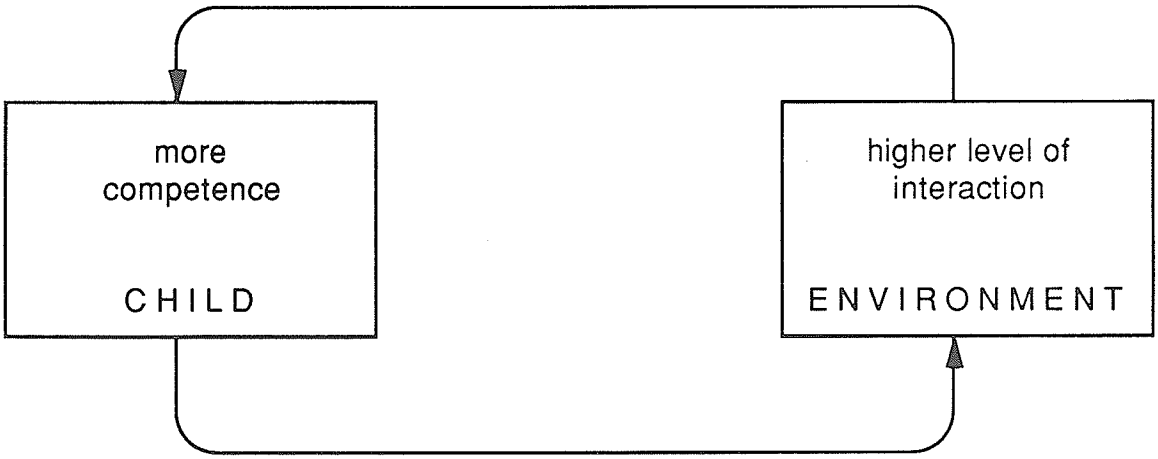

Figure 3.10. The recursive relationship between interaction with the environment and increased competence. Greater competence in turn allows interaction with the environment at a higher level.

What do children find involving? As we have shown, diversity, mystery, and manipulability are key characteristics. But other qualities relate specifically to children's interests, including wildlife, celebrities, fire, action, music, comedy and other children. The Children's Television Workshop uses all of the above to hold young viewers attention to blatantly instructive material on Sesame Street. There is no clear common denominator among these qualities; they might be best interpreted as a blend of the exotic with the familiar.

Kaplan has commented on how the relationship between familiarity and involvement differs with age. As an adult comes to know an environment and knowledge replaces mystery, the involvement promised by that place diminishes. That is, adults are less likely to want to explore familiar environments, or find them interesting. In this sense, familiar environments can be "used up" by the adult mind, reducing their educative capacity, and potentially leading to a lowered satisfaction level.[18] The neighbourhood, as one of the most familiar environments, is especially susceptible to being used up.

It is natural for children with their thirst for experience and adventure but limited range to take a deeper look at the places around them, to shift the focus of exploration toward a deeper engagement with known territory. In fact, familiarity is conducive to a child's involvement, as it is the starting point of play. Through familiarity, the mental images of elements in the environment become more manipulable and independent of the real thing. "Thus familiarity is essential to the playful rearrangement and recombination of the elements of thought that we tend to associate with insight and

[18] Stephen Kaplan and Rachel Kaplan, *Cognition and Environment*, p. 92.

creativity."[19] In this way children can maintain involvement in the neighbourhood despite its familiarity.

Children's interests must be the starting point for a successful program of education, but Bruner cautions those wanting to structure a program on the basis of those interests alone:

> It is sentimentalism to assume that the teaching of life can be fitted always to the child's interests just as it is empty formalism to force the child to parrot the formulas of adult society. Interests can be created and stimulated. In this sphere it is not far from the truth to say that supply creates demand, that the provocation of what is available created response. One seeks to equip the child with deeper, more gripping and subtler ways of knowing the world and himself.[20]

In conclusion, attempts to draw and hold attention must be carefully employed, to prevent the neighbourhood from becoming a source of stress. It is a simple matter to attract involuntary attention using techniques known to advertisers for years, but these are generally too aggressive for a the neighbourhood environment. The aim is to make small differences more noticeable without letting them become distractions, to spark interest without dictating it, and to sustain involvement by allowing experimentation and leaving questions un-answered.

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[19] Ibid, p. 93.

[20] Jerome S. Bruner, *Toward a Theory of Instruction*, p. 49.

Chapter 4
Field Investigations

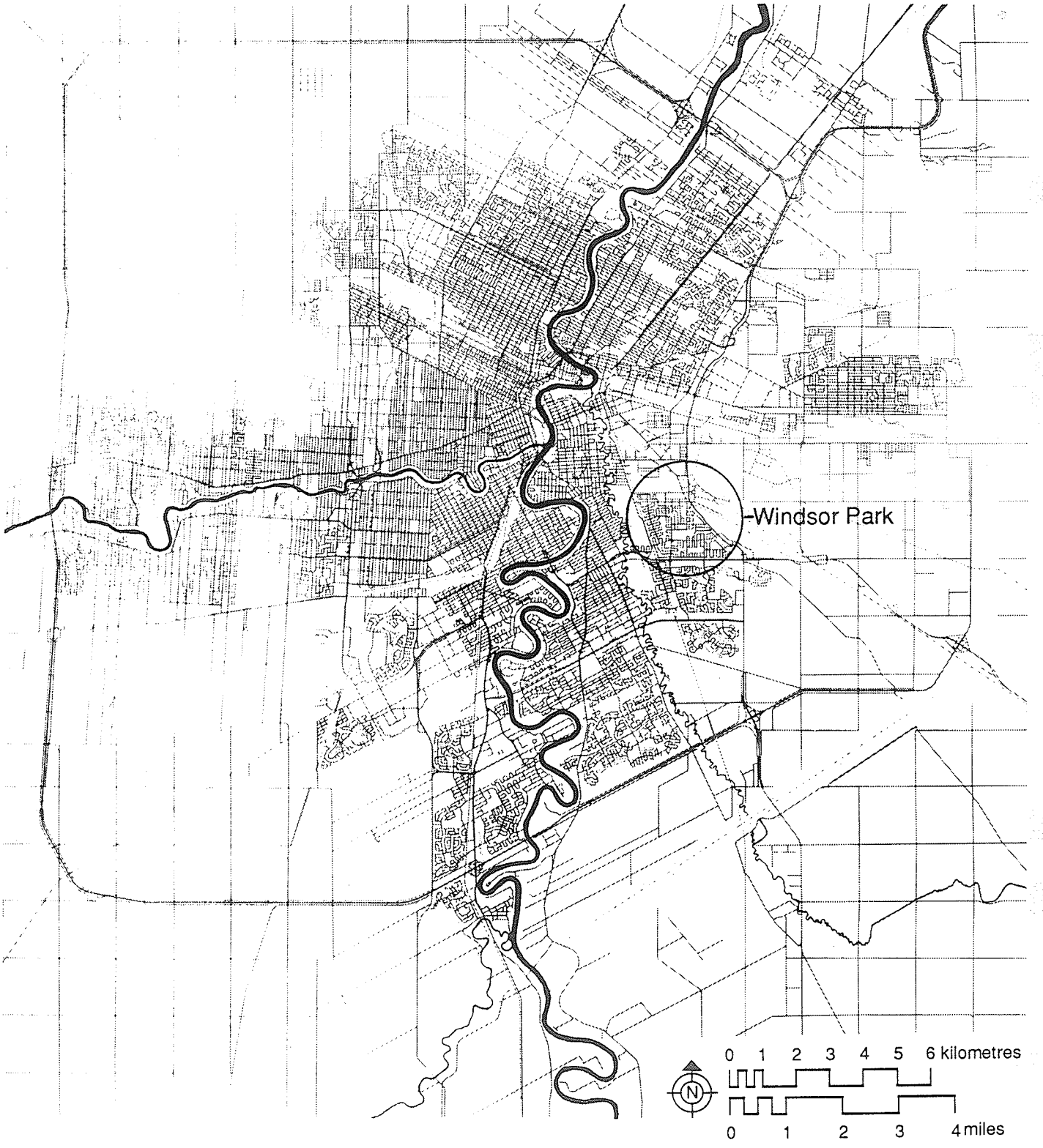

Figure 4.1. Windsor Park location map.

A. Site Description:

The field exercises in this chapter were devised to investigate the range, fears, attractions, and access limitations of a group of children from the Windsor Park neighbourhood in Winnipeg (Fig. 4.1). It covers 427 hectares (1055 acres), bounded by highways on the three sides and a rail yard to the north. The population in 1986 was 14,015.

While the north east part of the study area contains a number of pre-war houses, most of the neighbourhood was designed in the early fifties. Windsor Park was one of the first communities in Winnipeg to have a total land use plan, designating low and medium density residential use, parks and open space, school and institutional sites and commercial areas. This large and diverse neighbourhood has undergone considerable demographic and economic change since the first residents arrived (Fig. 4.2 and 4.3). It was among the most stable of Winnipeg's communities until the mid 1970's, when the population shifted toward lower incomes, higher transience, and single-parent families. Declining enrollments in the schools resulted in the closings and conversions to French immersion. The residents are primarily of British and French descent, but growing numbers of Eurasian and Native Canadian families are adding to the area's ethnic diversity.

The neighbourhood is well organized to accommodate play in the habitual range. The dominant housing type is single detached bungalows strung along bays, providing ample safe yard and street space for play (Fig. 4.4). Traffic volume and speed is low, and visibility is good. The houses are close together, so children playing anywhere on the bay will have good supervision, and there is at present a large population of elementary school age children to allow children to play with others without travelling too far.

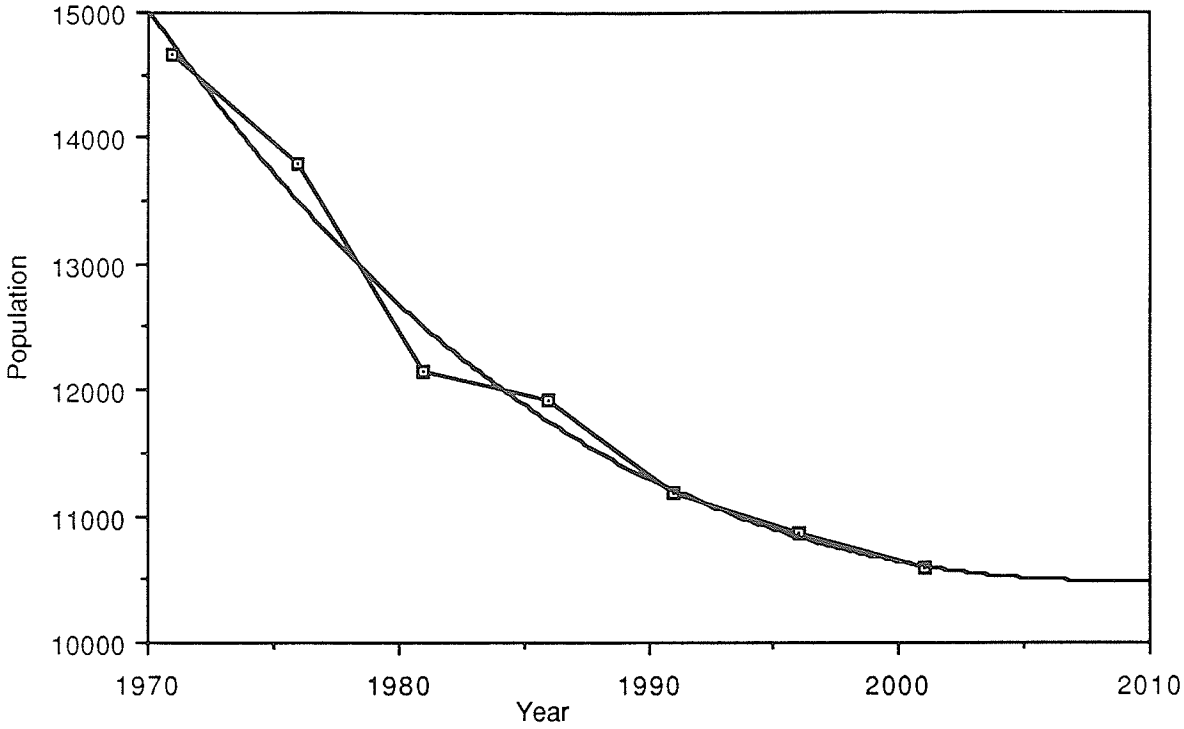

Figure 4.2. Windsor Park population projections. The young residents grow up and leave the neighbourhood, leaving an older and diminished population. New residents are primarily smaller, low income, single parents families. From City of Winnipeg, Dept. of Environmental Planning, Winnipeg Area Characterizations, 1981 and 1986.

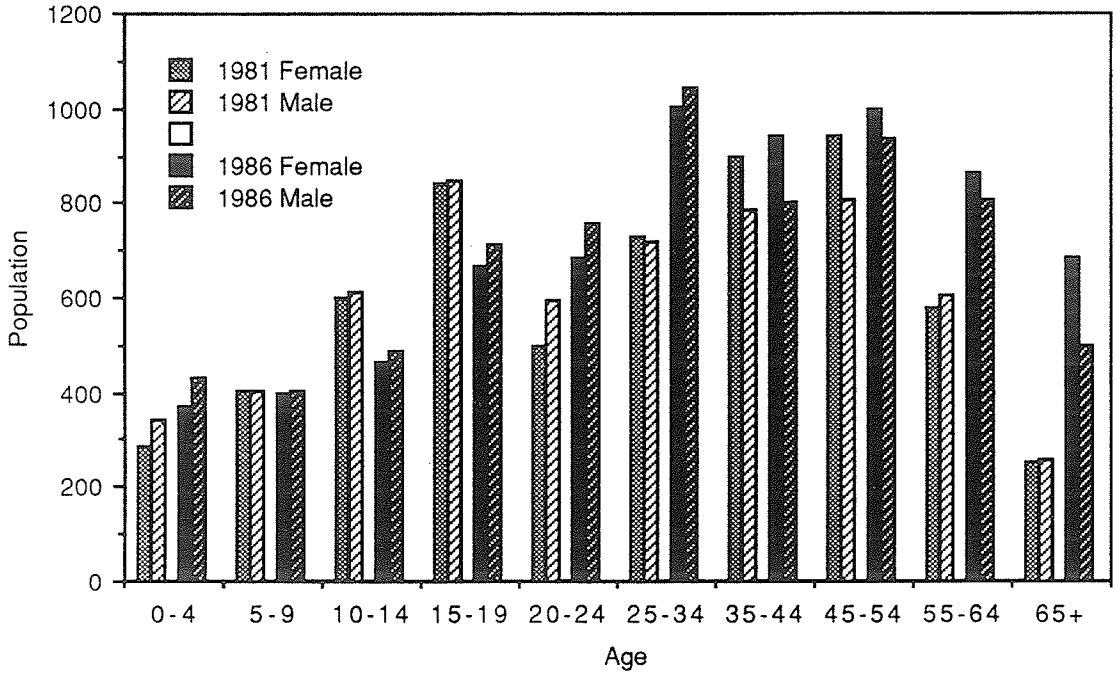

Figure 4.3. Windsor Park age/sex distribution. From City of Winnipeg, Dept. of Environmental Planning, Winnipeg Area Characterizations, 1981 and 1986.

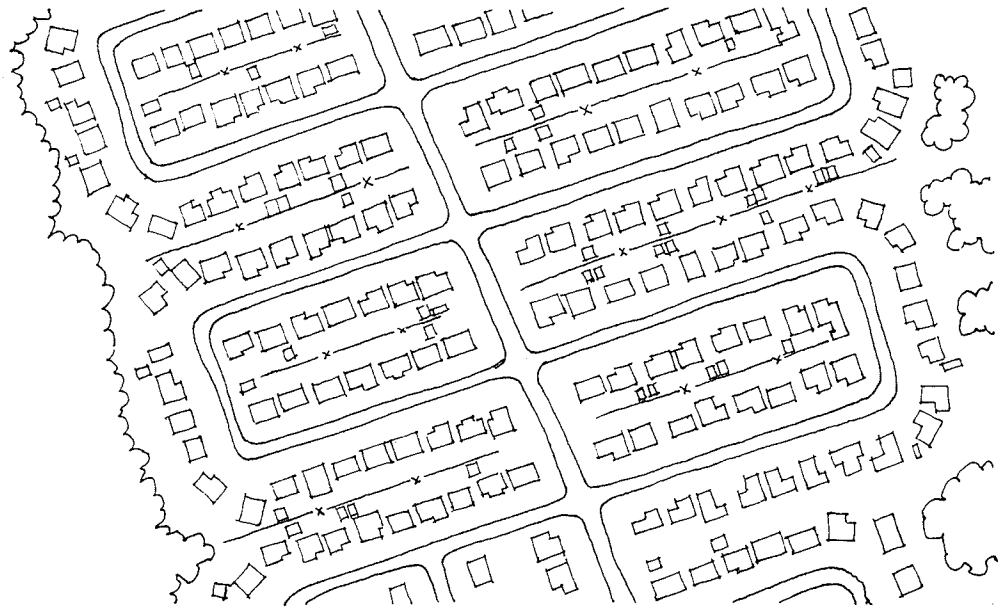

Figure 4.4: The typical housing pattern of Windsor Park.

In addition, many children have immediate access to various kinds of greenspace, from parks to rail right-of-ways. A system of pedestrian paths between bays helps them get to these places more quickly and reduces the foot traffic on major streets.

Windsor Park was designed so that every child need cross only one major road to get to school. By reducing the number of thoroughfares, the traffic along those routes increases, and they become a more significant barrier to movement for young children. This has given thoroughfares a high impact, dividing the community into seven distinct sub-neighbourhoods. These are illustrated in Figure 4.5. One would expect younger children's frequented range to be more or less limited to their own sub-neighbourhood. As they age, however, crossing roads is no longer a concern, and travel is bounded primarily by actual physical barriers, such as fenced golf courses, the Seine River, and Symington Yard and the bush to the north.

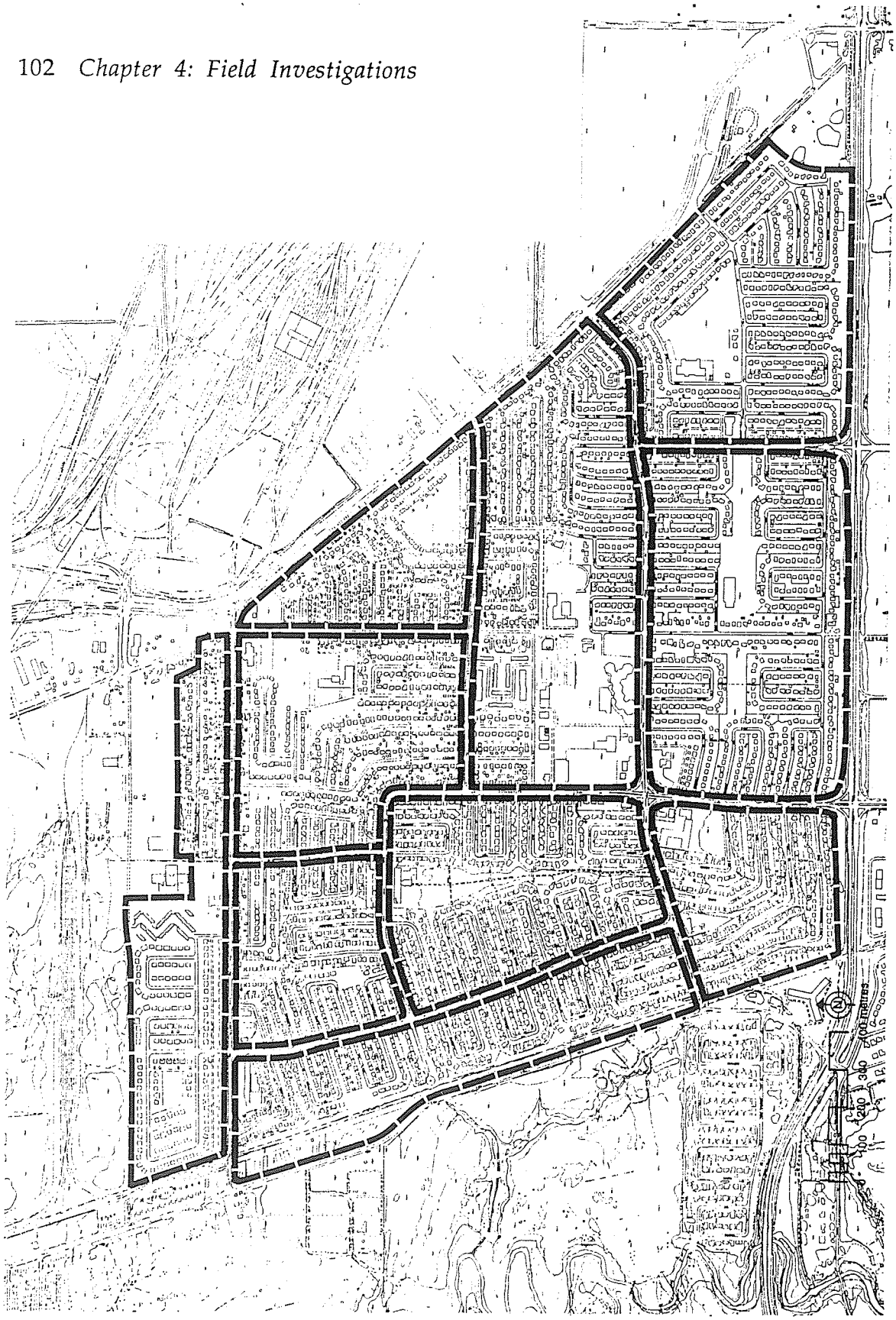

Figure 4.5: Windsor Park's ten sub-neighbourhoods.

In general, the extensive path network, the pattern of vehicular circulation minimizing major street crossings, and the diversity of land uses within the neighbourhood and adjacent to it provide children in Windsor Park many excellent opportunities to safely extend their range and experience a variety of educational settings. However, the quality is inconsistent, and much can be done to increase the perceptual access to places and activities within reach of the children.

B. Investigative Exercises

The first exercise, a questionnaire, surveys their patterns of behavior and attitudes toward the neighbourhood in each of the major topics covered in the previous two chapters: modelling, exploring, competence and values. The second exercise, a photography assignment, was designed to probe the core process of attention, revealing those aspects of the community which attract resident children's interest.

While every effort has been made to maintain rigor within the limitations of the methods employed, the exercises are neither comprehensive nor controlled enough to confirm the normative theory. Instead, they should be seen as a preliminary exploration of a group of students relationship with their neighbourhood environment, also serving to introduce issues necessary for the creative transformation of abstract and general principles into forms responsive to a social context. In this sense, the results of the exercises are not conclusive, but should be thought of as a demonstration of method and a supplement to the hypothetical principles outlined in Chapter 5.

Sample Selection:

The sample consists of a class of 31 Grade 5 students from Frontenac Elementary School, which lies in the heart of Windsork Park (see Figure 4.6).

The desire to simplify the investigation and minimize the disruption of regular classroom activities led to a less than ideal sampling procedure, described by statisticians as an "accidental sample." It consisted of a single Grade Five classroom, recommended by Frontenac's vice principal because it was far enough along in its studies to afford the time, and was noted for its

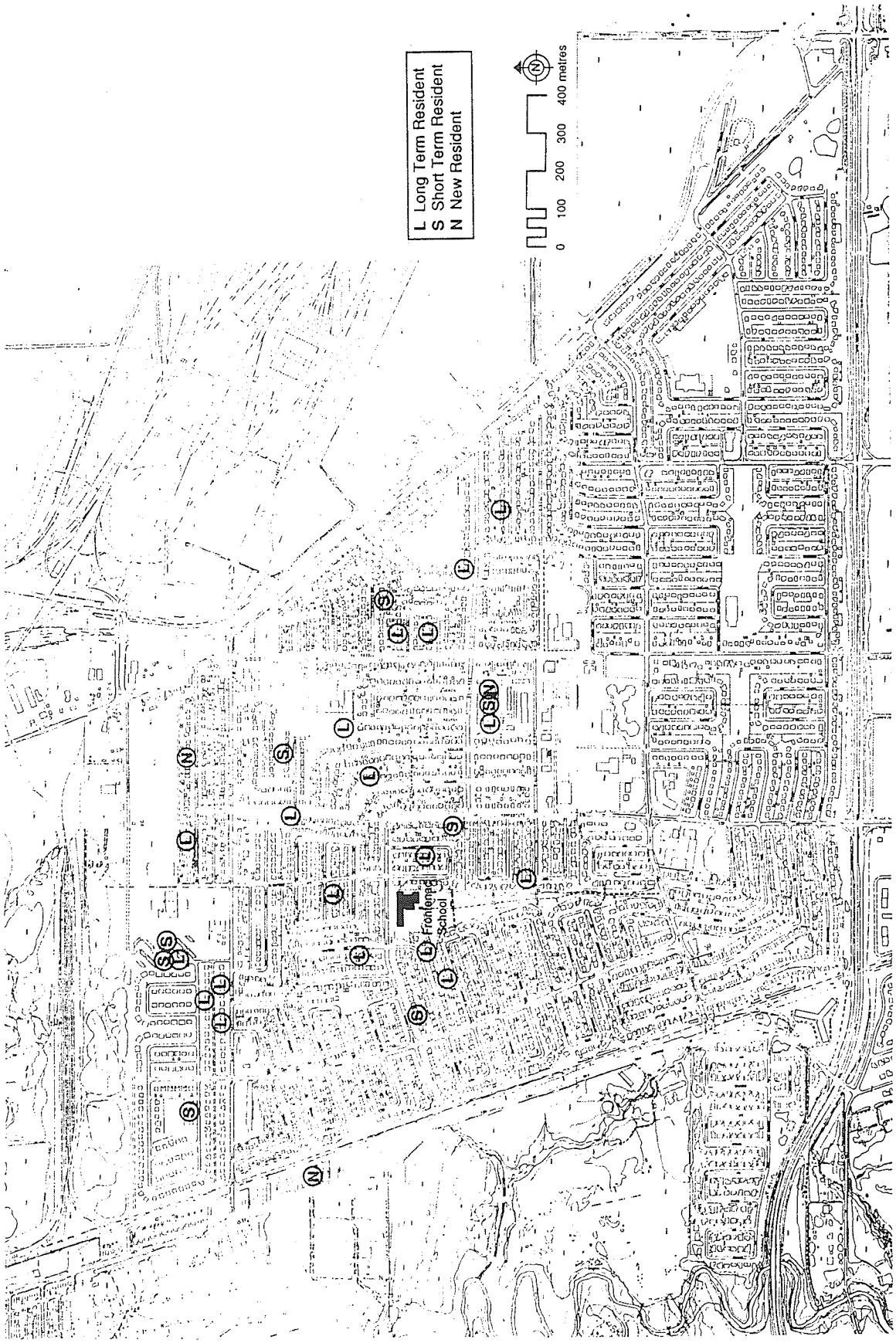

Figure 4.6. Distribution of the sample students' homes.

cooperative and enthusiastic students. Accidental samples are undesirable because the degree to which they represent the population being studied is often difficult to determine. For this study, the demographics of the neighbourhood were available, as was the class list.

This procedure was deemed acceptable because the sample met the following conditions, based on the class list:

1. The ages of the students are within one year of the normal for Grade Five, that is, all students were between 10 and 12 years of age and thus qualified as a sample of "middle age" children;

2. Though the ratio of female students to male in the classroom is slightly higher than that of the general population of Grade Five students in the community, the difference falls within acceptable bounds of stratification. The split between male and females in the sample was 53% female, and 47% male, while the general population of Grade Five students in the community is about 49% female and 51% male.

3. Their homes were well distributed throughout the area served by Frontenac School, representing all the major housing types and most of the sub-neighbourhoods illustrated in Figure 4.5.

Nevertheless, class populations are selectively compiled, and because this is the top Grade Five class, one must expect biases toward the high side of the communities socio-economic strata and more stable family situations than are typical of the neighbourhood as a whole.[1]

[1] Assuming a correlation between social status and the achievement motive, as demonstrated by B. C. Rosen, "The achievement syndrome: a psycho-cultural dimension of social stratification," *American Sociological Review* 21, 1959. pp. 203-211.

In addition, on the afternoon the exercises were given, three of the male students were absent, leaving the sample 58% female and 42% male. To correct for this, male and female responses are analyzed separately by percent wherever possible (control by "norming"[2]), but the scores for the class as a whole are biased toward the perspective of female members of the community. As a result, the statistical inferences drawn from the data may not provide an accurate representation of the entire community of Grade Five students, and should not be applied beyond the limited and hypothetical application presented in this thesis.

Methodology

The exercises were scheduled to occur on a Thursday prior to a Friday inservice day, with good weather forecasted for the weekend. The inservice ensured that students involved in the photography assignment would have at least one afternoon in the weekend to take photos before leaving for the cottage or some other out of town destination.

The experimenter and his assistant introduced themselves to the class as university students, "interested in learning ways to make the neighbourhood a better place to live." The experimenter then stressed that the students were not being tested, but that he was seeking advice. While he finished the introduction, the assistant passed around a box containing 31 folded strips of paper, and asked each student to take one. Eight of the strips of paper had the word "photographer" on them, the others said "writer." After every student had a strip, the experimenter asked those with the word "photographer" on

[2] Sanford Labovitz and Robert Hagedorn, *Introduction to Social Research, Second Edition*, (New York, McGraw Hill Book Company, 1976), p. 107.

their strip of paper to stand up and go quietly with the assistant into the nearby seminar room.[3]

The experimenter then passed out the questionnaire documents to the students who remained in the class. It consisted of ten questions: a mapping exercise, five open-ended questions and four multiple-choice questions. (see Appendix C for a copy and description of the questionnaire). Students were asked to read the instructions on the front cover while the experimenter read them aloud. After a brief period of questions, he asked them to begin the map. While they worked, the experimenter wandered from desk to desk, answering questions and asking for clarification on some of the map drawings. After twenty minutes, the teacher announced that the students should finish their maps. The experimenter then went through each of the remaining questions with the students, reading it out loud, answering questions, and occasionally asking students to clarify what they had written. The questionnaires were completed and collected in just under 45 minutes.

Meanwhile, the assistant in the seminar room had the students complete only the mapping portion of the questionnaire. After twenty minutes, she passed out a sheet of instructions and described the photography exercise to the students (the instruction sheet is included in Appendix D). They were each to be given a disposable camera, which they would take out into the neighbourhood on a sunny afternoon that weekend and snap photos of "interesting places and things in Windsor Park," emphasizing that the subjects should be interesting to the student as an individual -- not subjects they think others will find interesting. She suggested they go out without any destinations in mind, but should explore the neighbourhood and photograph

[3] The lottery system should have been designed to ensure a stratified sample of photographers. By pure chance alone the sample consisted of four boys and four girls.

things that catch their eye. On Monday, the cameras were to be turned in to the teacher, who labelled each with the name of the student. After a demonstration of how the cameras are used, each student was given a camera, and the group returned to the classroom. Their return was timed to occur upon completion of the questionnaires.

Once the film was processed, the experimenter returned to the class, and gave a set of prints to each of the photographers, keeping one for himself. On a one-to one basis, he briefly discussed the subject matter of each photograph, asking the student responsible to recall what had been the specific point of interest. It was necessary to verify the source of fascination behind each photo, because some had no apparent focus, while others, it turned out, had several potentially fascinating features. Incidentally, the interviews were fascinating in themselves - full of surprises, and revealing much about the style of exploration developed by each student.

Analysis Methods

Ordinarily, research involves the comparison of two groups of data, such as surveying residents' perceptions in two different neighbourhoods. Differences between the two groups indicate how the qualities of each neighbourhood affect the perceptions of the residents. For this thesis, the neighbourhood is compared to itself: the analysis seeks to uncover differences in the responses of residents from different parts of the community, and between the different sexes. This information will direct the interventions toward areas in the neighbourhood which appear to have the most problems, and will help to isolate those deficiencies which are unique to each sex, and are best addressed in changes to the places frequented by that sex.

The length of time each student had lived in the neighbourhood was assumed to have a strong bearing on the students' responses, so the analysis divided the sample into three different levels of familiarity:

Long term residents - those who have lived in the neighbourhood for more than three years;
Short term residents - those who have lived there for one to three years; and
New residents - those who have moved there less than a year ago.

The three year criterion is based on the profound range expansions which Hart recorded among seven to eight year olds (see Figures 2.2 and 2.3). It was reasoned that those who lived in Windsor Park during the three year period between this expansion and the peak of middle childhood sensitivity around age 11 should have attained a level of familiarity comparable to those who had lived there all their lives.

The maps are analyzed by location of the student's house as well, because it was assumed that the student's point of origin will have a direct bearing on the kinds of features he or she includes. Six vicinities were derived by isolating clusters of students homes which occur within Windsor Park's sub-neighbourhoods, (i.e. housing areas separated by major streets), except where student's houses from the next sub-neighbourhood were close enough that they seemed more reasonable to include. It is assumed that during earlier childhood, the sub-neighbourhoods were the starting points for cognitive maps, but by Grade Five, busy roads are no longer perceived as a barrier.[4] The vicinities are illustrated in Figure 4.7.

[4] This assumption is confirmed by the questionnaire, question 8.

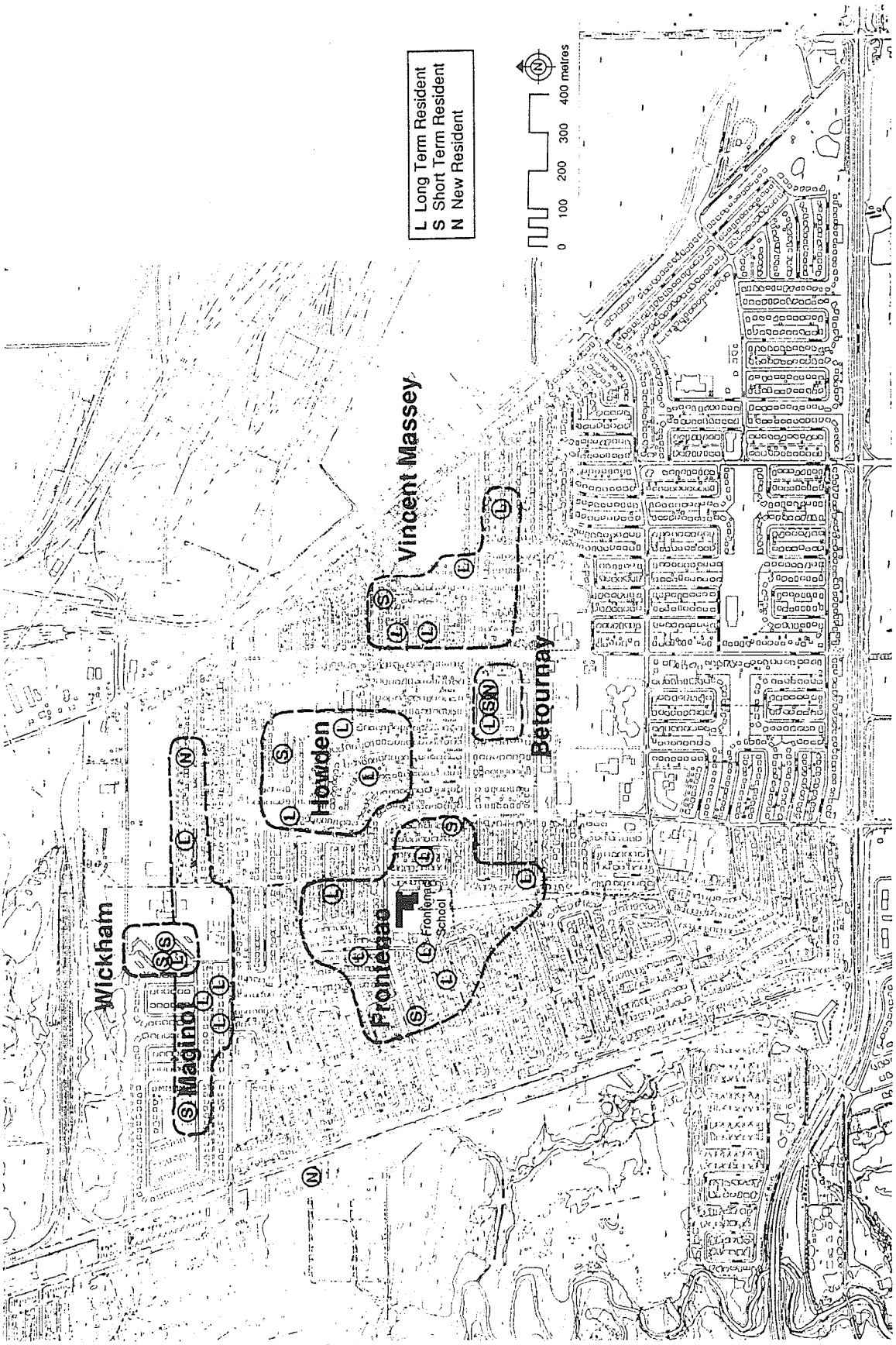

Figure 4.7. Vicinities for map analysis.

There are problems inherent in these methods of analysis. Some vicinities, Vincent Massey for instance, are very small samples, and contain only girls. When comparing map accuracies of each vicinity, how does one tell if it is the vicinity that is causing the differences, or the ratio of boys to girls, or their familiarity, or some other hidden factor? To minimize the confounding effects of these factors, the average level of familiarity and the percent of male and female students were plotted for each vicinity. The vicinities with the lowest familiarities did not consistently perform at the lowest level, nor did those with higher than average females correspond to the pattern of responses for the class's females. In other words, the vicinities appear to have an effect on the responses independent of these other two factors, and were therefore retained as part of the analysis. However, the degree to which each of the factors influenced the responses is unknown, and we cannot be sure that other, equally important causes have been overlooked.

A series of graphs were produced from the results for maps, questionnaire, and photography exercise - illustrating the responses grouped by familiarity level, vicinity, and sex differences. The graphs were most helpful in revealing patterns in the data, and many of them are presented in the discussion below.

C. Results and Discussion

i. Cognitive Maps

The maps were intended to uncover two kinds of information: first, how the image of the neighbourhood is structured in the minds of the students, and second, the child's "operational network:" which parts of the neighbourhood he or she enjoys and uses.

Drawings were analyzed by studying first the representation of the neighbourhood patterns of streets, houses, etc. and categorizing them using Appleyard's typology of mapping methods.[5] An accuracy rating was assigned to each map based on a four point subjective scale described below, and the range was recorded by determining the distance in metres from the students home to the most distant depicted feature.

To understand the operational network, the elements and places that occur in them were organized into categories, then the number of times the categories were mentioned was recorded to indicate the importance of those categories to the group. The major pedestrian routes and destinations were plotted as a graphic record of the operational network of the class.

Appleyard's Map Types

To uncover differences in the way groups of people mentally structure their surroundings, Appleyard developed a system for categorizing hand-drawn maps.[6] Those which use streets and paths predominantly are considered

[5] Donald Appleyard, "Styles and methods of structuring a city," *Environment and Behavior* 2, pp. 110-117.

[6] A similar but less concise method was employed by Hart, in *Children's Experience of Place*, pp. 100-104.

sequential, while those that are structured by means of buildings, districts, and landmarks are *spatial*. Each type was broken into four sub-types, based on the level of sophistication (see Figure 4.8.)

SEQUENTIALLY DOMINANT MAPS

Fragmented. This type of map consists of broken routes and incomplete series of places. None of the maps from this exercise fell into this category.

Chain. These maps are best described as one-dimensional. A single route is detailed, and little or no detail perpendicular to it is mentioned. On some chain maps, even right angle intersections are warped to become part of the linear route. Nineteen percent of the class's maps were of this type.

Branch and Loop. Still built upon a single route, branch and loop maps provide more lateral detail than the chain type, and overall a more sophisticated pattern of streets and paths. The class had 23% of its maps in this category.

Network. Network maps are the most complex sequential maps. They show more than one major route in relation to each other, and usually (though not always) show a high level of detail. They indicate a clear and extensive model which corresponds well to patterns in the real world. This proved to be the most common type of map, produced by 32% of the students.

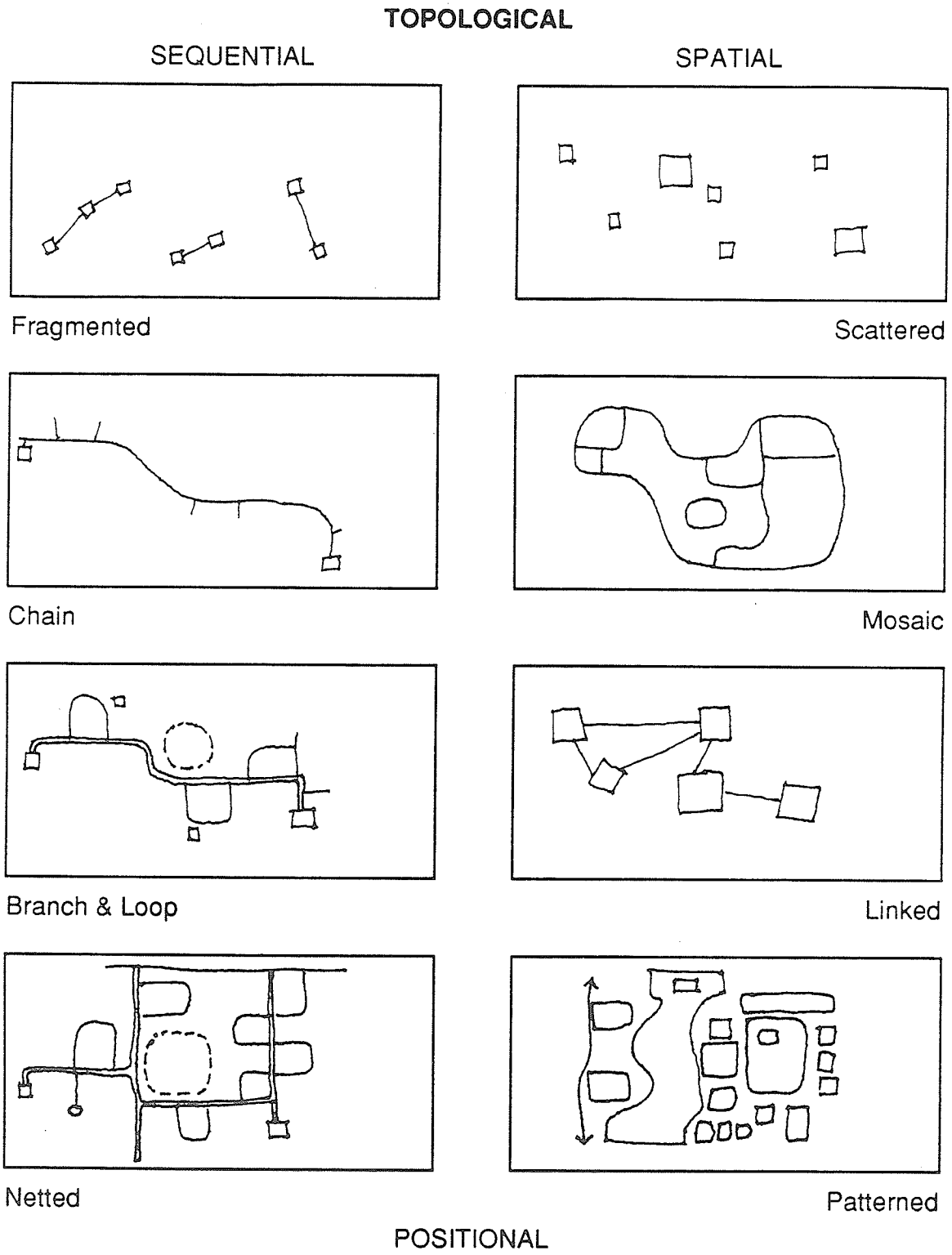

Figure 4.8. Appleyard's typology of mapping methods. Note the progression from simple (topological) representations to the more sophisticated (positional) representations in both sequential and spatial map types.

SPATIALLY DOMINANT MAPS

Scatter & Cluster. These primitive spatial maps consist of elements distributed over the sheet, which may be accurately placed in relation to each other, but show no attempt to connect them. Only one of the maps (3%) was of this type.

Mosaic. These maps are constructed of districts which are enclosed by distinct boundaries, like a bubble diagram or zoning map. None of the student's maps were of this type.

Link. These are maps in which the spatial elements are dominant, but some linkages have been indicated. This was the most common form of spatial map, used by 19% of the class.

Patterned. Patterned maps are built upon spatial elements, correctly interrelated to represent the overall patterns of the neighbourhood. They are highly sophisticated and extensive. Only one of the students produced a map of this calibre.

Sequential vs. Spatial Maps

Overall, 74% of the class drew sequential maps, outnumbering the spatial maps almost three to one. Appleyard found similar ratios between sequential and spatial maps: 70% to 26%, and 78% to 23% in his two study groups.[7] This ratio, however, does not hold true when we analyze the sexes and the vicinities independently.

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[7] Appleyard's study groups consisted of mostly uneducated adults, who had never seen a map of their community. The similarity in results despite such differences in the subjects might indicate a universal tendency for maps to be constructed sequentially, or it could reveal an underlying similarity between these two groups perception.

For most vicinities, the sequential maps were more commonly drawn than spatial ones, by about 2 to 1. Frontenac and Howden resident drew exclusively sequential maps. Only Wickham reversed that proportion, with twice as many spatial maps as sequential. As we shall see, the Wickham vicinity varies significantly from the rest of the neighbourhood in other ways as well.

There is a substantial difference between map types drawn by males and females (Fig. 4.9). Of the males, 92% drew sequential maps, while the females split their maps 61% sequential, and 39% spatial. All but one of the spatial maps drawn by the class were drawn by females. This too agrees with Appleyard's findings, where the females showed more variation in their methods of depicting the neighbourhood.

Familiarity had little effect on the ratio of sequential to spatial maps.

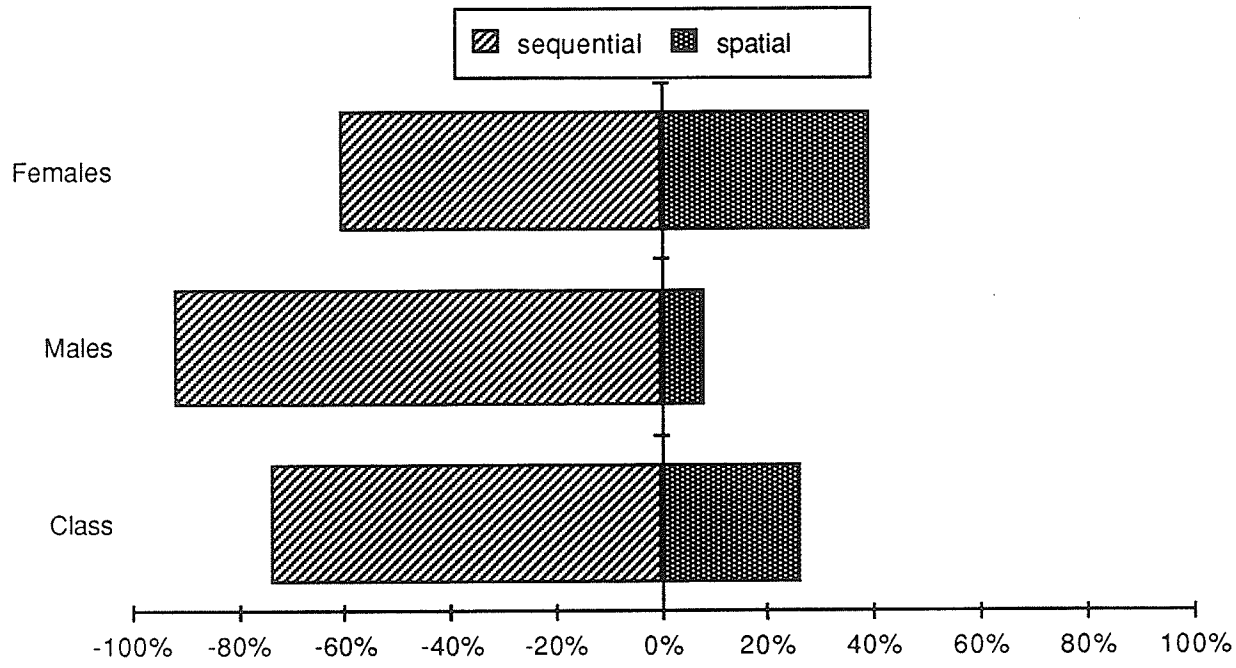

Figure 4.9. Map types for males and females.

Map Sophistication

Whether sequential and spatial, all vicinities showed a fairly high level of sophistication[8] in their maps, falling on average somewhere between the highest and second highest level of sophistication (see Fig. 4.10). Howden had the highest overall sophistication, with 100% of its maps in the network category. Wickham showed the lowest average sophistication, with its maps less detailed and extensive than most others in the class. While this difference is quite apparent from the maps, the small sample size (n=3) makes it inconclusive. On the surface, the ability of the students from each vicinity in describing their neighbourhood can be considered quite high.

[8] Average sophistication was calculated by assigning values of 1 to 4 for each sub type of map, with the higher numbers indicating higher levels of sophistication. To find the sophistication of spatial maps for males, multiply the number of maps in each spatial sub-type by the assigned values, add them up, then divide by the total number of spatial maps produced.

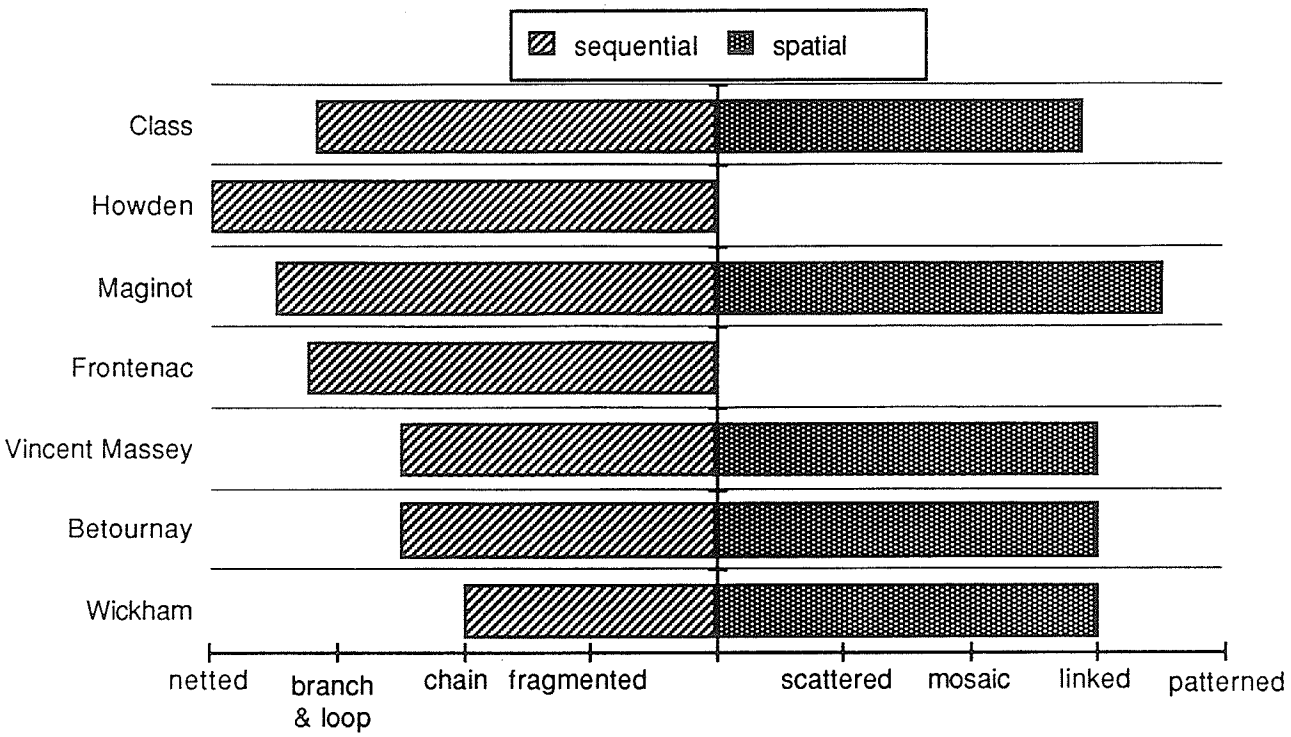

Figure 4.10. Map sophistication for vicinities.

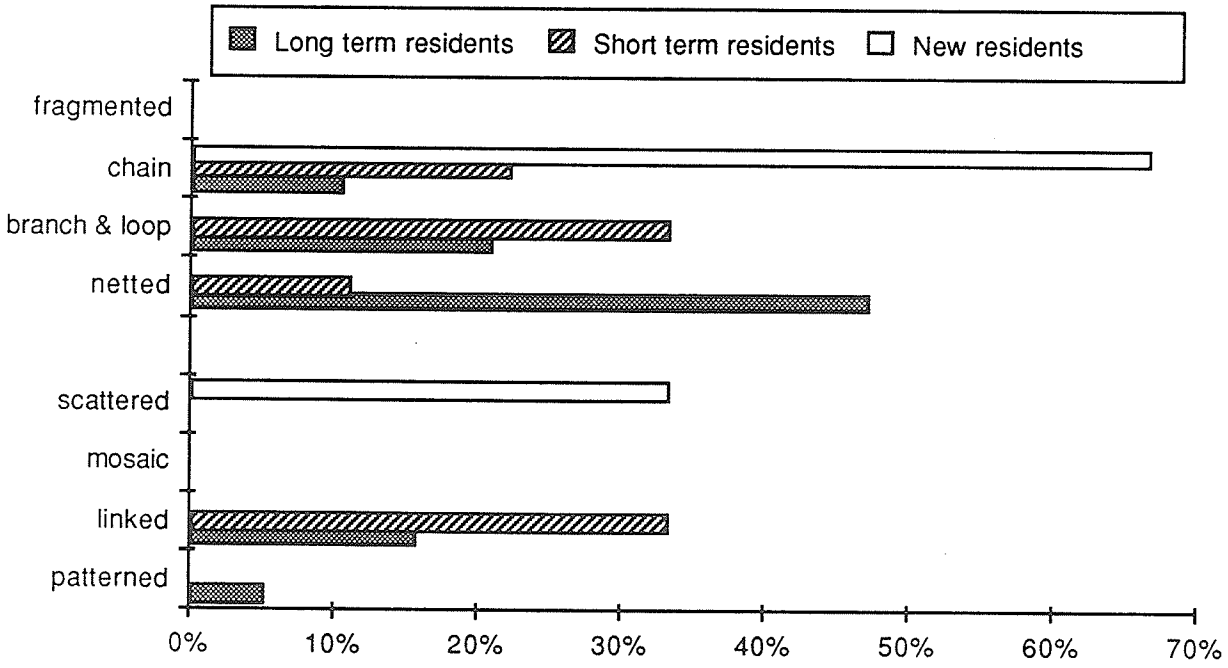

Figure 4.11. Map sophistication and familiarity.

Sex differences had only a slight effect on the sophistication. Males showed a slightly higher average sophistication than the females for sequential map types, and about the same average sophistication for spatial types.

Figure 4.11 indicates a clear pattern of increased sophistication as familiarity increases. New residents' maps had the lowest sophistication levels, short term residents' were slightly higher, and long term residents are consistently highest in both sequential and spatial map types. While it has little heuristic value, such an strong correlation does attest to the validity of Appleyard's system of analysis.

Accuracy

Accuracy is partially implied by sophistication, but on more than one occasion a student constructed an intricate map which shows little relation to the real neighbourhood. Thus the maps were analyzed separately for accuracy, on a subjective scale as follows:

Excellent: the representations have no major dislocations or distortions, and are sufficiently extensive to reveal an accurate understanding of the neighbourhood pattern. Nineteen percent of the class had maps at this level of accuracy.

Good: The representation is mostly correct, with errors which do not overwhelm the impression that the student has internalized the major patterns of the neighbourhood. This level was achieved by 26% of the students, including those who depicted with high accuracy a very small portion of the neighbourhood.

Fair: Many errors, but the overall locations of things is correct. This was the most common level of accuracy, applying to 32% of the maps.

Poor: These maps often lacked any comprehensible structure, consisting instead of a visual inventory of elements, or of routes straightened and simplified beyond recognition. Twenty-two percent of the class drew maps of this nature.

For the class as a whole, the maps are quite evenly distributed among the four levels of accuracy. Males, however, consistently drew more accurate maps than females, regardless of vicinity or familiarity. In fact, the average accuracy for males in the new resident category was higher than that of long term female residents, many of whom had lived in Windsor Park all their lives.

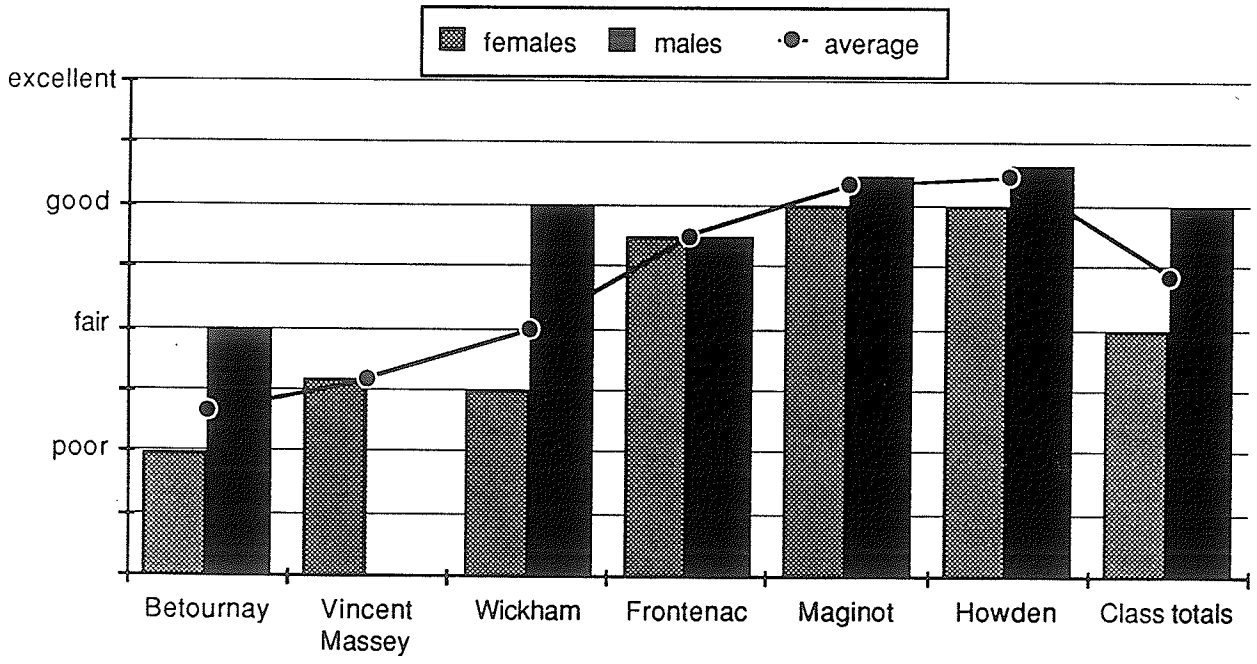

Figure 4.12. Map accuracy.

In addition, some vicinities produced higher average accuracies than others (see Fig. 4.12). Howden and Maginot's were higher than the rest of the class, with averages between good and excellent. Betournay and Vincent Massey, which produced nearly identical types and numbers of maps, had similarly low accuracy scores as well, hovering between poor and fair.

Range

The range figures are intended to give an impression of the physical extent of neighbourhood known to the student. Range was calculated by measuring on a 1:5000 scale map the distance (in metres) between the most distant object depicted on the student's map and the student's home. This does not correspond directly with any of the range categories discussed in Chapter 2, but might be considered an approximate measure of the *frequented* range (see page 62).

Figure 4.13 graphs the results of the range measurements. The average range for the class is 670 metres.[9] Familiarity showed no pronounced effect on range beyond a slight increase for long term residents, but large variations in the range of different vicinities and sexes were evident. Vincent Massey, the most remote of all districts, correspondingly had the greatest average range, while Wickham had the lowest. Except for Vincent Massey, the remoteness of each vicinity from the central destinations in the neighbourhood did not correlate with the range. Frontenac, which is the most central of all vicinities, had the second highest range.

[9] Hart found an average free range of about 600 metres for his Grade five subjects from New England.

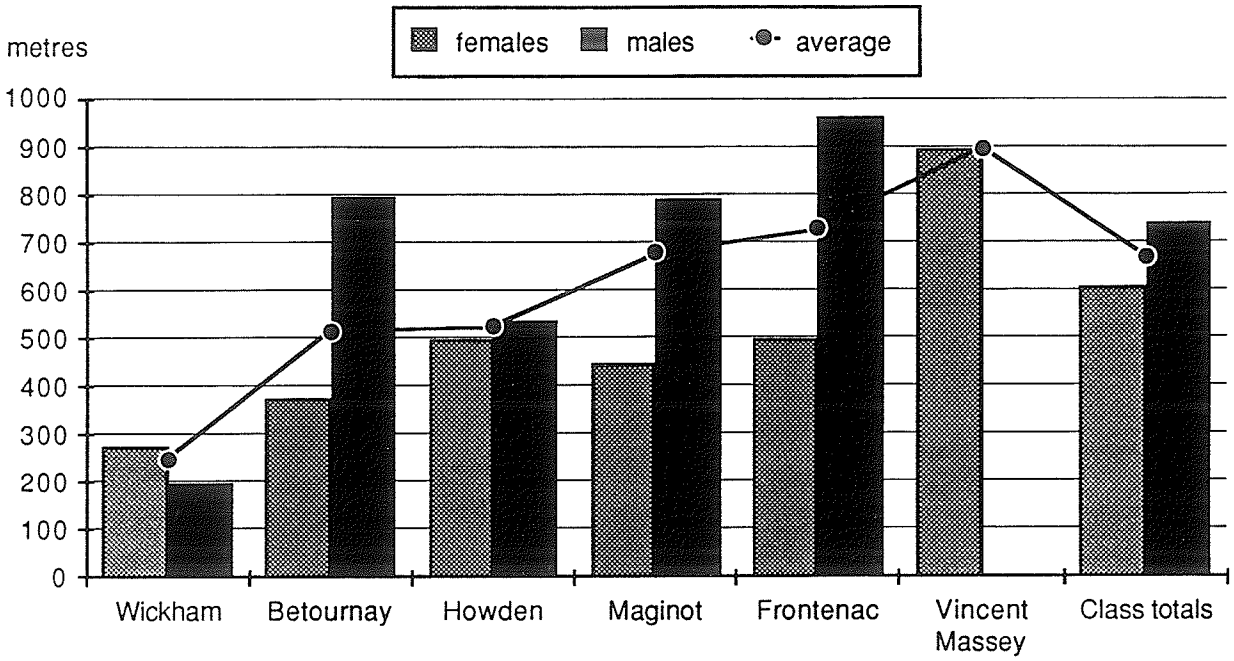

Figure 4.13. Map range.

Like the accuracy scores, the males' range is higher than females for each vicinity, but the difference is less extreme, averaging 741 metres for males and 608 metres for girls. It is interesting to note, however, that the students in the Vincent Massey vicinity are all female. One wonders whether the range of males from that vicinity would be correspondingly higher.

Features

The final form of analysis for the mapping question looked at numbers and kinds of features the students included on each map. Only those features which might be considered landmarks were listed, which excludes such commonly drawn elements as stop signs, driveways, streets, and generic houses[10].

[10] Only houses which were labeled with a friend's or relative's name were counted.

Frontenac School was the most frequently occurring feature, included in 74% of the maps. The high frequency is probably because the students were asked to draw their route to school as part of the exercise. Those that did not show the school either didn't indicate their route, or drew an arrow in the direction of the school. For most, however, the school did play a central role in the maps, and it was generally among the most highly detailed of all features.

The second most common features were the local convenience stores, drawn by 55% of the class. The impact of these stores on the children's experience of their neighbourhood is truly remarkable, as will become clear in the questionnaire analysis below. More than one map consisted simply of the students home, the school, and the convenience store.

Little consistent variation occurred between the sexes on features mentioned, however, students seemed to focus their maps on the unique features of their vicinity, indicating some autonomy in the perceptions of each vicinity. Betournay residents all drew the nearby outdoor pools, Frontenac focused on the school and its playground, Howden on the neighbouring houses, Maginot on the convenience store, Vincent Massey on its central park, and Wickham on the convenience store and local pocket parks.

The features were also grouped into seven categories: schools; designated open space (parks, playgrounds, and sports fields); commercial areas; housing (labeled houses, apartments, townhouses); recreation facilities and clubs (pools, community clubs, tennis courts, dance clubs); other institutions (Drop In Centre, church, fire hall, library); and undesignated open space (monkey trails, river, bushes, railroad tracks, parking lots). The results are shown in Figures 4.14 and 4.15.

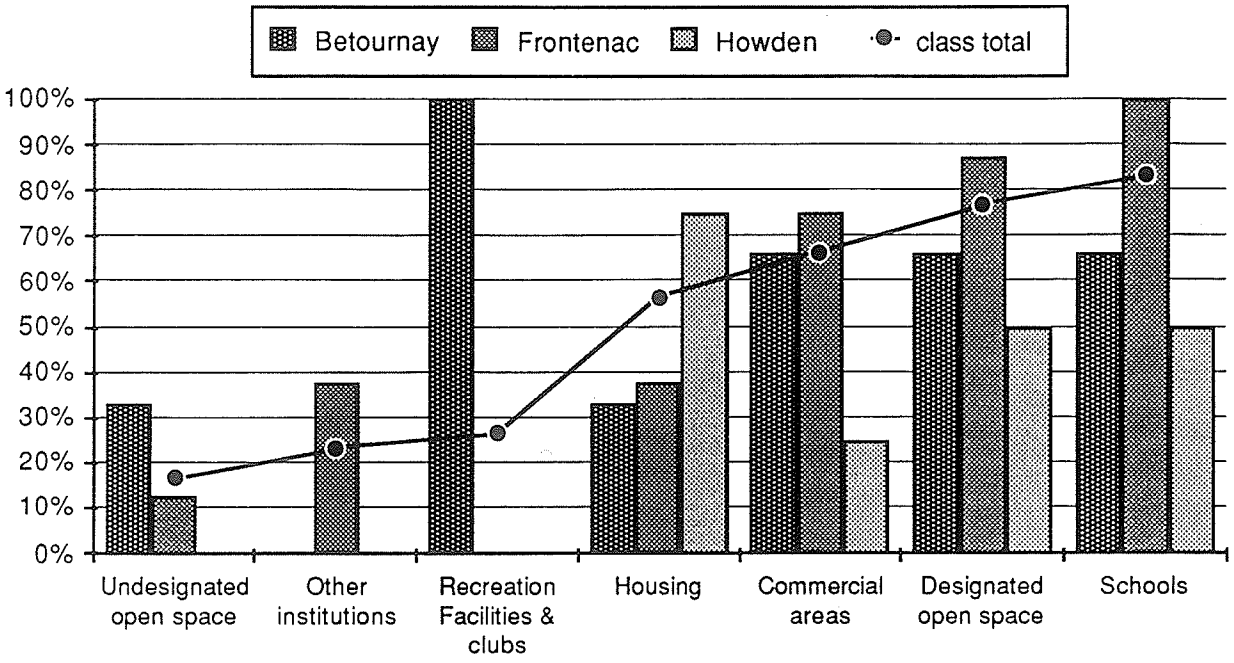

Figure 4.14. Features categories for Betournay, Frontenac, & Howden.

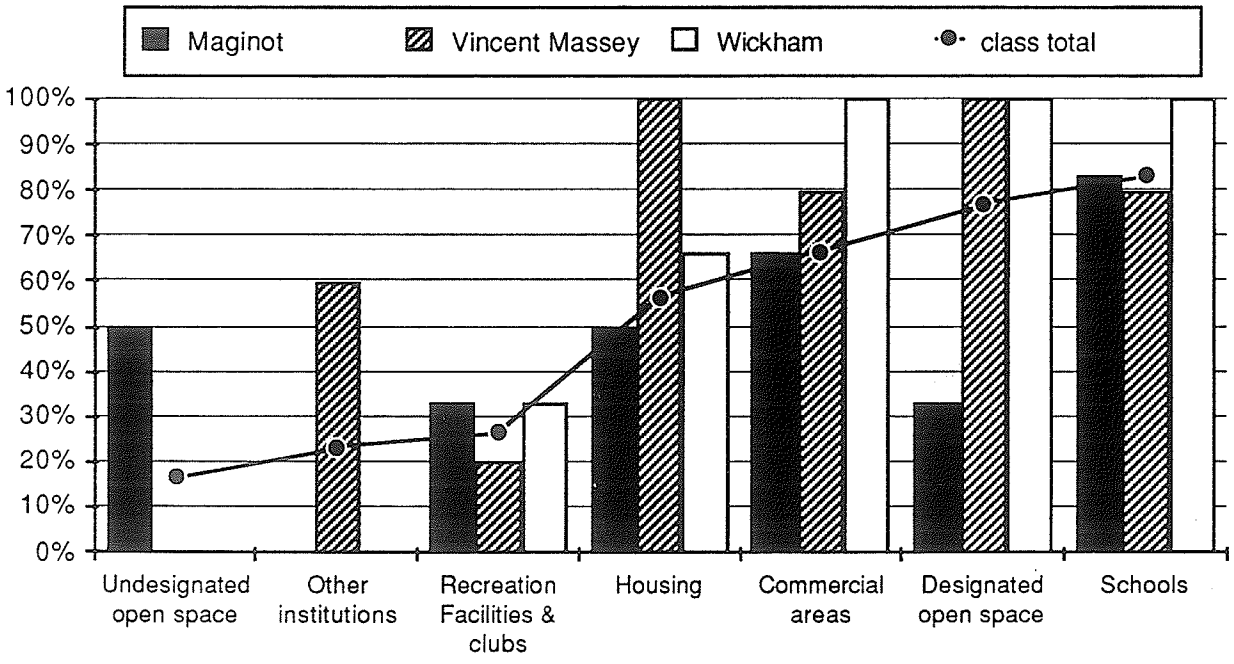

Figure 4.15. Features categories for Maginot, Vincent Massey, & Wickham.

The most frequently mentioned category of features was schools: even excluding Frontenac School, 29% of the class mentioned a school as a landmark on their maps. Designated open space was the second most common category, followed by commercial areas.

There was much variation in category mention rates for different vicinities, but male and female responses were similar, with female mention rates slightly higher than male for all categories except undesignated open space. The Betournay residents' answers vary substantially from the rest of the class,with 100% mentioning recreational clubs and facilities, compared to the class average of 20% for that category. All of the Vincent Massey residents mention some form of housing on their maps. They also unanimously included designated open space, which is understandable, given the large park at the heart of their sub-neighbourhood. The Maginot residents had the lowest mention rates for designated open space, and highest rates for undesignated open space, indicating that the bush and railroad tracks have a strong influence on their mental images of the neighbourhood.

Some measure of the richness of a student's mental image can be gained by simply counting the number of different landmark features each mentioned. This method presents problems when applied to the separate vicinities, because the sample sizes are too small to overcome the variations in individual mapping skill. A map which is low in richness does not necessarily represent a neighbourhood which is experientially impoverished. Yet a map which is high in diversity suggests a neighbourhood which is represented as a varied and complex mental image. In other words, high richness scores are more conclusive than low ones.

The class, on average, drew 4.29 features per map, with females mentioning 4.44, and males 4.08 (see Fig. 4.16). The residents of Vincent Massey drew the richest maps, averaging 5.6 landmark features per map, followed by Frontenac and Maginot, with 4.88 and 4.67 respectively. Howden residents were far below average with only 2.5 features per map.

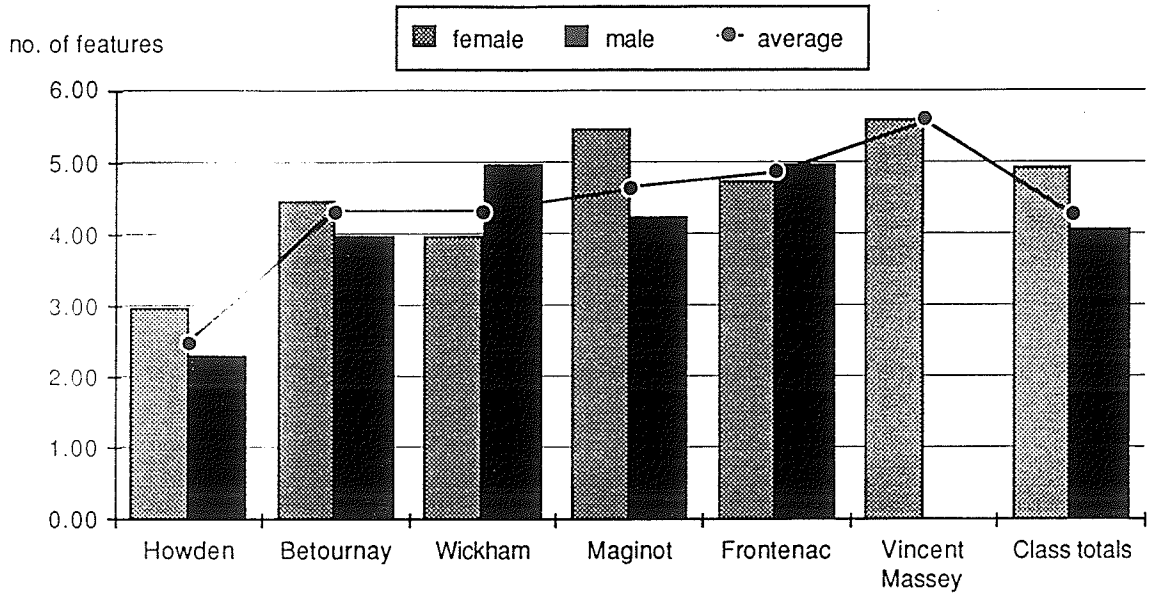

Figure 4.16. Map richness.

ii Questionnaire

The first four questions were analyzed in two ways. First, the specific responses were counted and graphed for males and females, and for each level of familiarity. Then, the responses were organized into categories, and graphed to give an impression of the relative importance of each category to the group. The following factors were noted: the amount of agreement in the answers, similarities and differences between the different familiarity groups, similarities and differences between the different sexes, most common responses and categories of response, and contradictions and agreement between results for different questions.

Favorite Places

The results for the favorite places question are illustrated in Figure 4.17. The students showed a relatively high degree of agreement[11] in their favorite places, with each response mentioned on average 2.3 times. The local convenience store, playgrounds, and the student's home or backyard were the most common specific responses. The boys' responses showed much less variety than the girls'. Forty five percent of them favored their own home and backyard, and they volunteered only four other favorite places. The girls came up with ten different favorite places, with no strongly dominant choice. Their most common response was the park and playground. No girls mentioned home or backyard. The most often mentioned category of response was "Designated open space," favored by 26% of the class. (see Fig. 4.18).

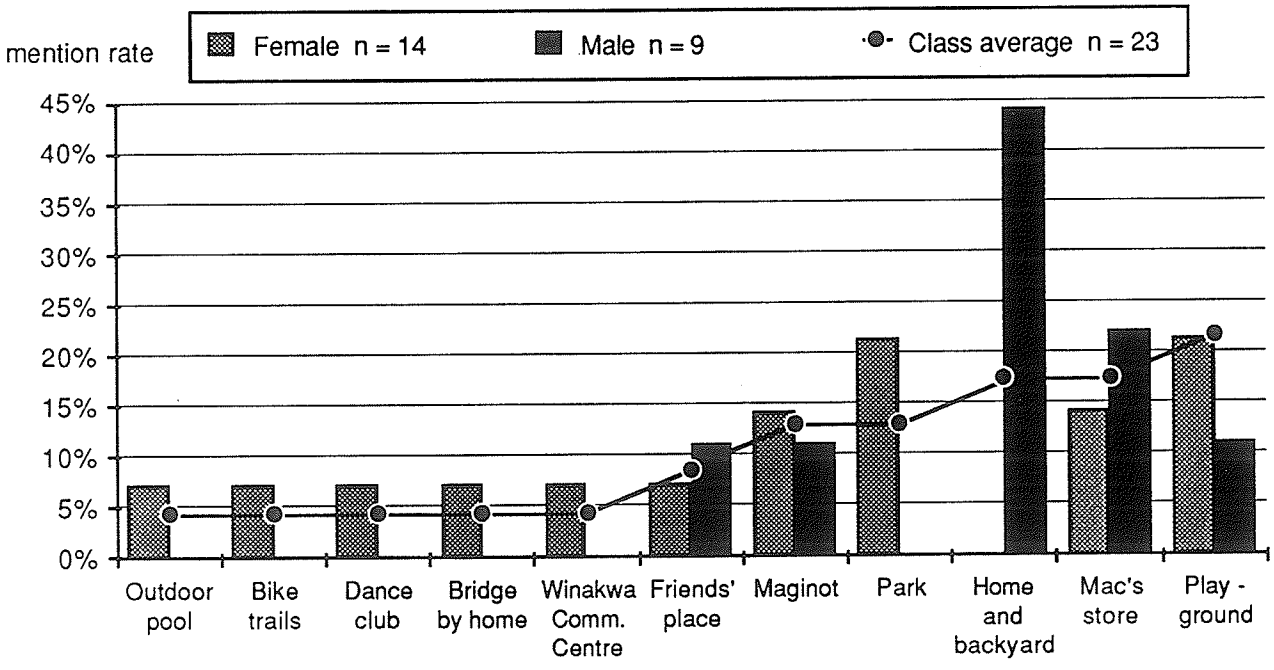

Figure 4.17. Favorite places.

[11] Relative to the other open ended questions.

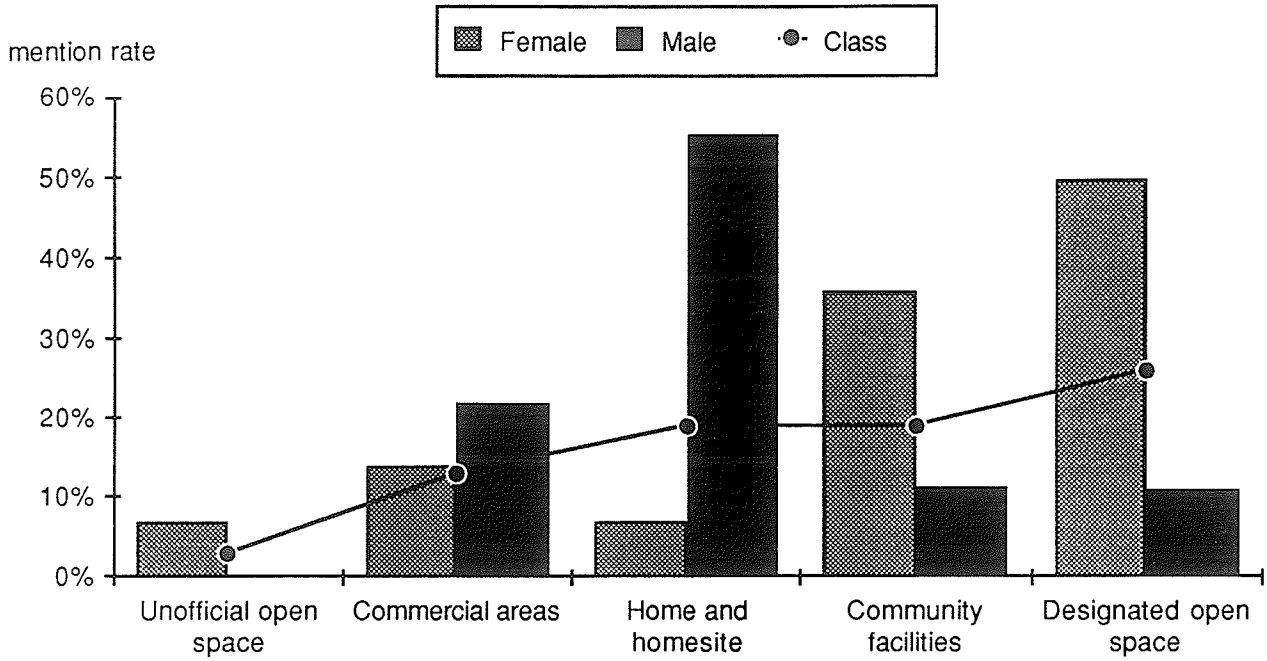

Figure 4.18. Favorite places by category.

The reasons cited for each choice show less agreement. The convenience store offered "good, cheap stuff," close enough to home that the children can get there on their own. The playground and park were enjoyed because there were "lots of things to do." Activities included meeting friends, using the play equipment, walking the dog. Play equipment was mentioned three times as the attraction to parks and playgrounds.

Least-liked Places

The class showed little agreement on the specific places they liked least, nor was any overall category of place widely disliked. Instead, the aversions appear to be the result of two factors: either the place was potentially dangerous, or it was boring or empty.

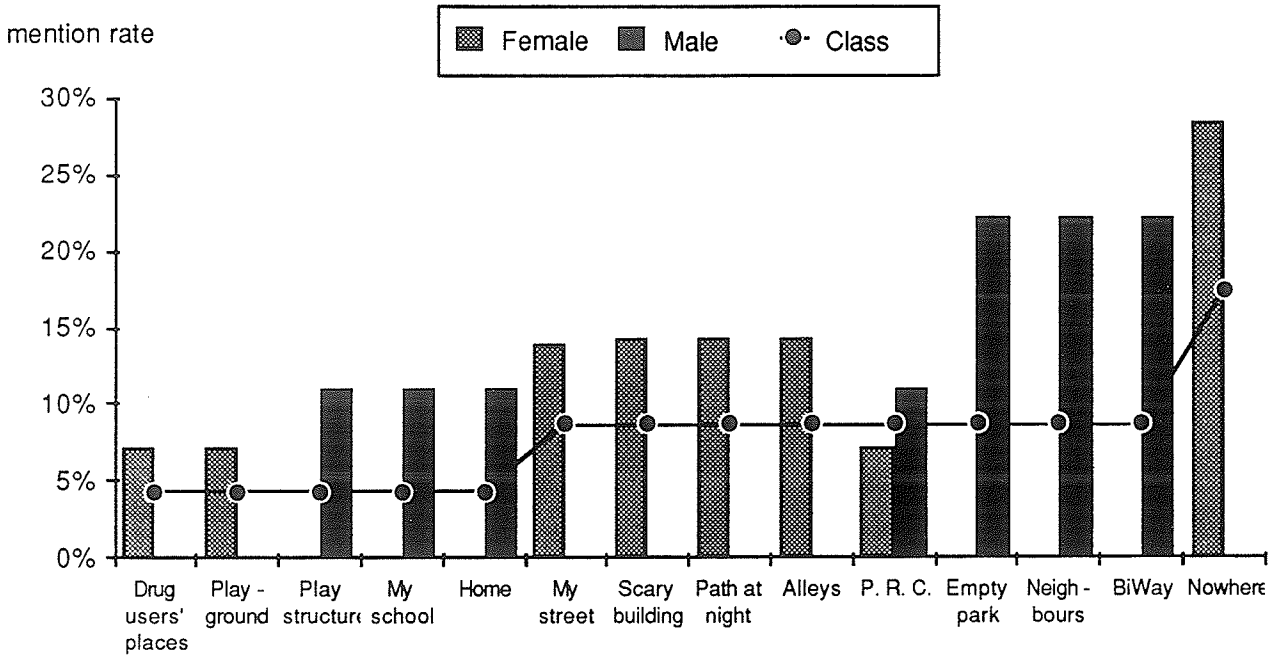

Figure 4.19. Least liked places.

Two of the three new residents disliked their own homes and street, both because there is nothing to do there. The most common response for the girls was "nowhere." (Fig. 4.19). All of the girls dislikes where based on perceived dangers, though some listed other reasons as well. None of the boys answered "nowhere." They were mostly aversed to both boring and dangerous places, but two of them listed the BiWay discount store as their least liked place, because it gave the neighbourhood a "welfare" image. In only one place did the boys and girls agree: Pierre Radisson Collegiate was disliked because "mean drug users go there." Another student generalized that she disliked any "drug places."

Admired Places

This question had very low agreement, averaging 1.25 mentions per place. Responses such as "playing with my friends" suggest that the class had trouble applying the concept of respect or admiration to the neighbourhood.

However, their responses were different from the favorite and most frequented places. Mac's convenience store, which was favored, frequented, fascinating, off limits, and desired, is not mentioned here. It appears that the places mentioned in response to this question have some special value to the students.

Home/backyard was the most commonly mentioned place, followed by Frontenac School (see Fig. 4.20). More than half of the boys responded "nowhere." The rest of them listed institutions: sports facilities and schools. The girls gave more varied answers, from a streetscape in the Exchange District (not in Windsor Park, but near the girl's home), to their backyard pool.

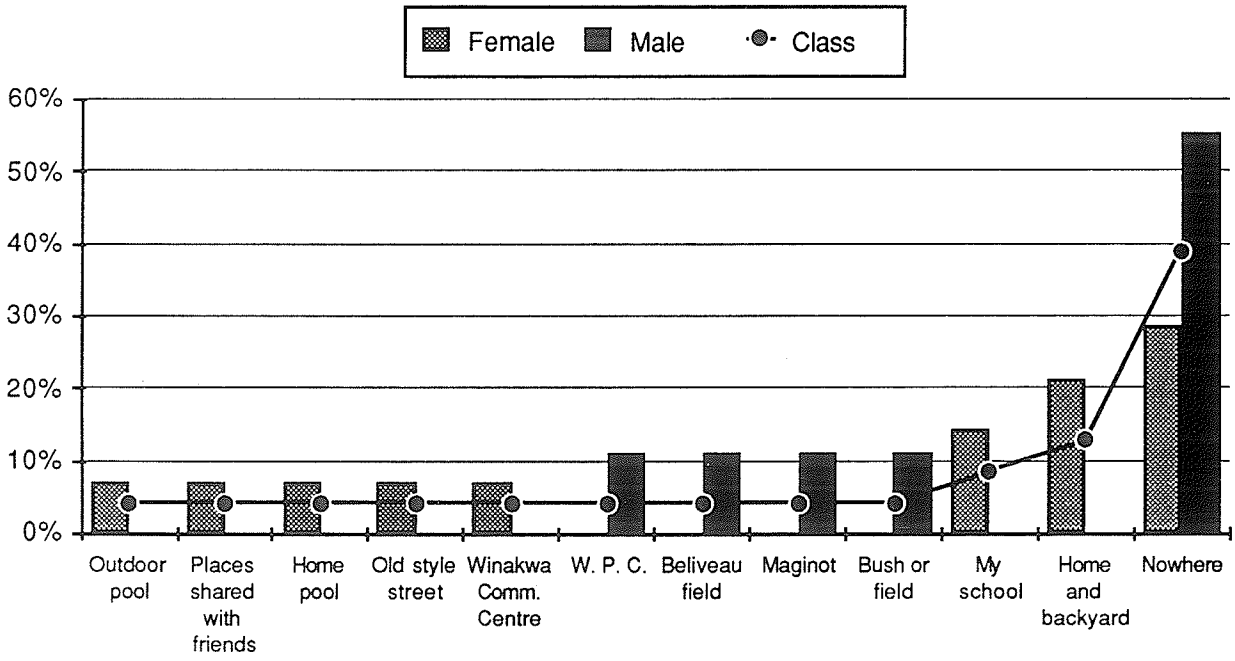

Figure 4.20. Admired places.

Most Frequented Places

The class members spend most of their time in their own yards, the park, and friends' yards (Fig. 4.21). This pattern is true for boys and girls, but the boys tend to use their own yards more, while the girls visited their friends. The park seems to function as a meeting ground for all: boys and girls, long term and new residents all frequent the park in similar proportions.

The females listed more than twice as many activities in the places they visit as the males (Fig. 4.22). The males activities consist almost exclusively of sports and related exercise.

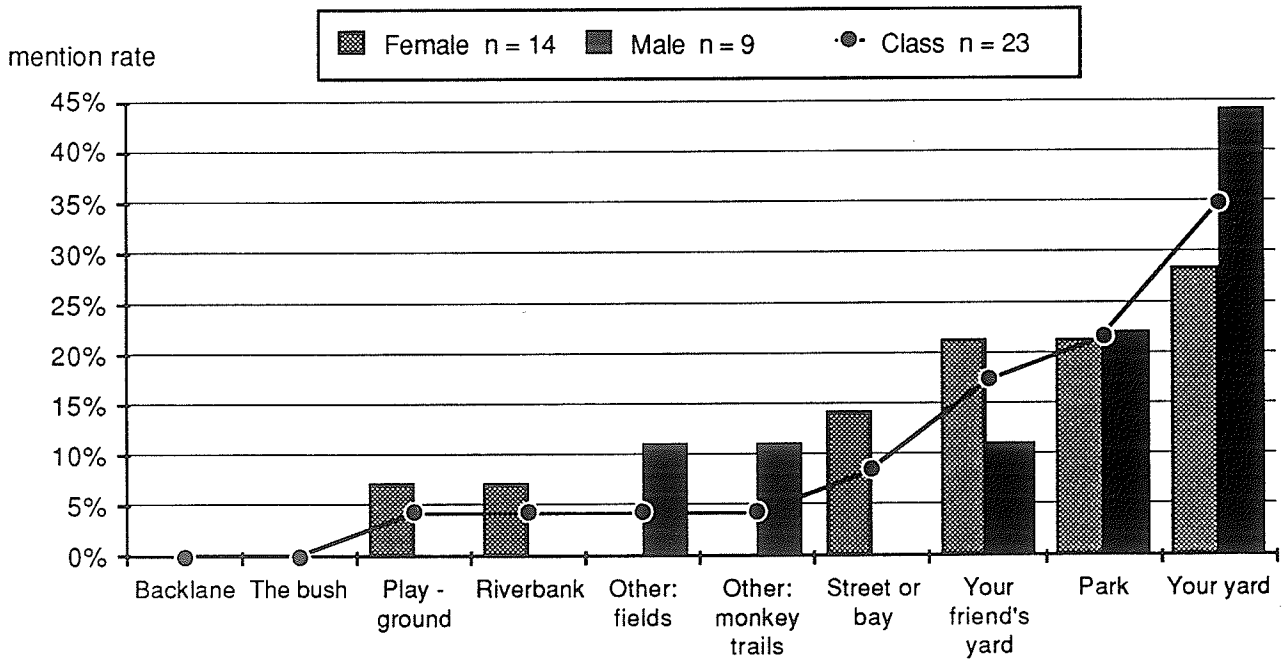

Figure 4.21. Most frequented places.

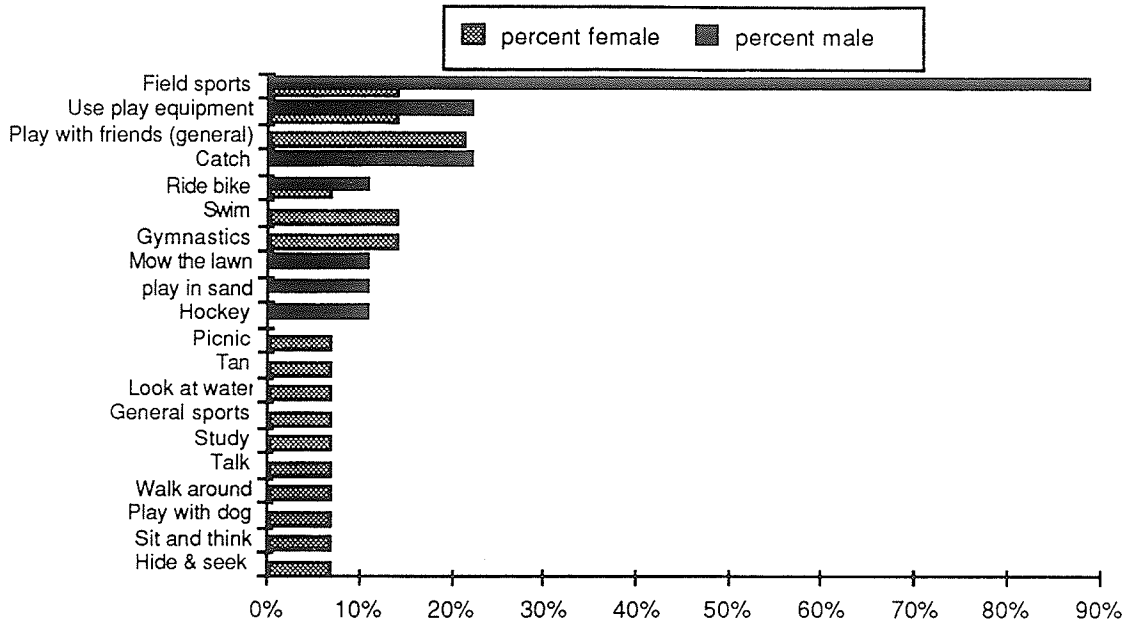

Figure 4.22. Most frequent activities.

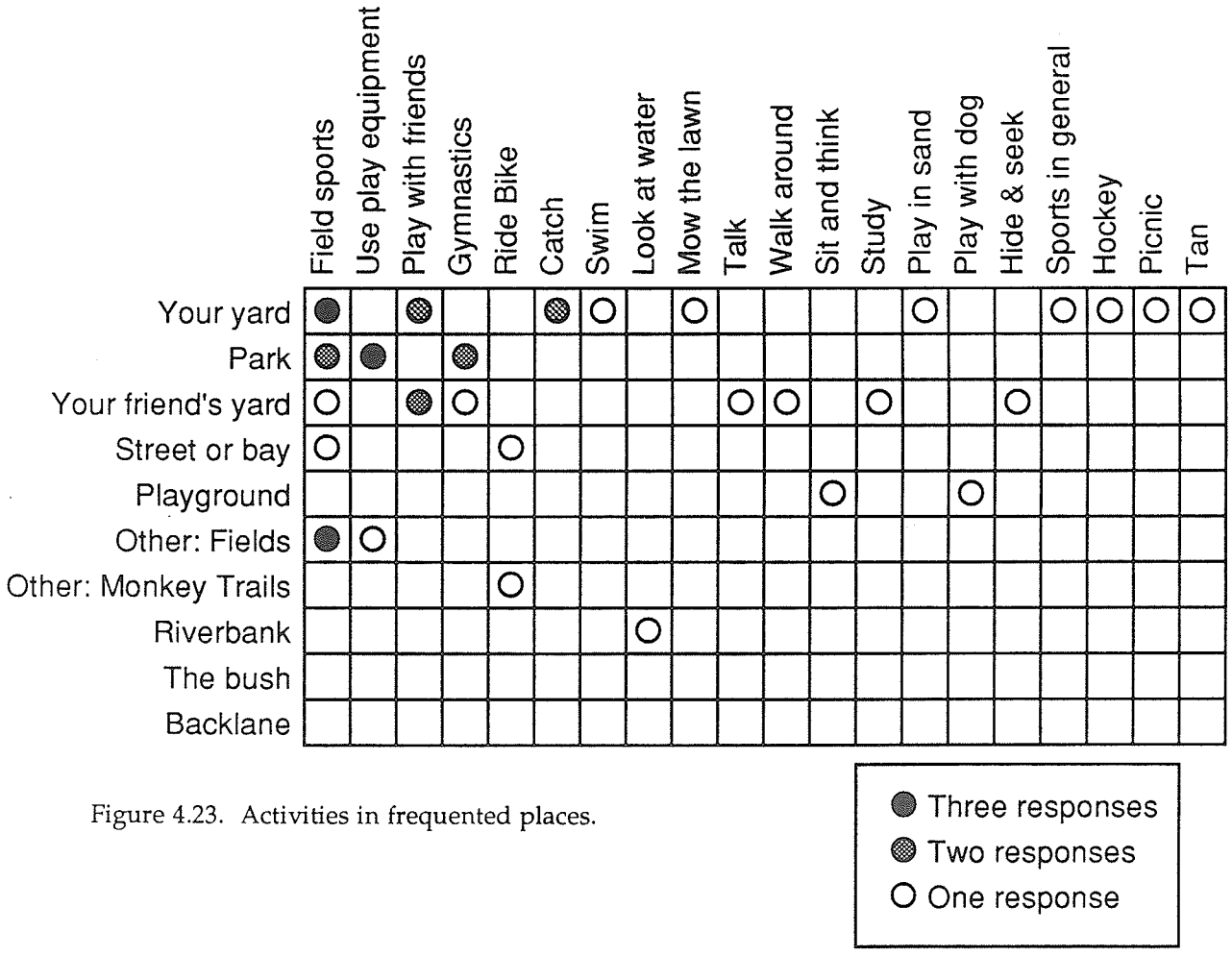

Figure 4.23. Activities in frequented places.

The relationship between activities and frequented places is shown in Figure 4.23. The class listed 16 different activities that occur in their yards and friends' yards. Most common were sports like baseball and soccer, and general "play with friends." The park was more limited, used mostly for its play equipment, sports, and gymnastics.

Perceived Opportunities in the Neighbourhood

The categories listed in this question address the student's perceptions of how the neighbourhood accommodates the range of activities Scherler identified as central to development of environmental competence.

The responses were averaged to indicate perceived deficiencies in the neighbourhood's experiential diversity, and to develop an overall sense of whether the students view their community as a place of possibilities or a place of restrictions.

The results are generally inconclusive, showing little variation between males and females perceptions, or the class as a whole. All of the competence functions are rated somewhere just above "a few opportunities." Perhaps more than three options should have been provided to allow students to differentiate between"few" opportunities and "many". Three options were enough, however, to reveal a consistent relationship between familiarity and perceived opportunities (Fig. 4.24). Indeed, the analysis of perceived opportunities by vicinity broke down because the effects of familiarity were overpowering, indicating that familiarity is the decisive factor.

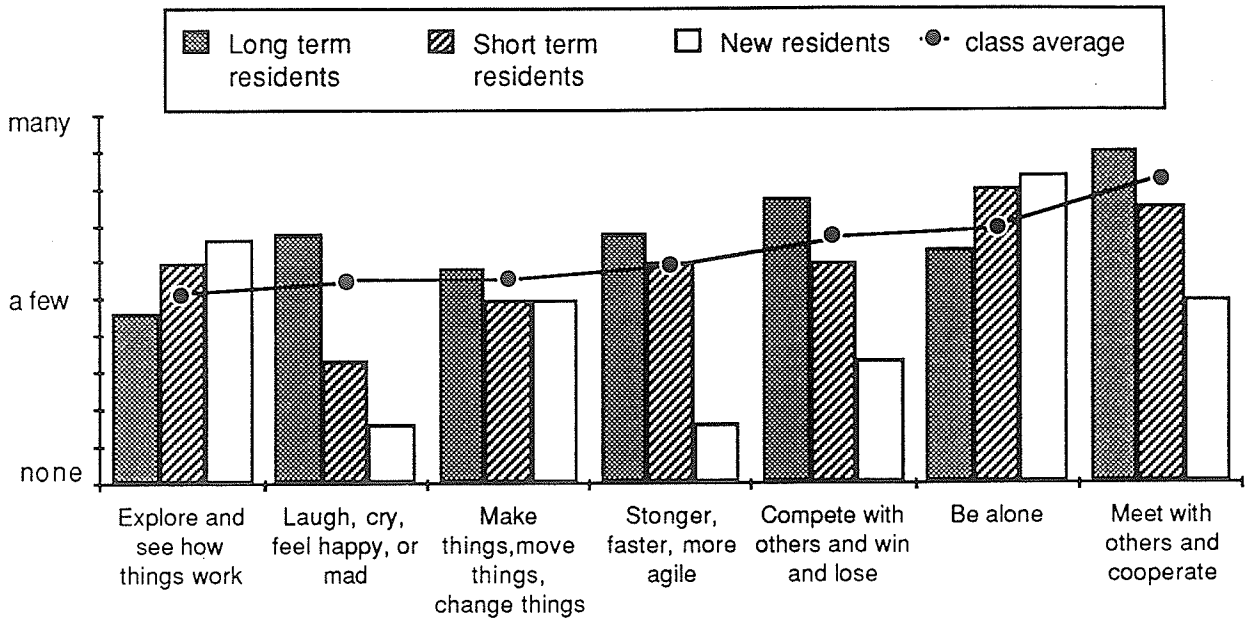

Figure 4.24. Familiarity and perceived opportunities.

In most cases, the perceived opportunities in the neighbourhood increase with familiarity. For two competence functions however, (being alone and exploring), this pattern is reversed, with the lowest values coming from long term residents and the highest values from new residents. This seems reasonable, since new residents would see more opportunities to be alone and explore.

Scherler's expressive function - the ability to meet with others and cooperate - rated highest for the class. The lowest overall was the explorative function. Males perceived more opportunities to explore than the females, who in turn felt more able to manipulate their environment. Males also rated the the neighbourhood higher for solitude, and girls for opportunities to socialize.

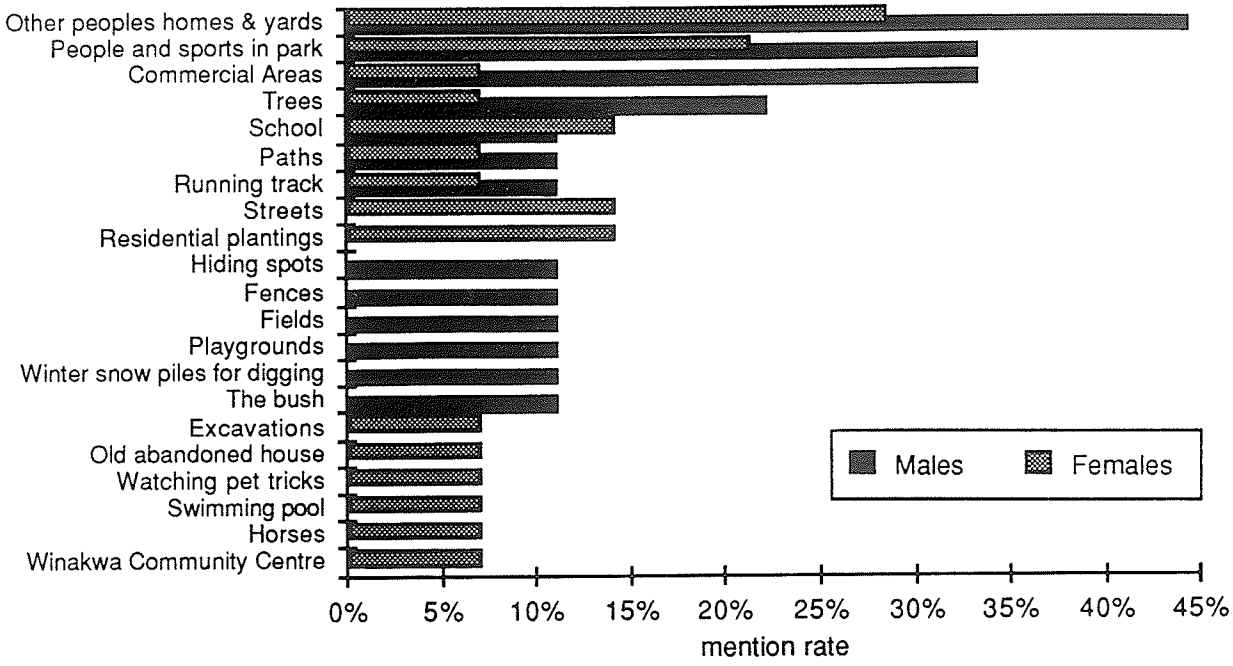

Figure 4.25. Most fascinating places and things.

Fascination

This question and the next were analyzed by counting the number of responses in each category (i.e. many, few, none) to assess the children's attitudes toward the neighbourhood's fascination and accessibility. The open-ended part of each question was analyzed in the same manner as questions two, three, and four.

From their responses, it appears that the children grasped the concept of fascination well. Even though the children responded that only a few places in the neighbourhood are fascinating, they listed a wide range of places and things that "grab your attention, and make you curious to know more about them," (see Fig. 4.25). Once again, others' homes and yards rated at the top of the list, with responses from all familiarity levels, boys and girls. Activities in

the park and commercial areas were also deemed fascinating by a number of students. The boys' other interests were mostly places and things that implied activity and allowed active exploration: running track, hiding spots, playgrounds, snow piles, the bush. The girls were fascinated by actively explorable places to a lesser extent, concentrating more on passively observed things in the neighbourhood, such as residential plantings, excavations, and horses.

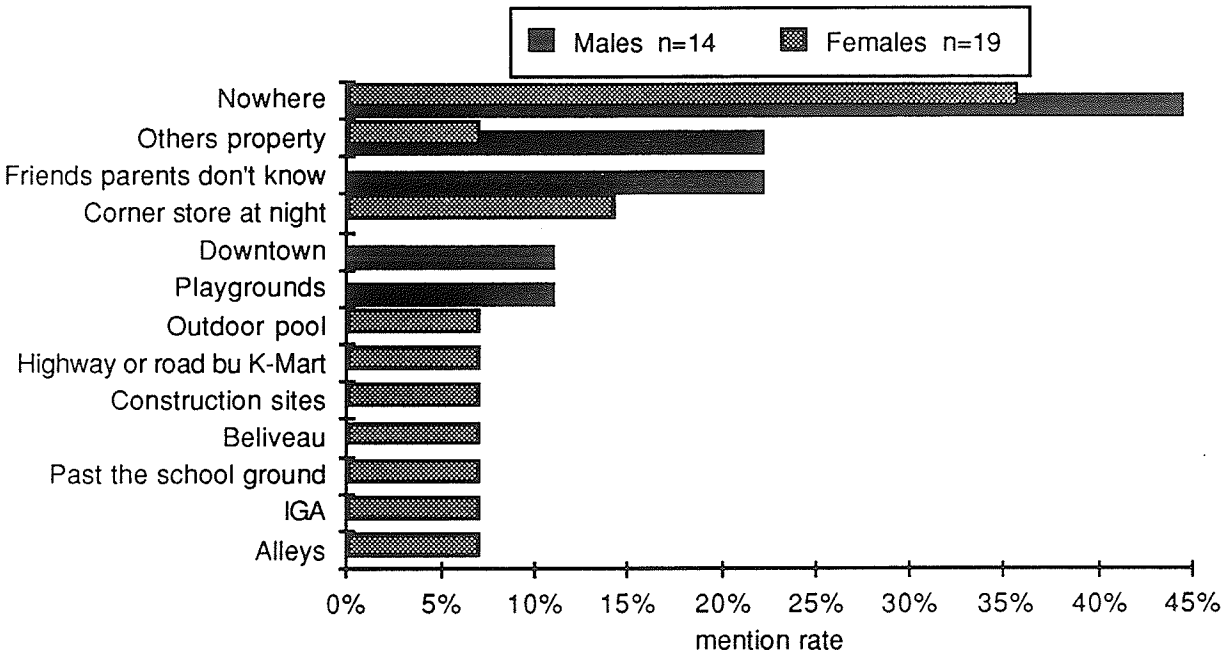

Figure 4.26. Places of restricted access.

Access

The class rated the accessibility of the neighbourhood high, with 39% of the students claiming that they had no limits to the places they could go. All three of the new residents answered that they had no restrictions on access.

The specific responses of those that felt limited showed little agreement. Others' property, the convenience store, and "friends parents don't know"

were the only places which received more than one response (Fig. 4.26). When grouped by category however, it is clear that places which might harbour dangerous people are most often restricted, followed by dangerous places, others' property, and distant places (Fig. 4.27). This order is true for both boys and girls.

Figure 4.27. Places of restricted access by category.

Frightening Places and Things

This question had the students order from most to least frightening a non-exhaustive list of elements in the neighbourhood, drawn from the common fears outlined in Chapter 2. The magnitudes for each option were tallied, giving a list of most and least frightening elements for the group.

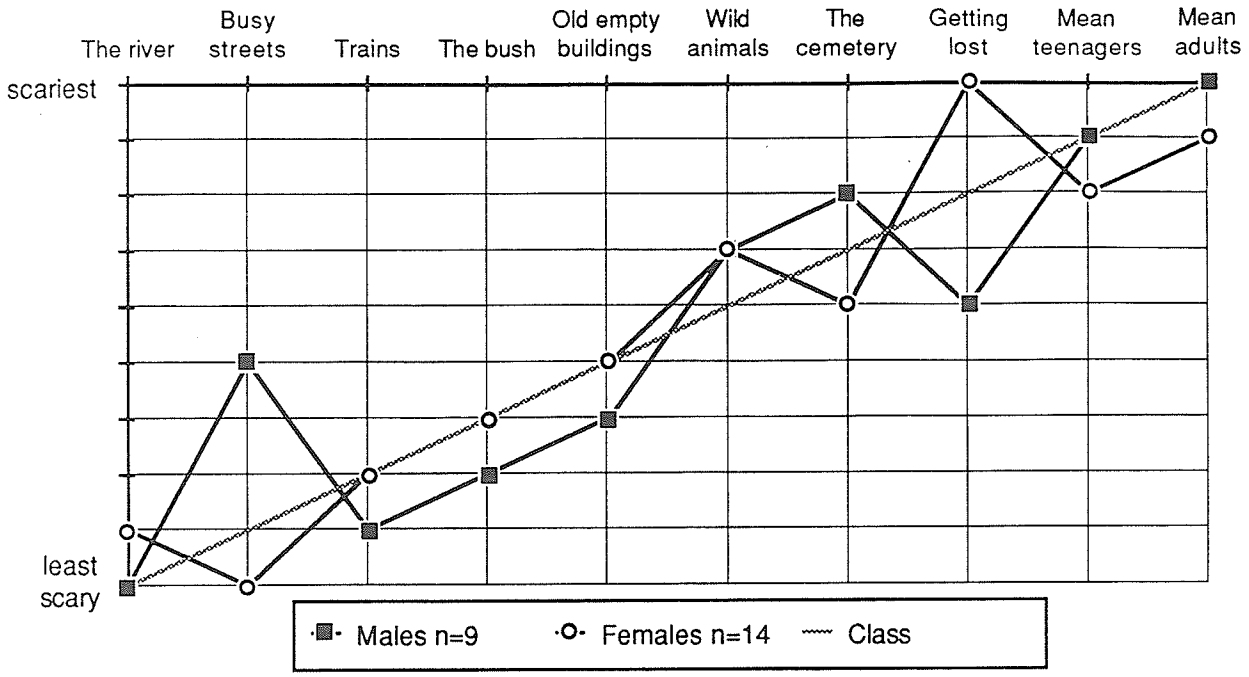

Figure 4.28. Frightening places and things.

Figure 4.28 shows the rankings of frightening places from 1 (most frightening) to 10 (least frightening) for males and females. The class ranked "mean adults" and "mean teenagers" most frightening, and "the river" and "busy streets" least frightening. It is interesting that the long term residents placed "getting lost" at the top of their list, while the short term and new residents ranked it sixth. Girls, too rated it as most frightening, while boys put it in fifth place. Boys and girls also disagreed on the fear of busy streets, boys ranking them sixth, and girls, in last place. Otherwise, male and female fears were quite similar.

Of the places too scary to explore, many students drew from the places listed in the ranking part of the question (see Figure 4.29). Forty three percent of the class, mostly males, answered "nowhere." Otherwise, "cemeteries" was the most commonly mentioned place, followed by "rivers" and "places where mean people go." The males only answer beside nowhere was "cemeteries."

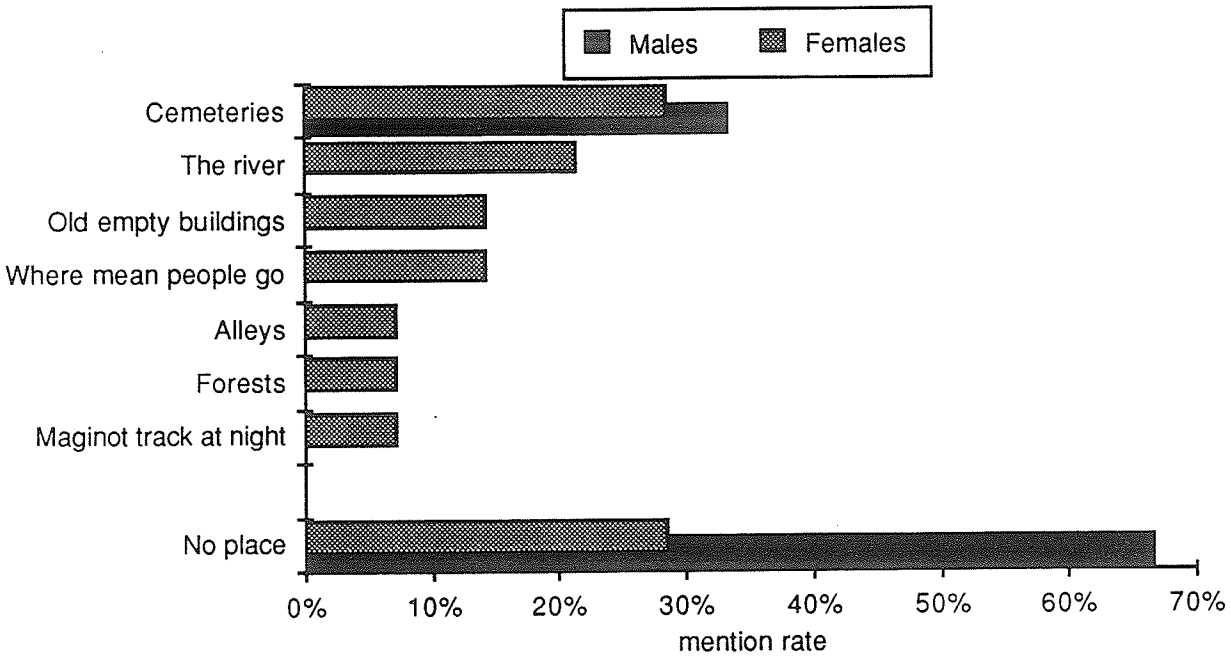

Figure 4.29. Places too scary to explore.

Suggestions

By the time this question was reached, the classes enthusiasm was fading. To spark their imaginations, the experimenter mentioned the examples of "water slides and parachute clubs" as the sort of things the students might like to see in the neighbourhood. Six of the students answered that they would like to see water slides, but these responses were omitted from the analysis.

The class showed a high degree of agreement on several of their suggestions (Figure 4.30). Six students (all long term residents) asked for more bike paths. Five other long term residents asked for a new indoor swimming pool, more conveniently located (the existing indoor pool, Bonivital, is on the outskirts of the neighbourhood: the west side of Archibald). Four wanted something done about the local bullies.

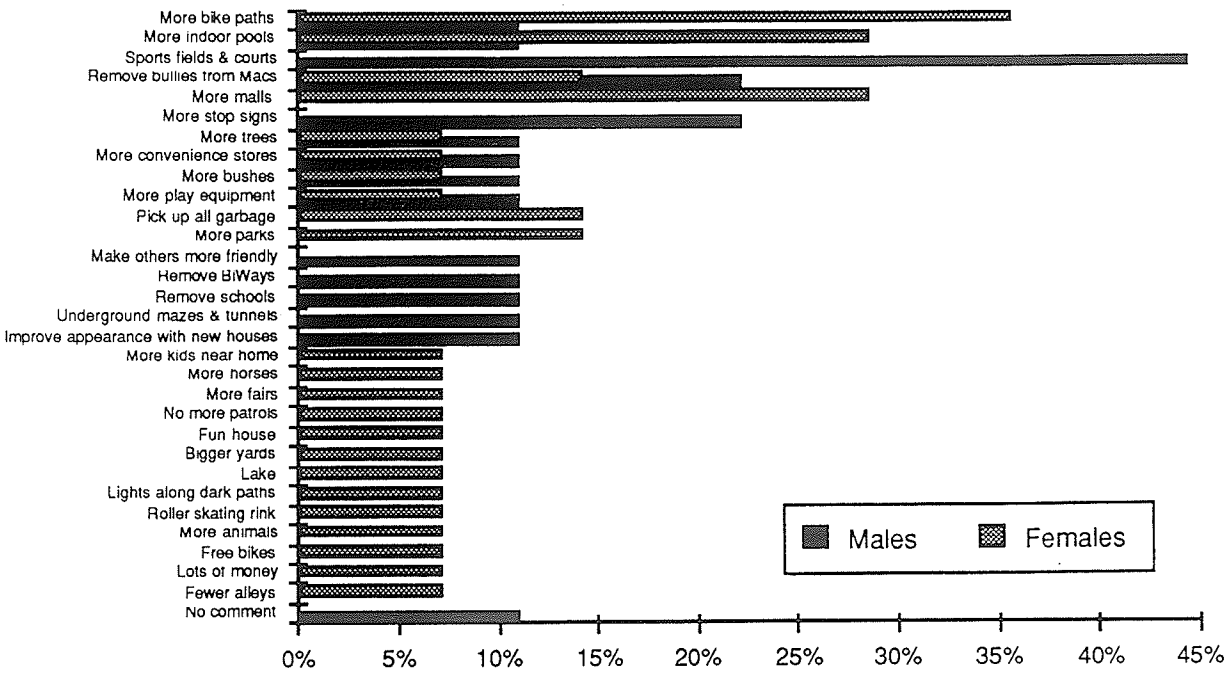

Figure 4.30. Suggestions.

The males were most concerned with getting more sports facilities, removing bullies, and adding stop signs. The girls had lots of other ideas. They wanted pools, paths, malls, parks, and the garbage in the neighbourhood picked up. When these specific responses are grouped by category, the boys and girls do share most of the same concerns (Fig. 4.31). Both desired more formal recreational facilities, and more diversity and richness in the neighbourhood. Females responses dealt more often with freer access and movement, and increasing the number of commercial areas, while the males showed slightly more concern for the safety and image of the neighbourhood. Familiarity had no major effect on these concerns.

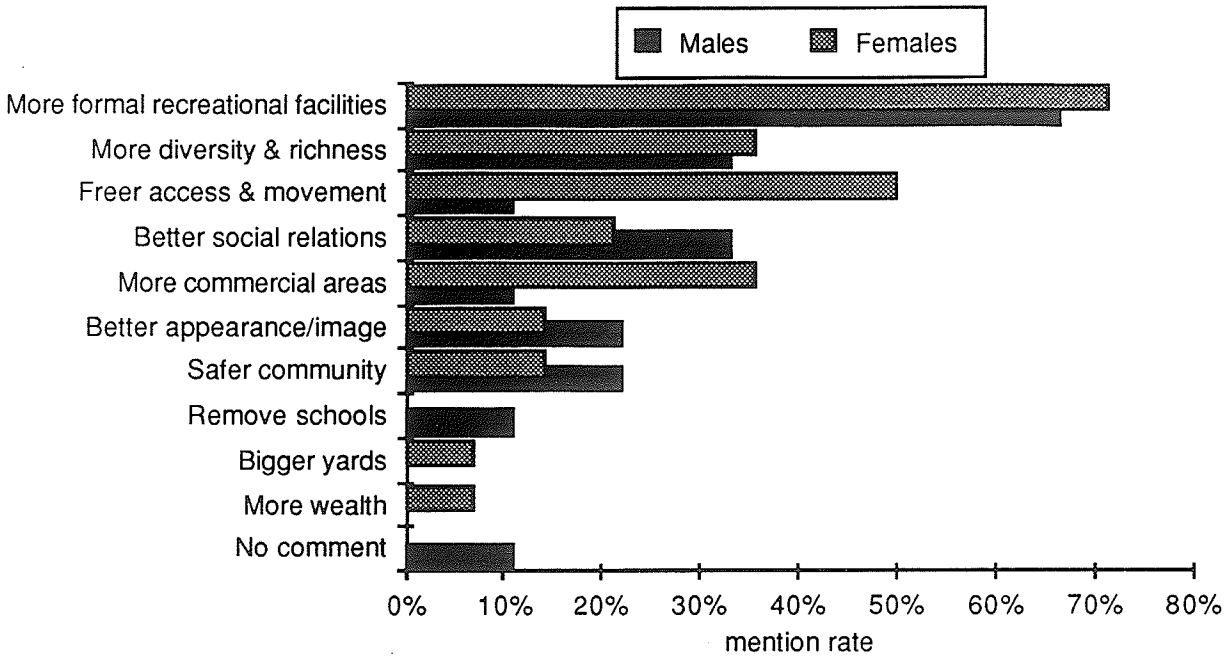

Figure 4.31. Suggestions by category.

iii. Photography Exercise

The photographers appear to have understood the intent of the exercise, and followed the directions without a problem. All eight photographers, four males and four females, turned in a full roll of pictures, averaging 23 prints per student for a total of 184 pictures. The quality ranged from good to excellent, some students taking exceptional care in selecting and framing their subjects. In most cases it was plausible that they found their subjects "fascinating."

Many of the students took multiple shots of certain subjects. This had a tendency to magnify the effects of personal interests when tallying the photos, making it necessary to deal with the total number of "mentions" instead of

the total number of "photos." "Mention" is used to mean that the subject was photographed at least once by a student. If a photographer took four shots of birds, he would count only one mention of the subject, "bird," even though birds were the subject of one sixth of his photos.

Another challenge in analyzing this data came from the vast diversity of subject matter: the students took photos of 70 different aspects of the neighbourhood, from shadows on a pavement to the janitor removing graffiti from the gym walls (see list in Appendix C). This was reduced to the 15 subject categories (and an unknown category for photos which the photographer couldn't remember the subject matter) listed in Figure 4.32.

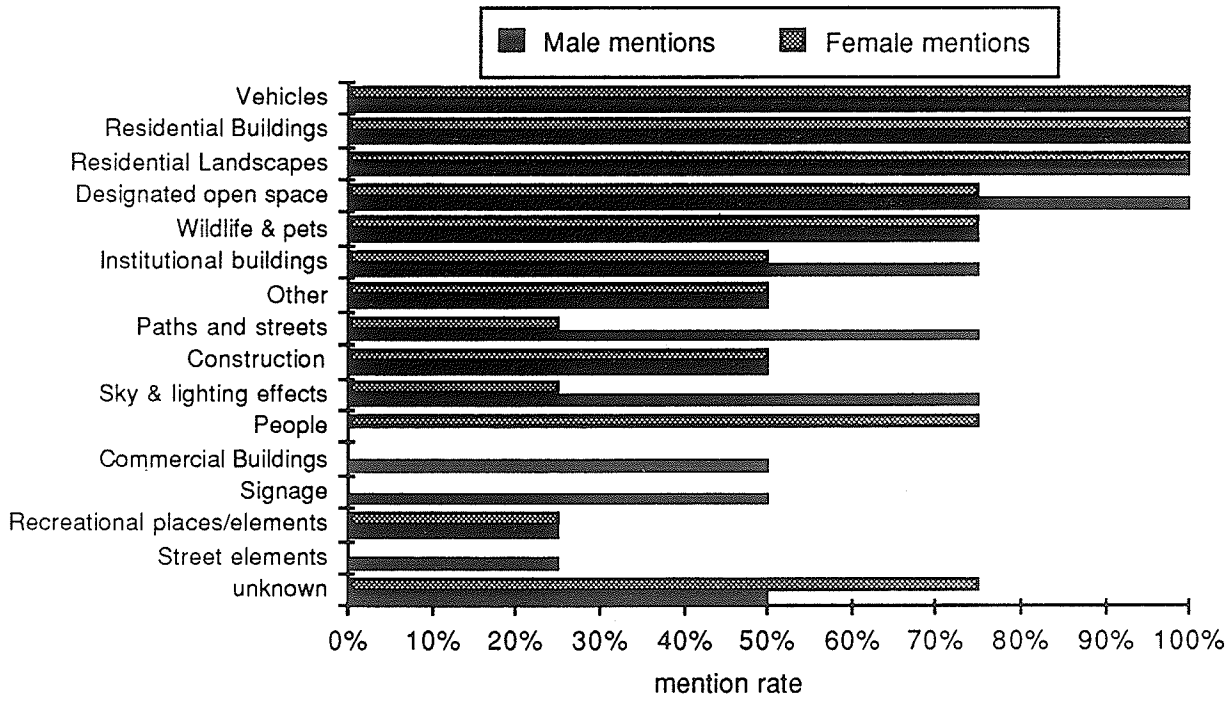

Figure 4.32. Mention rates for photograph categories.

The most commonly mentioned subjects were playgrounds and the student's own house, both photographed by 75% of the sample. Unique residential plantings, flowers, cars and paths were also mentioned by more than half of the photographers. All of the female photographers took pictures of residential plantings, a subject included by only one male. Seventy five percent of the females also took photos of their own house, the playground, and flowers. Construction sites, materials and equipment held a special interest for females, who mentioned them seven times. They were mentioned only twice by the males. The males' most commonly mentioned subjects were their own house, cars, playground, paths, and birds, all mentioned by 75% of them. The females included only one mention of birds or paths. Generally, the males and females gave similar responses, though the males were more interested in wildlife than domestic animals, and took more notice of lighting and atmospheric effects. They also made fewer mentions of residential landscapes, and tended to focus less on plants and more on residential landscape elements - things like lamp posts, fences, lawn ornaments. Street elements, commercial buildings and signage were frequently photographed by males, but not once by the females. Only females took photos of people, and they made over three times as many mentions of construction sites, materials and equipment, The females also had a number of photographs which were difficult to classify, among them a camper with people on the roof, snowshoes against the side of a building, and graffiti.

No obvious patterns can be discerned from these differences, other than a slight tendency for females to look at living, active features, and males to concentrate more on the inanimate. One fact that does stand out, however, is the central role of residential landscapes and buildings as a source of interest in the neighbourhood. All eight of the photographers included photos of

residential buildings and landscapes. In fact, 47 of the 184 photos were of residential properties. It is not surprising, for they are diverse, idiosyncratic landscapes which are, in Rapoport's terms, information rich. Visitors and residents alike can find much to look at in others' yards. This valuable insight was missed in the normative theory portion of this thesis.

Taking a brief look at the possible reasons why certain subjects were considered fascinating, we find, as Harrison and Howard did in their study of imageability, that both the meaning and the form of the subjects were involved. From the interviews, about 48% of the subjects would appear to be primarily of visual interest, while 33% are interesting because of the associations they bear. The remaining 12% are a combination of both: the fire hall is both a unique building form, and fascinating for what it means.

The diverse and inventive subject matter of the photographs, the range of scales (from butterflies to apartment blocks), and the occasionally exceptional observation skills all support the the idea that the sensual interest of the neighbourhood can be enhanced through subtle and simple interventions, and that those interventions will be perceived.

D. Summary of Findings

For each question, there was a clear tendency for boys to respond in similar manner, while girls answers are more individual, nonstandard, and distinct from the male answers. Contrary to the predictions based on the more extensive range and sophisticated spatial cognition of males, girls experience of their neighbourhood seems as rich, if not richer than the males. On the other hand, these distinctions, along with their poorer performance on the mapping exercises, may simply be further evidence that males having greater competence in mapping, and females in verbal communication.[12]

Effects of familiarity are still harder to assess, because of the small sample sizes, but generally the newer residents had a smaller range (park and yard) engaged in more solitary activities and relied more on institutions like Winakwa Community Centre. At the same time there was some indication of an attitude of courageous independence in spite of their limited experience.

Modelling

Most of the class used paths and streets as the central organizing elements of their maps, describing the neighbourhood with a moderate to high level of sophistication. Variations in mapping methods and landmarks were evidenced in the different vicinities as described below, and a consistently higher level of performance was recorded for males over females. The students appear quite able to navigate through their portion of the neighbourhood, and were familiar with an area extending on average 700 metres from their home. Within that range, the patterns of streets and paths can be described accurately, if not intensively.

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[12] P. Farb, *Humankind*, (Boston: Houghton Mifflin, 1978).

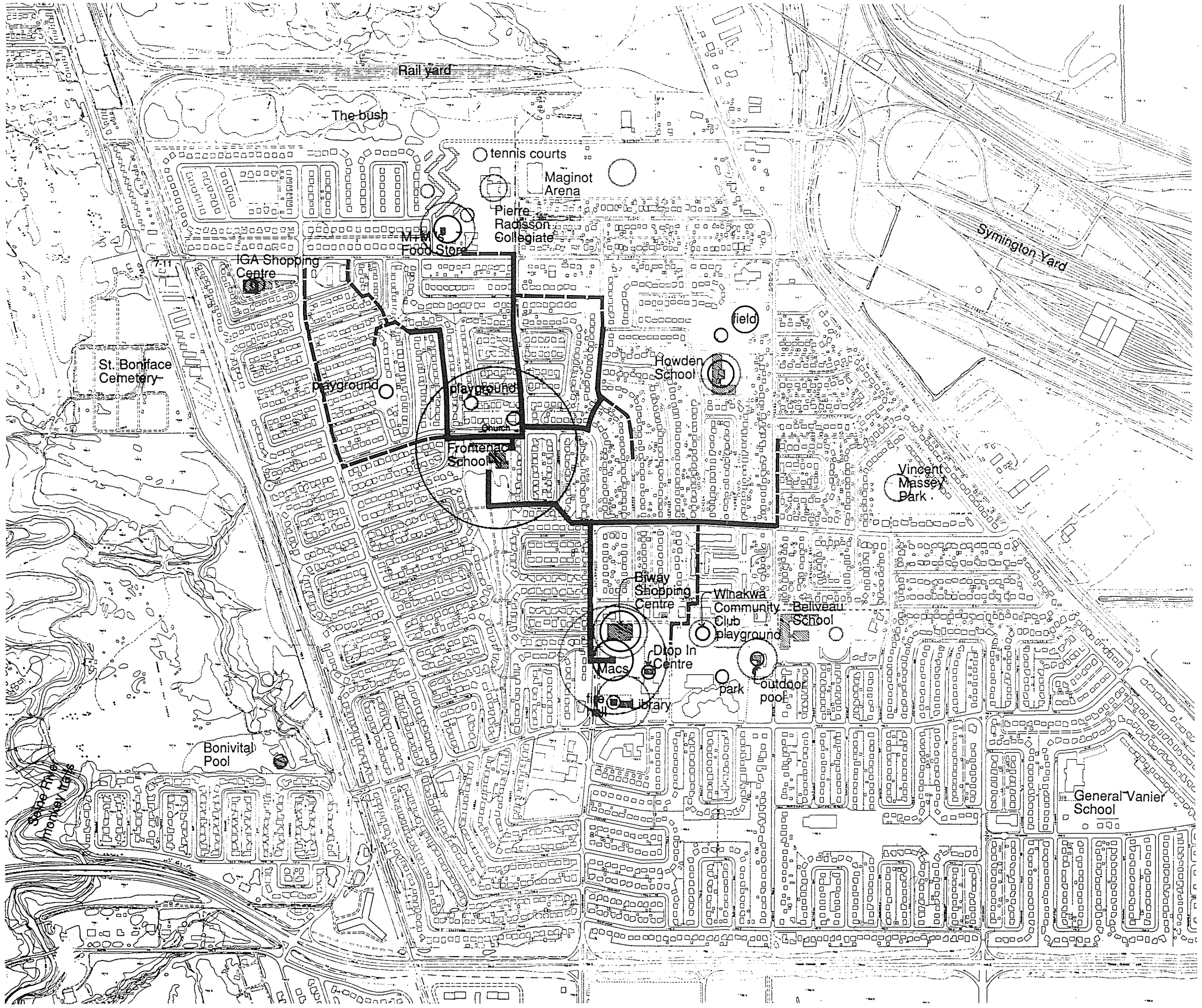

Figure 4.33. Composite map of children's operational network. The circles indicate favorite destinations for boys and girls. The routes are those which the class used to get to favored destinations. The girls gave more responses for each destination and mentioned a greater variety of destinations than the boys.

The composite map of the class's operational network shows a few heavily travelled routes, and some frequent destinations, specifically the convenience stores, sports facilities and parks (Fig. 4.33). The area from Frontenac school to the BiWay shopping centre can be considered the hub of the network. Schools other than Frontenac School figure prominently on the maps, but are not among the favorite places, so they must be considered landmarks.

The vicinities might be characterized as follows (see Fig. 4.34):
Howden residents created the most sophisticated and accurate maps, but the maps showed below average range and richness, suggesting that the residents have an excellent understanding of a limited portion of the neighbourhood.

Maginot showed similarly high level of mapping sophistication and accuracy, but had a range about equal to the class average, and above average richness.

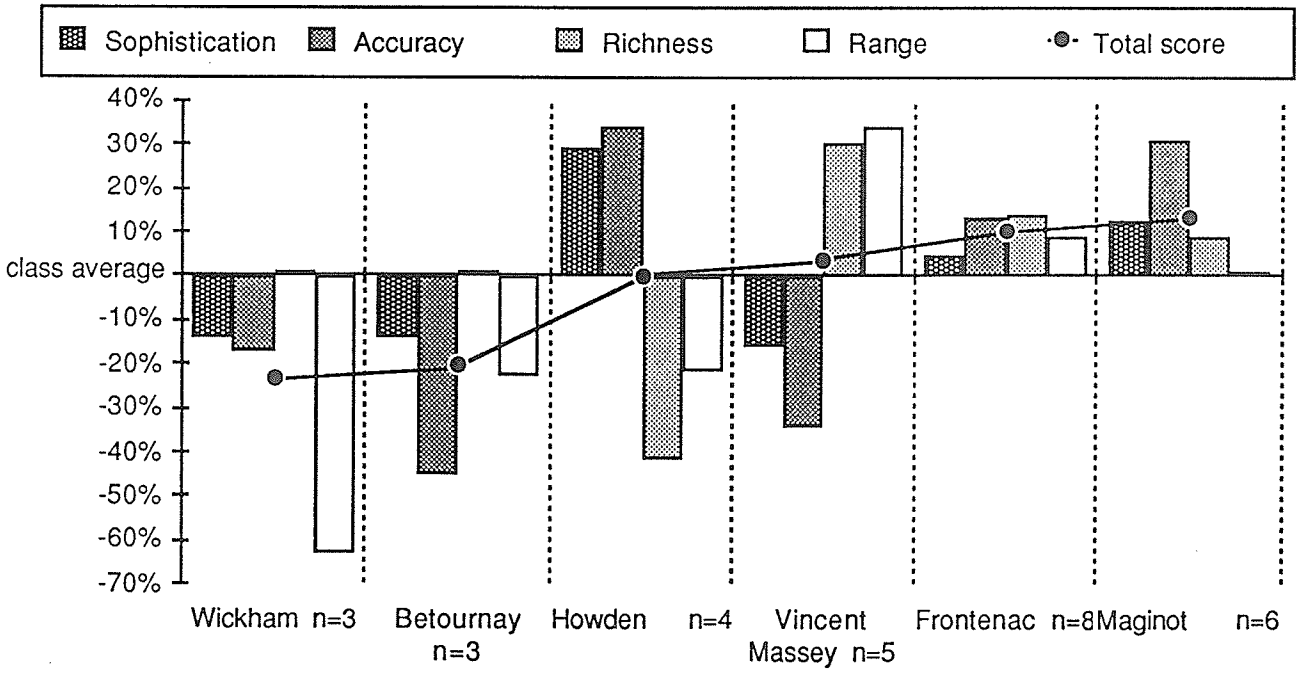

Figure 4.34. Vicinity characterization.

Another interesting aspect of their maps is the high number of undesignated open space features and the relatively low number of formal open spaces depicted, indicating that the residents may be somehow replacing formal open space with the more adventurous play environments adjacent to that vicinity: the bush, monkey trails, and rail right of ways. Overall, Maginot vicinity's maps indicate a healthy relationship to their neighbourhood in terms of diversity of experience and the ability to represent that experience.

Frontenac residents made less sophisticated and accurate maps of the neighbourhood than the above two vicinities, but indicated a higher than average range and richness. For most vicinities, there seems to be an slight inverse relationship between the sophistication/ accuracy and range/richness. Frontenac School was the central feature of most of the vicinity's maps.

The Wickham vicinity is actually a subset of the Maginot vicinity, a series of townhouse clusters with access to the same resources as Maginot. Therefore one would expect similar maps. Instead, Wickham had the least sophisticated maps of any vicinity, lower than average accuracy, and an extremely small range (250 metres, less than half the next lowest vicinity), though the richness is about the same as the class average. The convenience store, playground, and Frontenac School are the most prominent features. The maps suggest that these students have an impoverished experience of the neighbourhood, and an elementary model of that environment in their minds. Whether this is generally true of residents from the Wickham townhouses cannot be said, but from the evidence it is a vicinity in need of attention.

Betournay's maps showed a moderate level of sophistication, but an accuracy level between poor and fair - the lowest in the class. The range, too, was

lower than average, but its richness was normal for the class. Most maps focused on the convenience store and nearby recreational facilities: the park, pool, and Winakwa Community Centre. Like Wickham, the Betournay vicinity consists of a tight cluster of townhouses somewhat distinct from the rest of the community.

Vincent Massey's maps were of moderate sophistication and low accuracy, but had the highest range and richness scores of all vicinities. This vicinity is unique in its distance from the rest of the community (resulting in a larger than average range), and its highly complex social structure. Most of the maps showed one or more friends' houses, and the operational network largely consisted of routes between those houses. This is partially an accident of fate, for several of the class members live near each other in this area, and all are of the same sex (female), making it more conducive to friendships than the other vicinities defined for analysis. The social network contributed significantly to the richness score of this vicinity.

Exploring

Access is perceived to be high but freer movement and access is still desired, especially by girls. It is restricted primarily by potential encounters with dangerous people, traffic dangers, private property, and distance. The children dislike and will avoid places which are deserted or dull.

Mean people are the greatest fear of the children, followed by getting lost, the cemetery, and wild animals. Problems with teenagers and adults appear to significantly limit the students' explorations. One of the goals of the interventions shall be to seek ways to reduce this effect. The river, the bush, busy streets and trains were least frightening of the factors listed.

The class showed abundant fascination for the neighbourhood, including an unexpectedly high interest in residential landscapes in both the questionnaires and the photography exercise. Many are also fascinated by local stores and trees. The students' attention is held by features at a variety of scales, sometimes by virtue of the feature's form, and slightly less often because of its meaning. Overall, the students appeared highly perceptive to the variety of the neighbourhood.

Home and yard are the most frequently used outdoor spaces, and support a range of activities, active and quiet. This finding agrees with the observation that play in the habitual range (which consists of daily destinations) is well accommodated by Windsor Park's configuration of bays and single detached housing. For both male and female students, parks and playgrounds are important places, and the play structures are used and liked. Further study is required to determine if Jan Gehl's theory applies: that designated open spaces function as a gathering places for children, where they go to watch people or meet friends, regardless of the quality of play opportunities.[13] Convenience stores figure highly in the use of the neighbourhood, but are not valued in any special sense. They offer another kind of meeting place: a place which can be visited alone, and at which purchasing power can be exercised.

The bush, monkey trails, river, and other natural explorable areas were not mentioned often, but do appear to be valued and desired, especially by the males. Males also showed some degree of concern for the neighbourhood institutions: clubs, sports fields, schools.

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[13] Jan Gehl, *Life Between Buildings*, op. cit., p. 119.

Competence

The students perceived a moderate to good number of opportunities for each of Scherler's competence functions, suggesting that the neighbourhood provides a suitable balance of these basic needs for developing environmental competence, though this balance may not be equally distributed throughout the community. Both the explorative and productive function (making things and manipulating them), key components of the neighbourhood's educative capacity, scored among the lowest. Opportunities to freely express emotion might also be increased.

Values

No clear picture of the sacred, valued places in the neighbourhood emerged from the questionnaire. Instead, most males claimed that nothing was respected and special, while the females listed features which were special to them on a personal basis, but are not recognized by the group. Only their own homes and Frontenac School received more than one answer. One must conclude either that the children were unable to apply the concepts of pride and respect to the neighbourhood, or that there is nothing in the neighbourhood which is widely valued.

Chapter 5
Design Principles

A. Principles for Enhancing Experiential Learning

A principle is "a generalization that is basic and provides a guide for conduct or procedure."[1] From the previous chapters, four major principles for developing more educative neighbourhoods have become apparent. Each is described below in terms of its effect on the pyramidal model of learning, as illustrated in Figure 2.1.

1. DIVERSITY: *Provide diversity of experience.*

Given that all learning is accretive, building like a pyramid upon past experience, the broader the base of experience, the greater the capacity to learn. Diversity is the most fundamental principle for enhancing experiential learning. A child's library of percepts and concepts should be vast and bristling with possible connections. Rather than simply jamming the neighbourhood full of different stimuli, improved access can play a large role in expanding the range of experience.

2. COHERENCE: *Set experiences within a coherent framework.*

Experiences are more easily assimilated if related to each other in some orderly pattern. The technique for remembering a long list of items by imagining each in a different room of your house is an example of the power of a coherent framework. As diversity increases, the need for coherence among the barrage of stimuli becomes even more pronounced. In the learning pyramid metaphor, coherence is akin to structural soundness, or the adhesion between percepts, concepts and generalizations.

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[1] Definition from *Webster's Third New International Dictionary*, Springfield, Mass.: Merriam Webster Inc, 1986, p. 1803.

3. INVOLVEMENT: *The most effective learning situations are involving.* Involving experiences are those which are deeply absorbing and stimulating. They challenge us to take an active role in an interaction with the environment; to react physically or mentally. Activity enriches the experience and brings new associations to link percepts and concepts together. Moreover, the promise of involvement is an attraction, luring observers to become participants. Once the child becomes a performer rather than a spectator in his neighbourhood, the kinds of social and physical skills Scherler described are acquired more readily, and high level generalizations arising from the new competence are added to the learning pyramid. This increased competence feeds back upon itself to allow an even deeper level of interaction with the environment, which in turn leads to the acquisition of even more sophisticated skills.

At the core of this principle is the power of **discovery** for enhancing learning. Discovery is a form of involvement where an individual formulates *for him or herself* surprising new generalizations on the basis of experience. Such generalizations are deeply understood because they are supported by a learning pyramid built from personal associations between experiences and their resultant ideas. A major shortcoming of institutional education and traditional interpretive programs is the tendency to spoon-feed the learners with discoveries made by others, which, having no strong bond with the learners' existing knowledge, float through their mind until forgotten. The educative neighbourhood therefore must avoid ready-made generalizations, educating instead at the level of experiences, providing raw material for residents to make their own discoveries.

4. **QUALITY:** *People react to the quality and image of their neighbourhood.* Although well built and maintained places do not guarantee a positive response from residents, it is probable that poor quality will be noticed, and thus will influence the value system of those that live there. As well, attention should be paid to the personality of neighbourhood places we create: environments ought to be created with love and ingenuity and whimsey - more than a studied arrangement of catalogue items. Pride in one's community can also lead to awareness of what makes it good, of how comfortable places can and *should* be constructed. Since the neighbourhood is the source of our primary expectations about how the world works, it is vital that the highest standards of design, construction and maintenance be afforded to the places we live.

These four principles form the basis for the following list of measures for creating or upgrading neighbourhoods as educative places. There is no clear one-to-one correspondence between a measure and a principle. Instead, much of the preceding theory pointed to interventions which were convergent upon a few key areas. The pattern of convergence is illustrated in Figure 5.1.

The measures are arranged roughly from the most broad and fundamental measures to those which deal with more detailed, specific aspects of design. This is not intended to give precedence to the earlier measures. Depending on the situation, some seemingly less significant measures may turn out to be the best and only interventions necessary.

The list is not meant to be exhaustive, nor should a neighbourhood necessarily have all the characteristics listed. In fact, some may seem

contradictory, just as coherence and diversity are polar opposites. But diversity and coherence can co-exist by working at different scales: diverse details in a coherent frame. Similarly, the following measures must be considered in relation to each other and to the context of the neighourhood, selected and applied in a complementary fashion. They are best thought of as suggestions to be used, adapted, or discarded as the designer's judgement dictates, to invest residential places with a compelling and rich pattern of experiences.

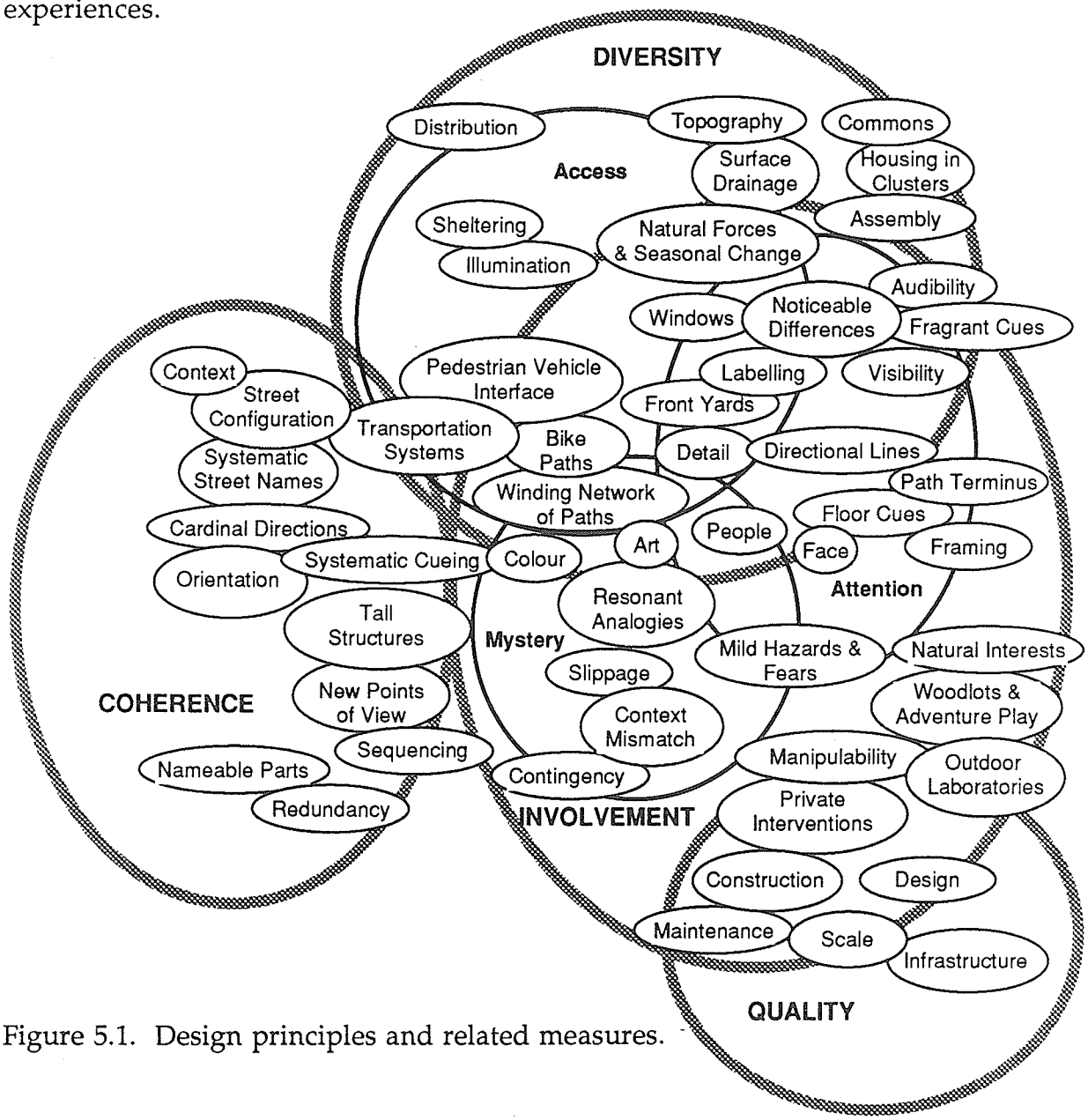


Figure 5.1. Design principles and related measures.

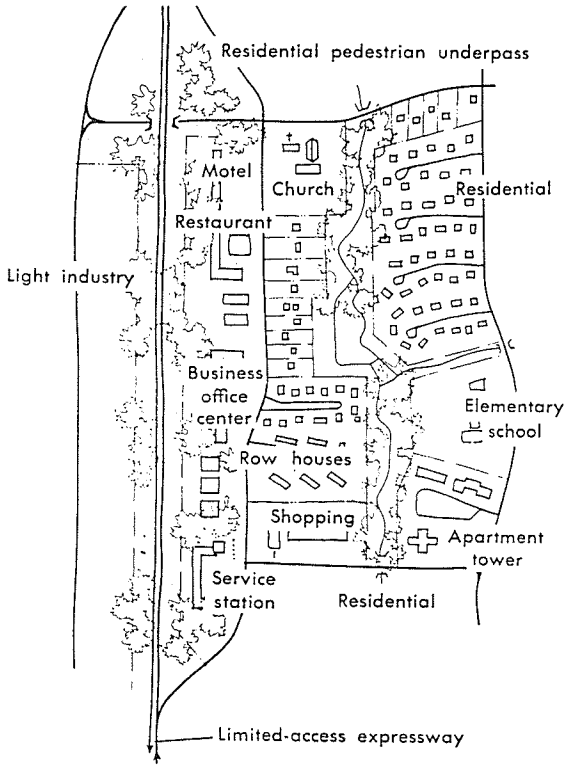
B. Structural Measures

The following measures operate primarily at the scale of the entire neighbourhood to increase its educative potential. They are most useful when designing a community from scratch, though many can be applied in a scaled-down form when retro-fitting an existing area.

Philadelphia. From (1), p. 14.

Quality

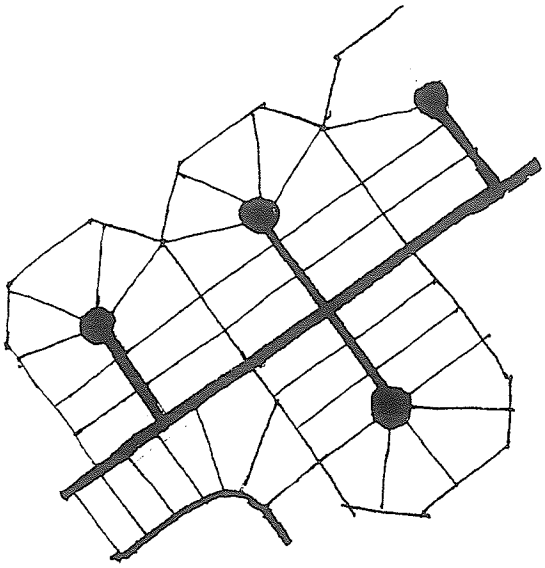
Seek a level of quality in the design, construction, and maintenance of the neighbourhood which is compellingly obvious, and gives form to ideals. Quality should be visible from the overall form of the community to the details of paving and light fixtures. See p. 37 and the discussion of an "architecture of convention," p. 82.



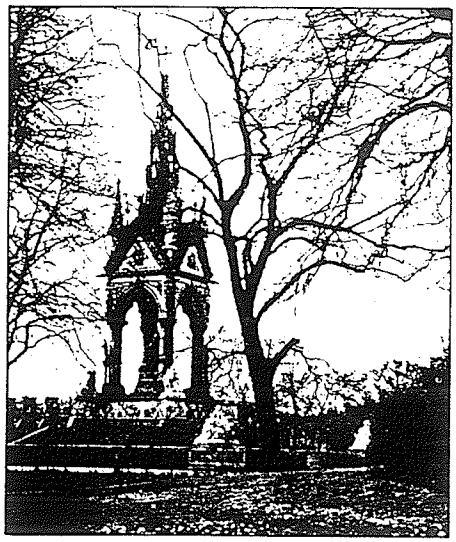
From (2), p. 212.

Nameable Parts

1. Compose the neighbourhood of a few simple, easily identified morphological *types*, like alleys, bays, and tot lots, which can be represented quickly in the mind and assimilated into the cognitive map. Any part of the neighbourhood which resists verbalizing, that is,which cannot be described with one or two words, is reducing the neighourhood's coherence. See "Language in Concept Formation," p. 23.



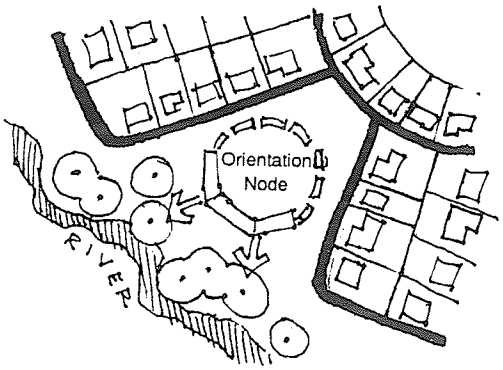
2. Repeat patterns of familiar elements and places in the neighbourhood to increase redundancy,[2] but be wary of the confusion that can arise from too much similarity without sufficient orientation cues. See discussion of coherence, p.43.



Hyde Park. From (3), p. 62.

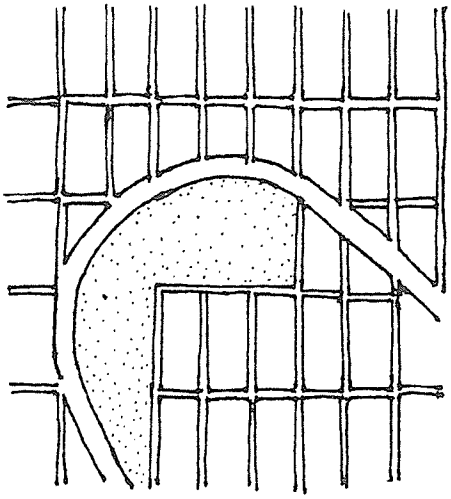
Orientation:

1. Locate distinctive landmarks to assist residents in orienting themselves. They should be visible from most parts of the community. Certain locations, such as the corners or centre of a district, magnify the effectiveness of landmarks for orientation. See "legibility," p. 44.



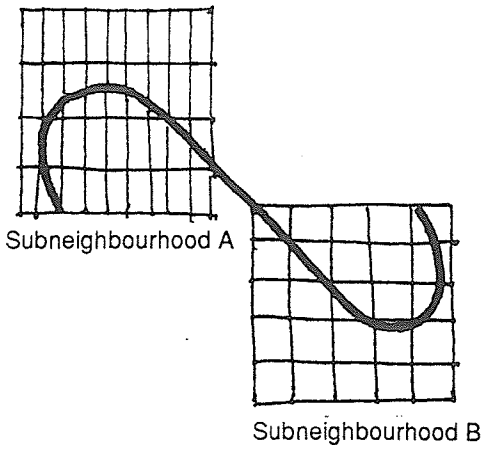
2. At key points where the neighbourhood meets the city, such as transit interchanges or the confluence of rivers, create orientation centres. These should be sheltered but primarily outdoor locations, which might contain maps and diagrams to interpret the visible sky line, or to orient residents to the cardinal directions.

[2] Redundancy is a term used in information theory to denote information which can be eliminated without loss to the essential message, but nonetheless is valuable to counteract errors in transmission and reception. The public speaking technique of "saying what you are going to say, saying it, then saying what you said," is redundancy in action.



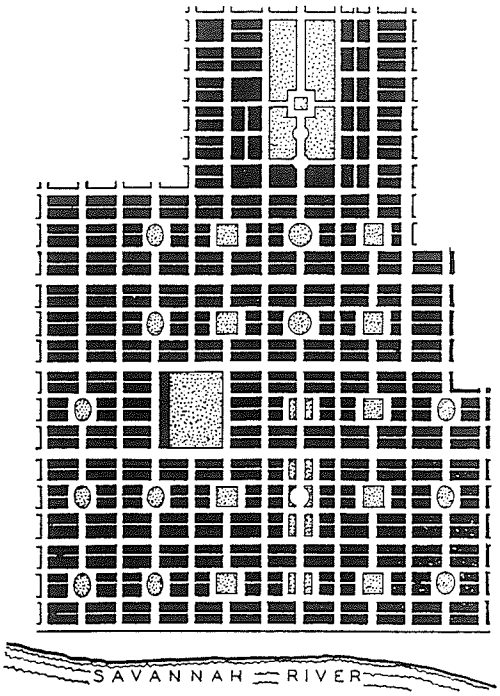
Contingency

Balance the pattern of clear morphological types with variations arising from personal judgement and preferences. Quirks add interest: a neighbourhood which is too axiomatic, too logical, simple and pure will fail to engage the resident's imagination for long, and will not stimulate higher levels of cognitive processing. See "architecture of convention," p. 82.

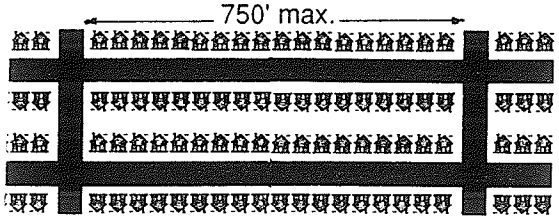


Context

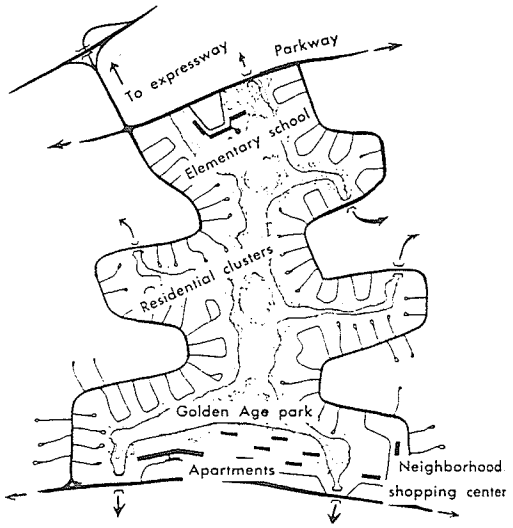
Structure each sub-neighbourhood so that it ties into the structure of the next sub-neighbourhood, creating a known context to support easier orientation and an expanding scope of understanding through assimilation. This should occur at all scales, from a ring of small cul-de-sacs which share a common access road, to a cluster of small neighbourhoods served by a single "spine" thoroughfare. See "contextual learning," p.81.



Savannah, Georgia. From (5), p. 54.



B. Stanwick recommends blocks < 750'. From (6), p. 153.



From (2), p. 212.

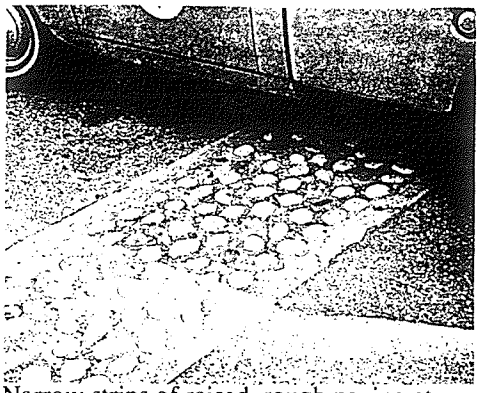
Street Configuration:

1. Select an orderly pattern of streets as a system of reference for navigating within the community. Certain patterns of streets, like grids or concentric ring roads, offer a redundant framework which is easy to represent in the mind. The curvilinear pattern common in most new subdivisions is low in redundancy, and therefore hard to model. The test for redundancy is whether exposure to one part would allow a person to understand and make predictions about other parts of the community.

2. Ensure that the street reference system is of a scale perceptible to pedestrians. The sectional grid of the prairie helps orientation while driving, but is of little value on foot.

Pedestrian Vehicle Interface:

1. Minimize the number of major street crossings between children's destinations within the neighbourhood and residential areas.



Narrow strips of raised, rough paving at crossings reduce speed and add texture. From (4), p. 337.

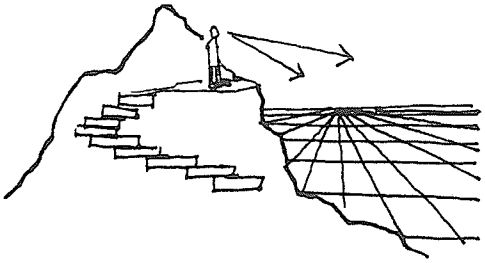
2. Where crossings do occur, give dominance to pedestrians, and legible indicators for drivers.

Winding Network of Paths

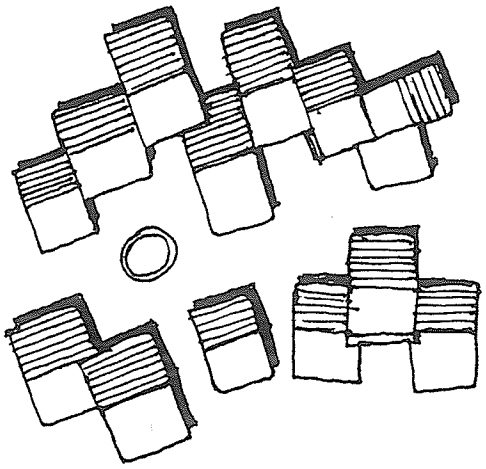
1. Make pedestrian paths wind over hills, around corners, and through vegetation, in marked contrast to the orderly pattern of streets.

2. Provide a network of alternative routes through each part of the neighbourhood.

3. Ensure that no large portions of the neighbourhood are omitted from the network.

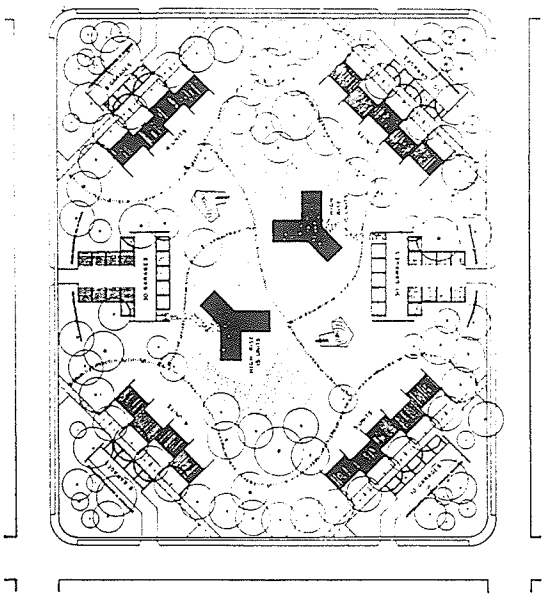


4. Provide a few key vantage points from which the overall structure of the place is obvious.



Housing in Clusters

Cluster housing where possible to increase supervision and perceived safety along streets and adjacent play areas. See discussion on extending the child's habitual range, p. 60.

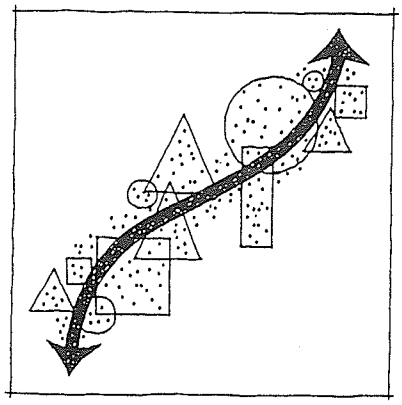


Commons

Locate housing clusters around centrally located open space, which is designed to provide diverse but visible and easily accessible environments to explore. These, along with paths, should be the focus of supplementary measures to enhance casual learning. See discussion on habitual range, p. 60.

C. Supplementary Measures

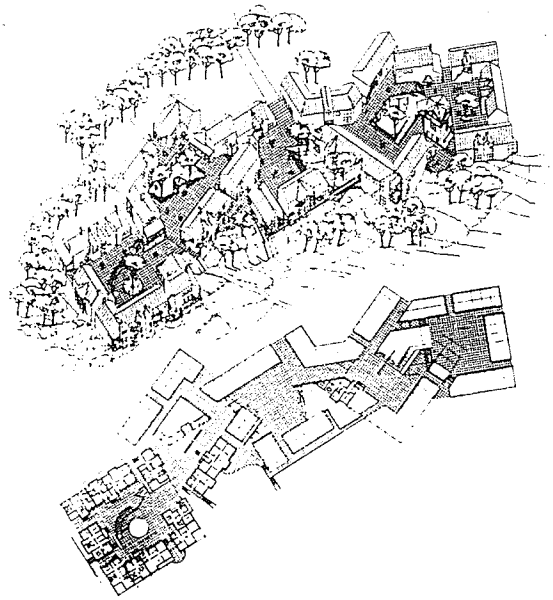
These are measures which are either temporary, changing, or added to existing fabric, but are no less important than the structural measures.



"Integration of various activities and functions in and around public spaces allows the people involved to function together and to stimulate and inspire each other." From (7), p. 103.

Diversity

1. Increase diversity within the neighbourhood without destroying the neighbourhood's coherence. To do this, decide first what makes the neighbourhood coherent, and avoid disturbing those cues, then add variety in areas where attention is not normally drawn (see section on attention). This will help to distribute attention more evenly.



Skadde, Denmark displays diversity of spatial structure, topography, and housing. From (7), p. 57.

2. Select diversity which stimulates the entire spectrum of senses, and operates at a range of scales from the barely visible to the largest apartment towers, but use caution in altering large elements because their impact on coherence is greater. Most of the following supplementary measures will contribute different kinds of diversity to the neighbourhood.

3 Concentrate diversity in the environments close to housing.

'rom (8), p. 57.

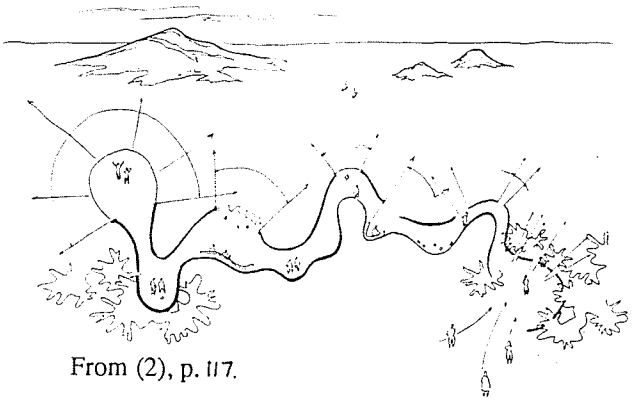
Manipulability

1. Create as often as possible opportunities for children to change things in the neighbourhood, to move, lift, turn, paint, or alter what is there.

2. Use clearly defined public lands for the majority of interventions which encourage hands-on experimentation. Private lands can be maintained for visual access; though a cooperative program might be instituted where private edges could be turned over for manipulation by the public, as mural space, for instance. See territorial fears, page 69.

Private Interventions

Encourage children to become active in designing and creating parts of the neighbourhood, especially in a manner that can be observed changing over time. Select community-based activities like gardening or playground design provide the all important sense of efficacy and responsibility. See discussion of Julie Honnold's work, p. 38.

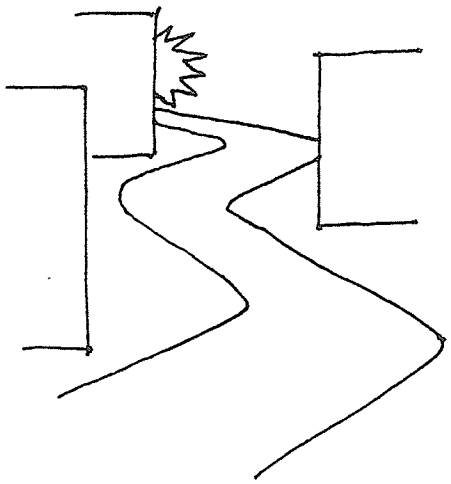


From (2), p. 117.

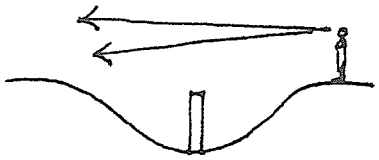
Visibility

1. Design paths so that at some point, one can gain a clear view of important places, complex elements.

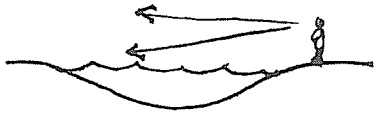
2. Rather than diverting pedestrian traffic, maintain paths past construction sites, so that they pass as closely as safety will allow.



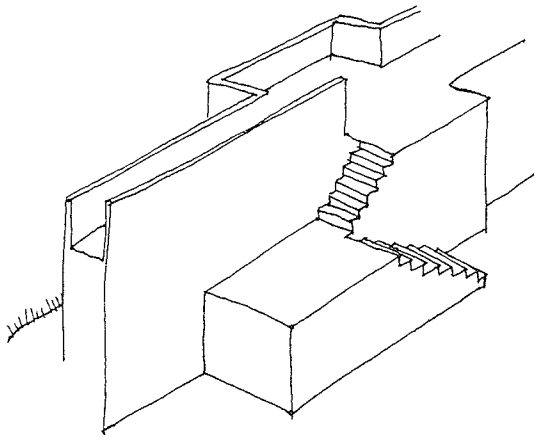
2. Clear views should not be provided all along a path. Instead, provide a sequence of enticing glimpses of neighbourhood attractions. Configure paths and open spaces so that objects of interest are only partially revealed, and require further movement to fully perceive.



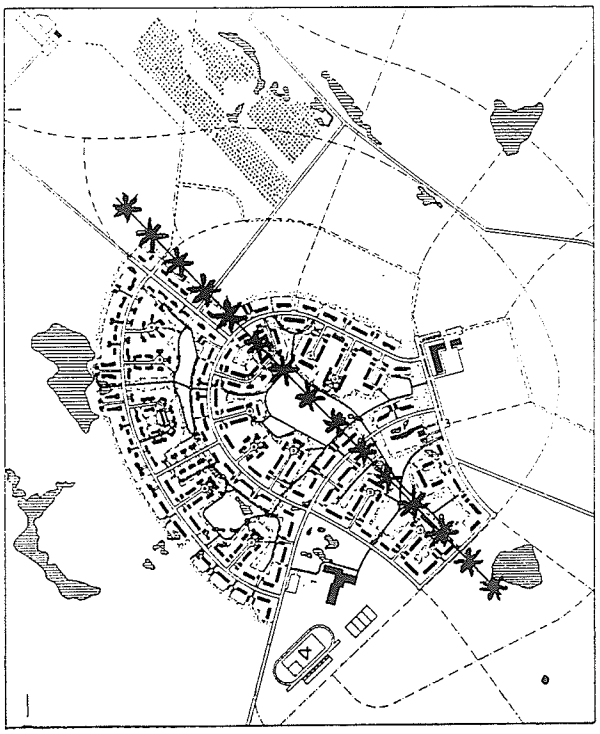
3. Use water or ha-has to preserve visual access in restricted areas.



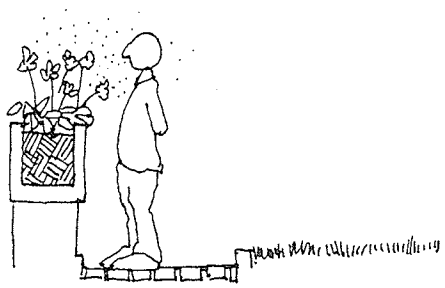
4. Avoid creating too many hidden exploration areas when adding diversity to the neighbourhood. While privacy is an important attraction of remote places, extremely remote and invisible attractions are dangerous and possibly frightening for children.



Noise barrier as elevated walkway and viewing platform.



Greenbrook, New Jersey. An axial arrangement of strong fragrances may assist orientation in this curvelinear street pattern. From (50), p. 146.



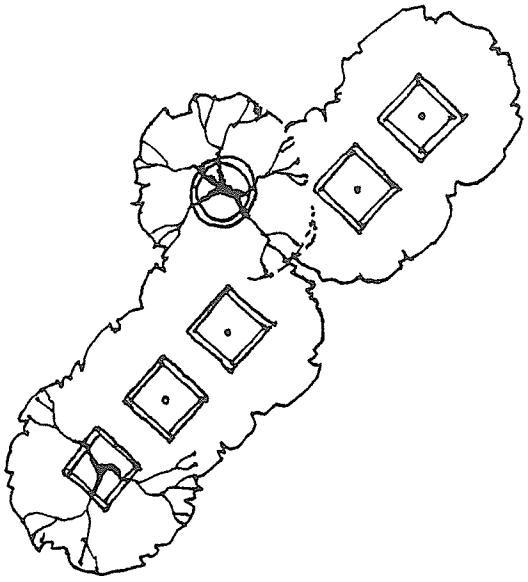
Audibility

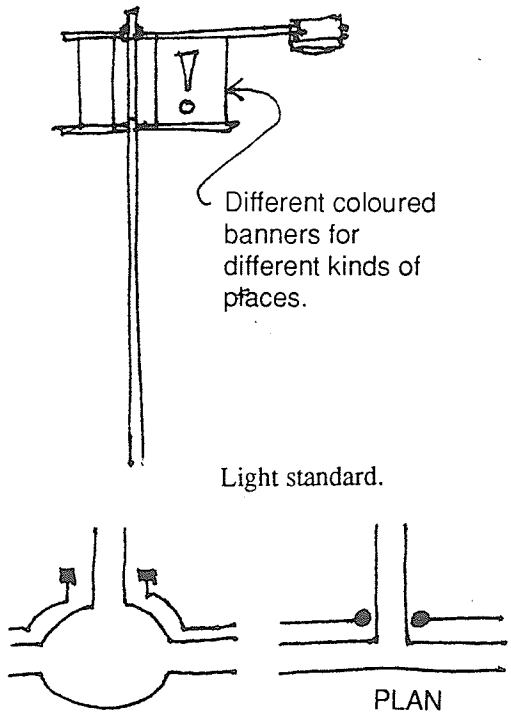
Mask traffic noise in areas of consistently informative environmental sound (p. 55). If barrier walls are used, ensure that they are not a barrier to visual and physical access.

Fragrant Cues

Use the haunting, evocative power of odours to enhance pattern recognition in the neighbourhood and encourage relational thinking (p. 56). Fragrant materials, particularly plants, can be added for the sake of enriching the sensation of the neighbourhood, but can also be located so that they elicit memories of similar, but not identical locations and elements. This measure is especially useful for drawing out large-scale patterns which are not visible at a single glance. Randomly locating the fragrances might lead to creative juxtapositions of ideas.

2. Use elevated planter boxes to bring fragrant flowers closer to nose level, allowing closer inspection and protecting them from foot traffic.





A generous entrance is more inviting.

Noticeable Differences

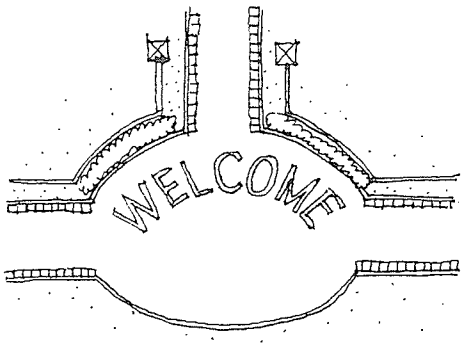
Use noticeable differences in the neighbourhood to illustrate ideas themselves, or draw attention to other features of educative potential. These include movement or change, path loops and diversions,variations in lighting intensity and colour, flourishes of detail, pattern making, and pattern breaking.

Cueing

1. Learn to interpret and use the system of cues which are widely understood and stable in that community to assist in image formation, perhaps to differentiate the edges of the neighbourhood, or indicate significant places within. Cues are discussed in detail on page 25.

2. Use cues to communicate appropriate behaviors. Some cues might invite participation, others will tell children they are not welcome.

3. Be as consistent in the use of cues as possible. This will make them far more effective communicators.

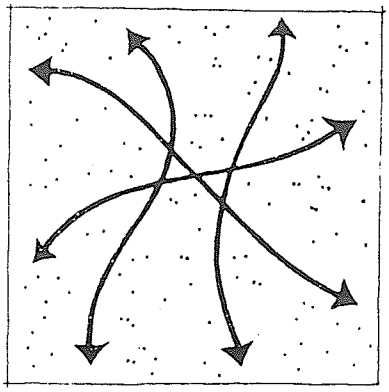


Redundancy

For all supplementary measures, use multiple cues or examples to reinforce the communication. Multiple cues are environmental messages which say the same thing in different ways.

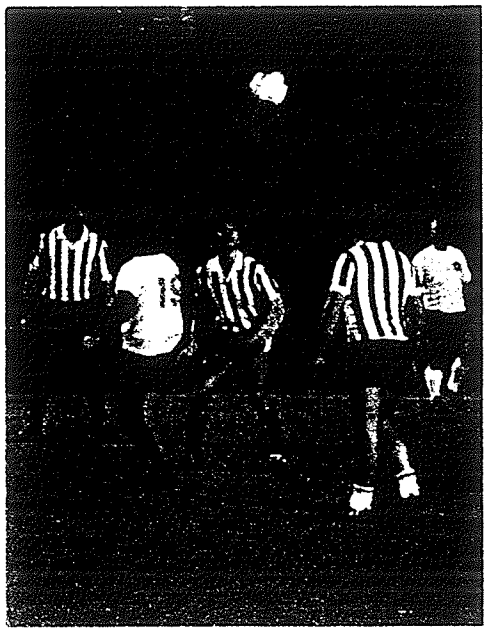
Distribution

1. Distribute new destinations along a variety of "safe" routes to increase exposure to the neighbourhood.



From (7), p. 83.

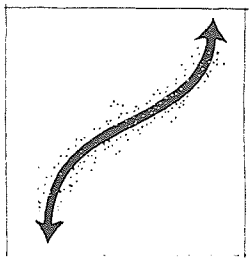
2. Distribute special attractions in the occasional range (such as children's dance clubs, video arcades, water slides, hobby stores, and theatres) throughout the city, to expose them to different areas.



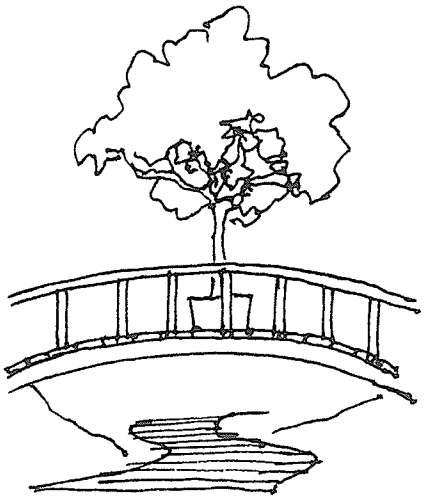
Teen recreation areas should be noted and avoided.

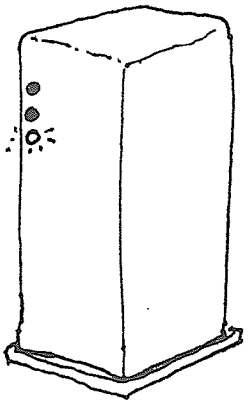
3. Encourage child visitors to facilities and organize tours during spring break. Government buildings might also incorporate galleries from which workers can be observed in an unobtrusive manner.

4. Avoid placing young children's attractions in conflict with areas claimed as older children's territory, or in any situation which is implicitly dangerous.



From (7), p. 83.





Assembly

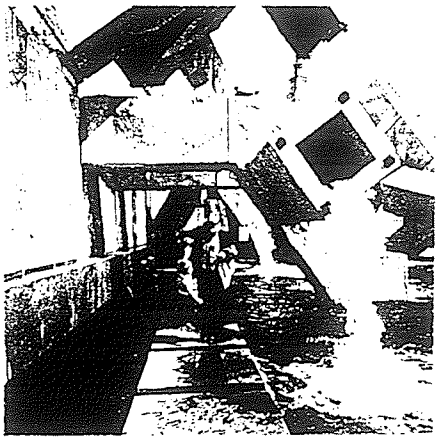
Concentrate groups of activities and attractions which too weak to stand on their own. Activities feed off one another to increase vitality exponentially. In general, a few concentrated pockets of intense activity are more successful than a widespread pattern of distinct attractions.

Context Mismatch

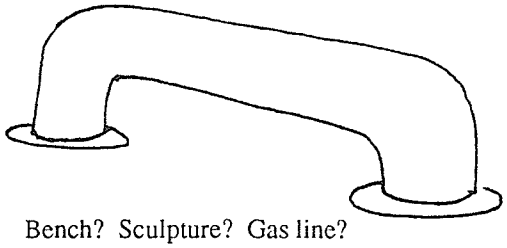
Introduce some surprising, non-permanent context mismatches (elements which appear out of place) to pose non-verbal questions with the environment. This measure should be used sparingly. See p. 31.

Resonant Analogies

Find ways to make the functional connections between elements in the neighbourhood more explicit. For example, the control box for a traffic light might have three small lights in its case which change as the traffic lights change. See p. 82.



Embarcadero Plaza, San Francisco. From (10), p. 229.



Bench? Sculpture? Gas line?

Florence: Interest and detail close-up and at a distance. From (2), p. 178.

Art

Provide places and set up programs to incorporate art into neighbourhood settings. Select art which is explorable, manipulable, or a catalyst for thought and conversation.

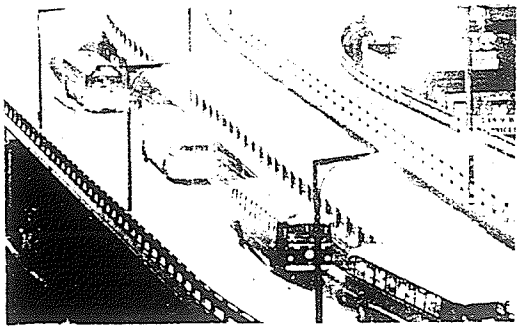
Slippage

Introduce ambiguity in the relationship between forms within the neighbourhood and the functions they appear to serve. This invites speculation and invention among residents and visitors. See p. 82.

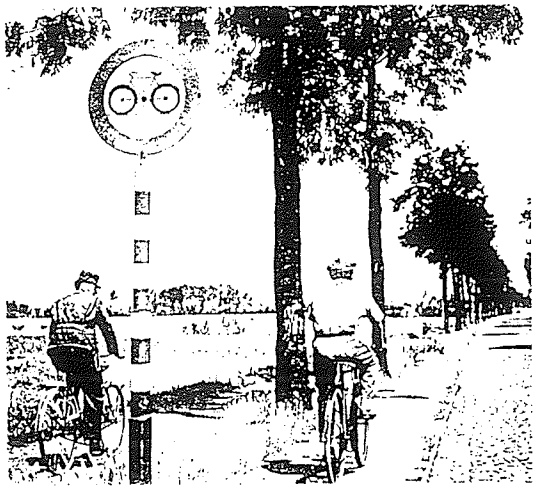
Sequencing

1. Arrange the level of information available to each age group so that those places and elements of interest to that group are sufficiently challenging to maintain interest without overwhelming them (p. 21).

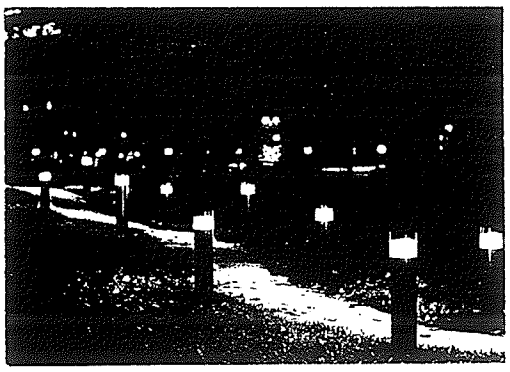
2. Provide a number of levels of information, some complex, others straightforward and clear. Highlight complex elements, like hydro poles and transformer boxes, to draw adults to look in more detail at the neighbourhood, and children to begin formulating hypotheses about those things.



From (12), p. 10.



Bike path, Belgium. From (10), p. 77.



From (11), p. 3.

Transportation Systems

1. Encourage bus travel by simplifying the route markers, maps, and schedules at stops, and offering free transit to selected educational destinations: museums or discovery parks (p. 67).

Bike Paths

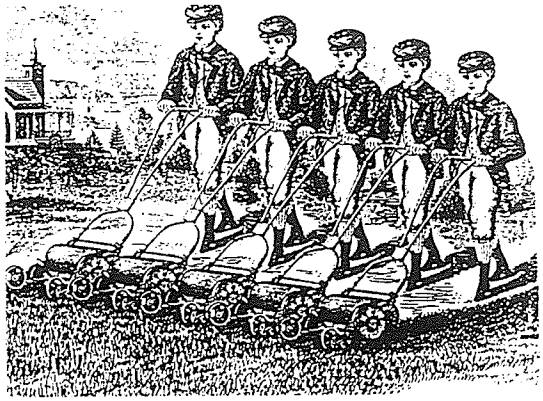
Develop throughout the city an extensive system of paths intended solely for bicycle travel, giving access to the most interesting parts of the city: river valleys, industrial areas, dumps, markets, etc.

Illumination

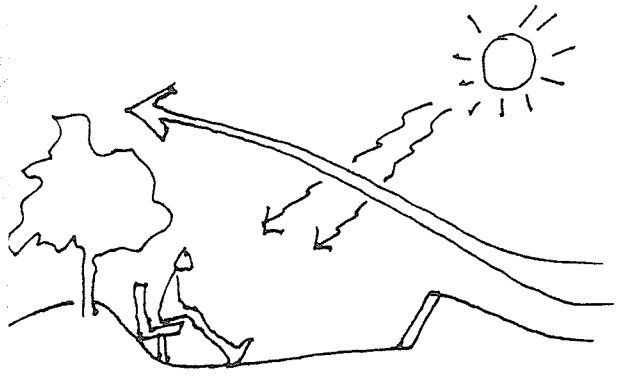
Provide even illumination along all pedestrian paths and some, but not all centrally-located play areas. By not illuminating every playground, the density of night use in the lit places increases, enhancing the perceived safety and chances of interaction.

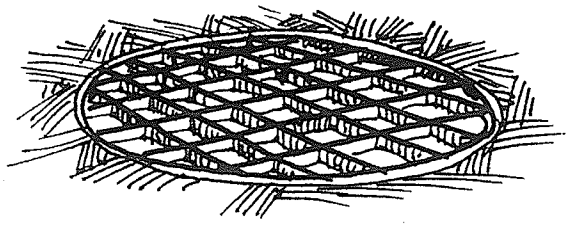
Maintenance

1. Keep all paths in the neighbourhood in good repair, plowed and ice-free to encourage their use year-round.



A high standard of maintenance may influence resident's values. From (6) p. 229.





Window: illuminated manhole.

2. Make maintenance a priority, so that it acts as a cue to denote safe public space, and instills pride and caring.

Sheltering

In the commons and outdoor laboratories, where lingering and intensive exploration is to be encouraged, adjust overall micro-climate with plantings, berms, walls, and trellises to increase comfort during the winter months, and provide shelter from wind, sun, and rain for the rest of the year. Wind moderation is especially important.

Windows

1. Develop variations on the idea of "window" (as well as actual windows) to make visible as many diverse activities, places, and elements as possible (p. 54).

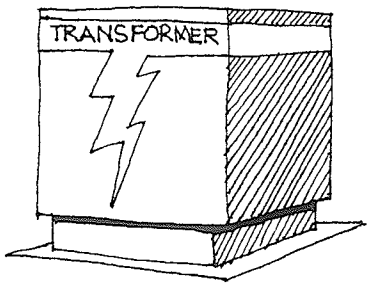
2. Use windows in areas of restricted physical access, or which are dangerous and commonly off-limits to children.

Mild Hazards & Fears

1. Incorporate mild 'hazards,' such as snow hills, rocks, climbing trees and log bridges, as attractions (p. 48).

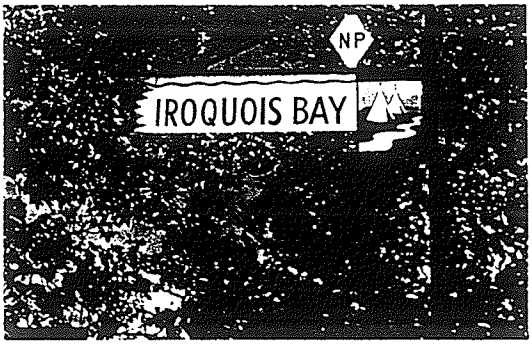
2. Allow optional access to or past places commonly feared, such as abandoned buildings, dark places, woods, and cemeteries. Draw attention to details of the place: revealed construction in abandoned buildings, or names and dates on graves. By involving the child in discovery, the fearful overall image might be suppressed.

Labelling



1. Use rooted,[3] concise labels to identify elements and places which defy comprehension by exploration or other means. The effectiveness of this technique depends on its sparse use (p. 55).

2. Concentrate labels or "windows" on sources of frightening strong stimuli within the neighbourhood to help children understand their cause.



Systematic Street Names

1. Name streets in a manner which is systematic (i.e. ordered alphabetically, numerically, or logically) to help people find destinations and orient themselves.

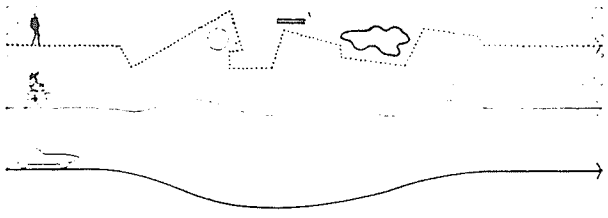
[3] Rooted, as used by Kevin Lynch, means labels which are in direct conjunction with the object being identified. See *Managing the Sense of a Region* (Cambridge, Mass.: the MIT Press, 1976), p. 30-32.

2. Avoid systems that are so redundant that they become confusing. Neighbourhoods with theme-based street naming systems reinforce the unique qualities of a community, but can also lead to confusing similarities: in one Winnipeg community, Clearwater, Stillwater, Edgewater, Bluewater, and Sweetwater all occur within a half a kilometer of each other.

Cardinal Directions

1. Display the cardinal directions often, and reinforce them with street names (i.e. Erie Bay North), diagrams on manhole covers or other common, durable elements.

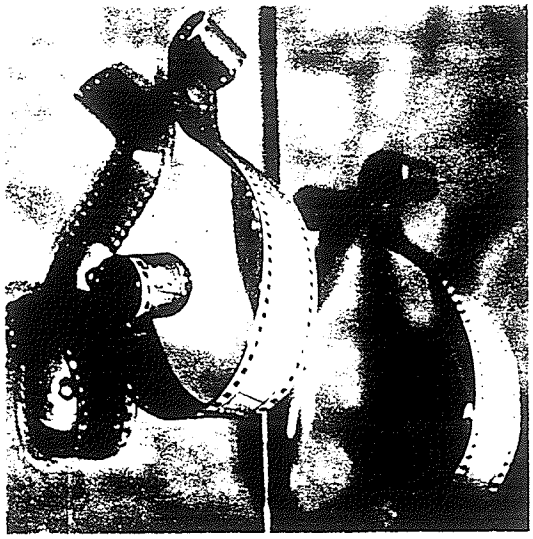
2. In areas with a grid pattern of streets, use street names in one direction and numbers in the other, or some other consistent system of reference.



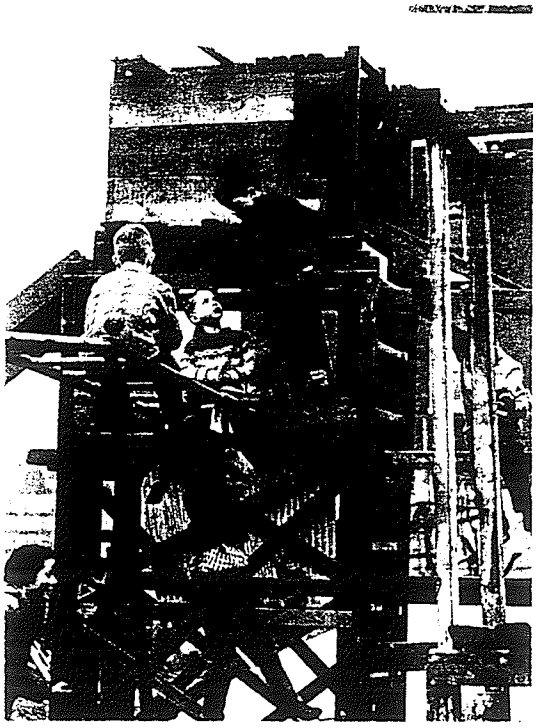
Path alterations. From (14), p. 270.

New Points of View:

Along the path network, look for ways to alter the point of view of the pedestrians, such as elevating or sinking the walkway.



Venice theatre door handle. From (10), p. 82.



Notting Hill Adventure Playground, London. From (8), p. 62.

Detail

Generously but carefully incorporate details into the neighbourhood, such as aromatic plantings in a play area, or relief patterns pressed into paved surfaces. Materials such as hand laid brick, fossil-rich limestone and unfinished wood offer a whole new world to explore at close quarters. Details are most likely to be observed during quiet play, or while seated and resting.

Woodlots and Adventure Play

Restore, retain and provide access to local woodlots. These provide different levels of challenges for physical, emotional, investigative, constructive, communicative, and competitive skills. [4] The primary advantage of these areas is that the challenges are not overt and predetermined, but are spontaneously defined and redefined by the individual.

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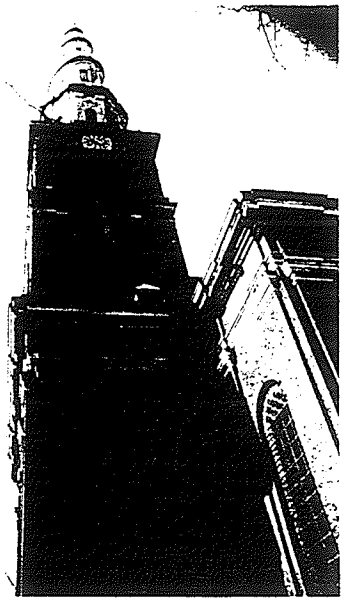
[4] Karl H. Scherler, "Umwelt als Bewegungsraum,"*Sportpadagogik* 1979, 6, 16-25, (German) quoted in Moore, p. 15.

Paddle Pool, London. From (9), p. 133.



Copenhagen steeple with access to the top via and exterior stairwell.

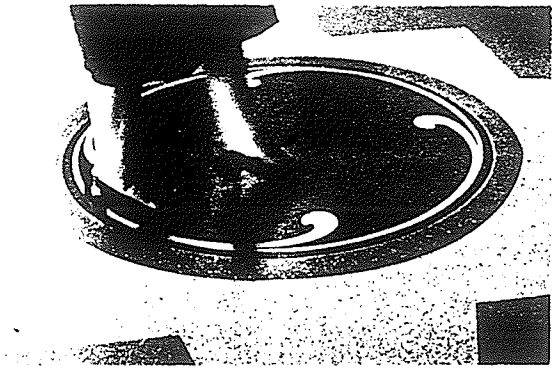
Outdoor Laboratories

Develop outdoor laboratories like the puddle park or wildlife sanctuaries which invite playful investigation and offer facilities for self-instruction. These should be incorporated into the neighbourhood as part of the fabric, rather than a special place.

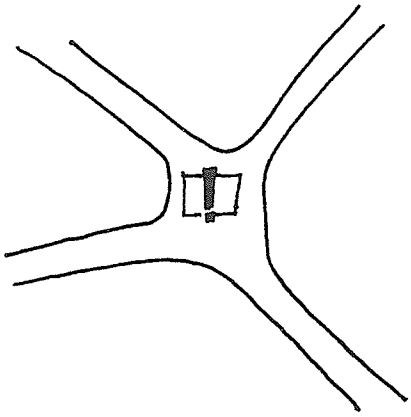
Tall Structures

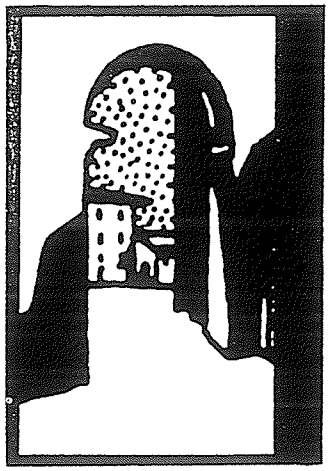
1. Underscore the importance of certain attractions by locating them above the regular cone of vision (p. 76). In addition, a single tall, complex structure located at a significant point in the community will assist in orientation, and will be an engaging source of mystery when seen from below.

2. Allow access to the top of the tower to give a panoramic view of the community. The physical climb can be an involving experience in itself.



From (10), p. 112





Floor Cues

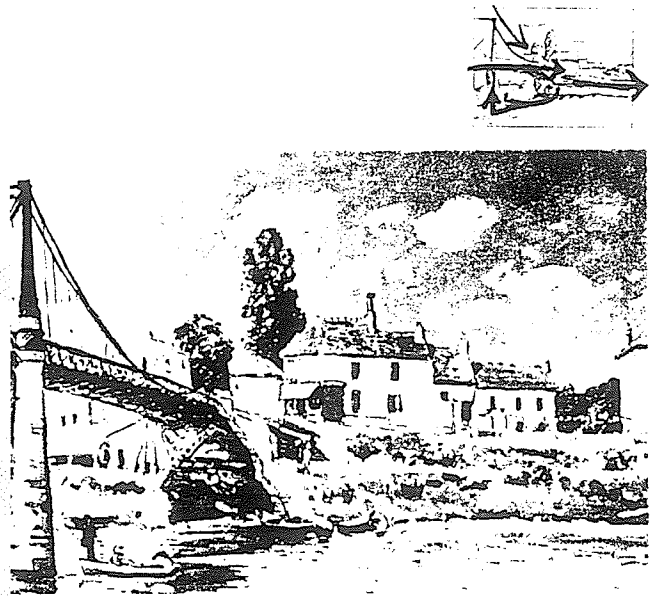
Because we pay so much attention to the surfaces we walk on, paths are ideal locations for subtle messages (p. 77). Develop a system of consistent paving material cues to denote special points along paths, such as decision points, view areas, and entrances. Other forms of information might also be communicated through pavement: metric units might be indicated, or the location of underground services permanently marked and labelled.

Path Terminus

Locate changing elements, such as a grouping of wind-responsive sculptures, at the terminus of commonly used paths.

Framing

Use elements in the foreground to frame and direct views to other features of interest. Arcade-like forms, tunnels, rows of vegetation, and doorways all offer opportunities to select views by framing.



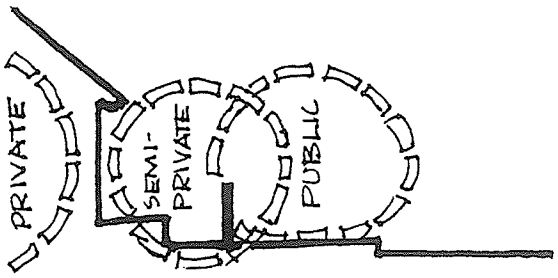
:rong directional lines from the bridge direct
e eye to the white building. Painting by
lfred Sisley. From (13), p. 174.

Directional Lines

Use scenographic "directional lines" to emphasize an interesting element from a controlled viewpoint, such as bus shelter or park bench.

Natural Interests

Use children's natural interests, such as wildlife, water and fire, to redirect their investigations to more subtle phenomena (p. 84).



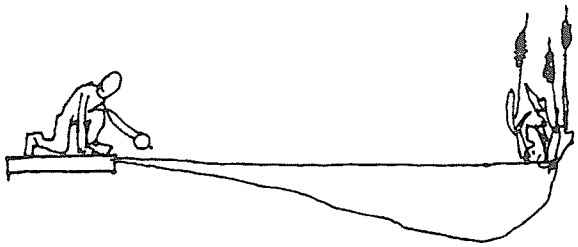
Front Yards

Include semi-private yard spaces between dwellings and the streets. The yards should allow personalization and invite casual contact with street activities.

·om (10), p. 48.

Topography

1. Topography is especially appreciated as a significant difference for image formation, and an adventure play opportunity. In the prairies, a landscape undulating with artificial hills and surface drainage features has economical benefits, supports wildlife and provides a highly explorable environment for children.

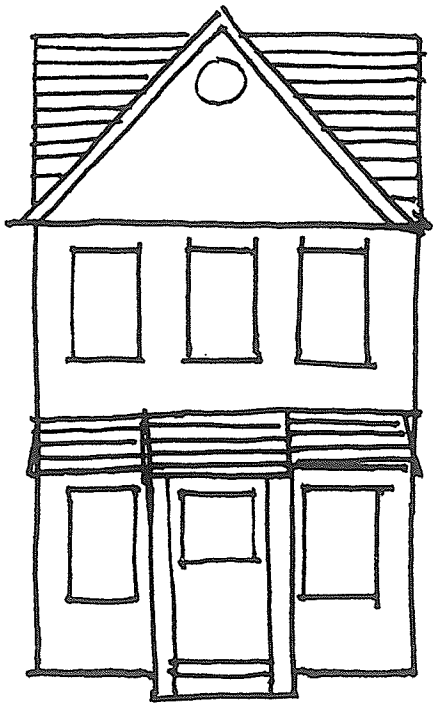


Surface Drainage

1. Drain residential sites on the surface wherever possible. Exaggerate the topography, including swales and ponds deep enough to retain water for most of the year.

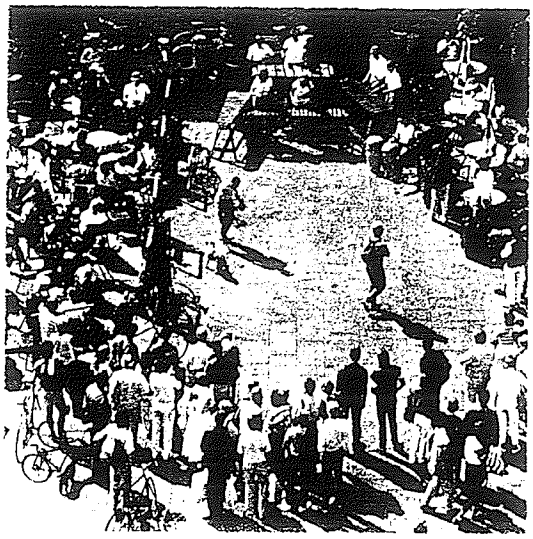
2. Provide shallow bank slopes on some ponds (<5%) to allow safe access to the water.

3. Encourage bulrushes and cattails to establish along steep pond edges, as a safety buffer, wildlife cover and a source of interest in itself.

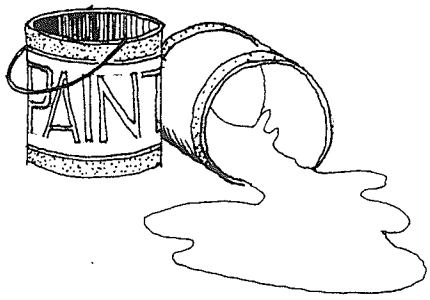


Face

Use the confrontational quality or "faceness" of building facades and other objects when viewed straight on to either draw attention or, by turning a potential attraction's face away, to divert it (see footnote 10, p. 79). Faceness can also be used to encourage viewers to seek the axis of symmetry, as tourists will often do when photographing a highly symmetrical landmark. Thus face has some use as a structural measure in organizing the neighourhood.



From (7), 34.



People

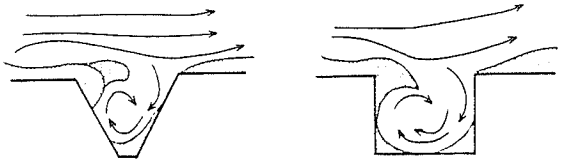
1. Encourage public activities, performances, markets, forums, and demonstrations. Provide gathering places and observation places with the express purpose of allowing people to watch other people (p. 77).

2. Encourage a mix of cultures in the neighbourhood, to expose residents to other ways of life.

Colour

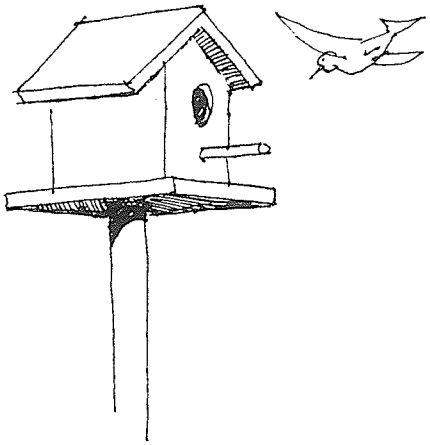
1. Use colour to enliven places, differentiate parts, attract attention, soothe or activate the residents. And if carefully controlled, it can serve to reinforce a system of non-verbal cues. Colour is perhaps the most economical tool available to enrich and inform the neighbourhood environment.

2. Enliven dark and monochromatic winter evenings with masses of coloured lights.



Natural Forces & Seasonal Change

1. Use snow fences and other forms to create interesting snow drift configurations in areas visible from paths.

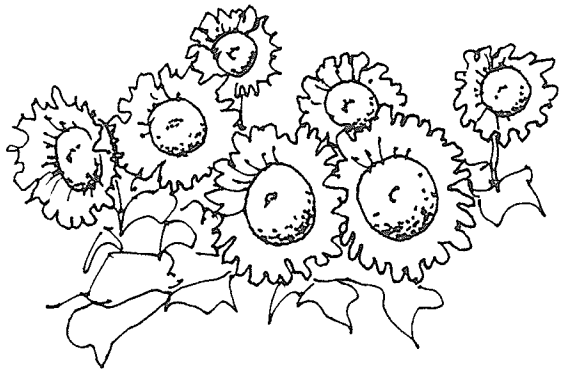


2. Amplify the visibility of forces and changes which occur in spring, using ridges to create differential snow melt patterns; puddle parks where the topography is carefully controlled to illustrate such things as evaporation, pooling, streaming, and riffle formation; mass plantings of early blooming shrubs and perennials; and community bird feeders, retention ponds, and dense cover shrubs to encourage returning wildlife to linger.

From (15), p. 91.

3. Plant left-over corners with varieties of flowering trees and shrubs which bloom one after another throughout summer.

4. Plant tree masses so that fall colours are highlighted, either by clustering several trees of the same species with one or two with different fall colour, or group them in a wide assortment of species. Particularly dramatic fall colour can divert attention.



5. Anemometers, wind socks, thermometers, barometers, and other weather instruments which make natural forces more visible can be placed in protected and supervised locations.

6. Incorporate sun dials, shadow sculptures or masses of sunflowers to dramatize the path of the sun through the sky.

7. Large open fields can be used to mark the solstices and other celestial events by placing monuments along the horizon.

Illustration sources:

(1) Garrett Eckbo, *The Landscape We See* (New York: McGraw Hill Book Company, Inc., 1969).
(2) John O. Simonds, *Landscape Architecture* (New York: McGraw Hill Book Company, Inc., 1961).
(3) The Smithsonian Institute, *Urban Open Space* (New York: Rizzoli International Publications, Inc., 1979).
(4) Jot D. Carpenter, Ed., *Handbook of Landscape Architectural Construction* (McLean,Virginia: L.A. Foundation, 1976).
(5) Arthur B. Gallion and Simon Eisner, *Urban Patterns* (Van Nostrand and Company, Inc., 1976).
(6) Garrett Eckbo, *Urban Landscape Design* (New York: McGraw Hill Book Company, Inc., 1964).
(7) Jan Gehl, *Life Between Buildings* (New York: Van Nostrand Reinhold Company, 1987).
(8) Lady Allen Hurtwood, *Planning for Play* (London: Thames and Hudson, 1969).
(9) A. E. Weddle, Ed., *Techniques of Landscape Architecture* (New York: American Elsevier Publishing company, Inc., 1967).
(10) Lawrence Halprin, *Cities* (Cambridge, Mass.: The MIT Press, 1972).
(11) *MidCan Lighting Catalogue*, 1989.
(12) Geoffrey Baker and Bruno Funaro, *Parking* (New York: Reinhold Publishing Corporation, 1958).
(13) Fritz Henning, *Concept and Composition* (Cincinnati, Ohio: Northern Lights Publishers, 1983).
(14) Francis D. K. Ching, *Architecture, Form, Space, and Order* (New York: Van Nostrand Reinhold Company, Inc., 1979).
(15) Ortho Books, *How to Design and Build Decks and Patios* (San Francisco, CA: Ortho Books, 1979).

Chapter 6
Summary & Epilogue

A. Summary: The Process of Experiential Learning[1]

A boy leaves his front door, his mind poised with expectations of what he will find on the way to his friend's house, based on previous journeys along this and similar routes. Some expectations are certainties, others are probabilities: he will certainly see his neighbour's house , but may not see his neighbour. The expectations and their degree of probability dictate what the boy is ready to perceive, so he will not be shocked if his neighbour is not in his yard.

He calls on his mental model of the neighbourhood to select a route which minimizes contact with feared places and maximizes contact with sources of interest. Attention along the chosen path will be fixed upon those elements which fit the expectations but stand out from the context, physically or by virtue of associated meanings. Occasionally he will see unexpected elements, if they are highly noticeable. The path configuration can direct attention as well. The greater an element's perceptual dominance and the longer it is in view, the more attention will be afforded to it.

The dominant elements will be pieced together into a coherent, probably sequential structure, forming the basic framework for the boy's mental model of the experience along the path. If the path is taken often, the model of the experience will become firmly anchored into his general model of the neighbourhood. The structure of the experience will be formed so that it matches the boy's expectations; if it cannot be matched (assimilated), then either confusion or an overhaul of the existing model (accommodation) will

[1] This summary was inspired by and based on the conclusion to Stephen Carr and Dale Schissler's "The City as a Trip," Environment and Behavior June, 1969, pp 7-35.

occur. The ease with which the dominant elements can be verbalized also eases the ability for them to be assimilated. Meanings help to link components of the experience together.

Learning occurs when assimilated experiences are subconsciously grouped and patterns of similarities emerge (with the aid of language) as concepts. Further experience shows how concepts tend to interact, and the boy expands his set of generalizations about the way the world works. The greater the personal investment in gathering and assembling experiences into generalizations, the more potent and useful the understanding attained. The greater his sense of power and responsibility in the neighbourhood, the more likely that understanding will be transformed into positive action.

The neighbourhoods of today loose much of their educative potential because they simply confirm our expectations: we expect to see nothing new, and the environment offers nothing new. The key to enhancing experiential learning is to provide a richly detailed and changing environment which will delight the senses, and regularly redefine our expectations.

B. Implementation

The measures listed in Chapter 5 may strike some as unrealistic from an economic and administrative standpoint. Who pays for these interventions? Who maintains, polices, and refurbishes them? To attain a highly accessible and manipulable community, substantially new management systems are needed, for which there are few precedents.[2]

Kevin Lynch's essay, *Managing the Sense of a Region,* is an examination of the problem of protecting and enhancing the "sensed environment,"[3] in response to the chaos of the modern city. He observes that most of today's urban environment is a product of a number of unresolved interests: builders, manufacturers of signs and fixtures, utilities companies, government agencies, real estate groups, individual owners, and many more. Each has its own goals, and is concerned with its own system of production and maintenance. The modern city's disorder and inhumanity are a direct reflection of these pluralistic intentions.

Control must come from two sources, according to Lynch. Users should be given as much responsibility and power over their home grounds as is feasible, to reduce the fundamental problem of imposed, inappropriate forms and purposes. This has the added advantage of enlivening and diversifying the community. Governments too should become more involved in ensuring environmental quality, both because it is part of their mandate to

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[2] The most similar program I am aware of is Michael and Susan Southworth's Lowell Discovery Network, described in *Alternative Learning Environments.*

[3] The essay's recommendations closely parallel the principles uncovered by this thesis: environments should be involving, imageable, communicative, and alive with human activities. Thus Lynch's implementation strategies are applicable. See Kevin Lynch, *Managing the Sense of a Region* (Cambridge, Mass.: The MIT Press, 1976).

protect public welfare and because they possess the tools to do so, through regulation of builders, taxation, and the management of public lands. Lynch envisions a new kind of public agency with expertise in environmental perception and design, which would be responsible for gathering information and making decisions at the regional scale.

What is the role of such an agency in a environment of increased private control? Lynch outlines a four part strategy of diagnosis, policy, regulation and design.

Diagnosis would involve periodic assessments of a locality's sensory environment, its accessibility, transparency, comfort, etc., which would be available to the residents as a guide for private interventions. More in depth analysis would be performed on areas identified as problems. "A diagnosis of the sensory state of the region will become the basic data for public action, for private development, for education, and for political agitation. It will also generate support for improving quality."[4] Other forms of diagnosis might include assessments of major projects prior to approval, and post-occupancy evaluations of new communities. The field investigations in Chapter 4 are typical of the diagnosis procedures which might be performed by the agency.

The second mode of action is the development of policies, from general standards and frameworks to norms for unique situations, such as a historical district. They might influence the design process, recommending higher levels of public participation, or better information on projects prior to construction. Policies could include management guidelines for maintenance, and a program of incentives and fees to prevent restrictions in

[4]Kevin Lynch, *Managing the Sense of a Region*, p. 43.

movement or other impoverishments. Funding for locally administrated improvements, and encouraging the formation of community improvement associations are further opportunities for policy.

The next step is an expansion of existing building regulations to specify sensory qualities which promote educative communities. To date, regulation of sensory qualities has relied upon objective, quantifiable definitions, such as the degree of impact of an eyesore on adjacent property values. Visual blight which merely impacts humans is not illegal, because the impact is so difficult to quantify. Until the legal limits are changed, the new regulations will have to be made as explicit as possible, requiring measurable levels of openess, illumination, orientation information, or transparency, for instance. Trade-offs must be allowed: no project can respond to all the design measures in Chapter 5. Perhaps a system of educative quotas could be developed, in which "points" are assigned for each measure taken. Lynch recommends that the less tangible qualities, such as coherence or explorability, might be incorporated through regulatory "patterns,"[5] describing preferred configurations and hard-to-define characters .

Finally, as a design service, the agency would develop systems of standard design elements: paving patterns, edge treatments, lighting units, adaptable to different sites, local materials and skills. Some members of the agency would be involved in the design of larger public amenities like adventure playgrounds and orientation centres, and the design of festivals, ceremonies, and special displays. Other members might specialize in design handbooks, illustrative designs and programs to train landowners how to evaluate and shape their own environment.

[5] See Christopher Alexander et al., *A Pattern Language* (New York: Oxford University Press, 1977).

In addition to Lynch's four functions, the agency should also be administrating a program of research, similar to the program run by the Canadian Mortage and Housing Corporation, or perhaps in conjunction with it. Ongoing research will help ensure the validity of proposals and guidelines developed by the agency.

Great care must be taken that the agency does not become so ponderous and bureaucratic that it cripples the efforts of designers. In order to motivate private design professionals to improve the educative quality of their work, the agency should provide clear information and examples, advice, and incentives; and it should recognize outstanding work through national awards.

Funding for educative improvements would come from the private grants and community-based fundraising programs to minimize additional public spending. Higher construction and maintenance standards, plus the administration of the agency may prove expensive, but as has been demonstrated, it is an investment in our future. What are the costs of an incompetent populace? What achievements have gone unrealized because some individual's potential was stunted by an environment hostile to development? These are the terms to be reckoned into the cost/benefit analysis of educative neighbourhoods.

One might argue that educative neighbourhoods would be more marketable, and therefore, more profitable. Implicit in this approach is a danger that educative neighbourhoods would become available exclusively to the rich, who may in fact need them the least.[6] Exclusivity runs counter to the

essence of experiential education, which is based fundamentally upon open access. Developers should not be funding educative aspects beyond those regulated by the regional agency.

C: On Experience

Nothing ever becomes real till it is experienced. Keats

This investigation relies heavily upon empirical theories to understand the way children interpret their surroundings. Yet science provides only some of the information necessary to positively alter the neighbourhood environment for learning. Taken alone, it can lead to a new kind of experiential poverty, as human values and caring are eclipsed in the objective quest for truth. John Holt condemns the reductive, soulless scientific approach to education in his book, *How Children Learn*. He points out the critical difference between tactile stimulation of an infant's toes, and a loving game of "This Little Piggy." While the outward manifestation may be the same, children are extremely sensitive and react to the emotional state and intentions of people around them.

Science not only separates thinking from caring, but also humanity from environment, natural environments from artificial, stimuli from response. The divisions are made to facilitate controlled experiment, to isolate causes and effects. But the nature of experience is irreducible; it is a continuum fraught with circular causality, in which changes to the environment cause changes in experience, which further change the environment. "We shape our buildings, and afterwards our buildings shape us."[7]

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[6] The relationship between socio-economic group and environmental competence is a topic for further research.

[7] Winston Churchill, from a speech to the House of Parliament, 1943.

Environmental experience is a product of the dynamic relation between a person's emotional reactions, moods, and current activities, and changes in the environment: weather patterns, the season, the time of day, the location. The transcendent, evocative and personal reactions to an environment are as influential as the direct responses to stimuli which are the focus of the preceding text. While science has a role as an information source supplementing the personal understanding of experience, the two remain irreconcilable. Science requires generality, predictability, and linear causality, while experience is idiosyncratic, fluid, and chaotic. Experience is a far richer, more imprecise and incommensurable phenomenon than can be accommodated by reductive analysis. Environmental psychologists David Lowenthal and Hugh Prince admit defeat, and suggest that the nature of environmental experience is best apprehended through visual art, literature, and introspection.[8]

The approach of this study then has been to assemble a body of relevant and reliable scientific findings on the ways in which people learn from their surroundings, and then compile these and field observations into "rules of thumb:" starting points to generate ideas. The personal touch, the artistic and caring tone of the educational neighbourhood, arises from the skill and personal insight of the designer, who is free to interpret any of the rules as he or she sees fit. This is the main reason a demonstration plan was included in this study; to illustrate how a dry, scientific tone can be transformed into rich and amusing learning places.

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[8] David Lowenthal and Hugh Prince, "Transcendental Experience," in Wapner, et al., eds., *Experiencing the Environment*, pp. 117-131.

What sort of information is best provided by science, and how should the other gaps in understanding be filled? Science is good at the hows: how we learn, how we attend, how we perceive, how we formulate ideas. The what's and why's are more personal, as are the all important feelings and meanings associated with them. Some generalizations are drawn about meaning and value in the preceding chapters, but generally, these unknowns are accommodated by increasing choice, access, and control.[9] We simply say the neighbourhood should provide room for personal experience. In a way, it is fortunate that there is no science of experience, for the implications of an environment offering tightly controlled experiences is almost Orwellian in tone.

The educative neighbourhood should therefore do three things. It should respond to those "how" mechanisms as indicated by scientific study to amplify the available information while maintaining intelligibility; it should provide access, opportunities to personalize and explore, and to control and choose experiences; and it should be imbued with all the warmth and care required to nurture growth. As Patrick Geddes recommended before the turn of the century,[10] education in the environment must replace the three R's with the three H's: Head, Hand and Heart.

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[9] The fact that the neighbourhood is open, accessible, and controllable is a moral lesson in itself, communicating trust and caring to the residents.

[10] George C. Martin and Keith Wheeler (eds.) *Insights into Environmental Education* (Edinborough: Oliver & Boyd), p. 4.

D. Directions for Further Research

As was noted in the preface, the review of research in this thesis was limited primarily to articles on information processing models of environmental perception. However, as Kevin Lynch has found, there has been very little empirical work on the relationship between environment and human development. "An understanding of how people change and grow as a result of their interaction with the environment, which might lead to the building of true learning places, is one of the basic research tasks ahead of us."[11] Lynch presents an excellent review of gaps in the research in *Managing the Sense of a Region*. Clearly, more can be discovered by looking for other sources of information, particularly analyses of implemented projects like the Lowell Discovery Network. Another form of research which might prove helpful is a review of biographies of leading artists, scientists, philosophers, writers, reformers, diplomats - what were their first neighbourhoods like? Is there evidence of a relationship between the physical settings for early development and later achievements? As well, it will be necessary to undertake studies similar to this thesis on other groups in the community, uncovering the unique educational needs of single parents, the elderly, the handicapped, and ethnic populations.

The principles and measures which have been discussed are only hypotheses; experimental testing is imperative. For instance, a comparative analysis of cognitive maps from two neighbourhoods, one built on a clear grid pattern, the another with serpentine layout of streets, could determine the extent to which coherence assists cognition.

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[11] Kevin Lynch, *Managing the Sense of a Region*, p. 174. The review of gaps in the research is found on page 175.

Little could be determined about children's value systems, either from the literature or from the field studies. Further research is required into children's associative connections with their neighbourhood, and especially on the places they value. An issue which must be resolved is whether removing barriers to access deters or promotes vandalism.

Another topic to be investigated is the role of preference in experiential learning. The work of Rachel and Steven Kaplan relates preference with familiarity to predict responses to an environment:[12]

	Unfamiliar	Familiar
Not Preferred:	Fear	Boredom
Preferred:	Interest	Comfort

Obviously, preference is a crucial motivational factor in our explorations of the environment. The Kaplans' theory of environmental preference is discussed briefly in Chapter 3, but other researchers have made contributions to the field which should be consulted.

An issue barely touched on is the effect of transcience on learning. J. B. Jackson noted in the late sixties the increasing mobility of Western society, and by all appearances this trend will continue, as we search out better jobs and more comfortable settings. The relationship between familiarity, stability and learning is complex, for in offering a secure foundation for intensive exploration, it denies extensive learning in new contexts. The nature of this trade off is worht investigating.

One of the most pressing needs is to determine how the new information age

[12] S. Kaplan and R. Kaplan, *Cognition and Environment* (New York: Praeger Press, 1982).

is changing our way of learning. As electronic simulations achieve higher and higher levels of fidelity, the neighbourhood may fail to hold the interest of its residents. Some futurists predict that the real world, the world of labour and sensations, will be forsaken as soon as it it feasible. They anticipate the day when we can "download" the contents of our mind into a computer, and live forever as pure thought. Already, startling advances have been made in "artificial experience" technology: remote viewing and tactile sensors that electronically transport the user to other lands.[13] Other researchers, however, recognize the value of the real world, and are currently looking for ways to make their robots frolic and play outdoors, providing the "experience" to calibrate their sensory instruments, and expand their "cognitive map" of the places they explore.[14] Future neighbourhoods may even benefit from the findings of such research.

How does learning from a simulation differ from real experience? What compromises are involved? Are they somehow compatible? The answers to these questions can direct the course of changes occurring today, and determine the destiny of sensed environment. Whether tomorrow's experiences will be real or virtual, our goal is to create landscapes for living and learning which reach beyond the primitive transmission of information afforded by the preceding measures, and strive toward art, toward eloquence.

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[13] Grant Fjermedal, *The Tomorrow Makers* (New York: Macmillan Publishing Company, 1986), p. 229.

[14] Grant Fjermedal, Chapter 13, "On Becoming Mind," and Chapter 2, "The Need to Frolic," in*The Tomorrow Makers.*

Appendix A:
Demonstration Plan

A. Site Selection

From the investigations of the Windsor Park children's perceptions and knowledge of their neighbourhood, the Wickham vicinity was selected as the site for a demonstration plan. The focus is necessary because interventions to enhance experiential learning in an existing neighbourhood employ primarily supplementary measures (see Chapter 5) which are best demonstrated at a smaller, more detailed scale. Wickham was selected because of the diminished extent and sophistication of its children's mental models and their lower overall performance in the investigations compared to the adjacent Maginot children. Both are located near a variety of learning resources, but the Maginot children appear to be making better use of them. The plan will look for ways to enhance the Wickham children's ability to understand their neighbourhood, expand their range, and enrich their experience.

As was stated earlier, the results of the questionnaire and photography exercise are not intended to be representative of the neighbourhood at large, and with this change in scale to the Wickham site, further in-depth surveying of residents is required before improvements can be implemented. Ideally, the principles of experiential education would be a component of an overall rehabilitation scheme upgrading the quality of the site's social and physical environment.

The following plan is a preliminary demonstration based on issues identified through on-site observations, analysis of the physical environment and the survey responses of the three children from the Wickham vicinity. The plan avoids dealing with social and physical issues beyond those which relate directly to educative opportunities, though many of the interventions

promise to improve the quality of life in the area. Its intent is simply to show how changes in the physical environment might enhance the ability of child residents to learn from and about their community.

B. Site Description

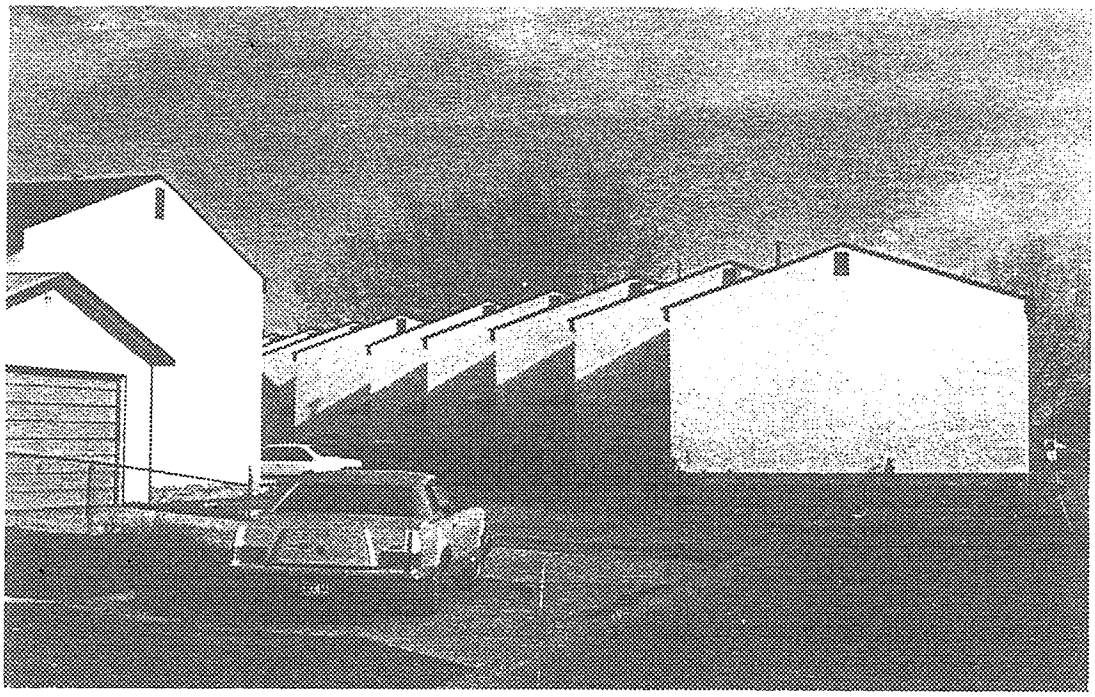

Figure A.1. Entrance to Wickham Place, in Winnipeg.

The Wickham vicinity consists of 63 two-storey townhouses clustered around a central parking street, and backing onto a series of triangular open spaces which make up the remainder of the 16 hectare (4 acre) site. It is adjacent to Maginot Arena, which serves the entire city, and Pierre Radisson Collegiate, a vocational high school.

The development, called Wickham Place, was built in the late sixties through a government incentive loan.[1] It caters to a specific group (low income

families) and is visually quite striking (Fig. A.1). Both attributes set it apart from the rest of the neighbourhood, creating a highly imageable place, as evidenced by its high mention rate in the cognitive map study. Unfortunately, many of the associations of that image are negative. It is known locally as "the townhouses."

C. Site Analysis

The site was analyzed below in terms of the four major principles for developing educative neighbourhoods. The resulting issues and opportunities are summarized in Figure A.2.[2]

Diversity

Perhaps the greatest shortcoming of Wickham Place is its lack of diversity. The architecture consists of 63 identical units in nearly identical clusters (the number in each cluster varies). The buildings are simple in form, and immediately comprehensible at a glance. They are finished in white stucco, with a small coloured panels as accents, though most of these are painted the same colour. The central street is of uniform width and character; there is no differentiation of private space, no planting, not even curbs to indicate the parking spot in front of each unit. Few of the small, semi-private back yards provided in the original plan remain, leaving back doors to open directly onto sparse public playgrounds. There are no more than ten trees on the entire site.

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[1]It was financed through a program of low dividend loans, designed to encourage private developers to become involved in public housing projects.

[2]Once again, issues arising from the special needs of the low income residents have not been considered in this demonstration, because they would require another round of research. Thus it is taken for granted that the residents will provide adequate supervision, maintenance, and personalization to make the plan work, and that they will remain long enough to build friendships and a community.

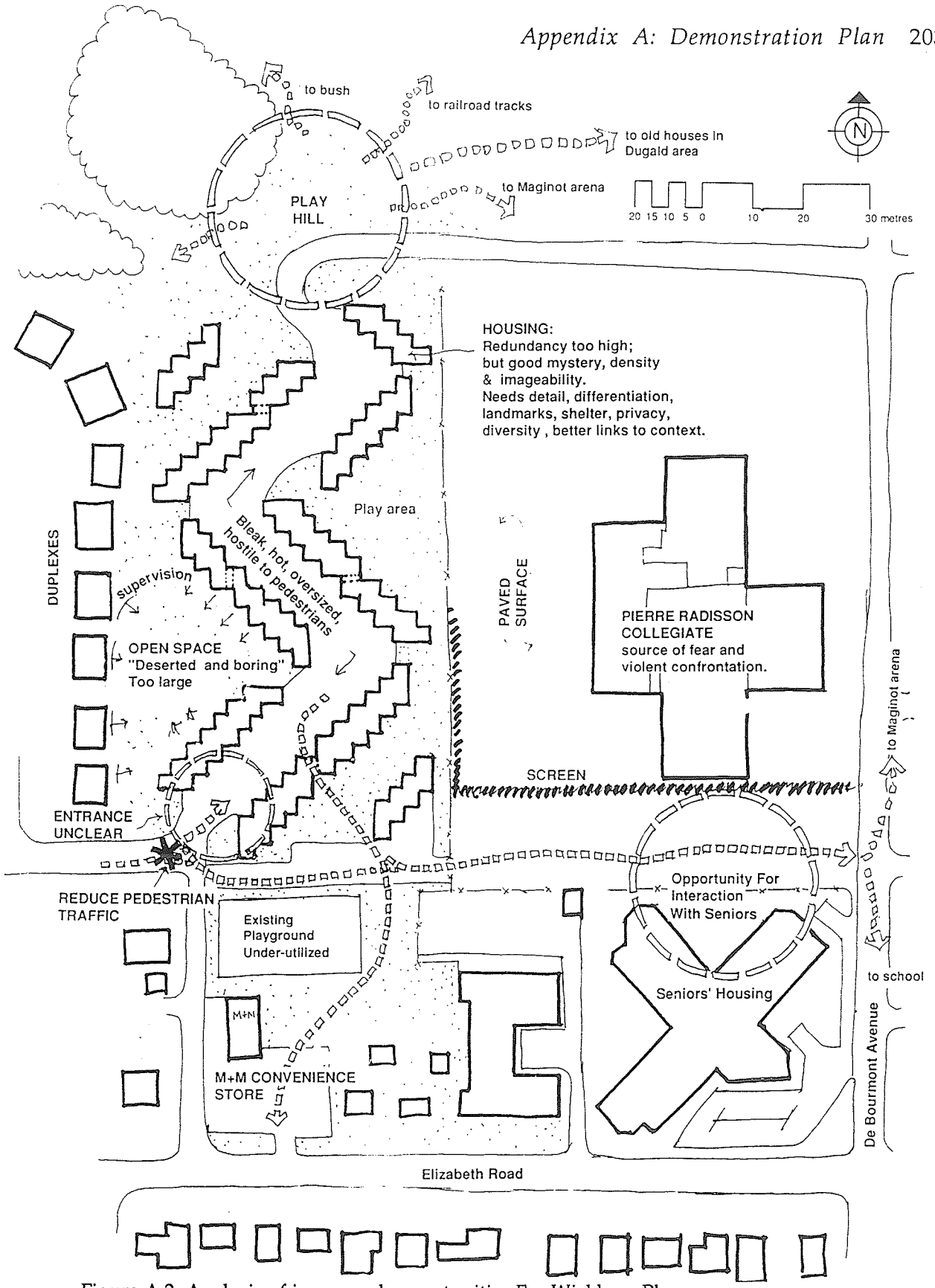

Figure A.2. Analysis of issues and opportunities For Wickham Place.

Just north of the development, however, is a woodlot which residents call "the bush." It separates Windsor Park from the rail yards and meat packing plants further north. The bush offers varied topography and vegetation, wildlife, sounds and smells and adventures. From observations of the site, it seems to be used often by children from Wickham Place, but not as fully as it might be. For instance, there is no evidence of fort building near the townhouses, but the bush further west has several forts. Wickham children appear to use the bush primarily as rough terrain to ride their bikes.

The convenience store just south of the development is a main attraction. None of the students from Wickham vicinity mentioned the bush on their maps, but all mentioned the store. It offers diversity of activities, cars, people and affordable merchandise. To the east, Pierre Radisson Collegiate is another kind of experience. According to the survey, it is perceived as a hangout for drug users and bullies -- one of the primary sources of fear in the neighbourhood. Also to the east is a new senior citizen's home, which remains mostly hidden behind hedges.

Coherence

Wickham Place's high level of coherence makes it an opportune site for educative rehabilitation. The infrastructure is in place: a clear, imageable, pattern, slightly too redundant perhaps, but its configuration was recorded accurately on two of the three cognitive maps from the area (Fig. A.3). If there had been another jog in the central street, some parts of the development would be impossible to differentiate from the others. As it stands, no two "segments" are the same; they all have different end conditions.

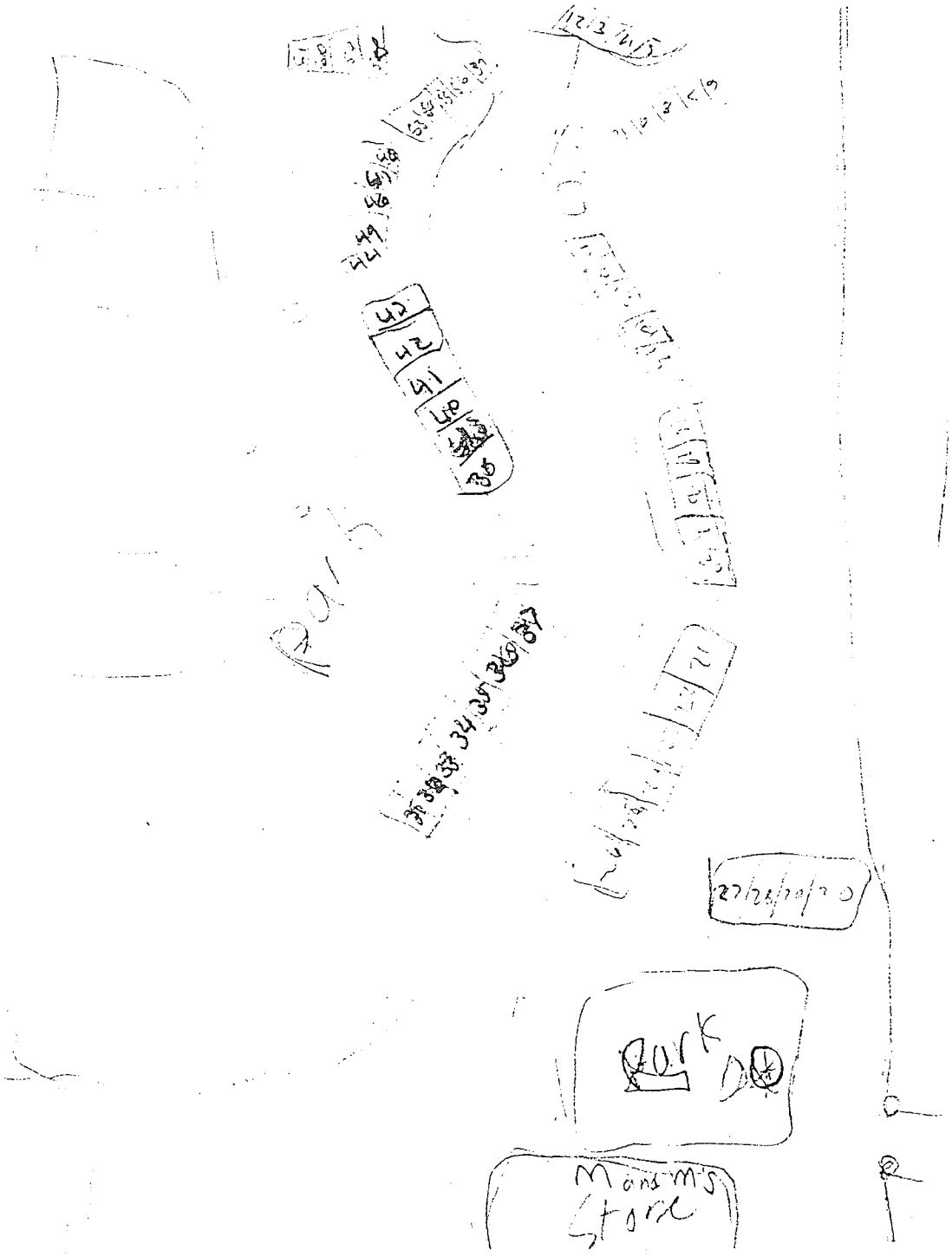

Figure A.3. One of the maps from the Wickham vicinity.

The entrance to the development is weak. From the change in architectural character it is clear that one is entering a new and distinct area, but with no other cues it is unclear if it is the main entrance. The first units face away from the entrance, presenting blank stucco walls to the street (see Fig. A.1). The north end does not terminate cleanly, either.

Involvement

The survey indicated that the backyard open spaces are not used because they are "empty and boring." Instead, most of the activity in the development is concentrated within the central street where people can be seen skateboarding, fixing cars, playing hopscotch, or just wandering through. The jogs in the street lend mystery to the experience of moving from one end toward the other. Passageways between the townhouse clusters are also mysterious and inviting, but there is little in the park spaces to sustain interest.

One source of the problem is the amount of park space. Typical densities for this type of development run about 20 to 25 units per acre.[3] In spite of its small, densely packed units, Wickham Place has just over 15 units per acre, with a minimum portion of the site devoted to road and parking. The remaining area is left as park space. The configuration of the space is problematic as well. It is a broken network of fragments, triangular pieces and slivers of land either too small to allow organized games or too discontinuous to encourage circuits of play and exploration. Density, the key quality of the central street, is the missing ingredient in the park spaces.

The bush meets most of the criteria for involving experience: manipulability, mystery, complexity, and has great potential for engaging local children's

[3] From Joseph De Chiara and John Hancock Callender, *Time Saver Standards for Building Types* (New York: McGraw Hill Book Company, 1973), p. 122.

interest if it can be made more inviting to explore on foot. Otherwise, opportunities for residents to manipulate their surroundings are few.

Quality

While the purity of the architecture and the spaces it creates are admirable, less care is evident in the details. In fact, it is the absence of details which most undermines the quality of the development. Missing are subtle aspects of design like roof overhangs to emphasize the brilliant contrasts of stucco and prairie sky, or entrances which encourage chance meetings between neighbours. Much of the delight we experience in well-made environments comes from the cumulative effect of quality details.

The lack of detail carries over into problems with the scale of the interior space. Even with the parked cars redefining the edges of the street, the space is too wide. The feeling that it was scaled for cars rather than people says something to the residents about their importance in the mind of the designer.

Does Wickham Place give form to ideals? Does it promote individual development? It seems clear that while few public housing projects give priority to these concerns, these are precisely the places in which ideals are essential, for they are the matrix from which disadvantaged children emerge as adults. Wickham Place should give its residents the power and responsibility to make changes, and free them to express themselves, to create, to explore, to share with neighbours and build a trusting community.

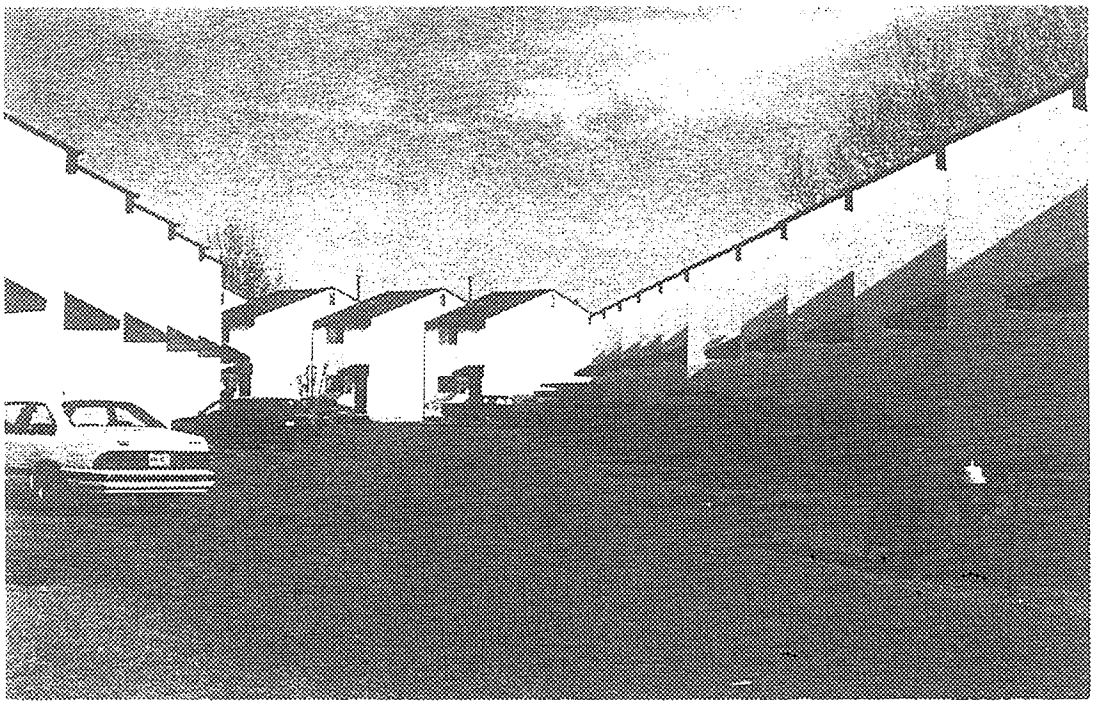

Figure A.4. The powerful repetition of forms in Wickham Place is undermined by a profound lack of detail.

D. Concept Statements

1. PEDESTRIAN PRIORITY: Increase pedestrian exposure to the environment. Because we perceive best while walking, shifting the development from catering to cars to catering to pedestrians is the prime concept in the plan.

2. PLACENESS: Use distinct image and high density as advantages, reinforce both to create a recognizable and positive character of place.

3. ROOTED DIVERSITY: Rather than imposing diversity upon the residents

from outside, encourage them to personalize their places as a "rooted" source of diversity, and an expression of personality and care.

4. COMMONS: Reduce and concentrate open space. Provide better play opportunities, including circuits of attractions, cooperative activities, and manipulable media. Concentrating open space may also lead to more social interaction, and the strengthening of community ties.

5. APPROPRIATE IMAGE: Control the image quality of the site, so that the rough terrain, so important for adventure play, does not conflict with the well groomed, presentational space in front of the homes.

6. ANCHORS: Provide an attraction or series of attractions at the north end of the site to launch explorations of the adjacent bush, rail yards, and light industry sites.

7. SHELTERING: Protect the site from the wind, and provide shaded spots to encourage lingering.

8. DIFFERENTIATION: Differentiate segments of the development with systematically located landmarks to assist in orientation and counteract this development's sometimes confusing level of redundancy. Clarifying entrances and individualizing the buildings will help in this regard as well.

9. QUALITY DETAILS: Make forms more intricate, detailed, and responsive to environmental conditions. Highlight details and features of interest.

10. ROUTE CHOICES: Provide at least two alternative routes to school and to other parts of the neighbourhood.

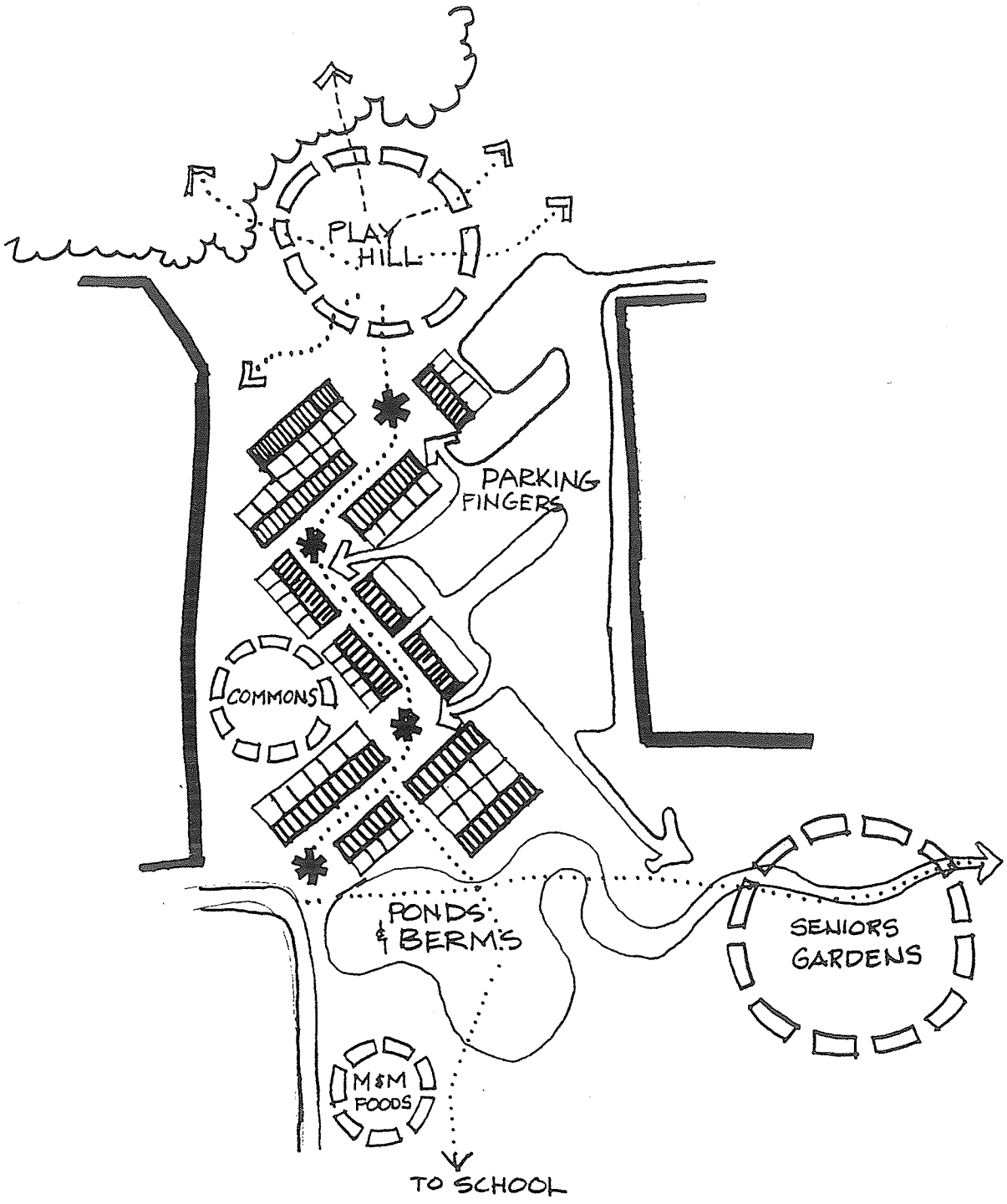

Figure A.5. Concept diagram.

E. Proposed Interventions

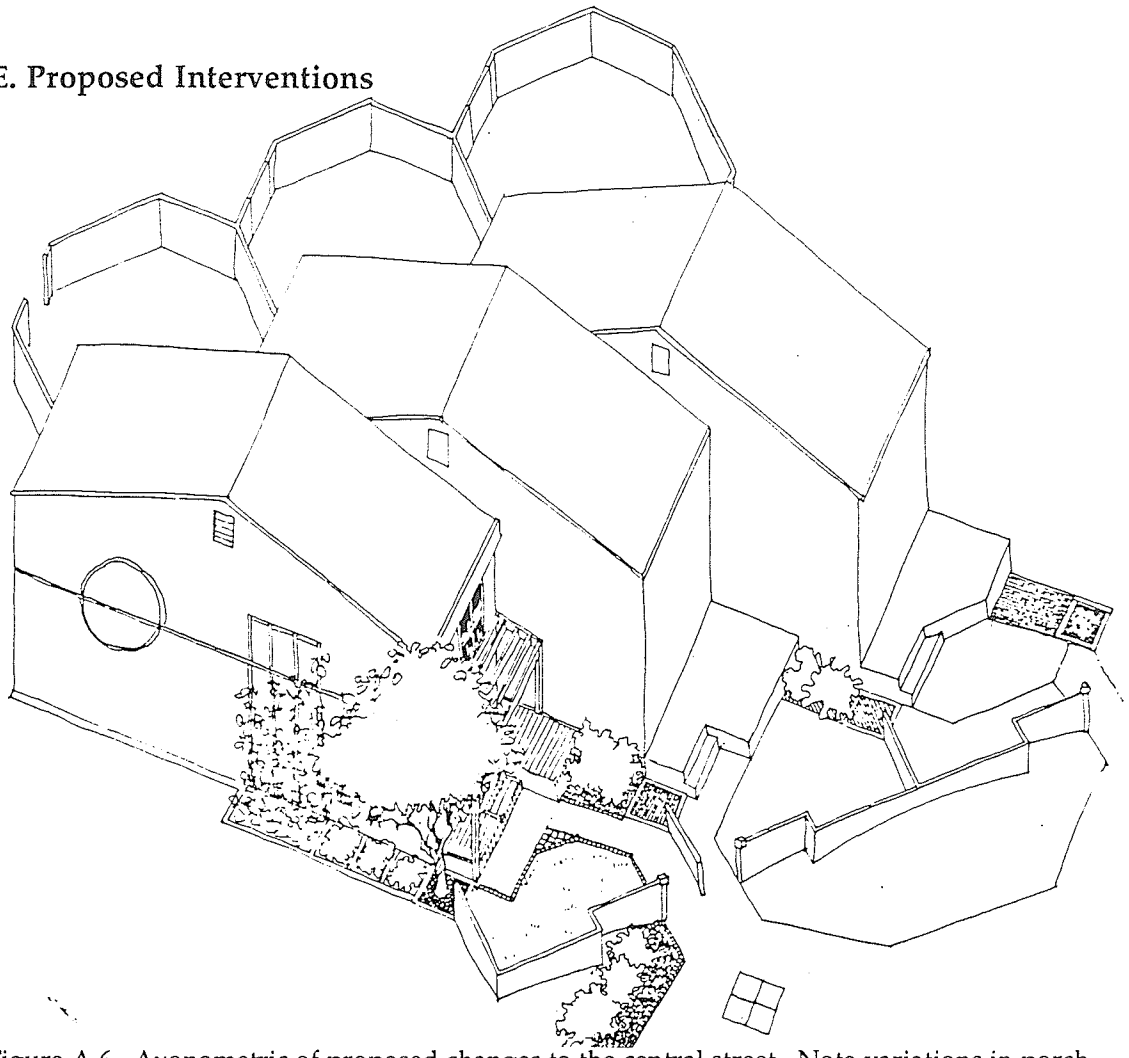

Figure A.6. Axonometric of proposed changes to the central street. Note variations in porch design, and the low fencing, trellises, and spaces for personalized planting. Backyards feature higher fences and gates.

1. Remove parking to the periphery.

In response to the goal of increasing pedestrian contact with the environment, all vehicular traffic has been removed from the central street, and parking occurs on land acquired from Pierre Radisson Collegiate. The walk from car to home must therefore be of sufficient quality to compensate for the loss of convenience, security, and comfort. In addition, the parking lots must become "positive space:" comfortable, attractive, and educative in themselves by providing places to work on cars.

2. Reduce park space by turning land over to private backyards.

The main rationale for concentrating open spaces is to increase stimulation and chances of interaction with others, but it has added benefits of allowing residents to exercise more control over their surroundings, making more intensive use of the land, and reducing the maintenance burden of the management company.

3. Provide each unit with a front yard.

The yards will give residents an opportunity to extend their dwelling space into the public domain, lending personality to that space, and will allow them to create and maintain a personal image for their home. This will become the major source of diversity in the development, and may lead to better social relations as neighbours become familiar with each other. The front yards also serve to improve the scale relations within the centre street, narrowing the public space from 16 metres (52 ft.) to 9 metres (30 ft.), so that the pedestrian can experience both sides of the walk simultaneously.[4]

4. Shelter and diversify the site with masses of vegetation. [5]

Plants are a source of diversity, seasonal variation, interest, and mystery; they can be climbed, and are expressive of human patterns and natural processes. Planting is used to achieve at least seven different results.

a. Exploration: Naturalized vegetation like short grass prairie is an ideal explorable feature, to be used as the ground cover for most of the fringe lands.

b. Climbing: Hardy, low branching trees, such as laurel willow and Manitoba

[4] Jan Gehl recommends even narrower pedestrian lanes:"A width of 4 metres permit a pedestrian flow of 50 to 60 persons per minute. More space is seldom needed!" From Jan Gehl, *Life Between Buildings*, p. 92.

[5] As one landscape contractor was quoted, regarding public housing projects:"Plant trees like a salmon lays eggs,and some may fail to die."

maple, will be generously planted throughout the commons

c. Enriching the sensory environment: Flowering, fragrant trees and shrubs are used as accents.

d. Seasonal variation: Trees with brilliant fall colours are arranged throughout the centre street dramatize the passage of seasons, and to reveal hidden patterns. As fall proceeds, residents will group the trees in their minds according to colour, not merely by virtue of proximity (see Fig.3.6).

e. Food: Fruit bearing trees and shrubs will be planted in the north end of the site. Species which are hardy and provide edible fruit for people as well as animals are ideal: saskatoon, chokecherry, crab-apple, plum. The observation that food comes from the earth and the sensation of eating directly from a tree are valuable additions to a child's experiential education.

f: Shelter: Mass plantings of evergreen trees along the northwest edge of the site should help to deflect the prevailing winter winds away from the centre street, and the resultant pocket of deep snow drifting can become a well sheltered site for building snow forts, etc. the centre street itself is well vegetated, reducing wind speeds and offering shade in summer to those who desire it.

g: Image: A dense, formal bosque of green ash bridges the entrance to Wickham Place, to imply an image of prestige and quality.

All vegetation is to be planted and maintained by the community, with guidance from a landscape architect.

5. Contrast building regularity with winding paths and berms.

Berms also serve to break up the space into smaller, more comfortable sized places, and make drainage patterns visible.

6. Separate Pierre Radisson Collegiate from children's routes.

As it stands now, children's exploration in the vicinity of P.R.C. is limited by fear of its students. A 2 metre high light-proof fence between Wickham Place and the school has been proposed.

7. Encourage interaction between children and senior citizens.

A row of garden plots for seniors along the path to Maginot arena should prove interesting to children wandering by. In order to allow them to observe without standing awkwardly at the fence, berms, climbing trees, fruit bushes and various other plantings provide an excuse to linger. Conversely, gardening gives the seniors an excuse to watch children play.

8. Make playgrounds make them more manipulable, challenging,

The large park space along the west edge of the site has been designated a commons (see Commons, p. 163). Surrounded on all sides by housing, it has the best potential for supervision of all open spaces on the site, it is well linked to the bush and the Wickham Road, and it is of adequate size to be developed as an intensive play environment. All other play equipment in Wickham Place is to be removed. The features of the new play area are:

a. Sand and water: sand is a manipulable medium which allows creative play and experimentation. Combined with water, it offers even more possibilities. The water comes from a pump which requires cooperation (or ingenuity) to operate.

b. Playhouse: The site includes a full scale replica of a typical housing unit's main floor plan, built with 50 cm high concrete walls and a sod floor. Walking through the floor plan will give the children a clearer image of their own homes, and may help them understand the layout of other buildings.

c. Playwall: The main play feature will be a wall designed and built by residents, with ledges, bells, planter boxes, ladders, windows to particular

views, steps, small cubby holes for privacy, moving parts,and platforms for large scale games. The idea of a wall is to provide an alternative to standard play equipment, and to set up a sort of momentum to launch explorations beyond the ends of the wall.

d. Trees: (see intervention 4).

e. Topographic variation: Small hills and gullies can become the stage for invented games, and will create noticeable variations in temperature, melting rates, wind, and snow drifting on the site.

f. Lawn: A flat stretch of simple, mown grass for playing catch and such, as a relief from the complexity of the rest of the site.

g. Intriguing materials: The sandpit is edged with tindlestone blocks, selected for their high fossil content. The playwall might be encrusted with ceramic mosaics, of constructed of hand laid brick, unfinished lumber, stone.

h. Lighting: The site will be well illuminated at night. Coloured lights will be substituted in the ground level lights in winter to cast a colourful glow on the drifts. Where coloured lights overlap, the effects of additive colour mixing can be observed (i.e. where the combination of blue and yellow light are perceived as grey).

i. Places for adults: Benches and tables are provided to allow adults to bring indoor activities outside: write letters, eat, play chess, as an excuse to watch the play and to give the children something else to observe.

9. Regrade the south end of the development to collect water.

The pond will be a visual amenity, as well as a demonstration of drainage. It should be alive with snails, reeds, crayfish, and wading birds (one purple martin colony on the site should take care of the extra mosquitoes) Along the north edge, a wooden platform allows contact with the water.

10. Enlarge the play hill on the north end of the site.

The hill should rise at least 15 metres above ground level to afford a good view of Wickham Place, and of other more distant points of interest: the meat packing plants, the rail yards, the light industrial complex to the north east, sports events at Maginot track, even activities on the now hidden Pierre Radisson Collegiate site. The hill is also an attraction for winter and summer play, and helps shelter the development from north winds.

11. Locate a windmill at the entrance from the parking lots.

A windmill will serve as a landmark, an identity marker, and an intriguing vertical structure responsive to natural forces. It can be a navigational beacon, allowing more distant explorations, especially in the bush, which provides few other orientation cues.

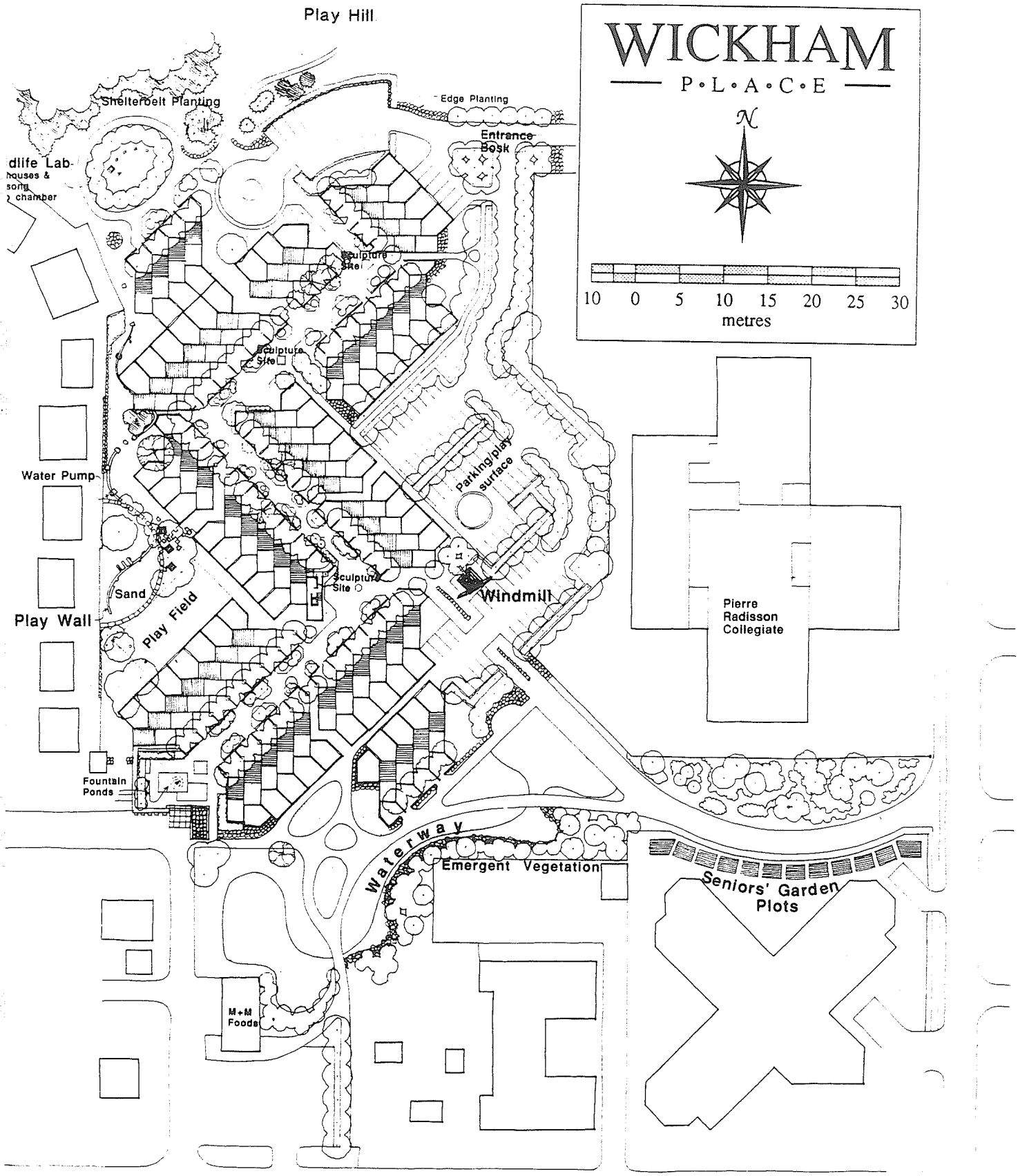

Figure A.7. Proposed interventions for Wickham Place.

Appendix B: Formal Environmental Education

A. History of Environmental Education

"Environment" is a vague notion, and accordingly its role in education has been a matter of controversy since the concept emerged in the middle of the nineteenth century. The Industrial Revolution and spreading urbanization created for the first time an obvious gulf between humanity and nature, and Darwin's *Origin of Species* brought with it the implication that we are products of a living and inanimate environment, not self-determined agents of God's will.

This new understanding triggered criticisms on the loss bucolic landscapes among romantic philosophers, and as a matter of course, a call for nature studies as Rousseau advocated a century earlier, and better living conditions for workers trapped in the squalor of labour communities. The concepts of ecology and sociology both arose during this period, in response to concerns about the quality of life and the environment.

Patrick Geddes (1854-1933), a Scottish botany professor, led a pioneering effort to unite these two concerns through public education. He saw the existing system as wasteful of human potential, and argued that "a child brought into contact with the profound realities of his environment would not only be more likely to learn better, but also develop a creative attitude toward his surroundings."[1] Education could become an instrument for urban rejuvenation and social well being by replacing the three R's with three H's: Head, Heart, and Hand. While Geddes ideas had little impact at the time, they were reinvented in the 1960's as the basis for the environmental education movement. Keith Wheeler calls him the movement's founding father.

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[1] George C. Martin and Keith Wheeler (eds.), *Insights into Environmental Education* (Edinborough: Oliver & Boyd), p. 4.

The most influential thinkers of the early twentieth century were C. C. Fagg and G. E. Hutchings, whose *Introduction to Regional Surveying* (1930), outlined prototypical techniques for field work in conjunction with classroom studies, and John Dewey (1859-1952), who, in response to the arid and abstract formality of institutional learning, convinced educators of the importance of learning from concrete example and fostering observation skills in the young. After the second World War, environmental studies were adopted into many curricula as field courses in natural history, a rather docile cultural spasm fueled by a growing number of naturalists societies and adventurers' clubs.

During the same period, however, mounting pressure was being applied to conserve the countryside, and rebuild cities and towns in a manner more sensitive to human need and environmental quality. By the sixties, activism had become a way of life. University students in particular were increasingly involved and successful in advocating social change. As the resolution of racial problems and the Vietnam War seemed imminent, activists on American campuses sought other issues which needed an enlightened voice. Evidence of environmental degradation through growing industrialization, some lessons from Vietnam on the severe biological consequences of defoliation, and influential publications like Rachel Carson's *Silent Spring?* turned the attention of students and special interest groups to environmental concerns. The interests of the naturalist coincided with the demands of the political lobbyist to form a temporary alliance on behalf of the environment.

The activists became involved in environmental education during the late 1960's with the realization that technological solutions to diminishing resources merely treated the symptoms, and that the root causes of the

environmental crisis were related to human subjectivity: specifically, misguided public attitudes, beliefs, and values.[2] In order to be effective, any long term plan to influence the state of the environment must start by influencing people -- particularly children, whose attitudes toward the environment are still at the critical formative stage.[3]

At the same time, the power of education for instigating social change had been demonstrated by the action-oriented "teach-in" method popular on university campuses since the mid-sixties. Environmental issues were becoming a prominent teach-in topic, and words like "ecology" and "eutrophication" entered the vocabulary of lay people. The ecologists' voices were joined by economists, sociologists, even radical industrialists like the Club of Rome, each with their own interpretation of the doom[4] we were spelling for ourselves. Concern grew all over the world, until in 1970, a Nevada conference of the International Union for the Conservation of Nature and Natural Resources (IUCN) marked the formal birth of the environmental education movement. The following definition, drawn up at the conclusion of the conference, has been widely accepted:

> Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulating of a code of behaviour about issues concerning environmental quality.[5]

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[2] Yi-Fu Tuan, *Topophilia* (New Jersey: Prentice-Hall Inc., 1974), p. 2.

[3] R. D. Hess and J. D. Torney, *The Development of Political Attitudes in Children*, (New York: Aldine, 1967).

[4] Keith Wheeler recalls a short lived T.V. drama series, *Doomwatch*, created during the height of the environmental movement.

[5] International Union for Conservation of Nature and Natural Resources,"Final Report: Inter-

Following this conference, UNESCO formed an environmental education program, and several countries, including Canada, adopted its objectives as part of their educational policies. Because Canada has no agency governing education on a national scale, these guidelines were made available to provincial education ministries, which were free to accept or alter them as they saw fit. Today, some form of environmental education exists in every province, though its acceptance at the local level is highly variable.[6]

B. Key Characteristics of Environmental Education

Environmental education as described in the IUCN definition is not a subject. It is a style of education, applied in several subject areas, and at all levels, from pre-school to post secondary. It is a very broad-ranged and complex: E.P. Hart has listed no less than twenty five key characteristics of the environmental education, drawn from an extensive review of the literature.[7] Its most fundamental characteristics are all in some way radical:

Values Education: In addition to deepening the understanding of global ecological concepts, a central feature of environmental education is the notion that awareness and action require students to clarify their individual values. The emphasis on values education is perhaps the most controversial aspect of environmental education, but also the most important if it is to succeed in influencing the state of the environment.[8]

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national Working Meeting on Environmental Education and the School Curriculum", as quoted in Sean Carson, *Environmental Education: Principles and Practice* (London: Edward Arnold Ltd. 1978), p. vi.

[6] John O. Towler, "A Survey of Canadian Pre-Service Training in Environmental Education," in *Journal of Environmental Education* 12, No. 2, Winter 1980/81, pp. 12.

[7] E. P. Hart, "Identification of Key Characteristics of Environmental Education," in *Journal of Environmental Education* 13, No. 1, Fall 1981, pp. 12 - 16.

Experiences: Another characteristic is an emphasis on first hand experience, based on a belief that environmental values can be best internalized by increasing involvement and participation in the real world. Experience, rather than abstraction, is the basis of environmental learning. Thus bold new teaching techniques were advocated, from more frequent class excursions, to evolving learning spaces, mobile classrooms, and "schools without walls".[9] This has created some confusion and overlap with "outdoor" education, which is also concerned with the formulation of values, but is aimed more at survival skills, physical education and nature appreciation.

Practical Skills: Environmental education advocates a shift in emphasis from academic concerns toward the acquisition of practical skills, such as critical thinking, creativity, problem solving, and activism. The application of knowledge is as important as the knowledge for its own sake. Peter Sandman of the University of Michigan sees the goal of environmental education as producing "environmentally effective citizens". Such people must possess a global understanding of issues in the cultural, social, and biophysical environment; an awareness of environmental impacts of values and behavior; skills in battling for environmental quality and building new enriching institutions; an ability to communicate and teach others to become environmentally effective; and, above all, a motivation to act on the basis of their values.[10]

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[8] James A. Swan,"On Values Clarification," letter to the editors, in *Journal of Environmental Education* 12, No. 2, Winter 1980/81, pp. 42-43.

[9] Leonard B. Finklestein and Lisa W. Strick, "Learning in the City," in *Alternative Learning Environments*, (Stroudsburg, Penn: Dowden, Hutchinson & Ross, Inc., 1974), pp. 252-255.

[10] Peter M. Sandman, "Environmental Education in the University of Michigan," in *Selected*

Systems Thinking: Many environmental educators also call for an approach to integrating knowledge from all subject areas in a manner analogous to the integration of ecological systems.[11] Through systems thinking, they seek a spiritual, holistic wisdom in place of the anthropocentric, competitive and materialistic values fostered by the existing system of education.

In reviewing the effectiveness of environmental education over the last twenty years, we find that early writers were overly optimistic in their expectations. Trudi Volk, et.al, studied perceived accomplishment of fifteen environmental educational goals, based on the opinions of leading environmental educators in 1984. The study found that almost all goals were accomplished to a very little or no extent. The greatest success was in the category of "ecological foundations knowledge", while "citizenship action" goals, the impetus for the whole movement, and the basis of the Geddes conception, were considered least accomplished.[12] As a conservation strategy, environmental education has proven to be ineffective.

C. A Summary of Weaknesses of Environmental Education

The following summary is drawn from various criticisms of environmental education programs in North America and Britain.

Environmental Education Programs in North American Higher Education" (ed. by Arden L. Pratt, National Association for Environmental Education, 1974), p. 2.

[11] William Devall, "A Sense of Earth Wisdom," in *The Journal of Environmental Education* Vol. 16 No. 2, Winter 1984/85, pp. 1-3.

[12] Trudi L. Volk, et. al., "A National Survey of Curriculum Needs as Perceived by Professional Environmental Educators," p. 11.

Perhaps the greatest weakness of environmental education is that despite many attempts, its central maxim has not been proven. Research has not substantiated the claim that increased understanding or contact with nature leads to an environmental ethic, or that such an ethic will lead to a commitment or sacrifice for the sake of the environment.[13] Instead, it appears that concern and motivation are based more on "a feeling of personal efficacy" than on exposure or information.[14] And other factors, such as the diffusion of responsibility (where people have faith that experts and technology will save us) may be involved. In other words, the focus of environmental education on facts and contact is incomplete. Some means to improve efficacy and reduce diffusion effects are required.

The second major criticism of the traditional approach to environmental education is that attitudes learned during childhood may not be as stable as we assume. A study by Julie Honnold found that as members of the ecological generation (those growing up in the late sixties and early seventies during the explosion of environmental information and concern) gain in social responsibility, their environmental concern diminished significantly.[15] She concludes that if information presented during childhood does not necessarily maintain its effect on values in later life, then supplementary adult and community-oriented environmental education ought to be pursued more aggressively.

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[13] Peter Timmerman, "Is it possible to teach environmental ethics?" in Paul Wilkinson and Miriam Wyman (eds), *Environmental Challenges*, (London, Ont.: The Althouse Press, 1986), p. 7.

[14] James A. Swan,"On Values Clarification,"p. 42.

[15] Julie A. Honnold, "Age and environmental concern: some specification of effects," in *The Journal of Environmental Education*, Vol. 16 No. 1, Fall 1984, pp. 4-9.

The third major difficulty in instituting environmental education is related to the method by which it has been introduced. Education is among the most inertial of all institutions, protecting society's most stable values. Change in the schools is always met with resistance, and failure of the new is perhaps judged too harshly.[16] Recognizing this, proponents of environmental education were forced to compromise the radical thrust of environmental education and introduce it as special topics within the existing curriculum, to be taught in approximately the same manner. Even though teachers generally agree that active involvement instructional methods are the most effective, most continue to use passive involvement techniques, such as lectures and readings.[17] "Through this implementation scheme, environmental education has been limited by the theoretical structures and presuppositions of existing educational practices without generating its own theoretical basis."[18] This process of "curriculum infusion" contradicts the basic spirit of environmental education as a special method of instruction, and reduces its power and freshness to that of every other subject area.

Finally, environmental education arose during a period of perceived crisis, and as such is associated more with extreme environmental dysfunctions than a systematic knowledge of environment which could guide citizens in their day-to-day encounters. It was further hindered by the association with the environmental movement, which eventually developed a bad reputation

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[16] Sean Carson, *Environmental Education: Principles and Practice* (London: Edward Arnold Ltd. 1978), p. vi.

[17] K. E. Schwab, "Instructional methods: Their use and effectiveness in environmental education," in *Journal of Environmental Education*, Vol. 14 No. 4, Winter 1982/83, pp. 8-12.

[18] David W. Rejeski, "Children Look at Nature: Environmental Perception and Education," in *Journal of Environmental Education*, Vol. 13 No. 4, Summer 1982, p. 27.

as conservationists insisted on tactics of fear, guilt, and self-righteous omniscience in their public information campaigns.[19] These methods, though surprisingly effective in the first half of that decade, eventually bred apathy and resentment, turning the public against the gloomy environmentalists in spite of the dangers. Environmentalism was dismissed as a fad. As Spenser Havlick recalls, "Even by 1973 and 1974 the enthusiasm for environmental activity among youth has cooled in comparison to 1970 and 1971."[20] The advocates had moved on, their attention taken up by new manifestations of the same old problems of civil rights and imperialism. Others criticized the movement for trying to save frivolous scenery, while people were starving on their doorsteps. The positive benefits of conservation, such as cleaner air, better play environments, and lower energy costs, had been overwhelmed by the potential for disaster in the public mind. Conservation was sold as an obligation, rather than an opportunity, and as public concern wavered, the form of education motivated by that concern was easily dismissed.

Some secondary problems encountered by formal environmental education programs include:

The controversy over values education: Some claim that environmental education interferes with the "rightful" vehicles of moral instruction: the church and the family;

Competing sources of environmental knowledge: In a recent

[19] James Swan, "Behavior: Practice vs. Preach Syndrome", in *What Makes Education Environmental?* (ed. by Noel McInnis and Don Albrecht, Louisville: Data Courier Inc., and Washington: Environmental Educators Inc., 1975), p. 207.

[20] Spenser W. Havlick, *The Urban Organism: The City's Natural Resources form an Environmental Perspective,* (New York: Macmillan Publishing Co., Inc., 1974), p. 79.

survey, over 60% of the environmental knowledge of fifth year students came from non-formal sources, TV, radio, newspapers.[21] Formal programs are only now coming to recognize the influence of these sources.

Few urban examples: Environmental education tended to ignore the environments that children were most familiar with: the city and neighbourhood.[22] Ecology seemed to be something that applied to remote natural settings, incompatible with the places people live.

Corporate resistance, and underfunding: It received little funding from government, since it had only a short period of public support, and met with adversity from corporations, which in many cases were committing the sorts of crimes that environmental education argued against.[23]

Ineffective teachers and resource materials: Because of this minimal support structure, few programs are in place to train educators in the special skills required for environmental education.[24]

Difficulty in achieving systems thinking: working within the traditional method of hierarchically structured lessons and separate subject areas contradicts the free association of ideas required for systems thinking. Ivan Illich describes the traditional method: "Schools are designed on the assumption that there is a secret to everything in life; that the quality of life depends on knowing that

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[21] J. M. Richmond, "A Survey of the environmental knowledge of fifth year students in England," doctoral dissertation, the Ohio State University, 1976, quoted in A. W. Murch, "Public concern for environmental pollution," in *Public Opinion Quarterly* 35, 1971, pp. 100-106.

[22] Education Facilities Laboratories and the National Association of Elementary School Principals, *Learning about the Built Environment*, (New York: E.F.L. Ltd., 1974), p. 10.

[23] R. Thomas Tanner, *Ecology, Environment, and Education*, (Lincoln, Nebraska: Professional Educators Publications, Inc., 1974, p. 96.

[24] John O. Towler, "A Survey of Canadian Pre-Service Training in Environmental Education."

> secret; that secrets can be known only in orderly successions; and that only teachers can properly reveal these secrets. An individual with a schooled mind conceives of the world as a pyramid of classified packages accessible only to those who carry the proper tags."[25] Illich proposes a radical decentralization of education, in a form that uses the vast informational resources of the city as a learning network.

This thesis is concerned with one aspect of Illich's network: manipulating the physical form of the neighbourhood to enhance its contribution to experiential learning. The following chart shows how the difficulties encountered by formal environmental education programs can be overcome by taking the program out of the classroom and into the community:

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[25] Ivan Illich, *Deschooling Society*, in World Perspectives Series, Vol. 44, edited by Ruth Nanda Anshen, (New York: Harper and Row, 1971), p. 76, as quoted in C. Alexander et. al. , *A Pattern Language*, (New York, Oxford University Press, 1977), p. 101.

COMPARISON OF ATTRIBUTES OF FORMAL AND CASUAL ENVIRONMENTAL EDUCATION

Issue	Formal Environmental Education	Experiential Education
Method of Instruction	Widely introduced as a special topic within the existing curriculum, using traditional, passive methods of classroom teaching (Rejeski, 1982).	Active, self-initiated and self guided experiential learning through investigations and observations of the neighbourhood environment.
Focus	Because it was born in a time of perceived crisis, it retains its symptom-treating,problem-solving bias, focused on extremes (Rejeski, 1982).	Experience provides a more phenomological and holistic understanding of our place in nature (Rejeski 1982).
Activism	Based on the notion that increasing awareness guarantees the formation of an environmental ethic, and that ethics lead to action (Timmerman, 1986).	The same, but also incorporates as motivation a sense of personal efficacy and responsibility, which is assisted by engagement within the environment.
Values Education	Typically, values clarification techniques are used to help students become aware of their beliefs and encourage the formation of personal values. These have been criticized as an invasion of students' privacy, or a kind of forced client-centered therapy in which children are unaware of their rights, or afraid to exercise them (Bayer, 1980).	Controversies over values education are diminished by removing the teacher as guide. Community-centred environmental education is self-initiated, so values are more purely matter of private, personal discovery. The role of experiential education in values education is discussed in detail in the section on development.
Systems Thinking	Interdisciplinary "systems" thinking attempted within a subject-based method of instruction opposed to that way of thinking (Rejeski, 1982 and Illich, 1971).	Inconclusive, experiential learning leads more naturally to an integrated understanding of the world. Individuals can structure their own thought.

continued on next page.

COMPARISON OF ATTRIBUTES OF FORMAL AND CASUAL ENVIRONMENTAL EDUCATION . . . continued.

Issue	Formal Environmental Education	Experiential Education
Age Group	School age children.	Centered in the community, it has the potential to reach all age groups.
Resource Materials	Under-trained teachers and a paucity of quality, timely resource materials (Volk, 1984, and Towler, 1980).	People teach themselves, and use real life situations as a resource.
Funding	Chronic under-funding, and adversity from corporations (Tanner, 1974).	The preference for engaging environments increases the market value of educational neighbourhoods, thus providing a direct economic return on the investment.
Accommodating Change	The environmental education agenda is radical at its core, but education is among our most conservative intstitutions (Sean Carson, 1978).	Works through the design institutions, which thrive on novelty, and can more readily embrace radical notions.

Appendix C: Questionnaire

A. Design of the Questionnaire

In its first draft, the questionnaire consisted of questions drawn from a package of core questions developed by Kevin Lynch for UNESCO.[1] On the advice of the thesis committee, a shorter, clearer second draft was prepared, which removed "leading" questions and promised to ease the analysis of responses. This draft was pre-tested on a Grade Five student of Guyot School in Southdale, a community adjacent to Windsor Park. It performed well, highlighting the restrictive nature of her immediate neighbourhood, and its effects on her attitudes and behavior. The final questionnaire was revised to re-structure questions in which one response was obviously easier than another (i.e. where answering "yes" required you to qualify your answer, while answering "no" allowed you to skip ahead). Such questions risk testing motivation rather than attitudes. The final version also has the students indicate how long they have lived in the neighbourhood, since newcomers cannot be expected to have the level of involvement and knowledge possessed life-long residents.

A copies of the final questionnaire is found on the next few pages, followed by annotated map samples and detailed tabulated results.

---

[1] Kevin Lynch (ed.), *Growing up in Cities*, (Cambridge, Mass.: The MIT Press, and UNESCO, 1977).

Name: _____

How long have you lived in Windsor Park?
less than a year
_____ years (fill in the blank)
all my life

Evaluating Your Neighbourhood

I am a university student studying how to design outdoor places. I am interested in learning what you like and dislike about the outdoor places in your neighbourhood, where you go, and what activities you do outside. Your answers will help me understand how to make the neighbourhood a better place to live.

Instructions

There are ten questions on the following pages. Read each question carefully. Some will ask you to draw things, others will ask you to write a short paragraph, circle numbers, or put an 'X' in a box. Don't worry if you are not an artist for the drawing questions, just do your best, and label anything that you think I might not recognize. Use the back of the paper to finish your paragraphs if you run out of room. If you have any questions, just ask me or the teacher. Have fun: this is not a test!

1. From memory, please make a map of your neighbourhood, and circle your favorite places on it. This might include places where you take walks, play, shop, eat, meet friends, or anything else you like to do.

Now draw a dotted line on the map to show your route to school, and any other paths you use often. Label the places your paths lead to.

2. Please tell me which one of your favorite places in the neighbourhood you like most of all. Why do you like it best?

3. Where in the neighbourhood do you like least of all to be, and why?

4. Can you think of any places in the neighbourhood you admire and are proud of?

5. When you are outside, where do you spend most of your time?
(Choose one of the following places by putting an "X" beside it, or write your own where it says "other.")

Your yard
Your friend's yard
Street or bay
Back lane
Park
Playground
Riverbank
The bush
Other _____

What do you do there? _____

_____

_____

_____

To answer this next question, circle the number which seems most correct to you. "1" means there are many opportunities, "2" means there are a few, and "3" means there are none. If you don't know, circle "4".

6. Does your neighbourhood have places where you can:

	many	a few	none	don't know
a. Become stronger, faster, and more agile?	1	2	3	4
b. Laugh, cry, feel happy, or mad?	1	2	3	4
c. Explore and see how things work?	1	2	3	4
d. Make things, move things, and change things?	1	2	3	4
e. Meet with others and cooperate?	1	2	3	4
f. Be alone?	1	2	3	4
g. Compete with others and to win and lose?	1	2	3	4

Before you answer these questions, take a minute to imagine exploring the neighbourhood, looking for interesting places and things. Think about where you would go, how you would get there, and what you would see. Now go ahead and answer the questions.

7. Fascination is the feeling you get when something grabs your attention, and makes you curious to know more about it. Put an "X" in the box which best describes your fascination with the neighbourhood:

I think every part of the neighbourhood is fascinating.

Most places and things in the neighbourhood are fascinating to me.

There are only a few things in the neighbourhood that are fascinating.

The neighbourhood has nothing in it that I find fascinating.

Which places or things do you find most fascinating?

_____

_____

_____

_____

_____

_____

8. Put an "X" beside the sentence which best describes your freedom to get around the neighbourhood:

I feel free to go wherever I want to go in the neighbourhood.

I can go to most places in the neighbourhood, but some are off limits.

There are only a few places in the neighbourhood I can go.

Its hard for me to go anywhere in the neighbourhood.

Where are the places you can't go, and why can't you go there?

_____

_____

_____

_____

_____

_____

9. How frightening does each of the things in this list seem to you?

(Please number them in order from 1 to 10, putting "1" beside the most frightening thing, and a "10" beside the least frightening thing).

_____ Wild animals in the bush
_____ Getting lost
_____ Mean adults
_____ Mean teenagers
_____ Cemeteries
_____ Old, empty buildings
_____ The bush (or any other forest)
_____ Busy streets
_____ Trains
_____ The river

Are there any places too scary to explore? If so, where are they?

_____
_____
_____
_____

10. Is there anything else you think I should know about your neighbourhood? Do you have any ideas to improve it?

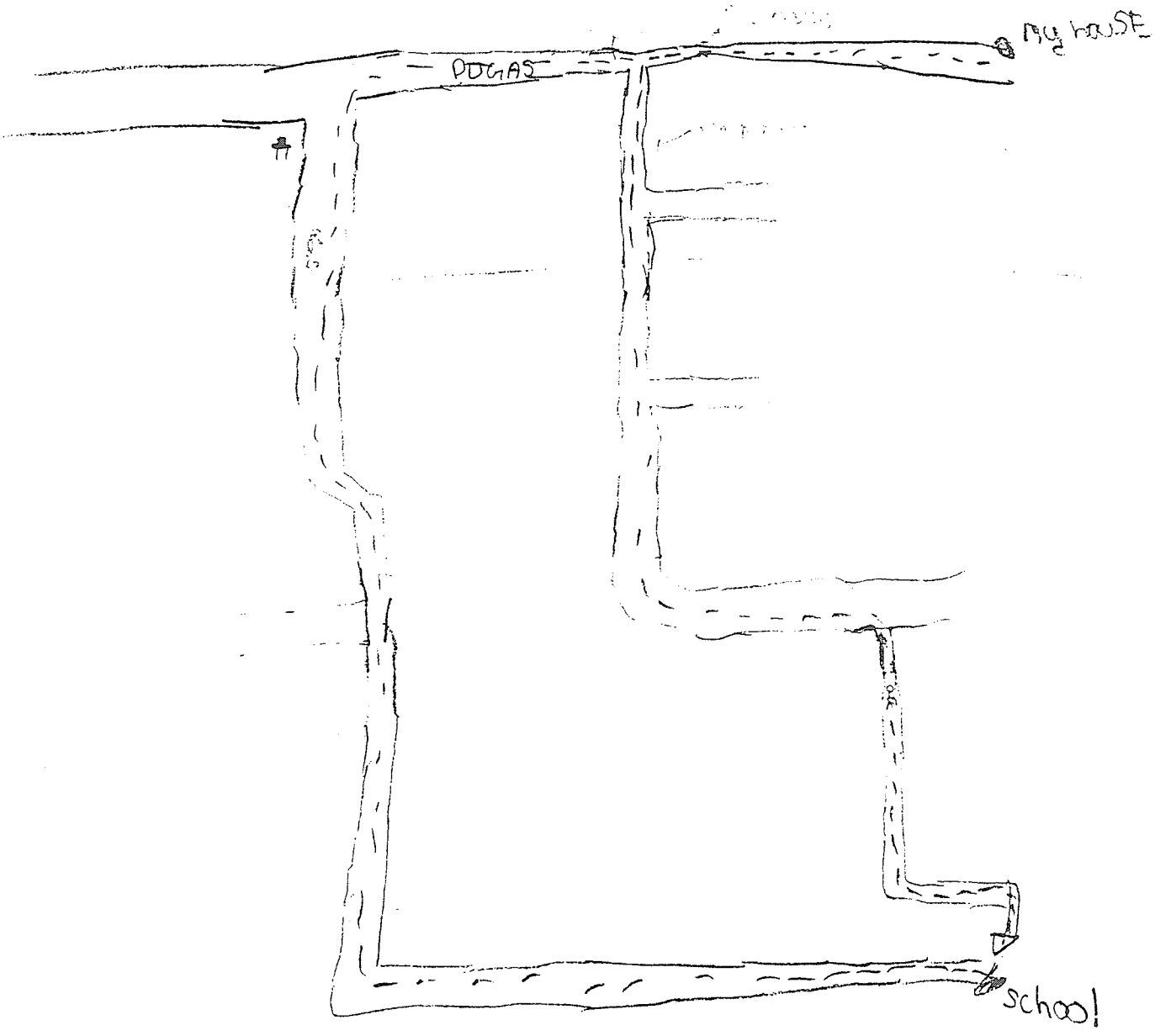
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

(use the back of the page if you need more space to write or draw)

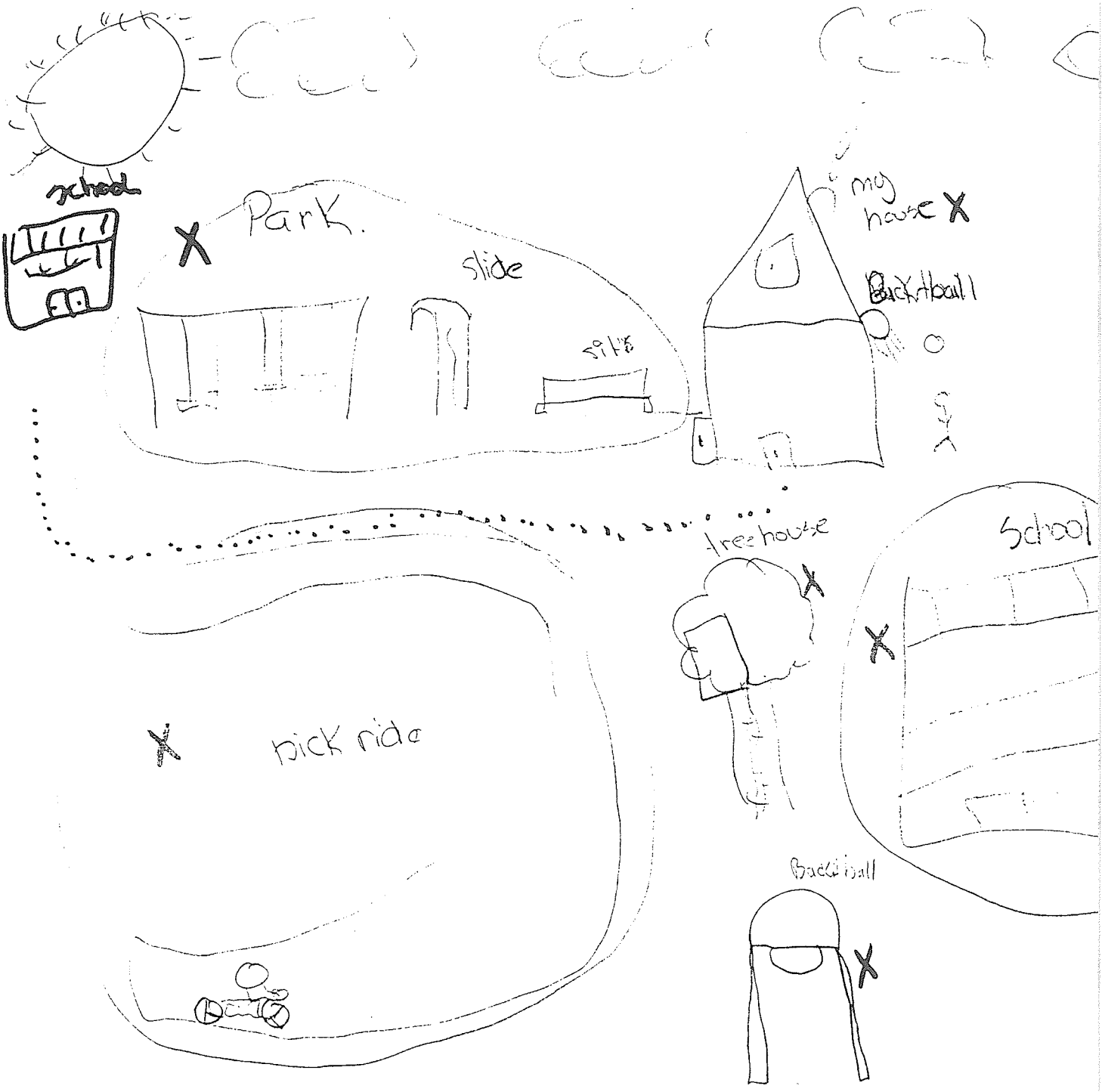
Thank you!

B. Map Samples

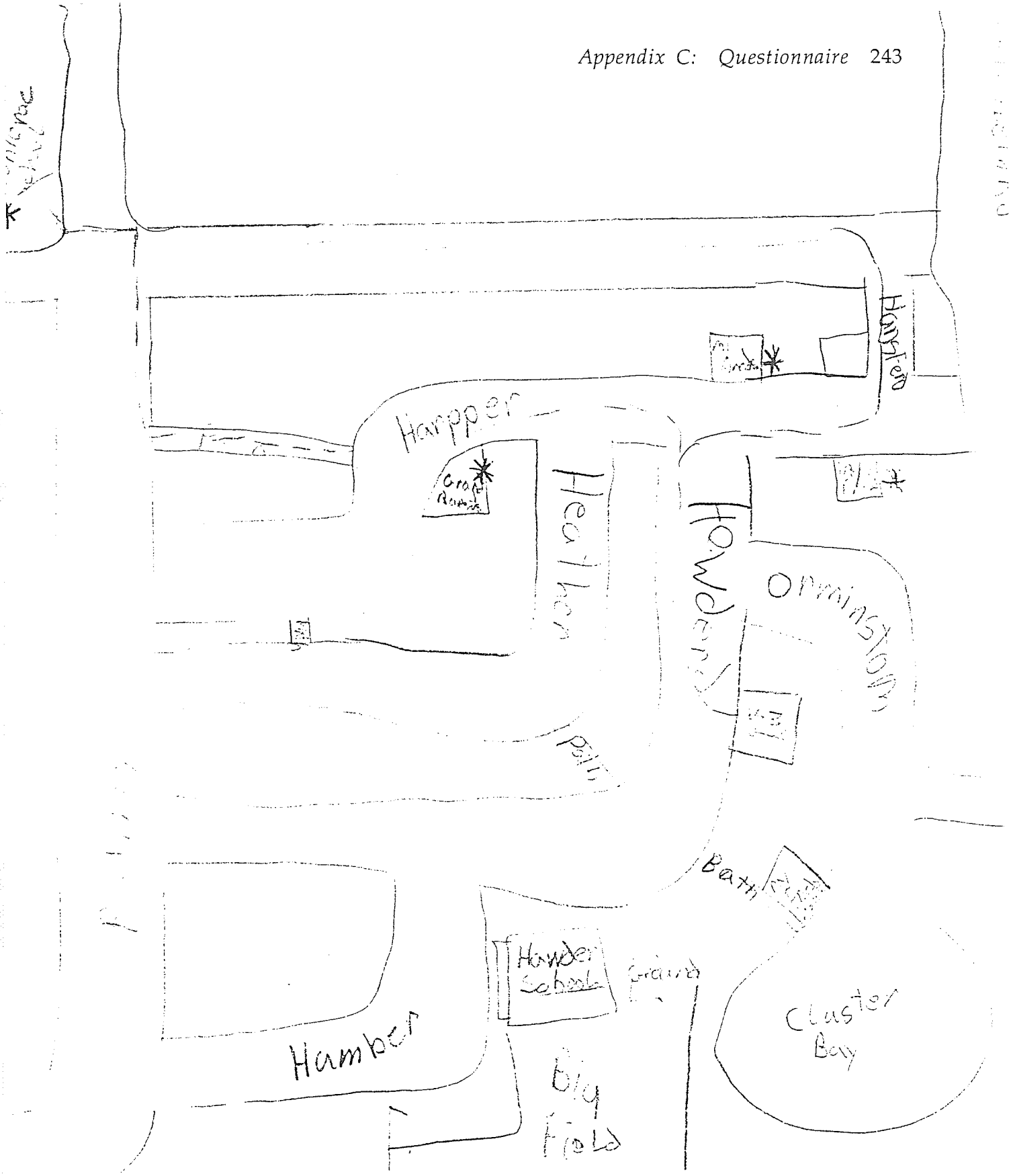
The following pages contain samples of the maps students drew in response to the Question 1. The type, sophistication, accuracy, range, and richness for each map is indicated in the accompanying text.



Map type - Sequential
Sophistication - Chain
Accuracy - Good
Max. distance - 200 m



Map type - Spatial
Sophistication - Scatter
Accuracy - Poor
Max. distance - 450 m



Map type - Sequential
Sophistication - Netted
Accuracy - Very good
Max. distance - 510 m

C. Tabulated Results

The tables provide a more detailed account of the results of the questionnaire and photography exercise than are presented in Chapter 5.

Tables for Maps

Table 1 lists the number of maps of each map type,the average accuracy, and average maximum distance depicted for the different sexes, vicinities and levels of familiarity. Class averages are also recorded. Table 2 concerns the map content more specifically, listing in categories the landmarks depicted and the average number of landmarks per drawing (referred to as "richness" in Chapter 5), again for sex, vicinity, and level of familiarity.

SEX		sequential map types					spatial map types					accuracy					mean range
	n	fragment	chain	loop	netted	sophist.	scatter	mosaic	linked	pattern	sophist.	VG	G	F	P	rating	in metres
Females	18	0	4	5	2	1.72	1	0	5	1	1.11	1	4	7	6	2.00	608
Males	13	0	2	2	8	3.23	0	0	1	0	0.23	5	4	3	1	3.00	741
Class	31	0	6	7	10	2.35	1	0	6	1	0.74	6	8	10	7	2.42	670

HOUSING AREA		sequential map types					spatial map types					accuracy					mean range
	n	fragment	chain	loop	netted	sophist.	scatter	mosaic	linked	pattern	sophist.	VG	G	F	P	rating	in metres
Apt. females	5	0	2	0	0	0.80	1	0	2	0	1.40	0	0	1	4	1.20	460
Apt. males	2	0	0	1	0	1.50	0	0	1	0	1.50	0	1	1	0	2.50	500
total	7	0	2	1	0	1.00	1	0	3	0	1.43	0	1	2	4	1.57	471
Betournay females	2	0	1	0	0	1.00	0	0	1	0	1.50	0	0	0	2	1.00	375
Betournay males	1	0	0	1	0	3.00	0	0	0	0	0.00	0	0	1	0	2.00	800
total	3	0	1	1	0	1.67	0	0	1	0	1.00	0	0	1	2	1.33	517
Wickham females	2	0	1	0	0	1.00	0	0	1	0	1.50	0	0	1	1	1.50	275
Wickham males	1	0	0	0	0	0.00	0	0	1	0	3.00	0	1	0	0	3.00	200
total	3	0	1	0	0	0.67	0	0	2	0	2.00	0	1	1	1	2.00	250
Maginot females	2	0	0	0	0	0.00	0	0	1	1	3.50	1	0	1	0	3.00	450
Maginot males	4	0	1	0	3	3.50	0	0	0	0	0.00	2	1	1	0	3.25	794
total	6	0	1	0	3	2.33	0	0	1	1	1.17	3	1	2	0	3.17	679
Howden females	1	0	0	0	1	4.00	0	0	0	0	0.00	0	1	0	0	3.00	500
Howden males	3	0	0	0	3	4.00	0	0	0	0	0.00	2	0	1	0	3.33	537
total	4	0	0	0	4	4.00	0	0	0	0	0.00	2	1	1	0	3.25	528
Vincent Massey females	5	0	2	2	0	2.00	0	0	1	0	0.60	0	0	3	2	1.60	900
Vincent Massey males	0	0	0	0	0	0.00	0	0	0	0	0.00	0	0	0	0	0.00	0
total	5	0	2	2	0	2.00	0	0	1	0	0.60	0	0	3	2	1.60	900
Frontenac females	4	0	0	3	1	3.25	0	0	0	0	0.00	0	3	1	0	2.75	500
Frontenac males	4	0	1	1	2	3.25	0	0	0	0	0.00	1	2	0	1	2.75	963
total	8	0	1	4	3	3.25	0	0	0	0	0.00	1	5	1	1	2.75	731

FAMILIARITY		sequential map types					spatial map types					accuracy					mean range
	n	fragment	chain	loop	netted	sophist.	scatter	mosaic	linked	pattern	sophist.	VG	G	F	P	rating	in metres
Long term residents	19	0	2	4	9	2.74	0	0	3	1	0.68	5	5	5	4	2.58	743
Short term residents	9	0	2	3	1	1.89	0	0	3	0	1.00	1	2	5	1	2.33	560
New residents	3	0	2	0	0	1.33	1	0	0	0	0.33	0	1	0	2	1.67	617
Class totals	31	0	6	7	10	2.35	1	0	6	1	0.74	6	8	10	7	2.42	670

Table 1. Results of map analysis.

MAP LANDMARKS

	Betournay n=3	Frontenac n=8	Howden n=4	Maginot n=6	V. Massey n=5	Wickham n=3	Females n=16	Males n=13	Class total n=29
Schools									
WPC Highschool	0	1	0	0	0	0	0	1	1
Beliveau School	0	0	0	0	1	0	1	0	1
PRC Highschool	0	0	0	2	0	2	2	2	4
Howden School	0	1	1	0	1	0	3	0	3
Frontenac School	2	8	2	5	4	2	14	10	24
sum	2	10	3	7	6	4	20	13	33
no. who mentioned school	2	8	2	5	4	3	16	10	24
% who mentioned school	67%	100%	50%	83%	80%	100%	100%	77%	83%
Commercial areas									
Convenience store	2	5	0	4	3	3	11	6	17
BiWay shopping centre	0	4	1	1	2	0	3	5	8
IGA shopping centre	0	2	0	1	0	0	1	2	3
Gas station	0	0	0	1	0	0	0	1	1
sum	2	11	1	7	5	3	15	14	29
no. mention commercial	2	6	1	4	4	3	13	7	20
% mention commercial	67%	75%	25%	67%	80%	100%	81%	54%	67%
Recreation Facilities & clubs									
Outdoor pool	3	0	0	1	1	0	3	2	5
Bonivital pool	0	0	0	0	1	0	1	0	1
Winakwa C.C.	1	0	0	0	0	0	1	0	1
Tennis courts	0	0	0	1	0	0	0	1	1
Dance club	1	0	0	0	0	0	1	0	1
Maginot track	0	0	0	1	0	1	1	1	2
sum	5	0	0	3	2	1	7	4	11
no. mention rec.	3	0	0	2	1	1	4	3	7
% mention rec.	100%	0%	0%	33%	20%	33%	24%	23%	27%
Designated open space									
Playground	0	5	1	2	2	0	7	3	10
Park	2	4	1	0	4	3	10	5	15
Sports field	0	0	1	0	0	0	0	1	1
sum	2	9	3	2	6	3	17	9	26
no. mention open space	2	7	2	2	5	3	13	8	21
% mention open space	67%	88%	50%	33%	100%	100%	81%	62%	72%

continued on next page

Table 2. Mention rates for map landmarks.

MAP LANDMARKS continued.

Undesignated open space									
Monkey trails	0	0	0	1	0	0	0	1	1
River	0	1	0	0	0	0	0	1	1
Bushes	0	0	0	2	0	0	1	1	2
Railroad tracks	0	1	0	2	0	0	1	2	3
Parking lot	1	0	0	0	0	0	0	1	1
sum	1	2	0	5	0	0	2	6	8
no. mention undesig.	1	1	0	3	0	0	2	3	5
% mention undesig.	33%	13%	0%	50%	0%	0%	13%	23%	17%
Other institutions									
Drop In Centre	0	1	0	0	0	0	0	1	1
Church	0	1	0	0	0	0	1	0	1
Fire hall	0	1	0	0	0	0	1	0	1
Library	0	1	0	0	3	0	4	0	5
sum	0	4	0	0	3	0	6	1	8
no. mention institutions	0	3	0	0	3	0	5	1	6
% mention institutions	0%	38%	0%	0%	60%	0%	31%	8%	21%
Housing									
Apartment blocks	0	0	0	1	0	0	1	0	1
Townhouses	0	0	0	1	1	2	2	2	4
Neighbours's houses	0	0	2	2	1	0	4	1	5
Friends' houses	1	3	1	0	3	0	5	3	7
Grandparent's house	0	0	0	0	1	0	1	0	1
sum	1	3	3	4	6	2	13	6	18
no. mention housing	1	3	3	3	5	2	11	6	17
% mention housing	33%	38%	75%	50%	100%	67%	69%	46%	59%
MAP RICHNESS	4.33	4.88	2.50	4.67	5.60	4.33	4.44	4.08	4.29

(average no. of landmarks per drawing)

Table 2. Mention rates for map landmarks.

Questionnaire Tables

In most cases, the results for each question are located on a separate page. Questions 6 and 7, however, are combined as Table 7 to save paper. The responses to open-ended questions have been organized into categories, for which percentages have been calculated. Because so many of the students gave multiple responses to the open ended questions, the percentages are based on the *total number of responses,* not the number of students in the sample. For example, the females (n=14) gave 13 responses in the category of "Exploring/Playing Opportunities"for suggested improvements to the neighbourhood (Table 10). This doesn't mean that 13/14 = 93% of the females want more opportunities to explore, because each of them gave on average 2.50 responses to the question, and there is a better than even chance that the multiple responses were in the same category. Instead, the percentages are calculated by dividing the number of responses per category by the total number of responses, to give the percentage of responses devoted to each category -- in this case, 13/35 = 37%.

Most liked places	Long term n=15		Short term n= 5		New n=3		Females n=14		Males n=9		Class n=23	
	Responses	%	Responses	%	Responses	%	Responses	%	Responses	%	Responses	%
Total number of responses	17		5		3		16		9		25	
Average responses per student	1.13		1.00		1.00		1.14		1.00		1.09	
Formal/Official Open Space												
Playgrounds	3		1		0		3		1		4	
Park	1		1		1		3		0		3	
Bike trails	1		0		0		1		0		1	
	5	29%	2	40%	1	33%	7	44%	1	11%	8	32%
Home and Homesite												
Home/Backyard	2		1		1		0		4		4	
Friend's house	1		1		0		1		1		2	
	3	18%	2	40%	1	33%	1	6%	5	56%	6	24%
Institutions & Community Facilities												
Maginot	3		0		0		2		1		3	
Outdoor pool	1		0		0		1		0		1	
Dance club	1		0		0		1		0		1	
Winakwa Community Club	0		0		1		1		0		1	
	5	29%		0%	1	33%	5	31%	1	11%	6	24%
Commercial Areas												
Local convenience store	4	24%	0	0%	0	0%	2	13%	2	22%	4	16%
Unofficial Open Space												
Bridge by home	0	0%	1	20%	0	0%	1	6%	0	0%	1	4%
		100%		100%		100%		100%		100%		100%

Table 3. Most liked places.

Least liked places	Long term n=15		Short term n= 5		New n=3		Females n=14		Males n=9		Class n=23	
	Responses	%	Responses	%	Response	%	Responses	%	Responses	%	Responses	%
Total number of responses	16		5		4		16		9		25	
Average responses per student	1.07		1.00		1.33		1.14		1.00		1.09	
Streets and Associated Space												
My street	1		0	0	1		2		0		2	
Alleys	2		0	0	0		2		0		2	
Path (at night)	1		0		1		2		0		2	
	4	25%	0	0%	2	50%	6	38%	0	0%	6	24%
Designated Open Space												
Empty park	0		1		1		0		2		2	
Dangerous playground equipment	0		1		0		0		1		1	
Playground (big kids)	0		1		0		1		0		1	
	0	0%	3	60%	1	25%	1	6%	3	33%	4	16%
Community Facilities												
Pierre Radisson Collegiate	2		0		0		1		1		2	
Frontenac School	1		0		0		0		1		1	
	3	19%	0	0%	0	0%	1	6%	2	22%	3	12%
Home and Homesite												
Neighbours	2	13%	0	0%	0	0%	0	0%	2	22%	2	8%
Commercial Areas												
BiWay store	2	13%	0	0%	0	0%	0	0%	2	22%	2	8%
Haunted house/scary bldg.	1	6%	1	20%	0	0%	2	13%	0	0%	2	8%
Drug user's territory (location varies)	1	6%	0	0%	0	0%	1	6%	0	0%	1	4%
Nothing	3	19%	1	20%	1	25%	5	31%	0	0%	5	20%
		100%		100%		100%		100%		100%		100%

Table 4. Least liked places.

Admired places	Long term n=15		Short term n= 5		New n=3		Females n=14		Males n=9		Class n=23	
	Responses	%	Responses	%	Responses	%	Responses	%	Responses	%	Responses	%
Community Facilities												
Maginot	0		1		0		0		1		1	
Frontenac School	1		0		1		2		0		2	
Windsor Park Collegiate	1		0		0		0		1		1	
Outdoor pool	1		0		0		1		0		1	
Winakwa Community Club	0		0		1		1		0		1	
	3	20%	1	20%	2	67%	4	29%	2	22%	6	26%
Home and Homesite												
Home/backyard	2		1		0		3		0		3	
Backyard pool	1		0		0		1		0		1	
	3	20%	1	20%	0	0%	4	29%	0	0%	4	17%
Formal Open Space												
Beliveau field	1		0		0		0		1		1	
Places shared with friends	1		0		0		1		0		1	
	2	13%	0	0%	0	0%	1	7%	1	11%	2	9%
Bush/field	0	0%	1	20%	0	0%	0	0%	1	11%	1	4%
Exchange District street	0	0%	1	20%	0	0%	1	7%	0	0%	1	4%
Nowhere	7	47%	0	0%	1	33%	4	29%	5	56%	8	35%
No response	0	0%	1	20%	0	0%	0	0%	0	0%	1	4%
		100%		100%		100%		100%		100%		100%

Table 5. Admired places.

Where most time is spent:	Long term n=15		Short term n= 5		New n=3		Females n=14		Males n=9		Class n=23	
	Responses	%	Responses	%	Responses	%	Responses	%	Responses	%	Responses	%
Your yard	7	47%	0	0%	1	33%	4	29%	4	44%	8	35%
Park	2	13%	1	20%	2	67%	3	21%	2	22%	5	22%
Your friend's yard	2	13%	2	40%	0	0%	3	21%	1	11%	4	17%
Street or bay	2	13%	0	0%	0	0%	2	14%	0	0%	2	9%
Playground	1	7%	0	0%	0	0%	1	7%	0	0%	1	4%
Other (fields)	1	7%	0	0%	0	0%	0	0%	1	11%	1	4%
Riverbank	0	0%	1	20%	0	0%	1	7%	0	0%	1	4%
Other (the "monkey trails")	0	0%	1	20%	0	0%	0	0%	1	11%	1	4%
		100%		100%		100%		100%		100%		100%
Activities:												
Total number of responses	28		5		4		23		14		37	
Average responses per student	1.87		1.00		1.33		1.64		1.56		1.61	
Ball Games												
Baseball	4		1		0		2		3		5	
Soccer	2		0		0		0		2		2	
Play catch	2		0		0		0		2		2	
Basketball	1		0		0		1		0		1	
Hockey	1		0		0		0		1		1	
Football	1		0		0		0		1		1	
Sports in general	1		0		0		1		0		1	
	12	43%	1	20%	0	0%	4	17%	9	64%	13	35%
General Outdoor Play & Games												
Use play equipment	2		1	20%	1	25%	2	9%	2	14%	4	11%
Play with friends (general)	2		1		0		3		0		3	
Gymnastics	2		0		0		2		0		2	
Swim	1		0		1		2		0		2	
Hide & seek	1		0		0		1		0		1	
Play with dog	1		0		0		1		0		1	
Play in sand	1		0		0		0		1		1	
	10	36%	2	40%	2	50%	11	48%	3	21%	14	38%
Solitary Activities												
Look at water	0		1		0		1		0		1	
Study	1		0		0		1		0		1	
Sit and think	1		0		0		1		0		1	
Mow the lawn	1		0		0		0		1		1	
Tan	0		0		1		1		0		1	
	3	11%	1	20%	1	25%	4	17%	1	7%	5	14%
Mobile Play												
Ride bike	1		1		0		1		1		2	
Walk around	1		0		0		1		0		1	
	2	7%	1	20%	0	0%	2	9%	1	7%	3	8%
Social Activities												
Talk	1		0		0		1		0		1	
Picnic	0		0		1		1		0		1	
	1	4%	0	0%	1	25%	2	9%	0	0%	2	5%

Table 6. Most frequented places activities.

6. Are there places where you can	Long term n=15 Responses	Short term n= 5 Responses	New n=3 Responses	Females n=14 Responses	Males n=9 Responses	Class n=23 Responses
Meet with others and cooperate	1.80	1.50	1.00	1.75	1.5	1.65
Be alone	1.27	1.60	1.67	1.21	1.67	1.39
Compete with others and win and lose	1.54	1.20	0.67	1.27	1.44	1.34
Stonger, faster, more agile	1.36	1.20	0.33	1.23	1.11	1.18
Make things,move things, change things	1.17	1.00	1.00	1.23	0.92	1.11
Laugh, cry, feel happy, or mad	1.36	0.67	0.33	1.10	1.11	1.10
Explore and see how things work	0.92	1.20	1.33	0.91	1.22	1.03

many = 2.00
a few = 1.00
none = 0.00
don't know = no entry

7. Neighbourhood Fascination Rat	Long term n=15 1.27	Short term n= 5 1.00	New n=3 1.00	Females n=14 1.21	Males n=9 1.11	Class n=23 1.18

every part = 3.00
most places = 2.00
a few places = 1.00
nowhere = 0.00

What's most fascinating?	Long term n=15 Responses	%	Short term n= 5 Responses	%	New n=3 Responses	%	Females n=14 Responses	%	Males n=9 Responses	%	Class n=23 Responses	%
Total number of responses	32		5		7		23		21		44	
Average responses per student	2.13		1.00		2.33		1.64		2.33		1.91	
Designated Open Space												
Park (when there are people there)	4		0		1		3		2		5	
Playgrounds	1		0		0		0		1		1	
Watching sports in park	0		0		1		0		1		1	
	5	16%	0	0%	2	29%	3	13%	4	19%	7	16%
Woodlots & Plant material												
Trees	2		0		1		1		2		3	
Bushes in backyard	1		0		0		1		0		1	
Flowers in yards	1		0		0		1		0		1	
	4	13%	0	0%	1	14%	3	13%	2	10%	5	11%
Home & Homesite												
Friend's house	1		2		1		2		2		4	
Yards	2		0		0		1		1		2	
Other peoples homes	1		0		0		1		0		1	
	4	13%	2	40%	1	14%	4	17%	3	14%	7	16%

continued on next page.

Table 7. Perceived Opportunities and Fascination

7. Fascination continued . . .

Community Facilities												
School	2		0		1		2		1		3	
Running track	2		0		0		1		1		2	
Swimming pool	1		0		0		1		0		1	
Winakwa Community Centre	0		0		1		1		0		1	
	5	16%	0	0%	2	29%	5	22%	2	10%	7	16%
Commercial Areas	3	9%	1	20%	0	0%	1	4%	3	14%	4	9%
Streets & Associated Spaces												
Streets	2		0		0		2		0		2	
Paths	2		0		0		1		1		2	
	4	13%	0	0%	0	0%	3	13%	1	5%	4	9%
Unofficial Open Space												
Fields	1		0		0		0		1		1	
The bush	0		1		0		0		1		1	
Winter snow piles for digging	0		1		0		0		1		1	
	1	3%	2	40%	0	0%	0	0%	3	14%	3	7%
Animals/Pets												
Watching my dog do tricks	1		0		0		1		0		1	
Horses	0		0		1		1		0		1	
	1	3%	0	0%	1	14%	2	9%	0	0%	2	5%
Other Elements & Places												
Old abandoned house	1		0		0		1		0		1	
Fences	1		0		0		0		1		1	
Plastic spider in neighbour's yard	1		0		0		0		1		1	
Excavations	1		0		0		1		0		1	
Hiding spots	1		0		0		0		1		1	
	5	16%	0	0%	0	0%	2	9%	3	14%	5	11%
		100%		100%		100%		100%		100%		100%

Table 7. Perceived Opportunities and Fascination

	Long term n=15 Responses	%	Short term n=6 Responses	%	New n=3 Responses	%	Females n=15 Responses	%	Males n=10 Responses	%	Class n=25 Responses	%
8. Access Rating (4=limited 1=free	1.92		2.80		2.67		2.14		2.44		2.21	
free to go anywhere = 3.00												
free to go most places = 2.00												
can go only a few places = 1.00												
hard to go anywhere = 0.00												
Places of restriced access:												
Total number of responses	16		6		3		15		10		25	
Average responses per person	1.07		1.20		1.00		1.07		1.11		1.09	
Nowhere	2	13%	4	67%	3	100%	5	33%	4	40%	9	36%
Dangerous Groups of People												
Beliveau (teenagers)	1		0		0		1		0		1	
Mac's at night (strangers)	2		0		0		2		0		2	
Alleys (creeps)	1		0		0		1		0		1	
Friends parents don't know	1		1		0		0		2		2	
	5	31%	1	17%	0	0%	4	27%	2	20%	6	24%
Home & Homesite												
Others property	3	19%	0	0%	0	0%	1	7%	2	20%	3	12%
Dangerous Places												
Construction sites	1		0		0		1		0		1	
Pool (parents say its dangerous)	1		0		0		1		0		1	
Playgrounds	0		1		0		0		1		1	
	2	13%	1	17%	0	0%	2	13%	1	10%	3	12%
Street & Associated Spaces												
Highway or road bu K-Mart	1		0		0		1		0		1	
IGA (dangerous traffic on route)	1		0		0		1		0		1	
	2	13%	0	0%	0	0%	2	13%	0	0%	2	8%
Distant Places												
Downtown	1		0		0		0		1		1	
Past the school ground (might get lost	1		0		0		1		0		1	
	2	13%	0	0%	0	0%	1	7%	1	10%	2	8%
		100%		100%		100%		100%		100%		100%

Table 8. Perceived access.

9. Frightening Things	Long term n=15		Short term n= 5		New n=3		Females n=14		Males n=9		Class n=23	
	Total	Rank	Total	Rank	Total	Rank	Total	Rank	Total	Rank	Total	Rank
Mean adults	61	3	15	1	7	1	55	2	28	1	83	1
mean teenagers	51	2	22	3	17	4	58	3	32	2	90	2
Getting lost	48	1	26	6	18	6	50	1	42	5	92	3
Cemeteries	64	4	24	4	12	3	63	5	37	3	100	4
Wild animals in the bush	72	5	17	2	11	2	61	4	39	4	100	5
Old empty buildings	92	6	24	5	20	8	77	6	59	7	136	6
The bush	109	9	28	7	22	9	96	7	63	8	159	7
Trains	107	7	38	9	17	5	99	8	63	9	162	8
Busy streets	107	8	44	10	18	7	111	10	58	6	169	9
The river	114	10	37	8	23	10	100	9	74	10	174	10

Totals are the sum of each student's rankings.

Too scary to explore:

Total number of responses	15		7		5		18		9		27	
Average responses per student	1.00		1.40		1.67		1.29		1.00		1.17	
No place	6	40%	2	29%	2	40%	4	22%	6	67%	10	37%
Cemeteries	5	33%	2	29%	0	0%	4	22%	3	33%	7	26%
The river	2	13%	0	0%	1	20%	3	17%	0	0%	3	11%
Where mean people go	1	7%	0	0%	1	20%	2	11%	0	0%	2	7%
Old empty buildings	0	0%	1	14%	1	20%	2	11%	0	0%	2	7%
Maginot track at night (mean people)	1	7%	0	0%	0	0%	1	6%	0	0%	1	4%
Forests	0	0%	1	14%	0	0%	1	6%	0	0%	1	4%
Alleys	0	0%	1	14%	0	0%	1	6%	0	0%	1	4%
		100%		100%		100%		100%		100%		100%

Table 9. Fears.

Comments & Suggestions	Long term n=37 Responses	%	Short term n=10 Responses	%	New n=8 Responses	%	Females n=35 Responses	%	Males n=20 Responses	%	Class n = 55 Responses	%
Total number of responses	37		10		8		35		20		55	
Average responses per student	2.47		2.00		2.67		2.50		2.22		2.39	
Formal Recreational Facilities												
More convenient swimming pools	5		0		0		4		1		5	
More play equipment	1		1		0		1		1		2	
Basketball court nearby	1		0		0		0		1		1	
Roller skating rink	1		0		0		1		0		1	
Fun house	1		0		0		1		0		1	
Football field	0		1		0		0		1		1	
Hockey rink	0		1		0		0		1		1	
Baseball field	0		1		0		0		1		1	
More fairs	0		0		1		1		0		1	
	9	24%	4	40%	1	13%	8	23%	6	30%	14	25%
Exploring/ Playing Opportunites												
More bike paths	6		0		0		5		1		6	
More parks	1		1		1		2		0		3	
Put in more bushes	1		1		0		1		1		2	
More animals	1		0		1		2		0		2	
More trees	0		1		1		1		1		2	
Underground mazes & tunnels	1		0		0		0		1		1	
Free bikes	1		0		0		1		0		1	
Lake	1		0		0		1		0		1	
	12	32%	3	30%	3	38%	13	37%	4	20%	18	33%
Commercial Areas												
Malls	3		0		1		4		0		4	
More Mac's	1		1		0		1		1		2	
Remove BiWays	1		0		0		0		1		1	
	5	14%	1	10%	1	13%	5	14%	2	10%	7	13%
Aesthetic Concerns												
New houses	1		0		0		0		1		1	
Pick up all garbage	0		0		1		2		0		1	
	1	3%	0	0%	1	13%	2	6%	1	5%	2	4%
Safety Concerns												
Lights along dark paths	1		0		0		1		0		1	
Fewer alleys	1		0		0		1		0		1	
More stop signs	1		0		0		0		1		1	
	3	8%	0	0%	0	0%	2	6%	1	5%	3	5%

continued on next page . . .

Table 10. Comments and suggestions.

10. Comments & Suggestions continued.

Social Concerns												
Remove bullies from Macs	2		0		0		0		2		2	
Make others more friendly	0		0		1		0		1		1	
Bullies and teens hang out at Belivea	1		0		0		1		0		1	
Big kids are dangerous	1		0		0		1		0		1	
More kids near home	0		0		1		1		0		1	
Lots of money	1		0		0		1		0		1	
	5	14%	0	0%	2	25%	4	11%	3	15%	7	13%
Remove schools	1	3%	0	0%	0	0%	0	0%	1	5%	1	2%
No more patrols	0	0%	1	10%	0	0%	0	0%	1	5%	1	2%
Bigger yards	1	3%	0	0%	0	0%	1	3%	0	0%	1	2%
No comment	0	0%	1	10%	0	0%	0	0%	1	5%	1	2%
		100%		100%		100%		100%		100%		100%

Table 10. Comments and suggestions.

Appendix D:
Photography Exercise

A. Design of the Photography Exercise

The photography exercise was included as part of the background research for the demonstration plan after some initial reluctance on the part of the committee. It was feared that the complexity of operating a camera and understanding the intent of the exercise might falsify the data in a manner difficult to detect. The most popular alternative was a photo sorting exercise, where the students would be supplied with a series of "objective" photographs of the neighbourhood and asked to sort them from most to least fascinating. This was pursued for a few weeks, but eventually rejected for several reasons. First, scanning a two-dimensional photograph for sources of interest is a different experience than exploring a real setting.[1] Second, objectivity in taking the photos was nearly impossible to attain; the compositions are bound to reveal the biases of the photographer. Third, some subjects make interesting photographs but are not interesting otherwise. Supplying photographs may invite the children to judge interest in purely visual terms. Finally, it became clear while taking photos that the students reactions could be anticipated with with a fairly high degree of confidence; in other words, this kind of exercise had little potential for supplying new information. Thus it was decided that despite the risks, the technique of having the children select the fascinating stimuli *from the environment* was superior, and offered useful, possibly surprising information provided that the exercise was clearly explained and followed by a brief interview with the students involved. Copies of the exercise instruction sheets, sample photographs and tabulated results follow.

---

[1] Tom Porter and Sue Goodman, *Designer Primer*, (New York: Charles Scribner's Sons, 1988) pp. 16-17.

Exploring the Neighbourhood with a Camera

You have been chosen to be photographers of the neighbourhood! You will each get a disposable camera to use, and you will be shown how to use it. The exercise is very simple:

1. One afternoon this weekend, take the camera and wander through the neighbourhood along the routes you normally travel.

2. Take pictures of any **interesting** places and things you see along the way. "Interesting" means something that stands out from the surroundings, and excites your curiosity.

3. Be sure to use the whole roll of film (take all 24 pictures).

4. Bring the camera back to school on Monday, and give it to Mrs. Keller. She will put your name on the camera.

Next week, I will have two sets of prints made. You will get a set or your pictures to keep, and I will keep a set for myself.

Here are some tips:

- Make sure you do this exercise in the afternoon, because its too dark to take pictures in the evening.

- Don't go out with any special destinations in mind. Just walk through the areas you normally use.

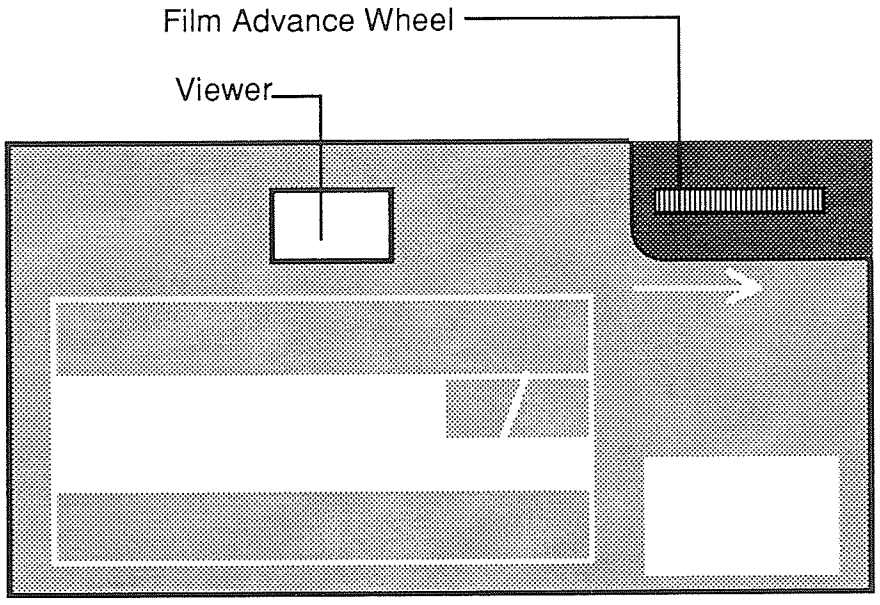
- Take pictures of things which are interesting **to you**, not what you think other people will be interested in.

- If you have any trouble with the camera, don't worry. First, double check that you have not run out of film, or that you have not forgotten to wind the film ahead after you snapped a photo. If it still doesn't work, just hand it in on Monday, and explain to Mrs. Keller what happened.

How to use the Cameras

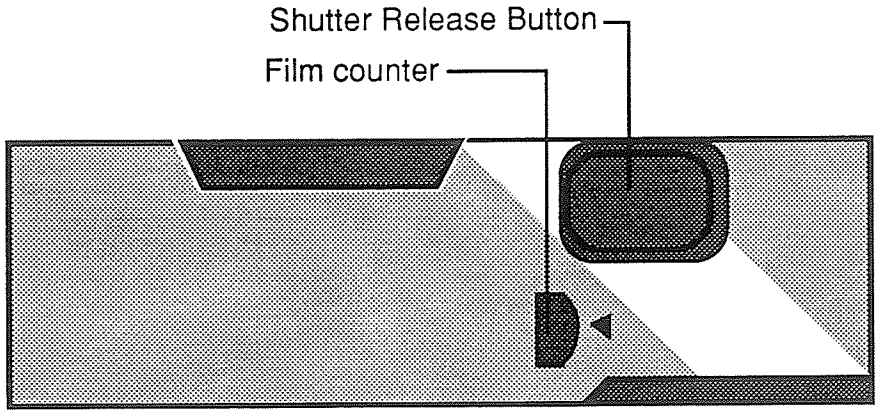
1. Just before you go outside to do the exercise, unwrap the camera.

2. Find the **film advance wheel** on the back of the camera. Turn it to the right (in the direction of the white arrow) until it stops.



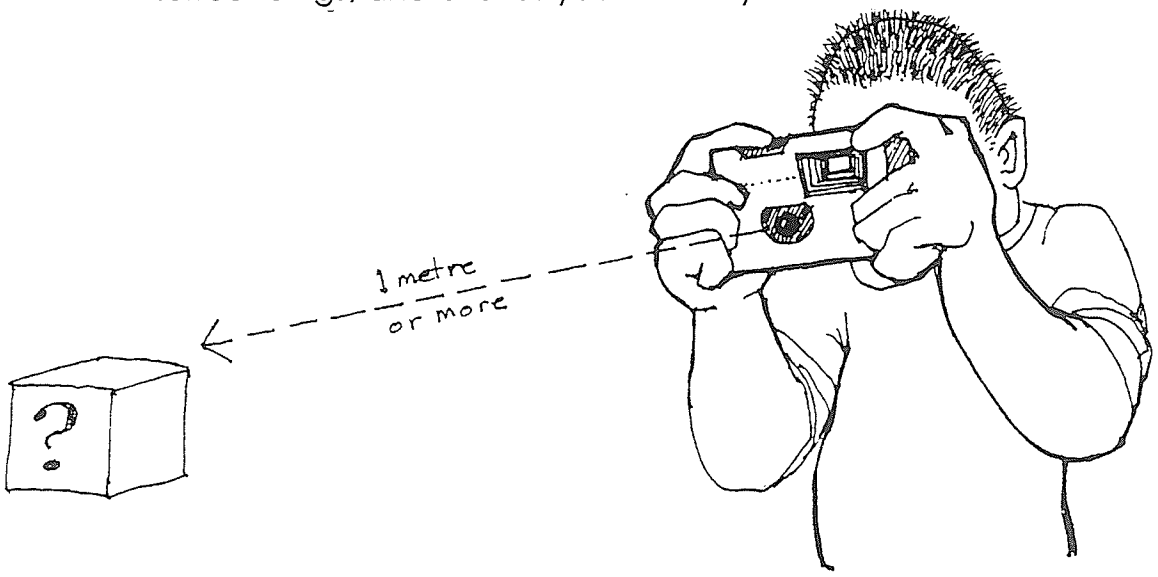
The back of the camera looks like this.

3. Look at the top of the camera. The **film counter** should be at "24". This means you have 24 pictures left to take. Now go out walking around.



The top of the camera looks like this.

4. Remember: You are supposed to take pictures of any **interesting** places and things you discover along your normal routes through the neighbourhood. "Interesting" means something that stands out from the surroundings, and excites your curiosity.



5. Look through the **viewer** on the back of the camera at the thing you want to take a picture of. Hold the camera so that your fingers are away from the lens. One finger should be on the **shutter release button** on the top of the camera.

6. Don't get too close to the thing you are photographing. Always stand at least two or three steps (one metre) away from it.

7. Now hold the camera steady and press the **shutter release button**.

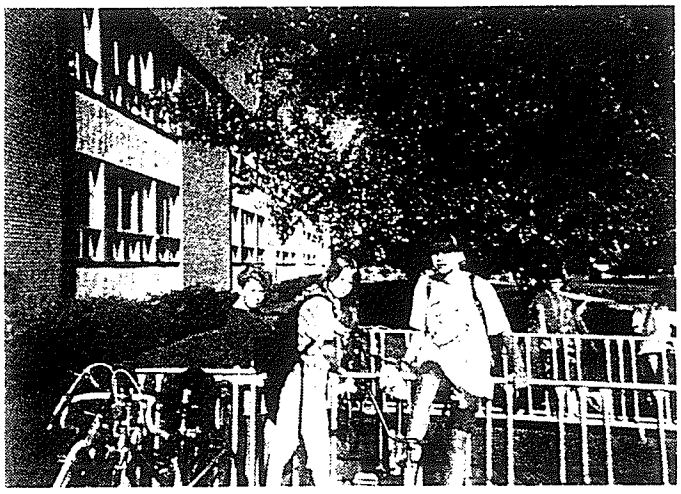
8. Wind the **film advance wheel** until it stops, and you are ready to shoot again! If you forget to wind it, you won't be able to press the **shutter release button.**

9. When you have taken 24 pictures, the **film counter** will read "0." You are done. Just turn the winder until the letter "E" appears in the counter, and return the camera to Mrs. Keller on Monday.

Thank you very much, and happy shooting.

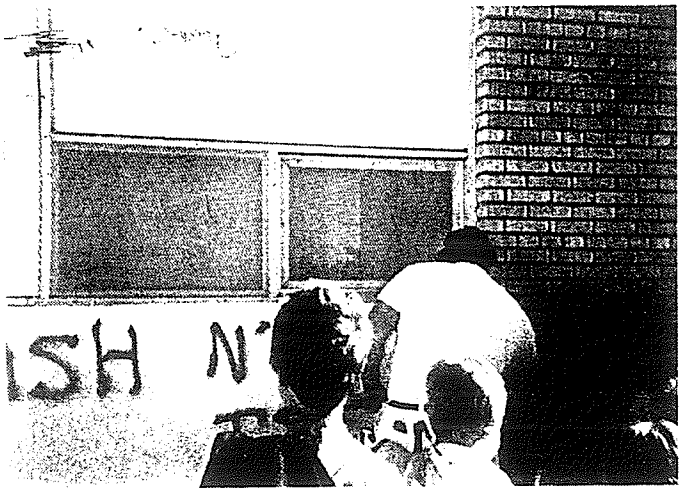
B. Photography Samples

The following pages contain samples of the photographs taken by the students participating in this exercise. They were chosen to illustrate the range of interests and keen observation skills of the students.

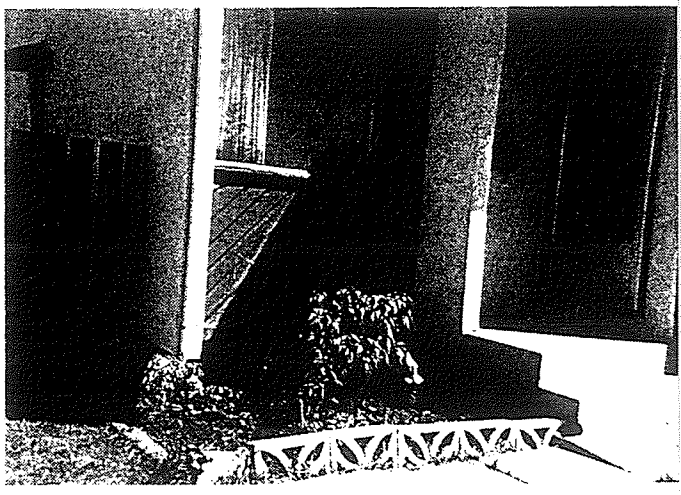


People - Friends

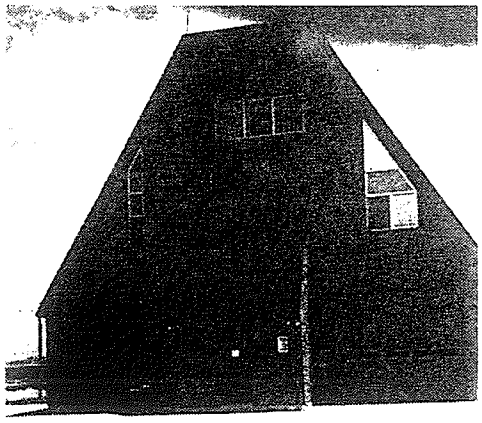
Vehicles - car



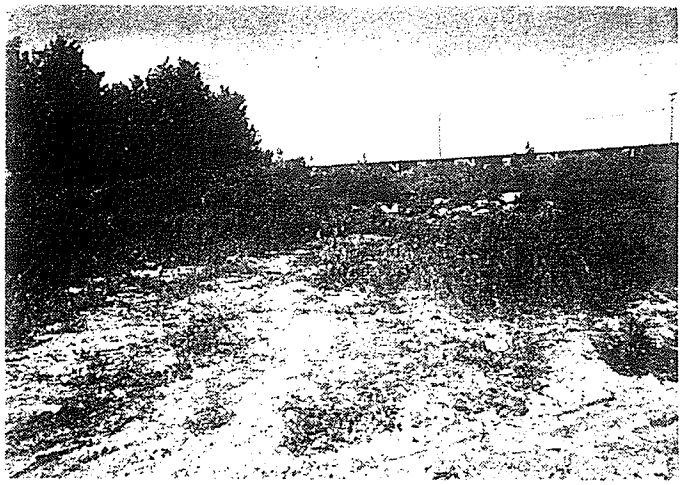
Other - Graffiti being removed



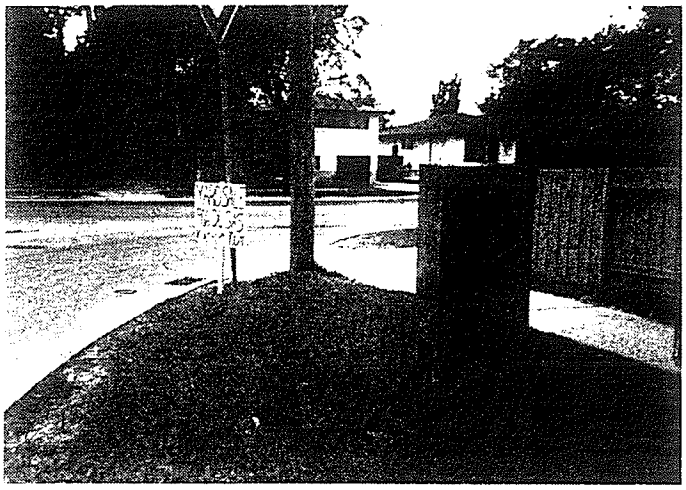
Residential landscapes - Flowers



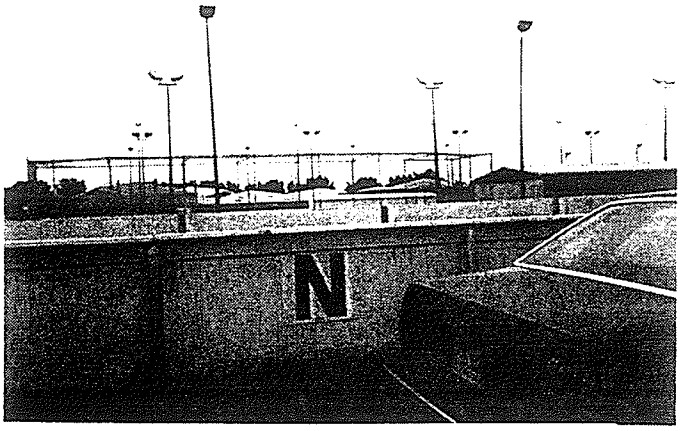
Institutional buildings - Fire hall



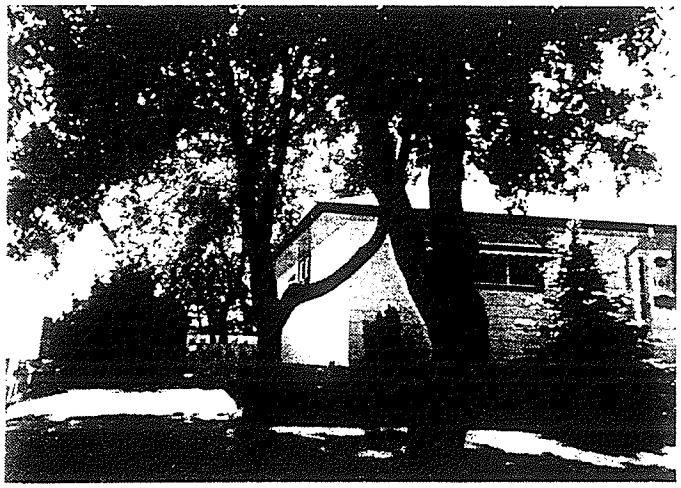
Paths and streets - Monkey Trails



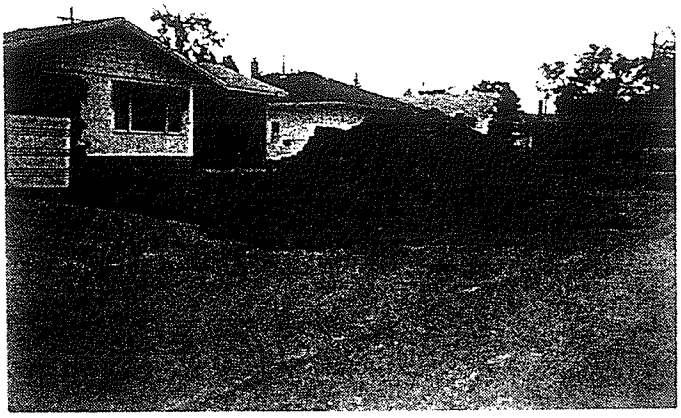
Signage - Street signs



Recreational places/elements - Hockey rinks



Wildlife and pets - Bird on branch



Construction - Construction materials

C. Tabulated Results of the Photography Exercise

The eight students randomly selected for the photography exercise consisted of four males, four females, four of them long term residents, and four short term residents (none of the sample belonged to the new resident category). The results are listed in Table 13 in terms of number of photos of each subject and category, and number of mentions of each subject and category. At the bottom of each category is listed the number of students who mentioned at least one subject in the category. Category titles are listed in bold text.

PHOTOGRAPHY EXERCISE

	Long Term		Short Term		Females		Males		Class	
Residential landscapes	Photos	Mentions	Photos	Mentions	Photos	Mentions	Photos	Mentions	Photos	Mentions
Unique plantings	9	2	5	3	13	4	1	1	14	5
Flowers	3	3	4	2	4	3	3	2	7	5
Residential landscape features	1	1	3	1	0	0	4	2	4	2
Driveway	0	0	1	1	0	0	1	1	1	1
Foil on windows	1	1	0	0	1	1	0	0	1	1
Treehouse	0	0	1	1	1	1	0	0	1	1
Garbage (water heater)	1	1	0	0	1	1	0	0	1	1
sum	15	8	14	8	20	10	9	6	29	16
No. who mentioned this category		4		4		4		4		8
Residential buildings										
Friend's house	7	2	0	0	3	1	4	1	7	2
My house	4	3	3	3	3	3	4	3	7	6
Sideyard	0	0	2	2	1	1	1	1	2	2
Elizabeth apts.	1	1	0	0	0	0	1	1	1	1
Townhouses	0	0	1	1	0	0	1	1	1	1
sum	12	6	6	6	7	5	11	7	18	12
No. who mentioned this category		4		4		4		4		8
Vehicles										
Car	2	2	4	3	2	2	4	3	6	5
Motorbikes	1	1	3	1	1	1	3	1	4	2
Truck	0	0	3	2	1	1	2	1	3	2
Double decker bus	1	1	0	0	1	1	0	0	1	1
sum	4	4	10	6	5	5	9	5	14	10
No. who mentioned this category		4		4		4		4		8
Designated open space										
Playground	5	3	6	3	7	3	4	3	11	6
Park	4	3	0	0	1	1	3	2	4	3
sum	9	6	6	3	8	4	7	5	15	9
No. who mentioned this category		4		3		3		4		7
Wildlife & pets										
Butterfly	6	1	0	0	0	0	6	1	6	1
Bird	5	2	1	1	0	0	6	3	6	3
Dog in yard	0	0	2	1	0	0	2	1	2	1
Pet	1	1	1	1	2	2	0	0	2	2
Bird house	2	2	0	0	1	1	1	1	2	2
Nest	2	2	0	0	2	2	0	0	2	2
Dog in car	0	0	1	1	0	0	1	1	1	1
sum	16	8	5	4	5	5	16	7	21	12
No. who mentioned this category		4		2		3		3		6

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Table 11. Photography subjects and categories.

Photography Exercise continued.	Long Term		Short Term		Females		Males		Class	
Institutional buildings	Photos	Mentions	Photos	Mentions	Photos	Mentions	Photos	Mentions	Photos	Mentions
Fire hall	1	1	2	2	2	2	1	1	3	3
Library	1	1	2	2	2	2	1	1	3	3
Winakwa C.C.	1	1	1	1	1	1	1	1	2	2
School	1	1	0	0	0	0	1	1	1	1
Lacerte School	0	0	1	1	0	0	1	1	1	1
Prendergast School	0	0	1	1	0	0	1	1	1	1
sum	4	4	7	7	5	5	6	6	11	11
No. who mentioned this category		2		3		2		3		5
Sky & lighting effects										
Clouds	6	1	5	2	4	1	7	2	11	3
Light /shadow	1	1	1	1	1	1	1	1	2	2
Sun	2	2	0	0	0	0	2	2	2	2
sum	9	4	6	3	5	2	10	5	15	7
No. who mentioned this category		2		2		1		3		4
Construction										
Street construction site	3	3	1	1	2	2	2	2	4	4
Construction materials	3	2	0	0	3	2	0	0	3	2
House construction	2	2	0	0	2	2	0	0	2	2
Bobcat	1	1	0	0	1	1	0	0	1	1
sum	9	8	1	1	8	7	2	2	10	9
No. who mentioned this category		3		1		2		2		4
Paths & streets										
Path	4	2	2	2	2	1	4	3	6	4
Monkey trails	2	1	0	0	0	0	2	1	2	1
Elizabeth road	1	1	0	0	0	0	1	1	1	1
New street off Elizabeth	1	1	0	0	0	0	1	1	1	1
sum	8	5	2	2	2	1	8	6	10	7
No. who mentioned this category		2		2		1		3		4
People										
Friends	0	0	5	2	5	2	0	0	5	2
Family	1	1	3	1	4	2	0	0	4	2
Neighbour	0	0	2	1	2	1	0	0	2	1
sum	1	1	10	4	11	5	0	0	11	5
No. who mentioned this category		1		2		3		0		3
Recreational places/elements										
Tennis courts	1	1	0	0	1	1	0	0	1	1
Pool	1	1	0	0	1	1	0	0	1	1
Hockey rinks	1	1	0	0	1	1	0	0	1	1
Basketball hoop	0	0	1	1	0	0	1	1	1	1
sum	3	3	1	1	3	3	1	1	4	4
No. who mentioned this category		1		1		1		1		2

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Table 11. Photography subjects and categories.

Photography Exercise continued.

	Long Term		Short Term		Females		Males		Class	
Signage	Photos	Mentions	Photos	Mentions	Photos	Mentions	Photos	Mentions	Photos	Mentions
Bus stop sign	0	0	2	1	0	0	2	1	2	1
Yard sale sign	0	0	1	1	0	0	1	1	1	1
Stop sign	0	0	1	1	0	0	1	1	1	1
Windsor Park sign	0	0	1	1	0	0	1	1	1	1
Street signs	0	0	1	1	0	0	1	1	1	1
Church cross	0	0	1	1	0	0	1	1	1	1
sum	0	0	7	6	0	0	7	6	7	6
No. who mentioned this category		0		2		0		2		2
Commercial buildings										
K Mart	0	0	1	1	0	0	1	1	1	1
Macs	0	0	1	1	0	0	1	1	1	1
sum	0	0	2	2	0	0	2	2	2	2
No. who mentioned this category		0		2		0		2		2
Street elements										
Mail boxes	0	0	1	1	0	0	1	1	1	1
Telephone lines	0	0	0	0	0	0	0	0	0	0
Newspaper dispensers	0	0	1	1	0	0	1	1	1	1
Fire hydrant	0	0	1	1	0	0	1	1	1	1
Telephone pole	0	0	1	1	0	0	1	1	1	1
sum	0	0	4	4	0	0	4	4	4	4
No. who mentioned this category		0		1		0		1		1
Other										
Camper being repaired	2	2	0	0	1	1	1	1	2	2
Sound barrier	1	1	1	1	2	2	0	0	2	2
Graffiti being removed	0	0	2	1	2	1	0	0	2	1
Air raid siren	0	0	1	1	0	0	1	1	1	1
Snowshoes	0	0	1	1	1	1	0	0	1	1
sum	3	3	5	4	6	5	2	2	8	7
No. who mentioned this category		2		2		2		2		4
Unknown	2	2	3	3	3	3	2	2	5	5
No. who mentioned this category		2		3		3		2		5

Table 11. Photography subjects and categories.

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