GARDEN DESIGN FOR CHILDREN

By

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TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

ABSTRACT

This thesis develops recommendations for the design of children's gardens which are sensitive to the preferences, perceptions, interests, and activities of middle childhood.

Children's gardens are not a new phenomenon. For over the past century, public gardens, schools, and private industries established extensive youth gardens, gardening programs, and resource manuals. Believed to teach important cultural values, these gardens typically followed a specific design which included rows of small, rectangular plots linked together by pathways and community areas. Although well informed about *how* to garden with children, little is known about children's perceptions and use of gardens. Such information would be invaluable when designing gardens *for* children.

To facilitate this understanding, middle childhood development, playground, and phenomenal landscape studies are reviewed, with a focus on child/nature relations. These studies disclose principles relevant to planning children's environments, and ultimately, children's gardens. More specifically, a study of children's artwork reveals how some elementary school students perceive gardens, suggesting that children have aesthetic, color, and landscape element preferences. Overall, youngsters prefer ornamental and colorful gardens with elements which stimulate activity and participation.

The Children's Garden at Longwood Gardens, Kennett Square, Pennsylvania incorporates the observations and principles gleaned from this research. The layout of this garden is explained, followed by design recommendations for gardens created for children's use and pleasure.

INTRODUCTION

> "The most effective kind of education is that a child should play among lovely things." Plato

Childhood is a time when fleeting moments cast lasting impressions; when exposure to environments profoundly shapes future environmental predispositions. As Wallace Stegner observed:

> ...there is a time somewhere between the ages of five and twelve which corresponds to the phase ethologists have isolated in the development of birds, when an impression lasting only a few seconds may be imprinted on a young bird for life.... Expose a child to a particular environment at this susceptible time and he will perceive in the shapes of that environment until he dies.[1]

If early experiences influence later preferences, then introduction to gardens during middle childhood may foster associations that continue when the child becomes an adult. Even environmentalists who believe there is an inherent need for natural settings, indicate that "if the possible benefits of natural areas are to be sought, the child must develop habitual behaviors in those environments."[2] Moreover, they assert that positive benefits come only with sustained exposure which lead to life-long patterns.[3] If people are to derive benefits from gardens, they must develop habitual behaviors in gardens during childhood. But before children can have these experiences, they must first gain access into gardens.

The significance of childhood experiences suggests how crucial adults are to a child's development. Children depend upon adults to teach them the values and skills needed to thrive in their society.[4] As interpreters of events and environments, their choice of lessons is of lasting significance. Unless encouraged, it is unlikely that children will think about gardens; appreciation for gardens and aesthetics is not learned from casual, free play, but from adult tutelage and guidance.[5]

Although adult perceptions and values are important, these should not be the sole criteria for determining children's environmental experiences. In Children's Experience of Place, Roger Hart argues that adults must respond to "children's activity in and experience of the physical environment."[6] One reason this is necessary is that "children see things as participants that we as observers may not see or understand."[7] Children's ideas add a much needed and frequently neglected dimension to the design process.

What can be accomplished if designers create gardens that are child-oriented? It is this study's thesis that the design of children's gardens should be based upon knowledge of children's development, preferences, and activities. How children respond and adapt to gardens in thought, feeling, and behavior is fundamental to creating child-oriented garden spaces. By designing gardens for children, we go beyond the simple act of placing them in garden settings, to one which promotes their physical, social, emotional, and cognitive development.

This study explores components of garden design as they relate specifically to children, with an emphasis on middle childhood as a distinct developmental period. Chapter 1 reviews historical and current perspectives about the design of children's

gardens. Chapter 2 presents an overview of development during years five to twelve, and features child/nature relations. Chapter 3 examines design considerations based upon research of playgrounds, phenomenal landscapes, and children's perceptions of gardens. Chapter 4 outlines the process used to design The Children's Garden at Longwood Gardens, Kennett Square, Pennsylvania. Finally, Chapter 5 explores the significance of garden design for children to public horticulture, while summarizing design elements that address the perceptions and preferences of children.

ENDNOTES

[1]Robert B. Riley, "Reflections on the Landscape of Memory," Landscape 23/2 (1979): 12.

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[4]Shari Ellis, Mary Gauvain, and Barbara Rosoff, "Development Viewed in its Cultural Context," in Developmental Psychology, eds. Marc H. Bornstein and Michael E. Lamb (Hillsdale, NJ: Lawrence Elbaum Associates, Publishers, 1984), p. 558.

[5]Yi-Fu Tuan, "Children and the Natural Environment," in Children and the Environment, eds. Irwin Altman and Joachim F. Wohlwill (N.Y.: Plenum Press, 1978), p. 29.

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Chapter 1

AN OVERVIEW OF CHILDREN'S GARDENS IN THE UNITED STATES

If asked, "What is a children's garden?" many would describe it as a place where groups of youngsters grow vegetables and flowers in small plots. How has such a distinct image evolved? An historic review of children's gardens demonstrates how adult values, interests, and perceptions resulted in a specific children's garden design, identified here as the individual plot plan. This does not imply that all who garden with children, do so in uniform rows of rectangular plots. A growing body of designers and gardeners seek alternatives which respond to children's wishes and preferences, some of which are highlighted in this chapter.

Early Children's Gardens

Children's gardens in the United States evolved from the Nature Study Movement at the turn of the century.[1] Essentially spiritual, this movement was concerned with shaping children's outlook on the natural world "for the purpose of increasing his joy in living"[2] rather than teaching facts and figures. Students participated in structured, classroom activities intended to encourage appreciation for nature while tending gardens on school grounds.[3] In effect, children's gardens suited the ideals and strategies of nature study by instilling a love of nature through gardening.

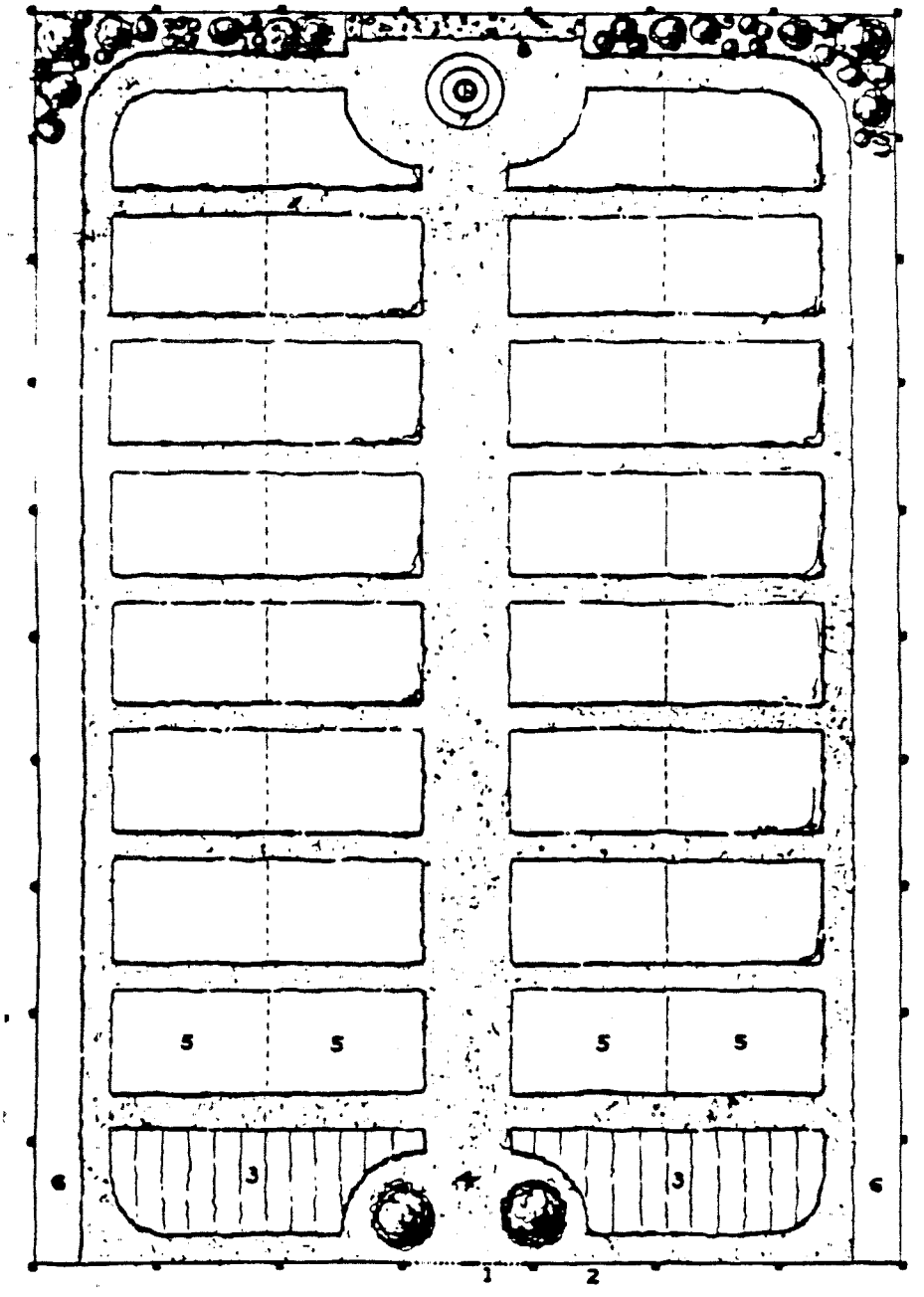
Variously designated as school gardens, school farms, and farm gardens, children's gardens were virtual European institutions by the 1870s. Institutionalization of children's gardens in the United States occurred later; the Massachusetts Horticultural Society sponsored the first American school garden in 1891,[4] but another ten years passed before the movement was truly underway.

American gardening programs for children became popular in response to the "crowded alleys and vicious surroundings,"[5] which society saw as a blight impairing the physical, mental, and moral well-being of its residents. Educators feared that city life compromised children's development and perceived school gardens as a means to inculcate effective work habits and social attitudes in young people.[6] One teacher's words eloquently express what educators hoped school gardens would cultivate:

> I did not start a garden to grow a few vegetables and flowers. The garden was a means to show how willing and anxious children are to work, and to teach them in their work some necessary civic virtues; private care of public property, economy, honesty, application, concentration, self government, civic pride, justice, the dignity of labor, and the love of nature....[7]

A fundamental type of school garden design providing "the greatest cultural development for children in the smallest area,"[8] evolved in accordance with these purposes and goals, and was soon recognized as "the school garden par excellence."[9] (Figures 1 and 2) Identified as the individual plot plan, this design typically included rows of small, rectangular plots which were assigned to individual students as their own property. Central and communal areas were occasionally included where teachers instructed and supervised activity, and children shared gardening duties. Although this layout was less than beautiful, its merits were many: "The site could be easily surveyed, the plots conveniently located and transferred, and their size could be

Figure 1. A typical school garden using the individual plot plan.



OUTDOOR SCHOOL GARDEN (Size of Plot 50x75 Feet)

(1) GATE, (2) Fence, (3) Observation Plots (4) Paths (5) Individual Garden Plots, (6) Flower Borders, (7) Sun Dial, (8) Grass Lawn (9) Shrubbery, (10) Berries.

Figure 2. An individual plot garden with paths between plots.

manipulated according to the availability of space, and of course, the number of gardeners."[10]

This design not only simplified gardening with children, but was perceived as a way to inculcate moral standards. The development of socially desirable virtues was considered easiest by following the individual plot plan "because there the interest is greatest, the rewards are more desirable, and cause and effect are more frequently and clearly demonstrable."[11] Responsibility for one's own garden plot promoted the virtues of economy, ownership, and efficiency. Moreover, communal areas encouraged individuals to share responsibility for community standards of order, beauty, and cooperation.[12] (Figure 3)

The individual plot plan also advanced work strategies and principles that evolved in accordance with a growing industrial society. "Educators discovered the

Figure 3. Children's gardens taught important cultural values.

"Little Brother Helps"

school garden to be an effective application of [industrial values], and set out to train tomorrow's industrial workers by means of the individual plot plan."[13] The layout was an orderly system that utilized all productive space and economized every movement, and at the same time promoted thrift, planning, and getting the greatest return for the least expenditure.

Public Gardens for Children

Although the school garden movement peaked at the close of World War I, with only sporadic revivals, public horticultural institutions continued planting children's gardens. Under the guidance of Ellen Eddy Shaw, the Brooklyn Botanic Garden, Brooklyn, New York (BBG) became the first botanic garden to establish a teaching garden cultivated by children.[14] This garden advanced the same attitudes of civic duty, industry, and love for nature fostered by school gardens, but it also directed "the

attention of the community, and especially of the school children, to the educational activities attempted by [the] Garden."[15]

Today the Children's Garden at BBG continues to use the individual plot plan. In teams of two, youngsters tend vegetable and flower gardens that are 4-by-15 foot plots for younger students, and 8-by-15 foot plots for older ones.[16] Children share maintenance responsibilities for community areas, which intermingle with individual plots and border the garden. These pocket gardens are designed to achieve educational goals, and aesthetic purposes are secondary. Located in one corner of the garden and surrounded by perennials, annuals, and herbs, the Children's Garden House is the site of various plant studies where hands-on and classroom learning unite.

Other botanic gardens modeled their children's gardens and educational programs after the one established at BBG. The Children's Garden at New York Botanical Garden, Bronx, New York (NYBG) reopened in 1986 after a seven year hiatus. In addition to standard individual and community plots, this garden includes modifications to make gardening wheel-chair accessible. Raised beds line the garden perimeter and paved pathways ease wheel-chair movement. Future construction plans include classroom and outside study areas.

Each of these two children's gardens have similar design and philosophic ideals in which education and aesthetics conflict. In contrast, Fernbank Science Center, Atlanta, Georgia, sponsors a horticulture program for children in which no typical school garden exists and no children tend individual plots. Nevertheless, the Botanical Garden at Fernbank is oriented towards children's interests and educational needs. Students come to Fernbank in a series of single-visits throughout the school

year. Classroom and outdoor instruction with hands-on activity is offered on a range of subjects from vegetative plant propagation to herbal folklore. During summer children can attend week-long horticultural programs but have limited gardening responsibilities.

Unlike the individual plot plan, Fernbank's garden complements the site as well as the educational goals of the institution and "demonstrates that instructional needs and aesthetics can be easily combined."[17] As with NYBG, the Botanical Garden at Fernbank is wheel-chair accessible. A gently sloped, paved walkway encircles the garden where sweeps of herbaceous and woody plants grow. Vegetables and herbs are planted in raised beds by students, but maintained by staff. Plants are selected to satisfy educational goals and enhance the garden's design.

Private Gardens for Children

Some children's gardens cater to the whims and fancies of childhood. One such place is the Cottage Garden at Old Westbury Gardens, Old Westbury, New York. Inspired by the venerable English cottage garden, this enchanting garden was designed as a play area for the daughter of Mr. and Mrs. John Phipps in the early 1900s.[18] It houses a miniature thatched roof English cottage surrounded by a fairyland of flowering plants. These include an array of dwarf herbaceous and woody plantings that are scaled to a child's smaller size. In stark contrast, a giant silver maple towers over the thatched roof. Nearby, a rose-covered trellised sandbox provides shade and delightful drifts of scent during summer.

Unlike typical school gardens, the Cottage Garden is visually appealing. Flowers are bright and plentiful; the cottage is well appointed, even down to details of

tea settings and teddy bears. Furthermore, it functions as a place for play rather than hands-on gardening. Children are not expected to grow summer vegetables and flowers but to observe and play among nature's wonders.

During the early 1980s, Barbara Paca-Steele and St. Clair Wright adopted their own approach to designing children's gardens for private residences in Annapolis, Maryland.[19] Like earlier children's gardens, these provoke a sense of wonder and appreciation for nature. However, these imaginative designs attempt to capture the essence of childhood fantasy. Tucked within these gardens are private hideaways for picnics, a witches' garden, and a wilderness terrace whose very name paints vivid pictures.

These designs evoke the special qualities unique to childhood and reflect the attitudes of the designers. Accordingly, a children's garden should be safe, yet magical; a place that is the child's own domain, separate from the adult world; one that kindles a child's imagination and inspires inquiry, play, and exploration.[20]

More recently, the Fantasy Garden, Chicago, Illinois, dressed up a vacant city lot during a 1986 community gardening project.[21] As with traditional children's gardens, it teaches gardening skills and cultural values. However, the design is based upon ideas contributed by neighborhood children: there are serpentine paths, a miniature hillside, and free-form flower beds, but no individual plots. Flowers and herbs are grown in communal plots which are as likely to be star-shaped as they are rectangular. Moreover, weeds are deliberately planted along the edges of the garden to maintain privacy from those passing by.

Summary

The individual plot plan used by the early school gardens influenced the design of later children's gardens and inculcated cultural values and attitudes in youngsters. Whether located at schools, parks, or botanical gardens, many children's gardens still follow the individual plot plan. Essentially, these gardens teach children what adults want them to learn and do not specifically address how children actually perceive and experience gardens. Recently, childhood qualities have been incorporated into some private gardens for children. The Fantasy Garden demonstrates how gardens can be places that are adult-designed responses to the child's interests, perceptions, and needs. Understanding this distinction, we are better equipped to separate children's gardens designed and influenced by adults from those which are designed by adults, but influenced by children.

Endnotes

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[9]Ibid.

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[11]Greene, p. 4.

[12]Ibid. p. 44

[13]Bassett, p. 36.

[14]Doris M. Stone, "Children's Gardening at BBG," Plants & Gardens 40/3 (Autumn 1984): 7.

[15]C. Stuart Gager, "Report of the Director," BBG Record 2/2 (April 1913): 65.

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[17]Fernbank Science Center, "Horticulture Program Goals," Atlanta, GA, 1986.

[18]Interview with Margaret Boegner, Old Westbury Gardens, Old Westbury, New York, 18 December 1986.

[19]Barbara Paca-Steele and St. Clair Wright, "Gardens Designed for Children," Plants & Gardens 40/3 (Autumn 1984): 55.

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Chapter 2

DEVELOPMENTAL THEMES OF MIDDLE CHILDHOOD

This study focuses on middle childhood which includes school-age children, ranging from ages six to twelve years of age. "It is a period marked by intellectual reorganization, expanding relationships, and changing conceptions of self and society."[1] Activity takes on new dimension and meaning, and although "playful behavior is retained from earlier periods, ... its style and purpose have changed to serve in an apprenticeship for life."[2] Mastering skills perceived as adult-like and gaining control over oneself and one's environment are themes pivitol to all other developmental issues.

Emphasis on mastery and achievement is one of many reasons why this study addresses middle childhood, but the original purpose was pragmatic; Longwood Gardens' staff wished to reach the largest number of children which they perceived to visit the garden. With further research, it was clear that the nature of middle childhood made this an ideal group for the study of garden design.

Physical Development

According to recent research, middle childhood is a period of remarkable health and vitality. Compared to their older and younger siblings, children from six to

twelve are relatively unencumbered by illness and are "among the healthiest members of American society."[3]

Growth proceeds steadily during the middle years, but is slower than the rapid physical changes of early childhood and adolescence. For example, the average six year old is a little over 3-1/2 feet tall and weighs 37 pounds, and by age twelve, has grown only an additional 1-1/2 feet and 30 pounds.[4]

Although physical development is slower, significant physiological changes occur in the school-age years which enable children to perform and master new skills. Nervous system and brain tissue development near maturity so that fine and gross motor coordination improves in conjunction with social and cognitive competencies. Yet, children do not develop equally, and how peers and adults respond to individual changes in physical growth and skills colors social realtionships and self-concept.[5]

Social Development

As a child's life experiences broaden during middle childhood, family no longer maintains an exclusive role. Although home-life still provides a sense of continuity, experiences with school and peers are increasingly important to a child's emerging identity. From this time, "a child not only takes direction from the family, ... [but] he or she now brings new values and ideas into the family."[6]

This emergence into new social situations increases children's sensitivity to social demands and relationships. They seek out companions their own age, often spending greater free time in casual or organized groups which allows children more

opportunities to learn about themselves and others. In turn, their perceptions gradually become less egocentric and concrete, allowing them to "... move from surface perceptions of how people look and act to more inferential perceptions of how they may be thinking and feeling."[7]

Personality Development

As their abilities develop, children in middle childhood struggle to gain "a sense of [seeing] oneself as capable, as being able to do meaningful tasks in the real world and not just baby stuff."[8] Drawings that strive for accuracy, obedience to social norms, and literal interpretations of events indicate how much children value feelings of competency.

According to Erik Erikson's psychosocial theory of development, environmental opportunities and people's responses significantly affect development of self-concept during middle childhood.[9] If attempts at learning new skills meet mostly with success and supportive interactions, then a sense of industry develops. On the other hand, if the balance of experiences is negative and disapproving, inferiority predominates.

Cognitive Development

Influenced by the theory of evolution, Jean Piaget perceived intellectual development as a qualitative process which occurs in invariant, sequential stages. Similar to the premise of evolutionary development, higher forms of intellect develop from lower forms. Piaget identified four stages of development: sensorimotor period (birth to eighteen months); preoperational period (two to six years); period of

concrete operations (seven to eleven years); and period of formal operations (twelve years and on).[10]

According to Piaget, at about five to seven years, children emerge from the preoperational period into the period of concrete operations. During this time, children begin to use logical reasoning, but only when working with concrete, immediately present materials. Reasoning on abstract hypothetical levels still presents significant difficulty. For example, youngsters can perform problems of addition and subtraction, but only when objects such as apples and oranges are present. Children also learn to classify on increasingly complicated levels and to understand reciprocal relationships.

Other cognitive achievements occur during the period of concrete operations. Children's thinking becomes more decentrated, that is, they can focus on several perceptual features of a problem, and they can conserve the properties of objects. In addition, children can now mentally retrace the steps of a problem, which may translate to other achievements, such a retracing a pathway through the neighborhood.

The result of these developments is that the thinking of concrete operational children is more flexible than the thinking of pre-operational children. They are better prepared to classify objects, employ memory skills, perceive spatial relationships, and exercise logical reasoning. Moreover, these cognitive developments reflect the interaction of many operations, skills, and environmental opportunties. According to Piagetian theory, true learning is the product of active participation and is not passively absorbed.[11] Children perceive relationships that exist in the world by active discovery and manipulation of objects.

Child/Nature Relations

Edith Cobb, a noted theorist, believes that children experience the natural world in a highly provocative way that becomes manifest during middle childhood.[12] Do children have a special kinship with nature? Is the nature of this relationship innate or learned? Cultural geographer Yi-Fu Tuan asserts that the relationship is likely to be innately founded, but cautions us to be aware of "our own subconsciously held values" that may favor this attitude.[13]

Whether innate or learned, there appears to be certain behavioral tendencies favoring plants and natural environments which are characteristic of age and developmental status. Evidence suggests that the traits and abilities of middle childhood influence children's perceptions, and ultimately their interactions with nature. Before exploring these, characteristics of early childhood which limit the preschooler's ability to appreciate natural settings are explored to distinguish the skills of older children.

A preschooler thinks egocentrically and is unable to make objective assessments, restricting his ability to make distinctions between himself and others: everything is defined according to how it relates to him. For this reason, a young child's perceptions of an environment are confined to his immediate surroundings. Landscape is not a meaningful experience because "to see the landscape requires, first of all, the ability to make sharp distinctions between self and others.[14]" A young child focuses on single objects and "is intensely aware of [a landscape's] separate components: a tree stump, a large boulder, bubbling water in a section of a stream...."[15] In effect, he sees the trees but not the forest.

Furthermore, Briavel Holcomb argues that a preschooler's egocentricity also limits his/her ability to distinguish natural from man-made environments. Accordingly, such distinction "is unimportant to young children"[16] whose preferences "... seem strongly associated with pleasurable activities and friendly people."[17]

The egocentricity which characterizes a child's early years diminishes during middle childhood, enabling him to be more aware of environmental differences. Maturing cognitive and social skills provide children with a broader reality base from which more objective assessments are made. Consequently, they are better suited to visually organize spatial relationships so that objects blend into a single composition. Now that a child's perceptions are more advanced, he sees the trees, but he sees the forest as well, suggesting that for the first time he may perceive a landscape and not just its parts.

Gardens for children may have greater significance during middle childhood than they would during preschool years because "interaction with nature on a large scale reaches its highest level of behavioral significance"[18] during these years. Children simply spend more time outdoors during middle childhood than any other period of their life. Writing during the late 1970s, Moore and Young estimated that one-fourth to one-third of the child population is outdoors at any given moment during the day.[19] In another study, landscape architect Clare Cooper Marcus observed that "children aged 5-10 years are much more frequent users of public open spaces in residential areas than are adults."[20]

School-age children also seem to have a spontaneous affinity for natural environments. One study reveals that "elementary school children possess slightly positive attitudes toward the environment without the intervention of formal instruction in the subject."[21] Moreover, they prefer natural elements such as grasses, trees, and flowers in their play areas.[22] Such tendencies and preferences indicate how important natural environments are to children.

Gardens are also potentially important for this age group because they add another dimension to play environments. An important developmental tool, play allows children to test themselves under circumstances in which there is little cost to them for doing so.[23] From about six years old, children's activities stress cognitive and social play rather than movement for the sake of movement. It is significant that "since a child's play is an important part of his cognitive development ... natural areas seem to be valuable to children as places where they can explore and learn about themselves and natural systems."[24] Appropriately designed gardens may better suit this developing emphasis because their elements are conducive to manipulation, observation of cause and effect relationships, and social interactions.

Children's growing awareness of cultural values during middle childhood may also justify designing gardens for this age group. Compared with younger children, they are more likely to be interested in activities that are approved and valued by adults. In primitive societies, "children know about the vegetation in their environment, and take pride in their knowledge, as part of their cultural heritage."[25] If gardens are incorporated into a child's heritage, she may attribute greater value to gardens as an adult. How much more will this be so if gardens are designed just for children?

ENDNOTES

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Chapter 3

DESIGN CONSIDERATIONS

Children do not perceive, value, or seek to use an environment in the same manner as adults. According to Colin Ward, by simple virtue of their smaller size, children must experience the world differently: "Obviously, the younger the child the closer his eye level is to the ground, [which] is one reason why the floorscape ... is very much more important for the young."[1] Developmental immaturity and limited life experiences also contribute to children's unique experience of place.

An understanding of how children interact with their environment is essential to designing gardens that truly belong to them. Playground and outdoor environmental studies are relevant because they identify children's environmental preferences and perceptions.

Playground Studies

Playgrounds can be described as play environments for children. Since the 1960s, designers have retreated from traditional playgrounds which are typically "a collection of single function equipment (swings, seesaws, slides) ... designed primarily for exercise or functional play."[2] Criticized as monotonous, predictable, and adult-oriented, traditional playgrounds neglect developmental needs of school-age children, who avoid them in favor of other play areas in their neighborhoods.

Contemporary and adventure playgrounds evolved from a rebellion against traditional playgrounds. More responsive to middle childhood development, their designs encourage cognitive and social play while reducing emphasis on physical activity. Although contemporary and adventure playgrounds share similar goals, design solutions and children's peer interactions and choice of activities differ.

Unlike traditional playgrounds, contemporary playgrounds are not easily defined by equipment. Aesthetic variables are important and include a range of textures, forms, colors, levels, and construction materials.[3] A number of unchangeable structures (sculptured play elements) are mingled with changeable structures (sand areas) to create pleasing arrangements that promote an activity flow so that one activity leads to another.

Adults often describe adventure playgrounds as unplanned and unattractive because these are more concerned with "supplying play materials ... which can expand the range of play opportunities for children"[4] than with appearance. Conventional play equipment is excluded in favor of loose parts, such as lumber for assembling houses and dirt for digging, which offer opportunities for creative play. The ambiguous, open-ended, and changeable characteristics of adventure playgrounds encourage children to replan spaces as their interests evolve.[5]

Of these three types of playgrounds, school-age children overwhelmingly prefer adventure playgrounds.[6] Why is this? Very simply, adventure playgrounds satisfy developmental needs of middle childhood better than traditional and contemporary playgrounds.[7] This is thought to be true because adult supervision is

limited, while opportunities to actively handle objects, master cognitive skills, and interact with peers are more available.

Regardless of any particular playground chosen for play, researchers believe that a host of factors combine to influence children's choice of activities:

> Environmental features, social influences, the freedoms to make use of available opportunities, and other aspects of a setting that ultimately [combine to] contribute to its atmosphere and to the behavior of its users.[8]

In general, the types of activities selected and the duration of play are not only influenced by design, but by peer relationships, adult visibility, rules pertaining to use, manipulable elements, and transitory and permanent qualities.[9]

While it is recognized that many factors determine children's selection of activities, opportunities and constraints of the physical environment may predict the majority of activities.[10] Equipment and resources either limit or promote the quality and type of interactions. For example, conversation is activity-related in traditional and contemporary playgrounds, but non-activity-related in adventure playgrounds. Traditional playgrounds encourage specific physical activity in association with specific equipment such as swinging on a swing. On the other hand, contemporary playgrounds promote a flow of activity such as running, climbing, imaginary play while adventure playgrounds foster group and creative interactions.[11]

Playground studies also document children's preference for vegetative and natural elements. Elementary school students "... want schoolyards liberally stocked with living materials."[12] In fact, grass, flowers, and trees are the only universally liked playground elements.[13] This prominent role of plants in playgrounds is

supported by other researchers who note that children actually complain when shade trees are absent.[14]

Other natural elements such as water (ponds, fountains), wildlife (animal habitats), dirt, sand, and loose materials are also favored by elementary school students.[15] In addition to natural phenomena, children prefer conveniences similar to those required by adults: water fountains, benches, trash cans, shade, and other comfort conveniences in aesthetic surroundings are important and have an added bonus of doubling as potential play resources.[16]

From these studies it is apparent that children seek playgrounds which satisfy developmental needs and avoid those which do not. No matter how well intended, play settings which fail to address children's preferences and activity patterns will go unused. As such, traditional playgrounds are ineffective for activities other than physical sport and are of little interest during middle childhood. However, playgrounds with flexible parts, limited adult presence, natural elements, and equipment which fosters social and cognitive mastery are used and enjoyed by school-age children.

Phenomenal Landscapes

Playground studies indicate that children discover and create their own unofficial play areas apart from those planned by adults. It is thought this occurs because "institutional arrangements for children fall short of providing conducive social settings."[17] Where are these discovered places? What are their qualities and components? How do they satisfy children's needs?

These questions are addressed in several studies about children's use of the outdoors. One study conducted by Roger Hart, documents how children explore, use, and manipulate their everyday environment, which is defined as the "phenomenal landscape."[18] Hart noted that highly maintained suburban sites, mown pasturelands, and roadways are avoided in favor of unkempt places where a sense of child-possession prevails. Children prefer places with "matured grass, bushes, trees, and diverse abandoned objects," where they feel free to alter the environment.[19] These places are frequently within 100 yards of the home,[20] giving children free, unescorted access.[21]

The qualities and availability of elements in phenomenal landscapes encourage activities specific to middle childhood development. Chief among these is "modifying the landscape through building and modeling,"[22] which allows children to learn by actively manipulating their environment. Building activities not only develop problem-solving skills, but as children interact with their peers, they learn skills associated with community, territoriality, and ownership.[23] Such activities and skill development are encouraged by proximity to home, absence of adult possession, and flexible landscapes composed of loose parts.[24]

Numerous studies identify children's preferences for specific features in phenomenal landscapes. Hart suggests that outdoor play areas should include "some of the qualities so important to children ... water, trees [for climbing], bushes, good dirt [for modeling], discarded objects, and varied topography with slopes."[25] In another study, Moore and Young identify significant place elements of 8-12 year olds who were asked to map or draw their favorite place: "The collective rank of natural systems, accounting for over a quarter of the aggregate mention rate [was impressive]."[26]

Trees, lawns, creeks/streams, tall grass/weeds/leaves, rocks, fish/aquatic life, flowers, gardens, and wild birds are among the preferred natural elements.[27]

Both Moore and Hart discovered that pathways are important place elements in phenomenal landscapes and "in many instances ... exist as literal shortcuts through small openings, impenetrable to adults."[28] They function to keep distance from adults and run across private property where children's presence is either accepted or undetected. Many times pathways are ends in themselves, an opportunity for children to wander in their own time and space.

A Child's View of Gardens

Playground and outdoor studies contribute tremendously to understanding how children experience these environments. But how do children experience gardens? Much of what has been written about children's gardens during the past century is either philosophical, asserting that gardening is healthy for children, or educational, instructing how to teach children to garden.[29] Very little is understood about how children perceive and use gardens. To remedy this, children's artwork was used to interpret how children perceive gardens.

Method

This study involved one hundred seventy-eight first through fifth grade students from one urban and one rural elementary school.[30] A one hour format was followed in which individual sessions were conducted for every grade level. Each session began with an introductory discussion of "What is a plant?" followed by an opportunity to transplant plant cuttings. Once the activity area was cleaned, the

drawing commenced. Students were asked to draw a picture in response to the question, "What is a garden?" They were encouraged to use whatever drawing media they preferred and most chose pencils and crayons. No further explanations were given. However, as they drew, individual students were asked, "What can you tell me about your drawing?" to ensure that all elements in their work could be accurately interpreted.

Garden Classification

These drawings of gardens fell into three classifications: ornamental, functional, and combined. Ornamental gardens are those which include non-edible plants that are meant to be enjoyed for their appearance, such as trees, flowers, and houseplants (Figure 4). Functional gardens are those which include edible plants, such as fruits, vegetables, and herbs (Figure 5). Finally, combined gardens refer to those in which students incorporated plants with ornamental and functional qualities into one garden (Figure 6).

Figure 4. A drawing of an ornamental garden.

Figure 5. A drawing of a functional garden.

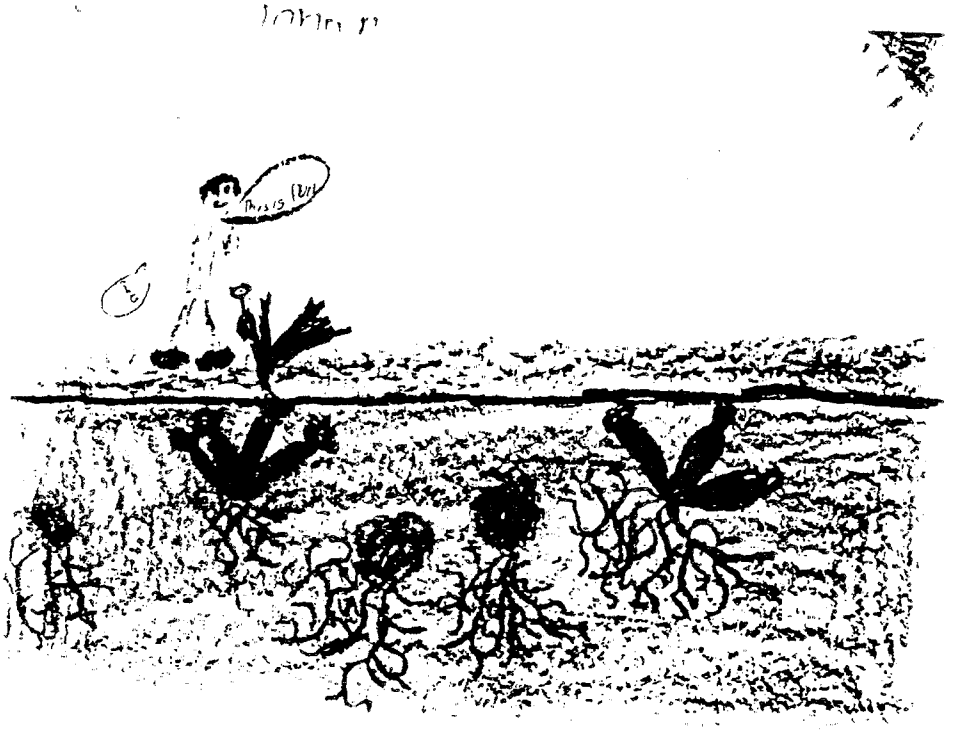


Figure 6. A drawing of a combined garden.

Most gardens in this study were strictly ornamental (47%), which was consistent through most grade levels (Table 1). However, first graders favored functional gardens while fourth graders favored those combining qualities. Gardens classified as combined ranked second (33%), and may be indicative of improved decentration skills. Purely functional gardens were the least preferred (19%). Three drawings did not include plants and could not be classified (1%).

Table 1.

Frequency of Garden Classification by Grade Level of Children

	Grade Level					
Classification	1	2	3	4	5	Total
Ornamental	6	17	8	26	26	83
Functional	11	2	7	8	6	34
Combined	5	3	6	32	12	58
Unclassified	1	0	1	0	1	3
Total	23	22	22	66	45	178

This suggests that children appreciate the aesthetic qualities that plants bring to gardens so that plants selected for children's gardens should favor those which are ornamental. This does not eliminate fruits and vegetables, but reveals children's sensitivity to beauty. Gardens must be aesthetically pleasing for children as well as adults.

Color Preference

Color preference in gardens was based on those colors chosen to illustrate flowers, fruits, and vegetables. Green was eliminated due to its obvious prominence. Ranked in order of preference, red is first (47%), followed closely by orange (45%). In descending order, the remaining colors are yellow (37%), purple (28%), blue (18%), no-color (18%), pink (15%), brown (7%), black (4%), and gray (2%). In general, these gardens enjoyed a bold explosion of color. Variety should be an ingredient of any design, but children's seeming attraction to brilliant combinations of red, orange, yellow, and purple should be used freely.

It is interesting to note that thirty-two students (18%) excluded color from their drawings. This seemed odd until the drawings were examined further and it was realized that twenty-six (81%) of these students were fourth and fifth graders who lacked time to complete their drawings because they paid so much attention to detail.

Garden Elements

These drawings also indicated which features children prefer in their landscapes (Table 2). Horticulturists may find it heartening that plants ranked in first place, with 175 of 178 students (98%) including plants in their drawings. The few who did not, justified the absence of plants from their artwork: one whose entire drawing consisted of soil insisted, "Plants are growing, but you can't see them." Another student drew a tractor emerging from a barn and explained, "It is going to the garden to work." Even when not specifically included in drawings, children seem to understand that gardens are plant environments (Figure 7).

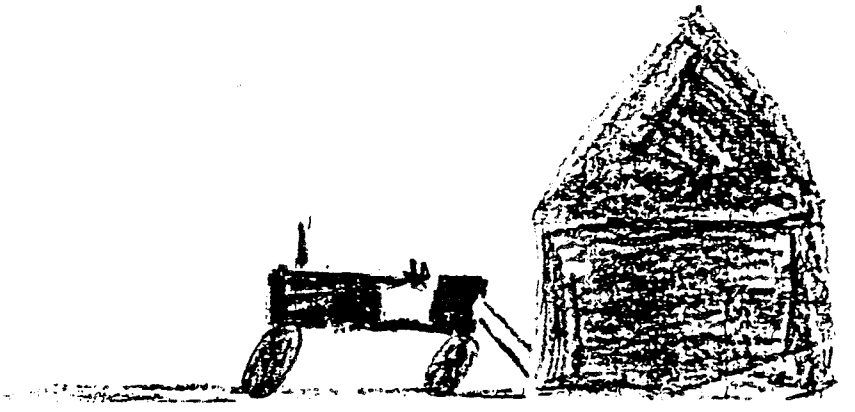
Table 2
Frequencies of Landscape Elements in Children's Drawings of Gardens by Grade Levels

Elements	1	2	3	4	5	Total
Plant	22	22	21	67	43	175
Animal	1	-	10	29	8	48
Water Feature	-	-	-	10	28	38
Building	1	-	3	5	20	29
Pathway	-	-	1	9	14	24
Fence	-	2	3	14	5	24
Plant Label	-	-	4	13	4	21
Garden Tool	-	1	3	4	4	11
Person	-	2	1	4	4	11
Trellis	2	-	1	6	1	10
Bridge	-	-	-	1	7	8
Scarecrow	3	-	-	3	-	6
Statue	-	-	-	1	3	4
Plant Stake	-	-	-	3	-	3
Swing	-	-	-	2	-	2
Airship	-	-	-	2	-	2
Seed	-	1	-	-	1	2
Plant Pot	-	1	-	1	-	2
Amusement Ride	-	-	-	1	-	1
Boat	-	-	-	1	-	1
Tennis Court	-	-	-	1	-	1
Window Box	-	1	-	-	-	1
Plant Light/Stand	-	1	-	-	-	1
Rocks	-	-	1	-	-	1
Beehive	-	-	1	-	-	1
Ladder	-	-	-	1	-	1
Topiary	-	-	-	1	-	1

The frequency of other garden elements occurring in these drawings drops abruptly from this point. Using the broadest definition, animals were included in 27% of the drawings. One student went so far as to describe his garden as a "wildlife preserve." Others included birds, bees, butterflies. fish, horses, moles, rabbits, snakes, spiders, and squirrels. Animals activated an otherwise static scene by using

gardens for bathing, eating, and nesting. They also encouraged human participation as noted by one student's grandfather chasing crows out of the garden.

Figure 7. Even when plants are not included, children understand that plants are integral parts of gardens.



Water elements ranked third (21%), evoking a feeling of activity and movement. Lakes, streams, fountains, sprinkling systems, and bird-baths were among the specific features illustrated. When included, water dominated the garden or served as an activity center. Streams divided drawings into distinct sections and were usually associated with bridges for climbing. Other water features encouraged animal and human participation (bathing, drinking, and playing), or were simply ornamental.

Buildings (houses, barns, and greenhouses) ranked fourth (16%) and may represent an attempt to relate gardens to home environments, which is critical when children select outdoor play areas. During middle childhood, youngsters struggle to balance independence with security of home and hearth. As evidence of this, children

frequently choose locations for outdoor play places near their homes,[31] suggesting children's need for a safe, yet private haven.

Pathways ranked fifth (14%) and were especially prominent in drawings of fifth graders, but failed to appear in drawings of first and second graders. Such contrast may be explained by changes in cognition during middle childhood. Younger children are just developing cognitive skills that are necessary to negotiate and reverse pathways. For this reason, it is unlikely that pathways would be included in their artwork. In a study of children's geographies, Hart observed that:

> routes [are] thought of in terms of the children's own actions first, the various landmarks being fixed in terms of them, instead of vice versa; and, the plan [can] not be rotated through 180 degrees, nor [can] the routes be reversed in thought.[32]

As children's cognitive skills develop through middle childhood, they use pathways more expertly, and this is reflected in the higher incidence of pathways in fifth grade drawings.

In these drawings, pathways led to hidden and undiscovered treasures, such as statues, bird baths, and ponds with goldfish surrounded by a bevy of bushes. They also circled around lakes and flower beds where children could wander without disturbing or stepping on plants.

Plant labels ranked sixth (12%). As students gained linguistic proficiency, they grew more dependent on labeling to identify objects, which is consistent with Howard Gardner's observation that graphic depiction declines as writing skills improve.[33] In this study, the frequency of labeling plants and garden elements

correlated positively with higher grade levels. As may be expected, no first and only four percent of second graders labeled. By third grade, when verbal skills are improved, thirty-five percent of the students labeled their drawings; fifty percent of fourth and fifth graders labeled. Even more astounding, fifth graders not only labeled to identify objects, but to direct usage as well!

In order of frequency, children also drew fences (13%), people (6%), and trellises (6%). Some elements mentioned fewer than ten times (6%) included bridges, scarecrows, statues, and plant stakes.

Integrating Playground, Phenomenal Landscape, and Garden Studies

While similar to playgrounds and phenomenal landscapes, gardens are unique places with their own qualities and characteristics. It is significant that children make distinctions between these environments and attribute specific qualities and uses to each. They are not so fussy about how playgrounds and phenomenal landscapes appear, but prefer gardens to be ornamental. Without further research we can only speculate why this is so. It is likely that children perceive gardens as adult possessed and their sensitivity to cultural norms may lead them to conform to accepted adult standards. Another explanation may simply be that children find beauty and restfulness in gardens and look elsewhere for other experiences. It may be indicative that children frequently stated they would use "their gardens" to read, play by themselves or with a friend, or get away from siblings.

Phenomenal landscapes and adventure playgrounds evolve through children's activities and manipulation of landscape elements, creating places for play and exploration. However, many gardens and traditional playgrounds are designed and

maintained to satisfy adult perceptions and values. The glistening, untouched quality of many gardens is a far cry from the abandoned meadows and loose parts that attract children to outdoor environments. Although different forms of activity are encouraged by recent playground designs, play is discouraged in most gardens; more often than not, children are prohibited from touching flowers, running down paths, and climbing trees.

Accessibility is another quality that differentiates these three environments. By definition, phenomenal landscapes are easily accessed because children create them. Ideally, playgrounds are accessible because they are designated child environments, located where children live, and free of charge. Yet children usually cannot visit public gardens independently and frequently require transportation. Even when no adult is necessary to transport them, many gardens require adults to accompany children, or charge an entrance fee to discourage unsupervised visitation. Private, neighborhood gardens may also be considered unavailable for play and exploration because children view these as "manicured areas under adult ownership."[34]

Design Considerations

These studies suggest design considerations which apply to child-oriented environments in general, and children's gardens in particular. Understanding children's development, activity patterns, and element preferences is fundamental to the design of child-oriented places. Furthermore, developmental level and age significantly influence a design's purpose and solution. Pre-schoolers benefit from physical activity which develops muscles and coordination. By the time children reach six, new activities must be incorporated to maintain their interest. Gardens designed

for children in middle childhood should foster cognitive and social activities, mastery of fine motor skills, as well as satisfy acitivty preferences.

Children's environments must accomodate and encourage activity. Gardens are activity centers, but differ from traditional playgrounds in that they are oriented towards interaction with nature rather than physical play. Incorporating appropriate activity into children's gardens is crucial to maintaining the interest of elementary school students. If a variety of ages must be accommodated, one alternative might be to segregate large expanses for physical activity, and smaller areas for cognitive and social games.

Children are attracted to locations where they feel free to manipulate and touch what is around them. Therefore, places with loose parts are essential. Opportunities to taste, touch, and smell provide concrete experiences and encourage further exploration and environmental knowledge. Objects must be reachable and areas free from intense adult supervision. Moreover, if gardens are to be truly child-oriented they must be fully accessible, transcending mere physical access and giving children permission to touch, explore, and alter the environment.

How a site is designed influences children's activity, element, and equipment preferences. As indicated by playground studies, how spaces and elements are organized affects children's play sequences.[35] A variety of elements, from very structured playhouses to ambiguous sand areas, allow children an enormous range of experiences. As such, children's gardens should include structured and flexible components, the selection of which depends upon the types of activites that are desired.

For example, treehouses for club-house activities, fountains for splashing and observing aquatic life, and mazes for path-finding might be included.

Freedom to choose play equipment, materials, and companions are crucial to children's behavior and choice of activity. Various studies by Moore, Hart, Rohane, and Sell demonstrate children's spontaneous affinity for natural phenomena and the importance of interacting with living things. As noted earlier, children's preference for natural place elements crosses many boundaries: plants, water, animals, "good dirt," discarded objects, and rolling topography should be part of their gardens.

Extracting the qualities of outdoor playsettings that appeal to children and applying these to design of children's gardens is difficult. Many components seem at odds with one another: how is children's preference for ornamental gardens understood in view of their preference for unrefined adventure playgrounds and phenomenal landscapes? How can children be encouraged to explore plants in gardens normally designed for viewing rather than touching? This is certainly challenging, and requires redefining how we think about gardens.

ENDNOTES

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[11]Ibid. p. 292-293.

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[21]Hart, "The Genesis of Landscaping," p. 362.

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[23]Ibid. p. 360.

[24]Moore and Young, p. 120.

[25]Hart, "The Genesis of Landscaping," p. 362.

[26]Moore and Young, p. 107.

[27]Ibid. p. 110-111.

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[29]L.H. Bailey, The Nature Study Idea, 3rd ed, (N.Y.: MacMillan Co.,1901); H.L. Clapp, "School Gardens," Education 21/9: 522-530; M.L. Greene, Among School Gardens, (N.Y.: Russell Sage Foundation, 1910); Lynn Ocone, The Youth Gardening Book, (Burlington, VT: Gardens for All, 1983).

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[32]Roger Hart and Gary T. Moore, "The Development of Spatial Cognition: A Review," in Image and Environments, eds. Irwin Altman and Joachim F. Wohlwill (N.Y.: Plenum Press, 1978), p. 120.

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[35]Brown and Burger, p. 309.

Chapter 4

THE CHILDREN'S GARDEN AT LONGWOOD GARDENS

Reminiscing about her childhood gardening experiences, designer Gertrude Jekyll observed that "the best way to [help children] love and value a garden is to give them a pretty one ready made."[1] This thought reflects the philosophic ideals of the Children's Garden; to build a display garden for children, in much the same way that Longwood is a display garden for adults.

In accordance with this purpose, the following goals were established:

(1) to create a special plant display at Longwood Gardens which interests children;

(2) to present plants on a cognitive level and physical scale to which children can relate;

(3) to present a self-explanatory, cohesive, and attractive display that possesses practical maintenance applications;

(4) to provide children with an extensive adventure with plants that stimulates their senses; and

(5) to provoke curiousity and enjoyment in plants.

The Children's Garden at Longwood Gardens also represents a behavioral approach to design and is based upon findings from playground, phenomenal landscape, and garden research. Due to the diversity of abilities and interests during middle childhood, the Children's Garden is targeted for youngsters ages six through nine.

Although this range represents an incredible pool of skills, too narrow a range would have been economically unfeasible.

Site Location and Context

The Children's Garden is nestled into a 1500 square foot conservatory room. Surrounded by other conservatory displays, this site possesses qualities of a perfect hideaway. For much of the year, it is protected from direct view by the dark, evergreen foliage of the Camellia Passage to the east and the lush grape foliage of the Fruit House to the west. During dreary winter months, camellia flowers add splashes of color, contrasting nicely with the dormant, knotty grape vines.

The Garden Path is north of the Children's Garden and is reminiscent of a cottage garden. A vine-covered fence wraps around beds of colorful flowers that spill onto a winding, cobblestone path. To the south, one looks outdoors to the canopies of trees lining the Main Fountain Garden which are lush during summer, but barren during winter.

Needs Analysis

Tucked into a quiet corner, Longwood staff consider the site of the Children's Garden as one of the least visited conservatory areas. Locating the Children's Garden here staff hoped to increase visitation to an underused site. Even with more people, it is unlikely that this area would be heavily travelled, making it ideal for children because it affords them a place "where time is suspended so they may explore the nature of themselves and the physical world."[2] Away from the mainstream of traffic, children can move at their own pace without pressure to hurry along.

Building a children's garden would also serve to demonstrate Longwood's commitment to youth and education. In doing so, staff wanted to attract more children to Longwood while responding to the needs of those already visiting the garden. Here would be a place where youngsters would be permitted to touch and examine plants in a garden designed for their interests, activities, sizes, and abilities.

Finally, a garden designed for children would address their needs as well as those of accompanying adults. Visitors with children are frequently observed to spend a lot of time telling them what not to do instead of enjoying their visit. Giving children a special place at Longwood might help parents cope with bored youngsters and stimulate more positive adult/child interactions.

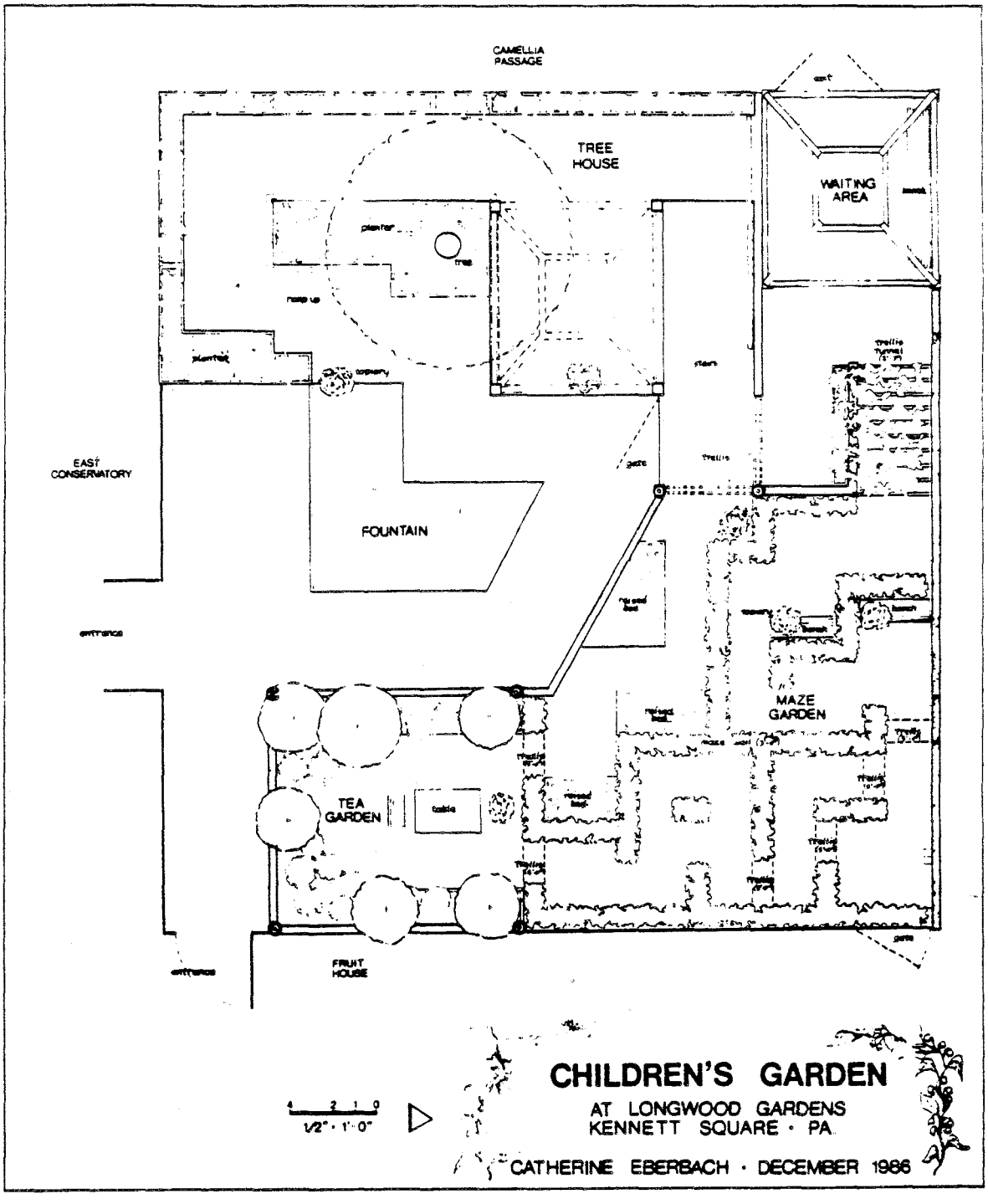
Design Proposal

The Children's Garden (Figure 8) is comprised of four major areas: the fountain and treehouse which are designed for children and adults; and the Tea Garden and maze which are exclusively for children. One remaining area is designated as a resting spot for adults.

Circulation through the garden follows a one-way pattern, leaving visitors few directional choices. One experience leads to another, effectively limiting the number of decisions that children incur at any one time. Children have freedom to enjoy each area for as long as they are interested before moving to the next area.

"Scale, a sense of the relative size of things, is an implicit yet crucial consideration in the design of childhood places."[3] It is especially important here because "children like to get into or make small places."[4] Therefore, the Children's

Figure 8. The Children's Garden at Longwood Gardens.



Garden is designed relative to a child's physical scale. For example, walkways for children and adults are a minimum of four feet wide; in children only areas, walkways are a mere 18 to 24 inches wide.

Diversity is also an important component of the Children's Garden. "It is up to the designer to arrange all these elements for children and their enjoyment in such a way that as many senses as possible are evoked ... by the rich use of texture, color, and scale.[5] The Children's Garden provides different sensory experiences through the use of various construction materials (wood, brick, hemp), elements (water, trellis, topiary), and physical experiences (climbing, crawling, touching). Moreover, the multitude of textures, scents, and visual appeal of flowering and non-flowering plants are bountiful resources for stimulating children's senses.

Fountain

When entering the Children's Garden, visitors see and hear an inviting fountain that is only 18 inches high. Five water domes are positioned in the fountain that are easily reached by children and adults who can alter the bubbles by touch. "In child's play, water is an object of curiousity, appraisal, and use."[6] The sensory impact of water-related elements is a special part of the play activities of children. Touching these water domes, children observe a simple cause/effect relationship which satisfies their desire for concrete experiences.

Engaging all visitors in the same experience, the fountain encourages interactions between adults and children. Everyone can share the delight of playing with water. Consequently, this activity provides a transition period in which children familiarize themselves with a new environment while still in the company of adults.

As visitors walk around the fountain and towards the treehouse, they pass along a four and one-half foot high fence. This height equals that of the average nine year old[7] and effectively limits how much is experienced at one time. Children are indiscriminate surveyors of environments and some structure is necessary to manage their behavior and reduce confusion.

The fence is painted with whimsical morning glory vines of blue, lavender, and green. A series of cut-outs similar to those at construction sites are positioned along the vine at different eye-levels. This allows all children to participate in the adventure and may entice them to journey onward. Bright yellow finials shaped like cannon balls sit on top of the fence in response to children's color preferences noted in the garden/drawing study.

Treehouse

Visitors are greeted by a four foot high topiary bear fishing in the fountain as they enter the treehouse. Topiaries are crucial to interpretation of the Children's Garden. The diversity of children's reading levels discourages use of labels; what is appropriate for fifth graders is frustrating for first graders and vice versa. Not only that, but Jekyll notes, "gardens look much better if you can do without labels."[8] Moreover, like the nature study movement, the focus of this study is to develop attitudes rather than teach facts and figures. Topiaries are used to suggest activity, identify points of interest, stimulate social interactions, and engage preschoolers through symbolic play. Topiaries and their props also add a dimension of flexibility. Children can use fishing poles, tea pots, and watering cans for their own play and as a means of manipulating and experiencing the garden.

As children and adults climb a series of ramps to enter the treehouse, they walk beneath the limbs of a huge tree limb covered with a creeping Algerian ivy (Hedera canariensis). In combination with an array of other plants, this canopy creates an intimate space and change of scale. Raised beds border all sides of the ramps and the easy accessibility of these plants invites touch and exploration.

When children reach the treehouse, they see plants from a new perspective; looking down on things rather than up is important to youngsters who must constantly adjust to a grown-up world. Here, "the tree offers the excitement, the vastly expanded horizon, and the status of height...he is no longer a dwarf among giants, he is a giant himself and commands a world."[9] In one corner, youngsters discover a topiary bear peeking through a fence made of hemp. From this vantage, visitors see the maze below and just a glimpse of the Tea Garden. Children can linger in this cozy hideaway or plot their trek through the maze.

Tea Garden

When exiting the treehouse, visitors approach the children only section of the garden, which is guarded by a topiary bear holding a "Kids only!" sign. How much do children value this separation from adults? When a model of the Children's Garden was previewed to elementary school students, they applauded! In fact, they expressed concern about how adults would know that they are not permitted to enter the Tea Garden.

Student essays on the Children's Garden reflect their unique perspective: "There is a place just before the maze where children drop their parents off." Another wrote, "The parents can relax outside the maze without their children bugging them.

They don't have to worry about their children getting lost because they are playing just a few feet away." Children view this as a place where they are in charge; the relative inaccessibility of the Tea Garden and maze to adults lends the area to child possession. And if parents need not worry about losing their children, neither do children worry about losing their parents. Youngsters perceive the garden as safe, fun, and totally their own.

The Tea Garden and maze are scaled down to accomodate children's small dimensions: walkways are 18 to 24 inches wide; trellises provide only a five foot clearance, allowing children but not adults easy access; raised beds are 8 to 12 inches high, and no wider than 18 inches wide. The scale is intimate so that everything is within easy reach of a young child's hand.

If children choose to enter the Tea Garden they follow a series of twists and turns preparing them for the maze. They pass raised beds overflowing with flowers blooming in their favorite colors. Intermingled with these are scented and textured plants, such as peppermint-scented geranium (Pelargonium tomentosum), lemon balm (Melissa officinalis), and rosemary (Rosmarinus officinalis). So that children may recognize plants during the rest of their visit to Longwood, flowers located here are the same as those on display in the conservatory.

Children enter the Tea Garden by walking beneath a trellis of red, orange, and yellow flowering nasturtium (Tropaelum majus). The canopies of weeping fig (Ficus benjamina), hairy wattle (Acacia pubescence), Acacia floribunda, and Pittosporum spicatum create a private enclave where children can escape adult supervision and

intrusive stimuli, if just for a few brief moments. Playing beyond direct supervision of adults also encourages feelings of competence and independence.

Once in the Tea Garden, they are greeted by a topiary bear who invites them to sit at a table and take tea. While visiting the bear, children have an opportunity to see, touch, and smell all sorts of flowers and herbs. Once they've finished, youngsters can move on to the maze which is entered from the Tea Garden.

Maze

The maze is a mass of ivy-covered walls that are three feet high and permit children to maintain visual contact with their parents, and parents with their children. Simply ducking down and hiding behind a wall gives children privacy. The maze also encourages cognitive and social play such as hide and seek.

The maze is designed so that visitors merely follow the path and are led to the end. Lack of space dictated that the maze include no dead ends. These might have challenged older children, but frustrated and even frightened preschoolers. Even so, children can practice reversing routes by running back and forth through the maze. As children move through this tangle of pathways, they meet a pair of six foot giraffes sitting on benches. Children can nestle beside them and have their pictures taken by camera-toting adults.

Children exit the maze by crawling through a 27 inch high tunnel covered with a flowering vine (Passiflora grandiflora). The scale of the tunnel reinforces the child-only orientation and discourages adult usage. Enclosed in this small shelter, "children can feel in control and can allow their imagination fly. Small dark places are

exciting ... and yet they are also womblike and secure."[10] At the end of the tunnel they are reunited with the adults, bringing the experience to a close.

Adult Waiting Area

When children leave the maze, they find their parents in a waiting area where shade and seating are available so that adults can relax while their children go through the Tea Garden and maze. If comfortable, adults are more likely to allow children to enjoy the garden at their own pace. This area also provides a point from which adults can observe, photograph, and interact with their children.

As visitors leave The Children's Garden, they come face to face with a seven foot topiary penguin holding a colorful, flowering plant. Placement of the penguin draws visitors to the garden's exit and also integrates the Children's Garden with neighboring conservatory displays.

Summary

The Children's Garden at Longwood Gardens is a place that truly belongs to children of all ages. The design responds to children's developmental needs, perceptions, and preferences. Young visitors are led through the garden without the use of interpretive labels, which could easily be confusing. This display garden furnishes children with a play experience that encourages cognitive and social development; they can touch, smell, see, and otherwise explore a beautiful garden world. In turn, it is hoped that children depart with a positive experience that extends through the rest of their visit, and indeed, the rest of their lives.

ENDNOTES

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[2]Robin C. Moore, "The Environmental Design of Child-Nature Relations: Some Strands of Applicative Theory," in USDA Forest Service General Technical Report NE-30, (Upper Darby, PA: USDA Forest Service Northeastern Experimental Station,[1977]), p. 210.

[3]Robin C. Moore, "Generating Relevant Urban Childhood Places: Learning from the `Yard'," in Innovations in Play Environments, ed. Paul E. Wilkinson (London: Croom-Helm, 1980), p. 62.

[4]Yi-Fu Tuan, "Children and the Natural Environment," in Children and the Environment, eds. Irwin Altman and Joachim Wohlwill(N.Y.: Plenum Press, 1978), p. 21.

[5]Lady Allen of Hurtwood, Planning for Play, (Cambridge, MA: The MIT Press, 1968), p. 34.

[6]Tuan, p. 18.

[7]Charles D. Ramsey and Harold R. Sleeper, Architectural Graphic Standards, 5th ed. (N.Y.: John Wiley and Sons, Inc., 1959), p. 43.

[8]Jekyll, p. 55.

[9]Tuan, p. 20.

[10]Ibid., p. 21.

Chapter 5

IMPLICATIONS FOR PUBLIC HORTICULTURE

Design Recommendations

Like any landscape design, children's gardens must address positive and negative attributes of the site, institutional goals and functions, as well as user preferences and interests. This chapter highlights design issues, qualities, and features relevant to the design of child-oriented gardens. The following list is neither exhaustive nor exclusive, particularly as it represents issues that evolved during research of this thesis and design and construction of the Children's Garden at Longwood. While the Children's Garden lacks some aspects described below, features that are necessary to complement the site, Longwood's mission, and the targeted audience are included; there are ramps to climb, water and plants to touch, and a section for children to call their own. With this in mind, guidelines for the design of children's gardens follow.

Age and Developmental Level. Children experience and view environments differently as their abilities, interests, and needs change during the course of development. It is imperative to target specific children's audiences and design gardens tailored to their specific perceptions and experiences. For example, the more physically oriented preschooler might enjoy gardens with ample room for

running and other gross motor activities. More socially sensitive and cognitively advanced children require different environmental experiences and are more likely to appreciate gardens where there are opportunities for clubhouse and building activities. They may also enjoy more complex designs which include mazes and other pathways to develop problem solving skills.

Scale. Children and adults are more comfortable in places scaled to their sizes and which protect them from feeling dwarfed.[1] Larger-than-life dimensions are frightening, so it is no wonder that small, cozy hideaways where control is more easily exercised, appeal to children. Pathway, staircase, canopy, trellis, fence, raised bed, and seating dimensions are special concerns for Longwood's Children's Garden. Decisions about length, width, and height are based upon information of children's average sizes.[2] For example, the average height for a nine year old is four and one-half feet,[3] so trellises and tree canopies permit a five foot clearance. Pathways are tiny ribbons weaving through the garden at only 18 to 24 inches wide. Raised beds are designed at 18-12 inches high with a maximum width of 18 inches so that plants can be easily reached by small hands.

Because of their diminutive size, children pay greater attention to the floorscape.[4] Detail should be focused where children's visual attention is greatest. Paving materials, textures, and colors should be rich in variety and changes in elevation should be interesting and easily managed.

Child-Possession. Children use all of their senses to interpret their physical surroundings and must be free to manipulate garden environments. Opportunity for hands-on experiences where children can actively play is vital. Other

qualities of child-possession include: (1) accessibility to where children live and play; (2) elements which are easily manipulated, such as water and textured plants; (3) a sense of timelessness which allows exploration at a child's pace; and (4) a comfortable scale relative to a child's size.[5] Child-possession is created in the Children's Garden by designating a section exclusively for children's use that is at a smaller scale and includes elements with high sensory impact. If an entire area cannot be dedicated to this purpose, child-only experiences can be integrated alongside adult areas. For example, vine-covered tunnels, which are near paths accessible to adults give youngsters an exclusive garden experience.

Aesthetically Pleasing. Children can distinguish between different environments. Although they prefer unkempt playgrounds and outdoor play areas,[6] the study of children's artwork implies that youngsters prefer gardens to be pretty. Ornamental quality does not exclude fruits and vegetables, but demands that these are placed within an aesthetic arrangement. All garden elements should be arranged to satisfy a child's sense of order and beauty.

Color. Bright, bold use of color is an integral part of children's gardens. Generous use of red, orange, and yellow may even draw children to an area. While emphasizing color preference as related to plants, it should be noted that other elements bring color to gardens as well.

Landscape Elements. Activity is the theme uniting many of the landscape elements in children's drawings of gardens. Animals, water, paths, bridges, and tools encourage children to observe or actively participate. Selection of landscape elements for children's gardens should consider that children perceive gardens as activity

centers with lots of play and exploratory opportunities. Moreover, their overwhelming preference for plants, animals, and water should persuade designers to include these in children's gardens. Landscape elements such as benches, drinking fountains, and shady places should also be considered for children's comfort.

Plants. Which plants should be part of children's gardens? It would be presumptuous to construct a list plants that all children are guaranteed to like. As with adults, children are not a homogenous group with the same plant preferences. However, plants with different touch, smell, taste, sight, and sound qualities are preferable and invite closer study. As these plants will experience much handling, those which tolerate such abuse should be selected. Finally, hazardous and poisonous plants must be avoided to safeguard children and limit the number of restrictions placed upon them.

Loose Parts. One goal of children's gardens should be to balance static and loose components so that children can participate in a garden's evolution. This kind of flexibility encourages a range of play, hands-on activity, and exploration. Loose parts in the Children's Garden consist of watering cans, teapots and cups, fishing poles, water, and small topiaries. Loose parts must be within a child's reach and tolerate tampering. Such items may require frequent replacement and stocking back-up supplies, so their number and type may depend upon the willingness of staff to let children control the site.

Pause and Gathering Points. Places where children can enjoy the experience of discovery and gathering with friends is important. Free from tight schedules, children can move at a slower pace and have more time to socialize and

uncover discrete parts of an environment. Pause and gathering points should be located away from the mainstream of traffic and include interesting items for discovery.

Accessibility. Although private and public children's gardens have different concerns, each must be readily accessible to children. Private gardens may be used more often by children if located within 100 yards of home, where they frequently play.[7] Accessibility to public gardens involves other issues: distance from children's neighborhoods, lack of transportation, restrictions about independent visits, and potential vandalism by unescorted children. Resolving these are not simple matters, however designers should make an effort to create the least restrictive environment. If possible, children's gardens should be located so youngsters can visit without adult escort. One way to do this is to locate children's areas where they can play without entering other public garden areas.

A Place for Adults. If adults are expected to accompany children, designs must include interest for adults. This may be as simple as providing a comfortable location to observe, interact with, and photograph their children. Sections where adults are allowed should include seating, protection from sun, and consider adult proportions of height and width.

Privacy. Children should have gardens where there is time and place to do what they want apart from adults. By doing so, children can casually explore gardens and develop feelings of competence and independence.

Interpretation. Traditional interpretive methods such as identification and information labels can be used in children's gardens, but are likely to go unnoticed unless placed at children's eye levels. If used, verse should be age appropriate and

labels located in places where children can easily read them. Other methods which allow children to interpret independently and engage their participation are potentially more rewarding. For example, topiaries are used to suggest activity and identify points of interest in the Children's Garden. Color coding areas and pathways may also prove valuable as ways to lead youngsters through gardens.

Interpretation may also be used to encourage interactions between adults and children. For example, a brochure is available at the Children's Garden entrance. Written for adults, this brochure suggests ways in which adults can make their child's visit to the Children's Garden and the rest of Longwood more enjoyable.

Child-oriented gardens require consideration of many issues, and how these are addressed is part of the creative design process. Generalizations can be used as guidelines, but specific design solutions depend upon what exists where each garden is to be planted. Careful examination of both general and specific concerns promises a more rewarding garden experience for the child.

Children's Gardens for Public Horticulture

Children's gardens are an exciting way for public gardens to demonstrate their commitment to youth. Designing gardens in response to children's perceptions, interests, and activity preferences may encourage greater use by children. This is extremely important in a world that is increasingly urbanized. Unless people learn to love gardens when they are young, love and appreciation may never develop.

What does this suggest about the role of public horticulture? It is my belief that public gardens have a special mission to provide children with a variety of

environmental experiences. Traditional methods of instruction and tending vegetable and flower plots may still be used, but public gardens are also obliged to create places which are sensitive to children's perceptions and preferences. Doing so validates children's opinions and clearly communicates that they are valued members of society. Equally important, such designs expand a child's knowledge of environments and encourage development according to individual abilities. Children absorb meaning and information through personal interactions with garden environments, and as with discovery rooms, this approach to design encourages the child to set the pace of learning.

What will public gardens gain by such ventures? Children's gardens may be a way for public gardens to position themselves in family entertainment and recreation markets. Those with young children may be more inclined to visit gardens with special attractions for children. Moreover, it is also likely that if specific places are available for children's participation, children may show greater interest in other garden areas. This may reflect an increased enrollment in children's programs now, and increased membership and support in the future.

Public gardens can fulfill their role in several ways. First, they can design and build gardens which are sensitive to children's perceptions and preferences. This would involve children more deeply during visits, but could also function as demonstration gardens in which visitors learn about designing children's gardens for the home.

Secondly, with more experience and knowledge, public gardens can implement outreach and research programs. Private residences, parks, community

organizations, schools, day care centers, and other child agencies are among those who could benefit from such activities. As advocates, public gardens would educate designers and those who plan public spaces to include more gardens where children play. They could also provide staff and financial resources for development of public gardens for children.

As advocates, public gardens should conduct or facilitate research about children's use of gardens. If unable to research, horticultural institutions should open their gardens to landscape architects, environmental psychologists, and other social scientists who are interested in doing so.

Some would argue that children's relationship with natural environments in general, and gardens in particular, is self-evident. This study represents one way to provide children with more meaningful garden interactions. There is still so much more to understand. How do children use garden spaces? Which plant qualities do children prefer? How does playing in gardens influence a child's development? So far, we simply do not know enough. Nevertheless, we can begin, and in beginning we bring children through the garden gate and welcome them into the garden world.

ENDNOTES

[1]Nan Fairbrother, The Nature of Landscape Design, (N.Y.: Alfred A. Knopf, 1974), p. 60; and Leroy Hannebaum, Landscape Design, (Reston, VA: Reston Publishing Company, Inc., 1981), p. 151.

[2]Charles D. Ramsey and Harold R. Sleeper, Architectural Graphic Standards, 5th ed. (N.Y.: John Wiley and Sons, Inc., 1959), p. 3 and 43.

[3]Ibid. p. 43.

[4]Colin Ward, The Child in the City, (N.Y.: Pantheon Books, 1978), p.22

[5]Robin C. Moore, "The Envivonmental Design of Child-Nature Relations: Some Strands of Applicative Theory," in USDA Forest Service Technical Report NE-30, (Upper Darby, PA: USDA Forest Service Northeastern Experimental Station, [1977], p. 212-213.

[6]Roger Hart, "The Genesis of Landscaping: Two Years of Discovery in a Vermont Town," Landscape Architecture 65/5 (October 1974): 360-362.

[7]Roger Hart, Children's Experience of Place, (N.Y.: Irvington Publishers, Inc. 1979), p. 55.

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APPENDIX

PLANT LIST FOR THE CHILDREN'S GARDEN

This list represents plants selected for the April 30, 1988 opening of the Children's Garden at Longwood Gardens. Plants are identified by their scientific name and followed in parentheses by their common name when available.

The Treehouse:

Abutilon x hybridum 'Dwarf Moon Chimes' (Chinese Lantern)

Aquilegia flabellata (Columbine)

Calathea zebrina 'Binotii' (Zebra Plant)

Calathea warscewiczii

Dizygotheca elegantissima (False Arailia)

Dolichos lablab (Hyacinth Bean)

Hedera canariensis (Algerian Ivy)

Muscari armeniacum (Grape Hyacinth)

Nephrolepis exaltata 'Compacta' (Boston Fern)

Pittosporum spicatum

Vinca major (Greater Periwinkle)

Viola odorata (Sweet Violet)

The Tea Garden:

Acacia floribunda

Acacia pubescence (Hairy Wattle)

Astilbe x arendsii 'Deutschland' (Spirea)

Delphinium (Larkspur)

Ficus benjamina (Weeping Fig)

Narcissus hybrid (Daffodil)

Lilium longiflorum var. eximum (Easter Lily)

Pelargonium graveolens (Rose-Scented Geranium)

Pelargonium tomentosum (Peppermint-Scented Geranium)

Pittosporum spicatum

Rhododendron hybrid (Azalea)

Rosmarinus officinalis (Rosemary)

Salpiglossis sinuata (Painted Tongue)

Salvia elegans (Pineapple Sage)

Tropaelum majus 'Gleam' (Nasturtium)

Tulipa hybrid (Tulip)

The Maze:

Hedera helix 'Duckfoot' (English Ivy)

Hedera helix 'Golddust' (English Ivy)

Hedera helix 'Jubilee' (English Ivy)

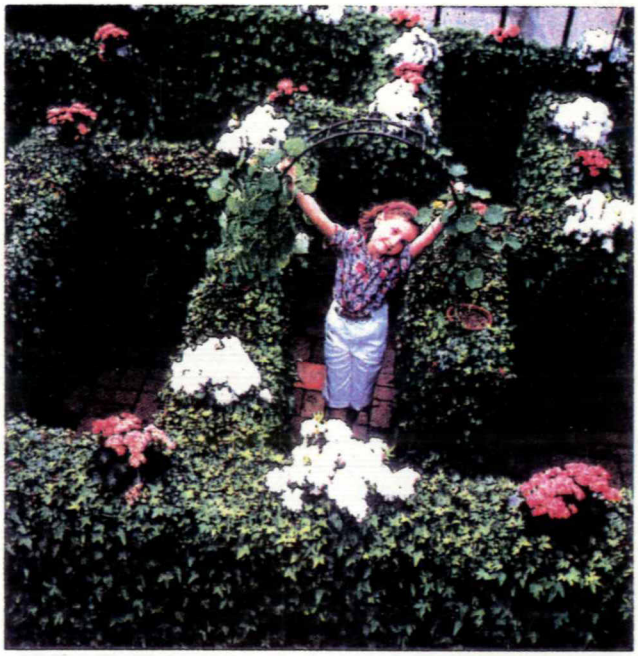
Passiflora grandiflora (Passion Vine)

Primula vulgaris (Primrose)

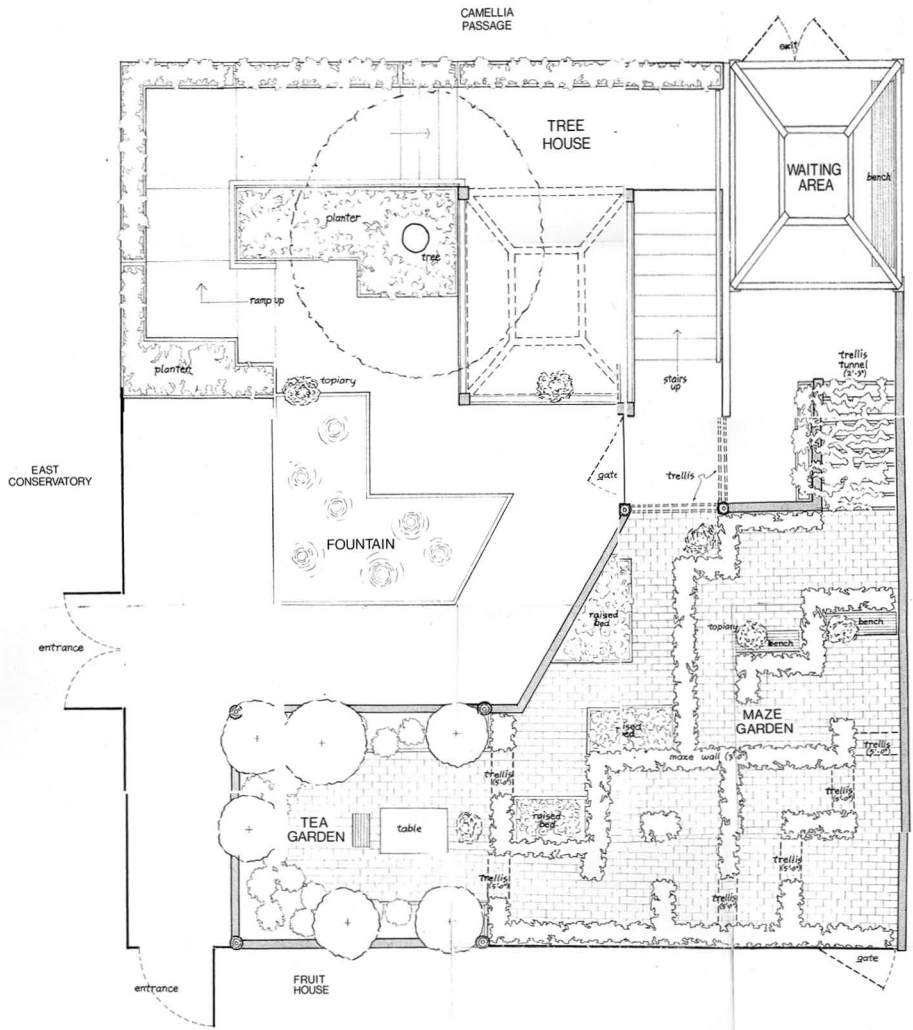
Tropaelum majus 'Gleam' (Nasturtium)

notes

HG REPORTS ON THE NEW AND THE NOTEWORTHY By Eric Berthold



Three larger-than-life topiary rabbits play host at the Longwood Children's Garden, where the young—and the young at heart—can hop through a magic hoop that leads to a vine-covered maze and stroke lamb's ears' furry leaves. "We wanted the garden to be a playful hands-on experience for the children, where they can be in charge," says former Longwood student Catherine Eberbach, who codesigned this indoor botanical wonderland with Mary Allinson. Open 365 days a year, in Kennett Square, Pennsylvania. For information (215) 388-6741.



4 2 1 0
1/2" = 1'-0"

CHILDREN'S GARDEN

AT LONGWOOD GARDENS
KENNETT SQUARE • PA.

CATHERINE EBERBACH • DECEMBER 1986