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I am submitting herewith a thesis written by Vincent Paul Gauthier entitled "Benefiting Built Environment Education: The Use of Scaled Three-Dimensional Urban Simulations as Teaching Tools in Elementary and Secondary School Curricula." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science in Planning, with a major in Planning.

George E. Bowen, Major Professor

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and recommend its acceptance:

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and Dean of the Graduate School

BENEFITING BUILT ENVIRONMENT EDUCATION:

THE USE OF SCALED THREE-DIMENSIONAL URBAN SIMULATIONS AS TEACHING TOOLS IN ELEMENTARY AND SECONDARY SCHOOL CURRICULA

A Thesis

Presented for the

Master of Science in Planning

Degree

The University of Tennessee, Knoxville

Vincent Paul Gauthier

December 1995

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DEDICATION

To my beautiful wife Susan, our supportive families, and everyone who has encouraged and inspired me throughout this project, may God bless all of you for your sharing efforts.

This thesis is dedicated to Rock and Catherine, my father and mother. Thank you for the wonderful life you gave me...we miss you.

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The majority of the photographs and other figures contained within this work were generated by the author. However, dozens of figures appear courtesy of the following: Ave Maria Grotto; Barry Beard (Natchez Cathedral High School); Butch and Shields Brown (Old New Inn in Bourton-on-the-Water); Center for Understanding the Built Environment (CUBE/ArchiNet); Children's Museum of Oak Ridge (Preface); Children's Museum of Tampa (Safety Village); Consolidated Edison ("City of Lights"); Susan Fillafer (Holy Land Hotel); Dr. David A. Johnson, AICP (Portugal dos Pequenitos); General Motors (Futurama); Knoxville-Knox County Metropolitan Planning Commission (KnoxBox City); Mini-Europe; Mud Island Memphis (River Walk); Braxton Payne (Madurodam); Johannes Schild (MINICITY, USA!); Sequoyah Energy Connection (Figures 2.12 and 6.4); Motoko Shimizu (Tobu World Square); Professor Emeritus Walter L. Shouse (LEGOLAND); and Splendid China Florida.

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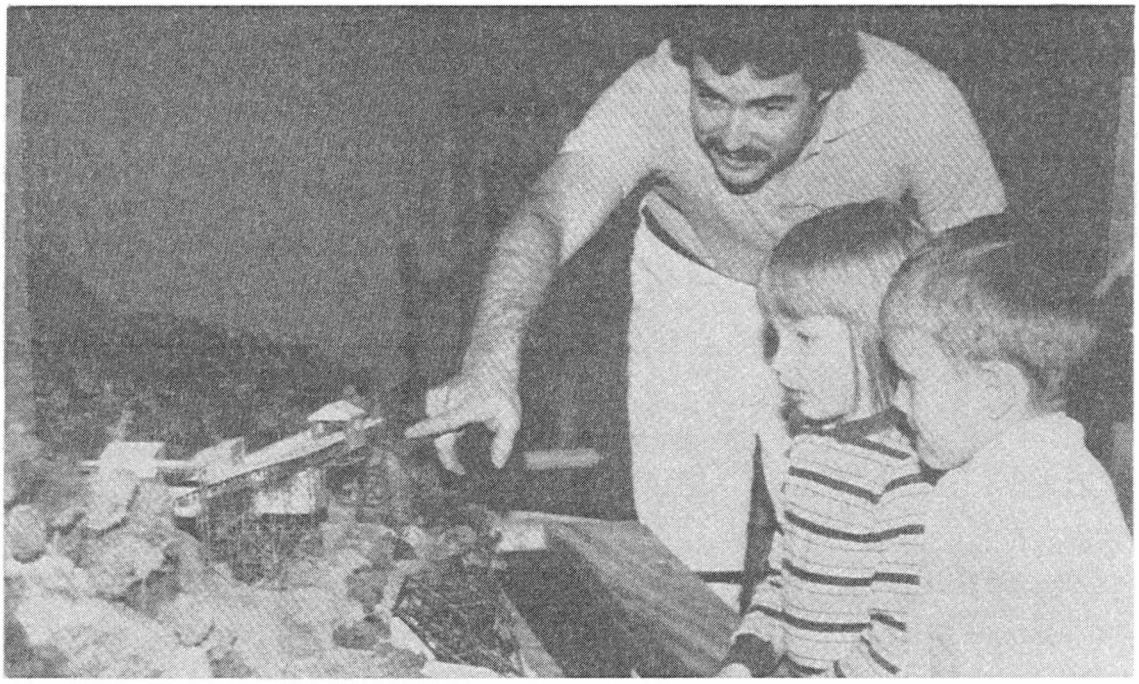
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ABSTRACT

The intent of this thesis has been to determine how three-dimensional scaled simulations, such as miniature villages and city planning models, can be used in built environment education. An extensive literature review uncovered a wide range of elementary and secondary school curricula oriented towards community design issues. In order to assess the programming associated with existing urban representations, surveys were mailed to a sample group of 65 public and private entities, each featuring at least one form of simulation. Questionnaire recipients included: planning agencies, museums, architectural firms, universities, and tourist attractions. Three mini-case studies were also conducted. Over thirty organizations responded to the survey, and as with the mini-case study group, these respondents described very diverse missions, and thus, equally diverse programming. Although educational concerns were considered important by nearly all of these groups, the level of their involvement through the use of their resources often indicated otherwise. This discrepancy is in part attributable to the fact that very few governing bodies have established policies regarding civics and planning-based studies. Nonetheless, due to the efforts of a small, yet committed, network of nonprofit educational outreach groups, an excellent array of teaching resources is currently available. Most of these programs and curriculum guides are successful, because concerned volunteers and educators have discovered that the interactive processes typically generated by scaled simulations are ideal for nurturing an enthusiasm and desire to learn.

PREFACE

"Reading architectural blueprints is like reading music.
Some people can do it after a specialized education.
But everyone can see *something* in the three-
dimensional representation of a building."
Jeremy Lebensohn



As a young man growing up in Quincy, Illinois, I often drove past a marvelous Prairie Style elementary school in the city's historic north side. The design of this Ernest Wood masterpiece was (and still is) truly captivating; however, it was a saying on one of the exterior walls that long ago emblazoned itself into my memory. There, in large off-white letters on a dark panelled background was a motto by which to live:

"For those who dare to teach must never cease to learn."

The planning field's Code of Ethics strongly encourages professionals to share their knowledge and expertise with others. This includes reaching out to both the young and old, rich and poor, gifted and challenged, and to all races, nationalities, and creeds. Why? Because everyone deserves the right to know about the environment in which they are living. They need to understand how these surrounding forces shape them as individuals; and, just as importantly they need to be instructed as to how they can positively effect and change these surroundings.

Big cities, small towns, and rural landscapes all have something to offer as places to learn. A strong comprehension of these settings, however, depends upon interaction through touch, sound, and movement; for such full-sensory experiences best solidify the educational message. Therefore, it is clear why many three-dimensional urban simulations, especially miniature villages, are remarkably effective as teaching tools.

It is obvious there are many educational resources which can truly enhance a child's civic understanding, and thus, his or her level of accountability. Since very few communities could ask for anything better than a well-educated, highly responsible citizenry, school boards must seriously consider mandating built environment curricula. Every time a generation misses out on the opportunity to learn from these resources, future generations suffer from the lack of properly informed leaders. Now is the time to incorporate planning oriented studies into elementary and secondary classrooms; for as it was once noted: "To build a child right is much better than rebuilding an adult."

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CHAPTER I

PURPOSE AND METHODOLOGY

Introduction

> "The aim of education is to help people learn how to understand, control and, ultimately, change their environment. But the education system in this, and in most other advanced industrial societies, is geared to precisely the opposite end: i.e. pupils are taught that the world is extremely difficult to understand; that only a privileged few can reach such an understanding; that these few have the right to control the activities of all the rest; and that, far from trying to change their environment, the vast majority of people should try and fit happily with the situation as it is" Albert Hunt (Ward).

The future of good planning and urban design depends to a large extent upon one thing. That critical factor is the level of awareness of urban development issues by today's youth and our future generations. Some of America's earlier planners understood this need quite well. Wacker's Manual of 1911 had as its primary mission to teach school children (and therefore their parents) about the new plan for Chicago. This commitment to an urban education is carried on today by such groups as the American Planning Association, UNESCO, and the Center for Understanding the Built Environment (CUBE). One of the learning tools that each of these groups has used is the three-dimensional scale model.

Scale models are often part of the first images small children have of cities. Model railroads, Disneyland, and "Mr. Roger's Neighborhood" all use some form of scaling to replicate the urban landscape. Internationally, miniature villages such as Madurodam, LEGOLAND, and Tobu World Square, act not only as tourist attractions, but as recorders of urban history (Figure 1.1). These small scaled simulations can be very effective in conveying information about the built environment. They can be particularly effective with school age children, because as educator Edgar Dale stated, "children are used to models" (83).



Figure 1.1
A Miniature Village in England

Three-dimensional scale models have been used in a number of classrooms. Schools across America including those in Minnesota, New Jersey, New Mexico, and Tennessee, have utilized models as educational tools. Some of these experiences have been very successful in helping the students attain a greater understanding of urban issues. For instance, one elementary school using a miniature urban model found that as their model became more complex and refined, the students began to "realize the need for such things as zoning restrictions, taxes and subsidies" (Beal 23). It is this type of early awareness that can build strong city leaders for the future.

Purpose

> "Anyone who wants to plan and build a community must be able to visualize two- and three-dimensional space and the four dimensional impact on the user. One must understand these relationships at the smallest scale first, in order to apply them to a larger scale" Anton Clarence Nelessen (Visions for a New American Dream).

Is the scale model an effective tool for teaching school children about such issues as neighborhood context, zoning, urban infill, and spatial relationships? The purpose of this study is to answer this question in a three-step process. The first process will be an evaluation of how models have historically been used in the architectural and planning processes, as well as in other venues. The second will be an overview of the different methods that have been employed to teach school children about the built environment. The third and final step will be an assessment of the ways three-

dimensional models are currently being utilized, with an emphasis on their use in elementary and secondary school planning education.

When developing a child's curriculum it is very important to determine which subjects and educational tools are the most effective in providing vital skills by enhancing comprehension; and hopefully simultaneously fostering an overall desire to learn. Addressing this curriculum concern planning professor Carl Patton noted; "no matter what the future holds for them, all elementary and secondary school children can benefit from an early understanding of how cities work, how buildings get built, and how people and groups obtain resources. The hope, of course, is that this early exposure will result ultimately, in better working, more attractive and more livable cities." He concluded by stating: "in any event, an early introduction of tomorrow's leaders to planning and design concepts should further our enlightened self-interest as professional planners" (Patton 1).

Planners are obligated to share their particular professional knowledge with educators, students, and other concerned citizens. If planners possess the ability to express urban concepts through the interpretation of scale models, then they must share this insight. Members of the planning profession have actively participated in Box City and other activities which employ scaled environments. How these and other activities can be tailored to a student's educational needs is the focus of this research.

Many forms of urban models can be found in cities throughout the United States, and elsewhere around the world (Figures 1.2-1.4). Therefore, an assessment of their usefulness as a teaching tool should be undertaken. This study will explain why, what, where, when, and how, scale models and other built environment simulations can be effective in "bringing the city to life" for school age children.

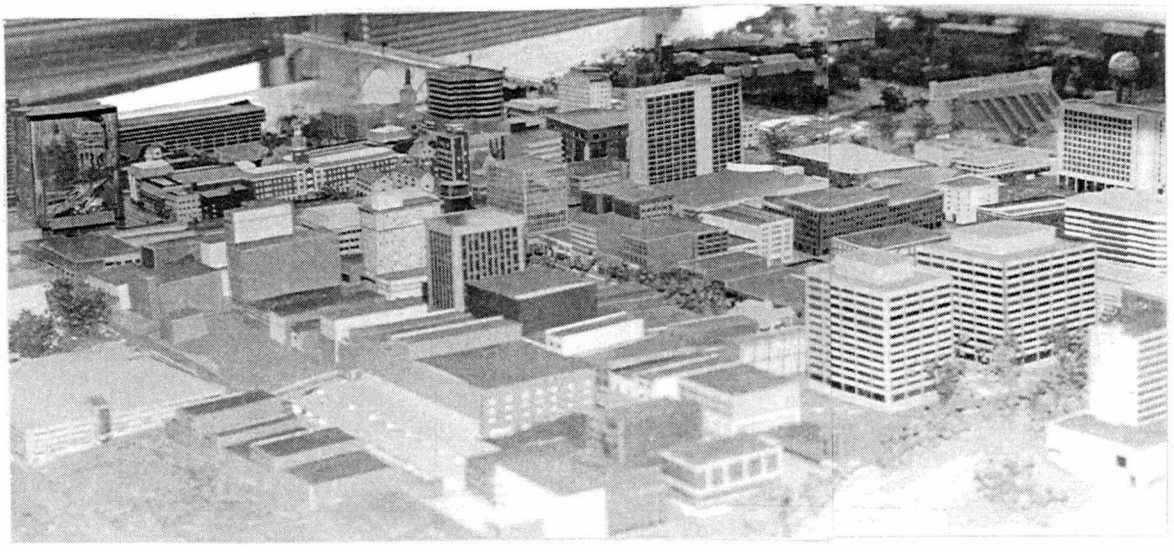


Figure 1.2
Downtown Knoxville Model



Figure 1.3
Manhattan Real Estate c. 1961



Figure 1.4
Manhattan "Unreal" Estate c. 1963

Research Questions

"How can America plan for less than greatness?" Pierre L'Enfant
(Washington: Symbol and City).

In order to ascertain the effect of scale models in teaching planning concepts, a series of research questions have been developed. My primary question is as follows: How can three-dimensional scale models be used in educating school children about the built environment?

My secondary questions are as follows: What are some "successful" examples of scale models of cityscapes? What elements of planning (e.g., zoning, urban design) can be taught through scale models? What other forms of modeling can be used to teach school children about the built environment? What organizations are involved in educating school children about the built environment? How does the size of the scale model affect the ability to comprehend? What type of impact has Box City had on teaching school children about planning? In what different settings (e.g., federal agencies, museums, tourist attractions) do models exist, that can be used to teach school children about the built environment? Beyond physical planning issues, how are scale models being used to educate school children about neighborhoods, cities and regions? How were scale models used historically (pre-20th century) to educate citizenry and clients? What are some of the educational benefits of using scale models compared with such mediums as maps, aerial photography, and drawings?

Methodology

"You can see a lot by observing" Yogi Berra
(Peters, Thriving on Chaos).

The methodology for this study reflects the complexity involved with the convergence of two subject areas. These typically separate concerns are: 1) the use of scale models within the context of planning and other design settings, and 2) the methods for educating elementary and secondary school children about the built environment. In order to maintain a more manageable scope of research, the primary focus has been on three-dimensional architectural scale models, and not on the use of other simulations such as virtual reality and SimCity.

The initial research method consisted of an extensive literature review of the subjects. A series of telephone and personal interviews with experts in the appropriate fields was then undertaken. Among the many individuals interviewed were: representatives from the Center for Understanding the Built Environment, Tennessee Valley Authority, Colonial Williamsburg Foundation, MINICITY, USA!, and the architectural firm, Murphy/Jahn. Several city planning and community development agencies were also contacted, including those in Philadelphia, Pennsylvania, San Diego, California, and Knoxville, Tennessee.

Interviews were also conducted with researchers at institutes of higher education, including Anton Nelessen at Rutgers University, and Peter Bosselmann, director of the University of California at Berkeley Environmental Simulation Laboratory. Input was sought from educators who have participated in Box City and other planning activities aimed at elementary and secondary school age children. Additional contacts were made with professional model builders, museum representatives, and other individuals with pertinent knowledge and experience.

Mini-case studies were conducted and a survey administered, in order to determine what specific planning education activities can and are being used. Through research, a number of places were discovered to have models and other types of simulations among their resources. These included such sites as; children's museums, governmental agencies, educational institutions, and tourist attractions. From this group, a survey questionnaire (Appendix A) was mailed to a sample population of 65 organizations (Appendix B). With the intent of providing an even greater analysis of educational programming and overall operations three mini-case studies were also undertaken. This research targeted Central Atlanta Progress, the Panorama of New York City at the Queens Museum of Art, and the U.S. Army Engineer Waterways Experiment Station in Vicksburg, Mississippi. When possible these mini-case studies consisted of on-site investigations and personal interviews.

Conclusion

"Architecture...is a magnificent game" Le Corbusier (Wiencek).

It can be very difficult to develop a formula for a truly enriching learning environment. Committing to educational activities which capture a child's interest and imagination, however, would be a great foundation. Many built environment simulations appear to possess some innate quality which fosters such enthusiasm. The images they present are often very powerful; and, as Suzanne Hilton explains, interaction with these simulations may initiate long lasting effects. "If you have ever put together a model from a hobby shop, you have begun developing a skill that could turn into a lifetime occupation. A boy who makes a village for his electric train is practicing traffic management and city planning. When a girl decorates her dollhouse, she may actually be starting a career in architecture or interior decorating" (Hilton, Preface). Thus, it is essential to have a better understanding of how and why teaching tools such as scale models can encourage children to learn about the wonderful world around them.

CHAPTER II

SCALE MODELS AND THREE DIMENSIONAL SIMULATIONS

Introduction

Before the written word there were depictions. What could not be described in speech was illustrated in drawings or in hand-shaped forms. These human-made three-dimensional depictions were the first "scale" models. As time progressed, so did the complexity of these models. The culmination of this progress is the state of high-tech modeling that exists today.

Webster's New World Dictionary defines a model as "a small representation of a planned or existing object" (or as "a person or thing regarded as a standard of excellence to be imitated") (Webster, 1987, p. 387). In the planning context, the term modeling can have several different meanings. Besides three dimensional scale modeling, planners can use mathematical or econometric modeling. These statistically generated models are used to make projections about the future. Although often useful in understanding planning concepts, mathematical and econometric models lack the visual qualities of three-dimensionality that are the essence of this study. Therefore,

these models along with other non-architectural or planning related scale models, such as model airplanes and ships, will not be discussed further.

The first part of this chapter features a history of models and other representations of the built environment spanning over 5,000 years. The next section covers the different types of scale models, their composition, and a categorization of their uses. The chapter ends with a broad overview of existing models and other simulations with an emphasis on their development and function.

The History of Models

Ancient Times

Since little has been written and just a few artifacts have been found, it is difficult to obtain a strong timeline of the evolution of scale models. However, enough evidence has been discovered to conclude that many cultures have used three-dimensional simulations of the built environment for either religious, political or architectural purposes. Although their exact purpose and level of complexity may vary greatly; they all show the need for people to replicate their environment at a more controllable scale.

Some of the earliest examples of model building the result of the ancient Egyptians preoccupation with the afterlife. In order to be prepared for the possibly stark nether world, many Egyptians were buried with physical reminders and necessities from their lives. Such an Egyptian was Meket-Re of Thebes who died around 2000 B.C.. "His tomb held models of a brewery, a bakery and a garden to ensure against hunger on the way to the next world. There was also a weaver's shop and a carpenter's shop. It did not bother Meket-Re that these models were very much smaller than his body because Egyptians believed that only the soul went on living-and fortunately the soul was very small" (Hilton 25).

Meket-Re also had a miniature pleasure barge, as well as a model of his own backyard with its seven sycamore trees and pond. Other models that assisted Egyptians in their "journey" included; assorted ships, furniture, family members, and slaves. The occasional real slave was thrown in just for good measure. Because of "the airless pyramids and tombs of arid Egypt these brightly painted clay models were perfectly preserved for thousands of years;" thus showing "a way of life in miniature to the archaeologists who unearthed them" (Creekmore, Your World in Miniature 2).

The ancient Greeks, known for their contributions to architecture and urban design, used scale models as part of their planning process. A scale model of the Delphi Temple is one of the oldest acknowledged architectural models. It is mentioned in the

writings of Herodotus dating from the Fifth century B.C. (Janke, 1978, 8). In addition to small scale models, the Greeks also used "paradeigmata," full-scale representations of such architectural details as capitals and friezes (Porter 3). Remnants of both of these types of design simulations can still be found in the numerous museums of Greece.

Other individuals in the early Greek civilization also found models to be quite useful. The tax collectors on Crete used models to assist in their collection duties. Houses, made from the island's once famous pottery, were given colors to indicate the amount of taxes to be levied on individual households. "The tax collector had only to glance at his scale model, check the color code of the house, and show up at the citizen's front door for payment" (Hilton 84).

The Romans followed the Greeks in their need to represent the built environment. Scale models were commonly employed in the design process for buildings in the Roman Empire. Vitruvius, the ancient Roman architectural essayist, noted that showing buildings in their proper context was of particular importance (Porter 2). Thus, representations of individual buildings continued to evolve into models of the urban form.

The Second Millennium A.D.

Several civilizations in Asia also had a history of using scale models. Of particular note are two famed Chinese dynasties, the Ming (1368-1644) and Manchu (1644-1911). "The ancient Chinese builders of Ming and Manchu cities worked without scale drawings, relying instead on intricate small-scale plaster models which display a remarkable precision and elaboration" (Porter 1). This tradition carries on, with China and Japan having some of the finest architectural models and most elaborate miniature villages in existence today.

It wasn't until the late Middle Ages that scale models again gained strong popularity in Western society. Since at that time most of the masons and carpenters were illiterate, master builders and architects used models instead of drawings and text to depict their ideas. Scale models were developed during various stages of a building's progress, and were brought to the construction site for firsthand reference. Other models were being built in order to test such things as rib vaults and other construction techniques. The National Museum of Bavaria in Munich, Germany is noted for its collection of these 14th and 15th Century models (Creekmore, Your World in Miniature, 3).

Noted modeler and architectural historian Rolf Janke explains: "since the early Renaissance an increasing number of models exist showing buildings and urban districts, especially those of fortifications" (1978, 8). Scale models were being used

for what Tom Porter, in his book How Architects Visualize, described as "design aids in the visual orchestration of mass and space" (Porter 5). In addition, architects and artists were increasingly encouraged to build scale models at the request of their patrons, and in order to help "sell" projects.

Two of the most famous designers from the Renaissance Leonardo da Vinci and Michelangelo, however, had very different opinions of this practice. Leonardo da Vinci, the consummate builder and inventor, built dozens, maybe hundreds, of models of his projects. Some of these models can still be found in the museum dedicated to him in his hometown of Vinci, Italy.

Michelangelo considered himself more of a sculptor than an architect. Most often he was unsure of his plan for a building or piece of sculpture until it was completed. He conceived and designed as he went. When commissioned by Pope Leo X to design part of a new church in Florence, he complained about the preliminary part of the job, that being the building of a model. Michelangelo feigned a couple of attempts at producing a model, including having one built by one of his assistants. However, the Pope continued to insist on a real scale model by the artist. Michelangelo eventually acquiesced and spent the next month working on a wooden model of the proposed facade for the church. But, as Suzanne Hilton reveals: "The model the Pope finally saw is still in a museum, so all the world can see how closely Michelangelo did not follow it" (114-115).

As much as Michelangelo may have despised the concept of modeling, it was the standard practice of the day. In a letter written by Michelangelo he once complained of an error that arose during the construction of a building "...even though I had made an exact model, as I always do." Among his many projects, Michelangelo also built both a conceptual clay model and later a large wooden model of the cupola for the Basilica of St. Peter in Rome. This wooden model reportedly took an entire year to build (Porter 6).

The Renaissance, however, brought a greater reliance on drawings with the maturation of perspectives. Architects and draftsmen gave a secondary role to models as they focused on how to show three-dimensionality in a two-dimensional medium. Later, Sir Christopher Wren echoed a feeling perhaps shared by Michelangelo. Wren saw models as being more beneficial to his clients than for his own exploratory uses. Wren wrote: "a good and careful large model" should be built for "the encouragement and satisfaction of the benefactors who comprehend not designs and drafts on papers." Tom Porter saw this new role for models as representing "a further step away from any wholistic conceptualization of space" (10).

Nevertheless, scale modeling not only survived the Renaissance, it even began to flourish. In addition to being used for architecture and planning, models were being more commonly used for experimental, educational, and recreational purposes. As Nuremberg, Germany grew into a center for toy making, it became well known for its

miniatures and models. However, "the famous 'Nuremberg kitchens' were not intended as toys at all. They were for instruction of young ladies," in order to illustrate the mechanics of a kitchen, as well as "teach good housekeeping" (Hilton 54). In the same way boys were taught about finance and to be neat and orderly through the use of miniature shops. Among those models that have survived to today, are a grocer's shop, a vegetable stall, a lawyer's office, and a butcher's shop featuring a butcher doll complete with a bloody apron.

One of America's most inventive luminaries, Benjamin Franklin, also promoted the use of models. After a tediously slow trip through a Dutch canal, Franklin decided to find out how these "highways" of the 18th century could be improved. By building a 14 feet long trough, that could hold water at least six inches deep, he created his own miniature waterway. While living in England he performed several experiments on his waterways, resulting in some fundamental revelations about canals. However, few people believed there could be a relationship between miniature ships and their full-size counterparts, and the waterways they used. Britain's Admiralty Board would not be convinced for another hundred years (Hilton 9-10).

The 19th and early 20th Centuries

A focus on the 19th and early 20th century reveals that most of the models built in that era were from the realm of architects and planners. The Modern Movement in

architecture, which rejected Beaux Arts academism, encouraged the revival of scale models as a tool to depict their pure and orderly spaces (Porter 14). Several well known architects were particularly noted for their models including Antonio Gaudi, Eero Saarinen, and Frank Lloyd Wright. Gaudi "was able to represent his complicated uninhibited shapes better with models than with usual orthogonal drawings" (Janke, 1968, 85). In the case of Gaudi's La Sagrada Familia church, these wire, canvas, and plaster models have been invaluable in its continued construction, years after the architect's death.

In 1934 Frank Lloyd Wright and his apprentices built a model of his proposed utopian community, Broadacre City. Wright believed that Broadacre City, "the inevitable community of the future, was compelled by three major inventions-the automobile, electric-communication and power transmission facilities, and standardized machine production" (Meehan 344). Through his model(s) he tried to accurately reflect these physical elements, as well as many aspects of the social and economic concepts he proposed.

The main Broadacre City model and its complement of ancillary building models were first seen by a national audience at the 1935 Industrial Arts Exposition of the National Alliance of Art and Industry. "The main model of Broadacre City measured twelve by twelve feet eight inches and was constructed at a scale of one inch to seventy-five feet. This represented four square miles of land or, as defined more traditionally, four

U.S. Public Land Survey sections for a total of 2,560 acres. This four-square-mile area, reportedly would accommodate about 1,400 families or dwelling units" (Meehan 344).

In 1981, the Frank Lloyd Wright foundation studied the remaining quarter of the model, as well as historic photographs, and determined there were only an estimated 761 dwelling units represented in the Broadacre City model. Nonetheless, the city as shown in the original full model was basically a complete, self-sufficient community. In addition to assorted dwelling units it featured: a stadium, large and small factories, a fairground, a cathedral with forested cemetery, acres of farmland, and a centralized commercial center. Other urban institutions contained on the model were a civic center, several museums, a broad range of educational facilities (including a college), public utilities, and a complete intermodal transportation system.

The focus of the Industrial Arts Exposition was to emphasize the "beauty and design in objects of mass production intended for the average consumer" (Meehan 343). This event, held at Rockefeller Center in New York, featured an unusual "electronic" opening ceremony. The festivities began when President Franklin Roosevelt threw a switch at the Oval Office in Washington, D.C.

On that opening night in 1935, Frank Lloyd Wright gave a radio address from Rockefeller Center regarding his utopian city. His speech dealt mainly with the

philosophical framework for Broadacre City. However, in his concluding comments he challenged Americans to sacrifice their time and to study the models in order to truly appreciate their message. Wright finished his speech with the following:

> "Because the psychological moment is here, the models are here to show you the future that is now. Really to grasp the significance of our work on this cross section of civilization requires considerably more intelligent and unselfish application on your part than most of you will yet be either prepared or be willing to give. But the making of these models required just that kind of application for a lifetime of experience. Many months of devotion on the part of the Taliesin Fellowship - the young men and women who unselfishly made them - has brought the models here where their worth for the future may be judged" (Meehan 347).

Just as Wright's commissions ebbed and flowed during the 1930s, so did the work of many other architects of the time. "During the Depression, when no one could afford to build new homes and cities had no money for constructing public buildings, architects had a problem getting enough work to do. One New York firm kept all of its men busy building strong scale models to be sold as dollhouses" (Hilton 31).

It was during this time that miniature villages first appeared and took their place in the annals of model history. Bekonscot the self-proclaimed "oldest model village in the world" was opened to the public in 1929. Located in the outskirts of London, Bekonscot is "an idealised version of rural England in the 1930s" (Bekonscot, Guidebook). Its model buildings and other structures were built at varying scales, ranging from 1:12 to 1:36 scale.

As with several miniature villages, Bekonscot was originally started as a hobby. However, by 1993, the attraction had been visited by over 11 million people. Bekonscot was built by London accountant Roland Callingham and his friend James Shilcock, a model railway enthusiast. Callingham lived in Beaconsfield and Shilcock in Ascot, hence the name Bekonscot. In 1932 the Bekonscot Model Railway & General Charitable Association was established to run the model village and handle financial matters. In a situation similar to that of Madurodam, a model village in the Netherlands, surplus profits from Bekonscot have gone to charity (Bekonscot, Guidebook).

Following both world wars urban models were developed to help in the rebuilding process of decimated cities. Many of these models were working models and have long since been dismantled. Triptych models showing cities before, during, and after the war, however, can be found in several European cities. Frankfurt and Rotterdam, both heavily damaged in World War II have such models.

A scale model built in the United States during the war years, was created in the hopes of saving lives in the future. Following the Mississippi River flood of 1937, at that time the largest recorded flood in America's history, a decision was made to better control our nation's waterways. After selecting a site for a model the size of "166 football fields" (Hilton 11)," the Army Corps of Engineers began to develop its simulation of the lower Mississippi River basin. With the "voluntary" help of German

Afrika Korps prisoners of war, drainage ditches were dug, roads and bridges built, and the river's watershed and surrounding land were shaped.

Following the war the model was completed and made functional for hydraulic tests. For over three decades the Mississippi River Basin Model served as one of the many simulations used by the Waterway Experiment Station (WES) in Vicksburg, Mississippi. The operations at WES, including their public education programs, will be discussed in greater detail in Chapter V.

Some of the largest architectural and planning models in the United States were built as exhibitions for World's Fairs. Several of these models still exist today. The Works Progress Administration built a model of San Francisco for the 1939 International World's Fair. Since then this model has been used in studies by the City's planning commission and other municipal entities. "The downtown quadrant of the model is updated every year." Thus, "the model has served as a record of the City's urban growth since the 1930s" (Environmental Simulation Laboratory).

At the same time there were also several simulations of the built environment at the New York World's Fair of 1939/40. In typical New York fashion two of these simulations were respectively proclaimed as the "world's largest model" and "the world's largest diorama." The Futurama model, designed by Norman Bel Geddes, projected how America would look in twenty years. Highlighting this exhibit was the

section "City of Tomorrow." The diorama was known as The City of Lights, and was akin to a compressed snapshot of New York City (Miller, Panorama). A third modeled environment was Democracity, a planned utopian community. This futuristic setting, located in the Perisphere, was designed by Henry Dreyfuss (Miller interview).

The enormous Futurama model was made of 408 separate sections. When combined the model covered approximately 35,000 square feet. It was primarily developed by using U.S. Geological Survey Maps. The model was housed in the General Motors Pavilion. An integral part of the exhibit was a ride for spectators billed as an "airplane" trip. "The Futurama used a row of moving chairs, each wired for sound, that travelled along the model's edge (Figure 2.1). Bel Geddes achieved sophisticated

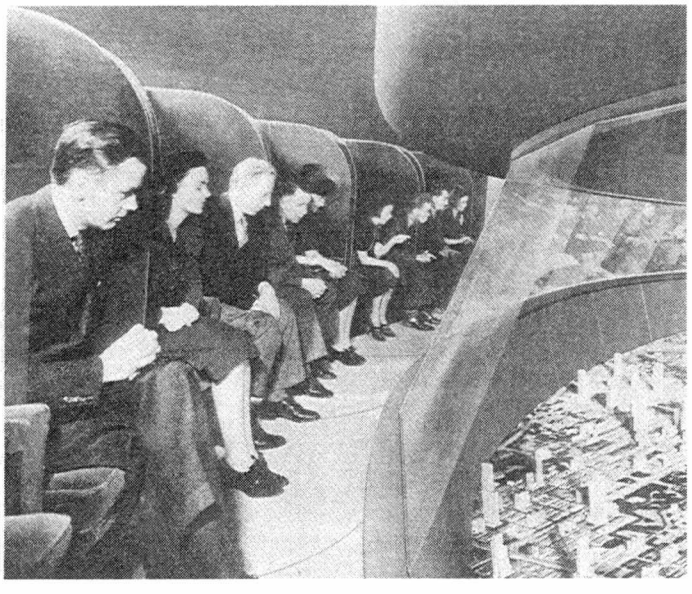


Figure 2.1
The 1939 Futurama

effects using changes in the scale of the model (from 1:1200 to 1:600) to simulate an airplane flying high, and then descending for a closer look" (Miller, Panorama, 32). The Futurama was demolished shortly after the fair closed.

The City of Light diorama (Figure 2.2) at the 1939/40 Fair was designed by Walter Dorwin Teague and built by the Diorama Corporation for the Consolidated Edison Pavilion. "The City of Light was a block-long contraction of New York with over 4,000 recognizable buildings from Brooklyn to Westchester. While the foreground buildings were done fully in the round, low relief was used for the background



Figure 2.2
The 1939 "City of Lights" Diorama

structures in front of the painted backdrop. The tallest building, the Empire State Building, measured 29 feet" (Miller, Panorama, 35). Overall, the diorama seemed somewhat to foreshadow the backdrops of David Letterman's late night television shows.

The Panorama of New York City, was built as a centerpiece for the 1964/65 New York World's Fair. Although supposedly only one quarter of the size of the Futurama, the Panorama of New York City was to become the heir apparent to the self proclaimed title of world's largest architectural model. The model features all five burroughs, and contains nearly 900,000 buildings. It was built at a scale of 1 inch = 100 feet (1:1200). Since the fair, the Panorama has been the primary permanent exhibit at New York's Queens Museum of Art.

Robert Moses had hoped his project would be used for both educational and urban planning purposes. Although interest in using the Panorama as a planning tool waned after Moses' retirement, it continues to provide a striking image of the Five Burroughs, much of which Moses helped shape. As one New York Times reporter described the Panorama, after a recent renovation, "here, you will enter the mind of one of the greatest master planners of all times. You will survey the city through the eyes of the man who transformed it" (Muschamp C1). A more in depth description of this model and its functions will be included in the Chapter V.

Post War Planning Models

During the second half of the 20th Century in America, the two greatest forces encouraging the construction of planning models were Urban Renewal and the construction boom of the 1980s. Both cases were the result of policies (e.g., 1981 Tax Act) established by the federal government.

One of the most famous planning models from this period belonged to the City of Philadelphia. It was developed under the supervision of Edmund N. Bacon, FAIA, then the executive director of the Philadelphia City Planning Commission. Its primary purpose was to demonstrate the affects of Urban Renewal and subsequent developments on the Center City of Philadelphia.

Starting in 1955, the Philadelphia model served as the focal point of a permanent city planning exhibit known as the Philadelphia Panorama. Aaron Levine, Executive Director of the Citizens' Council on City Planning, declared: "we make every effort in Philadelphia to have the citizens participate in the actual planning and building of their city." Thus, the Philadelphia Panorama was designed "to help the people of Philadelphia visualize the shape of the community in which they can live, work, and play" (Bacon).

The Philadelphia Panorama was housed in the city's Trade and Convention Center. According to the Center's Chairman, Lawrence M.C. Smith, the Philadelphia Panorama served the city in three ways.

> "First it presents the image of Philadelphia to the great number of foreign visitors who come to see Philadelphia. Second...it creates a feeling of interdependence in planning. Third, there are 30,000 school children from the parochial and public schools who come to this area for their social studies. They engage in actual planning tasks on a community level, and it serves to get them ready to accept the plans of the future, and to accept planning in their lives" (Bacon).

In addition to the main Center City model, the Panorama also contained a series of smaller models, maps, aerial photographs, architectural renderings, and plans. Among the other models was one that featured mechanical hands that would "lift off" a city block to expose a drawing of a planned development for the site. The main Philadelphia model likewise was used to show existing conditions as well as elements of the new Philadelphia Plan.

In order to illustrate both the new and the old, the Philadelphia model utilized a series of fairly simple but effective electronic devices. Overhead lights would shine down on a specific area, for instance, three square blocks. After a few moments, that section would flip over 180 degrees, and its reverse side would then be showing the proposed development for that area. The model featured a number of these changing panels, some covering only a few acres; while others covered such large areas as the Center City's Delaware River waterfront.

The current state of the Philadelphia model can be indicative of what happens to planning models that require constant upkeep. Because of the cost necessary to alter the model to reflect current plans, the model eventually became "obsolete" and expendable. According to Bob Presser, the Philadelphia City Planning Commission has mentioned in several meetings that they "ought to stick some money into it and put it somewhere," but they "looked at the cost to fix it up and it was just too expensive" (Presser).

Today the model is stored in a warehouse "in a terrible condition" (Presser). Although it may never function again as a working model, in its day it had a tremendous impact. Presser recounted; when we "took tours though there [the exhibit], it was very effective." Thus, due to its universal acceptance and its design successes, it became one of the quintessential "models" for current day planning simulations.

Projects involving models and other three-dimensional simulations continue to be developed. Some projects, however, never reach fruition. This is primarily due to cost, but sometimes it's political. One fairly recent project, whose original design was only partially completed, is the Freedom Plaza in Washington, D.C. It was designed by George E. Patton, along with Venturi, Rauch and Scott Brown, Joint Venture. The block long plaza currently consists of a two-dimensional map of the Federal area of the City. The design is based on the 1887 plan of Washington.

Freedom Plaza is primarily constructed of white and black stone with grass areas representing the Mall and the Ellipse. The original design also planned to include properly scaled models of a few of Washington's major landmarks. That design idea has been placed on the back burner, possibly permanently. Bronze inlaid floor plans of the White House and Capitol are currently the only representations of buildings within the plaza. A small bronze model of Freedom Plaza is located at the east entrance in order to help interpret the city plan (Carr 211-2).

Scale models, however, are alive and well in municipal planning agencies and downtown organizations throughout the country. Among the many U.S. cities with planning and development models are: Atlanta, Baltimore, Denver, Detroit, Kansas City, Los Angeles, Louisville, and St. Louis. Scientists and educators also continue to depend on numerous types of simulations for their research. The Environmental Simulation Center at the New School for Social Research in New York City, and the Institute of Urban and Regional Development's Environmental Simulation Laboratory at the University of California at Berkeley (present day home of the 1939 model of San Francisco) are two of the most active institutions involved in this work in America. Numerous other regional, national, and international organizations utilize scale models and other three-dimensional simulations on a nearly daily basis.

Types of Models

Introduction

There are many different ways to simulate the built environment. The intended purpose of the simulation typically determines what type of modeling technique is to be used. For example: a housing developer's model, a dollhouse, and a gingerbread house all represent a place of residence; however, their level of detail and type of construction is determined by their function. Models may be used as tools for both public sector planning and marketing private developments. Simulations and models are also used in tourist attractions, educational settings, and for private hobbies.

The following is a list of fairly common small-scale representations of the built environment: public and private planning models, miniature villages, environmental simulation models, architectural project models, Christmas villages, model railroads, historical representation models, and television and movie sets.

Children are also exposed to representations of the built environment through dollhouses and similar mini-buildings. Other common simulations include attractions at amusement parks, sandcastles, pop-up books, structures at miniature golf courses,

3-D puzzles, board games including Monopoly and Cathedral, and an assortment of "construction toys." These construction and modeling toys include Lincoln Logs, K'nex, LEGO, DUPLO, erector sets, Froebel blocks (used by a young Frank Lloyd Wright), and other assorted building blocks. Children use these toys to express their viewpoints about buildings and cities.

All of the above mentioned models and simulation devices have their own particular functions. But they all share the same intent to portray the built environment at a more controllable scale. As far as using them for educational purposes, one thing is clear, at least one or more of these models should be found in nearly every town in America.

Model Classifications

In an attempt to categorize the many types of models, a set of five classifications has been developed. They are as follows:

1. Explanatory/Evaluative
2. Experimental/Exploratory
3. Educational/Enrichment
4. Entertainment/Excitement
5. Et cetera/Et al

Explanatory/Evaluative

The Explanatory and Evaluative models are those used primarily in the traditional planning and architectural sense. Both public officials and private developers use these type of models to define and/or sell a project's ideas. These models are often on display in public settings. Among the most common uses are neighborhood or town models, building models, development project models, and topographic models. The essence of these models is in the process of critiquing the concepts they represent.

Experimental/Exploratory

Experimental and Exploratory models are built in the spirit of Benjamin Franklin. These models are used by a wide array of planners, engineers, architects, and industrialists. Environmental planning is perhaps the most common area in which they are used. They have been developed to help predict or protect against such things as arctic snowdrifts, typhoons, floods, earthquakes, pollution, and hurricanes. Designing for hurricanes is particularly important in built up areas such as CBD's, where the accompany gales can effectively turn an urban corridor (e.g., Poydras Street in New Orleans) into a life-size wind tunnel. Industrial and agricultural concerns use these type of models to test new layouts and equipment.

Educational/Enrichment

Educational and Enrichment models are most commonly found in museums and other similar settings. These models often feature interpretive devices such as legends, guidebooks, and audiotapes. Several groups use interpretive models within their information centers as a way to better define the organization's purpose. Historic sites often employ these models to depict a large site or to more accurately reflect what the area looked like during its period of significance.

Entertainment/Excitement

Entertainment and Excitement models are meant to do just that, bring fun and frivolity into ones life. These type of simulations consist primarily of miniature villages, model railroads, sporting models, scaled simulations at amusement parks, and other tourist oriented attractions. These are often some of the largest scale models, and also some of the most kinetic.

Et cetera/Et al

The Et cetera and Et al simulations are those that seem to defy categorization. These models may include television props, art work, and souvenirs.

Synopsis

For a number of models, determining just one specific classification of use is very difficult. Training models, for instance, could fit under both the categories of Education/Enrichment and Experimental/Exploratory. Most miniature villages, though intended for fun, offer cultural insights that are obviously educational. Some classifications may change with time, as is the case with the model of downtown Knoxville. Although this miniature urban scene originally served as a television prop, it is currently undergoing renovation for use as a design review and marketing tool for the city's economic development office.

One of the best examples of combining classifications is the Panorama of New York City, conceived by planner Robert Moses. "Moses saw the model, constructed for the 1964-65 World's Fair, not simply as a temporary public exhibit, but as a precise, permanent, and utilitarian planning tool...an ongoing resource" (Busch 26). The Panorama also "serves as an educational tool for school children. A lighting system indicating schools, hospitals, police and fire headquarters, museums, and other city facilities familiarizes children with the vast network of city resources" (Busch 27).

Although some models are obviously multi-faceted, overall the classifications prove useful. By categorizing models it may be easier to determine which models might be most successful in teaching children about the built environment. For instance, since

enjoyment of a subject helps speed learning, Entertainment/Excitement models may be more useful in teaching planning issues than Education/Enrichment models.

Design Elements

General

As Louis Sullivan said, "form follows function." Such is the case with models. For the purpose of this study, however, the elements that make up a model are not nearly as important as what the models represent. This is not to say that a model's properties are without impact when using them in an educational forum. But, due to the enormous amount of variables possible in the physical nature of models, it is important to note that the intent of the model drives its form.

Knowing what the model is supposed to achieve is paramount in its construction. "The intended interpretation and desired impression of the model must be clearly planned at the start, and properly prepared. In this way the appropriate methods may be selected, such as choice of construction materials," size, and scale (Knoll 123). Other model properties that Knoll describes include: shape, direction (position), shading, colour, and nature of surface (Knoll 8).

Dr. Stephen Sheppard in his book titled Visual Simulation: A Users Guide for Architects, Engineers and Planners, differentiates between these properties in order to explain how they affect the model: "Spatial position, scale, and shape or form may be thought of as primarily structural elements, expressing mainly three dimensional qualities. Color, line, and texture and detail, on the other hand, are primarily surface elements, expressing mainly two-dimensional qualities. All of these visual elements are affected by other variable conditions such as viewing distance, the direction from which the project would be seen, or lighting conditions" (Sheppard 47).

Scale

Scale is among the most important properties regarding the ability to absorb information. The primary reason models are used is to present objects at scales that make them more comprehendible. Models that are too large can lose the object's overall image; whereas, models that are too small may not have enough detail.

In order to present a broader view of the differences in scale the following graph (Figure 2.3) lists the scales for some fairly standard model types, as well as those for specific models indicated in this chapter. Some of these models have more than one scale. These differences may relate to either individual structures/sections, design techniques, or dimensional compressions. Note that 1" = 1' is a scale of 1:12; 1cm = 1m is a scale of 1:100; and that 1 ft. = 1 mile is a scale of 1:5280.

TYPE/NAME OF MODEL	SCALE	TYPE/NAME OF MODEL	SCALE
Main Street USA-1st story	.90:1	Miss. River Basin (vert.)	1:100
Main Street USA-2nd story	.80:1	Model RR - N gauge	1:160
Tiny Town	1:6	Miss. River Basin (time)	1:267
Amana Villages	1:12	Chautauqua Holy Land (v)	1:400
LGB gauge model RR	1:22.5	Sequoyah Nuclear Facility	1:500
Tobu World Square	1:24	Futurama ("near")	1:600
Madurodam	1:25	Broadacre City	1:900
Model RR - No. 1 gauge	1:32	Central Atlanta Progress	1:1200
Holy Land Hotel	1:50	Futurama ("far")	1:1200
SOM's Chicago Loop	1:60	Panorama of NYC	1:1200
The Alamo	1:72	San Francisco	1:1200
Model RR - HO gauge	1:87	Miss. River Basin (horiz.)	1:2000
Old Salem Putz	1:96	Mud Island River Walk	1:2112
Downtown Indianapolis	1:100	Chautauqua Holy Land (h)	1:3000

Figure 2.3
Cross Section of Models and Their Scales

Although the scale of a model is a significant property, it means nothing without a point of reference. "A model maker shows scale not by simply adding a sign, THIS MODEL IS 1/25TH SCALE. That means very little to most people. But 'people' or 'cars' added to the model practically shout what the scale is" (Hilton 29). This is especially important in terms of using models as teaching tools.

Materials and Construction Techniques

There are an infinite number of materials that can and have been used in the construction of models. The important thing to note is that the evolution of model making has made it possible to more accurately represent the built environment. "With models playing such a critical role in the design and planning process, it comes as no surprise that the art and the industry of model making has become increasingly sophisticated in recent years. The array of modern synthetic materials and technology available to the model maker has yielded new standards of precision and speed" (Busch 14). Among these new construction techniques are water jet and laser technologies. Using photographic cutouts is also fairly commonly when replicating the facades of existing buildings in larger contextual models.

Materials commonly change with what a model is trying to represent. Within the development period of a building project, several models may be designed to express

different concepts. Wolfgang Knoll and Martin Hechinger in their book Architectural Model: Construction Techniques, contend there are three stages in the design process, each requiring its own type of model. The stage and its applicable model are as follows: Pre-design (Conceptual Model); Design (Construction Model); and Completion (Exhibition Model) (Knoll 11).

For conceptual models, easily shaped, low definition materials are most often used. These include clay, plaster and other malleable substances. Construction models which need more definition are commonly made from cardboard, styrofoam, and certain soft woods. Completion models typically use whatever materials are necessary to most accurately represent or "sell" the project. Among the more common materials are: aluminum, steel, assorted plastics and acrylics, wood, paper, and yarrow, as well as the materials used for conceptual and construction models.

Again, it should be noted, the materials used are just an image of the true materials, and should be treated as such. The materials also vary in cost, which can have impact on getting used or old models for educational purposes. "Architect's daughters do not have dozens of dollhouses. Most of the material is used over again to make the next model" (Hilton 30). However, because of the nature of the materials used in conceptual and construction models, these models may be perfect for donation or long term loan.

Details

Details deal primarily with what Sheppard referred to as surface elements. The most common use of this in planning models is the use of colors. Color keys are used on the downtown models of both Louisville, Kentucky and Atlanta, Georgia. In Atlanta different colors are used to represent the decades within which individual structures were built. Texture and color combined can be of particular importance when representing buildings proposed for infill sites in historic districts or other design regulated areas.

Some critics say the lack of detailing in scale models has actually contributed to minimalistic architecture. The proliferation of a severe, Brutalist architecture has been blamed on the widespread use of balsa wood for modeling purposes. Oscar Newman in his book Colour of Architecture, "censured those weaned on a Bauhaus tradition who, relying on grey, cardboard models, spread the anonymity of a raw concrete environment" (Porter 83).

Functioning Models in the "Working World"

Introduction

With an understanding of the possible designs and uses for models, an in depth overview of existing three-dimensional simulations and their functions is warranted. The best way to describe these models is to divide them up into categories based on the places they are most commonly located. The four primary settings in which three-dimensional simulations can be found are: public planning offices and institutions, private design and development organizations, museums, and tourist attractions. Museums and tourist attractions often share many similar traits, as in the case of interpretive centers and other such venues that combine education with entertainment. Therefore, in order to best describe models in these different settings, museums and tourist attractions will be combined into one category. A fourth and final category includes three-dimensional simulations not typically found in these other settings.

As noted earlier, there are four basic types of models: Evaluative, Experimental, Educational, and Entertainment. Each of these types of models can be found in one or all of the of the different settings. However, some simulations are more common in one setting than another. Experimental models for instance would typically be found in public research institutions and not in amusement parks. Nonetheless each type of model performs its function as needed for the specific setting.

Within each of the different settings, the most commonly found models are those that represent either existing sites or proposed developments. Obviously architects would typically have more models of proposed buildings than would museums. Some models, however, are never intended to represent more than imaginary places. Most miniature villages feature replicas of real buildings; although, the cities or locales they represent (e.g., Madurodam) are fictitious.

The models mentioned in the following section are by no means meant to be a comprehensive list of all the three-dimensional simulations in existence today. What they do intend to illustrate is the broad spectrum of models currently being used, and where best to find them. It is important to remember that each and every model was designed for a particular purpose. Although their original intent may have changed, someone has found it important to retain many of these models for newer and possibly greater uses.

Public Planning Models

General

So much of what city planners have historically done is physical planning. Their primary intent has been to assure that new developments improve the area. At the very least, planners have tried to reduce the possible negative impacts upon

surrounding properties. Therefore, a thorough understanding of the area to be impacted is paramount in the decision making process. Rolf Janke sees the scale model as an excellent tool for planners to use in assisting this understanding; as his following statement indicates:

> "An assessment of the surroundings is basic to the solution of any design problem. It is only possible to site new buildings intelligently and to link them to traffic ways and green spaces, by closely studying their immediate environment. Out of the three fundamental factors in town planning - buildings, traffic, and green spaces - grow the demands and problems of the technical and economic solution of every project and not the least of its physical shape. If the existing conditions are not assimilated and appreciated, the formal result will have lost any real sense of association with the community. The most vivid means of conveying an accurate understanding of the actual planning situation is by three-dimensional representation. The architectural appearance of a town, part of a town or a town centre is therefore often shown by means of a model. Planning authorities, housing societies and industrial firms with extensive factories use models for demonstration and organization purposes. An urban expansion scheme undertaken in stages frequently entails a whole series of models, especially when it is necessary to illustrate a project as evolving from a basis of historical continuity and to make relevant points clear" (Janke, 1978, 30).

Municipal Models

A number of municipalities in America have heeded Janke's call for using urban models. These models typically focus on target areas, but on a rare occasion they depict an entire city. Downtowns are the most common subject for urban models. Mixed use neighborhoods and large project sites, such as abandoned railyards or a stadium complex, are also frequently represented.

City transportation planners use models to show the effects of highway and road expansions, as well as airport and harbor improvements. New transportation modes such as; magnetic trains, automatic guideways, and inner-city light rail systems are also being shown more often in model form. Whatever public planners have proposed in recent years, be it an intimate plaza or a "new town" development, models have been commonly called upon to help planners physically express their ideas.

As explained earlier, the Philadelphia Center City model was one of the earliest models to be used to help planners and other public officials in the evaluation process. Although it is no longer being used, many of its successors are functioning in cities throughout America. Most of these urban scale models were commissioned by their respective cities; while others were donated by local universities or by developers who had used them to illustrate their projects.

The Detroit Planning Commission built a model of the city's downtown, which is currently located in the City Council chambers. Such a setting is not uncommon; as it provides local decision makers easy access when they need it. In addition to planning commissions, community development (and redevelopment) groups often possess urban scale models. City departments, agencies, and corporations that presently have such models include those in Baltimore, Cleveland, Denver, Knoxville, Los Angeles, and St. Louis.

The Baltimore Development Corporation has two models depicting portions of its urban environment. The Central Business District is the subject of a continually updated cardboard and wood model. The other model depicts the planned waterfront renewal program. As in many municipalities, these models have been used for project comment by the local architectural review board. Denver's planning office has several models of the Central Platte Valley (CPV). These models (1:100-1:200) depict the CPV's 400 acres of reclaimed railroad land, and the downtown and residential neighborhoods that adjoin it (Farley survey). The model in the Knoxville Department of Community Development features the core of the city's downtown, as well as the University of Tennessee and Fort Sanders areas.

San Francisco's Planning Commission has used the updated 1939 model of the city for several urban design studies. The Planning Commission used the scale model (1:1200) to "study alternative growth scenarios for the downtown area and to demonstrate how much future highrise development could be accommodated without sacrificing the character of the City. These studies led to new height and bulk controls to provisions for the preservation of sunlight, and a comfortable microclimate in parks, squares, and on sidewalks" (Environmental Simulation Laboratory).

Downtown organizations are also primary locations for urban scale models. Louisville, Kentucky commissioned a model of its Central Business District in hopes of further spurring revitalization efforts. The city's economic development department

assisted Louisville Central Area, Inc. by paying $5,000 of the model's $18,000 construction cost. Built in 1983, this simply detailed model was recently appraised at $50,000, nearly triple its initial value (Louisville Central).

The Downtown Council of Kansas City is still looking for a permanent home for its new model. The model was built by Fifth Year Architecture students at the University of Kansas-Lawrence, and finished in early 1993. It features the portion of downtown Kansas City, Missouri that is within the Interstate loop. Atlanta's downtown organization, Central Atlanta Progress, Inc., has two models of the Atlanta CBD. These models will be discussed in detail, in Chapter V.

Internationally, planners use urban scale models to address problems similar to those faced in the United States. The following three examples of models used in Europe also show some of the pros and cons of using scale models. These pros and cons play an important part in concluding the overall usefulness of models as educational tools.

In Rosenheim, Germany, the Rohrdorf scale model (1:1000) has been used to help communicate project concepts to municipal council members. With the model in front of them "the council members and all those concerned find out what problems they face, which decisions are possible, and which alternatives should be developed" (Janke, 1978, 15). Elsewhere in Germany, a model built for the 1962 Industrial Exhibition in Berlin shows a broad view of Frankfurt and its surroundings. At a scale

of 1:1500, it depicts the primary traffic corridors between the Frankfurt-am-Main city center and the Rhein-Main airport. Janke sees this large exposition model as "a good example...of town-planning in operation" (Janke, 1968, 83).

Models cannot, however, guarantee better design. As Suzanne Hilton notes in her book It's a Model World, one new town in Sweden suffered from being planned completely by scale models. City planners used a series of wooden blocks shaped like buildings, and through a lengthy process of placement came up with a desired city plan. However, as soon as the new citizens moved into their city, the most common reactions were "it's dreary" and "there's no center of town." The planners agreed something was missing, but did not readily understand what it was. Eventually, "the planners realized their mistake. They had planned the whole city from 'a bird's-eye view,' not from the viewpoint of people on the street" (Hilton 36-37). Their dependence solely on the scale models created a serious problem, since the models did not completely represent the full intent of the planners.

Although there are some inherent flaws within scale models, cities such as Philadelphia, Louisville, and San Francisco have proven the numerous merits of urban models. In her book The Art of the Architectural Model, Akiko Busch summarizes why certain cities have strongly committed to using models in local planning:

> "In urban areas, they [models] are often crucial to the approval of development applications. Presented to local community and planning boards and zoning committees, such models may be used to demonstrate the proposed development's relationship to its site, its effect on traffic

patterns, its visual connection to surrounding architecture, its scale to neighboring buildings, and its overall impact on the neighborhood" (13-14).

Models as Regulatory Tools

Because models have proved to be such an important tool in depicting the overall impact of projects, some municipalities now require models as part of the planning approval process. Two such cities are Scottsdale, Arizona and San Francisco, California. For proposed developments in downtown Scottsdale the city requires either a three-dimensional model, a photo-montage, or a series of computer generated perspectives.

San Francisco is home to a wide assortment of scaled urban models. Due to regular updating, several of these simulations are often used for evaluating new developments. Section 148 of the City's Planning Code addresses how models of proposed projects are to be utilized within permanent planning models. It also calls for models to be used as separate non-contextual entities within the architectural review process. The following excerpt is from the part of Section 148 that stipulates the use of models:

"c) Models

In a C-3 district, in the case of construction of a new building, or any addition in height in excess of 40 feet to an existing building, two models shall be submitted to the Department of City Planning prior to approval of the project, as follows:

(1) One model of the building at a scale of 1" = 100'; and

(2) One model of the block in which the building is located at a scale of 1" = 32', which model shall include all the buildings on the block on which the building is located and the streets surrounding the block to the centerline of the streets and shall use as its base the land form starting at sea level" (Sheppard 164).

For many years, municipal governments have required some medium to represent proposed developments. Typically in the past, a set of black line drawings, blueprints, and/or an architectural rendering were all that were required. However, these proved inadequate when concerns increased regarding the overall environmental impact of developments. Cities had to have a better means of properly judging project feasibility versus the common good.

Many cities began to require better representations of the built environment. Public planners argued that although these new requirements may result in increased project costs, the information portrayed would allow for better planning and design decisions. Since the responsibility for the representations/simulations would typically be borne by the developer, cities had to have ordinances, such as San Francisco's, to assure some consistency. By improving the quality and complexity of models and other simulations, more flexibility has been allowed in the planning process. In his book Visual Simulation: A User's Guide for Architects, Engineers, and Planners, Dr. Stephen Sheppard states that such a flexibility is at the core of more equitable planning.

> "Although there is likely to be an understandable reluctance to add to the bureaucratic burden of regulations and procedures in planning decisions, improved regulation of simulations could lead to reduced restrictions in other areas. Many planning regulations such as zoning ordinances are applied as blanket policies or relatively arbitrary designations, because it is simply too complex to accommodate the infinite variety of site-specific conditions and project designs that occur. Simulations, however, can provide an enormous amount of critical information in a form that can be absorbed quickly, allowing people to judge site-specific issues more fairly" (Sheppard 170).

Other Public Entities

In addition to municipal planning and development agencies, other public entities also commonly utilize scale models. Universities with their Architecture and Planning schools, are one of the most common places to find scale models of the built environment. Perhaps the most extensive work in modeling and simulation in the United States is occurring at the University of California at Berkeley. The Environmental Simulation Laboratory located in the University's College of Environmental Design is responsible for many of the finest achievements in the field.

As previously noted, Berkeley's Environmental Simulation Laboratory is home to the WPA built model of San Francisco, that was first shown at the 1939 International World's Fair. The Environmental Simulation Laboratory (ESL) also has several other models of the Bay Area, as well as models of other cities including New York. The ESL produced a model of Times Square in 1985 to show New York city planners the potential for development allowed under the mid-town zoning codes. The purpose was

to compare a "make-believe" scenario of its future "with an alternative set of urban design controls intended to preserve the lights, signs, and openness of Times Square" (Environmental Simulation Laboratory).

The Urban Center Gallery in Manhattan has been the home of another one of the ESL's models. A section of Manhattan's West Side, including the Columbus Circle project and Donald Trump's proposed Television City, was built to investigate the aggregate effect of development in the area north of 59th Street. A group of concerned New Yorkers also temporarily installed a model of Trump City within the Panorama of New York to show its potential impact. For whatever reasons, Trump's enormous development has yet to come to fruition and likely never will in its original form (Miller, Panorama; Bressi, "New York").

As technologies improve planners are increasingly using motion studies and sequence analyses to better utilize their models. "In the U.S. so-called 'discursive' techniques were developed which illustrate the built environment not only in its dimensions and stereometric quality, but also in its aspects of motion, complemented by additional possibilities to perceive the lighting at different times of the day" (Janke, 1978, 32). The Environmental Simulation Laboratory has been at the forefront of these studies for a long period of time. Their work in this area including photographic simulators, computer image processing, and wind tunnel studies will be discussed later in this chapter.

Other universities are finding creative ways of using three-dimensional simulations including covering large regional areas. As a professor of landscape architecture at the University of Wisconsin, Phil Lewis, has sought to educate the public about the political, economic, and environmental impact of urban sprawl. His teachings "led him to establish 'environmental awareness centers' - low-budget versions of a bioregional Disneyland" (Tenebaum 16).

In 1967 Lewis built his first of several awareness center at the University of Wisconsin-Madison. These simulations utilize a series of two and three dimensional maps that depict the complex mix of natural and man-made features throughout southern Wisconsin. Featured are old grain mills, Indian effigy mounds, restored buildings, waterfalls, rivers, and many other local sites. Some of the older simulations show his vision for creating a 23 mile long green corridor connecting natural and cultural properties around Madison. Nearly realized, this soon to be completed pathway "wends its way among such wonders as the sewage treatment plant, wetlands, and parks" (Tenebaum 15-16).

In addition to the activities within the academic world, scale models are being used by a myriad of local, state, and federal agencies, as well as by a number of public non-for-profits. Three such groups currently operating in East Tennessee are the U.S. Olympic Committee, the Department of Energy, and the Tennessee Valley Authority (TVA). In Southeast Tennessee, for example, there is a recently developed model of

the Ocoee River depicting it as a sports venue for the 1996 Olympics. Two TVA engineers, Paul Loiseau and Mark Mobley, designed the concrete and wire replica of the river as part of an overall Environmental Impact Study (EIS). "Water released down the model allows engineers to plan the placement of boulders and sandbags that will channel water through the Olympic race course without disturbing the Ocoee River channel." With the approval of the U.S. Forest Service EIS, the Ocoee River becomes the first natural waterway to be used in Olympic whitewater competition (Lambert 3).

Both the Department of Energy (DOE) and the Tennessee Valley Authority use highly detailed engineering models, primarily in their work with atomic energy. According to Dick Salisbury of TVA's Sequoyah Energy Connection, models were used in the construction of all of TVA's nuclear plants. By using the models, the architects and engineers could determine, prior to construction, exactly where particular pipes and conduit lines could be placed. Salisbury noted that the cost of changing the location of such pipes during construction easily outweighed the cost of the models (Salisbury telephone interview). This usage of models is what Jane Jacobs in her article "The Miniature Boom," referred to as "shrewd investments in miniature to avoid full-size mistakes (107). TVA also uses models as interpretive devices at their facilities' information centers. These particular interpretive models will be discussed in more detail later in this chapter.

Whereas most of the models mentioned have been used for pre-construction analysis; some are built exclusively for post-construction evaluation and monitoring. Although post-construction models are rarely used, they are "most likely to occur in land management agencies such as the U.S. Forest Service, where simulations are used to help plan long-term management activities that affect visual qualities" (Sheppard 24). The extensive group of models at the U.S. Army Corps of Engineer Waterways Experiment Station (WES) are used for a vast array of purposes. For a more in-depth look at their functions, a detailed study of WES's operations will be provided in Chapter V.

Private Architectural, Planning, and Design Firms

General

In the private sector, the domain of most architects and developers, the model is a very common and essential tool. "Although an architect can understand blueprints and surveyor's charts very well, his clients rarely do. An architect is trained in 'spatial thinking,' but the people who hire an architect are not" (Hilton 26). Thus the model replaces both words and drawings, and serves as a more effective communications tool for the average person.

Most privately commissioned architectural models, however, are of individual structures or project sites, compared to the neighborhood and urban models used more commonly by public planners. Because of the singularity of the subject, final presentation models are typically built at a very high level of detail. Therefore, these models can be excellent for explaining architectural tenets and site specific planning goals.

In her book, The Art of the Architectural Model, Akiko Busch explains the architects dependence on models: "Architectural models, *as used by architects*...are the most efficient way to translate ideas, a way of collecting and articulating the precise spatial information about a proposed building" (Busch 13). Properly translating ideas is the essence of an architect's job. In order to guarantee their success, architects must constantly produce models and other simulations to "market" proposed projects to client, prospective occupants, or lending institutions (Moore, Preface).

One of the best marketing jobs done by models was during the immediate post-World War II housing crunch. Because of the shortage of materials and the lack of newly designed structures, models were called upon to provide a view of the future. Architects and professional model builders often referred to this period as the "magazine era," as photographs of their realistic models were published in mass nationwide. Much of the American public accepted these high quality representations

as the next step in their American Dream. And, it should be noted, these "captivating results...were not lost on architects" (Jacobs 109).

The Competition Model and the Model as Sales and "Visioning" Tool

In addition to being sought out for individual commissions, architectural firms frequently participate in design competitions. "For valuable downtown urban plots, developers may have little difficulty in persuading architects to go to the time and expense of submitting complex models for building proposals they may have only a small chance of winning. Such models provide an often fascinating glimpse of the unbuilt city, provoking comparisons between the city that might have been and the city that is" (Busch 118). Although some competitions ask for freestanding models, often the project model will sit within a larger model, so the proposal may be judged in its context. Architectural firms are typically given a set of guidelines for these "plug" models to assure consistency (Hansen).

Chicago, the site of perhaps this country's the most famous architectural competition (Tribune Tower in 1922), has also been home to a number of other design contests. In recent years a design competition was held for the proposed Harold Washington Library Center. The competition, held in 1988, featured models from a number of architectural firms including; heavyweights Skidmore, Owings & Merrill (SOM), Lohan Associates, Hammond Beeby & Babka, Inc., and Murphy/Jahn. In 1993 one of

the first exhibits held in the city's new main library was a retrospective of the competition focusing on the architectural scale models (Gapp 20).

The detail involved in many of these and other models is only restrained by the tools and time limitations of their creators. However, if the level of detail can help an architect "sell" his or her idea, or a developer successfully market a project, then the models have proved their worth. "With urban real estate commanding the high prices that it does, a model that leases a single floor even a month earlier has just paid for itself" (Busch 14). "In some cases the cost of such models can reach five or six hundred thousand dollars, an expense that nevertheless remains easily justified by anticipated revenues to the building's developer" (Busch 14). Scale models of newly constructed skyscrapers and other undertakings are thus typically found in building lobbies or in the reception area of the structure's primary tenant.

This type of marketing tool exists for more than just single structure developments, since it can be quite effective with much larger projects. Suburban office parks typically feature models in an attempt to illustrate their "organic fusion with nature" (Busch 25). Developers of neo-traditional towns and other major projects have used models to help convey their ideas of a new urban lifestyle. Big Sky of Montana, Inc. used an expansive scale model to help market their new "leisure community." To best show off the site's natural beauty, they placed a large outdoor model of the development on the exact spot in the Montana valley where the town was to be built.

Prospective residents were then invited to inspect its ski lodge, hotel, clubhouse, retail center, and residential neighborhood (Hilton 28).

Although no one associated with the development of Seaside, Florida was directly involved, an expansive model of that community was created in 1983. This urban model, however, did not replicate Seaside. Instead it was developed "to see how designers would respond to the architect's unique one-page code" (Dorschner 12). This design exercise was done under the direction of Professors Dhiru Thadani, Gregory Oaksen, and Peter Hetzel at Catholic University in Washington, D.C. Here, 140 first and second year architecture students designed and constructed their interpretation of how buildings could or would look like at Seaside (Mohney 97).

Most private firms will build whatever type of model or other simulation is necessary in order to meet a client's needs. As discussed earlier, architects use different levels of complexity based on whether the need is for a conceptual, working, or a final presentation model. With regard to his Broadacre City model, Wright defended his simplistic format as a right of the profession. "The blocklike effects seen in the model would not be so apparent as 'blocklike' in reality. But, here we have presented everything in the abstract; it is the architect's way" (Meehan 358).

Other abstractions of the built form include three-dimensional floor plans know as tactile blueprints. These are commonly used in explaining architectural designs to the

blind. Transparent models are also not representative of the final built form. Typically such "skeletal" models are intended to showcase interior spaces (Burden 68-69) As useful as models are, however, these abstractions must be understood as just that, abstract representations. This is necessary in order to prevent misrepresenting the built environment.

Models that accurately reflect the final design can often foreshadow easily corrected design flaws. As Suzanne Hilton states in It's a Model World: "with scale models, planners see what isn't there but should be" (Hilton 78). Such is the case with the model (1:200) of Skidmore, Owings & Merril's Chase Manhattan Bank in New York. The model features many human figures within its large ground level plaza; however none of them are seated (Janke, 1978, 52-53). In his studies, William Whyte, has singled out this urban plaza as being particularly pedestrian unfriendly.

Architectural Model Shops

Most of the nation's larger architectural firms have their own in-house model shops. These model shops take care of most of the firms standard modeling needs. However, with the advance of new technologies, specifically lasers, some in-house shops find they are somewhat limited by their traditional tools when competing with other modelers. Professional modelers at firms with the new technologies are faced with other demands. Richard Hopper, who served as the assistant director of the model

shop at Skidmore, Owings & Merrill during the 1980s, said the new technologies come with a price. "Once the architects know we have it, they demand higher-level models at earlier stages, so that we're providing greater detail on our study models" (Lebensohn 100).

A number of architectural firms decide to build and retain certain models for their own use in order to showcase their best work. Certain prestigious firms having a concentration of significant buildings in one city, will build an urban model that highlights their projects. Typically these models cover most, if not all, of the city's central business district. Several examples of firms having such models include: HOK Architects and Planners (St. Louis, MO); Murphy/Jahn (Chicago, IL); Skidmore, Owings & Merrill (Chicago, IL); and Smith Hinchman and Grill (Detroit, MI). The model of downtown Atlanta in the offices of Portman Properties/One Peachtree Leasing, not only promotes the architectural firm's designs, but also serves as a marketing tool for the part of the company that oversees leasing (Figures 2.4-2.6).

According to Ron Hansen, the head of Murphy/Jahn's model shop, the firm's model of the Chicago Loop sits in the top floor of their office building. This view from the area, known as the Cupola, allows visitors and staff to observe the model and the Chicago Loop simultaneously (Hansen). The Skidmore, Owings & Merrill's Chicago office has its model of the Loop in its partner's area. They employ a marketing

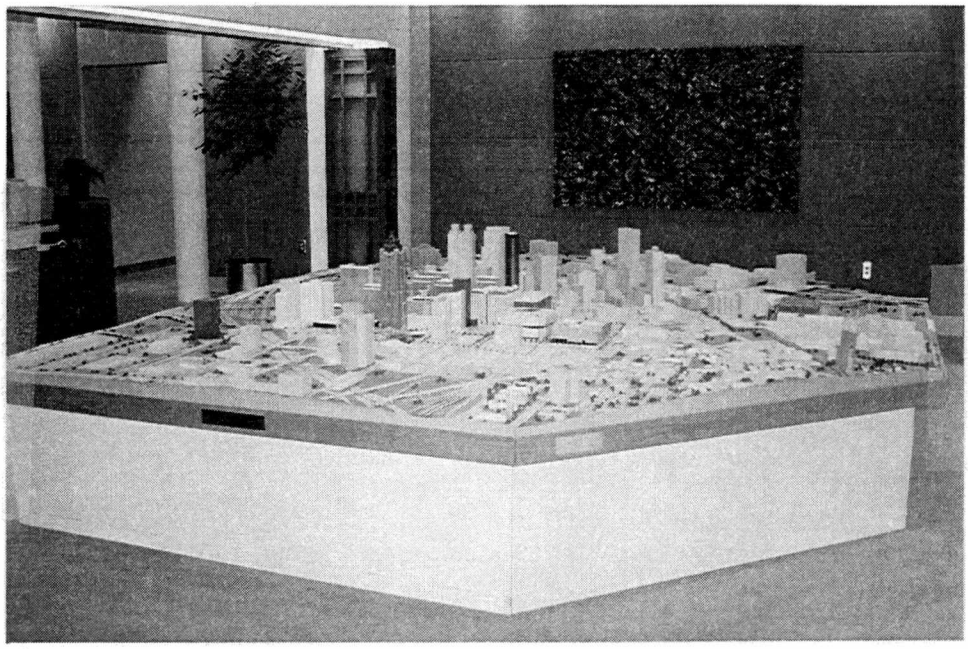


Figure 2.4
Portman Properties' Downtown Atlanta Model

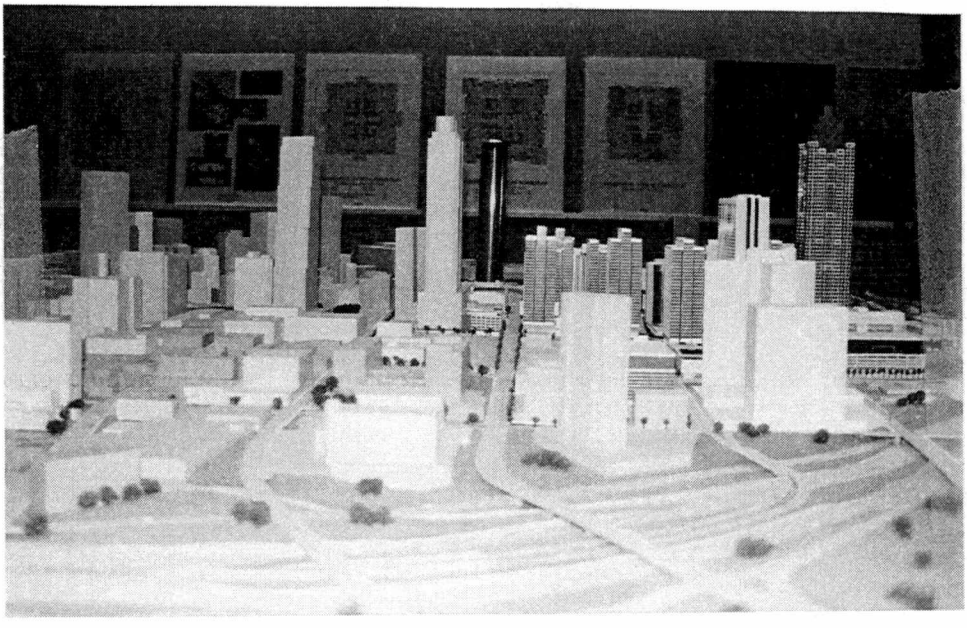


Figure 2.5
Closeup of Portman Properties' Model

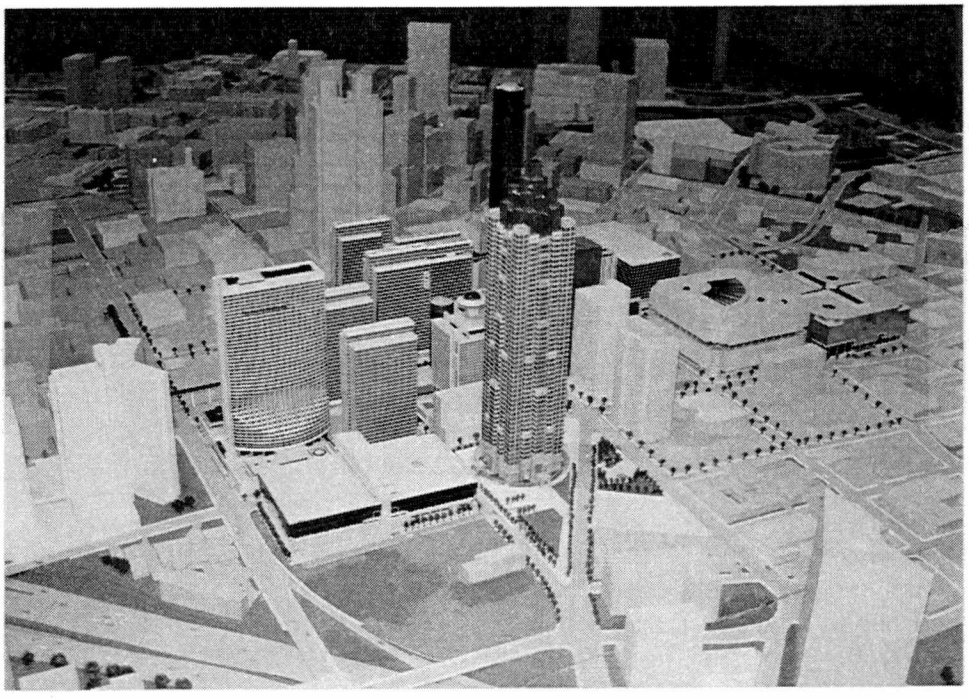


Figure 2.6
Highly Detailed Model of Portman's Peachtree Development

coordinator, who along with her other tasks, gives tours of the office with an emphasis on the model (1:60). In addition to being used as a marketing tool, SOM's Professional Development Committee uses the Loop model and others to stay abreast of new developments, as well as hone their individual presentation skills (Grunau).

Overall, most of the models architectural firms create are used as working models. In the case of final presentation models, however, even some of the firms with established in-house shops, routinely contract out with professional modeling firms in order to assure the highest possible quality. These model shops are also typically commissioned to do the precise work necessary for engineering models. Although the

following list is not intended to be comprehensive, it should serve as a cross section of professional modeling shops and studios across the nation. These firms include: American Model Builders, Inc. (St. Louis, MO); Awad Architectural Models Inc. (New York, NY); F.W. Dixon (Wobum, MA); Lester Associates (West Nyack, NY); Eisenhart Mills (Easton, PA); Fine Scale Miniatures (Peabody, MA); Gabriel Models (Fairfield, NJ); The Model Shop (Chicago, IL); Braxton Payne Miniatures (Atlanta, GA); Scale Models Unlimited (Chicago, IL & Menlo Park, CA); and Joseph Zelvin Models Inc. (New York, NY).

As a rule, clients pay for the cost of the model as part of their project cost and thus they becoming its owner. However, with certain competition models and most working models, architectural firms and modeling shops often retain them. Some models are disassembled and their pieces reused, but this is not always the case. "Most modelmakers are psychologically unable to destroy their models,...so they find storage space for the obsolete models" (Jacobs 196). These repositories could prove to be a gold mine for individuals looking for models to use as educational tools.

Other Private Groups

There are three other organizations worth mentioning that preach the use of models, even though they are not part of the mainstream of architectural firms, modeling shops, and developers. They are the American Engineering Model Society, the

National Association for Miniature Enthusiasts, and Nelessen and Associates. The American Engineering Model Society (AEMS) is a non-profit organization committed to fostering the use of models by professional engineers. Created in 1965, the AEMS was organized "to promote the use of models in industry, science, and government through the exchange of technical information concerning the use of models as design tools" (Burden 94).

Another non-profit group serving as a clearinghouse is the National Association of Miniature Enthusiasts (NAME). Since 1972, this organization has provided its members with both historical and technical data, as well as hands-on instructional training. Much of this is done through conferences (known as Houseparties) and via their newsletter, MINIATURE GAZETTE. NAME's audience is broad based, as is evident by their 1995 membership, which included approximately 10,000 individuals and chartered clubs (Discover NAME!; Encyclopedia of Associations 2622).

Nelessen and Associates is a private planning firm that generates most of its business by contracting with local planning commissions. The firm moderates workshops in which local commissioners learn to solve urban design problems through the use of models. Typically, a series of 39 building models are used that are representative of a city's architecture. By placing the models in different contexts, the commissioners get a three-dimensional look at concepts such as: massing, scale, setbacks, and solid to void relationships. Based on an APA workshop with Andres Duaney and Anton

Nelessen, these modeling kits are now available to the public. Some kits are specifically based on regional architecture, including styles from New England and the Desert Southwest (Nelessen telephone interview).

Museums and Other Tourist Oriented Attractions

General

In addition to architecture, engineering, and planning offices, as well as colleges and universities, there is another broad area with a high concentration of three-dimensional simulations of the built environment. Museums, interpretive centers, and other tourist attractions use a considerable number of scale models. These places are often well advertised and are typically very accessible the public. Therefore, they serve as excellent resources for exploring how models and other simulations are used.

Public planning and private development models are primarily architectural scale models used for evaluative purposes. They usually range in scale from 1:50 to 1:2000, and take up a limited amount of space. On the other hand, models found at museums and other tourist-oriented sites are typically educational and entertainment type models. Because of the wide array of functions these simulations serve, they can run the gamut on size, scale, and material. For instance, the 20 plus buildings at Safety Village in Tampa were built at an approximate scale of 1:3; whereas, the Chautauqua Institution's

replica of the Holy Land is built at a horizontal scale of 1:3000, and covers the length of a football field. Also, both of these were built to exist long-term outdoors, a very rare requirement for most planning models.

Interpretive Centers

One place to find urban scale models is in city tourism information centers. In San Diego the Downtown Information Center has a model of the area that includes Centre City and the Gaslamp Quarter Historic District. This scale model (1:50) is viewed by up to 2,000 visitors a month (Hardin-Burnett). Most of Charleston, South Carolina's historic area is on display in 3-D at the city's downtown intermodal visitors center. This colorful urban model is situated below floor level in a large recessed area, which is covered with plexiglass. It was originally designed to allow visitors to walk over the "city," but due to the model's value the perimeter of the exhibit has been recently cordoned off (Zaremba). A model of the entire 25,000 acre Biltmore Estate and Village is featured at Asheville, North Carolina's new visitors center (Prochaska letter).

The model of Downtown Indianapolis is located on the 28th Floor of the town's City/County Building. Attendants nearby help visitors relate the model (1:100) to the city visible below. The Greater Columbus Convention Center in Columbus, Ohio is itself the subject of a model. Developed as part of the building's design competition, the scale model now serves to acquaint visitors with its unique design, as well as the

plan of surrounding area (Readey survey). Although not currently interpreted, the Historic Natchez Foundation has a massive topographic model (68" x 93") of the city's 1973 master plan on display (Figure 2.7). Next to the model is an even larger aerial photograph Natchez, which helps to reinforce the image and siting of the city.

The Breakers Hotel in Long Beach, California serves as a tourist destination with its model of the City's Downtown. The model also features two of Long Beach's biggest attractions, the Queen Mary and the Spruce Goose. It is currently maintained at no cost by a local citizen. The Long Beach model is somewhat unusual in that the vast majority of tourist oriented urban models in the United States are found in museums



Figure 2.7
Topographic Map of Natchez, Mississippi

and interpretive centers, and not in private facilities such as hotels. One of the most famous public urban models is the Panorama of New York City located at the Queens Museum of Art in Flushing, New York. As noted earlier, a more detailed account of this model will be featured in Chapter V.

The Smithsonian Information Center, located on the Mall in Washington, D.C., features at least two different models of the City. These models focus on the core area of the Federal City. In addition to helping visitors locate certain monuments and museums, the models show the development of the city based on the plans of Pierre L'Enfant and later Daniel Burnham. The models are predominantly displayed in the middle of the Information Center, which gets nearly two million visitors a year (Potter survey).

Another set of models that show the changing plan of a city are those found at the Historiches Museum in Frankfurt am Main. These models of Frankfurt, Germany depict how the city's shape and design have been transformed since pre-industrial times. The triptych models include: the "famous town plan of Matthaeus Merian the Elder from 1628;" the destroyed inner city in 1944; and a continuously updated view of Frankfurt's present day urban core (von Wolzogen survey).

The Colonial Williamsburg Foundation has commissioned several scale models during the last 70 years of its existence. The model, currently in the Visitors Center, shows

Williamsburg, Virginia during the height of the Colonial period. According to Scott Spence, the Director of Architectural Projects, the Visitors Center model is constantly updated to reflect any new-found architectural or archaeological information. The model also denotes existing non-historic buildings, such as hotels and restaurants that are located on the perimeter of the historic district. Footprints of these buildings are shown in a two-dimensional blueprint form (Spence).

A situation somewhat similar to Colonial Williamsburg, is Old Salem in North Carolina. Since a restoration program was undertaken in the old Moravian village, several models have been built. In the Germanic region that the original Moravian settlers came from, a miniature display such as a nativity scene was known as a putz. This tradition continues in Old Salem as the village's three main models are still referred to as putzes. These three models are the Old Salem putz, the Christmas putz, and the Nativity putz.

The Old Salem putz was constructed primarily by university students, home in Winston-Salem during the summer of 1952. The scale model was intended to show how a restored Old Salem would look, and was used to garner support for preserving the area. This model built at a scale of 1/8" = 1' (1:96), has a base of 96 square feet, and features over 40 structures. Dr. George Waynick, Jr., one of the students who built the model, noted that after 10 years of being on display, the putz had to be reworked, "because the guides had used pointers and punched holes in it." Repaired

and then stored away for nearly three decades, this model has only recently been put back on public display. The restored putz premiered at this fall's 1993 International Home Furnishings Market, and is currently on display at the Lexington Furniture Industries showroom (Phillips 6A).

The Christmas Putz of Old Salem and the Nativity putz are both located in the village's Single Brothers House. In keeping with a fifty year long tradition, they are shown to the public every Christmas by the Women's Fellowship of the Home Moravian Church (Capps). The large Christmas putz (1:96) sits on a raised platform, approximately twenty-two feet long by nine feet wide. It reflects the entire town of Salem, c. 1860, under a blanket of snow. Buildings are constantly updated to most accurately reflect the period. These structures include barns, corn cribs, outhouses and other outbuildings that no longer exist. The Nativity putz features the hillside town of Bethlehem and other elements from the story of Christ's birth. A series of spotlights and variations in scale are used to emphasize the different features (Creekmore, Your World in Miniature, 13-15).

There are two museum models in New England that are worth noting. One is featured at the Boston Tea Party Ship & Museum; the other is part of the Shelburne Museum, located just outside of Burlington Vermont. At the Boston Tea Party Ship & Museum "a detailed model of 18th century Boston traces the historic route of the Tea Party participants" (Boston Tea Party Ship & Museum). This "whitewashed" model of old

Boston gives a fairly good overview of the City's early layout. The Shelburne Museum operates as an intact early 19th century community in Vermont. However, most all of the "village's" buildings were dismantled and reconstructed on the 45 acre site to create the present day outdoor museum. The model, located at the museum's information center, helps depict the plan of an idealized New England village (Hunter 163).

A 1968 National Geographic article featured a model the Mexico's National Museum of Anthropology used to highlight the Aztec city that once flourished on the site of present day Mexico City. The model was based on the accounts of early Spanish explorers, such as Bernal Diaz del Castillo. It recreated the sacred precinct of the Aztec capital, Tenochtitlan, as it would have looked in the early part of the 16th century. To help further interpret the site, the wall behind the model featured a large bird's-eye view mural of the entire city. Below the map were additional maps and drawings relating to the model (McDowell 518-519).

Some scale models cover much larger areas than that of an early American village or Indian religious complex. Two such three-dimensional simulations are the River Walk at Mud Island in Memphis, Tennessee and the previously noted Holy Land model at the Chautauqua Institution. The River Walk is a near exact replica of the Lower Mississippi River and it surroundings. Built at a horizontal scale of 30 inches to the mile (1:2112), this model of the river is 2,000 feet long, or equivalent to the length of

approximately five city blocks. The vertical scale of the river is shown by the contours of the riverbank with each interval representing five feet of depth.

The River Walk contains 1.5 million gallons of water, which it recirculates, drawing from the reservoir of water in the vast "Gulf of Mexico." The model can simulate various river stages, ranging from a low-water level to a flood. The floodplain area that surrounds the main channel, including sandbars, islands, chutes, and oxbow lakes, is depicted in a buff color. Bluffs and levees that enclose the floodplain are represented by a reddish-brown raised edge. The Gulf of Mexico, located at the terminus of the model, serves as "Tennessee's largest chlorinated swimming pool, with...over 20,000 square feet of sand" (Mud Island Memphis).

The River Walk features twenty cities on the Lower Mississippi, which are represented in basically a two-dimensional map form. While the overall river model is constructed of concrete, the cities are laid out in slate with aluminum strips used to represent major streets and thoroughfares. Other discernible urban features include such things as the runways at Memphis International Airport (Figure 2.8). In keeping with the river's form, the site's numerous bridges are depicted three-dimensionally. The River Walk was designed by landscape architect Nesbit Coltharp, working with the Memphis architectural firm of Roy P. Harrover and Associates. It was developed through the use of surveys, aerial photos, and navigational charts provided by the Army Corps of Engineers.



Figure 2.8
The Memphis Area on Mud Island's River Walk

The River Walk consists of 10,000 linear feet of pipe, over 60 freestanding information panels, and was constructed using 1,746 pre-cast concrete panels. Each of these panels is 32 square feet (4' x 8') in size and weigh approximately eight and a half (8.5) tons. The River Walk model also features three vertical concrete walls, each 480 square feet in size, which depict a number of the tributaries that drain into the Lower Mississippi River. Completed in 1982, total costs of the model and its

ancillary features reportedly ranged between five and fifteen million dollars (Mud Island River Walk).

Similar to the techniques used at the River Walk and at Washington's Freedom Plaza, are those used by New York City artist Greg LeFevre. LeFevre makes cast bronze tactile maps of cities, which are set into the pavement of city sidewalks and plazas. These bas relief maps typically include signage and graphic symbols to help locate local landmarks. With a maximum profile of a quarter-inch, they also meet American with Disabilities Act (ADA) requirements. Cities featuring these maps include; Boston, New York, Richmond, and Waukesha, Wisconsin.

When it is completed in 1996, Nashville's Bicentennial Mall will feature two dramatically different representations of the State of Tennessee. The first depiction will be within the Tennessee Plaza, located at the base of the State Capitol. The focal point of the plaza, which serves as the entryway to the mall proper, is an enormous surface map of Tennessee. This inlay map will be constructed primarily of paving stones indigenous to the state. Major cities and important landmarks will be highlighted. The second area will focus on the state's varied topography. Plans for the east side of the mall call for landscaping which will simulate Tennessee's real landscape. In an area stretching over several city blocks, visitors will stroll along winding paths from the illusory rugged hills of Appalachia to the fertile flatlands along the Mississippi (Johnson interview; Tennessee Bicentennial).

The scale model of the Holy Land at Palestine Park, in Chautauqua, New York, was specifically developed for use as an educational tool. The model was built in the early 20th century, at what is presently known as the Chautauqua Institution, in order to assist in better understanding the Bible. It was used to instruct Sunday School teachers, primarily Methodists, and other bible students in the history and geography of present day Israel and its neighboring countries. The vast model is laid out on the banks of Chautauqua Lake, which represents the Mediterranean Sea. The model has an approximate horizontal scale of 1:3000, and an exaggerated vertical scale of 1:400, to help best represent the cities and the natural topography (Irwin survey).

Museums and tourist attractions often have several scale models of the built environment that are linked by a common theme and not necessarily physiographically. Two such collections in the Midwest show the wide range of craftsmanship and professionalism that go in to such architectural scale models. Frank Lloyd Wright's Taliesin in Spring Green, Wisconsin, features many models of the master architect's designs from around the world. These scale models are of individual structures, building complexes, and communities, including Broadacre City. Many of the models were constructed during Wright's lifetime, while others continue to be built by the Taliesin Fellowship. Most models depict existing works; although, others portray either demolished buildings or structures that were never built. The Taliesin

Preservation Commission currently uses several of the models as interpretive tools for visitors (Kerr survey).

The Barn Museum in South Amana, Iowa claims to be home to the "Largest Collection of Miniatures in America Created by One Man," woodworker Henry Moore. Starting in 1968, Henry Moore spent 15 years trying to preserve the essence of rural America, at a 1:12 scale. He created an idealized Amana village based on real buildings in the Seven Villages of the historic Amana Colonies in Iowa. Included among the dozens of main buildings and outbuildings are: a sawmill, a bookbindery, granaries, wash houses, a pump house, calf barns, many residences, and the Middle Amana Kinderschule, a preschool dating from the height of The Community of True Inspiration. He also built scale models of an 1890s California logging camp; the Brown and White Farmstead in Cylinder, Iowa; and the village of New Salem, Illinois, famous for its one time citizen, Abraham Lincoln (Barn Museum).

Many interpretive centers use models that are much more site specific. These simulations are typically less comprehensive in their overall context than most of the aforementioned urban and regional models. These site models commonly focus on architectural details and/or specific building functions. Such is the case in San Antonio, Texas, with the scale models at the Alamo and Mission San Jose. Both depict the self contained Mission architecture of the Spanish Colonial period, but interpret it in different fashions. The glass encased model at Mission San Jose

features an audio-visual format. The program includes a continuously-run audio tape, using mini-spotlights to highlight specifically referenced areas.

At the Alamo visitors must rely on trained guides to help interpret the site's models (1:72). The Alamo features a scale model in each of its two historic buildings, as well as in a third structure. The guides focus on both the Colonial era lifestyle and how the Alamo functioned during its siege. The Alamo also has a fourth model that can be handled by the visually impaired (Saage survey).

An example of a site model of a modern structure, is the one located at the Sequoyah Energy Connection in Soddy-Daisy, Tennessee. This model (1:500) of the facilities at the Sequoyah Nuclear Plant, is just one type of simulation at the site's state-of-the-art education center. The model (Figures 2.9-2.11) depicts the two main cooling towers, the diesel generators, the transformers and transmission lines, several roads, a lake, and assorted smaller buildings, including the reactor. Integrated onto the model are two touch-activated computer screens, which give an "interactive video tour" of the site. Visitors can advance through the plant by listening to the instructions of the numerous video tour guides and by referring back to a computer map image of the site (Salisbury personal interview; Salisbury survey)

A similar model is located at TVA's Browns Ferry Nuclear Plant in Alabama. The model is situated next to a window at the facilities hilltop education center, allowing

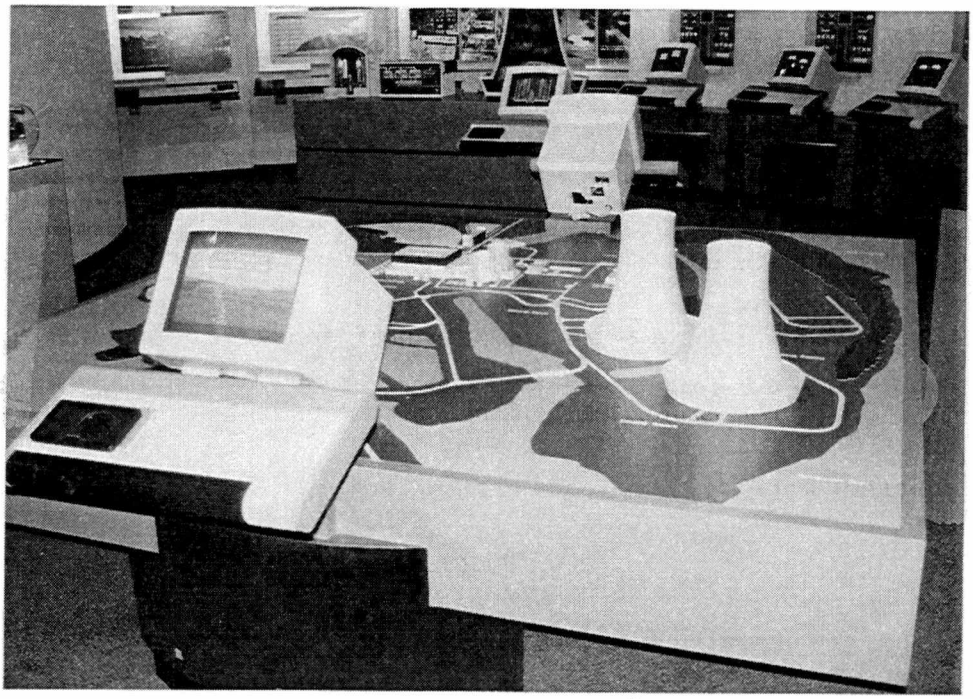


Figure 2.9
Sequoyah Energy Connection Model

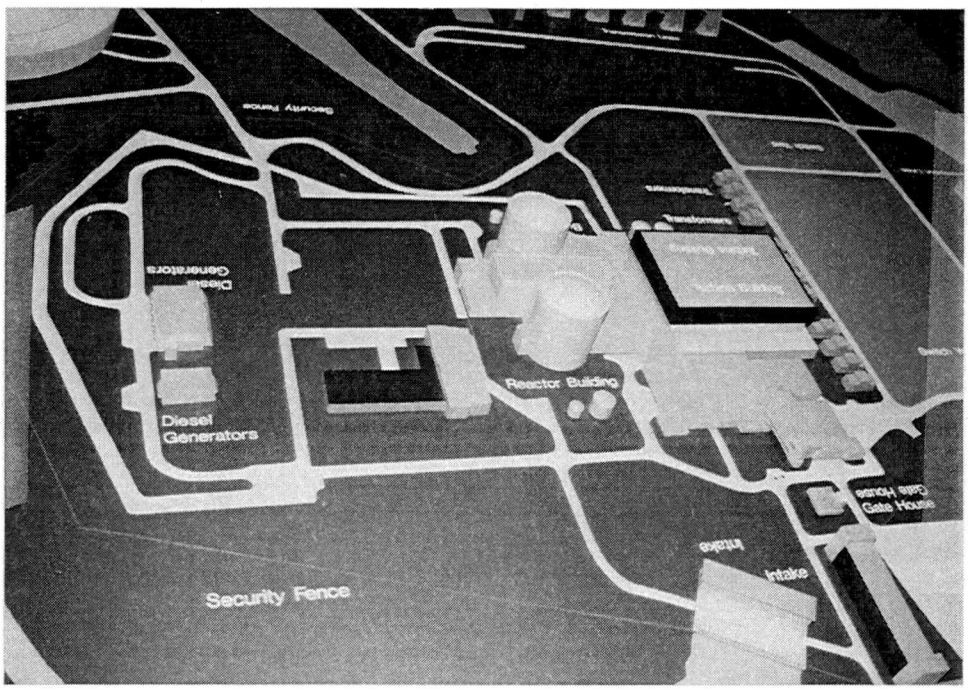


Figure 2.10
Closeup of Sequoyah Energy Connection Model

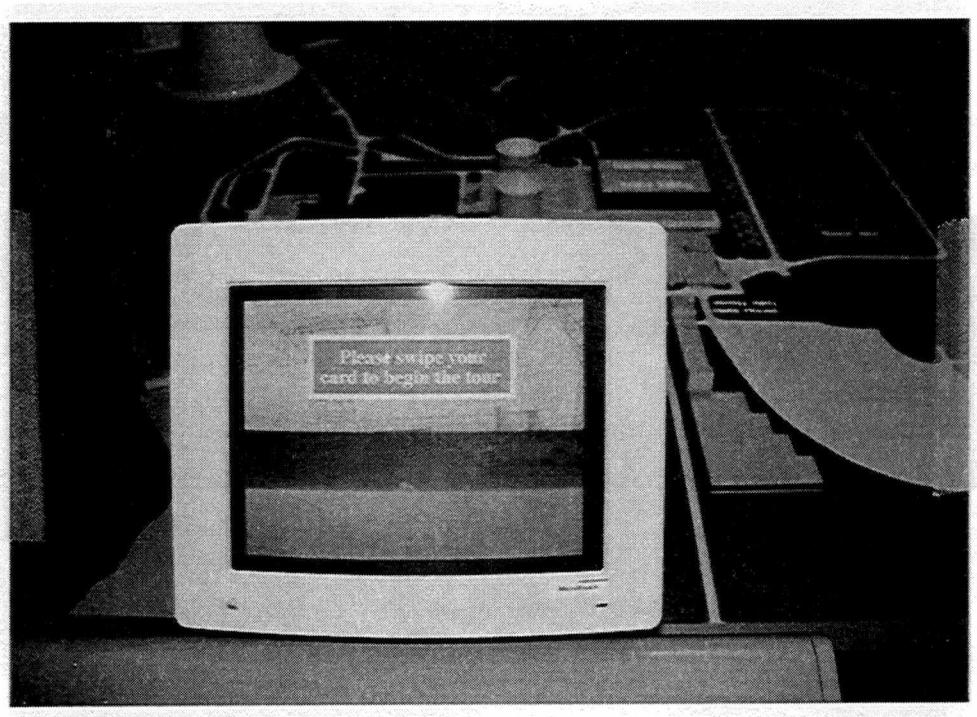


Figure 2.11
Interactive Computer on Sequoyah Energy Connection Model

for an additional comparative view of the site. Another such model is planned upon the completion of the visitors center at TVA's Watts Barr facility (Salisbury telephone interview) TVA also uses cutaway models of individual buildings to supplement these site models. The cutaway models at the Sequoyah Energy Connection depict the internal workings of such structures as; the reactor, a cooling tower, and the Turbine Building. This is done by relating graphics on an interactive computer with each model's dynamic lighting system (Figure 2.12).



Figure 2.12
Sequoyah Energy Connection's Cutaway Models

Other simulations incorporate architectural scale models into even larger schemes. Two such attractions sharing a common theme are the Cyclorama in Atlanta, Georgia, and the Battle of Chattanooga (formerly the Confederama-Hall of History) in Chattanooga, Tennessee. The Battle of Chattanooga is more typical of traditional scale models in its depiction of the City's Civil War history. The model (Figures 2.13-2.14) features railroad lines, landmark buildings, and an overall good representation of the area's diverse topography. Although the landscape is fairly precise in its detail, the model buildings and small human figures are not quite as accurate in their scale (Chapin).

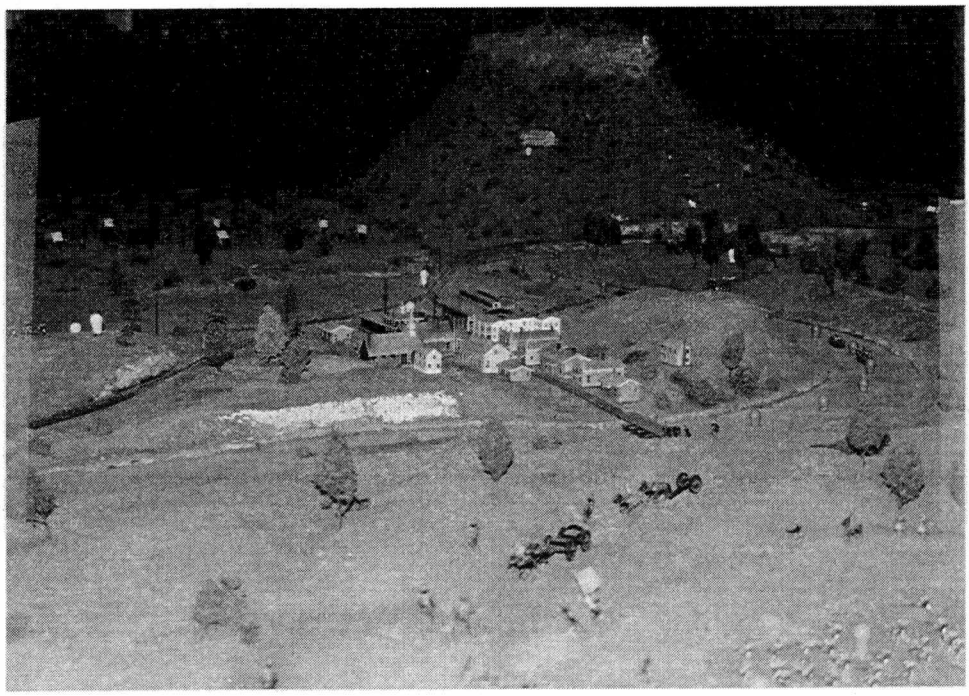


Figure 2.13
Battle of Chattanooga/Confederama

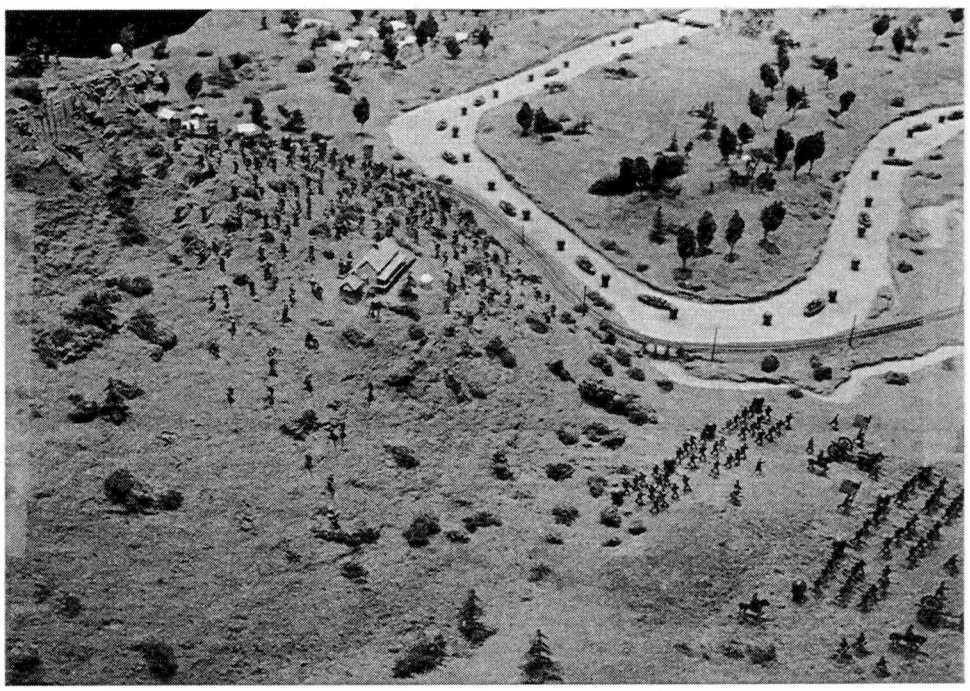


Figure 2.14
Battle of Chattanooga/Confederama

The Cyclorama in Atlanta is basically an enormous panoramic painting. This particular cyclorama depicts the Civil War siege of Atlanta. The painting originally travelled the country, but was eventually brought to Atlanta for permanent display. In the mid-20th century, small three-dimensional figures including humans, wagons, and buildings were installed at the paintings base. The models were added to increase the visitor's overall sensory experience.

One final type of simulation, commonly used in museums and other facilities, is the diorama. Typically dioramas are small three-dimensional scenes featuring scaled figures and a painted background. Perhaps the most famous architectural dioramas are the Thorne Rooms. The majority of these miniature period rooms, constructed by Mrs. James Ward Thorne, are on permanent exhibition at the Art Institute of Chicago. Although they may not be useful in explaining the tenets of urban planning, they are excellent for instruction in the history of American and International architectural styles and interior design. Another set of dioramas worth noting are located in the Tom Sawyer Dioramas Museum in Hannibal, Missouri. These sixteen miniature scenes give a good overview of small town life as Mark Twain saw it in the 1840s.

Amusement Parks

Amusements parks have long been in the business of simulating the built environment. Western ghost towns, colonial streetscapes, and European plazas are some of the urban

themes that are most commonly depicted. The featured buildings are usually represented at full-scale or close to full-scale. Other attractions are more model like in there depiction of both real and imaginary structure. Walt Disney Attractions, Inc., the undisputed king of theme parks, has historically used an vast array of scale models and other simulations, as both developmental tools and attractions.

Disneyland's Main Street USA is an idealized representation of a turn-of-the-century American streetscape. According to Disney Imagineer Dick Irvine, the buildings were designed at a scale that "looked good in reduced proportion." The first floor of the Main Street buildings were built at approximately 90 percent of full-scale. The second stories were designed at around 80 percent, with the upper floors continuing in diminished scale. Irvine noted that this was done "so that your eye is deceived with the feeling of looking up at exaggerated vertical space as well as looking at Main Street horizontally" (Bright 64). Disney designers used this diminishing technique on several buildings outside of Main Street, including Sleeping Beauty Castle.

Even the master, Walt Disney, had trouble using architectural miniatures as he had first envisioned them. When Disneyland opened in 1955, the attraction "Canal Boats of the World" was intended to take visitors past small scale recreations of some of the world's greatest landmarks. However, time, money, and a lack of technology prevented its completion. Walt Disney's initial idea of populating the attraction with

animated Lilliputian figures, proved unworkable at the time. Soon, "Lilliputian Land" became "Storybook Land," and guests rode canal boats past miniature scenes from some of Disney's classic animated films. Storybook Land, with its bonsai shrubs and perfectly manicured miniature landscape, continues to remain a very popular attraction with park visitors (Bright 116-118).

The Imagineers at Disney have always used scale models as part of the design and construction process. In the books Disneyland: Inside story by Randy Bright and Walt Disney's EPCOT Center: Creating the new world of tomorrow by Richard Beard, photographs and text portray how Disney's designers have extensively used these models. They range from the detailed paper model of EPCOT's United Kingdom, to the plexiglass and plastic models of the Omnisphere theaters, and from a truncated Mayan Pyramid to an expansive full color model of the entire EPCOT site. Models have also been used for engineering purposes, as is shown with the structural model of EPCOT's geodesic sphere. Of particular note are two photographs from Beard's book, which were taken during the construction of a Mexican Colonial village and an early 20th century American streetscape. Both illustrate how the builders working on the full-scale sets are being "guided by the small model in the (project's) foreground" (Beard 83).

Walt Disney himself used scale models as a sales and marketing tool for investors and potential visitors. Following the successful 1964-65 World's Fair in New York (home of the Panorama of NYC), Disney transferred several of the fair's exhibits to his theme park in California. Perhaps the most notable and well promoted of such exhibits being, the miniature communities from It's a Small World (Jo). Among the other exhibits were the audio-animatronic Lincoln and the Carousel of Progress. In Disneyland: Inside story, Walt is shown with a model of the Carousel of Progress, and the president of its corporate sponsor, General Electric, discussing the possibilities of incorporating the structure into the proposed Tomorrowland (Bright 176).

Nearby Disneyland, at Knott's Berry Farm, several architectural scale models have been showcased in the park's Fiesta Village. A walk down the El Camino Real has taken visitors past scale models of Spanish California's 21 Franciscan missions (Hunter 17). Kings Island amusement park near Cincinnati has featured one of the largest individual scale models in the world. That being a one-third scale (1:3) replica of the Eiffel Tower, equivalent to the height of a 33-story office building (Hilton 87; Hunter 119). In the past a number of other amusement parks, including Storytown, USA in Lake George, New York and Storyland in Glen, New Hampshire have featured miniature buildings among other attractions (Hunter 98 & 106). However, since these structures are often based on nursery rhymes and scenes from children's books, they may have limited use a planning education tools.

Miniature Villages

A miniature village typically has three defining features. First, it should be comprised of a collection of architectural models, usually built at a scale or scales of larger than 1:50. This size allows for a fairly high level of definition and detail. Second, the buildings should be placed along some form of pathway, to provide several different vantage points. Third, the village should be open to the public, in much the same fashion as an amusement park (Figure 2.15).

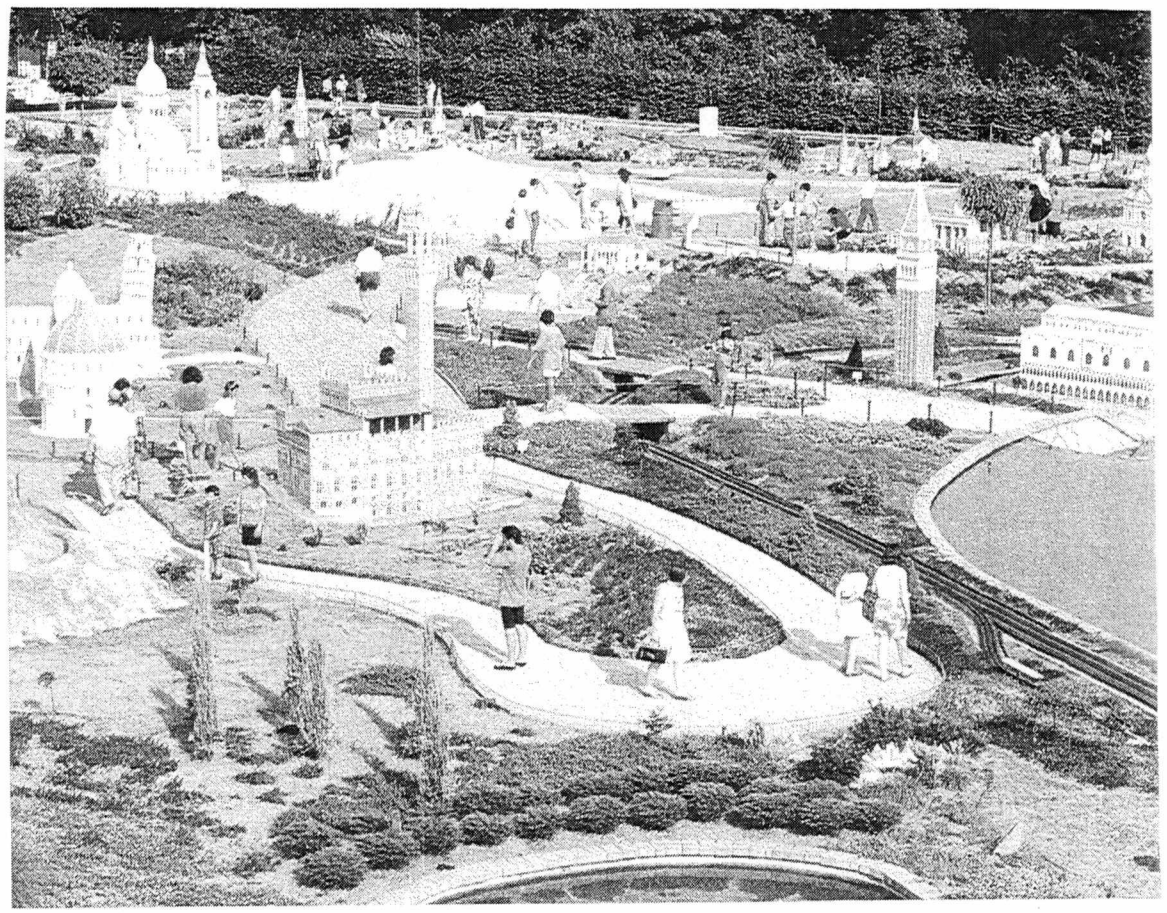


Figure 2.15
Mini-Europe

Perhaps due to the dominance of theme parks, extremely few independent miniature villages exist in America. Research indicates only two American-based examples exist; and, these are atypical compared to most miniature villages. These attractions are Safety Village in Tampa and Tiny Town located five miles outside Denver.

Work on the eclectic mix of miniatures at Tiny Town began in 1915. The scaled structures were the handiwork of a Denver businessman who was trying to provide his daughter with a child-like play area. Today over 100 urban, rural, and mountain scenes are on display. These scenes can be viewed from Tiny Town's "biggest attraction," a miniature railroad. The primary scale used throughout the park is 1:6, however, other scales are prevalent. Only a few of Tiny Town's earlier exhibits have survived. Most of the current miniatures date to after 1965 when a flood devastated the site. The park reopened in 1988 under the direction of the Colorado Institute for Real Estate Management (CIREM). Due to the original private nature and later problems such as the flood, one Tiny Town worker remarked; "over the years we've been closed more than we've been open" (Bradley).

The idea for Safety Village was originally conceived during the mid-1960s, and its first scaled buildings were built shortly thereafter. Today it serves as a highly popular focal point for the Children's Museum of Tampa. Even though Safety Village and its surroundings have undergone numerous changes during the last three decades, the purpose behind this miniature village has never changed. That being "Safety Village

was and remains today devoted to the belief that safety should be taught at the youngest possible age to as many children in our community as possible" (History of Safety Village).

The present day Safety Village is comprised of over 20 "historically significant buildings," streets, sidewalks, traffic signs, street lights, crosswalks, and traffic signals. The outdoor village is laid out in a basic grid pattern, with over a dozen buildings sitting on their own individual "city blocks." Many of the structures are based on real buildings in Tampa; while others are somewhat generic in design. Among the buildings are; a city hall, hospital, church, train station, auto dealership, ballfield, the Tampa Tribune, a McDonald's, and the Safety Village Suburbs (Children's Museum at Safety Village, map). All of this is done at scales where the average one and two story buildings range in height between five and ten feet. These varied scales of Safety Village (@ 1:2 - 1:10), however, are uncommonly large for a miniature village (Figures 2.16 - 2.18).

During its early years, policeman instructed children about many safety tips, including traffic safety. Five and six year olds learned how to obey traffic lights, use hand signals, and proper traffic lanes by driving scale model electric cars (Hilton 90-91). In addition to safety lessons, the current curators are using the village to teach children about careers and occupations, local history, geography, architectural styles, and about social issues such as prejudice (Goldsmith). The building's interiors are currently

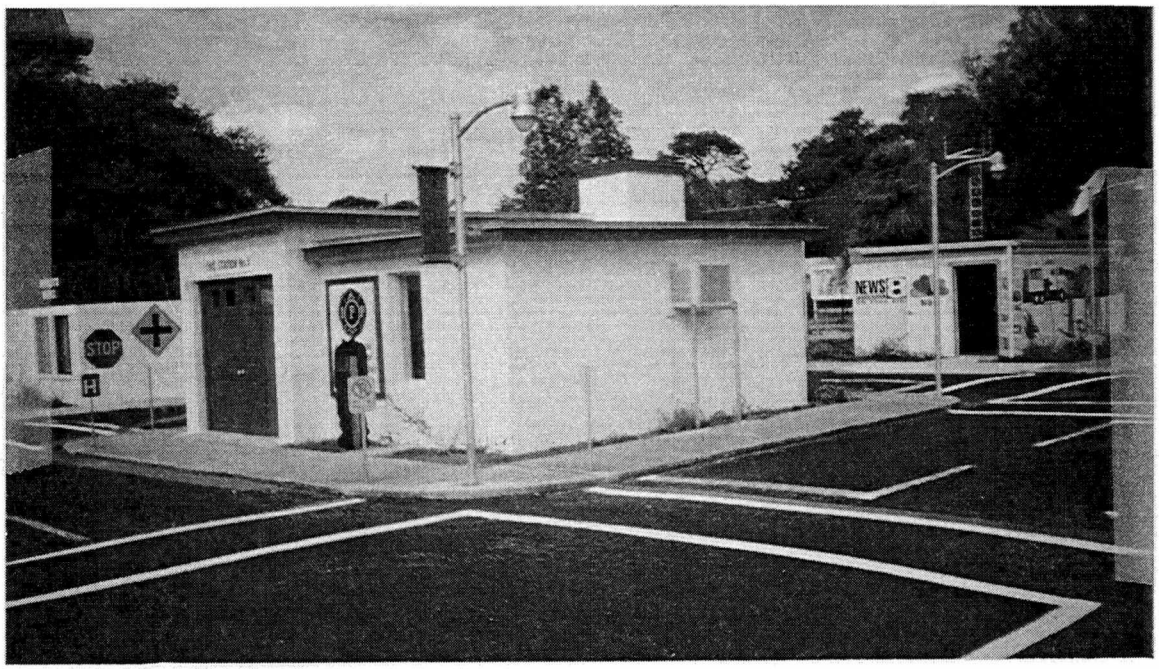


Figure 2.16
The Fire Station and Television Studio at Safety Village

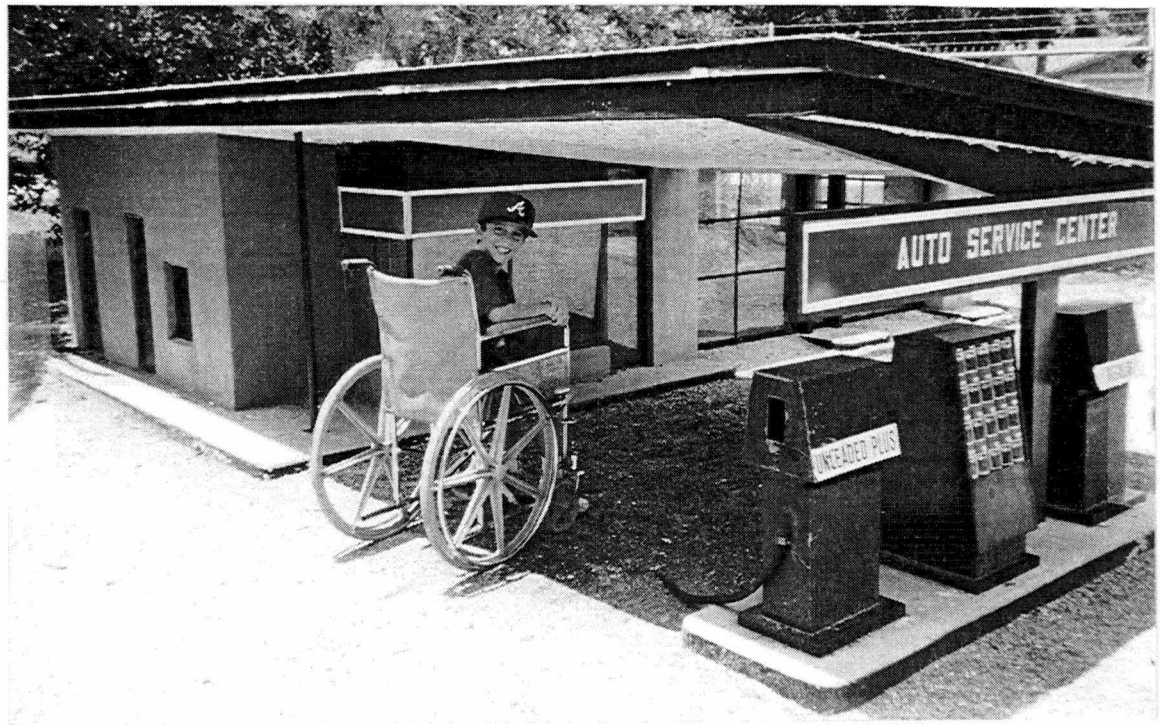


Figure 2.17
Safety Village's Auto Service Center

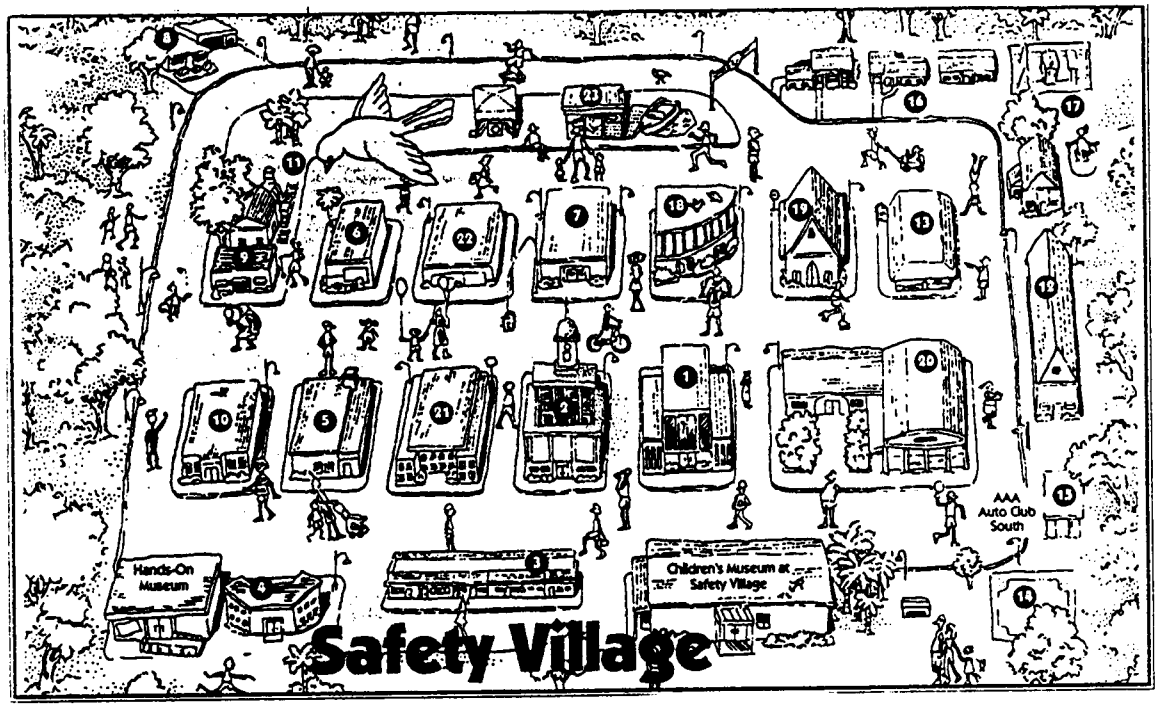


Figure 2.18
A "Bird's-Eye" View of Safety Village

being renovated to allow children and adults (at least short ones) to enter the structures. The curators feel they will help facilitate the learning process, by expanding Safety Village's resources (Winters survey).

Featured within the Children Museum's main building, are scaled down versions of an igloo, a Polynesian stilt house, an Aboriginal Australian bark hut, and a Japanese room and rock garden (Winters survey). Similarly scaled buildings are part of the Fall 1995 exhibit entitled, "Sticks and Stones and Other Homes." Tampa's most prevalent residential architectural styles are the basis for these structures. Among the types

included are a bungalow, shotgun, and a ranch style house. A mobile (manufactured) home and an architect's office are also part of the exhibit. The interiors of these structures will be open, and children will have the opportunity to do "finishing work" on them. Such activities may include painting, wallpapering, or making clay tiles. These latter would be used to decorate a Florida favorite, a home in the Spanish Mediterranean Revival style (Todd).

There are at least three other miniature villages in the United States that either have been recently constructed or are currently in an advanced planning stage. These villages are Splendid China Florida, LEGO Family Park, and MINICITY, USA!. Each of these parks is much more similar in design to the typical miniature village than it is to Safety Village. One of the main reasons for this is these parks have primary building scales (i.e., 1:15 and 1:24) that are much less massive than those found at Safety Village. Another very significant reason (which is partly responsible for their scale) is that all three parks are in some way associated with an existing miniature village.

Splendid China Florida is "almost a copy" of the Splendid China miniature village in ShenZhen, China, near Hong Kong (Kuang). Likewise, the proposed LEGO Family Park will be closely patterned after its parent park in Denmark. As with the original LEGOLAND, this California park will also feature amusement rides in addition to modeled environments. The intent behind MINICITY, USA! makes it unique among

these three developments. Although the MINICITY group has an agreement with Madurodam, this plan does not call for replicating the miniature Dutch town. Instead this planned miniature village will present a highly detailed image of the historical development of America (Gossink).

As of August 1995, the essential plans for MINICITY, USA! (aka MINICITY-USA!, MINI-USA!, Mini - USA!, MINI-USA, and MINI, USA!) had been established. These include the layout of the 10-acre park, marketing approaches, and long term cost analysis. The only major unresolved issues pertain to start-up financing. Although not the focus of this thesis, a brief discussion of the financial concerns within the context of the MINICITY, USA!'s overall development is helpful. Combined, this information will allow for a stronger understanding of the general purpose of most miniature villages; and, more specifically, it is intended to capture the mission driving the development of MINICITY, USA!.

The MINICITY, USA! concept is the brainchild of Johannes Schild, a long-time American businessman with international roots. During his youth Schild lived near the Dutch city of Den Haag, home of Madurodam, the obvious inspiration for much of the project. In order to bring MINICITY, USA! to fruition, Schild has spent the last several years cultivating a broad-based management and consulting team. This team consists of business professionals involved in architecture, entertainment, logistics, marketing, miniatures/modeling, and theme park operations. Under Schild's leadership they have

established a strong corporate philosophy and purpose for MINICITY, USA!. Their mission statement calls for MINICITY, USA! to be a "wholesome and educational recreational experience" -- a place to "celebrate American history [and] culture." In addition, this declaration calls for a focus on entertainment values, business partnerships, and a commitment to civic involvement (Schild, MINI-USA!, 4).

It is important to note the specifics outlined in the following paragraphs are subject to alteration and refinement as the project progresses. This information has been gathered almost exclusively from the management team and the MINI-USA! Business Plan, dated February 1995. Johannes Schild has stated that although some of the details may change, the intent behind MINICITY, USA! will remain the same (Schild, telephone interview, 21 Aug. 1995). That intent is to stress the highest standards of quality, and thus make sure "the educational and historical value of a visit to MINI-USA! will be a refreshing alternative [when] compared to competitive attractions" (Schild, MINI-USA!, 1).

MINICITY, USA!'s design scheme,depicting the "United States in microcosm," helps the park evolve beyond being solely an amusement oriented attraction. This plan for MINICITY, USA! indicates a purposeful intent to use the site as a legitimate teaching tool. In this regard, MINICITY, USA! is very similar to Madurodam in that it places a high level of importance on the role of education. This important commitment is evident in the following comments describing the surrounding the proposed park:

1. "In MINICITY we [can] offer an educational theme park" (Payne, 14 Aug. 1995).
2. "Visitors will be able experience a living lesson in more than 350 years of American history" (Schild, MINI-USA!, 5).
3. "You could do a lot more teaching...educating...entertaining... making it a more balanced park" (Payne, 14 Aug. 1995)
4. "Our intent is to...stir the fires of patriotism and pride in this, the greatest nation on earth" (Schild, MINI-USA!, 3).
5. "It's a walk through America's history" (Payne 14 Aug. 1995).
6. "Due to the unique educational quality of the park, we will develop school tour packages" (Schild, MINI-USA!, 3).

Plans for MINICITY, USA! depict a six-acre landscaped "village" comprised of over 150 natural and man-made landmarks. In order to ensure a high degree of relational accuracy, nearly all of the models will be designed at 1:24 scale (1/2" = 1'). Then, they will be situated in such a manner so as not to present an anachronistic or historically incompatible image. In addition to the modeled environments, the overall 10-acre minipark will also include a parking area, greenhouse, visitor services, and other support structures.

Currently, the MINICITY, USA!' park is targeted as a major destination point within an expansive development in New Kent County, Virginia. Delmarva Properties, a wholly-owned subsidiary of the Chesapeake Corporation, is in charge of this multi-dimensional development. Its prime 10,000 acre site is centrally located between Colonial Williamsburg and the capital city of Richmond, along Interstate 64. Among the larger attractions within the overall project scope is "The Legends at New Kent," a golfing complex developed by the Myrtle Beach-based Legends Golf Group. Colonial

Downs, a horse racing and training facility, is also a significant part of this development (Schild, MINI-USA!, 15-16). Both of these sites are currently under construction (Clay).

A third important component is the development's "Entertainment Village." It is here that MINICITY, USA! will be the primary focal point. In addition to the minipark, this area will also feature cinemas, art galleries, restaurants, retail shops, and other smaller attractions. Beyond the three major elements, long term plans for the overall site include such accommodations as hotels, office buildings, and residential communities. Although Johannes Schild feels this is an excellent location for MINICITY, USA!, he has stressed that alternative sites are also being considered. These considerations actually have a two-fold purpose. The long range purpose being corporate plans to expand on this idea into at least three other regions of the country (Schild, telephone interview, 4. Aug. 1995).

The primary purpose for establishing MINICITY, USA! at this site is in part very similar to that of the Virginia development proposed by Disney. Both organizations realize the value in capitalizing on the region's wealth of history. Unlike Disney's failed plans, however, the MINICITY, USA! park would only cover a fraction of the area of Disney's project. Further, MINICITY, USA! will not attempt to "recreate" history. Instead, the park will offer visitors a one-of-a-kind image of how the nation has grown and flourished. Another important contrast, is that the Delmarva group has

already received much of the necessary zoning and development approvals from the local government, at least with regard to the two largest attractions (Clay).

In addition to its size, MINICITY, USA!'s overall price tag is only a fraction of that for a project such as Disney's. The estimated $14.4 million cost of MINICITY, USA!, including two years of operating capital, is basically the same "investment level of two rides in a major theme park" (Schild, MINI-USA!, 11). The method for financing this amount is still undetermined; although, several alternatives are being reviewed. There is a strong possibility that Smith Barney will arrange a $12 million bond issue for the park, with the only major condition being a predetermined guaranteed attendance. In order to meet such a requirement, MINICITY officials have approached area school districts with a request to incorporate annual visits to the site into their curricula (Schild, MINI-USA!, 3).

As with many miniature village, "corporate involvement is essential to MINI-USA!'s goal of creating a realistic, dynamic environment, showing how Americans work" (Schild, MINI-USA!, 6). Companies that showcase their corporate identity will actually be contributing to the "authenticity" of the park. Such exposure can be done through the use of a logo and/or a miniature that is directly associated with their business. Readily recognizable symbols of the free enterprise system could include: an Exxon service station; Marshall Field's Loop department store; Yankee Stadium; the Goodyear Blimp; the Napoleon House in New Orleans' French Quarter; a Model A

Ford; the "needle-nosed" Transamerica Building; and delivery trucks, ships, and trains representing any number of national and international businesses. In addition, places such as MINICITY, USA! offer a tremendous opportunity for a company whose name or product relates to the intricacies of miniatures.

Part of Madurodam's contractual agreement stipulates they will help MINICITY, USA! target potential corporate investors. Although this is obviously a critical service, perhaps more important is their role in providing assistance on issues unique to miniature villages. This includes park development (i.e., infrastructure, landscaping, modeling, etc.), operations, educational marketing, and maintenance. At least one representative from MINICITY, USA!, Braxton Payne, has already received an in-depth look into Madurodam operations, which included an extensive investigation of the park's underground systems facilities.

Braxton Payne is a trained architect, who has spent the last twenty-plus years of his career working almost exclusively with architectural models and miniatures. During this time, Payne has served as both the President and Chairman of the Board of Directors for the National Association of Miniature Enthusiasts (NAME). He is an award winning miniaturist, currently operating Braxton Payne Miniatures in Decatur, Georgia, a suburb of Atlanta. With regard to MINICITY, USA!, Payne has been primarily responsible for the park's layout and the numerous design issues related to the miniatures.

Even though a working knowledge of Madurodam's operations is invaluable, its overall design format is quite different than the one planned for MINICITY, USA!. Whereas Madurodam represents a single, sometimes incongruous, modern Dutch city, Braxton Payne's plan for MINICITY, USA! depicts a park which is divided into several distinct areas, each showcasing specific periods and events in America's history (Figure 2.18). Payne states this design decision was made, in order to more easily tell the stories of time and place. These divisions allow MINICITY, USA! to "demonstrate changes in transportation, clothing and architectural styles, businesses and economics," showing what was (and is) important at certain historical junctures in the country (Payne, 14 Aug. 1995).

MINICITY, USA!'s four primary exhibition areas and their approximate representative time periods are as follows: "Discovery and Settlement" (1492-1787), "Exploration and Expansion" (1788-1877), "Invention and Industry" (1878-1950), and "Into the Future" (1951-21st Century). Three other more "stand-alone" areas will also be used, either providing complement or contrast to these four major thematic districts. The "European Area," a small collection of miniatures representing the homelands of many early American immigrants, will be the park's only subject area not based on sites in the Western Hemisphere. The other two areas will contain some of the most recognizable landmarks in the United States, the "Federal Area" of Washington, D.C. and the skyline of "New York Harbor" (Schild, MINI-USA!; Payne, 14 Aug. 1995).

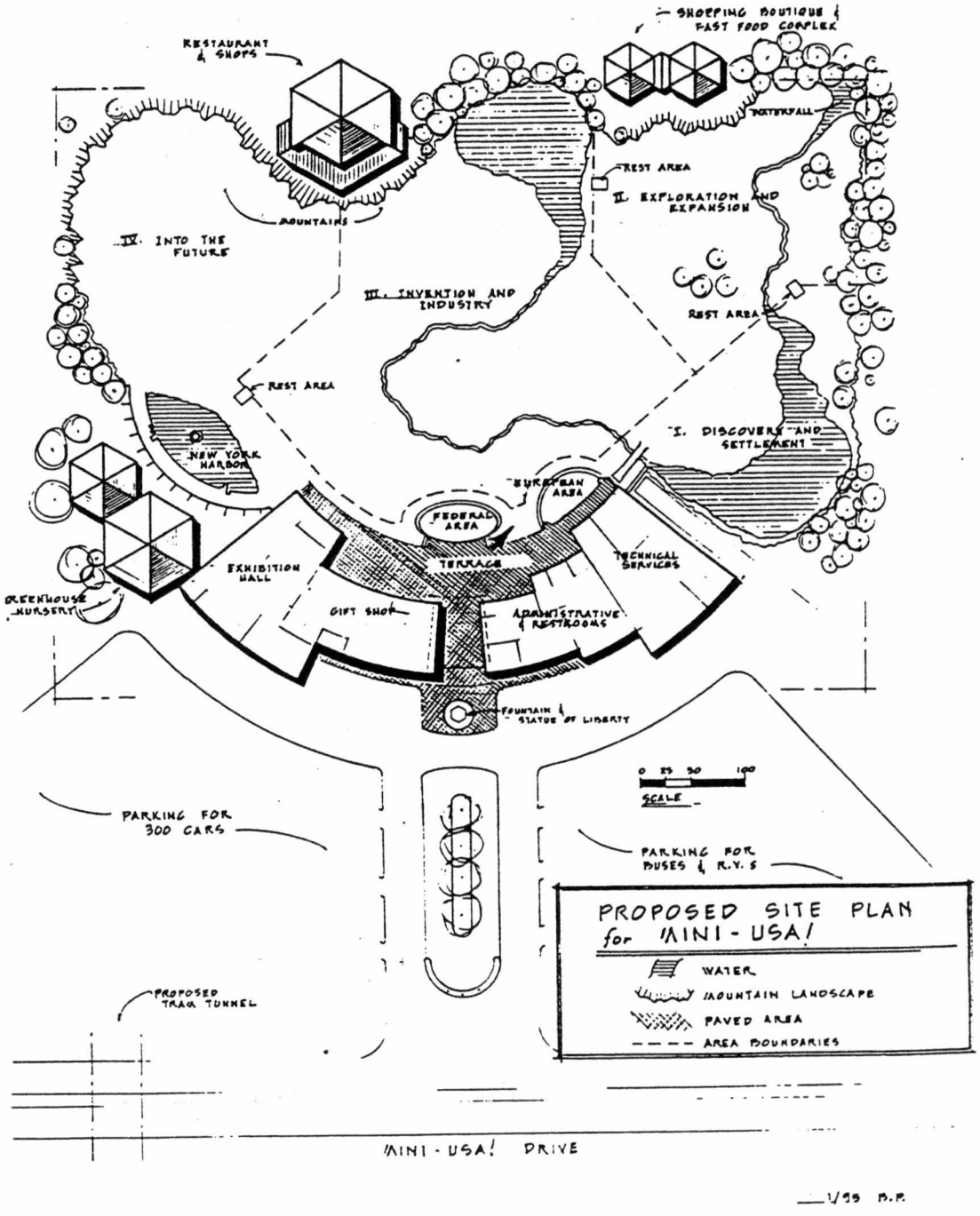


Figure 2.19
MINICITY, USA! Site Plan as of January 1995

The first action taken in developing this layout for MINICITY, USA! was deciding which landmarks were going to be featured. Many of the sites that were chosen are among "the most popular tourist destinations [in] the United States." (Schild, MINI-USA!, 1) These include such natural attractions as Niagara Falls, Mount St. Helens, and the Grand Canyon. Uniquely American structures ranging from Independence Hall to Hoover Dam were also selected. As part of their research on specific buildings designs (i.e., site plan, floor plans, elevations, etc.), the park planners contacted historical societies, tourism agencies, and numerous other preservation and design related groups around the country (Vaughan).

The next step in the design process was figuring out how the models could be the "most advantageously sited to tell the story" of America's development (Payne, 14 Aug. 1995). A simple chronological sequence proved to be the best way to differentiate MINICITY's four primary areas. Then, within each of these areas, numerous individual exhibits and vignettes were selected to illustrate a broad range of significant, although often unrelated topics. However, by incorporating common landscaping elements, period architectural styles, and other techniques, these independent scenes can be skillfully blended together. In this manner these assorted images will be akin to seemingly unconnected characters in a complex novel, whose relationships are only understood as the story further unfolds.

This flexibility allows MINICITY, USA! to expound upon numerous colorful and diverse subplots within the nation's overall unified storyline. Such a carefully crafted design scheme, also ensures this "window on America" will remain dynamic and fresh. This is due to the ease with which new miniature scenes and buildings can be appropriately integrated into the master plan. MINICITY, USA!'s management team feels that annually updating the models is critically important to the park's success. Included among the things they could potentially showcase would be; new transportation modes, acclaimed archaeological discoveries, recently restored buildings, and topical events pertinent to changing school curricula. As different corporate sponsors emerge, they too can be easily welcomed into their new micropolitan home (Schild, telephone interview, 21 Aug. 1995).

The following paragraphs provide a detailed physical description of the proposed park. This information was collected almost entirely from the group's most recent business plan (Feb. 1995). Therefore, the data should only be considered in light of the potential impacts which have been previously noted. Location, financing, corporate involvement, and both the cost-benefit ratio and legal ramifications of replicating certain landmarks, could all effect the site's final composition. Although the general layout will likely survive intact, a number of specific details may be different when MINICITY, USA! officially opens for business. However, whether its the overall number of historical figures (e.g., Benjamin Franklin, Geronimo, the Wright Brothers) enshrined in miniature, or the types of interactive technology employed on site, one

fact remains; MINICITY, USA! will undoubtedly be unlike any other center for learning in the entire United States.

The MINICITY, USA! experience begins on an elevated terrace, offering a "bird'seye" view of the entire 6-acre garden park. Here, visitors can gather their bearings, while studying the mountain chains, bodies of water, and dozens of well-known buildings awaiting them. In the immediate foreground of the terrace is the Federal Area. Its tallest building, the Washington Monument, serves as a point of orientation within the park (much the same way it does in real life). At 1/2" scale (1:24), this great American landmark towers to a height of just over 23 feet.

After getting acclimated to their new scaled environment, visitors set off on the full tour. Their first point of interest is the European Area. MINICITY's intent for this setting is to show the "contrasts between the organized life in this established society, and the spartan environment awaiting the early American" (Schild, MINI-USA!, App. 1). From here visitors cross over a bridge that spanning the symbolic "big pond" (the Atlantic Ocean), thus, entering into the land of Discovery and Settlement. Early examples of new world colonization by the Spanish, French, Dutch, and English are all exhibited here. A further emphasis on the radical changes for most European emigres is evident in the portrayal of Native American dwellings outside the Jamestown settlement. This vignette purposefully highlights the differences between these now neighboring cultures. Continuing through this area, visitors view the

lilliputian lifestyles of Colonial Williamsburg, Boston, and Philadelphia at the time of the Continental Congress. Revolutionary War scenes at Yorktown and Valley Forge have also been captured in miniature.

America's newly gained independence meant a brand new era, thus, a distinctly different district within the park is needed to interpret it. This section, Exploration and Expansion, depicts nearly a hundred years of the nations history ending with the period of Reconstruction. As with the real adventurers before them, visitors begin to head inland into the heart of the continent. MINICITY, USA! showcases two formidable early barriers, the Appalachian and Allegheny Mountains, in all their rugged splendor. Numerous other models illustrate this time of covered bridges, log cabins, taverns and inns, steamboats, slave cottages, and cotton plantations (e.g., the Hermitage).

In the Exploration and Expansion area, lessons are again learned through the use of comparisons. Midwestern examples of "a Shaker village and Amish settlement provide contrast, while illustrating...agricultural crops and farming techniques" (Schild, MINI-USA!, App. 1). Several Civil War scenes are also featured, ranging from the attack on Fort Sumter to the activities at McLean's House in Appomattox, where Lee agreed to surrender. A model of this latter building, which is currently under construction, will initially be used in MINICITY, USA!'s marketing campaigns (Schild, telephone interview, 21 Aug. 1995).

Moving further "west" visitors encounter; a working sawmill, "a giant elevated timber trestle over a magnificent waterfall," and covered wagons passing plains indian villages along the Oregon Trail. Abandoned gold mines, stockyards, a ghost town, and the famous Anasazi cliff dwellings of the desert Southwest, also dot the landscape. Reaching MINICITY, USA!'s miniature Pacific Ocean (obviously not in its entirety at 1:24 scale), there are the sites of vineyards, redwood and evergreen forests, sailing vessels, and a Spanish mission. The Exploration and Expansion area terminates at a terraced rest area, featuring a panoramic view of San Francisco with Alcatraz in the bay. The exhibit's Chinatown, cable cars, and Golden Gate Bridge (at least in part), are meant to ease the segue into the next miniature "historic" district.

By this point MINICITY visitors should have a good comprehension of the park's layout, including how extensive landscaping (both full-scale and miniature) is used to "visually set apart" the different sections. As noted earlier, this technique is employed to diffuse the anachronistic image presented in many miniature villages (see Tobu World Square). Another important quality of these dividing "forests" will be their composition. A strong effort will be made to make the large majority of these plants indigenous to the regions represented in their surrounding exhibits. Signs interpreting the plantings will further add to the park's overall educational mission.

Mechanized demonstrations are also extremely helpful in "bringing to life" this unique lesson in American history. Thus, as a way to fully illustrate individual events and

settings, the Fourth Dimension - movement - has been incorporated into many of the exhibits. One such example from the Exploration and Expansion area is a 19th century river canal, which features horse-drawn barges and an operational lock system. MINICITY, USA! will also feature manual and laser activated audiotracks allowing visitors to hear the songs and sounds of America's past. These may include excerpts from the heart-wrenching speeches of Frederick Douglass, or selections from the famous Lincoln and Douglas senatorial debates of 1858.

Braxton Payne stated that several other types of computerized stations are also planned at MINICITY, USA!. Their intent will be to provide visitors the "real opportunity to interact with models and replicas" (Payne, 23 Aug. 1995). Due to the expense, however, their number and quality will depend greatly on corporate sponsorship. Possible visitor-activated exhibits may allow the young (and the young at heart), to operate a drawbridge, load a cargo ship, or perhaps even initiate the feature film at a drive-in theater. Elaborating on the importance of such activities, Payne said; this "interaction is what is necessary to cement the memory of the experience" (Payne, 23 Aug. 1995).

The largest section in the park, Invention and Industry, will potentially have the greatest number of such interactive stations. Starting at the scene of San Francisco, baby-boomers and their elders will meander through the section's sites, which will flood them with memories and a feeling of nostalgia for this not so distant past. For

the more youthful visitor to MINICITY, USA!, this area will offer a special glimpse into one of America's golden eras, ending with the boom that followed World War II. Among the highlights in this section, are the work environments of Thomas Edison, Alexander Graham Bell, and Henry Ford. Ford's assembly line "is a hub of activity, as parts and supplies are delivered by road and rail to the plant, and finished products are stored in the yard, awaiting delivery by truck and train" (Schild, MINI-USA!, App. 1). These same railroad lines also service a steel plant and a coal mine, passing by small family farms and other factories along the way.

A model American town will have an active downtown business district. It will feature numerous turn-of-the-century commercial buildings, a handsome railroad station, scores of pedestrians, and a "new fangled" drive-in soda shop serviced by carhops on rollerskates. In keeping with the theme of patriotism, the annual Fourth of July Parade will be marching down Main Street. MINICITY's management team feels this nostalgic setting is ideal for corporate sponsors, who are interested in focusing on their heritage (Schild, personal interview). Here, multi-national companies can harken back to the days when they had one-store operations, and their names and logos were hardly even recognized in the towns two counties away.

Among the more famous attractions included in the Invention and Industry area are: the Indianapolis Speedway, Mount Rushmore, the Grand Coulee Dam, the Hollywood Bowl, Mount Palomar Observatory, the Queen Mary, and MGM Studios. Infamous

sites are also reproduced, with miniature bootleggers and neon lights livening up the depression era Las Vegas Strip. The birthplaces and residences of some of the most well known and beloved American figures from the first half of the 20th century will likewise be featured. Among them, the homes of two of Missouri's most notable sons, President Harry Truman's in Independence and Mark Twain's in Hannibal. Altogether this section will contain nearly one-half of all of MINICITY's displays.

MINICITY visitors leave this age of innocence and wonderment by entering a mysterious tunnel, which leads...Into the Future. When they finally reach the other end, these time travellers are treated to "the most dramatic scene in the park - New York Harbor" (Schild, MINI-USA!, App. 1). The Statue of Liberty and Ellis Island stand sentinel in the water, while a panorama of the Manhattan skyline forms an incredibly complex and colorful backdrop. Although this massive display has a cohesive theme, the rest of the section "will be a free-form collection of modern and futuristic exhibits" (Schild, MINI-USA!, App. 1). A central feature in this metropolitan collage will be an airport with every imaginable type of commercial and experimental aircraft. Also included, will be NASA facilities in Texas, Alabama, and Florida. This latter site, the Kennedy Space Center, will showcase the Space Shuttle Launch Pad.

According to Braxton Payne, this section of the park will be the best suited for illustrating urban planning concepts (Payne, 14 Aug. 1995). It not only offers the

opportunity to address existing trends, but also allows a bit of freedom to explore less conventional ideas. Thus, certain schemes can be incorporated at 1:24, which at full scale would likely never be developed. Although some of the exhibits may seem quite futuristic, it is likely many of the urban features depicted will eventually be mainstream. An example of this is the rapid transit monorail, which is currently used in only a handful of America's cities. At MINICITY this system would be shown as an integral part of a community's overall intermodal transportation network.

The Into the Future area will address numerous other issues dealing with a potentially "new and improved" built environment. Among these are, alternative types of suburban development, neotraditional commercial nodes, and housing choices to meet every need and taste. This area will also contain "up-to-date technology exhibits portraying the latest invention, discoveries and accomplishments of the scientific community" (Schild, MINI-USA!, App. 1). Although its subject matter makes this section the most adaptable to change, a few modern-era landmarks can be guaranteed a home here. If other miniature villages are any indication, then Seattle's Space Needle, the Louisiana Superdome, and the Gateway Arch will be as nearly impressive at MINICITY, USA!, as they are in real life.

MINICITY, USA!'s "official" tour ends with a close up view of the elliptically-shaped Federal Area. Here, visitors will see numerous statues and monuments intermingled with such sites as the Lincoln and Jefferson Memorials, the U.S. Capitol Building, and

the White House. A portion of Arlington National Cemetery will also be featured. In addition to these national symbols and all of the previously listed landmarks, scores of other proposed miniatures are noted throughout the business plan. Among them are: Carnegie Hall, Monticello, the U.S. Mint in Denver, Yale University, the Winterthur Museum and Gardens, Churchill Downs, the Mayo Clinic, Old Fort Mackinac, and the Grand Ole Opry House in Nashville. Also, the likes of Thomas Jefferson, Lewis and Clark, Daniel Boone, Will Rogers, Mickey Mantel, and possibly even Ted Turner or Bill Gates, will "take up residency" in the park. Calliope music will be heard as the Delta Queen plies the Mississippi, and lighthouses will signal to ships at sea. Above all this, hot air balloons and airships (blimps) will literally fly across the MINICITY sky, promoting their respective sponsors.

At least two Vanderbilt homes are planned in miniature (one of the only affordable means of replication), the Breakers in Newport and Asheville's Biltmore Estate, America' largest private residence. A number of very distinct religious structures will be featured as well including: Iowa's Little Brown Church in the Vale; the Cathedral of St. Helena; Saint Gauden's Shrine in New Hampshire; the St. Augustine Mission of Nombre de Dios; and Jackson Square's St. Louis Cathedral in the heart of New Orleans' Vieux Carre. MINICITY, USA's natural landmarks will range from Plymouth Rock in Massachusetts to Balanced Rock in Idaho, and all points in between. And, one last group worth noting are those attractions found outside the borders of the 48

contiguous states. These include sites in Alaska (Gray Line Pipe Line), Hawaii (U.S.S. Arizona National Memorial), and even Puerto Rico (El Morro Fortress).

In addition to the various mechanical miniatures and interactive displays, MINICITY, USA! will also feature several other amenities to help reinforce their educational mission. These may include tour guides, who would be authentically garbed in accordance with their section. Rest areas and learning stations will feature period music, "progress" maps, and small gardens arranged in the typical fashion of the times. The Exhibition Hall's mini-theater will present assorted programs of an historical nature (Schild, telephone interview, 14 Aug. 1995). Potentially these presentations could be customized to meet the particular needs of any school teacher or tour group. For those who just want to take a leisurely stroll through the park, small headphone units will be available to help guide them on their way.

MINICITY, USA!'s operational season will be similar to that of many other miniature villages and amusement parks, running from early spring through the fall (@ Apr. 1-Nov. 15). According to Johannes Schild, there is a very good chance that the park would also be open for special events and holiday periods such as Christmas (interview, 21 Aug. 1995). At such times, the already marvelously illuminated night scenes would be even further enhanced with the addition of thousands of colorful mini-lights. The off-season, however, is essential in order to properly maintain all of the models and flora, as well as incorporate any new exhibits. With a targeted

opening date in 1997, many issues must still be resolved. Nonetheless, it appears as though the MINICITY team is following a proven formula for success, which will appeal to a "little" something in everyone (Figure 2.20).



Figure 2.20
A Logo which Captures the Intent of Most Miniature Villages

The newest miniature village in America, Splendid China Florida, opened on December 18, 1993. It took over 24 months to construct the exhibits on Splendid China's 76 acre site. Most of them, however, were not created using traditional building methods. Instead they were literally handcrafted by over 120 artisans. This attention to detail was one of the major reasons the final development costs have been estimated as high as $100,000,000. Another factor in this price tag is the park's location being just two miles west of the entrance to Walt Disney World.

Although quality craftsmanship is evident throughout the park, the miniature Great Wall of China is truly exemplary. The simulated wall, which stands two feet high, winds around nearly a half mile of the site. It "was constructed from over 6.5 million 2-inch-long bricks, painstakingly laid, brick by brick, by Chinese artisans" (Splendid China Florida: Journey) (Figure 2.21. Referring also to the porcelain figures and the colored landscape which are incorporated into the exhibit, one observer noted; "everything is precisely scaled, when you take [a] picture, they fit perfectly to the clouds and sky in [the] background and you can be confused by the print whether this is the real Great Wall or just a mini replica" (Kuang).

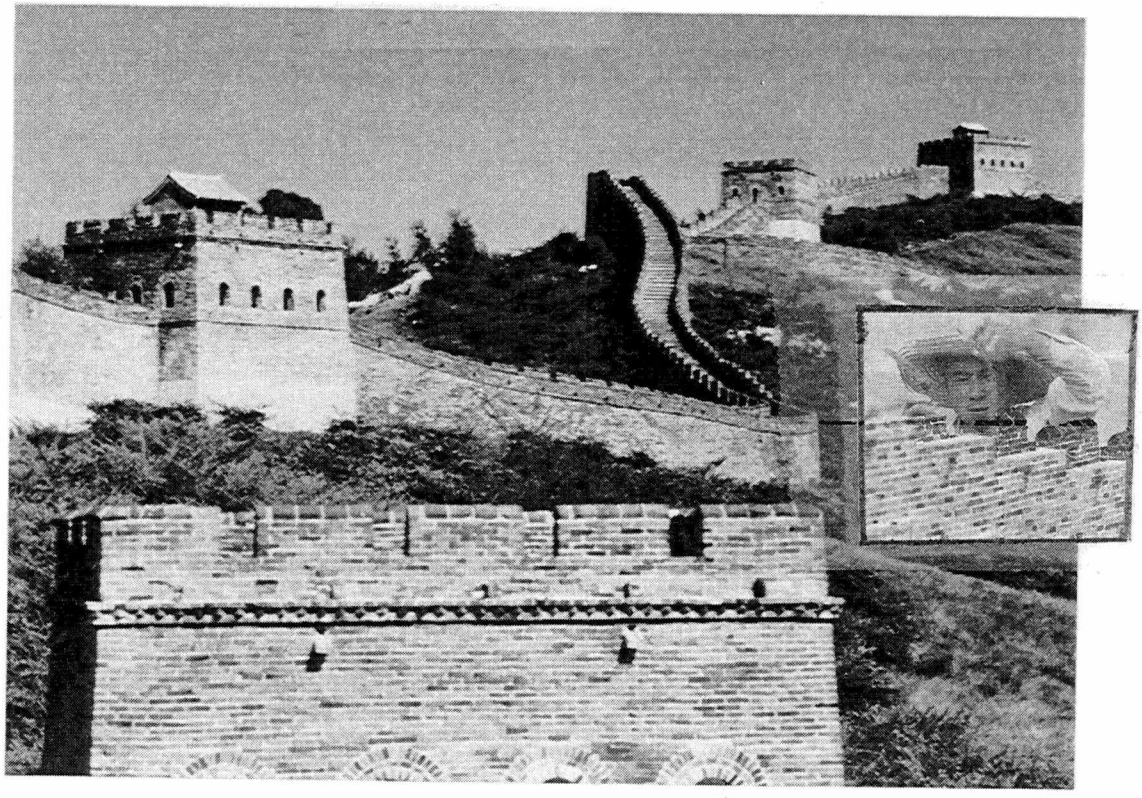


Figure 2.21
Splendid China's Miniature Great Wall

Splendid China features 63 exhibits, with the vast majority being miniature scenes from mainland China (Figure 2.22). According to a release from the China News Digest, the scaled structures range from a Mongolian Yurt to the Mausoleum of Dr. Sun Yat Sen. There are several images replicating the "minority lifestyles of Southwestern China." BuYi, Dong, and Miao Villages, as well as Bai and Hakkas dwelling houses, are all represented. Natural wonders are also featured with the highlight being the carved limestone formations of the Lunan Stone Forest (Kuang).



Figure 2.22
A Royal Scene at Splendid China Florida

The primary scale used throughout the park is 1:15. However, other miniatures are represented at such scales as 1:4, 1:6, 1:7.5, and 1:10 (Whitney) The historical nature of the park is much more consistent than that of the building scales. The lone example of modern architecture replicated in miniature is Sun Yat Sen's (d. 1925) burial place, an icon for the group he helped found, the Chinese Nationalist Party. Among the more historic structures represented in the park are: Tibet's Potala Palace,

YueYang Pavilion, the Terra Cotta Warriors Museum, Xinjiang's Id Kah Mosque, the Big Wild Goose Pagoda, Yellow Crane Tower in WuHan, and the KuMan Lake Summer Palace with its 17-arch bridge. Nearly all of the Forbidden City (Figure 2.23), including the 6,000 room Imperial Palace, is depicted. And, "of course, there are no portrait of Mao and the two slogans on the wall of TienAnMen Gate (Kuang).

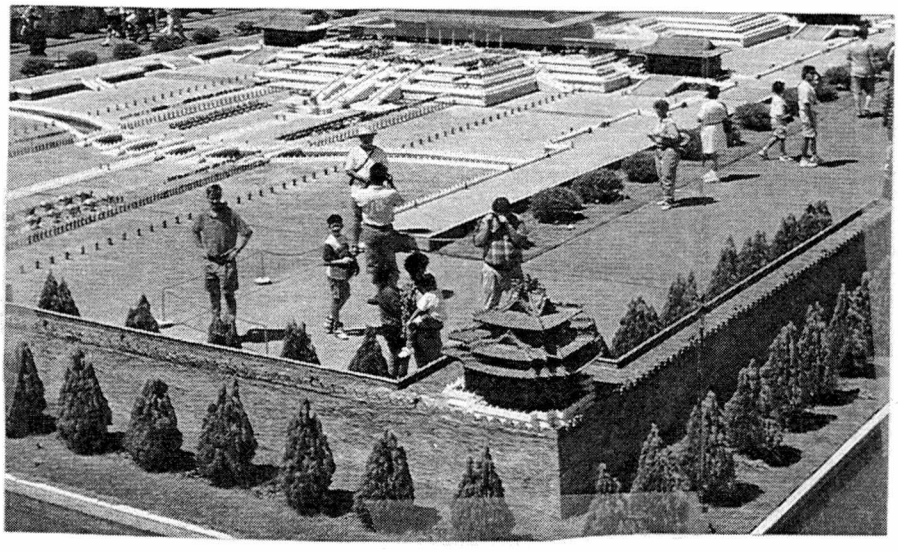


Figure 2.23
The Forbidden City's Imperial Palace

In addition to these scaled replicas, the park also features an orientation movie, martial arts and musical performances, native crafts, and lots of food. Many of these other amenities are found in the pavilions of a "full-scale" reproduction of the 13th century central marketplace, Suzhou Gardens. Together all of these exhibits and complementary activities cover a broad range of Chinese influences. Thus, the visitor to Splendid China (Figure 2.24) is given a much stronger sense of the true essence of China.

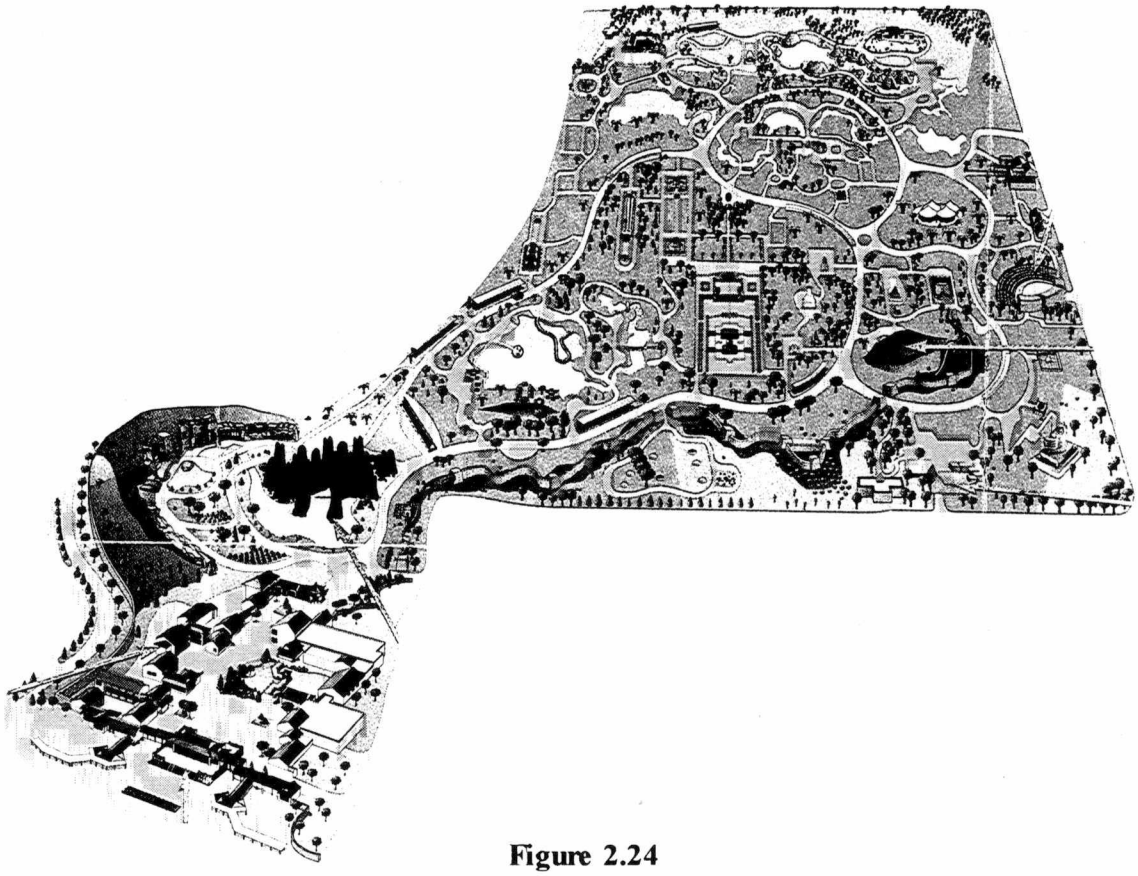


Figure 2.24
Site Map of Splendid China Florida

Miniature villages abound throughout Europe, with the highest concentration being located in the United Kingdom (Hilton 93). As described earlier, Bekonscot, outside of London, takes claim to being the oldest of the miniature villages. Bekonscot Model Village represents an idealized early 20th century English countryside. It features the imaginary rural communities of Hanton, Greenhaily, Bekonscot (the main township), Evenlode, Splashynge, and the fishing village of Southpool. A Gauge One model railroad (1:32) connects these "towns" stopping at their little stations. Over 10,000 miniature shrubs and conifers give the Village a truly natural setting (Bekonscot... Bucks 1992/93).

Among the miniature features at Bekonscot Model Village are: a cattle market, boat harbor, castle, coal mine, zoo, windmill, small amusement park, and logging camp. There are also: two lakes, one featuring a pair of lighthouses; several farms and pastures; an airstrip; the "Old People's Home;" a golf course; and several playing fields for polo, lawn bowling, horse racing, football (soccer), and cricket. Several of the town centers and individual buildings are based on real places. The buildings around the village green in Evenlode were inspired by the town of Clovelly in Devon. Clark College "bears a strong resemblance to Eton," and the pub in Bekonscot township was modelled after the now demolished Earl of Beaconsfield pub (Bekonscot, guidebook).

Two models that are exact replicas of noted landmarks include St. Teresa's Roman Catholic Church and the Alexandria Bridge. The bridge, a copy of the Sydney Harbour Bridge in Australia, "adds an interesting period touch," since the original bridge was completed in 1932. Recently, the curator of the real Hampton Court sent Bekonscot an outline of their garden maze. The new miniature, "Hanton Court Maze," has been faithfully reproduced using Baggesen's Gold honeysuckle. The level of detail throughout Bekonscot is the key to its success. From the music coming from the church to the hospital wishing well, all of these many elements increase the visitor's understanding of both the natural and built environment (Bekonscot, guidebook).

Madurodam in Den Haag (The Hague), Holland is perhaps the most famous and well visited of the miniature villages. It has also been noted as being the Netherlands most

popular tourist attraction. The Madurodam concept began when its founder, Mrs. B. Boon-van der Starp, returned to Holland after World War II. She suggested building a miniature city similar to the Bekonscot Model Village she had seen while abroad (Hilton 94).

Under the auspices of the Dutch Students Sanatorium (Mrs. Boon served on the Advisory Board), the miniature city idea was developed. The intent of the project was to allow for the attraction's profits to be donated to the sanatorium in the hopes of sustaining it for a long period. After receiving over a million guilders, the sanatorium closed in 1964. Much of the money generated by Madurodam, however, continues to be donated to a number of the Netherlands' most worthy charities.

Initial funding for Madurodam was secured through the goodwill and donations of many Dutch businesses, industries, and private individuals. This support along with efforts of well-known project architect S.J. Bouma and modeler Arthur Thuijs, enabled Madurodam to be designed and constructed within only a two year span. Mr. and Mrs. J.M.L. Maduro, who provided the original construction capital, saw the project as a lasting memorial to their only son George, a young army lieutenant who died in 1945 in the Nazi concentration camp at Dachau. The miniature of George Maduro's birthplace home in Curacao holds a special place in the park (Madurodam, guidebook, c. 1993; Payne 23 Aug. 1995).

Opened in 1952, Madurodam soon claimed fame as the world's largest scale model/miniature village (1:25). Madurodam is filled with replicas of some of the most noteworthy and beloved buildings found throughout the Netherlands. "One of the most unusual features of Madurodam is that it is planned to look as if it had grown up from ancient to modern times" (Hilton 96). Thus, this miniature city contains all the same resources as a "larger" city, with many less problems (Figures 2.25-2.28).

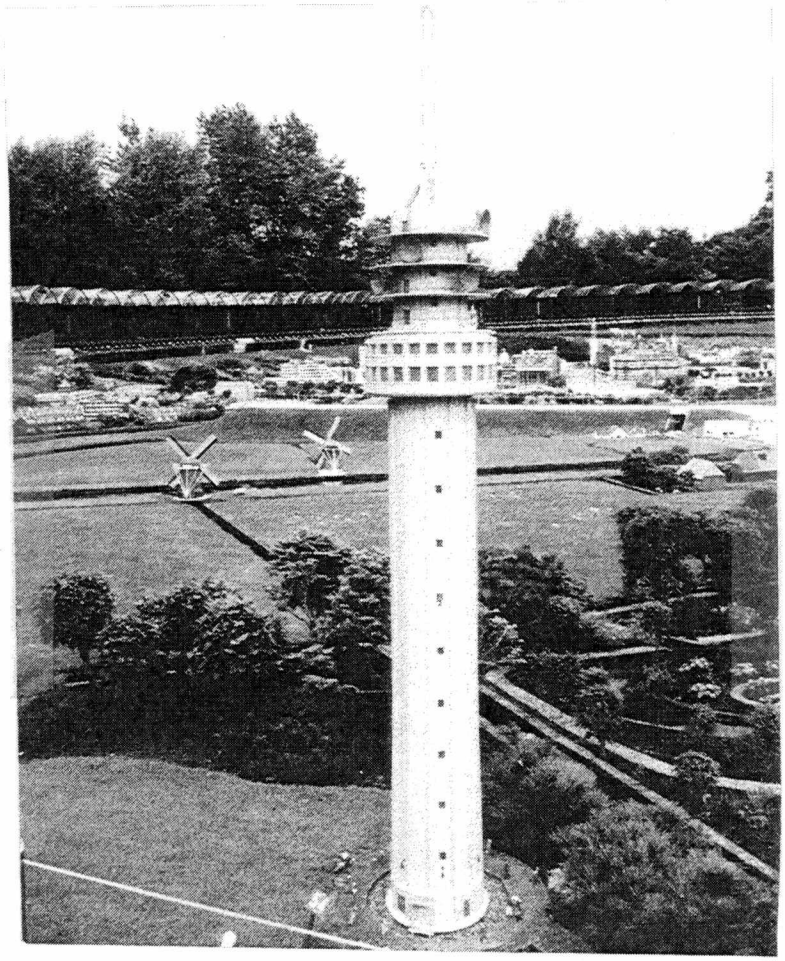


Figure 2.25
Madurodam's Realistic Mix of the New and the Old

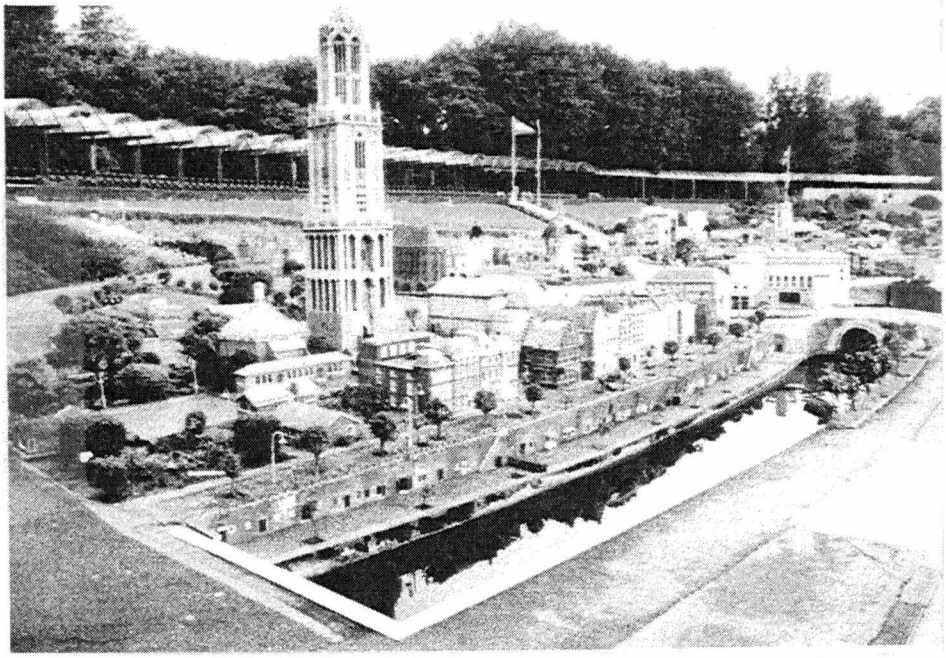


Figure 2.26
A Typical Dutch Streetscape in the Typical Dutch "City" of Madurodam



Figure 2.27
The Moving Madurodam

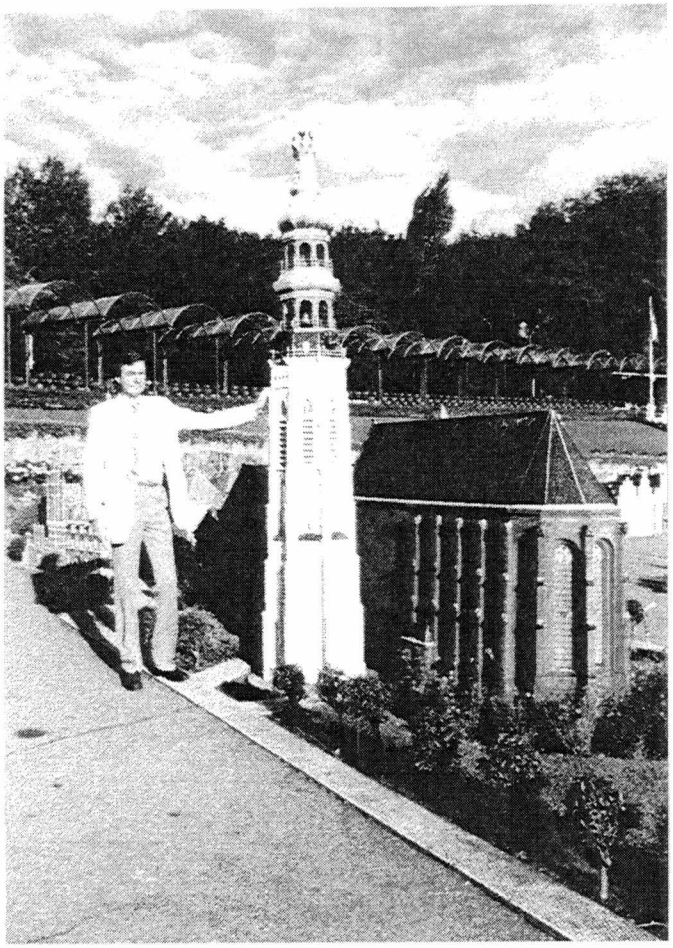


Figure 2.28
Scale Reinforced

Madurodam also comes with its own history, bestowed in part by Mr. Bouma (Creekmore, Your World in Miniature , 23). Starting with the 11th century castle on the River Maduro, visitors can see how the town grew to include: a 13th century village square; a medieval era protective wall with its town gate; a large cathedral built between 1330 and 1550; a late Gothic Town Hall;, and a 16th century fish market. The castle was based on the "Voordensteyn" Castle that stood on the Island

of Voorne. Gouda' s Stadhuis is the town hall. The cathedral is Sint Jan Bailiek in 's-Hertogenbosch. And, Madurodam's fish market (visbank) is from the municipality of Vlaardingen.

Nearly every structure has its own special place in Holland's history. While some of the real buildings have long since vanished, like the Voordensteyn Castle destroyed in 1100, a small collection of other models represent buildings that were lost as recently as forty years ago, during the bombing attacks of World War II. Present day Madurodam, however, is a vibrant city whose threats of destruction have seemingly long since vanished. Perhaps, the only exception to this is when a building is removed from the minipark due to its "real life" demolition, and/or the lack of a contract renewal with the model's corporate sponsor (e.g., the Johnson Wax Europlant) (Madurodam, guidebooks; Payne, 14 Aug. 1995).

Like many Dutch cities, Madurodam thrived during the Golden Age and declined in the period following. In the 19th century, the industrial revolution brought radically new technologies, which would forever impact the city's architecture and urban design. Included among the most modern structures in Madurodam are: a group of solar paneled houses from Zoetermeer; Eindhoven's space-ship shaped Evoluon; a "historic" ESSO oil refinery; the Ministry of VROM; the Rietveld-Schroder House; Unilever's headquarters in Rotterdam; the Euromast Space Tower; and the famous cubicle houses of Helmond and Rotterdam. Also, the famous Dutch architectural movement, "Nieuwe

Bouwen," is represented through two building complexes in Hilversum, the AVRO Broadcasting Studio (architects: Karsten and Merckelbach, c. 1936) and the city's expansive Town Hall (architect: W.M. Dudok, c. 1930).

The complex meandering plan of Madurodam is typical of European cities that developed over a thousand years. There are dozens of large plazas, private gardens, and intimate squares with statuary. The cultivated landscape around the Peace Palace is particularly noteworthy. Waterfronts are bustling with hundreds of shops, and five centuries worth of residences, including the house where Anne Frank's family was caught hiding. The port of Madurodam depicts an incredible array of activities. There are docked and in motion vessels that range in size from sailboats and tugs to oil tankers and containerships. Even at 1:25 scale, the enormous 26 knot Nedlloyd containership is well over 30 feet long.

The variety of Madurodam's transportation modes would make any planner happy. The miniature village features an extensive railway system, automobile and passenger ferries, aerial cablecars, an Autobahn-like motorway (featuring an emergency road care center), an international airport, and a system of canals with operating locks and dams. Utilities in Madurodam include: a replica of Nijmegen's coal-fired electricity plant with its desulphurisation unit; a natural gas production and drying plant; a Carousel waste water purification plant; a pumping station; and a BOHES hydraulic wind turbine. The Madurodam broadcasting tower, a PTT Telcom satellite dish antenna,

and the port's radar station, including its rooftop revolving scanner, are just three of the city's communications facilities.

Lilliputian visitors to Madurodam would have fun exploring the City's many attractions, which include: a brewery, planetarium, cheese market, exhibition hall, sports complex, zoo, small amusement park (fun-fair), theaters and cinemas, museums, and a wealth of historic churches and synagogues. One might find the mini-tourists cooling off from all of this fun either at the beach (swimming, sailing, etc.) or the Tikibad Pool at Duinrell, "the most exciting covered water slide complex in the world" (Madurodam, guidebook, c. 1993).

Among the more mundane, but necessary, city amenities Madurodam has featured are: a post office, bank, stock exchange, nursing home, supermarket, car dealership (Volvo), low-rent housing units, service stations, hotels and motels, factories, warehouses, and several government buildings and office complexes. This micro-city also has centers of learning such as: the Ter Apel monastery, an elementary school, a modern library (Rotterdam), the University in Leyden, and an outdoor cafe. In front of the cafe a tuneful street organ and its grinding proprietor teach musical lessons to mini-students of life. The "outskirts" of town features settings stressing the importance of Holland's agrarian culture. Tulip bulb fields, farms and dairies, tree nurseries, and polders with age old windmills, are all significant symbols of inventive Dutch

lifestyles. Altogether, Madurodam has everything a real city would normally have and more, including its own miniature, miniature golf course.

Madurodam is handicap accessible, and, its curators particularly encourage guests with visual impairments to feel the models and explore their architectural detailing. During the summer, visitors are welcome to view the city after dark, when 50,000 miniature lights illuminate hundreds of buildings, several night trains, and an electronic billboard that flashes news headlines. Not only does this produce a fantastic luminary spectacle, it also adds to Madurodam's "authenticity" as a city (Madurodam Den Haag - Holland; Madurodam guidebooks).

As comprehensive as Madurodam is, officials at the miniature village are in the midst of undertaking a massive expansion. This new development will enlarge the park from its original 4.4 acres to over 9 acres (Schild, MINI-USA!, 5). As with the park's growth over the years, these changes at Madurodam will only occur after planning with "infinite care...so as to not spoil [its] character." This is because, Madurodam was "the first miniature town built to a plan and it is extended accordingly" (World's Smallest Town). With its incredible resources and theme of planned development, the possibilities for using Madurodam to teach the concepts of urban planning are almost immeasurable.

Located in Coimbra, Portugal, is the miniature village of Portugal dos Pequenitos, "Portugal for the Little Ones." In a concept similar to that of Madurodam, most of the village is laid out using replicas of Portuguese landmarks. These models, often made out of the "true" materials of stone, clay, and wrought iron, are arranged so as to create somewhat of an idealized Portuguese city. The "city" is divided into five distinct sections; Portugal Metropolitano, Coimbra, Portugal Monumental, Portugal Insular e de Alem-Mar, and Paises de Expressao Portuguesa (Figure 2.29).

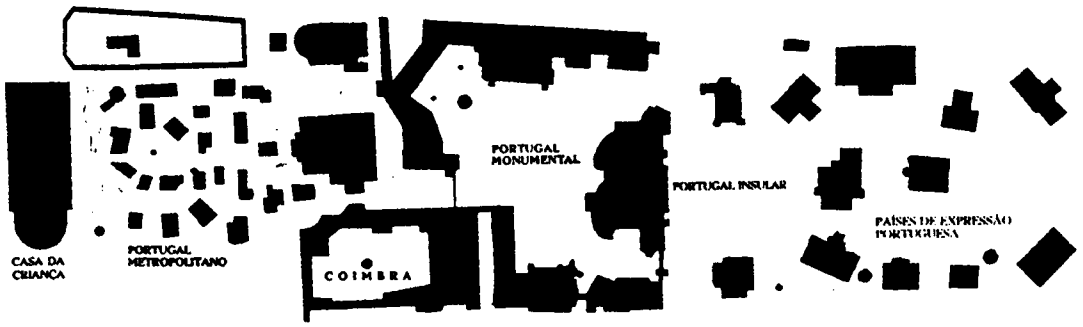


Figure 2.29
Site Schematic for Portugal dos Pequenitos

The latter two sections feature buildings from outside continental Portugal. Portugal Insular has buildings surrounded by water, representing landmarks from both the Azores and the island of Madeira. Paises de Expressao Portuguesa is comprised of structures from around the world including Brazil, Angola, Macau, Timor, and Mozambique. All of these sites are either current or former Portuguese colonies or settlements. To help understand these international structures, both the visitor's brochure and a large wall map within the park show the sailing routes taken by

Portugal's most famous explorers. The brochure also features a map of Portugal, that indicates the real location of the miniature village's over one hundred indigenous landmarks.

Portugal dos Pequenitos (Figures 2.30 - 2.33) does a good job of mixing local, national, and international structures, while still retaining its cohesiveness as a city. Although this mix is somewhat uncommon, perhaps the most unusual thing about Portugal dos Pequenitos is its scale. The scale of individual buildings seems to vary, ranging from approximately 1:10 to almost 1:2. Nearly all of the structures are at least large enough to allow for children to enter them. Compared to the typical scale



Figure 2.30
Portugal dos Pequenitos ~ Portugal for the Little Ones



Figure 2.31
Exploring the Interiors

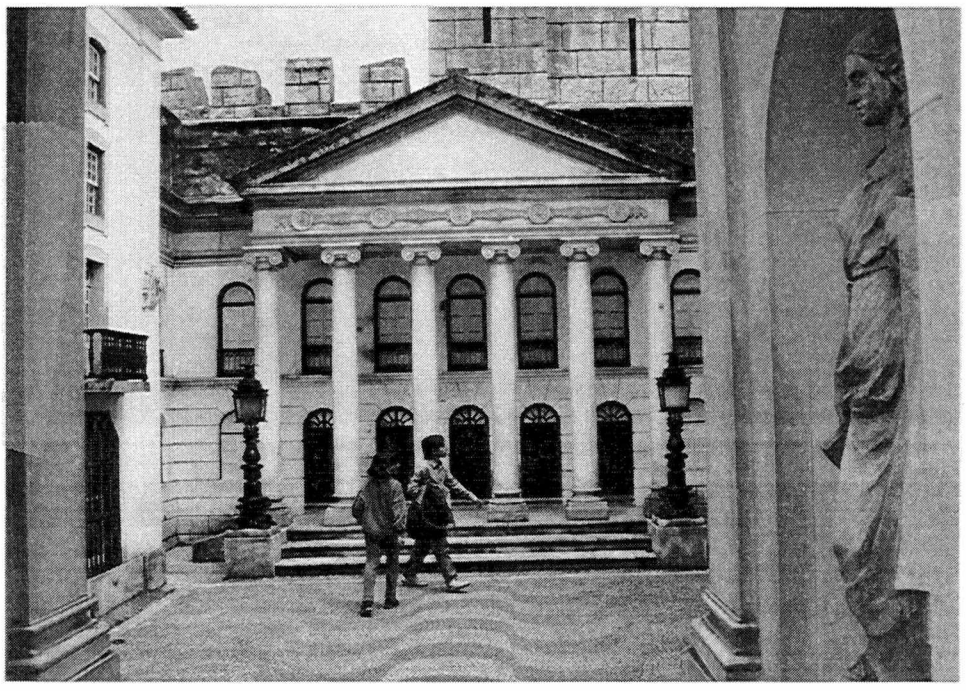


Figure 2.32
Taking a Leisurely Stroll in Coimbra

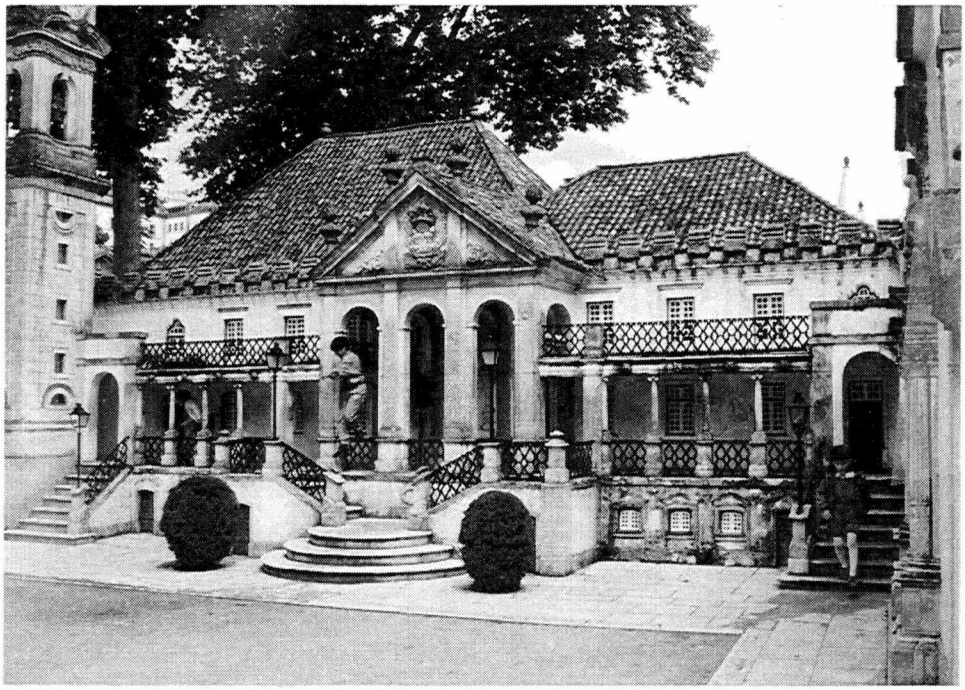


Figure 2.33
Grasping the Meaning of Architecture

models found in miniature villages, many of these models are immense. This especially holds true in the Portugal Monumental section, where some structures are over forty feet (40') high and sixty feet (60') wide. Nonetheless, these structures still pale in comparison to their original counterparts, and thus remain very useful in exploring Portugal's built history (Portugal dos Pequenitos).

Although Bekonscot, Madurodam, and Portugal dos Pequenitos, portray idealized urban and rural settings, many if not most miniature villages do not place their models in such a planned context. These "unplanned" miniature villages typically leave space between their model buildings, so as not to imply any relationship. Even with a lack

of context, many of the structures portray planning tenets through their own individual designs. Such is the case with the over 300 scaled buildings at Mini-Europe in Brussels, Belgium.

Mini-Europe is a collection of some of the European Community's most recognizable natural and man-made landmarks. As a fairly new miniature park its models are particularly noted for their quality and cost. The Grand Place of Brussels alone cost nearly a half-million U.S. dollars. All of the buildings are at 1:25 scale, "to allow comparison between buildings, never seen together" (Meeus survey). In addition to Brussels's Grand Place, other models particularly well-suited for planning education, include: Piazza San Marco in Venice; a hillside village on the Greek island of Mykonos; and the Baptistery, Cathedral, and Tower of Pisa, which are featured without their encompassing wall. The Brandenburg Gate is also depicted, frozen in time, as workers and revellers are shown dismantling the old Berlin Wall. Other intriguing miniatures include: Le Corbusier's Notre Dame du Haut in Ronchamp, the George Pompidou Centre in Paris, a smoking Mount Vesuvius, and an Ariane rocket that blasts off every five minutes (Mini Europe).

Minimundus ("Small World") in Klagenfurt, Austria, goes beyond the theme of Mini-Europe by featuring landmarks from around the globe. At a 1:25 scale, the miniature village depicts the Eiffel Tower, Japan's Osaka Jo-Koen (castle), and Independence Hall in Philadelphia. In October 1992, Minidomm, a model village featuring a similar

theme ceased operation (Blechschmidt). Minidomm was a comparable size park to Minimundus, located in the town of Ratingen near Dusseldorf, Germany. Minidomm featured extensive models of German architecture including the port of Bremerhaven and the Gothic Cathedral at Ulm, as well as miniatures of Paris' Arc de Triomphe and the Statue of Liberty (Hilton 93). The future plans for Minidomm and of its current owner Georg Dommel, are presently unknown.

LEGOLAND, in Billund, Denmark, is more than just a miniature village, it is also part amusement park and part sales tool. LEGOLAND opened in 1968 as a three acre park, "in the middle of the bleak Jutland moors, where people had no desire to come" (Wiencek 139). Twenty-five years later, the 24 acre LEGOLAND Park welcomes over one million visitors annually (Meras E10). The main focus of the park is an area called Miniland, where scale model buildings (primarily 1:20) and other figures are constructed entirely of LEGO bricks (Townsend 16). Although the properties of LEGO bricks make the designs somewhat limited, at 1:20 scale, most buildings can be replicated fairly accurately.

Miniland features: "working" windmills; castles on the Rhine; a section of Florida's Cape Kennedy; an African savannah (at full scale); an elaborate Thai temple; the Egyptian landmark Abu Simbel, with its four colossal statues of Ramses II; and a 46' high replica of Mount Rushmore, set into the side of a man-made cliff. In addition to individual sites, this area of LEGOLAND features small scale copies of actual villages

from Denmark, Finland, Norway, Sweden, and Wales. The urban areas represented include "a charming section of Amsterdam overlooking a canal," and a section of the busiest part of Finland, Copenhagen harbor (Wiencek 127). Also, "thirty fantasy buildings make up the town of the future" (Hilton 92). Together, this eclectic collection of miniatures helps to make up a fun-filled environment (Figures. 2.34-2.37).

It took eight model builders a year and half to build the section of Copenhagen harbor. Among the 120 plus buildings, are houses from the historic Nyhavn district, large

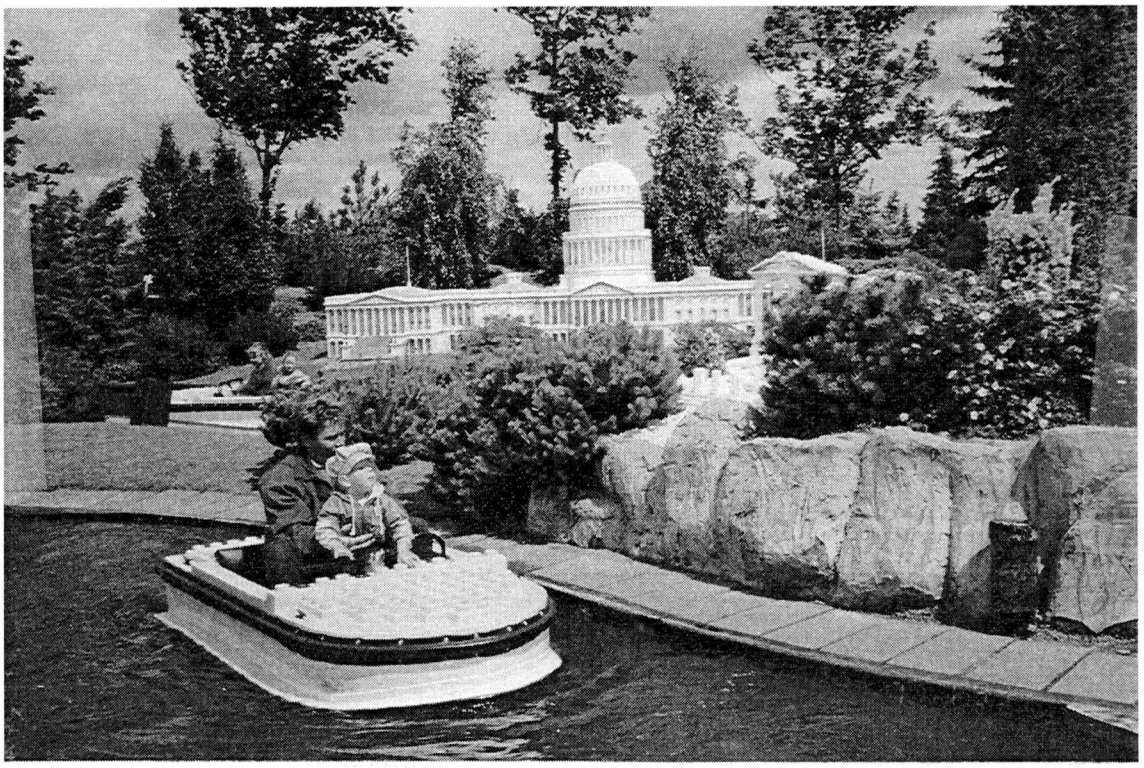


Figure 2.34
Viewing Miniland from a LEGO Boat

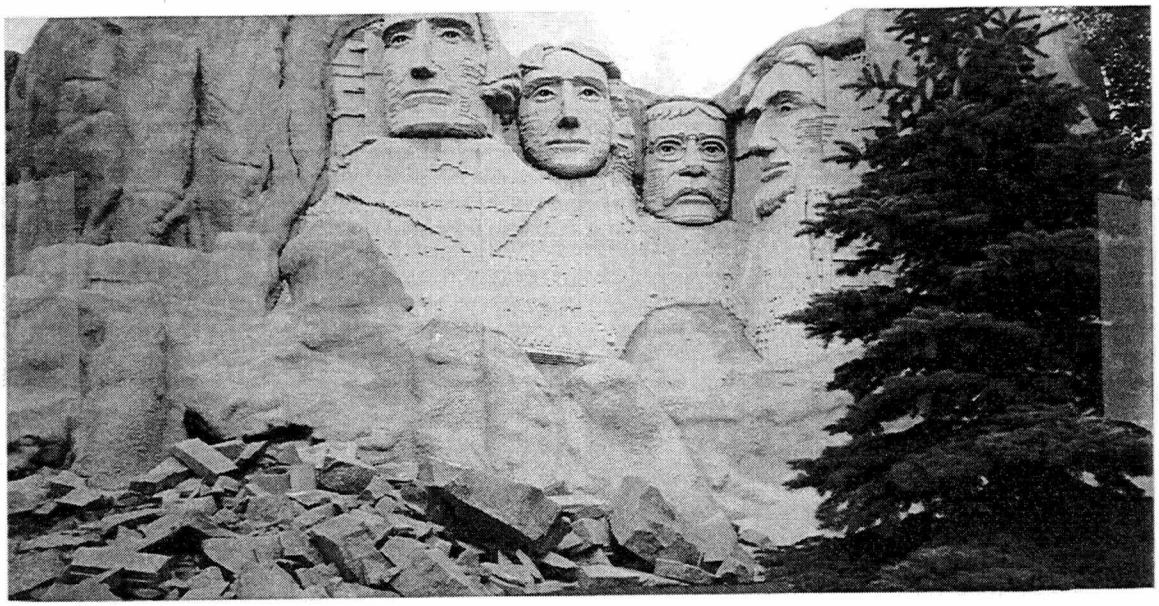


Figure 2.35
LEGOLAND's Version of Mount Rushmore

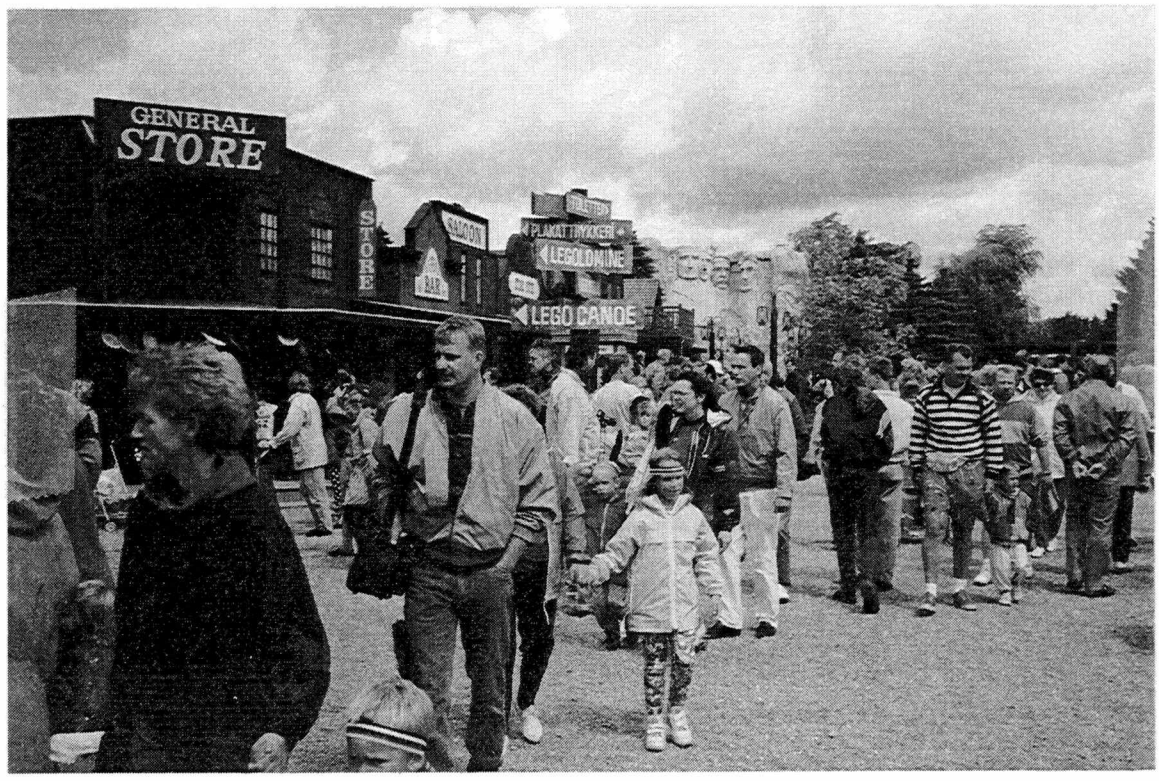


Figure 2.36
A Near Full-Scale Streetscape from America's Western Frontier

warehouses, and the Amalienborg Palace. In addition to all the buildings, the port contains 41 LEGO ships of all shapes and sizes. The harbor area also features the famous statue of the Little Mermaid, so small at 1:20 the "foreign substance" of copper was used instead of LEGOs (Wiencek 131). In their quest for authenticity and in the spirit of Disney, the master builders built plaster, clay, and wood models of such sites as the Swedish Village before proceeding in LEGO brick. "Realism was not the only goal of [Dagny] Holm and the other master builders, for the park is more than a mere recreation of the world, it is a special view of the world," focusing on humor and the lighter side of life (Wiencek 145).

For the architect in all of us, the park has a "construction area" set aside, so any age visitor can build his/her own LEGO masterpiece. LEGOLAND also includes a Traffic School, featuring streets, crosswalks, road signs, and a large LEGO/Shell service station. Children between the ages of 8 and 12 drive tiny electric cars around this nearly two acre site in the hopes of earning a "license." The park also features a full-scale Western town, LEGOREDO, based on Laredo, Texas (Townsend 16).

LEGO miniatures are also used as worldwide marketing tools. Large model buildings such as the White House and the U.S. Capitol travel around to malls and shopping centers, as part of the popular LEGO American Road Show. With LEGO's enormous success in North America, the company plans to build a park similar to LEGOLAND in the United States. Although there have been neighborhood campaigns against the

development, the new 125 acre LEGO Family Park to be located in Carlsbad, California, has a tentative opening date of 1999 (Sloan; Schafer).

The continent of Asia also has its fair share of miniature villages. Perhaps the newest attraction is Tobu World Square, which opened during 1993. Located in Kinugawa, Japan, just outside of Tokyo, Tobu World Square is one of the world's largest miniature villages, covering over 19 acres. The scale model buildings (1:24) span the spectrum of both historic and modern international architecture. And, they are possibly the most accurately detailed of any models found in any miniature village ("Tiny Town").

As in Mini-Europe and Minimundus, there is no attempt to place the buildings in a manner that creates a model city. Having the Sphinx and the Great Pyramids of Giza, as the backdrop to the White House is proof enough (Figures 2.37-2.38). Even so, the level of detail in the individual subjects has made Tobu World Square both educational and awe inspiring. Two examples of scale models from New York City's skyline prove this point emphatically.

Whereas, most of the world's buildings are depicted in their finest form, the scene in front of Manhattan's Flatiron Building does not. This "truthful" depiction of a New York City street scene features commercial buildings covered with soot and graffiti, a bar with broken out windows, and a couple of cigarette billboards. There is also a

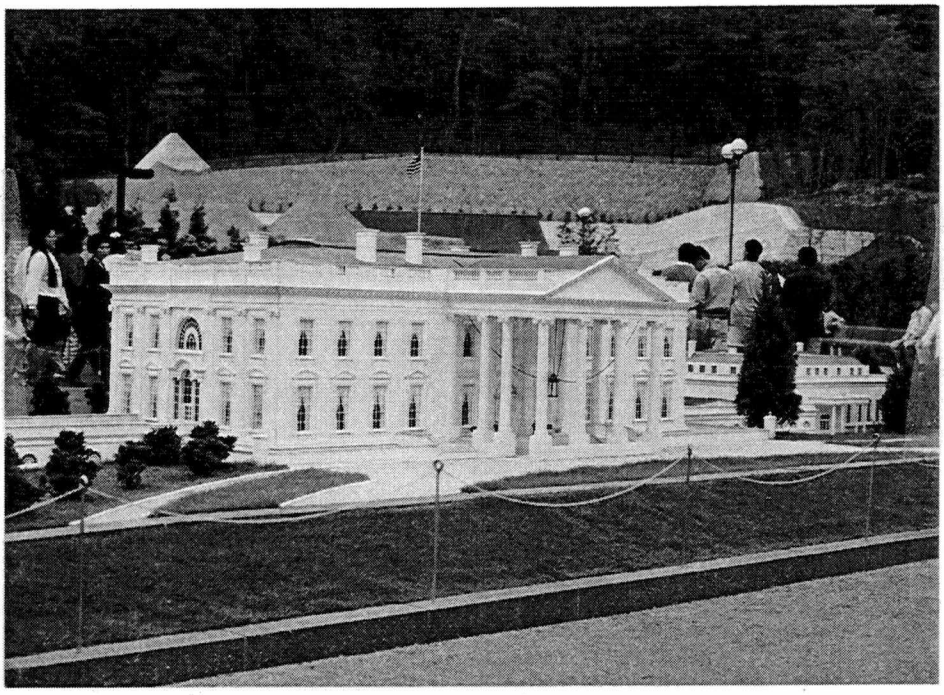


Figure 2.37
International Landmarks at Tobu World Square

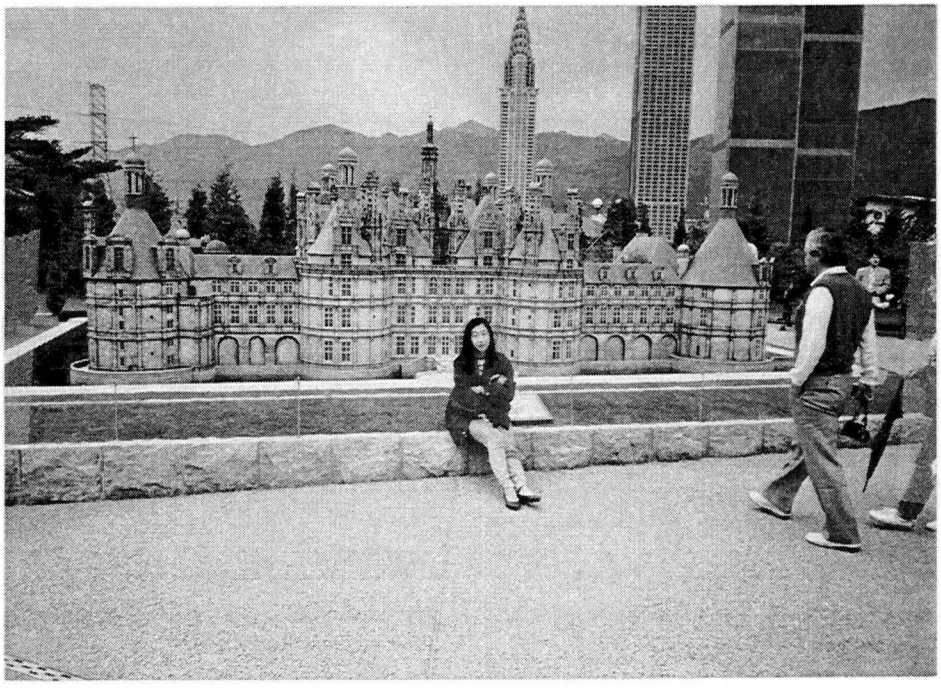


Figure 2.38
An Anachronistic Image: A French Palace with Manhattan Skyscrapers as a Backdrop

nasty four vehicle accident, complete with three police cars, an ambulance, a tow truck, and several crowds of onlookers. Nearby, the twin miniatures of the 110 story high World Trade Center in New York, provide visitors with a good idea of the true height of skyscrapers. Even at 1:24 scale, the structures tower over the park, standing in excess of 55 feet (Figures 2.39-40).

With a site the size of nearly 15 football fields (including end zones), Tobu World Square is able to feature over a hundred of the world's finest plazas, temples, gardens, castles, and ancient memorials. Some of the most spectacular miniature buildings at Tobu World Square are also some of the most inspiring structures in real life. The

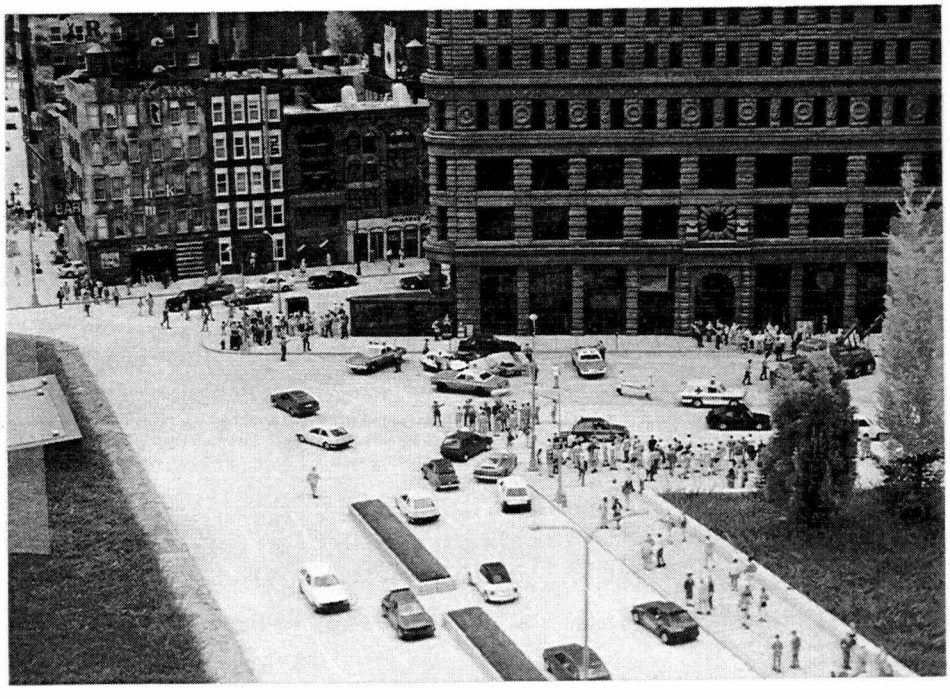


Figure 2.39
A "Realistic" New York City Street Scene

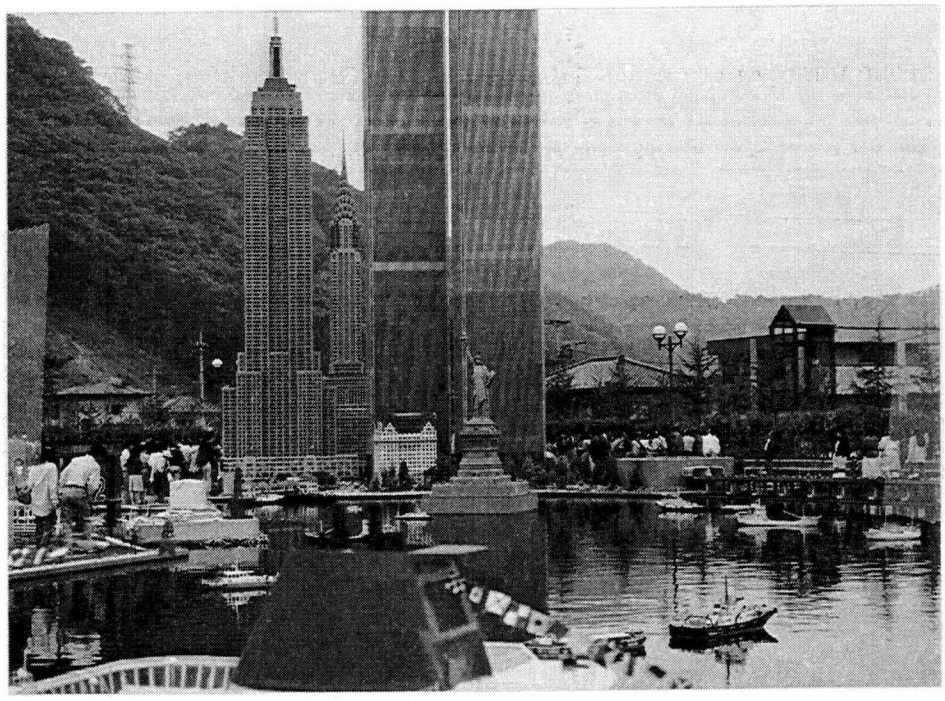


Figure 2.40
The Towering World Trade Center at Tobu World Square

religious models alone are phenomenal. These include: Antonio Gaudi's La Sagrada Familia, Notre Dame and Le Sacre Couer in Paris, Japan's Horyuji monastery near Nara, the Cathedral of Milan, Iran's Masjida-i-Shah in Ispahan, St. Basil in Moscow, Cambodian's Angkor Wat, and the Basilica of St. Peter in Rome, which features Bernini's colonnades and a well-crowded square (Figures. 2.41 -2.42).

Among the dozens of other noteworthy structures, are the following from the Middle and Far East: the Taj Mahal in Agra, Beijing's Forbidden City, the new Tokyodome, Seoul's Namdaenum (South Gate), the Great Wall of China, and Frank Lloyd Wright's Imperial Hotel in Tokyo, which was demolished in 1968. From the West are such

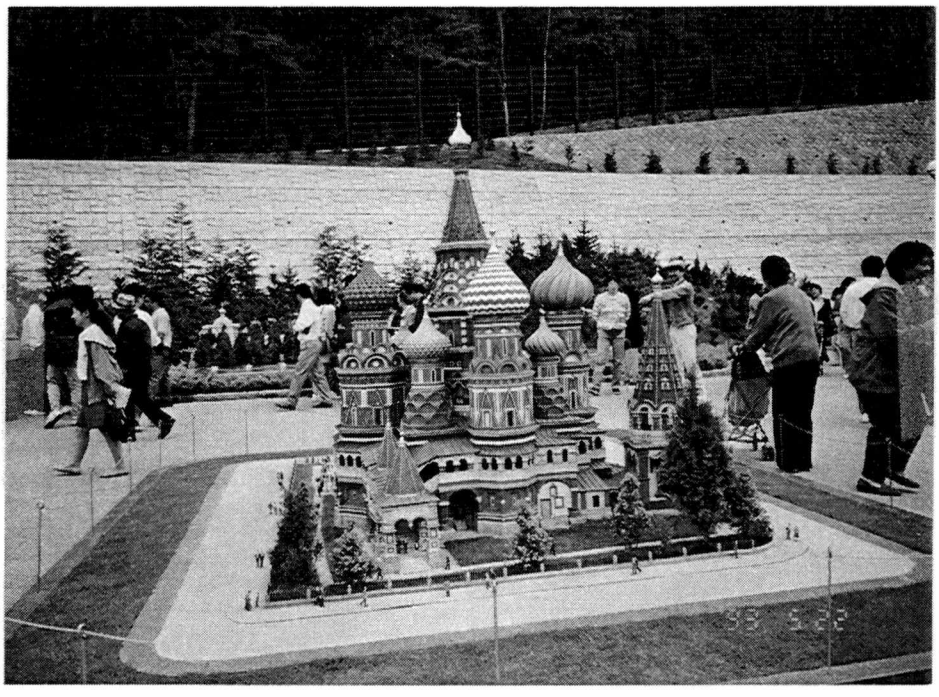


Figure 2.41
Russia's Beautiful St. Basil



Figure 2.42
The Vatican's Basilica of St. Peter

landmarks as: Venice's Grand Canal and Piazza San Marco, the Tower Bridge in London, France's Chateau de Chambord, the Acropolis in Athens, Barcelona's Park Guell, Buckingham Palace and Victoria Circle, the Chrysler Building in New York City, King Ludwig's Neuschwanstein Castle in Bavaria (the inspiration for Disney's Sleeping Beauty Castle), and the Palace of Versailles, complete with its extensive Gardens (Figures. 2.43 -2.44).

In addition to the numerous sites already mentioned, there are a number of other miniature villages that dot the globe. There is the original Splendid China in Shenzhen, near Hong Kong, which has also claimed to be the world's largest miniature



Figure 2.43
Britain's Buckingham Palace and Victoria Circle



Figure 2.44
A "Memorial" to Frank Lloyd Wright's Work in Japan: Tobu's Imperial Hotel

village. This miniature village even comes with its own Chinese traditions, which include a thorough cleaning of the village before the end of every lunar year ("'Gulliver' in China"). Shenzhen is also home to a much newer miniature village. Window of the World opened in 1994; and, in less than a year and half the site has had over 5.5 million visitors. The landmarks in this theme park are divided by continents, with the sites of Australia featured in the "Area of Oceanica." According to a New York Times Magazine article, a similar park to Window of the World is located in Beijing and another will open soon in Canton, China (Laude).

The Holy Land Hotel in Jerusalem also possesses a large scale model. As described in a 1967 National Geographic article; "Jerusalem's ancient glory, reproduced in miniature, sprawls across the grounds of the Holyland Hotel' (La Fay 742-743). This tourist attraction is a 1:50 scale miniature of Jerusalem's Old City. The marble, stone and wood model was meticulously designed through the input of historians and archaeologists (Figures 2.45 - 2.48). Visitors can follow guides or use audio tapes when perusing the diminutive Holy Land (Chekvi survey; Fillafer)



Figure 2.45
The Miniature Village at the Holy Land Hotel in Jerusalem

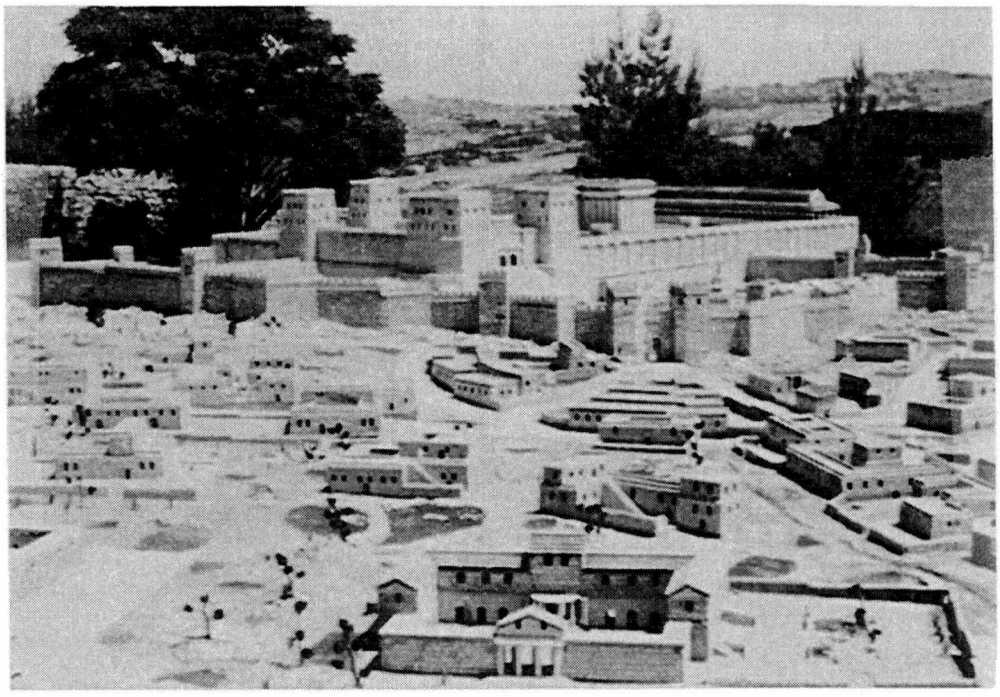


Figure 2.46
The Holy Land Hotel's Version of the Holy Land

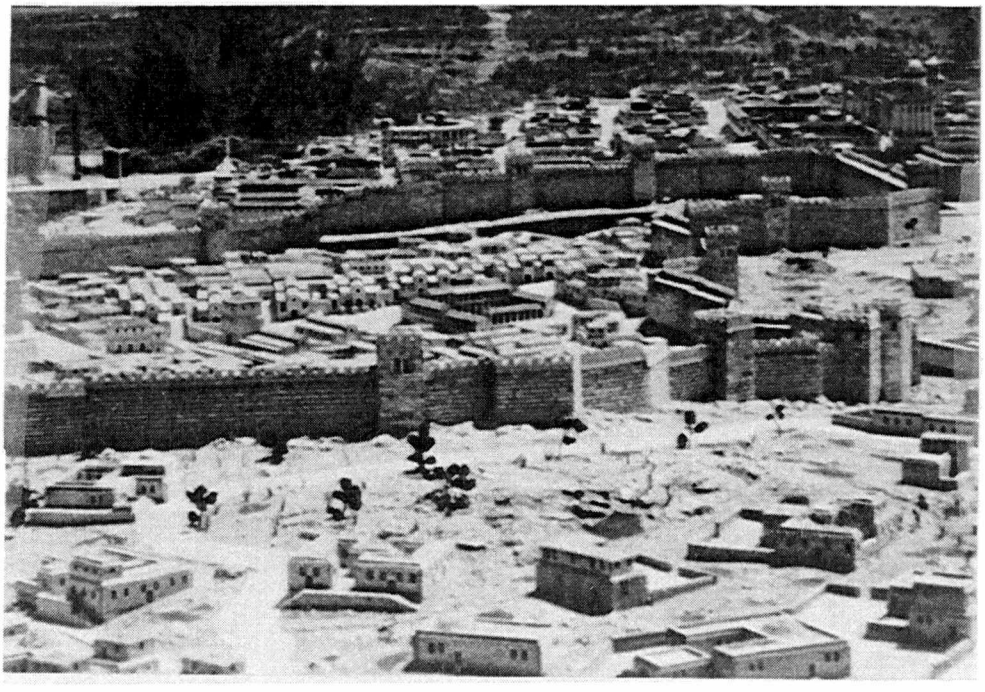


Figure 2.47
The Ancient Walls and Gates of Jerusalem



Figure 2.48
A Closeup of the Miniatures at the Holy Land Hotel

Other international miniature villages include: Meiji Mura (Village) in Inuyama City, near Kyoto, Japan; Miniature World in Victoria, British Columbia; Swiss Miniatur, S.A. in Melidi, Switzerland, near Locarno; and Window on China in Taipei, Taiwan. Among the sites in the "motherland," England, are the Land of Legend Model Village in Cornwall, and the Old New Inn's Model Village in Bourton-on-the-Water, Gloucestershire (Figures. 2.49-2.51). According to MINICITY, USA!'s Johannes Schild, there are also two miniature villages in Italy, as well as one that was recently completed just outside Paris. This attraction in suburban Elancourt Park is well known both as Le Pays France Miniature and Mini-France (Schild, interviews, 14 Aug. and 28 Aug. 1995).



Figure 2.49
The Miniature Village at the Old New Inn in Bourton-on-the-Water

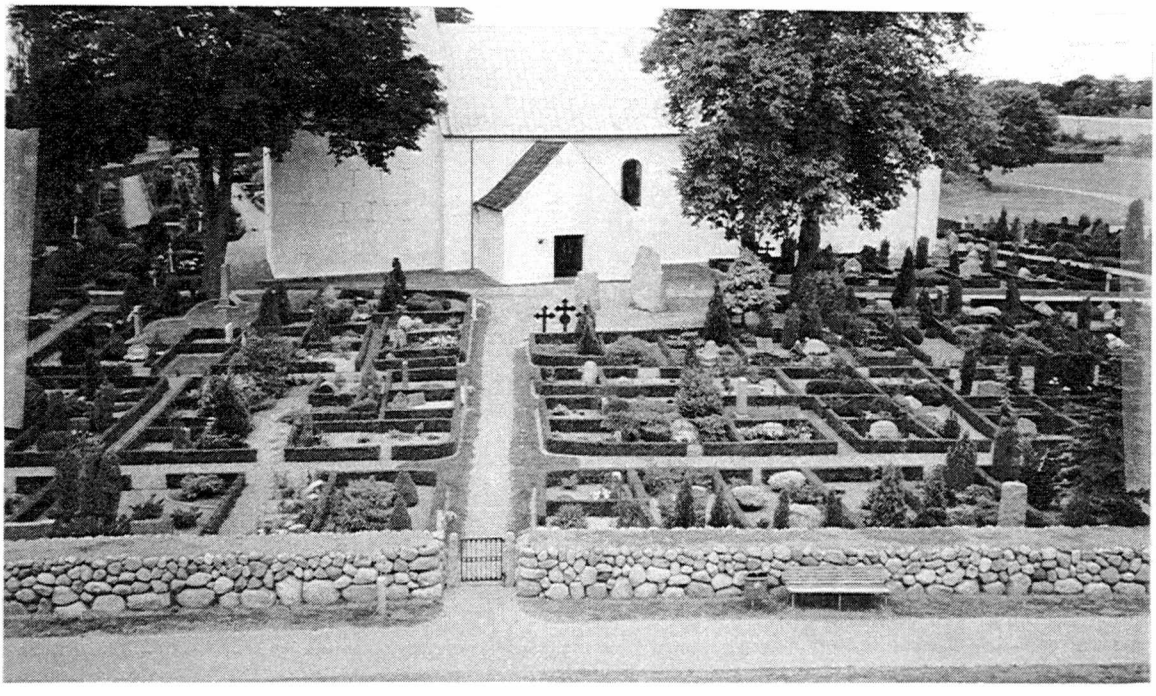


Figure 2.50
A Miniature British Cemetery



Figure 2.51
The Mayor of Natchez as a Big Personality in England

Private Hobbies and Other Attractions

General

Private hobbies have played a significant role in the history of models and miniatures. Many museum collections started as private hobbies, as did a number of miniature villages. People across America are still building a wide variety of simulations of the built environment. Although some are displayed publicly, most are being built in the nation's dens, basements, and garages. Among these home model builders are LEGO

fanatics Michael Burton and Gary Istok. Within Burton's Grosse Pointe, Michigan home, these men are constructing a 600 square foot fictitious European city, with a full complement of architectural styles ranging from Medieval to Modern (Wiencek 30). Other modelers try to replicate important buildings from their youth. These include Lynn Priest's model of the Polo Grounds in New York, and a replica of the Montreal Forum built by Roger Gibson of Battle Creek, Michigan (Dodd 1C & 9C)

Model Railroads

Probably the most popular privately built simulations are model railroads. The model railroad layouts, also known as pikes, can represent anything from an imaginary mountain landscape to a faithful replication of a real urban setting. The scale of the pikes can also vary, with some of the most commonly used track gauges being Z (1:220), N (1:160), HO (1:87), and O (1:48) (Figure 2.52). Current day estimates show that about 75% of model railroaders use the HO pikes, which first appeared in the 1930s. The N scale trains, introduced in the late 1960s, are now preferred by approximately 16% of model railroaders (Holiday Model Trains).

The pike's scale often drives its popularity. This in large part has contributed to the recent successes of the N scale. Although the N scale is basically half of the linear size of HO (1:160 vs. 1:87), N model trains are only 1/8th as large three-dimensionally as their HO counterparts, thus consuming less overall space. Larger scale pikes used

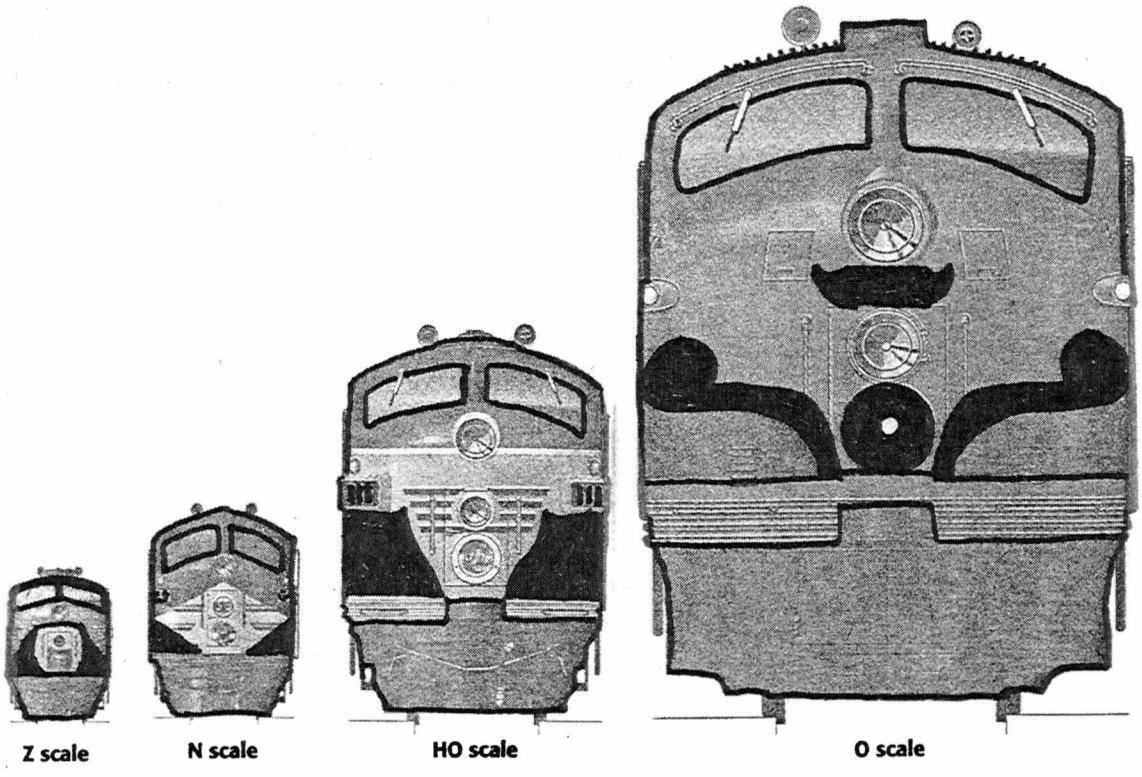


Figure 2.52

Actual Size of the Model Rail Scales: Z, N HO, and O

primarily outdoors, are most commonly found in temperate climates and in use at tourist attractions. These grander scaled model railroads include LGB brand (1:22.5), 3 1/2" gauge (1:16), and 7 1/2" gauge (1:8). Other model railroad scales and their related dimensions are as follows: British N (1:148), [2mm = 1']; TT (1:120), [.1" = 1']; British 00 (1:76), [4mm = 1']; S (1:64), [3/16" = 1']; British O (1:43), [7mm = 1']; and No. 1 gauge (1:32), [3/8" = 1'] (Paust 6; Schleicher 8).

Model buildings, the key to a pike's urban layout, can be constructed from scratch or bought intact at a hobby shop. Overall, the size and complexity of a model railroad layout, is only limited by the creativity and resources of its designer(s). Therefore, to help all the tens of thousands of model railroaders, several "industry" newsletters, journals, and catalogs are presently being published. These and other publications are also useful to miniature car enthusiasts, who often build similar yet typically less detailed layouts.

Many model railroad pikes are built and run by clubs, most of which are made up of like-minded "engineers." Since most of these model railroad clubs are private non-profits, their layouts are typically only open to the public on special occasions. However, some clubs have layouts that are open to the public year round as tourist attractions. One such group is the Chattanooga Area Model Railroad Club (CAMRC), which operates in a joint venture with the Chattanooga Choo-Choo Company. Their model railroad, the Chattanooga Southern, is advertised as both the "World's Largest HO Gauge Model Railroad" and "as one of, if not the largest model railroad exhibit(s) in the world open to the public" (Chattanooga Southern).

The Chattanooga Southern pike (Figures 2.53- 2.56) measures 174 feet long by 33 feet wide (at its broadest point), and is located on the second floor of the Chattanooga Choo-Choo Terminal Station. The layout sits behind a plexiglass shield, and is only visible to visitors from a walkway adjacent to one of its long sides. The CAMRC

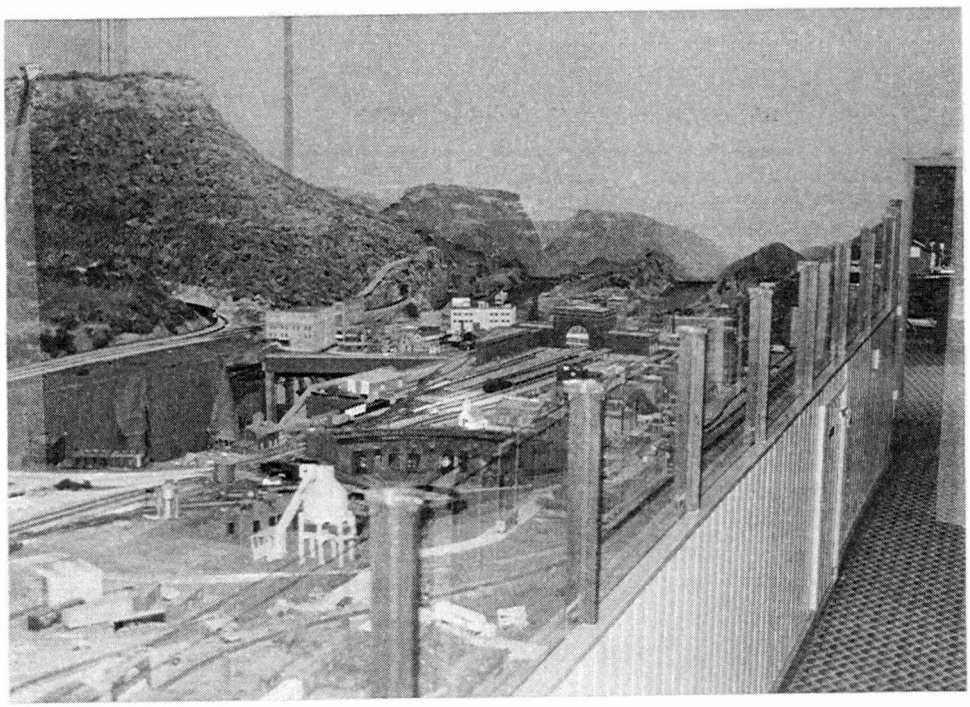


Figure 2.53
The Chattanooga Southern Pike in the Chattanooga Choo-Choo Terminal Station

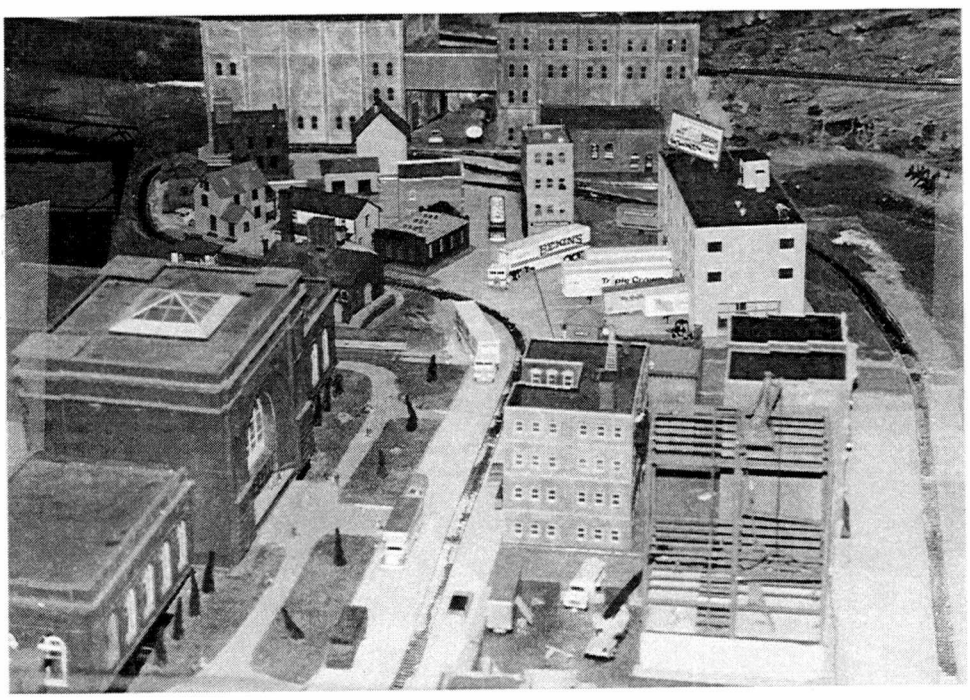


Figure 2.54
The Chattanooga Terminal Station and Surrounding Area at HO Gauge

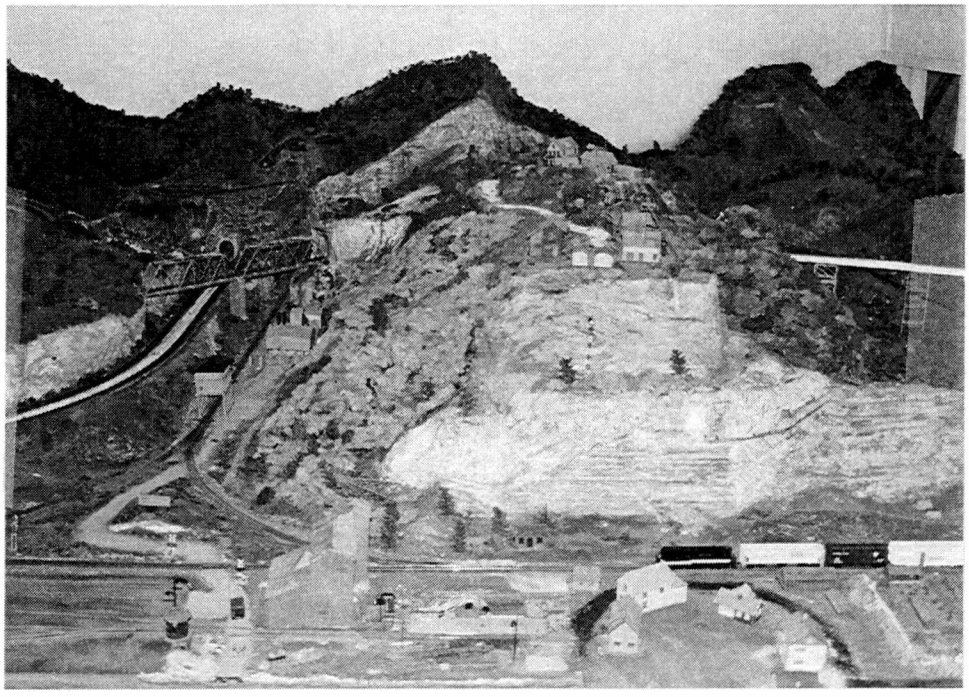


Figure 2.55
The Imaginary Portion of the Chattanooga Southern Model Railroad

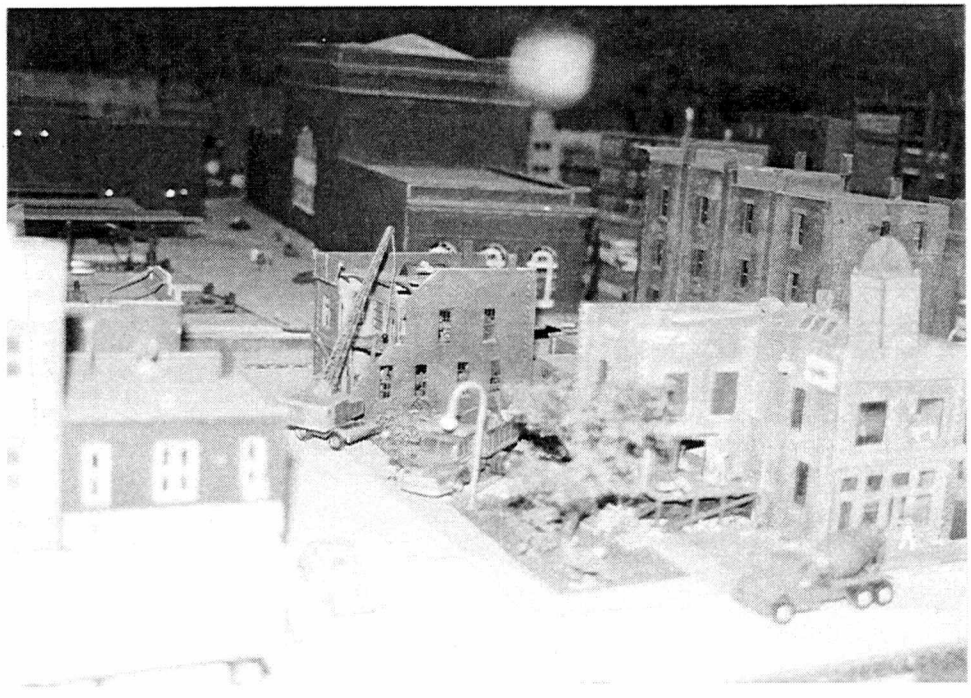


Figure 2.56
An Emphasis on Realism

designed the model railroad to be half "real" and half fantasy. The first 100 feet represents a section of Chattanooga, Tennessee, during the late 1950s (Hovan survey). The remaining 74 feet depicts a "typical" slice of life in the Cumberland Mountains, including a coal mine, a logging camp, "Hobo Jungle," and an old, rural cemetery. A visitor's guide to the layout points out over 40 noteworthy scenes and buildings along the tracks. Among these narratives is a cursory description of the architecture, function, and history of the Terminal Station, which "saved from demolition...is now designated a landmark by the National Register of Historic[al] [sic] Places" (Chattanooga Southern).

There are three other examples of model railroads worth noting, specifically in regard to their theme, level of detail, and their accessibility. These three pikes were chosen because together they are fairly representative of the broad scope of model railroads. First, is the Railroad Room at the Yorktown Museum in Yorktown Heights, New York. Usually open year round, visitors can view scenes from the Old Put Line in Westchester County (Barile 16). The model, however, is currently being extensively enlarged to feature a more accurate representation of historic Yorktown (McCarty). The work is being done with strictly volunteer help, and thus the new layout will not be completed until sometime after 1995.

The second notable pike was developed by the Quincy Society of Model Engineers (QSME) in Quincy, Illinois. This group of model railroad enthusiasts understood the

importance of planning prior to beginning their pike. Three things were necessary as a framework for the model railroad, a name, location, and set period in time. The QSME chose the "Chesapeake & Lake Erie," a fictitious rail line operating in Northern Pennsylvania. The time selected was the Autumn of 1958. "The first of these decisions establishes an architectural foundation for the structures and the scenery. The second provides a valid reason to have a mixture of steam and diesel locomotives on the railroad" (Chesapeake & Lake Erie Rwy).

Since the Chesapeake & Lake Erie (C&LE) pike was built primarily for the personal use and satisfaction of its "engineers," it does not easily accommodate large numbers of visitors. In contrast to layouts where the only access to the tracks and buildings is from the exterior perimeter, the C&LE snakes along the sides of a central "walkaround" area (Stoll 64-65). Although the walkaround is fairly narrow and has only one access, designers like this type of layout, because it gives them an encompassing view of the modelled environment. The C&LE (1:87) is located in the basement of a senior citizen's complex, and is only open to the public for holiday season tours and by appointment.

The third layout is the spectacular Franklin & South Manchester (F&SM) model railroad. The F&SM is much more than just a private pike, it's a dynamic workshop for a professional modeler. This HO gauge (1:87) masterpiece has been developed by George Sellios, the founder of Fine Scale Miniatures. Fine Scale Miniatures, also

FSM, is a company that produces supplies for model railroaders and other hobbyists. Located in the heart of Sellios' factory in Peabody, Massachusetts, "the F&SM is one of the few private layouts that's regularly open for viewing," with "well behaved children allowed with adult supervision" (Hayden 15). During 1993, the layout was open to the public one Saturday per month.

The F&SM focuses on the central business districts of the "typical" Massachusetts cities of Manchester and Dovertown. Set in 1935, the layout depicts both the positive and negative sides of living in a large New England city during the Depression. There are literally hundreds of miniature scenes on this 266 square foot layout (7' x 38') The larger features include a harbor with coal barges, cranes, and shipping vessels, dozens of "brick" and "stone" faced commercial buildings, an expansive rail yard, and several industrial areas, complete with smokestacks and soot. Among the other elements of the F&SM pike are: a couple of diners; a two-pump service station; half-standing buildings deteriorated from both fire and neglect; a shopping district; and a type of street most commonly found in New England, that runs beneath buildings.

Overall, it is the attention to detail that makes the F&SM so realistic. Laborers, hobos, and children can all be found along the crumbling streets and trash strewn alley ways of the cities. There are dozens of buildings with faded advertisements painted on their facades. Weeds are growing out of cracks in the sidewalks; and groups of ducks are floating in the Northfield River. Many automobiles can be found on the

pike including one with a parking ticket on its windshield, and another that is riddled with bullet holes. Also, in the pre-environmentally conscious days of the Depression Era, seemingly untreated industrial sewage is pouring into the Manchester harbor, not far from a group of fishermen. Even with all this detail, the pike is far from completion. The future expansion is to include the city of Franklin and an expansive mountain landscape.

The incredible detail of the F&SM led Model Railroader editor, Jim Kelly, to declare, that he couldn't view photos of the layout with out the sensation of being "pulled in" to the urban atmosphere. "It's almost as if I could walk the streets and peer into the alleys while exploring George's cities" (Kelly, J., 4). The author of this thesis feels that when compared with all the previously noted models and miniature villages, the Franklin & South Manchester model railroad is undoubtedly the most highly detailed and perhaps most accurate depiction of a complex urban setting.

Other noteworthy, urban oriented model railroads include a layout of Reading, Pennsylvania, which is run as a tourist attraction on a hill site overlooking the city, and architect Lorell Joiner's Great Southern Rwy., which depicts the urban scenery of West Texas from San Antonio to Van Horn (O Gauge - 1:48) (Joiner). There are obviously thousands of more model railroads in America and their popularity has remained strong. In their research on simulations, University of Washington professors D.L. Bonsteel and E.R. Sasanoff noted that model railroads provide "a

resource of real things for use in models of a real world" (Porter 97). Perhaps this is why model railroads continue to be built, since average individuals are able to create and shape an urban or rural atmosphere, as realistically as they deem fit.

Assorted Hobby Models

The grotto is another type of simulation that has been typically built as a hobby, most often for religious use. Although many grottos only feature a simulation of a cavern or a crypt, several others feature scaled representations of a variety of different objects. One particular grotto that focuses on depicting buildings and urban scenes is the Ave Maria Grotto near Cullum, Alabama. Ave Maria Grotto's four acre site features dozens of miniature buildings from around the world, placed in a natural hillside setting. All of the models were the work of Brother Joseph Zoettl, O.S.B., a native of Landshut, Bavaria (Sermons in Stone).

Brother Joseph built his first miniatures in 1918, while working the night shift at the Saint Bernard Abbey powerhouse. He primarily used cement for his models; although, he also used whatever other materials were available. Years later this included the thousands of little stones and trinkets sent to him by people from around the world, who had seen his work. With limited resources, no training, and usually only a postcard or memories to work from, Brother Joseph built some of the most famous buildings associated with the Roman Catholic faith. Nonetheless, many architects who

have visited Ave Maria Grotto have said the buildings are appropriately scaled. No standard scale, however, is used throughout the site (Campion survey).

There are a wide assortment of miniature scenes at Ave Maria Grotto (Figures 2.57-2.58). Several feature groups of buildings with a common setting, such as Rome and Jerusalem. For the most part, however, the buildings are not placed in any accurate context to one another. The Roman section features: the Coliseum, St. Peter's Church

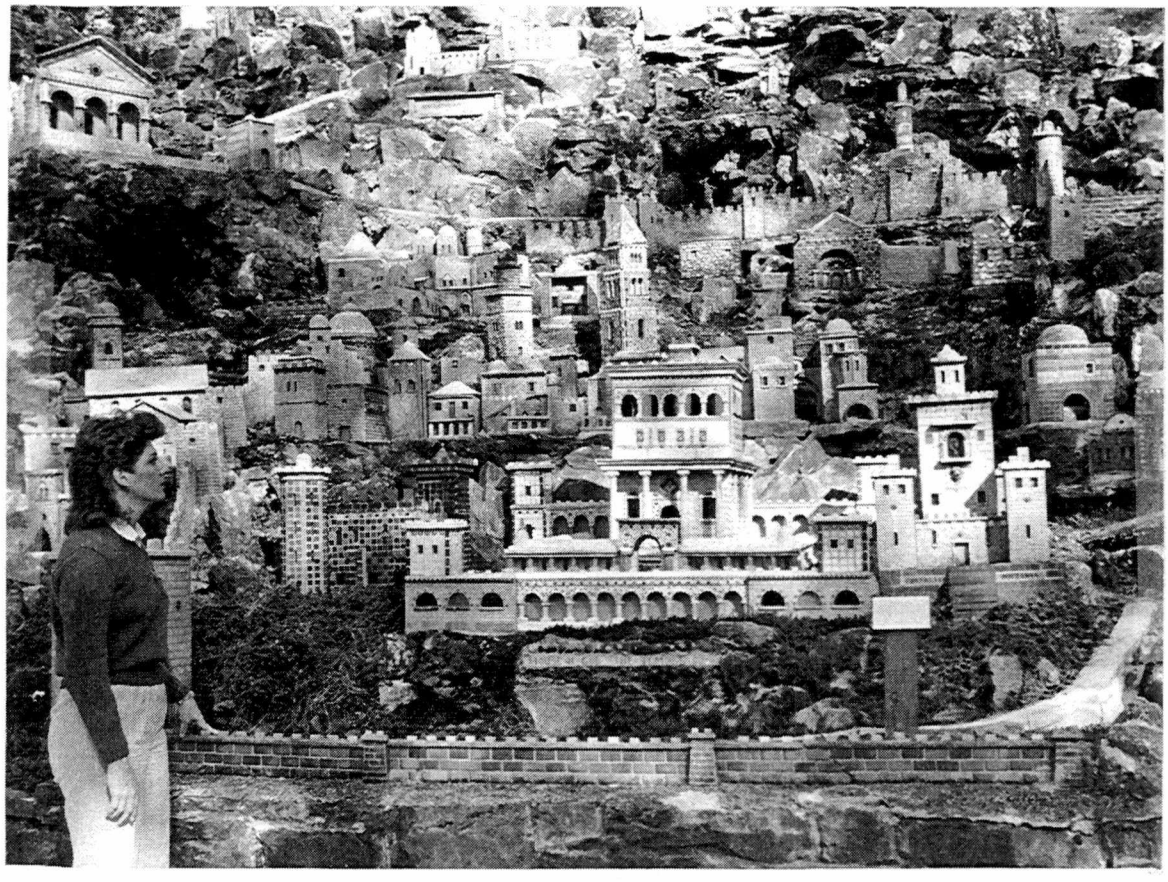


Figure 2.57
Jerusalem in Miniature at Ave Maria Grotto

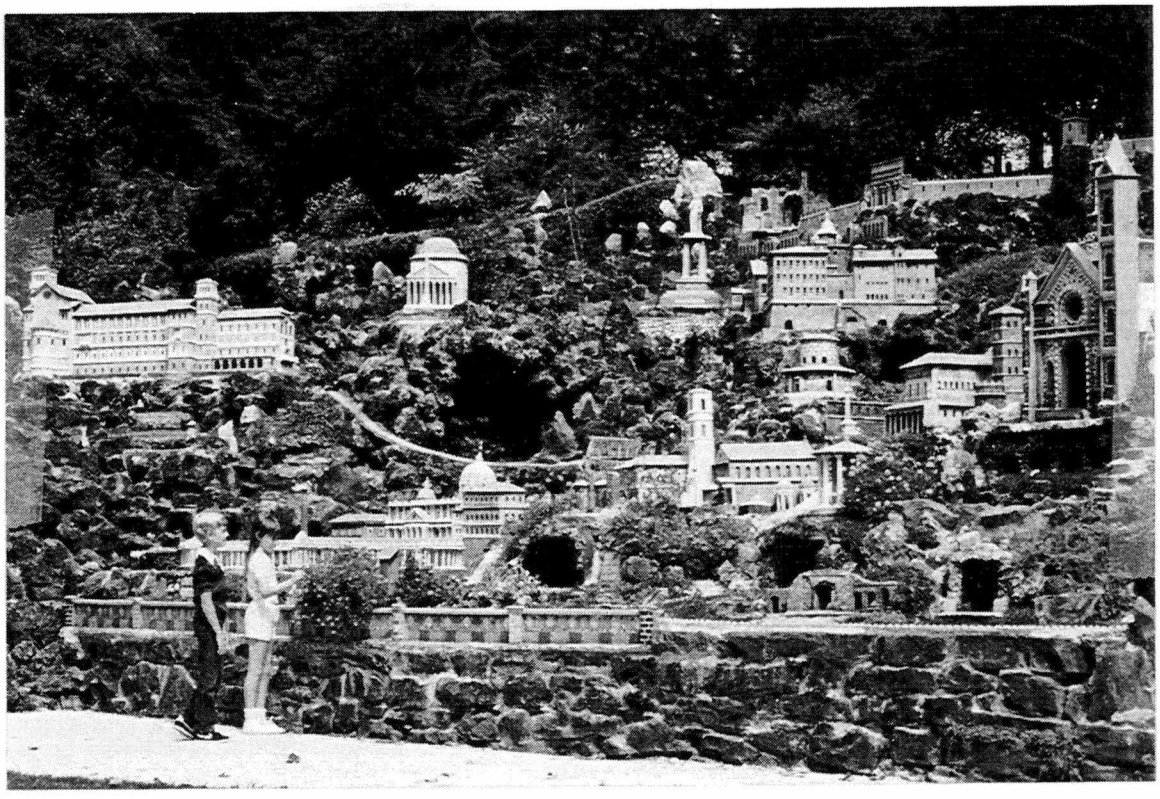


Figure 2.58
The Landmarks of Rome

and Square, the Catacombs, the Benedictine College of Sant' Anselmo, the Roman Aqueduct, the Pantheon, the wall built under Emperor Aurelian, and Monte Casino monastery, destroyed during World War II. Two different sections known as the Holy Land and "Little Jerusalem" feature such models as: the Hanging Gardens of Babylon, an Egyptian pyramid, the Temple of Jerusalem, the Cenacle (where Christ offered the Last Supper), the Garden of Gethsemane, the Fortress Antonia, and both Mount Zion and Mount Tabor.

Other international structures include: the Basilica and Grotto at Lourdes; a Benedictine monastery in Seoul, Korea; the Basilica in Fatima, Portugal; a Bavarian castle; the Carmelite Convent in Lisieux, France; and the World Peace Church in Hiroshima, Japan. The buildings depicted from the United States are primarily missions including: the Alamo in San Antonio; Nombre de Dios in St. Augustine; San Miguel in Santa Fe; and San Juan Capistrano, one of nine California churches built by Father Junipero Serra. Initially the models were built as a pleasurable diversion for Brother Joseph, and later for the enjoyment of the other Benedictines at Saint Bernard Abbey. Today, Ave Maria Grotto is open to the public, and is visited daily by tourists, school groups, and individuals on pilgrimage (Morris).

There are several other types of hobby oriented miniatures, most being either seasonal or made specifically for children's use. Christmas Villages are the best example of a seasonal representation of a cityscape. The buildings in a Christmas Village are typically limited edition miniatures, and are marketed by a company such as Hallmark Corporation in Kansas City, Missouri. Collectors are responsible for the layout of the buildings, and often incorporate them into temporary model railroad pikes. The popularity of these Christmas Villages is evidenced by the number of year round Christmas stores, and such newsletters as Lefton's Colonial Village News, whose motto is "Serving a Worldwide Community of Collectors."

There are also a number of other similar miniature collections, not based on a Christmas theme. An example is the Lilliput Lane collection of cottages by David John Tate. Two of Lilliput Lane's molded sculptures from the 1992-1993 and 1993-1994 series show the artisan's fascination with changes in the built environment. The 1992-1993 "Forget-me-not" cottage is depicted as being rundown, overgrown with weeds, and possessing a fallen down For Sale sign. A year later the same structure, now known as the "Heaven Lea Cottage," has been restored and features a new front door, roof, and paint job, as well as a colorful flower garden. The miniature automobile parked in front of the 1993-1994 limited edition cottage, with its Just Married sign and mismatched shoes hanging from the rear bumper, helps complete the story of the cottage's revitalization. Members of the Lilliput Lane Collector's Club are entitled to: an annual catalog; personal invitations to demonstrations and conventions; the Club's full-color quarterly magazine Gulliver's World; and, free admission into the Lilliput Lane Visitor's Centre in Penrith, England (Lilliput Lane, 1992 and 1993).

Other collections feature reproductions of real buildings, including ones from such southern cities as New Orleans, Charleston, and Natchez ("The Streets of Natchez Collection" by Anna Saterstrom). These "figurines" are typically either porcelain, bisqueware, or pewter. Individual buildings and sites, both real and imaginary, are also available. Among the companies marketing these miniatures are the Danbury Mint, the Franklin Mint, Hawthorne Architectural Register, and Lenox. Some

collections such as the Lenox Spice Village (Basil House, Paprika House, etc.), not only serve as artwork, but are intended for more "useful" functions as well.

The Monumental Miniatures company focuses on a more classical theme. Instead of producing ready-made buildings, Monumental Miniatures provides natural sandstone blocks and assembly plans. Fully assembled the structures will be "authentic replicas" of "the great architectural achievements from world history." Among the designs are the Egyptian Pyramid, Greek Temple, Roman Barrel Vault, Gothic Arch, and Roman Arcade. The miniatures come in two sizes, the Collector's Classic and the slightly smaller Desktop Classic (ArchiSources, 8).

For those interested in making their own three dimensional structures, numerous cardboard, wood, and plastic modeling kits are available. One particularly useful kit is aimed at those who are interested in remodeling or designing a new house. That is the 3-D Home Kit from the Design Works, Inc. Its model capabilities are advertised as helping to "visualize ideas, improve design, communicate with builder and designer, and save time and money." The kit includes construction material and detailed instructions to build a 1/4" (1:48) scale model, for up to a 6,200 square feet structure. Among the things simulated by the construction material are: brickwork, clapboard siding, doors and windows, interior walls, and landscaping (3-D Home Kit).

Cutout books are another medium for creating scaled versions of buildings, especially historic ones. Dover Books produces the "Cut and Assemble Series," designed by Edmund Gillon and A.G. Smith. Examples of the HO gauge settings in this series are: an early New England village, a New York harbor, Main Street, and a Victorian seaside resort. "The World at Your Feet," the Perigree series by Alan Rose, features such books as Build Your Own Chrysler Building and Build Your Own Taj Mahal. Three-dimensional puzzles also replicate similar landmarks including King Ludwig's Neuschwanstein Castle and the U.S. Capitol.

Numerous individual models have been designed of historic homes around the world. Somewhat representative of this may be the antebellum homes of Natchez, Mississippi. During the 1950s, the artist Annis Dunbar Jenkins Snedeker, a native Natchezian, produced finely detailed replicas of three local landmarks. The handcrafted models were of Dunleith, Gloucester, and Green Leaves, the home in which she was born. The only one of these models currently on display is Green Leaves (Figure 2.59). The model of Dunleith was lost to fire. Snedeker did other miniatures as well, including one of a destroyed Hudson River Valley estate, which she reproduced from photographs and archaeological evidence (Carpenter; Morrison). A much larger model of the home, Fair Oaks, is on display at the Historic Natchez Foundation. The replica of this 1822 planter's residence, constructed by Custom Miniatures of Kirkwood, Missouri, was donated to the foundation by the man who had it commissioned, Andrew L. Zinsmeyer.



Figure 2.59
A Model of Green Leaves: An Antebellum Home in Natchez, Mississippi

Existing mainly in the realm of children, are representations of the built environment such as dollhouses and sandcastles. Few dollhouses are designed or built with regard to a larger context, such as a streetscape or a neighborhood. However, some "do-it-yourself" kits (e.g., Greenleaf's modeling kits) are designed to make both individual structures, as well as groupings of buildings, which are intended to simulate villages. Even if they are displayed as individual structures, dollhouses can be useful in the understanding of architectural styles and individual house plans. Dollhouse collections can be found in museums and in private homes around the world. Collections in the United States have been showcased at museums such as: The House On The Rock in Spring Green, Wisconsin; the Nashville Toy Museum; Carol & Barry Kaye's Museum

of Miniatures in Los Angeles; and the Washington Dolls' House and Toy Museum in Washington, D.C.

Few sandcastles are ever around long enough to be used as teaching tools. There are, however, annual sandcastle competitions, which often feature the "works" of architects and engineers. These groups build both fanciful designs and replicas of real structures. Professional firms, such as Sand Sculptors International (SCI), build sand models to serve as tourist attractions. In April of 1993 SCI claimed it had built the "World's Tallest Indoor Sand Castle" (24'6") at the Valley View Mall in Roanoke, Virginia. This spectacular sand castle was designed to stand for several months (World's Tallest). The ice castles and other frozen structures from the St. Paul Winter Carnival, also suffer from the limitations of time. Scale, however, is typically not a concern, since these ice sculpted buildings can stand in excess of 100 feet.

Finally, two scaled environments are worth noting which are on other ends of the size spectrum. The larger of the two can still be found in Shepherdstown, West Virginia. Florence Shaw, a teaching supervisor at Shepherd College, was responsible for its creation back in 1928. In an attempt to recruit local children to the summer school classes she supervised, Miss Shaw promised to help build them a model farm. In keeping her word, Miss Shaw and nineteen of her student teachers, spent part of that summer supervising a crew of a dozen Shepherdstown children, a stone mason, and a carpenter. The result was a one acre farm site with "a house and barn precisely scaled

to a child's size." Both the barn and the two-story, ten-foot-high, Dutch Colonial style house remain today. The "Little House," with its rocking chairs and stone fireplace, is still open (if you can fit) to the public through the stewardship of the town's Rumsey Extension Homemaker's Club (Keister 48).

An entirely different type of simulation was described in the 1893 Quincy Herald newspaper. This model environment was the focus of the article "A Seventeen Year Job: The Making of the Great Swiss Automatic Village." Automatic villages typically depicted the activities of a working community or a historical scene. Three different "village" cabinets were displayed in Quincy, Illinois, each with its own unique setting. These were: a canyon scene along the Denver and Rio Grande Road, featuring moving trains and a performing circus; a sea-based vignette from Greek mythology; and a Swiss/Bavarian hillside town.

This latter automatic village was designed to showcase a whole town's daily work routine within a single seven-story cottage. The cliffside cottage stood "some eighteen hands high and spread about six cubits in length," which is approximately six feet high by ten feet wide (6' x 10'). Its mechanical elements were set into motion by a "man with a Frankfurter accent," who wound it up every two hours and forty minutes. Within this time all of the village's activities were repeated on a 12 minutes cycle.

Among the scene's active participants were five cobblers pegging away in a shoe shop and a mason climbing a ladder with his hod. There was also a linseed oil stamp mill, an old fashioned grist mill with an elevator, flowing water wheels, a millwright dressing a stone, and a blacksmith's wife carrying refreshments, who prompted the ringing of a dinner bell. The Herald reporter revealed there were some "movements so fine that they represent the growth of the foliage, and it is an actual fact that trees are shown in the valley which are actually growing taller as the mechanism ages."

As with many 19th century dioramas, the automatic village was a travelling exhibit. Although such a distinction often called into question its quality, the Herald reporter indicated this did not apply to the miniature village which took Joseph Bergmann nearly two decades to build. "Usually these fly-by-night museums and shows are worse than useless, but Manager Berger has a clever and attractive exhibition--a mechanical marvel that surprises every spectator" ("A Seventeen Year Job").

Less Traditional Uses and Technological Influences

General

As determined so far, the majority of models can be found in public and private planning/design firms and as exhibits in interpretive and entertainment settings. There are, however, several other less common ways in which models are being used. These

include theatrical sets, art work, games, and as investigative tools for the psychiatric profession. Also, such things as zoos, aquariums, and eco-parks, serve as proxies or models of the natural environment. The focus of this thesis is an understanding of the built environment; therefore there will be no elaboration on these environmental proxies, except to note that they are typically scaled simulations based on man-made designs.

This section will also cover the numerous technologies currently being used in conjunction with models. These include climatic, photographic, and computer simulations, as well as such technologies as virtual reality and holograms. Since the primary settings and functions for models have already been addressed, only a cursory review of these less standard models and technologies will be provided.

Medicine, Movies, and Mayors

In recent years, models have gained recognition from psychiatrists and psychologists as tools for evaluating behavior. From individual buildings to scaled neighborhoods, these simulations bring out issues that may be difficult to formulate in a strictly conversational setting. "Miniature habitats serve a...clinical role...and indeed are frequently used by child psychologists in analyzing the child's view of social interactions. A doll house, for example, and the events that the child stages therein may reveal much about his feelings towards the way his family interacts" (Busch 11).

Other researchers are using scaled environments to see how they affect "temporal experience, neurological functioning, information processing, and the timing of behavior." One such researcher is Alton De Long of the University of Tennessee. De Long and his associates have determined that child-sized environments lead to a "quicker onset of complex play behavior in children" (De Long, "Effect of Space." 8). By using "models" that range in scale from 1:2 to 1:96, these and other experiments have shown De Long that scale simulations "speed the perception of time and quicken the solution of design problems." His work has also shown that individuals exhibit higher brain activity, (as measured by EEG's), when working with models (Kleeman 187). In addition to improving problem solving, De Long feels that scaled environments may help children with attention deficit disorders (De Long, "Effect of Space." 8).

Whereas some models are being used in the noble cause of academic research, other models have the sole function of being art work. The message behind the artistic miniatures of Sculptor Charles Simonds, is perhaps that some inner cities may be beyond repair. Simonds' "undersize buildings and villages, composed of minute unfired clay 'bricks,' are models of decay rather than construction. Poised on vacant windowsills, doorways, and curbs, their demise was inevitable. Scattered across New York City's Lower East Side like miniature archaeological sites, these pieces document urban decay rather than the splendors of urban architecture celebrated by most architectural models" (Busch 12).

This celebrated urban architecture is often what Hollywood and its counterparts are trying to depict. Much of what Americans envision when they think of distant places or cities from the past, is based on television and movie images. Individual buildings, neighborhood streets, and entire town sections are often constructed on the back lots of production studios. These structures are built in a myriad of scales, and used as theater sets, television backdrops, and as movie props. The scale of the simulated built environment is based on its creative function, as well the resources of the producer. Such things as Western ghost towns are typically constructed at near full scale; whereas other scenes are done as small scale models, because of the enormity of their subject. Designers commonly use these scale models to depict ancient town settings, large scale urban destruction, and futuristic cityscapes.

Two particularly well documented models were those built for the movies *Ben Hur* and *Tora! Tora! Tora!*. In *Ben Hur* the Circus Maximus, where the chariot race took place, was part full-size set and part scale model. Nearly everything above the first two rows of the great ring was scaled including the massive columns, the entry gates, and numerous rows of seats. Through complex photography the film makers were able to combine the two differently sized sets to make the Circus Maximus look complete (Hilton 117).

In *Tora! Tora! Tora!*, the entire Pearl Harbor and all its ships were replicated. In order to build the set accurately enough to withstand closeups, studio modelers spent

24 hours a day for six months to construct all of its components. This concerted effort was made knowing that most of it was to be destroyed (Hilton 117).

Both versions of *Attack of the 50 Ft. Woman*, although perhaps not the cinematic successes of the two previously mentioned movies, do offer an interesting look at small scaled "urban" settings. Two movies from 1992 focusing on miniaturized environments are Disney's *Honey I Blew Up the Kids* and *Toys* starring Robin Williams. Although produced primarily through an overlapping photography technique, the music video for the song "Love is Strong" shows the members of the Rolling Stones roaming the city streets as New York giants. The children's television show and numerous videos featuring Thomas the Tank Engine provide both urban and rural views of communities. The modeled environments presented in this show are intended for younger children; thus, they are simpler in form than most of Hollywood's offerings.

In addition to television, movies, and music videos, the print media also uses urban simulations. Two advertisements, one for an automobile and the other for a window manufacturer, illustrate this fact. The EFCO Corporation promotes its windows by depicting miniaturized versions of such places as Chicago's Merchandise Mart with the "towering" architects who chose their product leaning over the buildings (EFCO). A more extensive urban image is presented in a Rolling Stone ad for Honda's del Sol convertible. Next to photographs of the del Sol and the slogan, "It's not what you add

on to our car that makes it more fun. It's what you take off," is an older American-made car which has been covered with a highly detailed model of downtown Seattle. This colorful, city model features dozens of accurately scaled three-dimensional buildings mounted to the roof, trunk, and side panels of the car. Setting off the whole image is the real Seattle skyline in the background (Honda).

Games are another area where three-dimensional simulations are used to depict the built environment. The formats of these games range from using simple block forms to computer generated images. Urban Dynamics is a game used to teach planning students and others about the conflicting realities of politics, economics, and land use when developing a city. Four groups of "citizens" place small colored cubes representing commercial, residential, and institutional buildings, on a grid that serves as a series of city blocks. The wooden cubes are tinted one of four colors representing the game's four hierarchal social classes. As in real life, the most wealthy group has the greatest number of colored blocks; whereas, the poor group not only has the fewest cubes, but most of them are initially located on the city's least valued land. The game proceeds as "officials" representing the different classes make deals with one another about the "best" way to plan the future growth of the city.

Recent entries into the realm of planning games include several computer simulation programs. Although they are not truly three-dimensional, they deserve comment as being one of the primary strongholds of future simulations. Perhaps the most noted of

these "educational/entertainment" programs is SimCity. In SimCity an individual player serves as the Mayor of a city populated with simulated citizens, known as Sims. The city can be based on the plan of a real city (e.g., San Francisco), or it can be an imaginary layout produced by the computer.

The player/mayor of SimCity is responsible for: overseeing zoning, road construction, utility rates, tax levies, the demand of suburbanites, the effects of natural catastrophes, crime, pollution, greenway development, more demands from suburbanites and other Sims, potholes, traffic jams, and a host of other "quality of life" issues. The game usually ends when the overwrought mayor is no longer able to adequately control all of the city's concerns. Typically this end comes via a sweeping fire or a nuclear meltdown (Peterson 24).

For an even more "three-dimensional" image of the city, there is SimCity 2000. The SimCity 2000 view shows the city at more of an angle than the original game's bird's-eye view. Its new multi-level interface allows the construction of subways and several other urban amenities unavailable in the first edition. Among the up-to-date scenario challenges are: Charleston's Hurricane Hugo disaster, the Oakland fires, and escalating unemployment in Flint, Michigan. Such increased activities mean a greater need for knowledge; thus, SimCity 2000 provides an on-screen newspaper to indicate the current sentiments of the mayor's SimConstituents (SimCity 2000 cover).

Maxis the company responsible for both SimCity software programs, also has other games such as SimFarm and SimHealth. In SimHealth, which was commissioned by the nonprofit Markle Foundation, players match health care plans with reform plans from Hillary Rodham Clinton (Landis, "Playing Games"). Other computer simulated environments are part of such basically non-violent software programs as Kid CAD, Myst, and Buried in Time. Although most of these programs rely on imaginary settings, Buried in Time depicts historical scenes including Leonardo Da Vinci's studio and the 11th century Mayan city of Chichen Itza (Wilson).

Technologies Associated with Simulations

Universities from around the world have been the birth place of many technologies currently being used with models. As previously noted, one of America's hotbeds for such work has been the University of California at Berkeley Environmental Simulation Laboratory. The success of Berkeley's ESL has been due in large part to its past driving forces, who have included Donald Appleyard and Kenneth Craik, and currently include Peter Bosselmann. Several other universities in the United States have been actively working with models and related simulations such as the Environmental Research Laboratory (ERL) at the University of Arizona. The ERL assisted Disney's Imagineers, with The Land section at Epcot Center. Through a series of study models featuring real vegetation, they were able to help develop The Land's extensive growing areas (Beard 109).

Among the other American institutions active in simulation research are MIT, Cornell University, Carnegie-Mellon University, the University of Washington-Seattle, Yale University, Washington University in St. Louis, Rutgers University, and the New School for Social Research in New York City. Internationally, several schools have strong simulation programs including: the University of Stutgart's Department of Urban Design and Planning, the University of Lundt in Sweden, the University of Technology in Delft, Holland, and Scotland's Mackintosh School of Architecture and the Glasgow School of Art. Multi-national companies have also possessed simulation departments. In the past these have included General Electric's Visual Simulation Laboratory and the Boeing Space Simulation Centre in Washington, D.C. (Burden; Porter). Although none of these lists are complete, they are representative of the broad spectrum of interests, academic pursuits, and past innovative successes within the simulation field.

One of the primary areas of research and development has been in what Rolf Janke referred to as "discursive" techniques. This means capturing through models and other simulation forms the concepts of time, motion, light, and other elements of change. Many of these techniques include simulating climatic effects on the built environment. These include using models to study the impact of typhoon winds on Hong Kong's skyline, sonic booms on Swedish cities, snow drifts on planned Antarctic research stations, and air pollution patterns in urban areas such as Center City Philadelphia (Hilton 32-33). The Waterway Experiment Station in Vicksburg, Mississippi focuses

on the impacts of floods, droughts, and other issues that impact water based eco-systems.

The following three examples from the University of California at Berkeley (UC-B), show the diversity of one institution's simulation research. The Environmental Simulation Laboratory's Boundary Layer Wind Tunnel frequently uses models in its tests regarding ground level wind currents. Extensive studies of New York and San Francisco, among other cities, have provided insights into the construction design and spacing of skyscrapers. This research has allowed for design modifications that compensate for the impact of wind flows between buildings and at street corners (Environmental Simulation Laboratory). The ESL also uses both traditional models and a Sun/Unix network database in attempt to recreate sun and shadow patterns. These techniques prove very useful in determining how new developments will impact their surrounding area (Busch 27; Environmental Simulation Laboratory).

Researchers at the Earthquake Engineering Research Center at UC-B's College of Engineering (EERC) have used an assortment of techniques to simulate earthquakes. One of the most impressive of these simulators has been the "shaking table." Scale models are placed on the table and vibrated up to or just past their stress point. These models have included individual structures, large urban areas, and everything in between. Some of the larger models have weighed in excess of 60 tons. Laboratory technologists at the EERC are able to simulate nearly any intensity of earthquake,

including ones twice as strong as the worst in California's history. The simulator works as follows: "a cushion of compressed air supports the table, while hydraulic actuators move vertically and horizontally to simulate the earth's trembling." Researchers feel these studies have been invaluable in the construction of everything from interior residential stairways to bridges, dams, and tunnels (Hilton 34).

Simulators have also been used to show the impact of time on planning. For example, the sunlight and shadow studies deal as much with time as they do with climate. Many of the automobile traffic studies deal with peak-time demands, as well as the demands over a balance of time. A section of the model of the Rhein-Main airport, mentioned earlier, used a series of 1:500 scaled planes to explain flight handling and departure and arrival schedules (Janke, 1968, 83). Some researchers even compress time as is done at the Waterway Experiment Station in Vicksburg. This allows for more immediate results, and therefore additional research time.

Although architecture and the molded landscape may seem generally static, most people perceive their environment as a "transitorial space" (Burden 76). Therefore, the ability to simulate motion is vital to a proper conceptualization of the built environment. As Tom Porter acknowledges; "at the essence of our understanding of space is [the sense of] our movement within it" (91). To this end, researchers have spent the last thirty years designing technologies that simulate motion and depict change over time.

Some of the earliest work in this field was done by Donald Appleyard and his colleagues at the University of California at Berkeley. What was first developed at the ESL, was a remotely guided periscope with a minute movable lens approximately 2.5 millimeters in radius. With the support of a gantry and control system, the periscope was designed to "'fly', 'walk', or 'drive' through physical models of buildings and landscapes under either operator or computer control" (Appleyard). The periscopes images were then projected onto a closed-circuit television or other medium for detailed review.

Researchers at simulation labs around the world still use similar and improved techniques to peer into modelled environments. Urbanoscopes, endoscopes, and complex modelscopes are just a few of the camera oriented simulation devices they've used. Municipal planners typically cooperate with these researchers to solve complex transportation, development, and design issues, they would be otherwise unable to simulate. Architects and designers, also find these simulators particularly useful for guiding clients through interior spaces.

In order to successfully depict motion, these environmental simulation devices must share at least one characteristic. That is the ability to present information in a sequential manner, through either a videotape, slide series, film, or computer program. Predictably, the television has been the most commonly used tool for displaying these excursions into the lilliputian world. Although the television screen has the limitations

of any two-dimensional medium, advancements in high resolution technology should further enhance its ability to display these three-dimensional images.

In her book It's a Model World, Suzanne Hilton gives a very visual laymen's description of an environmental simulator in use.

> "The simulated guideway was built so that the road's designers could turn themselves into miniature people and see for themselves how it will look. The scale-model roadway travels through a mini-city, sometimes lifted over a business section on a piece of elevated highway. Cars whiz by in both directions. A specially designed TV camera with a miniature viewing lens travels the roadway just as if it were inside one of the cars. The people watching the TV screen get the feeling that they have been miniaturized and they can see how the highway will look at their own eye level. The scale models are changeable, only the TV camera stays the same, so that the researchers can switch from the automated guideway to study a particular cloverleaf section or the traffic jams at the local airport" (Hilton 108).

There are a number of other simulation techniques currently being used to depict models. Although its scenes are frozen in time, stereoscopic photogrammetry is quite useful for giving depth to two-dimensional images. This photographic method gets its name from the term stereopsis, meaning depth perception, which is the human ability to see things three-dimensionally. Stereoscopic photogrammetry is actually a simple process. It consists of creating two nearly identical photographs of a model by taking the shots from slightly different angles. "These stereo pairs can [then] be viewed as slides in common 'binocular' slide viewers," or "they can be projected using polarized filters over the lenses which match polarized glasses" (Burden 123). In effect, what the viewers then see is a three-dimensional image.

The key to all of these simulation techniques is that they have improved the model's overall effectiveness. One of the main reasons for this success is these technologies compensate for some of the primary shortfalls that occur when using scale models. Among the most ingrained problems in modeling are what is known as the "Gulliver Gap" and the "toytown syndrome." These terms refer to "the awareness of our own physical size in relation to that of a scale model" (Porter 92). Simulators and other devices help individuals overcome these perceptions, and allow for a less distorted view of the modelled environment.

Among the other technologies currently being used are strict computer simulations with no physical model applications. This is an area which Tom Porter referred to as "cybernetic space." These technologies include Geographic Information Systems (GIS) and Computer Aided Design (CAD) programs with such names as Macromedeia's ModelShop II, Autodesk's 3D Studio, Autodessy's Form Z, and Alias Upfront 3D (Charles 14).

The architecture and planning firm of Skidmore, Owings & Merrill is involved with some of the most impressive private applications of this type of software. SOM uses the three-dimensional computer image of a CBD to do plug-in models, which are akin to those done by their model shop. Their list of retrievable CBD's currently includes London, Los Angeles, New York City, San Francisco, and Washington, D.C.

Additional information regarding these and other cities is being added almost daily to their expanding database (Grunau).

Two final simulation technologies worth noting are virtual reality and holograms. Virtual reality is a computer-generated, interactive system that "surrounds" its viewer with the image of a 360-degree three-dimensional setting. By wearing a pair of virtual reality goggles, participants can actively move through a replicated or imaginary "landscape," complete with a variety of sensory stimulations. Although the technology is fairly new, it is already being used to do such things as: test machinery prototypes; train surgeons; evaluate the design complexities of nuclear reactors; and improve the visual capabilities of the legally blind. Virtual reality is also being used extensively for recreational purposes, including simulating downhill skiing and walking on Mars (Ryan; Ditlea; "Virtual Reality").

Holography was discovered in 1947, but was not developed into a standard reproducible application until 1963. It was at this time that laser technology allowed the first sizable holograms. By splitting a laser beam into two parts, and through the use of mirrors, an object's reflection can be reproduced on a plate of glass in what seems like a three-dimensional image. There are two types of holographic apparitions, a Virtual Image and the more complex Near or Real Image. Because of the ability to see all around an "exact" image, some individuals consider holography to be "the only representational medium which is capable of reconstructing all the visual properties of

our perception of real space" (Porter 112). Perhaps the advancement in virtual reality and other technologies, since he wrote those words, might cause Tom Porter to reevaluate this view.

Together, all of these various simulation and enhancement techniques offer the ability to more accurately represent the built environment. Extending the applications of three-dimensional models and other simulations, also provides for a greater opportunity for experimentation and investigation. This in turn, will hopefully lead to a better understanding of the problems and opportunities facing our cities. When used as a way to bring information from a stationary working model to a large public forum, these technologies succeed in improving the democratic system. This is done by more closely involving the average citizen in the overall environmental design process.

Summary

To illustrate the proliferation of three-dimensional simulations of the built environment, and to show the resources available in a typical city, the following is a list of scale models and their uses in Knoxville, Tennessee. The University of Tennessee (UT), Knoxville's largest employer, has several simulations of the built environment. The largest and perhaps most impressive of these is a scale model of the entire UT campus (Figures 2.60 - 2.61). The model features both the agricultural and main campuses, as well as part of Fort Sanders. It was designed in 1972 by Three

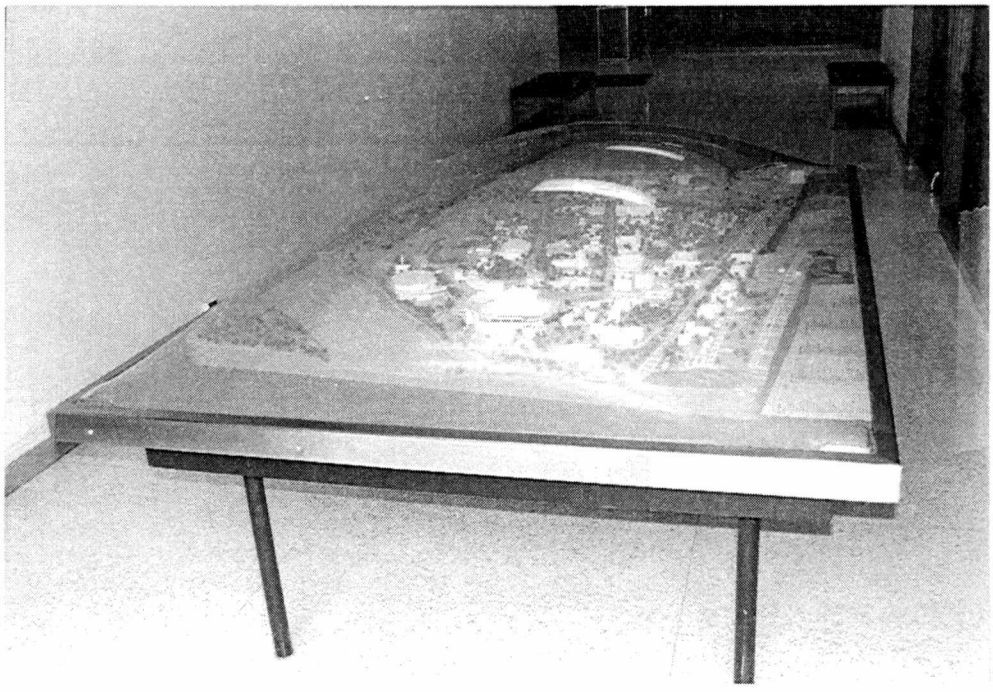


Figure 2.60
University of Tennessee Orientation Table Model

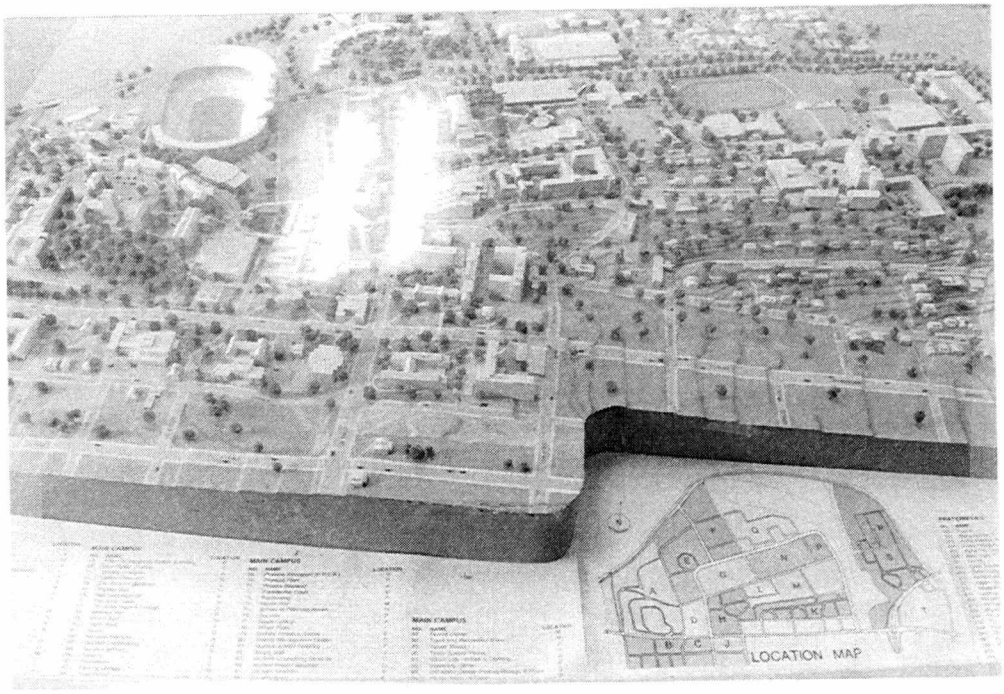


Figure 2.61
Closeup of Model Showing Legend and Related Map

Dimensions, and updated in 1983 by the Office of Campus Planning. This model (1:100), currently located in the University Center, serves to help people orient themselves to the campus (Alexander survey).

In addition to the one in the University Center, two other historically significant campus models have existed at the University of Tennessee. The earliest of these was a tabletop model of the school, which dated to the late 1890s. It was originally displayed in Nashville at a celebration of the Tennessee Centennial (Creekmore 153). A more functional campus model was made by Three Dimensions' proprietor, Neal Henderson, during the late 1960s. This plug model (1:600) was used for many years by campus architect, Malcolm Rice, to evaluate new developments at the university (Henderson, 6 Dec. 1993).

More recently, many other models have existed throughout the university, which have not been necessarily related to the campus proper. These include the McClung Museum's exhibit models of James White's House and the Temple of Amen-Re in Karnak, Egypt. Another individual building depicted, although campus-oriented, is the presentation model of Andy Holt Tower, which is located in one of the building's public corridors. The School of Planning and its Design House have been home to several urban models over the years.

Obviously the largest concentration of scale models on campus can be found in the School of Architecture. Although many of these models are of individual structures, larger subject areas are also addressed. These multiple-building sites can include office complexes, commercial nodes, residential neighborhoods, and industrial sites. An example of such an area is Knoxville's Fourth and Gill Neighborhood, which was the focus of a few dozens models during the Spring 1993 semester.

Some of the models found throughout the rest of the city are also the handiwork of University of Tennessee students. This includes a scale model of the Mabry-Hazen House and its surrounding neighborhood. This model was developed and constructed during 1993, through a joint effort of the schools of Architecture and Interior Design. The primary purpose of this model was to help the Hazen Historical Museum Foundation evaluate its assorted land holdings. The model was built at a 1:16 scale, with a base measuring approximately three feet by four feet (12 sq. ft.). It has recently been placed in the back room of an auxiliary house on the property, making the model unavailable for standard public viewing.

Some spectacular models have been displayed at the Knoxville Museum of Art (KMA). The Museum's highly successful exhibit, "The Howard Bros. Circus," was billed as the "world's largest miniature circus." This replica of an early 19th century circus, built at a 1:16 scale, featured over a million pieces and covered nearly 7,000 square feet (Howard Bros. Circus). The KMA is also in possession of nine of the

famous Thorne Rooms. These intricate dioramas are partially dismantled and not on display. They have been in storage for a number of years, and will likely remain so until the Museum receives and/or allocates funding for their repair.

Among the assorted scale models located in Knoxville, is a replica of the Southern Railway Station, complete with its "original" clock tower. It was given to the station's owner, Marilyn Bullock, by a Massachusetts modeler "in appreciation for saving the station from demolition" and for restoring it (Maples). Several "promotional" models have also been developed for Knoxville area projects in recent decades. These include: three-dimensional simulations of the Whittle Complex, the City-County Building, and a table top model of 1982 World's Fair site, constructed by Neal Henderson. This latter model was used during the Fair's planning stage to "stimulate local interest and encourage business participation" (Creekmore, Knox County Tennessee, 222-223).

Several local businesses and agencies also have scale models including the numerous architecture and planning firms in the city. The East Tennessee Community Design Center has a number of different design models, as well as play structures and modeling games for children. Celebration Station, Sir Goony's miniature golf course, and other children's activity centers contain scale model buildings and other simulations. Knoxville's annual Fantasy of Trees features: Elfin Village; Sugar Plum Village with its dozens of gingerbread houses; and a model railroad exhibit, sponsored

by the Knoxville Area Model Railroaders Club. The museums and industries of nearby Oak Ridge also have a number of scale models. This includes a partially destroyed five-scene, watershed model of area coal mining, which is part of the collection at the Children's Museum of Oak Ridge (Shapiro).

Undoubtedly the best permanent planning model in the city belongs to the City of Knoxville and its Department of Community Development. However, this model did not start out as a planning model, but as a prop for local television station and NBC affiliate, WBIR-TV Channel 10. The station used the model to simulate a flight over the City's Central Business District. They then showed a brief clip of this "flight" as a background to the credits during the beginning of their newscasts. WBIR also produced a video on the nine month long construction of the Downtown Model. This presentation featured several different images of the model, through the use of such photo-simulation techniques as snorkel cameras (Childress).

After the filming, WBIR dismantled the multi-sectional model, placed it in storage, and then, before it could collect too much dust, donated it to the City. The 1:40 scale model (Figures 2.62 - 2. 67) features the Downtown business core, the World's Fair site, the main campus of the University of Tennessee, and the historic Fort Sanders area. The following figures show the model as it appeared in 1993.



Figure 2.62
The Downtown Knoxville Model in the City's Department of Community Development

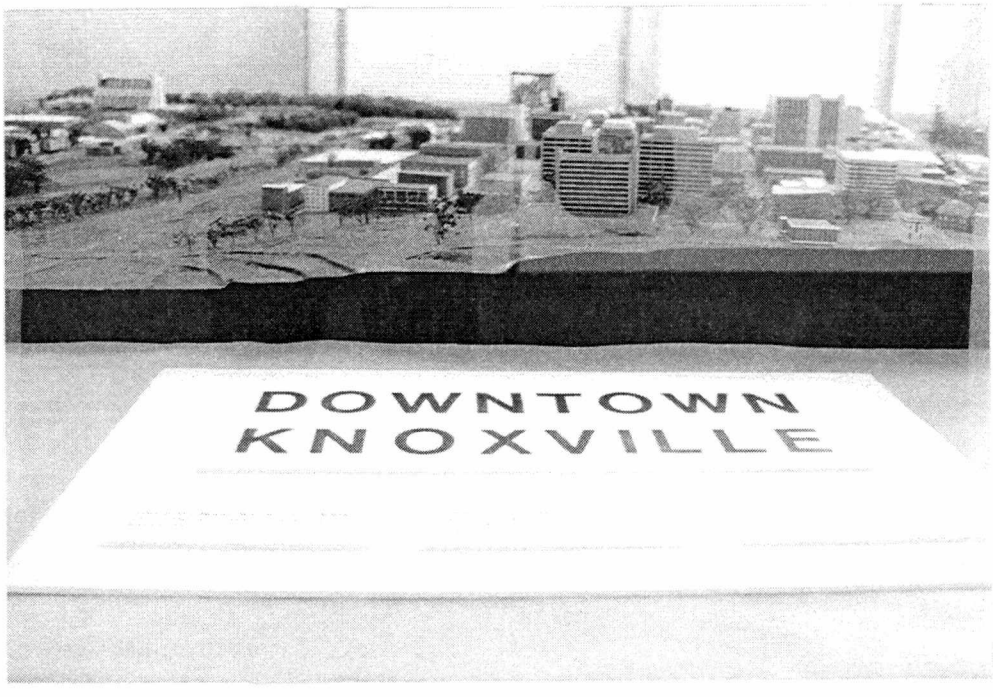


Figure 2.63
One of Two Legends on the Downtown Knoxville Model:

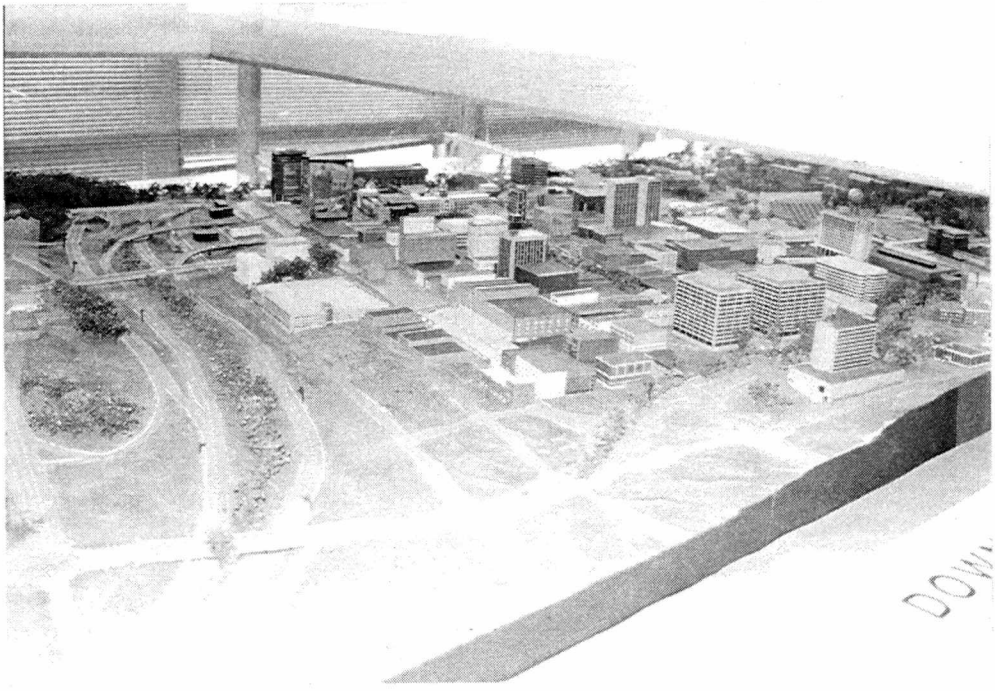


Figure 2.64
The Downtown Knoxville Model: The Heart of the Business District

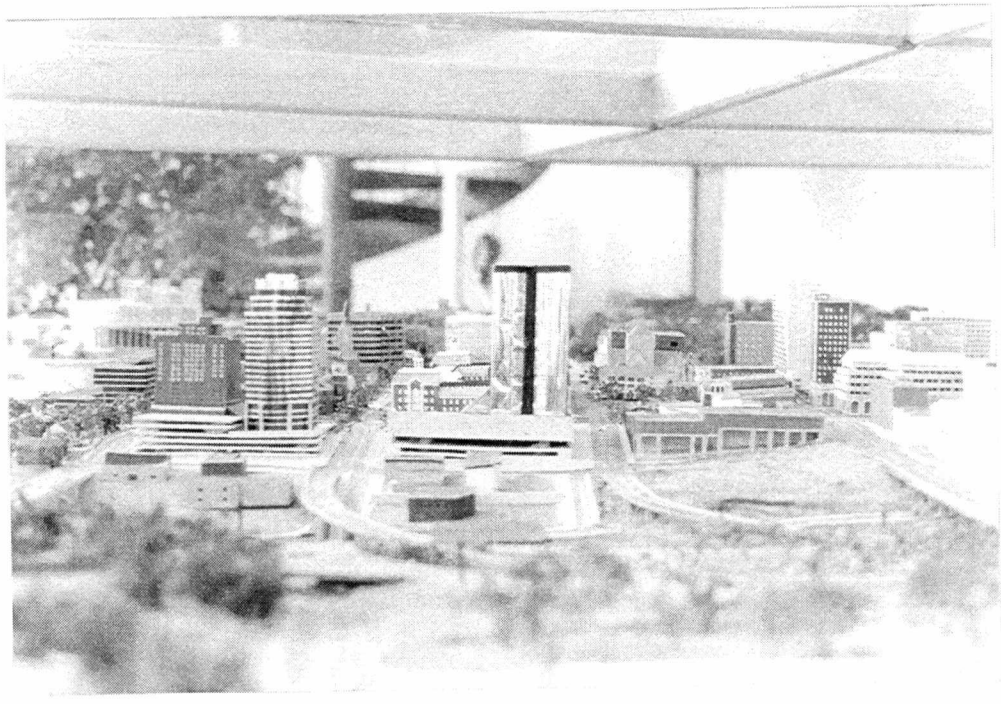


Figure 2.65
The Downtown Knoxville Model: Closeup Looking "West"

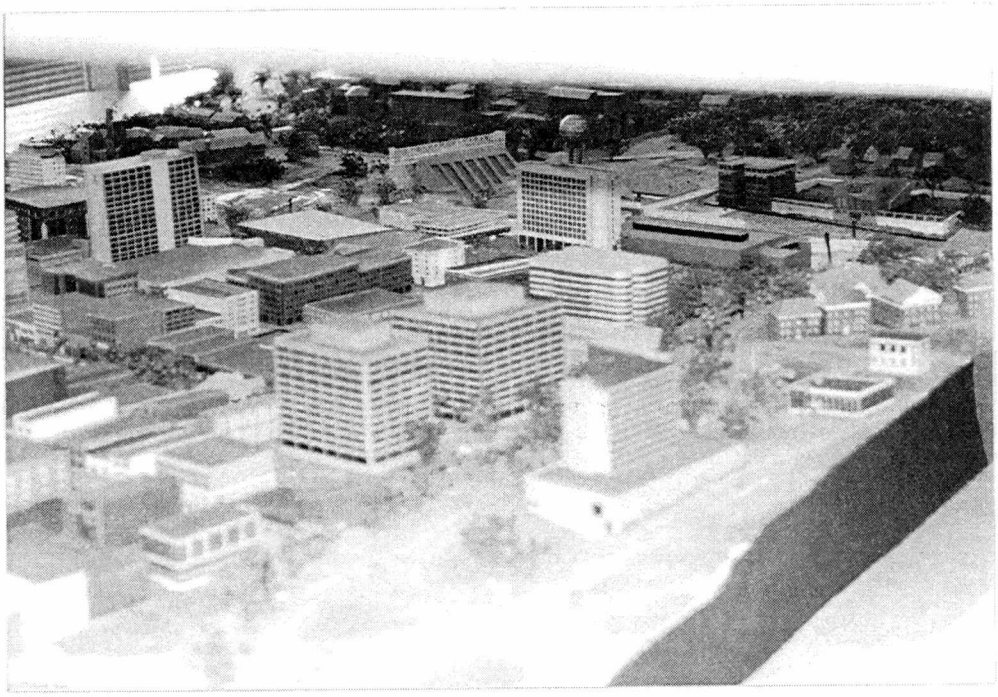


Figure 2.66
The Downtown Knoxville Model: The TVA Towers and the World's Fair Site

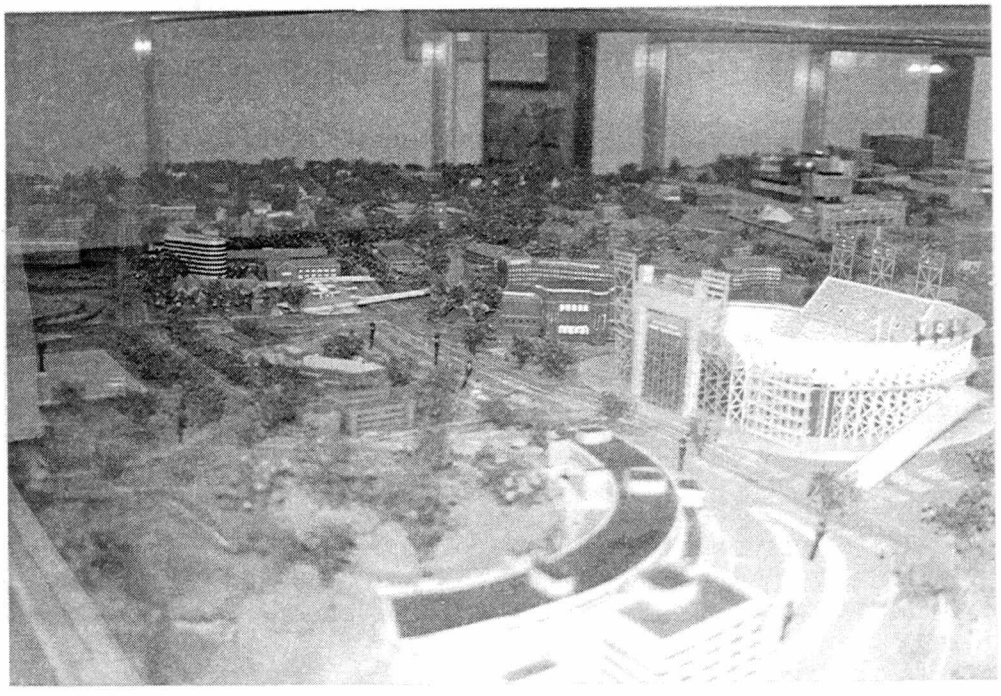


Figure 2.67
The Downtown Knoxville Model: The University of Tennessee Campus

Numerous plans have been considered for the model during the last several years. These include: having it updated annually by local architecture students; extending it to include buildings from the Old City; featuring it as part of a tour for local elementary schools; and, possibly using it as plug model for developers to insert their "required" project models. There have also been discussions of placing it on an inlaid map of Knoxville, similar to Freedom Plaza in Washington D.C., or even moving it (approx. model weight is 3,500 lbs.) to a new downtown design studio (Blasius interview; Blasius, survey).

In 1995 a group of local planners and developers began to seriously consider implementing some of these ideas. They felt by joining efforts they could utilize the Downtown Model as a marketing tool for the proposed riverfront redevelopment, as well as other projects. The participating parties have included the East Tennessee Community Design Center (ETCDC), Knoxville's Department of Community Development, the University of Tennessee, and Collin Coulter Maritime Developer. In order to help further promote this new riverfront concept, including the sale of Volunteer Landing's residential units, most of the renovation work on the model has taken place in the main lobby of the downtown Hyatt Regency Hotel (Collins; Shupp).

According to ETCDC Executive Director, Terry Shupp, the refurbished model will not only depict the planned waterfront project, but also many of the other physical changes that have occurred in recent years around the downtown. Among these developments

are the Henley Street Tunnel, South Knoxville Boulevard Connector, Old City, Fort Kid, and the World's Fair site, as of June 1995. Additions to UT's campus will include Hodges Library, the clock tower, the railroad trestle, and other more recent changes. Minor repair work on existing buildings and elements, such as the streets and greenways, ensures a completely fresh look for the entire Downtown Knoxville Model.

Knoxville also has a different type of urban scale model that is in its initial development stages. The model, which will depict very early Knoxville, is planned as the main floor centerpiece of the proposed Blount Mansion Interpretive Center. As a long time, local history buff, antique dealer, and modeller for over 30 years, Neal Henderson, of Henderson & Associates (aka Three Dimensions), was selected to build the historical model of Knoxville. It is intended to show how the City looked in 1796, including James White's fort. This interpretive model will have a base size of approximately 5' x 5', with a scale of 1" = 40' (1:480) (Henderson, 6 Dec. 1993 and 9 Aug. 1995).

The Knoxville Junior League is assisting Henderson by researching old deeds and compiling maps, drawings, photographs, and other artifacts of Knoxville's early development. The group is also writing a study guide to help interpret the model and other exhibits. All of this investigation into Knoxville's ante-bellum history is vital to the model's effectiveness. As Blount Mansion executive director, Patrick Clarke,

notes, the scale model needs to depict Knoxville "as accurately as possible so it can be a good educational tool" (Brown, Fred).

It is unknown as to whether these examples are truly representative of the three-dimensional scaled resources of an average American city. Maybe Knoxville has more than most, or maybe there are fewer models in this city than are typically found elsewhere. The point is that these models do exist and in significant number. Finding out what type of scale models and other simulations may exist in another community, however, will likely take some in-depth research and perhaps a bit of "lilliputian" luck.

CHAPTER III

PLANNING EDUCATION FOR SCHOOL AGE CHILDREN

Introduction

For many municipalities public education expenses consume the single greatest portion of local tax revenues. Thus, communities should feel obligated to teach their youth the lessons of good citizenry. This involves an understanding of such local issues as physical resources, societal composition, and political directives. By discussing the broad range of roles within the planning profession, these concerns and many others can be disseminated among America's youth.

In an article partially lamenting the lack of past educational efforts, planner and educator, Carl Patton, stressed; "in thinking about the planning profession, we could do worse than adopt some ideas of the past and work to educate the public about planning by bringing these concepts back into elementary and secondary school education" (Patton 1). These lessons of citizenry need not only be confined to the occasional social studies class field trip or a weekly three-minute current affairs video segment. Such issues are dynamic and broad based and can be taught in innumerable settings.

The first part of this chapter will address the types of settings, organizations, and publications available to assist in the education process. The second part will be a broad overview of more traditional teaching methods addressing the built environment. However, since the focus of this study is the use of models and other three-dimensional simulations as planning education tools, only a cursory overview of these two-dimensional techniques will be presented. The third section of this chapter will cover the use of planning oriented models within the classroom. The chapter's fourth section will focus on educational programs specifically aimed at children in non-school settings. As in other settings, the concentration will be on three-dimensional simulations. The fifth and final element of this chapter will be an examination of the Center for Understanding the Built Environment (CUBE) and its Box City curriculum with an emphasis on how this program has provided an entirely new venue for children to learn about planning.

Settings and Support Systems

Environment

This chapter will not only focus on the techniques used to explain the built environment, but also the settings in which these lessons are taught and by whom. As discussed in Chapter II, studies have shown that the spatial scale of both the learning

environment and the subject being studied can influence how well a child processes information. Models and child-sized settings can foster more concise and insightful feedback an essential element in evaluating progress. This is not only true with regard to comprehending the elements of neighborhoods and cities, but in understanding how children perceive all of the forces around them.

Settings that promote these kind of experiences are common. Most communities often provide such spaces for children in dedicated "discovery" rooms at local museums and science centers. Expanding on this idea, several cities have developed full-blown children's museums. Theme parks and amusement centers, such as Celebration Station and Discovery Zones, are private sector attempts to create child-oriented environments.

In classrooms across America, teachers use travelling exhibits, in-house projects, and other devices to enhance the learning environment. The subjects discussed through these simulated settings can vary greatly, ranging from the workings of a human heart to bicycle traffic safety to European history. However, there is at least one secondary school in America whose entire focus is to create both the setting and curriculum for learning about the built environment. That institution being, The School for the Physical City, in the heart of Manhattan (Vatsky, 7 Jan 1994).

Partnerships

Most cities cannot afford the luxury of an entire institution dedicated to educating children about such issues as neighborhood revitalization and public transit systems. Thus, the responsibility typically falls upon area professionals and volunteer groups. Local chapters of the American Planning Association and the American Institute of Architects are excellent sources for information on the built environment. With their ties to national organizations, these groups can be supplied with an extensive amount of program material. More importantly, however, is that the members of these groups often possess a knowledge and love of their area, which is as invaluable as any physical resource.

The American Planning Association (APA), and its professional counterpart, the American Institute of Certified Planners (AICP), have long been active in promoting planning education for school age children. The directives for these actions come from a national code of ethics, as well as numerous local initiatives. Their mission statements consistently charge planners with sharing their time and expertise with students.

A 1978 resolution from the Tennessee chapter of the American Institute of Planners (the predecessor to AICP), held that planners must inform people of how certain forces shape their environment. Further, it added, that planners had a responsibility to teach

citizens about the appropriate manner in which to communicate in a public forum. The resolution stated; "the school system is an excellent place to begin the educational process; therefore... A.I.P. will promote the study of planning in schools as an initial step of a public awareness campaign." In order to implement this strategy, the resolution called for contacting school officials to encourage planning in "curriculums, text books, career guidance counseling, and extra curricular activities." Further recommendations included identifying appropriate study materials, developing lecture series, and utilizing public hearings as demonstration projects (Tennessee Chapter of the American Institute of Planners).

APA currently encourages interaction with students through several programs and publications. One of the most successful outreach programs is the "Planners Day in School," which has recently become a popular part of APA's annual national convention. This program brings planners into middle and high school classrooms to expound upon the planning profession. To facilitate this, APA provides the planners and teachers with educational materials and project kits. Local chapters and other planning groups have also found this to be a worthwhile experience (O'Meara). Building on its success, APA added to this program at the 1994 National Conference in San Francisco by establishing a new interactive session known as the "Youth Planner Town Meeting." (Mullahey, "Youth Planners Voice Concern").

Planners are obviously unable to participate in such activities on a daily basis. However, planners can shape the manner in which planning concepts are taught by providing teachers with a broader understanding of the principles of the profession. In less traditional subject areas such as urban planning, the education process can typically succeed only after first boosting a teacher's knowledge through in-service training and supplementary publications. Most school districts participate in such "teaching teachers" programs, with their focus often being determined by school boards and curriculum advisors.

Such a program aimed at civic concerns was developed for the Minneapolis/St. Paul region by the Metropolitan Council of the Twin Cities Area, a local planning agency. During summer training sessions, junior high school social studies teachers were educated on how the Metro planning group established regional goals and policies. The council staff also provided the teachers with a classroom kit entitled "Metropolitan Issues." The kits featured case studies on community wide problems and included potential solutions. Among the issues to be discussed with the students were: affordable housing, hazardous waste disposal, downtown revitalization, recreational water use, airport noise, water quality, transportation choices, and land use planning ("Teachers Learn").

The American Institute of Architects has also assisted and recognized similar endeavors through its program, "The Search for Excellence in Architecture in

Schools." An award winning example is the "Teach the Teachers" program, originally sponsored by the Missouri Council of Architects and AIA Kansas City (ArchiNews, May 1989, 1). The California Council AIA has also benefited educators and students through the development of its Built Environment Education Program (BEEP) (ArchiNews, Mar. 1989, n. pag.).

Engineering groups encourage an understanding of the built environment during National Engineers Week. As part of the 1994 event, students were asked to submit designs for the "Future City Competition." A noteworthy middle school entry, known as Colony 2010, featured a highly detailed three-dimensional model of the proposed community. Also, as part of the activities, seven student groups were invited to Washington, D.C. as finalists in a 185-school nationwide SimCity challenge. The engineers chose the computer game, because it "taught connectedness." Since, "in the SimCity algorithm, soaring crime rates and joblessness trigger riots; positive economics, low crime, and education keep the peace" (Peirce, "Future Policymakers")

The Building Experiences Trust in Great Britain is an excellent example of an international group concerned with planning oriented studies. Under the direction of Nigel Frost, the Trust has published several works, including the Report of the International Conference for Built Environment Education in School (5-18), based on the 1992 event held in Cambridge, England. One of their current projects is the development of the "International Movement for Built Environment Education in

Schools." The first phase of the project consists of getting "eminent designers," such as Sir Richard Rogers, to show "their support by signing the World Declaration for Architecture in Schools which mandates built environment education for young people in the general education system in all countries throughout the world" (ArchiNews, Mar. 1994, 7 & 10).

Colleges and universities are also great resources, especially those offering "College for Kids" and other similar summer programs. Carl Patton helped to develop one such program while at the University of Wisconsin-Milwaukee's School of Architecture and Urban Planning (SARUP). As part of a university-wide mission to become more involved with the local community, SARUP established a link with Riverside University High School, a Milwaukee magnet school. Based on considerable input, a supplemental curriculum focusing on the built environment was developed. The first step was to orient the high school teachers about this new subject matter. Then, a classroom program was established on the university campus. This class was taught in the SARUP model building on four consecutive Saturday mornings. Under the direction of an academic staff specialist, the "students were taught the basic concepts of model building: how to conceptualize a design, build a simple model, and present the design" (Patton, 1987).

Building on this success, SARUP developed a six week summer course open to all Milwaukee high school students. It was held for four hours each day, five days a

week. The course, which focused on a park redevelopment scheme, required students to establish "development companies" and present their plans as they would in a true work environment. This included depicting their plans initially in concept form, then with a formal scaled drawing, and finally through a detailed model. The main purpose behind these plans was to showcase the graphic skills emphasized in the curriculum. These skills included: illustration and photographic methods, computer assisted drawing, and simple modeling techniques (Patton).

In the private sector, all sizes and types of companies provide educational assistance. Exxon, one of the world's largest companies, sponsors a program to enrich secondary school curricula. Known as the Exxon Energy Cube, this package includes training session programs, lesson plans, videotapes, wall charts, and "Choosing Tomorrow," a classroom simulation game (Hart).

Disney has also provided educators with many ideas through behind the scenes tours and access to its imagineers. Such was the experience for those who attended a recent conference in Orlando entitled "Environments for Learning: Creating Interactive Learning Environments in the School" (ArchiNews, Mar. 1994, 11). Further fulfilling their mission of combining education and entertainment, the Disney Institute is scheduled to open during 1996, in Lake Buena Vista, Florida ("Destination Disney").

Architectural and planning firms such as Skidmore, Owings & Merrill, often support education programs. Referring to their efforts, marketing coordinator, Michelle Grunau, acknowledged; "education has always been a priority for SOM, in-house and out-of-house." In order to best meet their educational objectives, even large firms such as SOM must seek out additional guidance. The Chicago Architectural Foundation was brought in to help SOM.

The Chicago Architectural Foundation (CAF) is just one example of the numerous nonprofit organizations on both the local and national level that offer advice on educational programming. Among CAF's many offerings are exhibitions, lecture series, a children's program called "Design Education," and teacher training seminars, including a session on May 12, 1994, in which teachers constructed building models (Chicago Architectural Foundation; Mall).

The Center for Understanding the Built Environment (CUBE) is perhaps the nation's best education-oriented nonprofit group currently focusing on architecture and planning. Under the direction of its highly spirited leader, Ginny Graves, CUBE has spread the message of good urban design all across America and beyond. The organization uses numerous methods to share educational information including newsletters, workshops, assorted resource guides, and curricula. A more detailed discussion of CUBE will be presented later in this chapter.

In addition to the ones mentioned above, several other national organizations and quasi-governmental agencies are particularly notable for their efforts in the field of built environment education. Such a list includes: the American Architectural Foundation, American Association of Museums, American Association for State and Local History, Association for Living Historical Farms and Agricultufiral Museums, Association for Youth Museums, National Association for Miniature Enthusiasts, National Building Museum, National Endowment for the Arts, National Endowment for the Humanities, National Trust for Historic Preservation, Smithsonian Institution, and UNESCO. These groups primarily assist smaller organizations and schools through grants, travelling exhibits, and publications. Additional national and regional groups that offer educational assistance will be listed in Chapter IV with reference to survey question number 29.

Typical of the activities these groups support are the two following projects funded by the National Endowment of the Arts (NEA). A grant from the NEA is enabling the Kentucky Heritage Council, the Kentucky League of Cities, and the University of Kentucky School of Architecture to establish a Small Town Design Institute. One of the primary missions of the institute is "to educate school children in the design process" (HP Forum News). On a broader scale, the NEA contracted with the Philadelphia-based, Organization & Management Group, Inc., to identify K-12 teachers that are using innovative techniques to teach design issues in the classroom. Peter

Hawley, the program specialist for the project, indicated NEA's intent was to find out "how the teachers are actually using the materials and what they think the benefits are for their students" ("National Endowment Searches").

Because of their knowledge of area resources, certain local groups can offer excellent programs and insightful counsel with regard to education on the built environment. Community arts councils, chambers of commerce, downtown development groups, preservation societies, public libraries, and history museums are found in nearly every city. These organizations often sponsor exhibitions, lecture series, walking tours, festivals featuring learning zones, and classroom programs.

America' oldest community arts council, the Quincy Society of Arts (QSFA), is a model organization for providing such in-school and after-school programming. Many of these activities occur under the umbrella of its "Arts=Education" program. Through Arts=Education, QSFA provides numerous services (nearly all free) to local educators and institutions. Among the in-school projects they have sponsored, are several that are oriented to the built environment including an architect-in-residence series and a travelling exhibit of local architectural styles and building elements (Husar, "Travelling Exhibit Offers Lesson"). With the generous help of Quincy Preserves!, QSFA has also distributed the architectural resource guide, Color Adams County, to over a thousand school age children.

Publications

Since the early part of this century, municipalities and their planning arms have been promoting planning ideas through textbooks and other educational publications. The most famous and perhaps earliest of such works was Wacker's Manual of the Plan of Chicago. In 1912 the city's board of education adopted this manual as an eighth grade text. Not long afterwards similar efforts were supported by leaders in Cincinnati and Dallas. The Kessler Plan Association of Dallas authorized "a civic textbook that would encourage a mindset for planning" (Patton 1).

Municipalities and other organizations continue to turn out a wide variety of built environment publications. Often these works serve as their primary tool for educational outreach. The publications can range from children-oriented handouts and project books, to lesson kits and curriculum guides for parents and teachers. In order to further their understanding of children's relationships with the built environment, many educators also review current sociology texts and journals.

These sociological publications have proven useful in addressing the specific needs of individual children and classrooms. Since such works often focus on particular environmental effects, they can aid educators who may lack a familiarity with the context within which their students are living. Two such books developed by William Michelson and his associates are The Child in the City: Changes and Challenges and

The Child in the City: Today and Tomorrow. The latter book features a particularly salient chapter by Kevin Lynch entitled, "The Spatial World of the Child."

Lynch, a noted city planner and educator, admits a special interest in the interrelationship between children and their environment. This theme is apparent in several of his works including Growing Up in Cities. Among the many important concepts promoted in this book, is one that recommends using modeling projects to help students better understand the built environment (Lynch 22). Other noteworthy books include The Child in the City authored by Colin Ward, Paul Goodman's Growing Up Absurd, and Children and the Environment, edited by Irwin Altman and Joachim F. Wohlwill.

Curriculum plans and teaching guides remain among the most popular and effective ways to foster planning education in the classroom. These resources typically focus on providing a more general overview of the built environment. However, the context of some guides is intended to be limited to either specific sites, projects, or events. The National Building Museum's An Educator's Guide to the Exhibit "Washington: Symbol and City", is a good example of such a resource.

Subject oriented curriculum guides are also popular. These can cover such subjects as energy conservation, transportation, and solid waste management. The following two guides are examples of programs that focus on historic preservation. The first one is a

recently developed curriculum based on a collaborative effort between the National Park Service's National Register of Historic Places program and the National Trust for Historic Preservation. This project guide, "Teaching with Historic Places," is based primarily on lesson plans by Fay Metcalf.

A distinctly creole flair is evident in the second guide, the "Education Through Historic Preservation Program," co-authored by Tulane University School of Architecture professor Eugene D. Cizek, Ph. D., A.I.A., and fellow Louisianan Lloyd L. Sensat, Jr. This program's curriculum guide has been designed to be easily adapted and integrated to meet changing needs. Its 18 years of award wining success is proof of this flexibility. Education Through Historic Preservation (ETHP) has been recognized by the National Art Education Association, the Louisiana Landmarks Society, and the Freedom Foundation at Valley Forge (National George Washington Medal of Honor). The program and its founders also received the National Trust for Historic Preservation's first award for education in 1982.

The "Education through Historic Preservation Program" is unusual in that it calls for a collaborative effort between elementary, high school, and university students. Since 1977, these groups have worked together to create an unparalleled, multi-sensory record of some of southern Louisiana most significant landmarks. The collegiate architecture students have typically been responsible for producing Historic American Building Survey (HABS) drawings, several of which have been nationally honored.

Through a strong emphasis on on-site visits, the younger participants learn about a broad range of aspects related to a specific historic landmark. Among the educational activities outlined for the school children, are multi-media architectural renderings, writing prose and poetic histories, and presenting character portrayals at museum exhibitions (Cizek).

According to Sensat, who works with the St. Charles Parish Schools' Talented Visual Arts Program, all of these activities, which capture the interest and imagination of the students, are critical in maintaining a built environment heritage. "Unless we make young people realize the importance of our native architecture, these buildings don't have a future" (Cuthbert D4).

Educational guides with a broader context include Blueprints: A Built Environment Education Program by Marjorie Wintermute, Community as a Learning Resource, A Teacher's Resource & Guide by Ramona K. Mullahey, and Think Tank published by Piney Mountain Press. Another contemporary guide is Planning Education Kid Style, edited by TVA's Nancy Brown. The accompanying video to this program is further referenced in the section of this chapter dedicated to Box City. Dr. Anne Taylor's popular "Architecture and Children Program" utilizes curriculum posters as its primary teaching tool. The posters are supplemented by a video and the handbook Teacher's Guide: Interdisciplinary Learning Activities from the Architecture & Children Posters.

Other textbooks and curriculum guides include Investing in Our Future: A Handbook for Teaching Local Government by Lydia Bjornlund, Homes & Cities by Colin Moorcraft, and Our Man-Made Environment - Book 7, developed by the Group for Environmental Education, Inc. (GEE!). Assorted journals and newsletters also provide current information on built environment education including: The Journal of Museum Education, Heritage Education Quarterly, CUBE's ArchiNews, and Resources, the APA quarterly newsletter "for people teaching kids about planning."

There are numerous "project" books that are used in the classroom and at home to help children understand the built environment. The Art of Construction: Projects and Principles for Beginning Engineers and Architects by Mario Salvadori, is an award winning example of such a book. This book not only explains how different structures are built, but also illustrates how to make scale models that simulate the actual construction process and the principles behind it. A simple scaled tent is used to explain tension and compression. Arches, bridges, and skyscrapers help define concepts such as vertical thrust, oscillation, and plasticity. The book's two chapters on how and where to build with regard to climate, tornadoes, and earthquakes, could be of particular interest to an aspiring planner (Salvadori).

Many other publications encourage model building, as well as other fun teaching techniques which foster learning. Architecture in Education: A Resource of Imaginative Ideas and Tested Activities, edited by Marcy Abhau, features a group of

modeling projects as part of the chapters "Neighborhoods and Streets" and "Cities." Three books by Susan Purdy and Cass R. Sandak utilize modeling exercises as a way to understand ancient civilizations (i.e., Egypt, Greece, and Roman). Cut out models are a significant element in I Know that Building! Discovering Architecture with Activities and Games by Jane D'Alelio. Kathleen Thorne-Thomsen's Frank Lloyd Wright for Kids: His Life and Ideas - 21 Activities teaches children to read architectural plans and explains how to build a model of Fallingwater with graham crackers. In Fun With Architecture, David Eisen provides a format to design a whole city using stamps of architectural elements.

The Kansas City Museum's Children's Activity Book was originally developed for a local architectural and engineering exhibit entitled "On Any Corner." Nonetheless, the book was designed to be used in any community. It provides instructions for building a miniature city; and, suggests such exercises as touring your neighborhood and awarding homeowners and businesses for fixing up or maintaining their property. A copy of a beautification certificate is provided in the book.

Obviously not all books are activity oriented, with many relying strictly on text and illustrations to portray specific concepts. Several particularly good examples include the following books which show the development of individual buildings and cities over time. Two such works by Renata von Tscharner and Ronald Lee Fleming are New Providence: A Changing Cityscape and A Changing American Cityscape. David

Macaulay has authored several award winning books of this genre, including Cathedral: The Story of Its Construction, Unbuilding, and Underground, about the essential services provided under city streets and buildings. For an international flair, Xavier Hernandez, Jordi Ballonga, and others have collaborated on the beautifully illustrated Barmi: A Mediterranean City Through the Ages, Lebek: A City of Northern Europe Through the Ages, and San Rafael: A Central American City Through the Ages.

Among other informative books are those by Forrest Wilson. Wilson's City Planning: The Games of Human Settlement is especially noteworthy. A few additional books deserving mention are My Backyard History Book by David Weitzman, The Kid's Guide to Social Action by Barbara A. Lewis, Architecture is Elementary: Visual Thinking Through Architectural Concepts by Nathan B. Winters, and 50 Simple Things You Can do To Save the Earth from the Earthworks Group.

Traditional books are just one type of tangible teaching tool that is being produced and published. Other forms include videos, project kits, handouts, and computer programs. The American Planning Association publishes PLAN-O-GRAM, which is intended for use in classroom settings to teach students about the planning profession. Aimed at grades 4-12, this handout touches on such things as zoning, census data, and neighborhood planning.

SimCity has two publications that supplement its standard software package. One is The SimCity Planning Commission Handbook by Johnny Wilson. The other is the "SimCity School Version" teacher's guide, available from ArchiSources. "Hometown U.S.A." is a computer program that designs structures at the HO gauge scale (1:87). The software allows for the custom detailing of building elevations, roof configurations, street furniture, and other site elements. After being printed, the designs can be cut out and constructed into three-dimensional models (ArchiSources 5).

Many of the authors and organizations indicated above have produced numerous other works. Thus, the denoted publications are not intended to be a comprehensive list, but instead a framework for what is available. Two very useful annotated bibliographies regarding built environment education are A Reference Guide to Books for Young Readers about Architecture and Construction by Anna Behrensmeyer, and Educational Materials in Planning for Use in Elementary and Secondary Schools: An Annotated Bibliography by Gretchen Beal. The bibliographic works compiled by Joanne Guilfoil are also very helpful.

For additional lesson plan information, an excellent source is the recently published curriculum guide by the National Building Museum. Another important guide is TVA's 1993 Case Studies in Environmental Education. Perhaps the most valuable overall service for gathering titles and other data is the U.S. Department of Education's

Educational Resource Information Clearinghouse (ERIC). Finally, it is important to note nearly all of the publications mentioned in this chapter can be procured either through the APA or AIA bookstores, or directly from the publishing organization and/or author.

Overview of Traditional Teaching Methods

Many elementary and secondary school curriculums currently feature issues within the broad field of planning. Environmental matters, transportation safety concerns, and the problems of the homeless, are just a few of the topics educators are addressing. These issues are typically taught on a voluntary basis; although, a few subjects have become mandatory. The most traditional way to teach planning elements in the classroom has been through standard audio-visual techniques including slide shows, videotapes, and basic texts. Although not as common, field trips and other similar out-of-class activities have also been used.

The City as a Classroom: Secondary and Post-Secondary Exercises in Experiencing and Understanding the Urban Environment, by R. Charles Bryfogle, serves as good starting place to evaluate built environment education. Dating to the mid-1970s, this teaching guide provides a solid cross section of the conventional teaching methods that have been prevalent during the last two decades. As director of the Information Centre on Urbanization in British Columbia (and later Arizona), Bryfogle developed

this guide to meet the then current demands of local school systems. At that time nearly half of the Canadian provinces had either already adopted, or were in the process of instituting a compulsory urban studies programs as part of high school social studies curricula (Bryfogle, Urbanization).

Bryfogle placed a strong emphasis on writing about urban experiences. He recommended such exercises as visual essays, research papers, personal journals, and constructing word pictures. In order to better understand the built environment, he suggested projects which required analyzing photographs and maps, reading newspapers and magazines, and viewing television news programs. Such analysis also included out-of-class field work, specifically visual surveys and personal interviews. Finally, he encouraged role playing sessions as a way to encourage interaction throughout the entire class (Bryfogle, City as Classroom).

Current teaching guides advocate the continued use of many of these same techniques. However, newer guides typically encourage more hands-on activities, while also taking advantage of contemporary technologies. Ramona K. Mullahey's Community as a Learning Resource, A Teacher's Resource & Guide, published in 1994, is a good example of such a guide. Both of its primary components, a 30 minute video and guidebook, are intended to assist teachers with developing and implementing curricula. The program was designed for students in kindergarten through high school; thus, it has numerous exercises aimed at a broad range of skill levels. Among the planning

topics it covers are sewage treatment, NIMBYs, and understanding a "sense of place" (ArchiSources 7).

Specific examples of such teaching techniques abound. Local newspapers commonly feature articles about innovative new school programs. Professional journals and organizational newsletters also detail classroom activities. For even further information, copies of the actual projects children have produced can often be secured. The programs highlighted in the final four sections of this chapter are intended to provide a small glimpse into the numerous ways children have been taught about the built environment.

Non-Three-Dimensional Teaching Techniques

As noted in Bryfogle's approach to a traditional planning education, the use of three-dimensional simulations is often very limited or even nonexistent. Such techniques typically focus more on verbal, written, or drawing skills. Storytelling and parables are a popular way to explain notions to young children. Two videos based on the cartoons of planning critic, Richard Hedman, prove such methods can also appeal to adults, as well as older children. Although these videos, "The Panel" and "The Dig," are currently unavailable due to some copyright difficulties, they may be ready for classroom use again in the near future.

Producing maps and drawing buildings are two techniques that give children an outlet to express spatial notions and ideas of design. Mapping was a common tool used as part of the "Man and the Biosphere" program operated by the United Nations Educational, Scientific and Cultural Organization (UNESCO). As part of this project, children in classrooms across the world drew their "images of locality." These students were from such places as: a poor, dweller-built settlement outside Mexico City; a small village in Poland; an Argentinean Villa; and the heart of Melbourne, Australia. Numerous illustrations of these maps are featured in the book Growing Up in Cities: Studies of the Spatial Environment, edited by Kevin Lynch.

Students can sketch buildings from either memory, photographs, or by viewing them in person. They can also design imaginary structures and cities as a way of "exploring" the built environment. Such techniques and other similar methods are an integral part of several educational programs. One curriculum that uses a number of these approaches is the "Education through Historic Preservation Program" by Gene Cizek and Lloyd Sensat. In addition to writing and drawing exercises, numerous board games and other types of contests foster creativity, and give students a welcome break from standard classroom exercises.

Some activities require leaving the classroom. This includes neighborhood inventories and both visual and verbal surveys, such as those performed by the Manatee County Youth Planning Commission (YPC). The commission created in 1991, is composed of

high school students in the Bradenton, Florida area, who are interested in learning about the planning profession. They assist and are supervised by the county's Planning, Permitting, and Inspections Department. One of YPC's first projects was to help determine the needs and impacts occurring along an area highway. Based on the information they gathered, a 27 page report was developed, including maps and survey data. This report, U.S. Highway 41 Corridor Study Inventory and Analysis, was then presented to the Board of County Commissioners (Manatee County).

Other types of surveys are less technical and can be used with much younger children. Most of these types of visual survey forms include numerous drawings and/or photographs of building elements (e.g., hip, gable, and gambrel roofs; brick, stone, and clapboard facades; and casement, sash, and fixed windows). Students circle the appropriate elements to match the building they are surveying. Tennessee students have used a version of a survey form from Maurie Van Buren's Heritage Education: The Story of American Homes ("The Community Is a Classroom"). Van Buren's curriculum packet also provides photographic slides, so students and teachers need not leave the classroom.

The Architectural Treasure Hunt is a similar educational tool commonly used by museums and preservation groups. This activity typically involves children and adults scouring a residential neighborhood or downtown block of buildings looking to match specific architectural details with those illustrated on a handout. Among the many

groups that have sponsored such an event are, the Center for Understanding the Built Environment (CUBE) and the Gardner Museum of Architecture and Design in Quincy, Illinois.

Other out-of-class activities are often part of a larger overall classroom program. Such is the case with the Built Environment Education Program, sponsored by Los Angeles based developer Pardee Construction Company. This program, aimed at all school levels, featured a dozen two or three week mini-courses. In addition to classroom instructions, the students visited construction sites, businesses, and governmental offices. The program's curriculum was developed by Interface Network, a San Diego based nonprofit education organization (Woodcock).

Role playing is a particularly good activity for letting students express their creativity, while still allowing teachers to gauge their comprehension of a subject. Another positive reason for using role playing is that it often pushes the envelope of the main discussion, thus, forcing students (and teachers) to think critically about previously unaddressed issues. In a journal article by Dennis Asmussen and Richard Cole, a simple format for role playing about the built environment is defined. The primary elements of this approach include: an overview of a planning problem, teacher led inquiry sessions to identify, classify, and analyze possible solutions, and finally, the actual role playing between a Board of Control and a group of citizen's committees (Asmussen).

In 1990 the Urban Land Institute (ULI) published a planning oriented program curriculum that focuses on role playing entitled Dilemmas of Development. A companion curriculum, UrbanPlan, was published by ULI the following year. These two programs were specifically designed to teach high school students about the types of interactions necessary when making public policy decisions or getting a major development project approved. In order to assure the "realness" of these lessons, the programs use existing developments in Fairfax County, Virginia and Kansas City, Missouri, to show the students how the professionals actually achieved their goals.

Dilemmas of Development simulates a land use public hearing. Students debate the issues behind a planned suburban office park by taking on the roles of planners, developers, attorneys, government officials, and other concerned parties. In UrbanPlan, students address the complex issues of neighborhood revitalization. Based on a Request for Proposals from an imaginary community, different student groups work as development firms competing for the project. After the RFP process, the students then plan an actual redevelopment project.

There are two other noteworthy programs that involve role playing about the built environment. The Education through Historic Preservation Program in Louisiana has used this technique for a number of years. In 1995 this interactive process was entitled "Conversations with George Washington Cable, Mrs. Stella Lemann, Dr. Bernard Lemann, and Other Famous Creoles." All of these historical figures were

associated with one of the French Quarter's most significant (and unusually named) buildings, Madame John's Legacy. The "actors" for this program were 22 of Lloyd Sensat's students from the St. Charles Parish Schools' Talented Visual Arts Program (Cuthbert D4). A program in a similar vein is the Gardner Museum of Architecture and Design's, "Quincy Characters." Here, costumed youths portray such individuals as architects, homeowners, bankers, and contractors, who are specifically related to the architectural displays in the museum.

Models and Other Simulations in the Classroom

Educators are constantly seeking to increase the comprehension rates of their students through the tools and methods by which they teach. In his book, Audio-Visual Methods in Teaching, Edgar Dale explains how he and other teachers often "contrive experiences" to improve these levels of understanding. "We simplify the teaching process, by inventing a plan or device which has many of the advantages of the direct experience without certain of its disadvantages. We 'edit' reality... in order to make something clearer" (Dale 84). These enhancing devices most commonly exist in the form of models and similar simulations.

"Think of the advantage of teaching American history, geography, and social studies if you could take your classes through a miniature New England village of Revolutionary times" (Dale 94). Since Edgar Dale stated this nearly fifty years ago, numerous

teachers have discovered the benefits of using three-dimensional simulations. These models have not only been used in conjunction with the subjects Dale mentioned, but also in courses ranging from english (e.g., Gulliver's Travels) to art to religion.

The following three examples, which focus on modeling, show how a knowledge of the built environment can increase the overall understanding of another discipline. Such is the case with a group of sixth graders from the Kansas City area, who learned about mathematics in the midst of studying about ancient history. This lesson was observed by a university professor who was evaluating the students as part of a "Teach the Teachers" program. While building scale models of the Parthenon, Professor Kathryn Loncar, noticed that a group of students "stumbled onto the concept of pi." She further noted that the class' teacher picked up on their discovery as well" (Dean 100).

At Cathedral High School in Natchez, Mississippi, eighth and tenth grade religion students designed several different three-dimensional simulations as part of a special religion class assignment. Their teacher, Mike Roboski, said the project was intended to "allow them to express themselves in some form outside of text or book." Among the resulting projects was a scale model of the Temple of Solomon and at least two miniature versions of portions of Jerusalem (Gibson) (Figure 3.1).

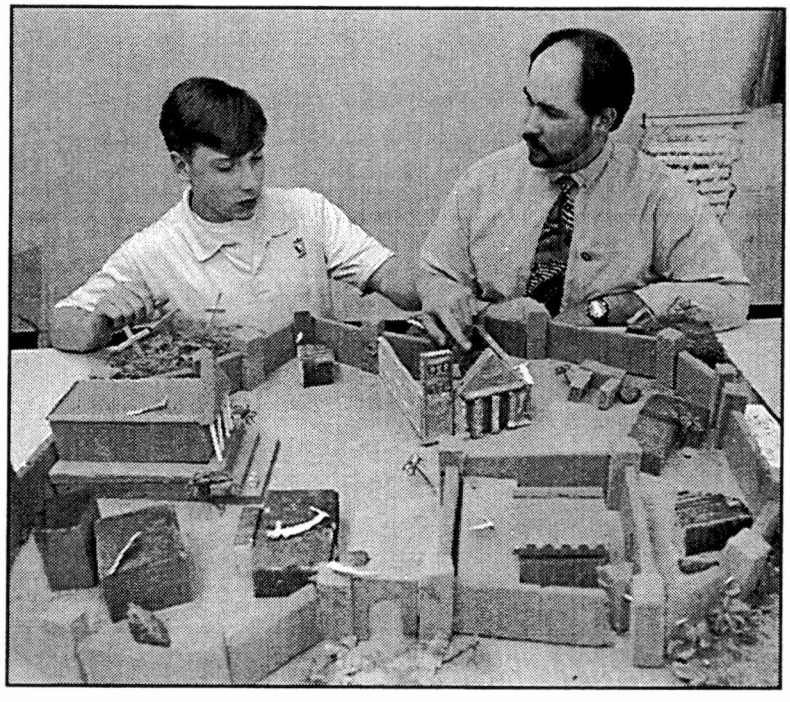


Figure 3.1
A Student Uses the Model He Constructed to Explain an Issue to a Teacher

Fifth grade students at San Antonio's Hawthorne Elementary School also built models while studying ancient civilizations. One such model of a Mayan village was constructed on a corrugated cardboard base using little more than Play-Doh and popsicle sticks. The overall history lesson, including the modeling recommendation, was part of the school's newly adopted continuity-based curriculum. A fifth grade teacher at Hawthorne, Debra Mentzer, contends the projects in the curriculum increase students desire to learn. "We always talk in schools about raising expectations,...yet alot of textbooks don't do it. This has [advanced] content. And the kids love it." The curriculum developed by the Core Knowledge Foundation emphasizes many of the

ideals advocated by the foundation's creator, university English professor and author of Cultural Literacy, E.D. Hirsch, Jr. (Kelly, D.).

In addition to making models in the classroom, students often use resources at home to make their creations. Probably the most common at-home projects are those produced for science fairs. Whether explaining the workings of a coal mine or testing flow rates for a city drainage system, three-dimensional simulations are an invaluable resource.

Betsy Creekmore maintains, however, not all models need to be built by the students themselves. "A civic-minded miniaturist can make a much appreciated contribution to a city's public schools by constructing for them a portable...accurate scene - provided the subject of the display has been approved in advance by school authorities" (Creekmore, Your Miniature World, 142-143). Travelling exhibits, such as EnviroScape, are also very useful. This portable display, from the firm JT&A in Washington, D.C., depicts the many land uses associated with a watershed (Bennet).

Planning-oriented models have been used in the American classroom for a large part of this century. One of the earliest examples was done as part of a master plan educational outreach program. During the 1920s, "Cincinnati school officials involved students at the kindergarten level in city planning by having them build and landscape model cities" (Patton 1). Since then, numerous other programs have used similar techniques, often stressing the interdisciplinary nature of planning.

The modeling projects featured in two Illinois schools are somewhat indicative of the teaching methods currently being used. As part of a City Planning unit, sixth graders from Bloomington set up a large, three-dimensional, city model on top of three, eight-foot long tables. Teachers used the construction process, as well as the projects associated with the finished model, as part of the learning experience. "Specific lessons dealt with the following topics: transportation, funding education, trying to prevent a factory closing through the formation of a corporation, electing new council persons and a new mayor, pollution, nuclear power, and redevelopment" (Beal 3).

In Quincy, Illinois second and third graders at Washington School built a model city based on certain self-imposed zoning regulations and design guidelines. To prepare the students, their teachers took them on tours of neighborhoods, museums, and a local cemetery. They further studied architectural styles, construction methods, landscaping, street patterns, and other planning principles. The result was a cardboard box city made up of local landmarks, businesses, and industries, which were laid out with regard to land use. One decision regarding the compatibility of uses was summed up by an eight year old future planner. He noted that his "class made sure smoke-belching industries were placed far from the model of Blessing Hospital because of pollution concerns" (Husar, "Planning a City"). Many of the techniques used in this project are also used in the Box City program, which will be discussed later in this chapter.

Other well documented examples include the construction of a pueblo village, an urban British streetscape, and riverfront redevelopment schemes. As part of a year-long volunteer arts project, New Mexican students hand-made their own miniature adobe bricks, with which they constructed individual pueblos. When the small buildings were completed, they were assembled into a village. The culmination of this project was a traditional Indian ceremony featuring food and music in honor of the class' work. Highlighting this ceremony was the student's native ancestral "blessing" on the new pueblo community (ArchiNews, Dec. 1989, 3).

As illustrated in The Conservation of European Cities, edited by Donald Appleyard, a group of 80 British elementary students constructed a planning model as part of an urban studies program. The model replicated an area around their school know as Hythe Street. This linear streetscape model measured over 20 feet in length, and contained at least ten "blocks" filled with cardboard buildings featuring finely detailed facades.

The 1994 recipient of APA's public education award focuses heavily on modeling and other simulations. This winning concept was the "Call to the Visionary Artist" (CTVA) program in Hartford, Connecticut. Since being launched in 1991, this program has brought urban design and planning concepts to over 3,000 students of all ages. CTVA works by partnering volunteer planners and architects with classroom teachers for periods of 8-10 weeks. Thus far, CTVA projects have allowed students

from 30 area schools to do designs such as, compatible infill for vacant downtown lots and redevelopment plans for underutilized riverfront parking lots. Following design reviews by guest jurors, a select number of the models, drawings, and other graphic images are chosen for display at Hartford's "First Night" celebration (Georges).

Students at the Technology Academy in Honolulu, Hawaii have also been concerned with improving their environment. Their goal has been to provide neighborhood kids with their own gathering place, the Central Oahu Youth Center. Although they had previously been involved with other design projects (i.e., building models of "edible architecture" communities from gingerbread), the 35 Technology Program students knew they needed professional help for this "real" project.

Under the direction of Architect-in-School, Glenn Miura, AIA, they "conducted need assessment surveys, drafted models, filed reports, learned computer-aided design, solved engineering glitches, took field trips to military youth centers and brainstormed." Their final project, including a model and other graphics, was then presented to the Mililani/Waipio/Melemanu Neighborhood Board. The Youth Center was well received; and, since the early part of 1994, it has been waiting on possible funding sources in order to "complete the design development and construction documentation" ("Communities Can Benefit").

Anton Nelessen, author of Visions for a New American Dream, does most of his modeling work with adults at planning seminars and town meetings. He has, however, also worked with children, both in the classroom and at "Livable Cities"conferences. He reasons such programs are valuable, since "the younger you start, the better you build the person's intuition." Nelessen typically uses elements of his "Hands-On Models" Design Workshop with these groups (e.g., third graders) to illustrate ways of develop better communities. Among his many findings, he has observed that using this design technique with children produces at least one constant; that being children almost always put the church (or other institutional building) directly in the center of the development (Nelessen personal interview).

Three-dimensional simulations are an integral component of several curricula, resource guides, and project kits, including ArchiBox Pop Up by Judi Shiels (ArchiNews, Jan. 1992, 11), Hubbard's Urban Studies System, and City Building Education from the Santa Monica based Center for City Building Education. According to the AIA's "Learning by Design" program, City Building Education is an extraordinary tool for teaching about the natural and built environment. The AIA asserts this technique, developed under the direction of Doreen Nelson, "goes beyond the mechanics of model construction to a systematic, albeit infinitely variable, model for learning" (Sandler).

Hubbard's Urban Studies System was designed as an interdisciplinary, multi-media program, that relies heavily on student interaction. Through the extensive use of models, maps, and film, students address both real and simulated urban problems. Most activities center around the Metropolitan Area Model, a 24" x 30", full-color model, containing over 100 number-keyed features. Other elements of the non-graded program include study overlay sheets, role-playing cards, and the "Pollution Simulation Kit" (Hubbard Urban Studies).

Although, many of the above mentioned model-based programs may be fun; they are not intended to be games or toys. This is not to say, however, that students at all levels would not benefit from using such playful devices. As noted in Chapter II, such three-dimensional games as "Urban Dynamics," can provide an excellent format for studying societal and development conflicts. "Little Planner," by Leisure Learning Products, Inc., is a board game aimed at 3-6 year olds, which teaches such basic concepts as "shape recognition" and "visual projection" (Planners Bookstore 4). These and similar types of resources have been referred to in Planning magazine as "architectural awareness game[s]" (Georges). Some schools even provide instructions on the use of certain three-dimensional "toys." Such is the case in Western Illinois, where John Wood Community College offers a non-credit course on model railroading (Turek survey).

From 19th century, Froeble blocks to modern day LEGOs, building block toys have long had a place in America's schools. Numerous descriptions of the types of uses and educational benefits derived from these blocks are provided in the book, The World of LEGO Toys. A quote from the chapter entitled "LEGO Bricks in the Classroom," summarizes these advantages:

> "In late preschool and early primary school, teachers begin to use LEGO theme sets that give children the chance to build such things as farms, harbors, or gas stations - places and things they recognize from the real world. The children build these things not only for the experience of building them, but in order to play at operating them. It helps the children gain a deeper understanding of the way the world works...The sets also encourage children to make up stories about what they have built, stimulating creativity. With concrete material the children get interested in subjects they might otherwise find abstract and boring" (Wiencek 91-92).

Three-Dimensional Planning Lessons Outside the Classroom

"The concept of reinforcing a textbook knowledge...with visual displays is still a valid one, and obviously it is easier to take one museum-quality exhibit to students in their classroom than to transport an entire class to the museum" (Creekmore, Your World in Miniature, 142). Although this may often be the case, the size and inflexibility of certain simulated environments makes it impossible to move them. Thus, field trips and other nonclassroom activities are essential in providing the best all around education.

The summary of Knoxville's resources in Chapter II indicates that cities often offer a variety of settings outside of school, in which to learn about the built environment. This portion of the chapter will focus on a few such places that have established formal educational programs featuring their three-dimensional simulations. The sites mentioned below are intended to provide a broad overview of the types of facilities ensuring these unique learning opportunities. Additional information on educational programming by these groups, as noted on their surveys, will be presented in Chapter IV.

Models are used quite commonly in interpreting historical sites. Among the sites that feature one or more "urban" models as educational tools are: Old Salem, Colonial Williamsburg, and Taliesin in Spring Green, Wisconsin. TVA's Sequoyah Energy Connection, a center for environmental sciences, includes several models as part of its education programming. Significantly, this program is "keyed to the state curriculum guide" (Salisbury survey). Private architectural firms, including HOK (St. Louis) and SOM (Chicago), have city models which are highlighted during school tours. Two other sites that use models extensively in their educational programming, The Queens Museum (The Panorama of New York City) and the Waterways Experiment Station in Vicksburg, will be detailed further in Chapter V.

In addition to The Queens Museum, numerous other museums have used models and building simulations as part of their educational outreach programs. These include

both permanent and travelling/temporary exhibits. The following are two such exhibits that appealed to both young and old alike. In 1985, a group of 30 young European architects presented an exhibit of their "dream houses" at the Pompidou Center in Paris. The exhibit was highly acclaimed and lauded for its creativity. However, all of the pieces in the exhibit entitled, "L'Architecture est un jeu...magnifique" ("Architecture is a magnificent game"), had one very unusual thing in common. That is, each of the building models was constructed solely out of LEGOs (Wiencek 109).

"Architect Designed Dollhouses" is a travelling exhibit developed through an international competition sponsored by Architecture-Design magazine. This 1982 competition drew over 260 entries, with the top 62 being judged by architectural historians Bruno Zevi and Vincent Scully. The architect's approaches varied dramatically, ranging from a "whimsical home for mice" to a dollhouse that "portrays the gradual destruction of the environment, problems in landscape, and the chaos and recovery of urban space" ("Architect Designed"). The exhibit premiered at the Royal Institute of British Architects; and, in 1994 it was hosted by the Gardner Museum of Architecture and Design (Architect-Designed).

Children's museums are excellent resources for programming aimed particularly at younger students. Among the many American cities with such museums are: St. Louis (the Magic House), Fargo, Indianapolis, Memphis, Tampa, Boston, Richmond, and Oak Ridge, Tennessee. Adventure Place in Akron, Ohio, incorporates many

hands-on simulation activities with its recently opened museum, the Inventors Hall of Fame. Educational programming is also incorporated into the activities of certain miniature villages, including Portugal dos Pequenitos and Mini-Europe.

Just visiting most miniature villages and reading along in a guidebook, is often an educational experience in itself. As just noted, however, some miniature villages realizing the importance of their resources, have established formal education programs. One such place is the Children's Museum of Tampa, which includes the original Safety Village, USA. As noted in Chapter II, this "model" community was initially used only for bicycle and pedestrian accident prevention training (Figure 3.2).



Figure 3.2
A Child Learning the Rules of the Road at Safety Village

Now it is part of an overall program that teaches children about architecture, urban planning, business and careers, safety concerns, area history, and a wide array of other cultural and social issues (Children's Museum at Safety Village, brochure; History of Safety Village).

The following excerpt from a Safety Village brochure describes how interactive learning can take place in a larger-scaled miniature village.

> "In Safety Village, youngsters can *expand* their horizons and learn about the Village neighborhood. There are more than 22 unique child-sized buildings just ready and waiting to be explored. Children can take their pick -- either walk through the streets of the Village in search of adventure or simply pedal pint-sized car. Once they come to a stop, youngsters can enter the buildings and take part in the world of everyday life. Each building was designed to represent a slice of life in Tampa. Children will find plenty of action in the police station, get a chance to check out real books in the library, play the anchor in a television news studio or be the teller in a bank. There's even a place to gas up the car. Working traffic signals let young drivers and pedestrians know when it is safe to cross the street" (Children's Museum at Safety Village brochure).

"Miniature models seem to have an inherent fascination for people because of this they work well as an educational tool and a public relations device" (Miller, Panorama, 40). Understanding this, the LEGO Group promotes several educational programs using its famous bricks. At LEGOLAND Park in Billund, Denmark, as at Tampa's Safety Village, children can learn about automobile safety and driving rules at the park's Traffic School. The park also contains numerous, less structured settings that foster

learning, including an extensive LEGO construction area. Outside the park, LEGO brings their "large," miniature buildings to the people, through the LEGO World Show and the LEGO Americana Road Show. Finally, building contests and exhibits, sponsored by both the company and devoted fans, are featured annually at numerous sites around the world (Wiencek).

The commitment to quality, evident throughout Madurodam, appears to permeate their educational programming as well. One example is that role playing at Madurodam takes on a much higher level of importance than in most other settings. Since it is considered a "real" town in miniature, Madurodam must have its own "real" public officials. In that spirit, 30 boys and girls are chosen annually to serve on the Municipal Council of Madurodam. These specially picked school children from the Hague (Den Haag) then elect from among their own ranks a mayor and aldermen. During their year, "the Council and its Mayor, who has a fine chain of office, undertake official duties and take part in the town's public functions and receptions" (Worlds' Smallest Town). Being the first miniature village built according to a master city plan, these responsibilities may include reviewing any proposed new developments with much the same rigorous review that such plans would undergo in a "larger" city. For the majority of Madurodam's visitors, who are unable to secure a seat on the council, an educational "passport" is provided, which features questions and trivia about the city (Madurodam guidebooks; survey).

The Center for Understanding the Built Environment and Its Box City Curriculum

CUBE

Whereas, the town of Madurodam took nearly two full years to construct, many a Box City has been built up (and taken down) in a single day. These "cardboard communities" have become one of the most popular and effective means for teaching children about urban planning. Box City and its newly expanded curriculum guide are part of the extensive educational outreach program championed by the Center for Understanding the Built Environment (CUBE). Although the center was officially incorporated in 1983, it is rooted in a "movement" which started twenty years earlier. For it was in 1963 that Ginny Graves, CUBE's founder and inspirational leader, began working with children's educational programming in the Kansas City area.

Very early on, Ginny Graves learned the importance of taking the lessons of art and architecture "out beyond the museum walls," by bringing them directly to children (Dean 58). While working on several different educational ventures, she came to realize the need for a formal organization to help further her cause. Together with her husband, Dean Graves, a Fellow of the American Institute of Architects, and a group of dedicated educators, preservationists, and planners, Ginny Graves formed the nonprofit corporation, CUBE. This organization was established to fulfill one very basic purpose. "The Center for Understanding the Built Environment (CUBE) seeks to

educate citizens who understand and actively participate in the development of a quality built and natural environment, one and interdependent" (CUBE:).

In recent years numerous awards have been given to both Graves as an individual and CUBE as a group. These include honors from the American Institute of Architects, the National Endowment of the Arts, the National Trust for Historic Preservation, and The Urban Network. The reason for this much deserved recognition is simple. Ginny Graves and her dedicated band of volunteers have worked diligently to develop America's most comprehensive collection of programs, workshops, and "manipulatives" (i.e., models), for teaching school children about the built environment. The resulting resources they have assembled are amazingly varied. They range from a local lending library, to a national computer network (America Online), to internationally certified educational kits.

The name "ArchiNet" is basically synonymous with CUBE. ArchiNet was actually the first name of the organization. It was given this name by the initial group of teachers, who helped develop it as "very local, very homegrown" effort. However, as the organization flourished, it was decided they needed a "more grown up name." Hence, the name, The Center for Understanding the Built Environment, was born (Graves interview).

ArchiNet's logo (Figure 3.3) is derived from John Ruskin's quote, "art is that which the hand, the head, and heart go together." It is intended to symbolizes the type of interactiveness fostered by the group. As an *ArchiNet* member, an *ArchiTeacher* can order *Architivity* curriculum packets from the *ArchiSources* catalogue via the *ArchiLine*. Such *ArchiFriends* have also been able to keep up with current events through *ArchiMinutes* and *ArchiNews*, and/or volunteer to mentor *ArchiKids* during *ArchiCamp*. (It should be noted, that several of these entities also commonly appear with a lowercase first letter, including archiNet and archiNews.)

CUBE/ArchiNet has two places for conducting all this business. The administrative offices are located within Dean Graves' former architectural studio, which is attached



Figure 3.3
The ArchiNet Logo

to the Graves' private residence. Farther from "home" is CUBE's newest center of activity; their handsome red brick headquarters nestled in the midst of Kansas City's blue collar Midtown Neighborhood. At the heart of this converted church building, which they share with antique shops and an elementary school, is the CUBE Resource Center and Library.

The Resource Center, which opened in 1991, features a conservatively estimated 800-1,000 different items that have been indexed and catalogued (Graves interview). It offers both free and rental services for such items as slide shows, resource guides, school curricula, urban planning games, videotapes, and books for all ages. At these sites workshops are developed and presented, network computers are accessed, and the ArchiNews newsletter "is published on an enthusiastic but erratic schedule" (ArchiNews, Mar. 1994, 2). Further, Graves' ArchiSources serves as a clearinghouse for numerous products, publications, and organizations, including Autodesk, Polaroid, and LEGO.

A considerable amount of time and energy is needed to fulfill CUBE's agenda. Thus, an article in the September/October 1993 issue of Historic Preservation magazine, is perhaps properly entitled "Why Is This Woman Smiling?" That is, because "Grave's various efforts are staffed entirely by volunteers," and with their help the message is getting through (Dean 57). Whether it is because of Ginny Graves' enthusiastic and charming demeanor, or because of CUBE's educational cause, or likely a bit of both,

one fact remains; the organization is successful in educating children about the built environment due to the tremendous commitment by professional and lay people alike.

One particularly dedicated group of volunteers is known as the CUBE Cadre. This team of educators and design professionals does presentations at workshops across the country. This includes sessions at "CUBE at Seaside," the annual conference sponsored by the Seaside Institute. Using the planned community of Seaside, Florida as a learning ground, CUBE has found an effective "full scale" environment for promoting much of its urban design ideals (ArchiNews, Mar. 1994).

Establishing partnerships in schools is a particularly vital function for CUBE. The "Community in the Classroom" program joins teachers with design professionals and student interns. During a full semester, the team participates in direct interaction with students. Two of the primary tools for interaction include field trips and a community service project. For their participation, teachers can receive graduate course credits through the involvement of the University of Missouri at Kansas City (UMKC) School of Education (Center...CUBE).

Even though some teachers can get upper-level credits, most of them get involved with CUBE for the sole purpose of providing their students with a greater learning experience through an understanding of the built environment. As Ginny Graves puts it, "the teachers are volunteers in the truest sense...because they don't have to do these

programs as part of their curriculum" (Graves interview). In that spirit, "Teach the Teachers" has become among the most important programs administered by the folks at CUBE.

A primary purpose of the "Teach the Teachers" workshops is to create a "multiplier effect" in the classroom. Since its inception, thousands of teachers worldwide have learned about the built environment; and, they in turn have passed this knowledge onto a current estimate of nearly one million children. In addition to workshops, this instruction is offered through the University of Kansas as a graduate level course. As a main requirement of the course, participants must develop "a lesson plan ready to be implemented into the classroom" (Center...CUBE).

This and similar programs have also been offered at such sites as Ottawa University and University of Colorado in Denver. Typically they are designed to meet teacher recertification requirements (ArchiNews, May 1989, 10) Due to their content, the AIA has also approved many of these CUBE programs to go towards AIA Continuing Education System Learning Units (CUBE:)

Regarding her research into CUBE's programs, UMKC professor, Kathryn Loncar, has stated that "Teach the Teachers" "fits beautifully into the notion of holistic and integrated curricula that is now being explored by reform educators in American Schools" (Dean 100). As part of this reform, CUBE sees as its mission, to add a new

level of awareness into the classroom. "The ultimate goal of CUBE is not simply to enable children to learn to value the built environment, nor is it just to improve their problem-solving skills. The Fourth 'R' in the CUBE educational model is responsible action" (CUBE:).

CUBE promotes several different curricula and teaching devices to help foster this heightened awareness of civic and personal responsibility. The most notable of such is Box City. The "Walk Around the Block" curriculum is also valuable in that it helps to refine many of these ideals, by emphasizing the importance of aesthetics and detail in design. "If Grave's Box City was aimed at giving children a better understanding of the issues and processes of city planning and urban design, her second instructional package, which she calls Walk Around the Block, is aimed primarily at increasing visual awareness and instilling an appreciation of built design" (Dean 59).

This appreciation is developed through a focus on a place familiar to the students including their own house, school complex, neighborhood, or city. "The curriculum is intentionally setup so that it can be adapted to any place" (Graves interview). An example of this flexibility is evident in the curriculum's teaching tool, "City Game." The game's format stresses a knowledge of land use, the preservation process, design, and stewardship, as they all relate to local resources. An added benefit is that it encourages students to stay strongly focused while on field trips and similar outings, by requiring them to record specific elements they encounter (e.g., neon signs, brick

sidewalks, tile roofs, smoking chimneys, etc.). This documentation also gives the teachers a further sense of accountability.

An event in rural Stillwell, Kansas is evidence of how such programs can impact children. Here, "fifth and sixth graders, who had learned about their town through Walk Around the Block, created a walking tour and slide presentation about their community and then convinced city officials to save an aging round barn that was threatened with demolition" (Dean 59). In other communities, Walk Around the Block's "Action Letter" has resulted in such things as the installation of new traffic lights (Graves interview).

CUBE/ArchiNet has promoted numerous other programs and resources over the years. In addition to supplying an overall Built Environment Education packet, the group has been involved with such activities as "Adopt a Building" and "Create Your Own Architectural Calendar." They have also provided either full or partial sponsorship for a number of competitions, including the popular "Kids Love KC Contest."

Several different forms of three-dimensional simulations have also been counted among their resources. Besides Box City, they have fostered learning through "StrucSticks" and the "GeoBlock Game Kit." StrucSticks, which comes with the Builder's Handbook, helps children learn how to build "geometric models, sculpture space frames and other structures" related to architecture ("ArchiNet: Supplies").

The GeoBlock Game features several large blueprints with different land forms, on which children place color-coded wooden blocks labeled by land use. One young student described it as: "a game where you organize a city on a map and...I like to plan where the houses and parks are going to be. The best thing about the city plan is that you get to work on the project like a landscaper. The best thing about it **really** is when you are finished, you really feel good about it" (ArchiNews, Mar. 1994, 6).

Some might argue that all these programs are primarily aimed at encouraging students to become urban designers and city planners. However, Ginny Graves maintains: CUBE's "projects and in-school programs are **not** intended to train architects, historians or other related field professionals, but to inform the general populace about the issues and challenges of the built/natural environment and the role **they**, average citizens, can play in quality. The goal of these efforts is to take teachers, and by extension, their students, to the highest level of participation **in** and stewardship **of** the environment" (Graves, "Why Professionals").

Box City

General

Of all the CUBE programs, Box City seems to encourage the greatest amount of individual participation. This is important since such activity plays a critical role in

the learning process. Two different, but not necessarily, opposing viewpoints explain why this interactiveness makes the Box City program so effective. According to UMKC professor Kathryn Loncar, "children become enthralled with Box City...because the exercises deal, in very concrete ways, with what is most important to youngsters: their homes and neighborhoods" (Dean 100). Another common theme echoed by those who have "worked" with children developing a Box City, is that it "not only brought about the learning, but it did so in a way that appealed to them. It was fun" (Prochaska Planning Education Kid Style).

Perhaps it was the idea of combining something familiar with something fun that inspired Dean and Ginny Graves, and Kansas City-based architect/planner Glen LeRoy, to develop and refine the Box City concept. From its simple beginnings in 1969, Box City has grown to include its own full-fledged curriculum. This curriculum is now formatted so that Box City can be tailored to different settings, sizes, and age groups. However, as many of CUBEs numerous publications indicate, Box City's purpose continues to remain the same. "Box City...encourages skills, in group cooperation, writing, art, mathematics, [and] spatial relationships," "instills [an] understanding of the development of cities, their present problems and successes" and "demonstrates the need for preservation ethics and for future planning" (Box City Is Our City).

The current Box City Classroom Pack includes 40, white cardboard, die-cut boxes: 6" modular cubes are meant for industrial buildings, 5" for commercial and civic uses, and 4" for residential, with some 4" boxes featuring gable roofs. Highrises can be made by stacking any combination of these boxes. Also included are: a town grid base map (42" x 78"), "masters" for building permits, a checklist of planning concepts, and other teaching guide material. For a larger gathering, the Festival Pack contains 1,000 boxes with instructions and sample plans on how to customize a city base map. This may include something as simple as using a series of 4' x 8' plywood risers covered in Kraft paper, with duct tape representing streets (Dees). With all this in hand students set out to design "a real city, an international city, a city of the future, a utopian city" or some other type of "planned" community (Center...CUBE).

Helping teachers (or whomever is assisting) to direct their students is the curriculum guide, Box City an Interdisciplinary Experience in Community Planning. This 113 page resource document, by Dean and Ginny Graves, provides all the necessary information for developing either a single-day fun activity or a complex semester long project. "The Box City curriculum teaches how cities are planned, or unplanned" by getting students to reflect on specific examples around them (ArchiSources 1). For instance, one section of the curriculum asks children to focus on one particular residence in a familiar neighborhood. Then, students answer questions about how it would be to live there including: the distance to their school or a store; whether it's easy to ride a bike in the area; what types of playgrounds are nearby; and if these

playgrounds are good or bad. Understanding these issues, the children then set out to build their city.

Different groups utilize Box City and its curriculum to meet their own needs. In this spirit, teachers are encouraged to manipulate and customize the grid maps as they see fit (Dees). Although the approaches may vary, the end process typically remains the same. Andrea Oppenheimer Dean's article in Historic Preservation, with quotes from Ginny Graves, provides a good brief synopsis of how and why this learning experience works.

> "Box City takes its participants through a city planning process that teaches them the vocabulary for city planning, the complexities of planning decisions, and the need to balance the conflicting needs of planners and developers, residents and builders. Each student is given a role to play in mock city-planning hearings, for instance and 'children quickly learn that the person who speaks out rules the city,' says Graves 'and that that person may not always be the one who knows the most or is doing good for the city.' She adds that one of the main purposes of Box City is to 'raise the awareness of people who feel helpless about what's happening around them and to show youngsters how they can be a part of the process'" (Dean 58).

The hands-on activities and end product often enrapture those who are working with Box City. This not only includes the students, but also the teachers, administrators, architects, planners, parents, and other volunteers who are involved. As one interested observer, Mike Green, the arts editor for the San Antonio Express, exclaimed; "I don't know when I've been more elated and hopeful. This program would do a world of good not just for the education of children but for the future of our city. Box City is

an essential experience for children" (Box City Is Our City). In addition to explaining the Box City process in greater detail, the following examples further illustrate this type of contagious enthusiasm which Box City often elicits.

Such is the case in Birmingham, Alabama, where just a few years ago, the Box City curriculum was only used sporadically at best. Now, thanks to a collaboration between the local AIA chapter and the Birmingham Historical Society, the "Fabulous Fridays" program has architects and other design professionals doing Box Cities in school gymnasiums throughout the city (Graves, "Why Professionals"). In Kansas City, one fifth grade teacher brimming with excitement for Box City, felt he had to share his good fortune. Therefore, unable to bear the thought of throwing away his class' huge (seventeen tables) Box City project, he decided to donate it. Using unpaid vacation time and a rented van, he move it to the school district's nearby resource center, where it was displayed so that other teachers could learn from it (Dean 59).

Glen LeRoy, AIA, AICP, one of Box City's first proponents, continues to work with Box City and other CUBE programs. He finds the interaction very fulfilling; especially, when he observes how students (and teachers) are learning to define their role as decision makers within the built environment. Bringing more of a theoretical approach to Box City, Leroy focuses on such issues as sustainability and proper intervention through zoning and development ordinances. He has shared his ideas with groups of nearly every size, including one huge gathering that featured Box

Caderas from 26 different schools in Kansas City's two-state metropolitan area (LeRoy).

LeRoy pointed out a Box City session at AIA's 1994 national convention in Los Angeles as being particularly gratifying. This Box City simulated the greater Los Angeles ecosystem, including the ocean, valleys, mountains, and desert. When the participating students (one gifted school class and one poor inner city class) were eventually faced with the issue of sprawl (which the instructors purposefully intended), a long discussion ensued regarding impacts and priorities. The resulting consensus was that the density of the city should be increased, so as to maintain the integrity of the mountains. LeRoy indicated the most important lesson learned by the students that day was with "appropriate rules and regulations," you can change "behavior" in the decision making process. Thus, making planning and development based decisions more of a collective responsibility and less of an individual one (LeRoy).

KIDS CITY

In 1995, the South Carolina Chapter of the American Planning Association (SCALA) received an honorable mention from the national APA for its overall programming. Specifically singled out was its student mentoring program, KIDS CITY (Rothschild 17). At the core of the KIDS CITY curriculum is Box City. SCALA designed the

curriculum, so a diverse age group of students could work together in developing a large and complex Box City.

When fully implemented, the KIDS CITY program becomes "a highly visible culmination of the classroom learning experience" (Kids City 1). This is most evident when students join forces to develop an enormous Box City, as part of a local festival or similar event. Several weeks prior to the event, elementary through high school age students begin to learn about different facets of city development. Third graders are assigned two building types, including one residential and a choice between a commercial, industrial, or institutional building. The students then investigate the functions, designs, and impacts of these structures and their land uses. Middle schoolers, who are studying state history, develop the historic aspects of the miniature town. Older students learn to act in assorted "professional" and "civic" capacities, which are typical to any city. For instance: social studies students serve as the city's public officials; art students are trained as architects; and, geography students learn about developing infrastructure and siting utilities (Mullahey, "Kids Creating Communities").

At the time of the festival, a large (40' x 80') reusable astroturf base map is laid out and cordoned off. Around the perimeter of this grid map, are a construction yard, a builders' supply store, a town hall, and an emcee's stage, from which the KIDS CITY proceedings are announced. The town hall features the "offices" of the teenage mayor

and his/her town council, a permitting counter, and a 96 sq. ft. "Growth Barometer." As things progress, each third grader is issued a building permit. One-by-one they affix the permit to a site on the base map. Then, with the help of the student architects, they proceed to pick out building materials to construct their cardboard structures.

The key to KIDS CITY is that the type of building a student constructs and when it can be placed on the map is based entirely on the specific needs of the community. This need is determined by closely regulating and evaluating the Growth Barometer. The following description details this development process as it occurred at a typical KIDS CITY event.

> "As the **Growth Barometer** or 'scoreboard' was unveiled...it was announced that until a certain number of houses *(places to live)* were built, there would not be a need for such places as a mall *(places to shop)*, a library *(places to provide service)*, a hospital or high school *(places to help)* or movie theaters *(places to have fun), etc.* And jobs *(places to work)* were needed in the forms of industrial and commercial uses for the people who moved into the town to build a house. A bar on the **Growth Barometer** indicated the base elements of the start-up town and was moved upwards as the population, jobs and services increased, monitored in Town Hall. When the right ratios were present to build a fire station, hospital or airport, five students portrayed the Mayor and the Town Council and looked for the appropriate site; or the School Board Chairperson and Board members located a new school or stadium when it was deemed necessary by the 'scoreboard.' Upon completing any building, every child's contribution was announced by the emcee as the building was placed on the previously selected site" (Mullahey, "Kids Creating Communities").

Obviously such a major undertaking requires the commitment of numerous professionals and other volunteers. Perhaps KIDS CITY's growing success is due to the method in which SCALA advertises for helpers from among its members. A sample of such a request is found in the guide book, KIDS CITY: A Planning Curriculum & Festival Process. "**PLANNERS WANTED** SCALA is looking for Planners to work on Kids City...BENEFITS INCLUDE: smiles and hugs; feeling good about our profession; stopping the annoying habit of being called 'planters;' and being as important a role model as a fireman, policeman or a rock star to our rising generation" (Kids City, n. pag.).

KnoxBox City

A more traditional Box City curriculum has been used throughout the state of Tennessee. Knoxville area planners and architects began the program "in response to the American Planning Association's national focus on education. The project grew and grew until it went statewide" ("Knoxbox City Wins"). Its impact on one particular Knoxville school is well documented in the video production, Planning Education Kid Style. By chronicling the educational and societal benefits of Box City, this video has played an important role in the continued development of the program. In recognition of its influence, Planning Education Kid Style has received several prestigious awards. The American Planning Association and the International City Managers Association are among the more notable organizations to formally honor the documentary.

The KnoxBox City program was initially developed by the Knox Area Section of the Tennessee Chapter of APA. During the fall of 1990, this group adopted as one of their educational missions the incorporation of a planning oriented curriculum into area schools. In order to successfully fulfill their directive, they determined four things were essential. They saw the need for: 1) receptive teachers and administrators; 2) a logical place for planning education in the existing curriculum; 3) support from area professionals; and, 4) a good overall educational program and teaching device (Prochaska Planning Education Kid Style).

The original group of open-minded educators was found at Sequoyah Elementary School. Perhaps it's significant that this public school building is located in the heart of a massive planned neighborhood begun in the 1920s. As in many other cases, third graders were targeted, since their studies already mandated a focus on communities. The school's four, third grade classes totaled 93 students. Most of the professional expertise came from Knox Section APA members, who were employed at the Tennessee Valley Authority and Knoxville-Knox County Metropolitan Planning Commission (MPC). Financial and classroom design assistance was also provided by the local architectural firm, Community Techtonics. Finally, Box City was chosen as the teaching tool.

A number of activities helped prepare the students for the construction of their four Box Cities (one for each class). The children first read about cities with their studies

focused on history, basic vocabulary, and general development concepts. Then, the professional planners came to the school to discuss more detailed planning issues. Things such as zoning, transportation, and historic preservation, were explained through the use of maps and slides shows. Next, each student was assigned a building type and asked to investigate how their individual building would be utilized by different Box City citizens. "Beyond getting them to think about the whole city, and how those various land uses fit together, those third graders were asked to think about what people did in cities, and how what they did, related to the building types and to the land uses" (Prochaska Planning Education Kid Style).

The planners intentionally chose building types with which the children would be familiar. Among the nearly forty uses were: a hospital, a sewage treatment plant, an airport, several single-family homes, businesses, a park, a homeless shelter, a water tower, and the City/County Building, home to the MPC planners. In order to help the students "convert" their boxes into buildings, Community Techtonics' architects gave the students very simple lessons in construction and styles, including how to design an elevation. However, most of the final building design was left up to each child's own imagination.

When it was time to actually create their communities, the students all gathered in the school gymnasium. In each corner of the gym the classes laid out their Box City grid map. These maps had been tailored to reflect such local resources as the Tennessee

River, and the Cumberland and Smoky Mountains. Each class had also chosen a name for its community, including Snow City and the ubiquitous KnoxBox City.

Starting with the main institutional structure (City/County Building), the students began to layout the city in a predetermined order. Each time a building was placed on a site (Figure 3.4), the student planning commission determined whether the location was appropriate. Assisting the young commissioners were real planners and architects (Figure 3.5). When a consensus could not be reached, the honorary mayor made the final decision. In the original KnoxBox City program, the mayor was well versed in development issues and the students knew it. She was an elected Knox County Commissioner, who had formerly served on the Metropolitan Planning Commission.



Figure 3.4
Finding the Best Spot in KnoxBox City



Figure 3.5
Area Professionals Offer Guidance

One teacher lauding the impact of Box City's curriculum on her students, stated exuberantly; "they have gotten so into it...the excitement's just blossomed into everything. We've applied it in reading, and social studies, and art...as a big unit that just kind of expanded...it caught on and just wherever it goes will go with it" (Prochaska Planning Education Kid Style). As part of these additional activities, the students wrote letters to Knoxville's mayor and other state and local officials. They requested information on such things as the city's flag and seal, so they could design ones for their own Box City.

Over several weeks, this initial KnoxBox City program was filmed and edited by students and faculty at The University of Tennessee's Graduate School of Planning.

This video and a subsequent workbook now provide an excellent supplement to the Box City curriculum offered by CUBE. For one thing, this material may be useful in encouraging any parties who question the merit of such a curriculum. As noted in Planning Education Kid Style, most Box City participants quickly comprehend and appreciate the curriculum's value.

> "Incorporating planning into Sequoyah Elementary School took some effort, but everyone agreed it was worth it. The teachers knew it was worth it. Planning is not new to them, they do it on a daily basis with their lesson plans. Plans they develop to transfer knowledge from a variety of places to one place - the mind of a child. The architects knew it was worth it, too. Otherwise they wouldn't have provided the funds for the materials and teachers for the project. And, the local planners knew it was worth it. They knew that one day those third graders would be there at a public hearing, or on a committee, or in an elected office. Some might even be practicing planners or architects. Whatever, the more they knew about the planning, the better their communities would be" (Prochaska Planning Education Kid Style).

Summary

Numerous educational resources have been defined throughout this chapter. In general these resources have proven effective at overcoming gender, social, and racial divisions; and, most have worked well with a wide range of different age children. Perhaps the reason for such universal success is that every child, regardless of background, is concerned about his or her physical surroundings. This is why a built environment curriculum often generates curiosity and excitement in the classroom. Teachers aware of the value of enthusiastic pupils quickly capitalize upon this interest.

Parents, teachers, administrators, and even children themselves need to work diligently at guaranteeing the highest quality education possible. This means ensuring access to the best available teaching tools. Only a handful of curricula, including Box City and Education Through Historic Preservation, have a generation's worth of students as proof of their merits. Conversely, there are many new educational programs needing thorough evaluation in order to determine the areas in which they are most effective. Clearinghouses such as CUBE, APA, and the National Building Museum are invaluable to educators seeking out the appropriate resources to meet their needs.

In addition to nationally recognized programs, each individual community offers its own special educational opportunities. Since few, if any, cities have a comprehensive list of their resources, an area wide survey would prove useful. Inquiries could be targeted at museums, government agencies, architectural firms, and other similar groups within a fifty mile radius. Although gathering resource data would be the primary purpose, such an activity has the added benefit that it can help to establish community partnerships. The culmination of these efforts should be a collection of educators, both professional and volunteer, who possess the necessary tools to teach children about the built environment. Thus with a long term commitment, such studies will hopefully challenge students to take on responsible roles in shaping their world.

CHAPTER IV

SURVEY RESULTS

Introduction

For the purpose of this thesis a questionnaire was developed in order to determine how three-dimensional simulations of the built environment were being used for educational purposes. This questionnaire was mailed to 65 organizations and agencies that featured such simulations. This sample group of 65 was developed by research that included, literature reviews, personal interviews, travel, and telephone surveys. Appendix B features a list of these 65 questionnaire recipients.

The questionnaire was mailed to a specific contact person, when available, and included a self-addressed stamped envelope. For those questionnaires sent outside the United States, a self-addressed envelope and one U.S. Dollar bill (for postage) were included. In some cases, a second questionnaire was mailed, when through a telephone conversation it was determined the original questionnaire was either misplaced or never received. Appendix A includes a copy of the questionnaire (slightly reduced in size), as well as sample copies of the questionnaire cover letters for both national and international recipients.

Response Rates

Recipients of the questionnaire responded in one of three ways. Questionnaire recipients either: (1) returned a fully or partially completed questionnaire, (2) responded with a letter and/or publication (e.g., tourism brochure), but did not return a completed questionnaire, or (3) did not reply in any manner. Several organizations that returned completed surveys also included additional information such as catalogs, maps, brochures, and books.

Of the 65 questionnaire recipients, 48 (74%) were mailed within the United States and 17 (26%) were sent internationally. International organizations included those from Canada, Israel, the Far East, and Western Europe. A total of 37 of the 65 (57%) organizations responded in some fashion. This included 33 (51%) organizations that returned completed questionnaires, and four (6%) groups that sent only correspondence.

Of the 33 organizations that completed questionnaires, 27 (82%) were from the United States and six (18%) were from Europe and the Middle East. Two organizations from both the United States and abroad returned only correspondence. Overall, eight of the seventeen (47%) international organizations, and 29 of the 48 (60%) U.S. groups responded. The breakdown of national/international respondents is fairly similar to that for all respondents, thus indicating a suitably diverse data set. An overview of the

type of organizations that did not respond showed that most were museums, followed by municipal planning agencies, and then miniature villages.

The primary data in this chapter will focus on the 33 organizations that completed questionnaires. In most cases, the questionnaires were filled out in their entirety; however, in some instances certain questions were left blank. Through the review process, it became clear that nearly all incompletions indicated areas that respondents felt did not apply to their resources. Therefore, throughout this chapter such absences will be noted as Not Applicable (N/A).

Purpose and Function

Organization Types

In response to question number 2 (Figure 4.1), each of the 33 respondents denoted their type of organization. The Colonial Williamsburg Foundation marked two, Museum and Other/Private (a non-profit educational organization/large outdoor museum). Among the other concerns listed under Other/Private were: architectural and commercial real estate firms (HOK, SOM, The Portman Companies), educational institutions (Chautauqua Institution, University of California-Berkeley, and The University of Tennessee-Knoxville), and both public and private non-profit

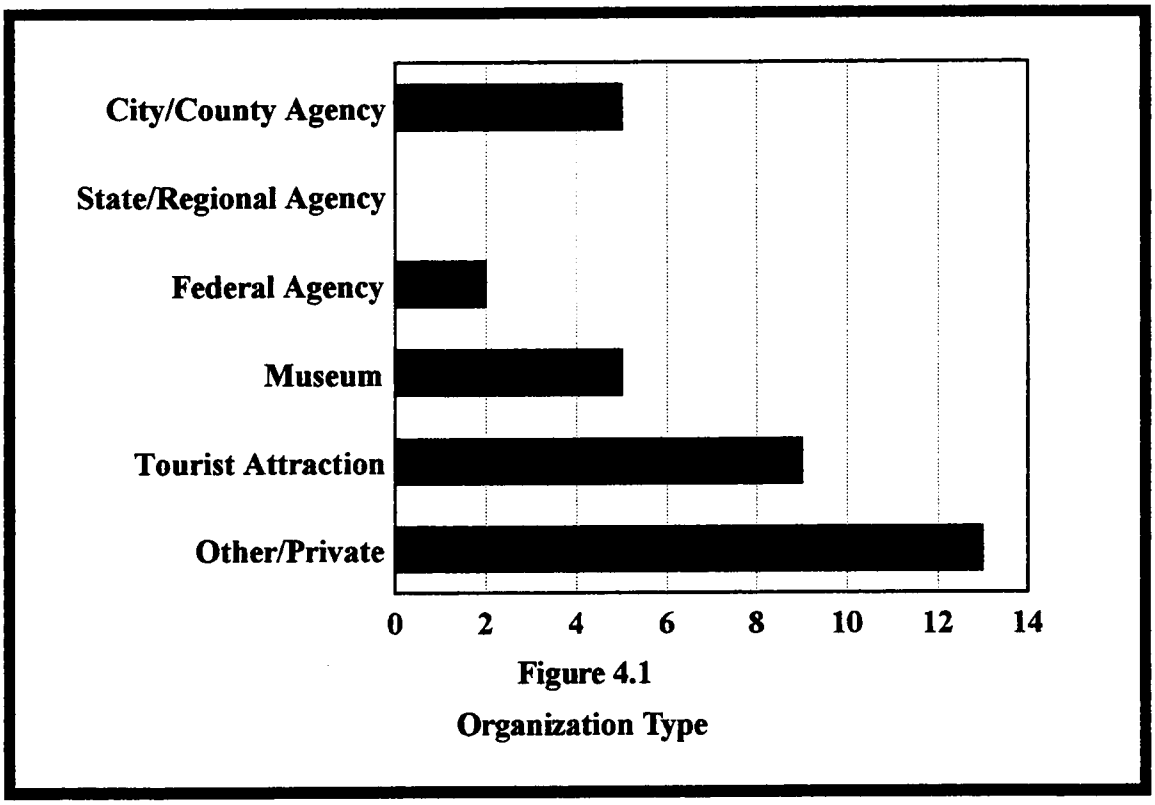


Figure 4.1

Organization Type

development corporations (Baltimore Development Corporation, Central Atlanta Progress, Downtown Council of Kansas City, Louisville Central Area).

Not only do the kinds of organizations vary, but their types of resources do likewise. These resources include both the amount (Figure 4.2) and types of models (Figure 4.3) that these organizations feature. How respondents viewed similar resources also differed. For instance, the Quincy Society of Model Engineers saw their model railroad as many models, while the Chattanooga Area Model Railroad Club saw theirs as just one.

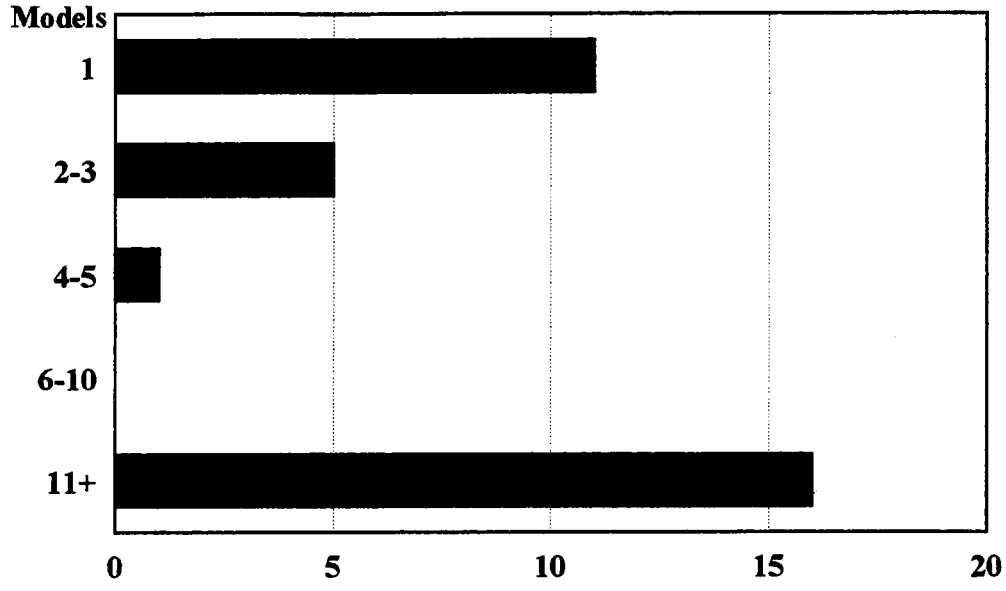


Figure 4.2

Number of Scale Models per Organization

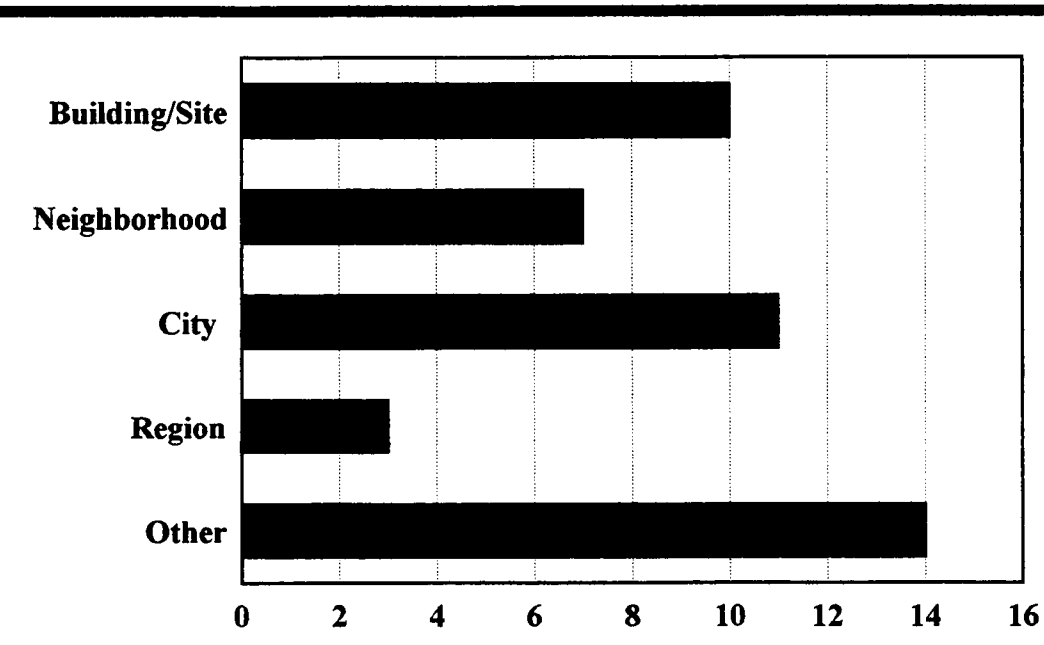


Figure 4.3

Model Types Primarily Featured by Each Organization

Types of Models

In response to question number 4 (Figure 4.3), several organizations noted that they had more than one type of model. Therefore, the overall number of models exceeds 33. Model types listed under "Other" included: streets, waterfronts and waterways, university campuses, industrial resources, and sets of individual non-contextual buildings (e.g., Mini-Europe). Although several respondents also listed CBD/downtown under "Other," other organizations, such as Central Atlanta Progress and San Diego's Centre City Development Corporation, listed their CBD model as being either a Neighborhood or a City.

Each organization had its own specific reasons for building its model(s). Even similar groups, such as architectural firms, based their reasoning on the needs of each individual client. Nonetheless, the initial purpose of construction for each model falls under at least one of the following model classifications:

- Evaluative/ Explanatory
- Experimental/Exploratory
- Educational/Enrichment
- Entertainment/Excitement

Although some groups had more than one reason to build their model(s), the responses to question number 5 indicated each groups' primary purpose. The organizations were

split evenly in regard to their purpose. Approximately one-third of the groups described their function as either Evaluative (11 respondents), Educational (10), or Entertainment (10). The two organizations who constructed their models for primarily experimental purposes were the Environmental Simulation Laboratory at UC-Berkeley, and the Army Corps of Engineers Waterways Experiment Station.

Question number 6 asked, "does your model simulate a place that is: real, imaginary, [or] a planned development." The overwhelming majority of the models (91%) were built to simulate real places. However, some organizations indicated that either their primary model was a hybrid, or that they had numerous models that varied in what they simulated.

The Taliesin Preservation Commission was the only group that responded to question number 6 by marking all three choices. Obviously some of Wright's designs, such as the mile high skyscraper, would be more appropriately labeled as futuristic or visionary than imaginary.

Among those that marked both real and planned developments were, the Environmental Simulation Laboratory at UC-Berkeley, Louisville Central, Inc., and Skidmore, Owings & Merrill. The Chattanooga Choo-Choo indicated that their model simulated both a real and an imaginary place.

Scale

The scale of each individual model is based on a myriad of influences including, the organization's resources (e.g., money, exhibition space, time), the model type, purpose of construction, and its long-term function. Consequently the number of different scales is quite large, as is indicated in Figure 4.4. Some of the more seemingly odd scales are easily explained including: 1:87 being the HO model railroad scale; 1:192 represents 1/16" = 1'; and 1:251 (actually 1:251.44) is the horizontal scale for the Chautauqua Institution's Holy Land model based on 1 3/4' = 1 mile. Although the sizes of the models (i.e., square feet at the base) were not determined, research has shown their overall dimensions are at least as varied as their scales.

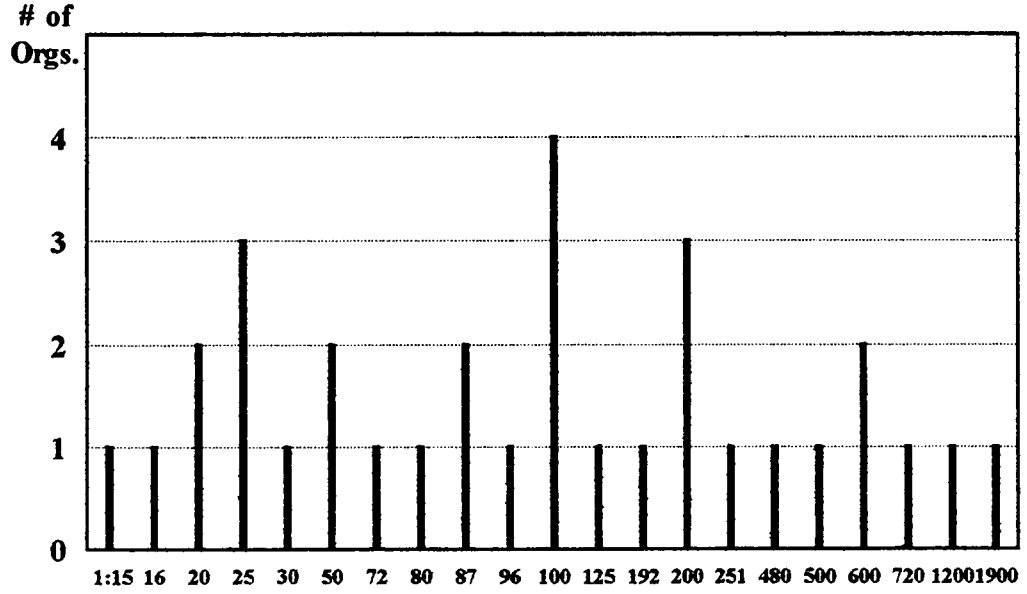


Figure 4.4
The Scale of the Primary Model for Each Organization

In response to question number 8 only two organizations, Bekonscot and Old Salem, Inc., indicated scale had no impact on the ability to absorb information. Bekonscot's survey maintained that "no one appears to have great difficulty" comprehending the miniature village although the building scales are quite mixed (Newman survey). Old Salem, Inc. offered no explanation for their response.

Of those that found scale to have an impact, many groups, such as HOK, noted that less detail could be provided at smaller scales; but, that the "big picture" was easier to comprehend. Thierry Meeus, Managing Director at Mini-Europe, stated that the reduced scale also allowed the comparison of buildings which are typically not seen together.

The Children's Museum of Tampa, like Bekonscot, features buildings with no relative scale. Both organizations felt the comparison of similarly scaled buildings is not nearly as important as the fact that all the buildings are at a reduced scale. The museum's Executive Director Marian S. Winter noted that smaller scales allow children to "feel more in control of their environment" (Winters survey).

Resource Availability and Marketing

Nearly one-fourth of the respondents stated they were either a private corporation or another type of private entity. Nonetheless, over 90% of all the respondents (30 of 33)

noted that their resources were open to the public. Two groups, the Waterways Experiment Station and the Taliesin Preservation Commission, both stated that while some of their models were open to the public, others were not. The Downtown Council of Kansas City, one of the only groups that stated that they were closed to the public, did note they were open to private groups.

School children visited 87% of the sites open to the public, thus 79% of the overall number of sites. As Figure 4.5 shows, the regularity with which school children visit is quite varied. The largest number of organizations, nearly 40%, are visited daily by elementary and secondary school students.

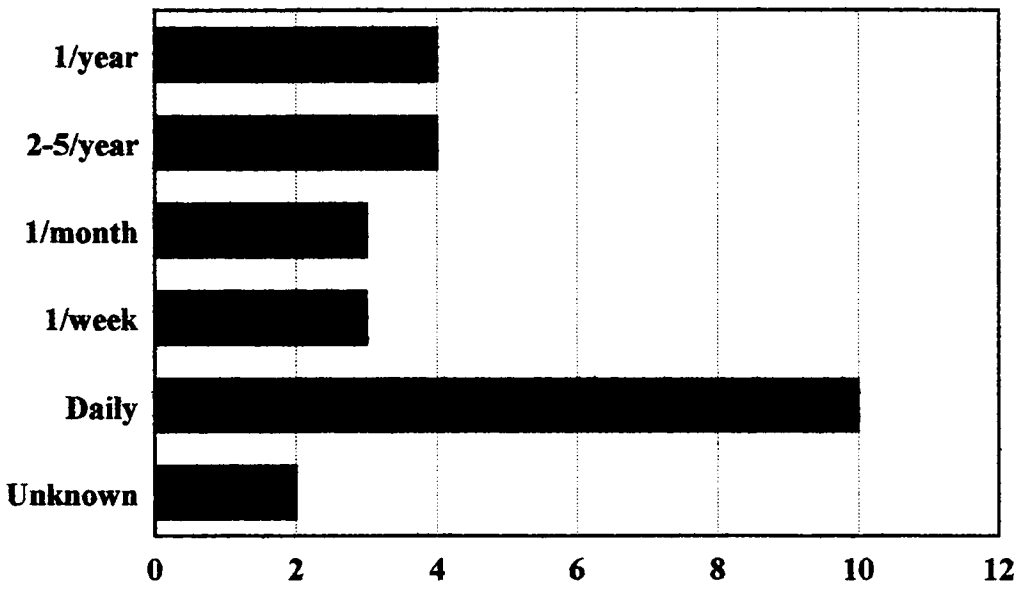


Figure 4.5

Number of Times an Organization's Facility is Visited by School Children

Question number 12 asked; on average "how many school children visit your facility annually?" Most organizations rounded their numbers or estimated from overall attendance. Three groups were unable to provide an estimate, including the Smithsonian Information Center. Mary Grace Potter, Director of the Center, stated it would be difficult to separate between children and adults from their nearly two million annual visitors. Figure 4.6 denotes the wide variety of annual attendances.

The diversity in attendances are a result of a number of different variables. These include location, physical resources (e.g., size of building), the organization's function, and marketing. In response to question number 15, nearly 60% (19 of 32) of the organizations reported they advertise or market their facilities. However, only 63%

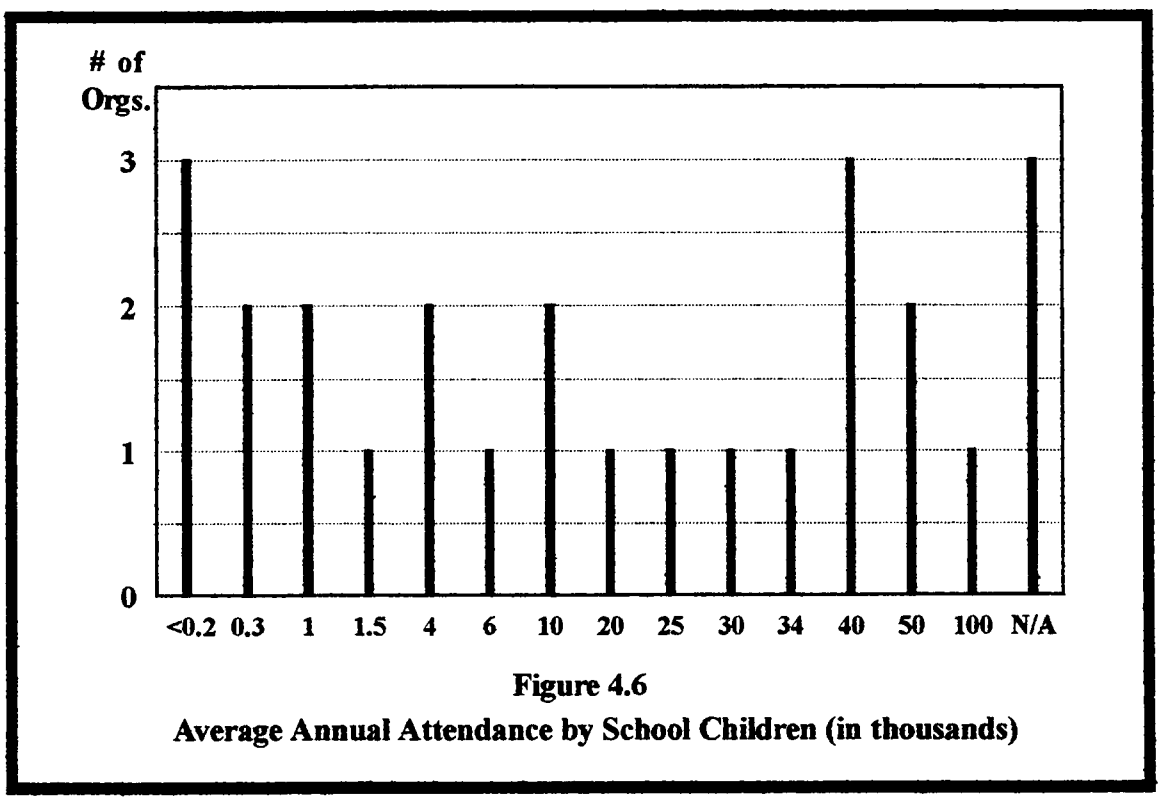


Figure 4.6
Average Annual Attendance by School Children (in thousands)

of those who advertise, 38% overall (12 of 32), specifically target school children. Note that the total number of respondents is now 32 instead of 33. The reason is that The House on the Rock did not complete any responses beyond question number 12.

The organizations that most commonly featured promotions were those that classified their models purpose as being either for Entertainment or Education. As stated earlier, these groups primarily included miniature villages, historic sites, and museums. The types of promotions noted ranged from simple brochures and public service announcements to billboards and international multi-media campaigns.

There were four respondents from the United States that specifically singled out their promotions aimed at schools. They were the Colonial Williamsburg Foundation, Taliesin Preservation Commission, TVA Sequoyah Energy Connection, and the U.S Army Corps of Engineers-Waterways Experiment Station. In order to attract students, these groups have used an assortment of promotional techniques including direct mailings, visits to schools, and special event programs. Internationally, Bekonscot Model Village has targeted teacher magazines, and Mini-Europe has used educational brochures.

In answering question number 18 (Figure 4.7), 13 of 32 respondents indicated they target specific groups in their educational program marketing. An equal percentage (41%) stated that they had no specific target groups.

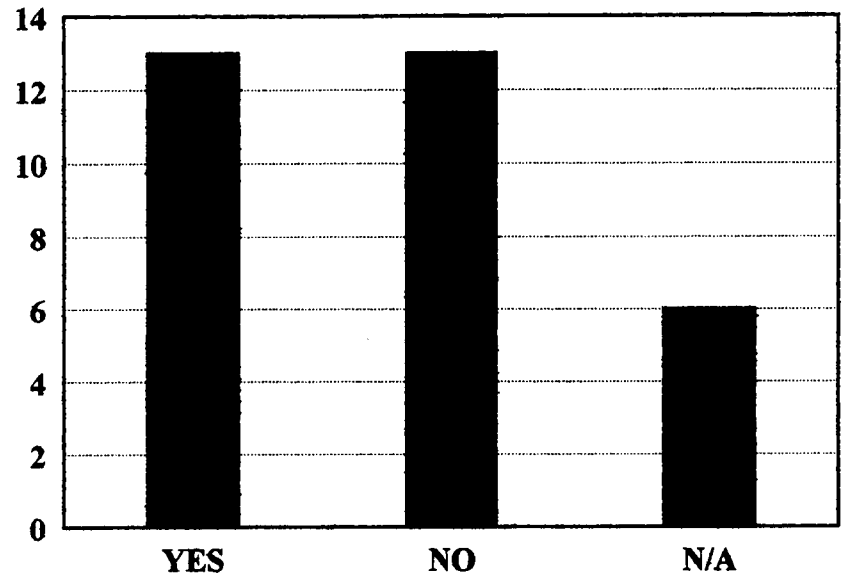


Figure 4.7

Organizations that Target Specific Groups in Marketing Educational Programs

Although the types of target groups are quite varied, it is obvious that certain organizations feel their resources are tailor made for specific groups. The following are examples of target groups, and why if any reason the respondents have chosen to focus on them:

1. The Alamo: Fourth and Seventh graders; "this is when they learn about Texas history" (Saage survey).
2. Bekonscot: Pre-school, infants, and juniors; "the younger child appreciates the exhibition much more than the senior" (Newman survey).
3. Chautauqua Institution: Performing/Fine Arts schools.
4. Children's Museum of Tampa: "The museum is geared for children ages 12 and under" (Winters survey).
5. Historisches Museum Frankfurt am Main: "houses of youth, pupils...also targeted seniors and adult evening classes" (Wolzogen survey).

6. Mini-Europe: Young children and architecture students.
7. San Diego Centre City Development Corporation Downtown Information Center: "Business, political, civic, social, professional, ethnic, cultural, neighborhood, and educational groups" (Hardin-Burnett survey).
8. TVA Sequoyah Energy Connection: Middle school and up; "our exhibits are more effective with students in this age range" (Salisbury survey).
9. U.S. Army Corps of Engineers Waterways Experiment Station: "Science and engineering students for possible future employees" (Stroupe survey).

Educational Programming

Several issues help determine why certain organizations have educational programming, and how having models effect this programming. These matters concern the educational benefits of models, the comparative advantage of models over other mediums, how best to teach with models, and what study areas are most commonly focused upon when using models.

Benefits

General

Question number 13 asked the respondents what they felt were "some of the educational benefits of using scale models?" The responses ranged from simple

paraphrases to complex analogies. The majority of the respondents focused on at least one or more of the following benefits:

1. Orientation/instant recognition;
2. Depiction of a remote or nonexistent development;
3. Easier understanding of spatial relationships;
4. Interactive nature (including relation to scale).

These four reoccurring themes often overlap, and are intrinsically related to the purpose of the model and/or the host organization. It is logical that an organization whose mission statement focuses on education, may find their model beneficial in relaying information on an area's historical development. The small scale interactive qualities of models may be beneficial to a group focusing on entertainment. Although these two benefits are distinctly different, one organization could easily emphasize both attributes through one model.

Orientation/Instant Recognition

Several respondents felt that the most important benefit of their model(s) was as a tool to allow visitors a greater recognition of their surroundings. The primary model at the Smithsonian Institute Information Center reinforces other printed tools such as maps, since it "fixes landmarks more effectively in visitor's mind" (Potter survey).

Scott M. Spence, Director of Architecture at the Colonial Williamsburg Foundation, also stressed this point noting that the Foundation's site model "helps put buildings into their context." There is an "immediate recognition of 3-D forms," which "orients people to what they will see before they visit the historic area" (Spence survey).

Although most such models serve as an introduction to an area, the model in Indianapolis' main municipal building allows for immediate recognition and relative comparisons. "The model is located in the 28th floor observatory of our downtown building. The children can relate the model information to the actual facilities which they are seeing through the observatory window" (Reinking survey).

Educators at TVA's Sequoyah Energy Connection feel it is vital to their educational mission for people to be able to focus on certain easily recognizable areas. The large Nuclear Plant Site model "allows us to highlight important things and downplay/eliminate unimportant details that distract from the message." It also "gives a view that most people will not be able to get on their own" (Salisbury survey).

Depiction of a Remote or Nonexistent Development

As with the Sequoyah site model, many models provide a three-dimensional representation of a place that is basically inaccessible. Most such models depict a site

that has been lost to demolition or to historical development. Other models focus on distant locales and/or futuristic schemes.

An overall benefit of these types of models is they typically emphasize the area's cultural context as much as its built environment. This intent is summed up by Chautauqua Institution Historian, Alfreda Irwin. "The additional sensory stimulation gives one more approach to understanding an era, a region of the world, a reason for conflicts, a way of life" (Irwin survey).

The individual landmark models at Mini-Europe, provide visitors a unique grouping of some of the most significant "concrete" members of the new European Community (E.C.). Since "the European Community is not yet a familiar concept in Europe except for the technocrats, in Mini-Europe, with modesty we try to make it more real" and "introduce other aspects [including] culture [and] architecture" (Meeus survey).

According to Wallace Saage, Curator of the Alamo, a model can be the critical link to properly interpreting a historic site. "There are only two original buildings left today. The models help to show visitors the way it used to look as we talk to them about the Mission Period" (Saage survey). Brother Augustine Campion speaks of the images of the historic sites represented at Ave Marie Grotto by saying it's "like being there" (Campion survey).

Easier Understanding of Spatial Relationships

Planning agencies and development firms made up the vast majority of respondents, stating the primary benefit of a model was to ensure a better understanding of spatial relationships. Typical of these responses is the one given by Wayne Blasius, Deputy Director of the Knoxville Department of Community Development. "Most people have trouble understanding spatial relationships; model helps to make it more understandable. Model can also foster interest in planning, architecture, etc." (Blasius survey).

These views are echoed by several other groups including the Portman Company, SOM, and the Denver Planning, Zoning, and Community Development Department. Dick Farley, Denver's Deputy Director of Urban Design stated; "layers of ideas can be presented from a 3-D model," and thus "urban design and planning ideas can be grasped immediately" (Farley survey).

Rick Wood of HOK sees these benefits going even one step further. As director of the firm's model shop, Wood sees models as a way to explain the professional world, while at the same describing the design process. "In showing an architectural office to children it can be hard for them to understand the purpose of what we do. How do you explain to a 10 year old what a facility programmer, a cost estimator, or a spec writer does? But as soon as they see a model of our proposed building in the context

of a existing site, they know exactly what the architect's intentions are" (Wood survey).

Interactive Nature

"Scale models allow for a hands on approach which in turn allows for a better understanding of spatial and contextual relationships" (Young survey). This hands on or interactive nature, which Doug Young of Central Atlanta Progress speaks of, is a commonly noted educational benefit of models. The size, scale, and proximity of a model in relation to its viewer can have a tremendous impact on how a model is used as a teaching tool. This is especially significant with children.

At Bekonscot the models "can be viewed easily," which Director Barry Newman notes is important, so that "questions can be asked of the pupils" at the same time they are overseeing the site (Newman survey). Marian S. Winters, Executive Director of the Children's Museum of Tampa, believes that in addition to a model's scale, the ability to touch and investigate the miniature buildings makes "children feel more in control of their ways of learning" (Winters survey).

Wolf von Wolzogen, Padagoge of the Historisches Museum Frankfurt am Main, speaks poetically of the interaction between the interpreter and the individual viewing the model. It becomes "story-telling while wandering through the streets with one's

eyes" (Wolzogen survey). Regarding their model of the Holy Land, H. Chekvi states that it "brings the site alive" making Jerusalem "easy to grasp for youngsters" (Chekvi survey).

Peter Bosselmann of UC-Berkeley's Environmental Simulation Laboratory sums up all of these attributes and more by simply stating that the primary benefit of models is that they can provide "school children, an understanding of the physical world" (Bosselmann survey). Whether that understanding is promoted through visualization, orientation, or interaction, an increased awareness of the built environment is achieved.

Models versus Other Graphics

The purpose of question number 14 was to determine the comparative educational benefits of models with those of other graphic representations. All but one of the respondents, who found the question applicable, felt that models were more effective than maps, photography, and drawings in teaching school children about the built environment (Figure 4.8). Ann Robertson, a planner with the Downtown Council of Kansas City, was the sole dissenter. Her reason simply being, "I would think a combination most useful" (Robertson survey).

"Several respondents focused on a model's greater ability to better represent the "realness" of a place. The following three replies are typical of such viewpoints.

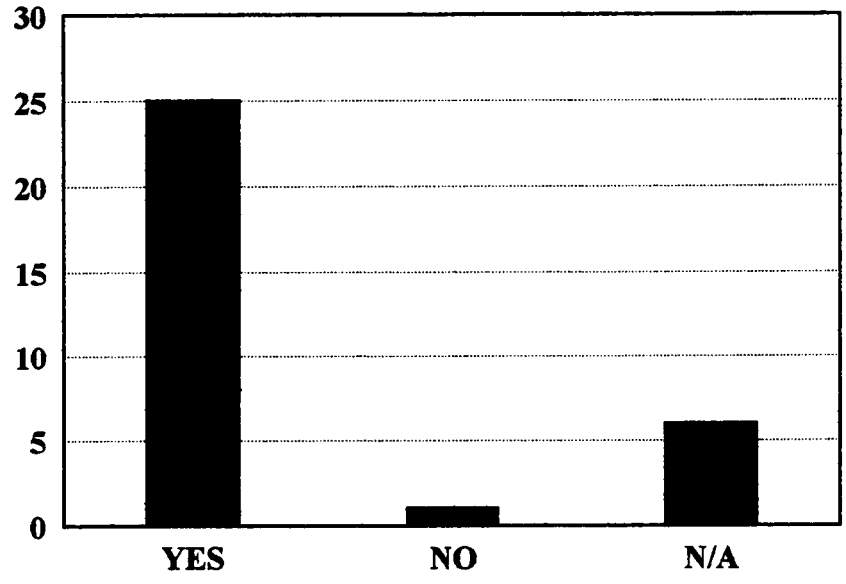


Figure 4.8

Respondents Who Felt Models Were Better Teaching Tools than 2-D Graphics

First, the Smithsonian Institution: "The 3-Dimensional quality projects a view closer to the real environment" (Potter survey). Second, UC-B's Environmental Simulation Laboratory: "Information is relative to the eye of the beholder, less abstract" (Bosselmann survey). Third, Ave Maria Grotto: "Students can see how the building may be laid out - better than pictures - almost like the real thing" (Campion survey).

The most obvious comparative benefit of three-dimensional simulations, such as models, is they are three-dimensional. Scott Spence of the Colonial Williamsburg Foundation explains this advantage. "In most cases, drawings and photos are usually flat and most people don't know how to read drawings or maps anyway. Scaled

models show terrain, landscape, building forms in a recognizable form understood by most people" (Spence survey).

These three-dimensional traits help stimulate learning through increased sensory input, specifically through site and touch. "Some students have difficulty visualizing 3-D objects from 2-D representations - models overcome this" (Young survey). "More information and complex relationships can be easily shown" (Farley survey). This is because models are "more explicit, more detailed" (Hardin-Burnett survey).

Referring to maps, drawings, and photographs, the director of HOK's model shop, acknowledged; "as good as those 2-D media are, there is something to the fact that you can actually walk up to, walk around and touch a 3-D model" (Wood survey). Marian Winters of the Children's Museum of Tampa declared; "the hands on learning" afforded by their miniature buildings "helps children process what they learn" (Winters survey). Bekonskot's Managing Director simply stated that "touchable [is] more fun" (Newman survey).

Three respondents addressed the comparative benefits of models with regard to particular types of settings, functions, and to the size of the development being represented. Respectively, those organizations were Mini-Europe, the Quincy Society of Model Engineers, and TVA's Sequoyah Energy Connection. Mini-Europe's Thierry Meeus noted that with miniature villages an "outdoor visit = more fun" (Meeus

survey). Bob Turek, a Registered Agent of the QSME, stated that an inherent trait of model railroads is that they allow for students to "see motion," as well as "relative size" (Turek survey). Regarding the size and scope of a particular site, the comment was that "a nuclear plant must be shown in 3 dimensions [in order] to convey its magnitude" (Salisbury survey).

Alternative Types of Simulations and their Benefits

Question number 26 was as follows: "Besides three dimensional scale models do you have any other types of simulations or models that are used to teach students about the built environment?" Exactly one-half (16 of 32) of the respondents answered affirmatively to the question (Figure 4.9). These alternative types of simulations are quite varied and often reflect the advanced missions of the respective agencies and organizations.

Computer generated simulations and interactive programs were the most commonly noted alternatives. These interactive simulations were predominantly associated with institutions featuring educational missions. This is the case at Frankfurt, Germany's primary history museum, which has a scaled plan of the city. This two-dimensional plan features manually operated lighting that allows visitors to focus on specific significant areas. TVA uses a highly beneficial alternative planning simulation as part

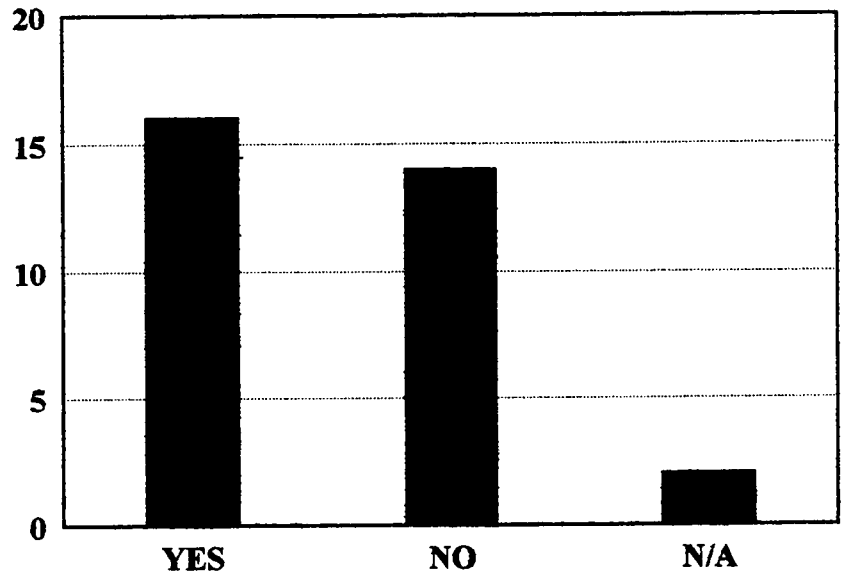


Figure 4.9

Organizations Also Using Non 3-D Model Types of Simulations as Teaching Tools

of its educational programming at the Sequoyah Energy Connection. "The Balancing Act is an interactive computer simulation that lets visitors run the TVA region for 30 years and see the effects on the environment, standard of living, jobs, [and] energy costs" (Salisbury survey).

Major design firms and planning groups use a number of different computer models including SOM, HOK, and UC-Berkeley's Environmental Simulation Laboratory. HOK's St. Louis office has an Animation Department that produces computer generated 3-D views that can move and rotate.

The Army Corps of Engineers Waterways Experiment Station (WES) in Vicksburg has an excellent collection of modern simulation technologies. These include virtual reality systems, computer aided design programs, ship simulators, and computer holographs. Although some are available for students to investigate, most of these simulations are strictly used for the purpose of advanced experimental research. A more detailed description of the WES facilities will be provided in a mini-case in the following chapter.

A tactile map is an example of an alternative model used primarily in an interpretive setting. Tactile maps typically allow visually impaired visitors to feel the layout of a particular place. The Alamo and the Smithsonian Institution's Information Center possess tactile maps.

Several organizations indicated they had "child-size" structures, designed at typically 50-75% of full scale buildings. In addition to the outdoor buildings at Tampa's Safety Village, the "full scale" Children's Museum building contains a small scale igloo, Australian bark home, and South Sea island hut. As indicated in Chapter II, plans are well underway to also exhibit several Florida-themed simulations within the museum proper. The Colonial Williamsburg Foundation has "scaled structures and buildings that children can go into and understand structural details" (Spence survey). Other groups including the Chautauqua Institution and Old Salem, Inc. noted the use of landscaping and a farm as alternative simulations.

Educational Activities

Programs and Staffing

Although a vast majority of the groups noted some form of educational programming, barely less than one-half feature someone who oversees these activities. In response to question number 19, 47% (15 of 32) of the groups indicated having someone on "staff who deal[s] specifically with educational programming" (Figure 4.10). A few groups noted that even though a person on staff was dedicated to educational programming, it was just one of the individual's job duties, and often not their main responsibility.

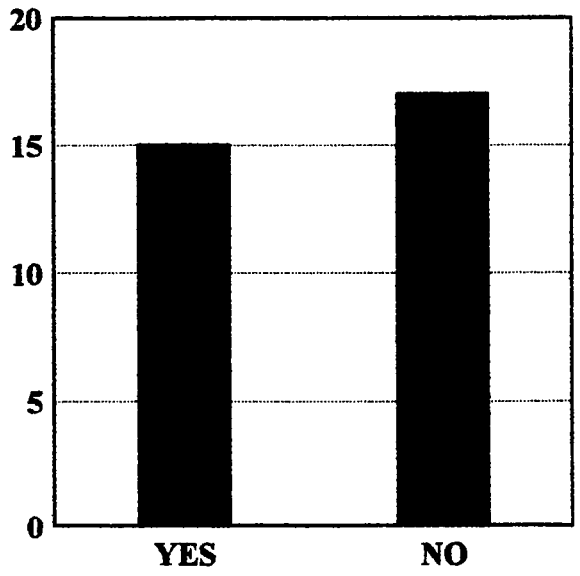


Figure 4.10
Organizations with Staff Who Deal Specifically with Educational Programming

The types of educational programming these organizations offer are quite varied and ranging from self-guided tours to semester long courses. Among these different types of activities were the following: workshops, slide presentations, interpretive educational programs, research programs, history talks, public affairs platforms, mentor programs, guided tours, speaker's bureaus, school partnerships, and special events. In certain cases, brochures, educational packets, and teachers packets were provided to supplement these programs. The organizations that provide one or more of these educational activities include: the Alamo, Bekonscot, Children's Museum of Tampa, Colonial Williamsburg Foundation, Historisches Museum in Frankfurt, HOK, Mini-Europe, Old Salem, Inc., San Diego's CCDC Information Center, Taliesin, and the USACE Waterways Experiment Station.

The intent of question number 20 was to determine not only overall programs, but also those directly associated with the organization's model. Perhaps the lack of a direct reference to models in the question, "What type of educational activities do you have?", is why very few groups related their programming to their model(s). An additional question asking about activities specifically associated to the models, could have provided more applicable information.

Nonetheless, four groups did respond with their models in mind. The Smithsonian Institution uses the Information Center's two models as part of their "pre-visit educational activities, orientation and way finding services" (Potter survey). Models

and other tools are used by the Sequoyah Energy Connection for "hands-on basic science programs keyed to the state curriculum guidelines" (Salisbury survey). Among other activities, the miniature village, Madurodam, provides students with a "passport" filled with questions about the design and layout of the imaginary city. Finally, the Quincy Society of Model Engineers "teach a non-credit college course," through a local community college, that covers information on model railroad construction, American history, and urban and rural development (Turek survey).

Box City

Question number 27, "Has your organization ever participated in Box City?", seemed to cause more confusion than anything. Only one of the 32 (3%) respondents answered yes (Figure 4.11). Dick Farley, Deputy Director of Urban Design in Denver's Planning and Community Development Office, reported that Box City was done "as part of the AIA organized effort" (Farley survey).

Several respondents put question marks instead of check marks in the "No" slot. The respondent from the Chautauqua Institution left both a question mark and a check mark explaining the following:

> "I think perhaps we have [participated in Box City] at the very first of the century when John Dewey was a consultant for our children's school and he was responsible for a progressive elementary program for a year or two. They made model buildings as I understand as part of that creative program" (Irwin survey).

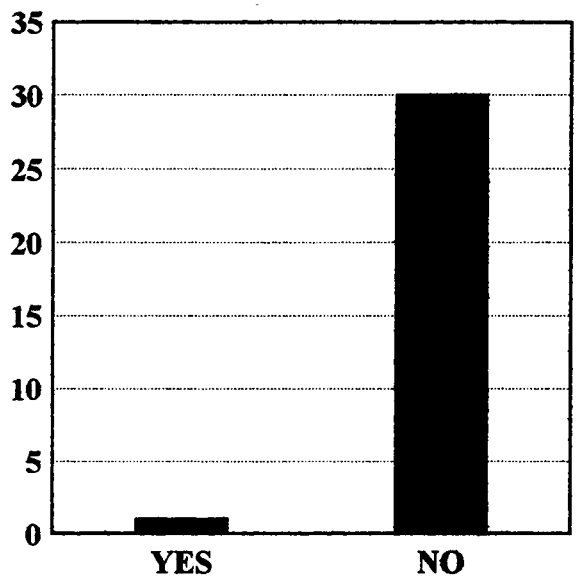


Figure 4.11
Organizations Who Have Participated in Box City

Although John Dewey's approach was obviously not the same as that being used in today's Box City program, perhaps some of the educational concepts regarding planning and the built environment were similar.

Groups Offering Educational Assistance

Often times one group will depend on the expertise of another in order to enhance their educational activities. Question number 29 (Figure 4.12) asked whether or not the respondents belonged to any organizations that assisted them in educational

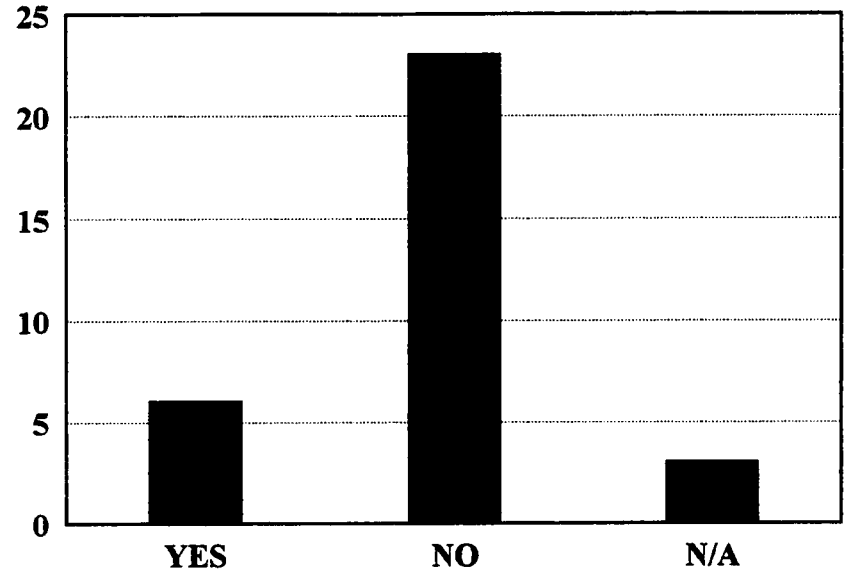


Figure 4.12
Organizations Belonging to Groups Who Provide Educational Program Assistance

programming, and if so, which ones? Only six groups (19%) indicated that they had such an affiliation.

The following is a list of the organizations that have provided assistance, with the respondents that noted them in parentheses.

1. American Association of Museums (Old Salem, Inc. and the Smithsonian Information Center)
2. American Institute of Architects (HOK)
3. Association of Living History Farms and Museums (Old Salem, Inc.)
4. Association of Science Technology Centers (TVA Sequoyah Energy Connection)
5. Florida Association of Museums (The Children's Museum of Tampa, Inc.)
6. National Model Railroad Association (The Quincy Society of Model Engineers)

7. North Carolina Museum Council (Old Salem, Inc.)
8. Nuclear Energy Institute {formerly the United States Council on Energy Awareness} (TVA Sequoyah Energy Connection)
9. Southeastern Museum Conference (Old Salem , Inc.)

The Smithsonian Information Center expressed they were also members of "assorted tour and travel industry associations" (Potter survey). Although they did not indicate so, it is obvious that many of the other respondents are affiliated with groups that provide educational assistance. An example is Denver's Planning and Community Development Office, which sponsored Box City "as part of the AIA organized effort" (Farley survey).

Focus on Planning and the Built Environment

The survey featured three questions dealing with educational programming as it directly relates to planning issues. These three questions inquired about: specific planning concepts currently being taught; other potential planning ideas; and, how to use non-physical planning issues to teach children about the built environment. A large number of the answers seemed to overlap, as the respondents interpreted the questions to best fit their own circumstances. Consequently, the responses to questions number 22 and 23 will reflect a general overview of the planning elements not addressed in question number 21.

Question number 21 asked, "what if any elements of planning are discussed through the use of your model(s)?" Respondent were given the following six elements of planning to choose from: Zoning, Urban Design, Architectural Styles, Housing, Open Space, and Transportation. Respondents were also provided a slot designated "N/A." Figure 4.13 graphically illustrates that a large majority of the organizations are actively using their models to discuss at least one element of planning. Only 22% (7 of 32) of respondents found the question not applicable. The typical respondent selected between two and three elements, with several respondents indicating that all six elements had been used in discussion.

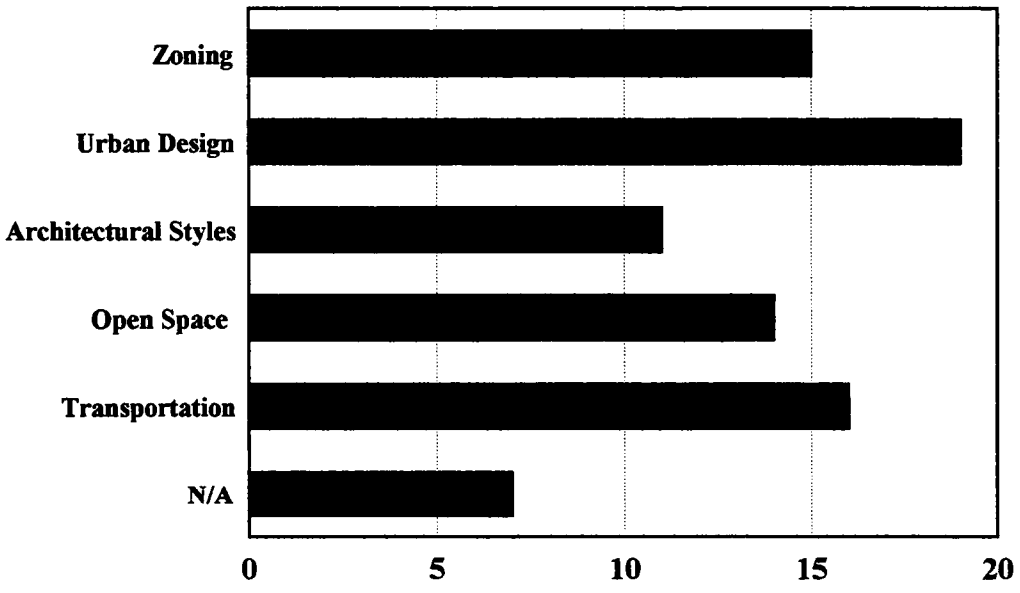


Figure 4.13

Elements of Planning Discussed through the Use of an Organization's Model(s)

As previously noted, there was some confusion regarding questions number 22 and 23. Following the six planning elements to choose from in question number 21, question number 22 asked "what other planning ideas do you think could be focused on by using your models?" Question number 23 was as follows; "beyond physical planning issues how are the scale models used to educate students about neighborhoods, cities, and regions?" Some respondents found it difficult to differentiate between the intent of these two questions. Therefore, the following quotes feature responses to both questions. Overall these responses indicate which of the less traditional or peripheral planning elements can also be taught through models.

1. The Alamo: "Climate, remoteness, and the manner in which the settlements, towns, and cities were established in relationship to the Spanish missions" (Saage survey).
2. Central Atlanta Progress Inc.: "Trends of development - style and location", also "city history, current planning and development options and projects" (Young survey).
3. The Children's Museum of Tampa: "job-career education, role playing of everyday life" (Winters survey).
4. The Colonial Williamsburg Foundation: "evolution of how the town grew and the form in which it grew by" (Spence survey).
5. Denver Planning, Zoning, and Community Development Department: "Sun/shadow studies; wind patterns and pressures at street level" (Farley survey).
6. Downtown Council of Kansas City: "Preservation" (Robertson survey).
7. Historisches Museum Frankfurt am Main: "Historical development and the changing of a city throughout the ages" (von Wolzogen survey).
8. HOK: "Alternate schemes that drop in and out of the same site. Models built in parts that would [depict] sequential phases and stages of a project" (Wood survey).
9. Knoxville Department of Community Development: "Proposed building/developments could be built to scale and inserted to see how well the fit in context" (Blasius survey).
10. Mini-Europe: "the art of model making", also "technology, especially with animated models" (Meeus survey).

11. The Portman Companies: "help to study the relationship for the site, the style to fit the site" (Giddes survey).
12. San Diego Centre City Development Corporation's Downtown Information Center: "Lifestyle choices...economic development ....to point out blighted project areas" (Hardin-Burnett survey).
13. Smithsonian Information Center: "Location of services, accessibility issues." "History of Federal City - work of government agencies" (Potter survey).
14. Taliesin Preservation Commission: "Planning issues related to user sensitivity." "Wright's concepts and historical perspectives of urban planning, which served as a model for many suburban and planned developments in the U.S." (Kerr survey).
15. UC-Berkeley, Environmental Simulation Laboratory: "Ecology... representative democracy at the local level" (Bosselmann survey).
16. U.S. Army Corps of Engineers Waterways Experiment Station: "Water resources and environmental issues" (Stroupe survey).

Question number 28, "what other programs would you like to do with your resources?", was meant to give the respondents one final opportunity to express their visions for their organizations. Although question number 28 inquired about programs in general, most of the responses reflected a predilection towards doing planning related programs. This is due perhaps to the overall theme of the survey, and the type of groups surveyed. Nonetheless, these answers help fill some gaps as to how to use models and other resources for educational programming.

Several groups suggested increasing different types of educational programs such as; science and engineering camps for gifted students (Waterways Experiment Station), outdoor environmental classes (Sequoyah Energy Connection), and slide illustrated presentations on urban design issues to citizen groups, schools; etc. (Denver Planning, Zoning, and Community Development Department). The programming intent for both

the Knoxville Department of Community Development and HOK can be summed up by the architectural firm's model shop director, Rick Wood. "Provide [an] overall city model as a context setting for several schemes by various designers that could be dropped in and out" (Wood survey). Knoxville DCD and Bekonscot also noted the desire to annually update their models.

One organization was interested in bringing their models to the masses. Sheila Hardin-Burnett of San Diego's Centre City group, said they would like to "transport our models to other parts of the county and to major special events. [For instance], one year (1988) we went to Del Mar Fair at the county fairgrounds" (Hardin-Burnett survey). At Louisville Central Area, Inc., they simply desire to "make it more available to the public" (Baines survey). Finally, prior to any real educational programming in Kansas City, planner Ann Robertson, explains they must first overcome one big obstacle; "Our model is rather new so we are still looking for space to display it" (Robertson survey).

Program Feedback

Question number 24 queried whether students, teachers, or parents were asked to comment on the organization's educational programming. The most common comments were elicited in question number 25. As Figure 4.14 indicates, of the 25 groups that found question number 24 applicable, nearly equal amounts of teachers

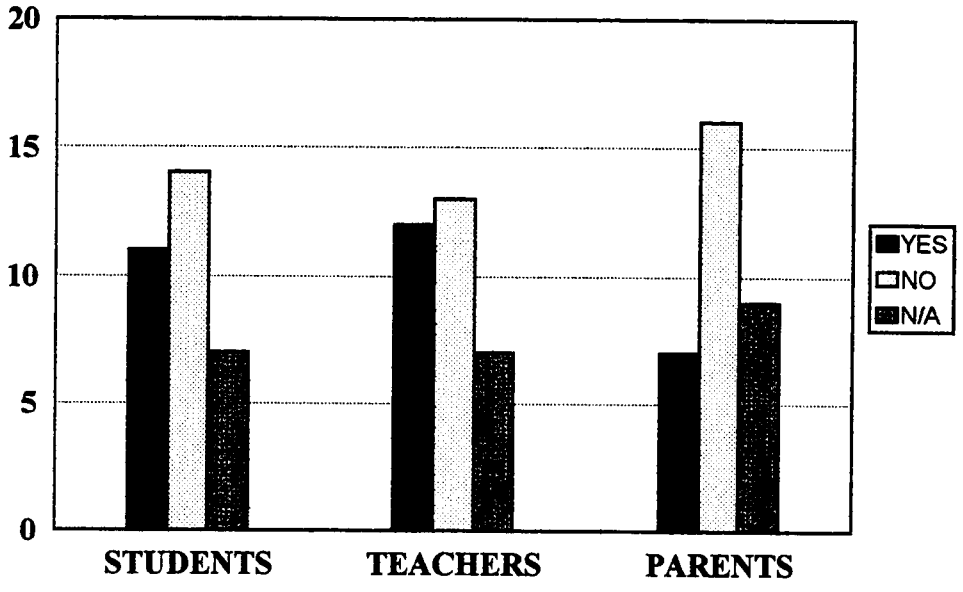


Figure 4.14

Groups whose Comments Are Sought on an Organization's Educational Programs

and students were asked for their comments. The non-applicable (no response) results are in essence a "No" answer. Therefore, the average for all three groups who reported seeking remarks about their educational programming, was approximately 31% (30 of 92). It should be noted that in some instances, certain organizations considered a registration book as their only method for seeking comment.

Terry Kerr, of the Taliesin Preservation Commission, summarized the feelings of nearly all of the organizations that answered question number 25. He claimed that Taliesin received "generally enthusiastic responses." These groups received comments including, "wow," "marvelous," "unique," "interesting," "surprising," "stimulating,"

"thought-provoking," "go on, more details, more information," "exciting," "loved the models," "love[d] the village," "didn't know your facility could do all that," "models are fun," and "great kid language." Recipients of such comments were: The Children's Museum of Tampa, Frankfurt's History Museum, Mini-Europe, San Diego's Information Center, Taliesin, UC-Berkeley's Environmental Simulation Laboratory, and the Waterways Experiment Station.

According to Bekonscot Model Village, teachers profess they "can do more work in [a] one hours visit regarding buildings, than [through] hours [of] work in the classroom" (Newman survey). Richard Salisbury, of TVA's Sequoyah Energy Connection, noted that "teachers of younger students like the classes, but say the exhibits are too advanced. Middle school and up like the exhibits and the classes" (Salisbury survey). It seems visitors can't get enough information at Colonial Williamsburg. "They always want more interpretations focused to children about children of the 18th century" (Spence survey).

The comments received at both HOK architectural firm and the Waterways Experiment Station, indicate that some students are looking to the future. These comments include: "how long did it take you to do that?"; "how much do you make?"; and, "how do I get a job there?" Dick Farley, of Denver's city planning office, noted that most students are grateful just to learn what planners do.

Summary

A majority of those surveyed were willing to share valuable information about their resources. This may have been due in large part to the organizational roles held by the individual respondents. The cover letter included with the questionnaire requested that the person completing the survey be someone on the staff who "works closely with the model, especially in a public relations capacity." As evidenced by their titles, many of the respondents were indeed people in such positions.

These respondents interpreted specific questions within their own roles and context of their organization, and tailored their answers accordingly. There is no doubt that other persons among the responding organizations might have responded in a different vein. However, it is important to note that most of the individual respondents showed a fairly strong understanding of their group's resources and programs.

In a few cases, respondents indicated they were confused about the purpose of certain questions. Perhaps some of this problem stemmed from the broad diversity of the groups surveyed. It is evident that some of the organizations found the educational and marketing questions only slightly, if at all, applicable. This was particularly true for a number of the planning and development groups. Likewise, several of the commercial tourist attractions downplayed any role they might have as educators.

Several things could have been done in order to clarify the intent of the survey. It is very likely such actions would have ensured a much larger database, including greater detail regarding human to model relationships. In addition to the adjustments indicated earlier in this chapter, more complex and time-intensive procedures could have been undertaken. These would have dealt with the survey process in general, as well as the specific composition of the questionnaire.

The 63 groups surveyed were not chosen at random. Instead, they were specifically selected from a set of organizations, which research indicated were in possession of three-dimensional simulations. Although, such a decision greatly reduced the possibility of a lower return rate; it may have indeed favored organizations that more aggressively marketed their resources. A simple pre-survey questionnaire may have resulted in a much greater selection pool from which to choose.

This brief survey could have been used to determine exactly which organizations possessed scaled simulations. Those surveyed could have included: planning agencies within the nation's 250 largest metropolitan statistical areas; the official tourism offices for all 50 states, as well as numerous countries; a minimum of a hundred children's museums and other museums with an interactive focus; scores of private architectural and planning firms; and, all of the universities in America which feature built environment studies.

The language barrier may have also affected the quality and quantity of the survey responses. Surveys were mailed to organizations in 14 countries, representing at least 11 different languages. Therefore, a translated questionnaire may have resulted in a larger response rate. It should be reiterated; however, that the international response rates were only slightly lower than those for the United States.

Perhaps the primary thing missing in the survey questionnaire was an inquiry into how students and/or other people directly interacted with the model. The questionnaire should have asked whether informational legends or other written materials were attached to the model(s). These data displays may have covered such things as: scale, dimensions, cardinal direction, history of the model, and the time period depicted. Also in this vein, would have been a question regarding whether other complementary services, such as audio-tape tours and guidebooks, were provided; and, how much, if anything, did they cost. Facts such as: hours of operation, number of employees, model costs (construction and maintenance), admission fees, and annual budgets, would have further defined each organization's desire and ability to educate. Although several respondents addressed many of these concerns, direct questions may have provided more definitive answers.

Even with these possible omissions, the data furnished in the completed questionnaires provided a solid base from which to determine the relationship of models and planning education. The result has been a critical assessment of how and why simulations of the

built environment are being utilized (and underutilized). Although a few groups are maximizing the benefits of their resources, most of this chapter's analysis makes a strong argument for the need to increase the access and programming associated with these three-dimensional resources.

CHAPTER V

MINI-CASE STUDIES

Introduction

From the 65 survey groups indicated in the preceding chapter, three organizations were selected for a more complete look at their facilities and educational programs. The three organizations are Central Atlanta Progress, the U.S. Army Engineers Waterways Experiment Station, and the Queens Museum, site of the Panorama of New York City. These three were specifically chosen because of their mission relating to planning, and because of their availability and openness to the public. Literature reviews, telephone interviews, and on-site visits were performed to gather the following information.

The Panorama of New York City at the Queens Museum of Art

The Panorama of New York City (Figures 5.1-5.5) is unique among urban models due to the combination of its original purpose, its size, and because of the ongoing effort to keep it up to date. Although it shares some similarities with the model of San Francisco, built for the 1939 International World's Fair in that city, the sheer area represented in the Panorama of New York City sets it apart. The original Panorama



Figure 5.1
The Panorama of New York City (c. 1990): The Tip of Manhattan and Beyond

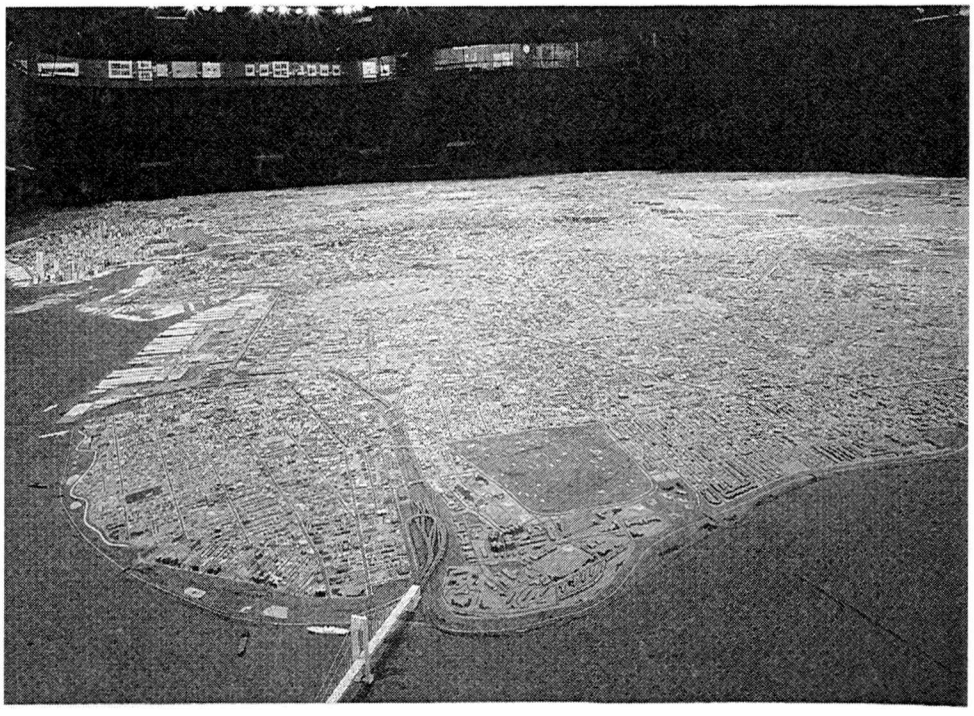


Figure 5.2
The Panorama of New York City: Brooklyn Looking North

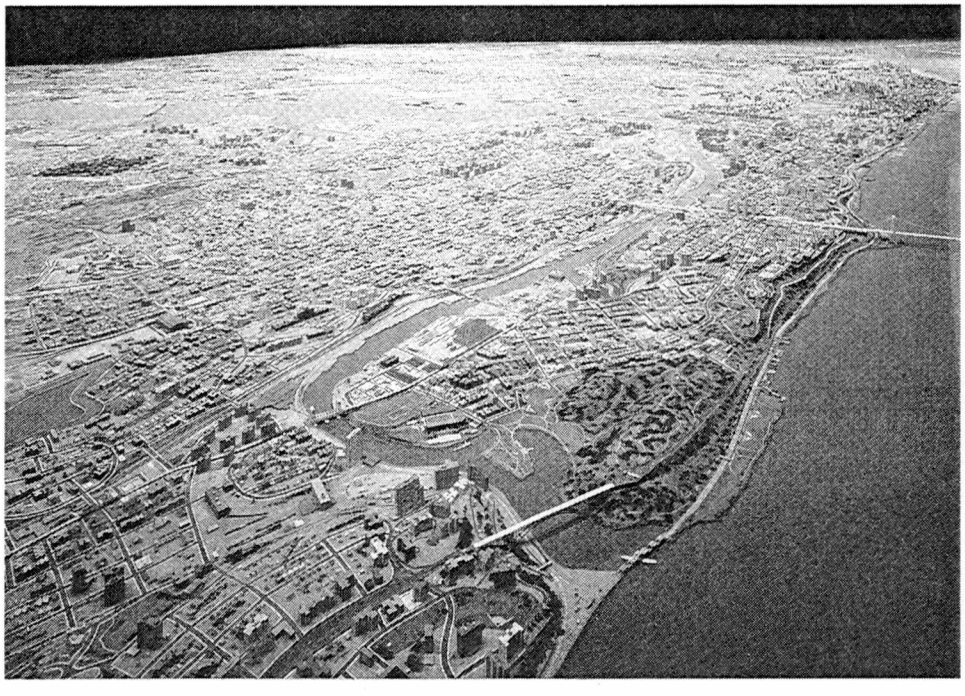


Figure 5.3
The Panorama of New York City: The Bronx Looking South

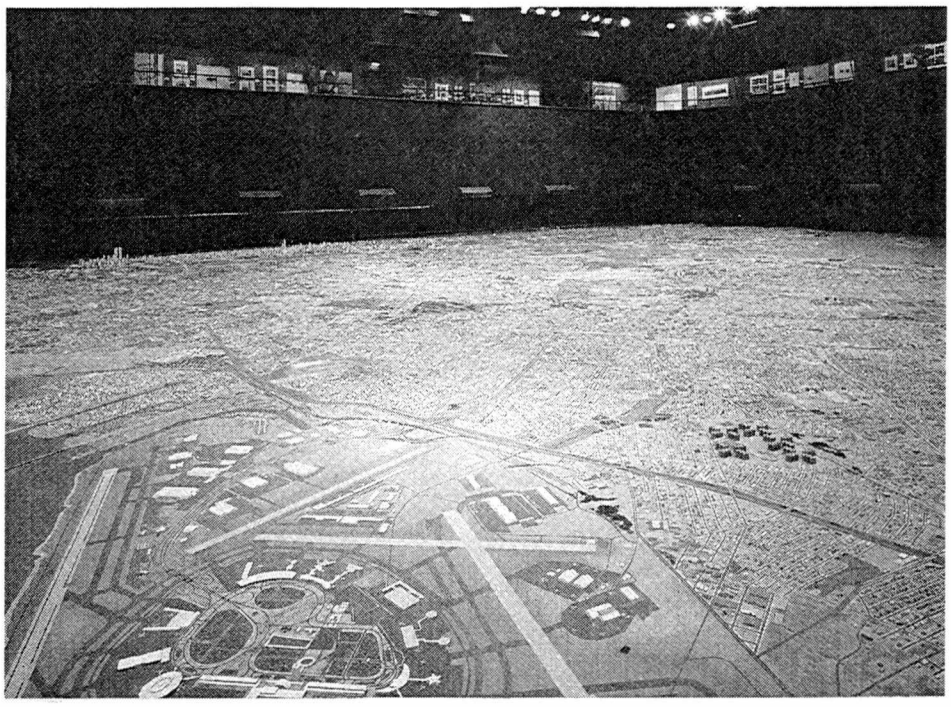


Figure 5.4
The Panorama of New York City: Queens with Kennedy Airport in the Foreground

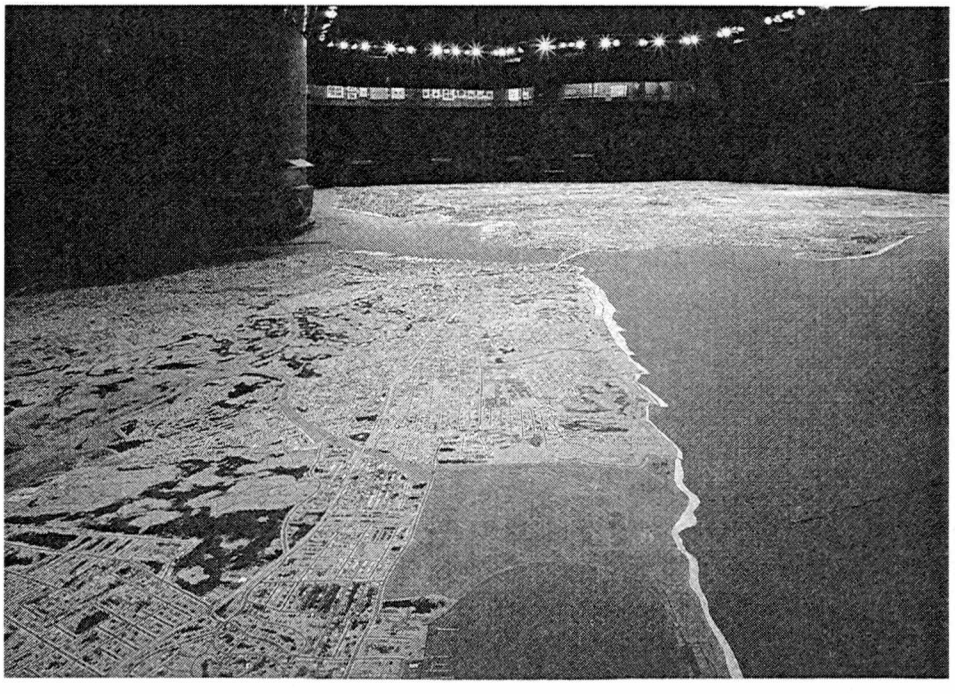


Figure 5.5
The Panorama of New York City: Staten Island Looking Northeast towards Brooklyn

featured basically all 320 square miles of New York's five boroughs, covering a base area of over 9,300 square feet.

The Panorama was constructed for the 1964/65 World's Fair in New York. Since then, it has been the primary, permanent exhibit at the Queens Museum of Art (formerly The Queens Museum) in Flushing Meadow-Corona Park. In 1992 a complete renovation of the model was begun. This two year project was the most extensive work done on the Panorama since its installation. The updating was performed at the Nyack, New York, facilities of Lester and Associates, the model's original builder. During this period, the entire Queens Museum of Art (QMA) underwent its own rehabilitation program, making the Panorama and other exhibits more accessible. The Panorama was reinstalled in its original location; and, with much fanfare it reopened to the public on November 23, 1994 (Mahoney).

The Model's History and Future

The Panorama of New York City was the brainchild of New York planning legend, Robert Moses. As president of the 1964/65 World's Fair Corporation, Moses envisioned the Panorama model as both a fair exhibit and a future planning tool. The model was to be the centerpiece of the host city's New York City Pavilion.

Moses hired modelmaker Raymond Lester to construct the Panorama at the scale of 1 inch = 100 feet (1:1200). In the past Lester's firm had built several large municipal project models for Moses, but none of this magnitude. "With its colossal scale and down-to-earth factual literalness, the Panorama clearly reflected the distinctive tastes of Robert Moses" (Miller, Panorama, 14).

Moses understood that in order to use the Panorama as a vehicle to assist in planning, it must be as accurate as possible. Lester's "July 1961 construction contract for the Panorama specifically stated, 'the complete model shall be designed as a comprehensive planning and study device for use after the closing of the World's Fair'" (Miller, Panorama, 36). "Its design could only deviate minimally from fact, [thus] the contract allowed only a 1 percent margin of error" (Miller, Panorama, 19).

The Panorama was located in the refurbished New York City Building on the Fair's Flushing Meadow site. The building had originally been built for New York's 1939 World's Fair; and, it served for a brief time as the headquarters for the United Nations (Vatsky, 7 Jan. 1994). The Panorama model was installed on the site of the building's former skating rink.

For ten cents tourists could see the Panorama through an excursion billed as a "helicopter trip" over New York City (Figure 5.6). "Visitors to the World's Fair viewed the Panorama from pod-shaped fiberglass cars, which took five minutes to

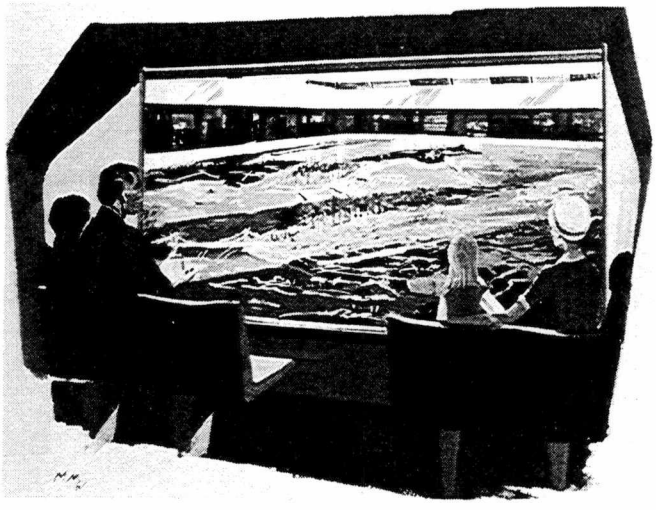


Figure 5.6
The Panorama's "Helicopter" Ride

travel around a track on the model's perimeter" (Barol 34). The "helicopter trip" simulated aerial views of the city from 3,000 to 20,000 feet. During the ride an audiotape narrated by Lowell Thomas pointed out different historical and physical features from each of the five boroughs.

Upon exiting the ride, visitors entered a second floor glass-enclosed balcony that overlooked the model (Figure 5.7). Another Lowell Thomas tape provided listeners with additional information about the city, as well as the model itself. Shortly after the fair was over, the "helicopter trip" closed leaving only the balcony area open to the public. The ride reopened for a short time in 1967; but, the costs of maintenance, operations, and insurance, were all cited for permanently closing it (Barol 34).

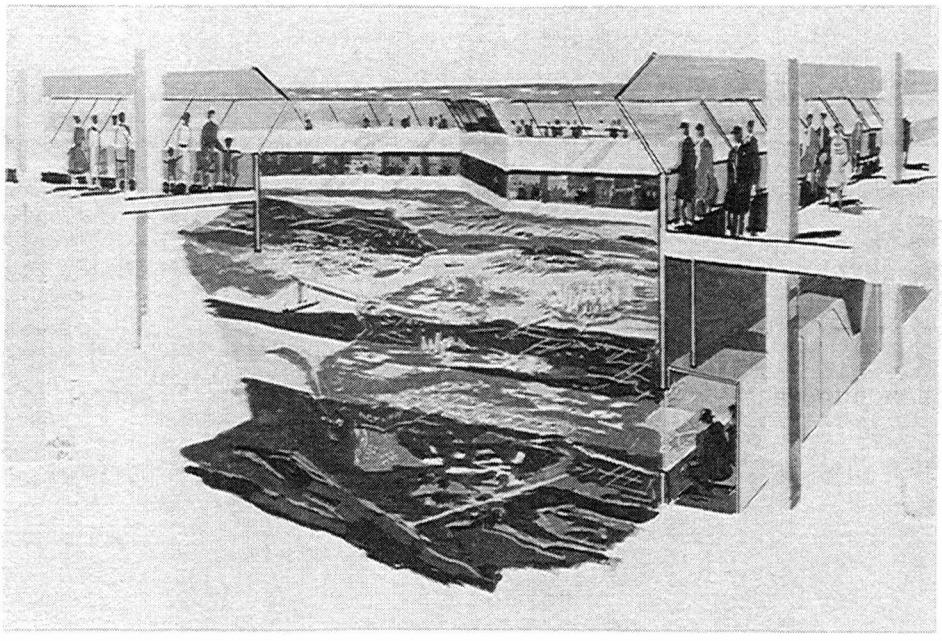


Figure 5.7
Cross Section of the Panorama Exhibit including the Second Floor Viewing Area

After the fair plans were made to move the Panorama model to either a new city civic center or the lobby of the World Trade Center. Neither materialized. When Flushing Meadows reopened in 1967, so did the Panorama. Beginning in 1966 the New York Planning Commission became technically responsible for the Panorama. However, it was Moses' agency, the Triborough Bridge & Tunnel Authority (TBTA), that provided the financial support necessary to maintain and update the model.

"Inherent in its conception as a permanent planning tool and educational device was the intent to keep the Panorama current with the city's constant changes" (Miller, Panorama, 37). It was even built so that when the fair opened it would be up to date with projects then under construction. During each year from 1967-1969, the TBTA

paid Lester and Associates to keep the Panorama model current. After Moses' retirement in the early 1970s, the TBTA interest in the model waned. With the founding of the Queens Museum in 1974, the Panorama of New York City became the possession of the museum. With its change of ownership came the last significant update the model would have for nearly 20 years. The 1974 renovation included adding the twin towers of the World Trade Center. This time the City of New York, not TBTA, paid for it.

Although the Panorama spent nearly a decade serving as a public planning tool, it was not as widely used as perhaps first envisioned. "Moses, who was in his seventies when the Panorama was built, used the model infrequently. His creation became less a planning tool for his future projects than a celebration and commemoration of his past achievements" (Miller, Panorama, 39). Neighborhood planners then and now see the limits of using the model, especially in judging the impact of most infill projects. "The broad geographical scope of the Panorama is too big, while the size of the individual buildings is too small to serve these type of projects" (Miller, Panorama, 40). However, an exception to this, as mentioned in Chapter II, was the evaluation of Donald Trump's proposed Television City project.

After the Panorama's last major update, both private and public entities were encouraged to donate scale models (1:1200) of their projects (Figure 5.8). "In 1990, 140 models of major elements of the 1980s building boom were donated to the

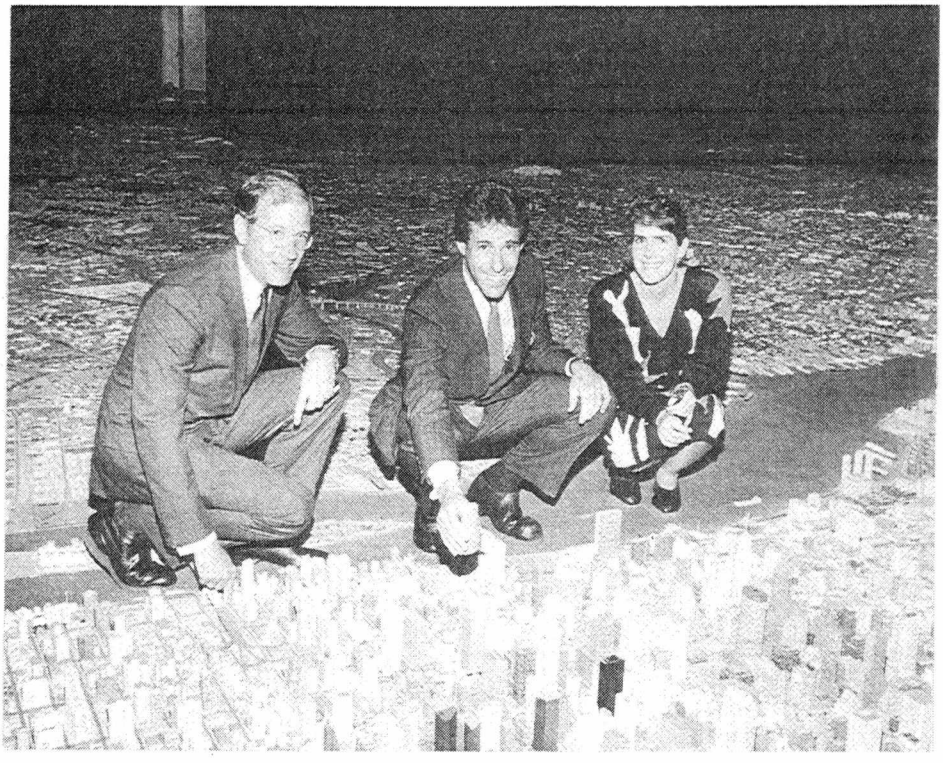


Figure 5.8
Placing a Model of a Philip Johnson Designed Building on the Panorama (c. 1987)

Panorama by the respective architects" ("Panorama of the City"). Even with such a contribution, the overall response to keep the model current was spotty. Thus, much "new public construction,...the deterioration of the South Bronx, and...scores of smaller structures [had] gone unrecorded" (Miller, Panorama, 37). It is estimated that prior to its recent updating, the Panorama was around "20,000 buildings out of sync with the real city" (Barol 34).

The work on the Panorama and its supporting exhibit area was part of an overall, three-year, $15 million museum renovation (Muschamp C1). This undertaking resulted

in nearly one-third more exhibition space for the museum (Vatsky, 7 Jan. 1993). In his comprehensive book, The Panorama of New York City: A History of the World's Largest Scale Model, former QMA curator Marc Miller noted that such a major renovation was at the core of the museum's mission. "For us as at The Queens Museum, the Panorama presents a special challenge-it is a living exhibit that we must continue to change at a pace as dynamic as New York City itself" (Miller, Panorama, 42).

As part of the recent renovation and enlargement of the exhibit space, the perimeter viewing area around the Panorama was completely removed. In its place architect Rafael Vinoly designed a series of ascending ramps that basically followed the original course of the helicopter ride. Jutting out from these ramps are several platforms with transparent floors (Jo). These new viewing stations allow for a much closer scrutiny of the model's details. Planning for this heightened examination of the Panorama's preciseness, the entire model underwent a meticulous refurbishing. Among the many original elements that were fully restored, was a tiny plane on thin wires that takes off and lands every minute or so at the miniature LaGuardia Airport (Barol 33; "Panorama of the City").

The Model Itself

Designed and built between 1961-64, "the creation of the Panorama was a long, difficult and rigorous task" (Miller, Panorama, 19). Lester and Associates employed 25 full-time model makers for four years to construct the model (Barol 34). Dozens of other full-time workers, using U.S Geological Survey contour maps, Sanborn insurance maps, and aerial photographs, helped research, design, and install the Panorama. The final cost of the Panorama, in 1964 U.S. Dollars, was over $672,000 (Miller, Panorama, 4).

At its longest point from the tip of Staten Island at Perth Amboy to the northern edge of the Bronx, the model was nearly 155 feet long. The Panorama measured 137 feet at its widest point, across Manhattan to the Nassau County line. As a point of reference, Manhattan's dimensions were 70' by 15'. It took 275 individual sections, mostly 4' x 10' (Figure 5.9), to form the 9,335 sq. ft. model ("Panorama of the City"). Except for a section depicting Far Rockaway, which was originally eliminated because of an initial installation problem, the Panorama featured the entire area of New York City. This includes 771 miniature miles of shoreline.

The original Panorama of New York City featured around 830,000 model buildings. By its 25th anniversary in 1989, the Panorama featured approximately 35,000 more buildings (Miller, Panorama, 46). The total number of structures represented after the

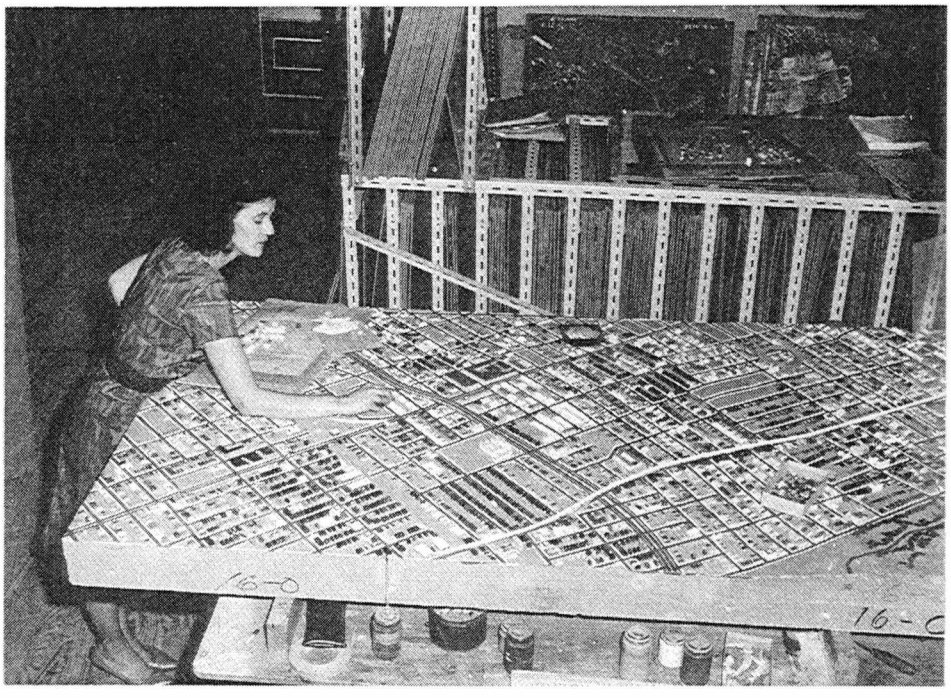


Figure 5.9
A Worker at Lester Associates Detailing One of the Panorama's 275 Separate Sections

recent updating was at least 895,000. Perhaps the transformation of Staten Island best reflects how the model has documented the changes in the Five Burroughs. When the model was first exhibited, "it was easy to think of the Island as a rural enclave. Today...the eye scans an almost seamless carpet of suburban houses" (Muschamp C7). Such changes made the New York Times reporter who witnessed these changes, wistfully wonder "should preservation laws apply to toy towns?" (Muschamp C7).

Most of the model buildings are small homes and industrial structures, which were molded from a range of 150 standard designs. Also, forty different unit styles were used for the Panorama's numerous brownstones, tenements, and apartment buildings.

Approximately 25,000 miniatures were custom-made to best simulate New York's most notable buildings.

The size of four New York landmarks helps to indicate the Panorama's scale. The Statue of Liberty stands only four inches (4") high, the height of Coney Island's parachute jump is two and half inches (2.5"), and the Empire State Building is slightly over one foot (12.5") tall (Figure 5.10). Also, measuring from north to south, the lake in Central Park has a length of approximately fourteen inches (14") (Barol 33).

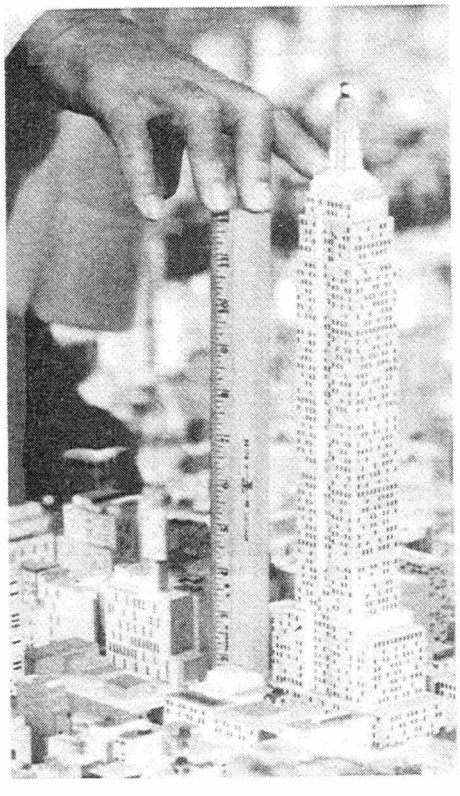


Figure 5.10
The Empire State Building at the Panorama's 1:1200 Scale (1" = 100')

The Panorama featured a continuous lighting system that went from dawn to dusk to night. The night cycle began every three minutes and lasted nearly 45 seconds. During the dark period, 3,172 colored lights showed the location of the City's municipal facilities. Five different light cycles helped identify buildings relating to: protection, education, health, recreation, and commerce/welfare/transportation. The model also featured a strict color code. This included painting local roads-dark gray, highways and parkways-light tan, city blocks-off white, and urban blocks-light green. During the recent renovations, the entire lighting system was changed; and, nearly everything received a new coat of paint. This included many of the miniature windows which are covered with ultraviolet paint, so as to reflect "life in the city" during the model's night cycle.

"In every section of the Panorama, Moses' ambitious projects [were] not only seen but...in odd ways emphasized" (Miller, Panorama, 39). This meant such things as highlighting the parks (a special interest of Moses), so they would standout even in the dark. The 35 bridges on the Panorama, several of which were built under the direction of Moses (Figure 5.11), were also specially detailed. From the beginning, they were "by far the most accurate and finely made structures on the Panorama" (Miller, Panorama, 30). These and several other of Moses' projects were originally the only features not constructed out of one of the Panorama's standard modeling materials

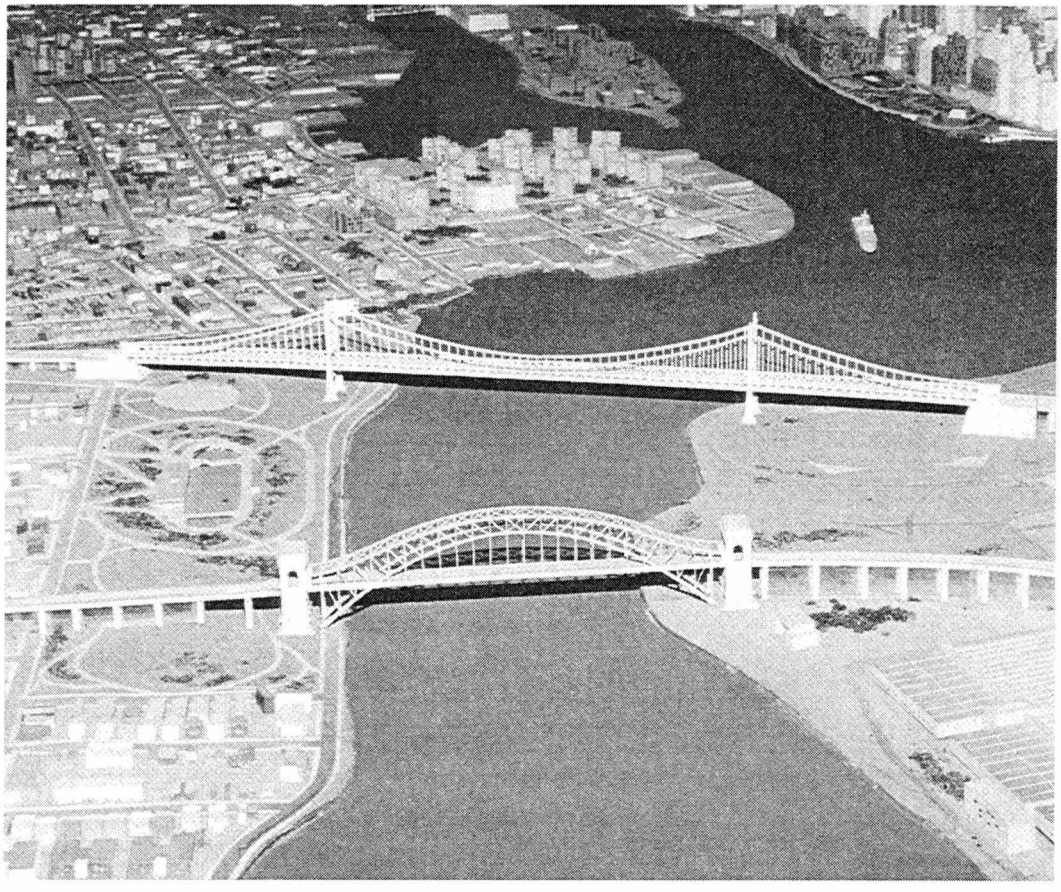


Figure 5.11
Brass Bridges Emphasize Robert Moses' Influence on Both the Panorama and the City

(Muschamp C7). Instead, the bridges were crafted out of brass, and formed using a chemical milling process. Lester and Associates also made a duplicate of each bridge for Robert Moses' personal office (Miller interview).

Complementary Exhibits

In addition to the main model, the Panorama of New York City exhibit also featured a group of other models that helped to interpret New York's built environment. The two most significant examples were situated at either end of the Panorama tour. The Triborough Bridge & Tunnel Authority exhibit, which greeted visitors at the close of the Panorama, featured several models. Most of the models were either examples of past achievements or future plans of TBTA chief, Robert Moses. A new permanent exhibit next to the Panorama contains a few of these pieces, as well as detailed information on the Panorama and both of the World's Fairs held on the site.

A model depicting New Amsterdam in 1660 was located in the pavilion's entry hall. Originally built in 1931, it was completely refurbished for the 1964 World's Fair. Although the New Amsterdam model (Figure 5.12) was built at a larger scale than the Panorama model (1:300 compared to 1:1200), it was obviously much smaller. "The contrast in size graphically demonstrated the city's growth from a trading post on the tip of Manhattan to a sprawling five-borough metropolis" (Miller, Panorama, 16).

On a broader scope, the Panorama "was one of a triumvirate of objects at the fair, each of which, in its own way, was the world's largest example of a particular mode of cartography" (Miller, Panorama, 14). The Unisphere, which still stands today, is a 140 foot high steel representation of the Earth. Serving as the Fair's symbolic theme,

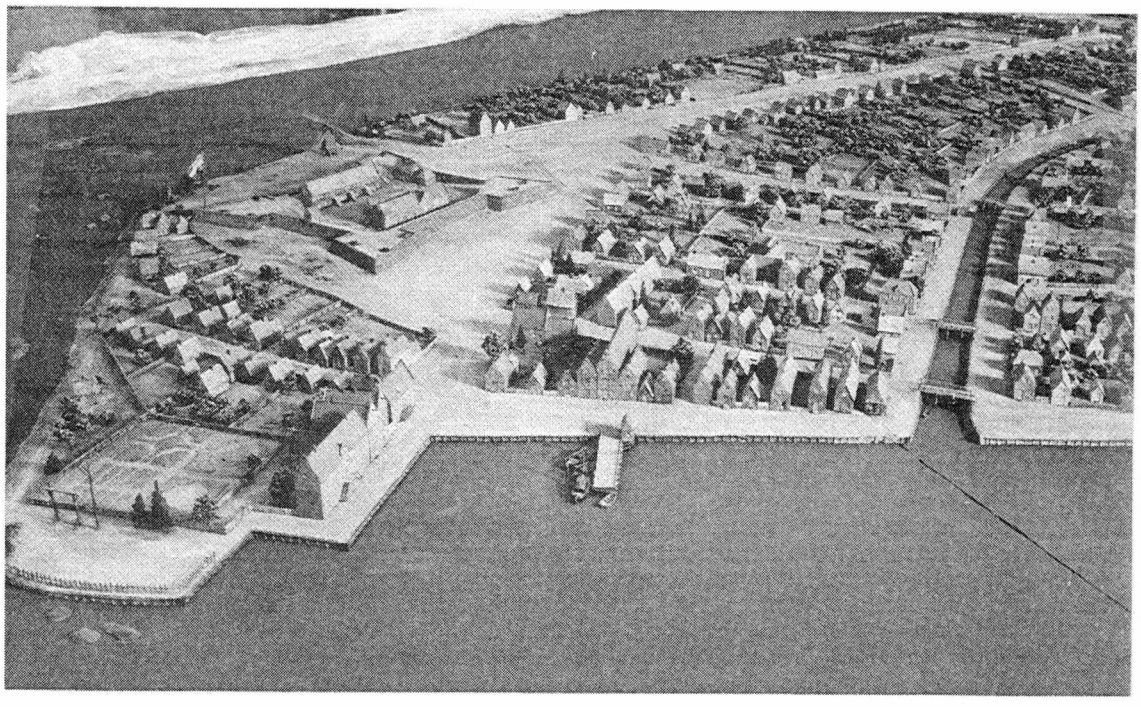


Figure 5.12
The New Amsterdam Model Exhibited at the 1964 World's Fair

the Unisphere was billed as the "World's Largest Global Structure." In the New York State Pavilion "was-and may still be" the "World's Largest Road Map." Designed in part by architect Philip Johnson, the huge mosaic of New York State was based on maps distributed at Texaco service stations. The "road map" covered an area larger than a half a football field or 9,000 square feet (Miller, Panorama,15).

Educational Programs

At the time the Panorama was being developed, Robert Moses made clear his feelings that the enormous model should be used to teach urban planning to the masses. The

Panorama's current caretakers have attempted to fulfill Moses' vision. The Queens Museum of Art uses several educational programs ranging from independent tours and workshops to programs that are coordinated with the New York City school system.

The museum's education staff feels the model really helps give students a holistic view of New York. "Most children know only limited sections of the city and their understanding of the whole is often disjointed since they usually travel from one part to another by subway" (Miller, Panorama, 41). Because of these perceptions, the staff has tried to focus their efforts on what makes the Panorama unique - its size, fundamental accuracy, and comprehensive nature.

"The Panorama's role has changed as the exhibit has been integrated into the aesthetic and educational mission of a fine arts museum" (Miller, Panorama, 36). Having the model as a museum exhibit, as opposed to a fair "ride," has allowed docents and curators to customize programs to individual group needs. One of the biggest of those groups has been elementary school students, specifically the city's second and fourth graders. This is due to a citywide mandated curriculum that states that such students must study about New York City (Vatsky, 7 Jan. 1994).

In order to address the needs of these student, the Queens Museum, in coordination with the New York Board of Education, created a program called "City Safari." The "City Safari" program is split into four different elements. First, a board game is

distributed to local elementary schools. The board game helps "players learn about the resources of the city as they seek the quickest route between sites in the five boroughs" (Miller, Panorama, 43). The three final portions of "City Safari" take place at the Queens Museum; however, the recent updating has caused them to be altered from the original format noted below (Vatsky, 6 Sept. 1995).

The second overall part of "City Safari," is a movie that simulates a helicopter ride over New York City. After seeing this bird'seye view video, students tour the Panorama, while listening to a taped narration aimed at their specific age group. Following the tour, school groups have the option of participating in a fourth activity known as a "neighborhood workshop."

These architectural/neighborhood workshops are part of a broader mission of the museum, in which they also try to reach secondary age students as well as adults. The workshops allow individuals to hand-make scale models out of clay, wood, paper, or cardboard. The concept is for the participants to simulate portions of their own neighborhoods. These workshops, as with other programs, are done in a "social studies vein," and are intended to be more than just architectural history projects (Vatsky, 7 Jan. 1994).

Among the other youth-oriented services and programs provided by QMA are "Art Quest" and "Discovery" (Queens Museum...School Programs). The museum has also

recently produced a new booklet to prepare students for a visit to the updated model. The Panorama of New York City at the Queens Museum of Art: Pre-Visit Activities booklet is filled with ideas of how to get students to better understand the built environment. It features definitions (e.g., scale, borough, panorama, etc.), a two-dimensional compass, measuring and math problems, and lessons on how to read maps. There are also descriptions of different types and styles of buildings, and directions on how to design your own building. With this project, students are asked to consider the building's function, height, window placement, and door configuration. One final fun activity is the do-it-yourself "best of New York" list (Panorama...Pre-Visit Activities).

Special programs such as "Please Touch" provide "tours with tactile components for students with physical, mental and/or emotional disabilities" (Queens Museum of Art: School Programs). Following these tours Pearl Rosen, the Special Education Coordinator, and her staff typically use workshops to further explain architectural and planning tenets. They use old models from the Panorama (e.g., bridges), larger scale models (e.g., the Chrysler Building), and pieces from actual buildings, to help clarify spatial concepts, shapes, and material qualities. Also, "braille on the rail" has allowed the Panorama's visually impaired visitors to "get a sense of where they are and the size of the city within the enclosure" (Vatsky, 7. Jan. 1994).

Other groups from politicians to driving instructors have also used the Panorama, both as an educational tool and a promotional device. In order to advertise the 1970 "Keep New York Clean" campaign, the Panorama model was photographed with an attractive young human model standing over it holding a broom. Several years later Mayor Ed Koch used the Panorama model in a television promotion, by tracing on it the route of the New York City marathon (Miller, Panorama, 41).

Perhaps the most unusual class of students to visit the Panorama was the group of New York City "cabbies-in-training." Their instructor brought them to the Panorama, feeling it was the best way to familiarize them with the entire city. He noted that most of his class were non-New Yorkers, and for many English was not their native tongue. The instructor saw the Panorama model as an excellent way to break through the language barrier, as well as provide a holistic image of the city, which can be quite useful in the taxi profession (Vatsky, 7 Jan. 1994).

In the past, tens of thousands of people have toured the Panorama. "During the 1988/89 school year, over 26,000 elementary and high school students from all sections of New York visited The Queens Museum to see the Panorama" (Miller, Panorama, 41). The Panorama has long been the museum's most well attended exhibit. Thus, the museum plans to further extend its role with regard to educational outreach.

Following the Panorama's renovation, most of the educational programs directly related to the model were retained. The updated exhibit design allowed for the addition of several new teaching tools. Among the things that have been added, or soon will be, are raised line maps, additional braille text, an audio script (primarily for adults), and a series of city maps around the perimeter of the model. Another new activity is the "Giant Boroughs" program, which uses photo forms to help students locate different landmarks throughout the city. According to the Queens Museum's Curator of Education and Community Services, Sharon Vatsky, the museum is continuing to look at new educational programming techniques to utilize and interpret the Panorama. Devices such as interactive videos are being considered, with the only obstacles to their implementation being the ever present constraints associated with time and finances (Vatsky, 17 Aug. 1995).

Central Atlanta Progress

The mission of Central Atlanta Progress is quite similar to the numerous nonprofit organizations in America that promote downtown activity. Atlanta's popularity in recent years, however, has resulted in a level of increased growth and change that is anything but typical. To best record and present information about this change, Central Atlanta Progress (CAP) uses two independent three-dimensional scale models.

Except for a few differences, both urban models cover the same area of the central city. Each model illustrates different aspects of city growth; so, together they are very effective in depicting the dynamic urban setting of Downtown and Midtown Atlanta.

The Organization's Background

"Central Atlanta Progress, Inc. is a nonprofit corporation of businesses and institutions in Atlanta which have worked with each other and with government since 1941 to build a better central city" (Central Atlanta Progress: 1993 1). According to CAP's 1992 Annual Report the current organization is "a dynamic blend of over 150 corporations and institutions working in partnership the City of Atlanta, Fulton County, the State of Georgia, and other metro organizations" (9). The CAP membership is made up of the chief executives of these 150-plus "civic-minded" organizations.

The charge at CAP is broad based and has prompted involvement in a number of diverse projects. These have included: improving street lighting along pedestrian corridors; helping to establish new police precincts; and working closely with the development of the new Georgia Dome, the site of the 1994 Super Bowl, as well as a major venue for the 1996 Summer Olympics. Much of CAP's involvement in the area is planning oriented, and often includes fostering public/private partnerships. Central

Atlanta Progress "conducts research and planning and acts as a catalyst for a wide range of programs and projects for the improvement of the central area" (Central Atlanta Progress: 1992 11).

In recent years Central Atlanta Progress has been active in two Central Area Studies (CAS). The first study focused on new infrastructure and transportation. The current CAS was initiated in 1988. The Central Area Studies II emphasizes "maintenance, marketing and design...to enhance the quality of life offered" in Central Atlanta (7). As part of their 1993 Work Summary Program, CAP targeted seven areas to help implement elements of this study. These areas include: public safety, housing, urban environment, economic development, transportation, the Olympics, and human services. In this vein CAP has helped develop and/or support a Downtown Child Development Center, a Community Improvement District, a multimodal passenger terminal, and COMNET, a security communications network between government agencies, private security forces, and the police department.

Central Atlanta Progress is located in the newly refurbished Hurt Building, which is situated across form Georgia State University in the heart of Downtown Atlanta. Both of CAP's scale models are located in the glass enclosed foyer of their first floor headquarters. The oldest of the models is wall mounted, while the other is a more traditional table model. The models are visible from the Hurt Building's main lobby; thus, being "open" to the public even during off hours for CAP.

The Wall Model

The first large urban model made for Central Atlanta Progress was built in the mid-1970s. For the last past twenty years this wall mounted model (Figure 5.13) has served to reflect the growth of Downtown and Midtown Atlanta. To depict this growth, the model features color coded buildings, representing the periods in which they were built (Figure 5.14). The color code is as follows: peach colored buildings were built in the 1990s, yellow-1980s, white-1970s, light gray-1960s, and dark gray-prior to 1960. This color code, along with the model's scale, 1" = 100' (1:1200), is noted on a detached plexiglass legend (Figure 5.15).

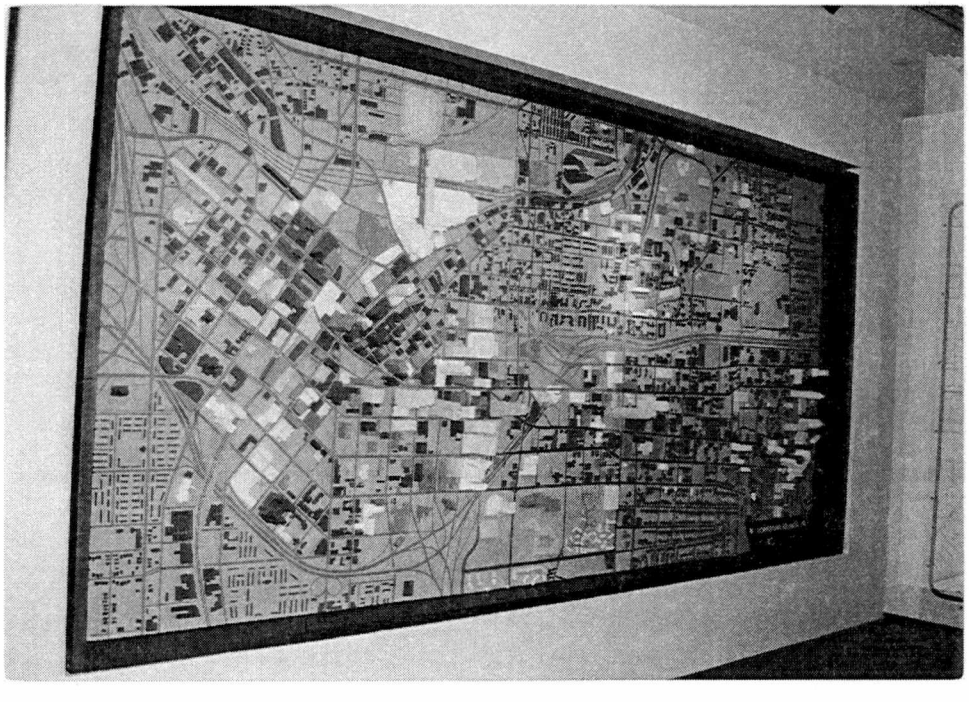


Figure 5.13
The 1:1200 Wall-Mounted Model at Central Atlanta Progress, Inc.

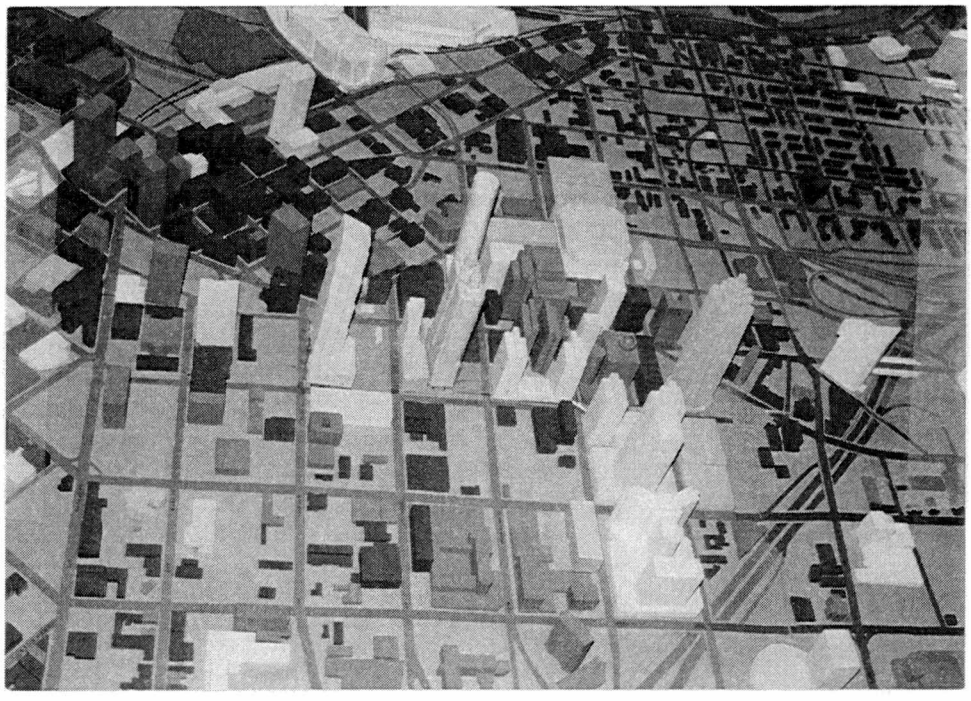


Figure 5.14
Color Coded Buildings According to Date of Construction

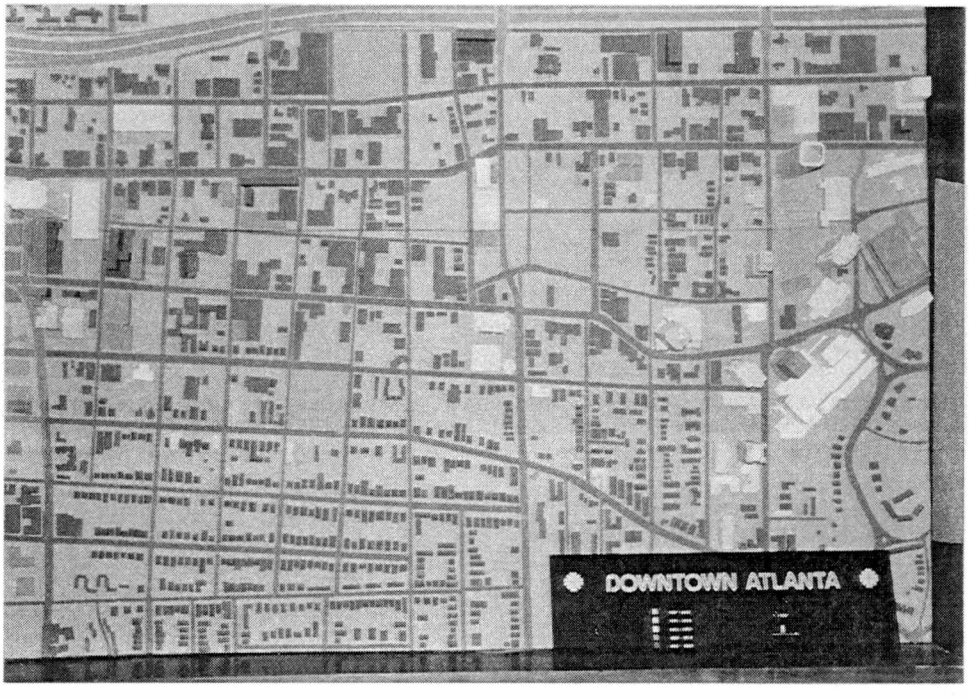


Figure 5.15
CAP's Wall Model and Informational Legend

The model features the overall area of the Downtown, as well as the Midtown area up to 16th Street. The area covered by Central Atlanta Progress extends approximately another one-half mile north of 16th Street to Brookhaven. This expansion illustrates CAP's growth and outreach, especially in the Midtown area, since the model was first developed. Because of the way the model is mounted and inset into the wall, extending it has been considered too costly and not worthwhile (Kelman, personal interview).

In addition to buildings, the model also depicts topography (with base contours), railroads, and roadways. Certain street names are indicated on the model to help put things in better context. Most of the features are depicted in low-detail, so that building placement is emphasized over individual architectural aesthetics. Overhead track-lighting highlights the model.

Over the years the model has been updated by student interns. Recently CAP has contracted with a local architectural firm to continue the updates. However, even with the constant revisions, the current model is not a completely accurate representation of Atlanta's central area.

According to Paul Kelman, CAP's Vice-President for Planning, the very nature of the model makes an exact replication of the city nearly impossible. For instance, the wall model "does not accurately reflect Interstate changes," such as those around

International Boulevard (Figure 5.16). Without tearing up large portions of the model, such changes will never be denoted. This problem is inherent in most urban models; but, it is not considered this model's biggest concern (Kelman, personal interview).

The biggest problem with the wall model is gravity. This is due to its construction technique, which has buildings extending horizontally (Figure 5.17). Although this provides a fairly unusual birds-eye view of Atlanta, it does cause long-term maintenance headaches. Kelman notes that in response to this problem CAP has recently decided to eventually replace all cardboard and balsa models with styrofoam ones.

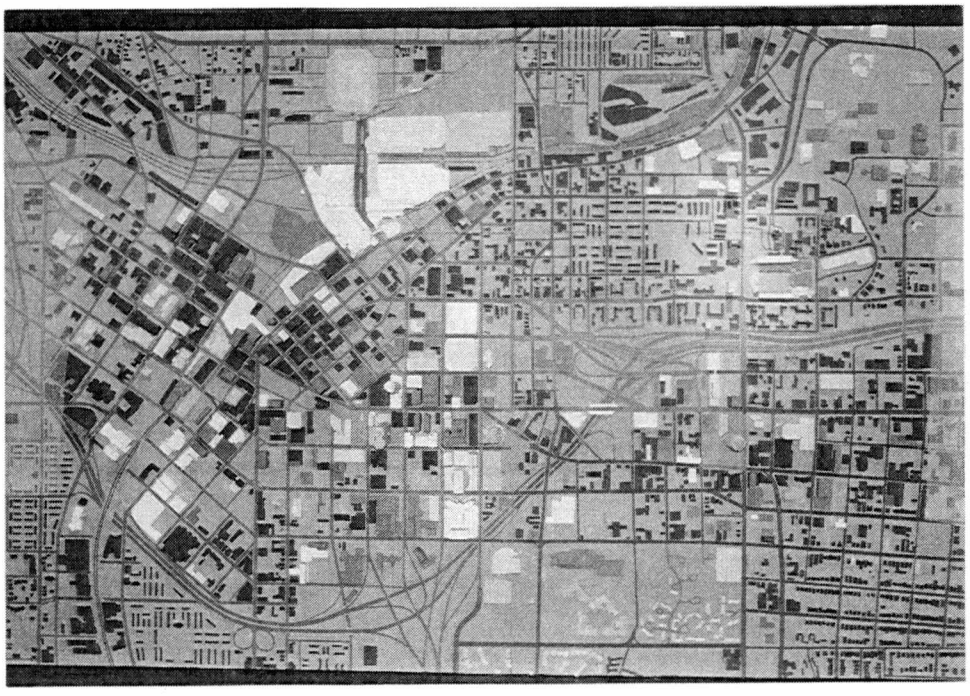


Figure 5.16
Atlanta's Roadways Frozen in Time

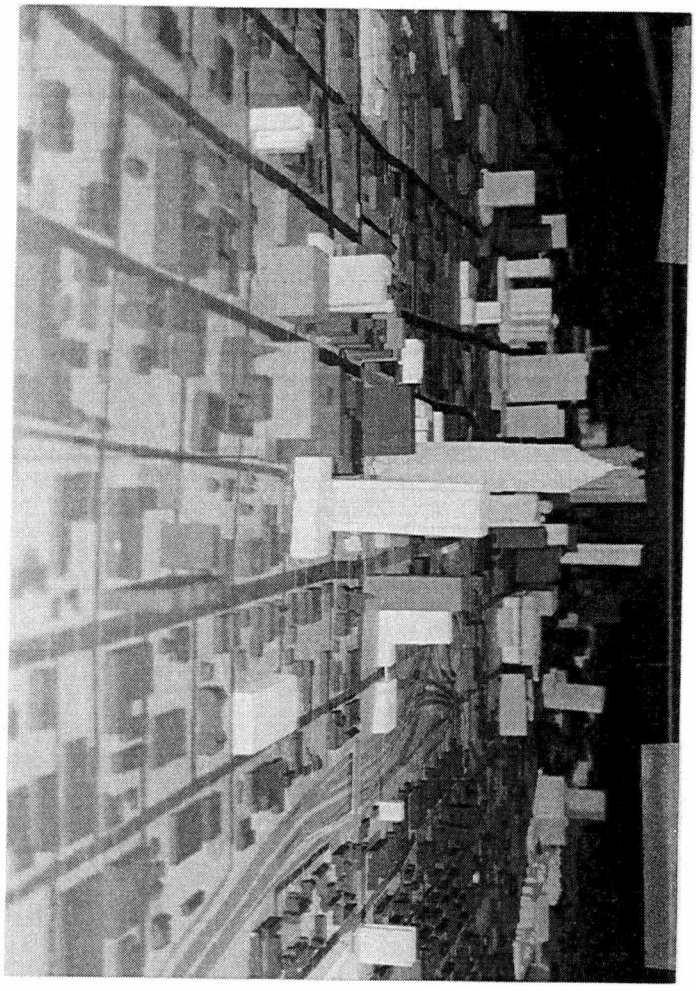


Figure 5.17
CAP's Wall Model Fighting the Forces of Gravity

The Bramalea Table Model

In 1991 Central Atlanta Progress became caretakers of the table model featuring the city's central area. The model had been developed by Bramalea Georgia, a subsidiary of the Denver based development company, Bramalea, Inc., in order to promote a

proposed Downtown project. However, other construction activity in the central city and a subsequent market glut forced Bramalea to cut its losses and drop the project. A deal was then made with CAP to take possession of the urban scale model.

The table model, built by Atlanta Models and Exhibits Inc. (AMEI), has a similar scale (1:1200) to CAP's wall mounted model. All of the buildings on the model (Figure 5.18) are a grayish white to indicate a more cohesive environment. Compared to the wall model, however, these miniature buildings have much more defined architectural detailing (Figure 5.19). The overall area covered by both models is similar; but, the Bramalea model deleted some areas of the central city intentionally.



Figure 5.18
The Bramalea Table Model at Central Atlanta Progress, Inc.

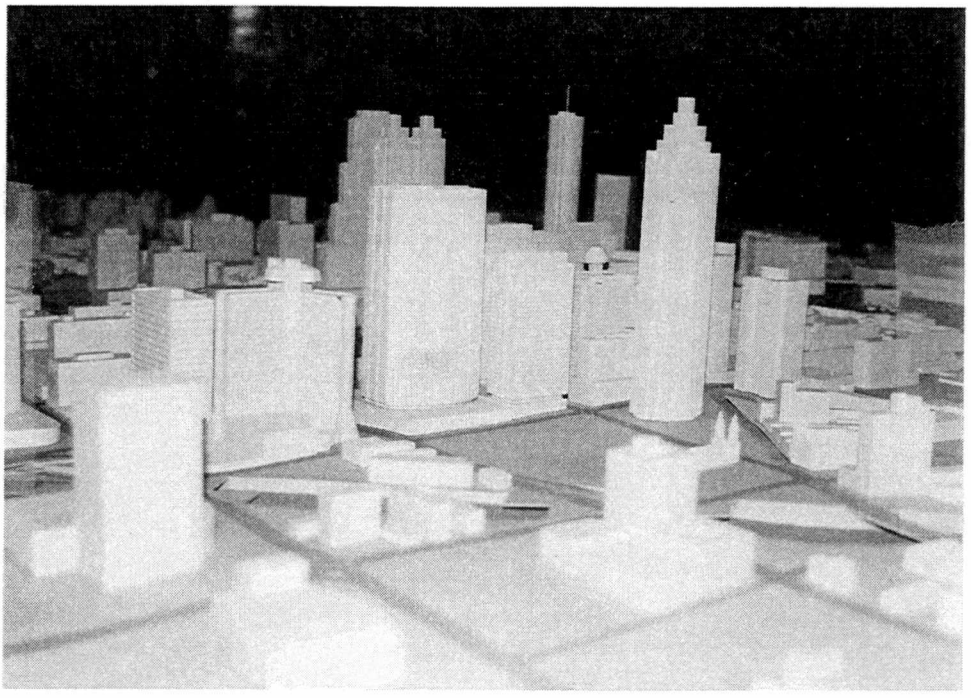


Figure 5.19
A Closeup of Some of the Detailed Models on CAP's Bramalea Layout

The purpose of the model was to show the impact of a proposed 63 floor, 1007 foot high, office building in Downtown Atlanta. As noted on the model's legend, Bramalea Georgia had "a controlling interest in the site that abuts Ivey Park where the Peachtrees [streets] part at Baker Street." Bramalea called the site "The Peachtree Triangle." In order to better highlight their Downtown site, a decision was made to eliminate the Georgia Tech area from the model (Figure 5.20), and thus "de-emphasize tenant possibilities in the Midtown area" (Kelman, personal interview).

Kelman stated that a part of Bramalea's decision to "give" the model to CAP was based on the understanding that the model would be publicly displayed. At the time,

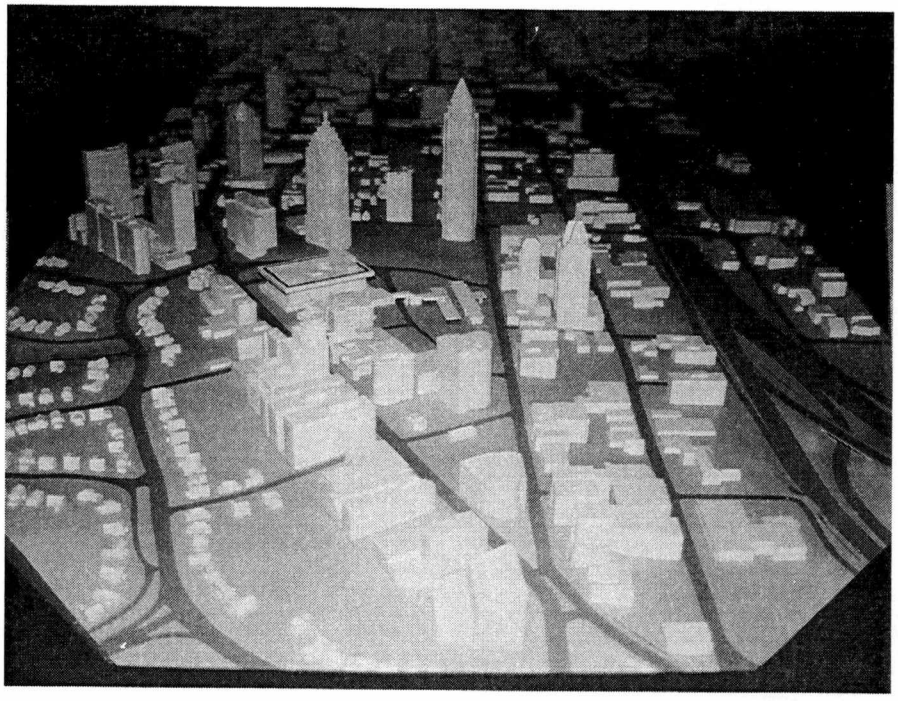


Figure 5.20
A Portion of Atlanta's CBD excluding Georgia Tech

Kelman countered that in order to display it publicly, "the model must be representative of what truly exists" (Figure 5.21). Thus, Bramalea had the modeler "cut out" the block on which the proposed building sat and replace it with a depiction of the real site.

The cutout block has been retained, so that it can be plugged in to show interested parties the Cesar Pelli designed building in its proposed context (Figure 5.22). The cutout model is currently being stored in a compartment in the models base, and is accessible through a velcro hinged panel (Kelman, personal interview). For further information on the Bramalea proposal, a binder detailing the project is located in a

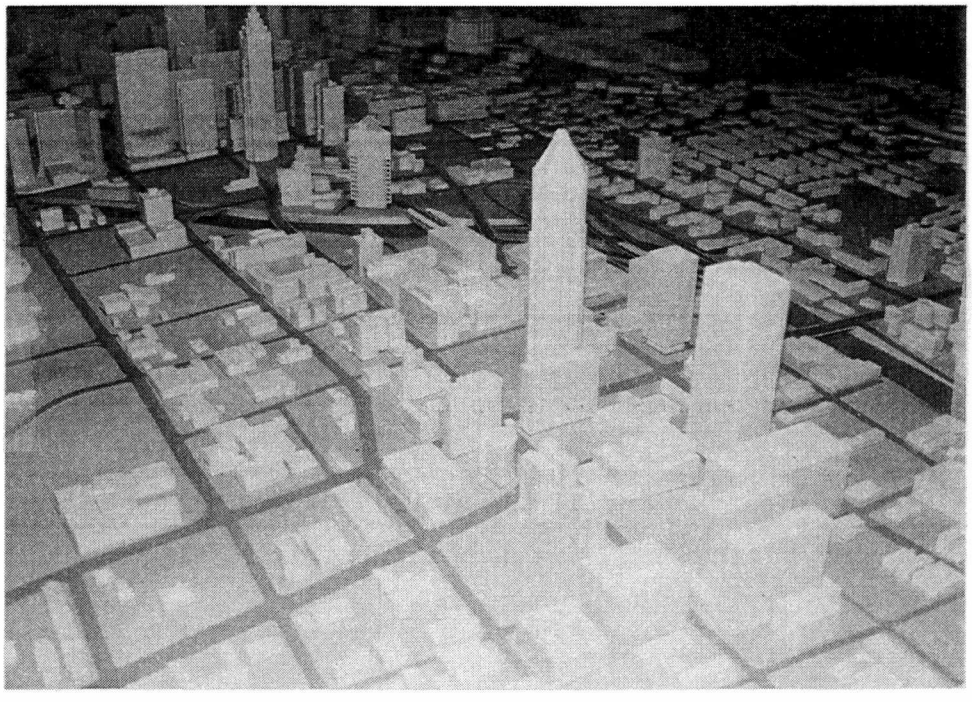


Figure 5.21
A Closeup Looking Towards Atlanta's Midtown Area

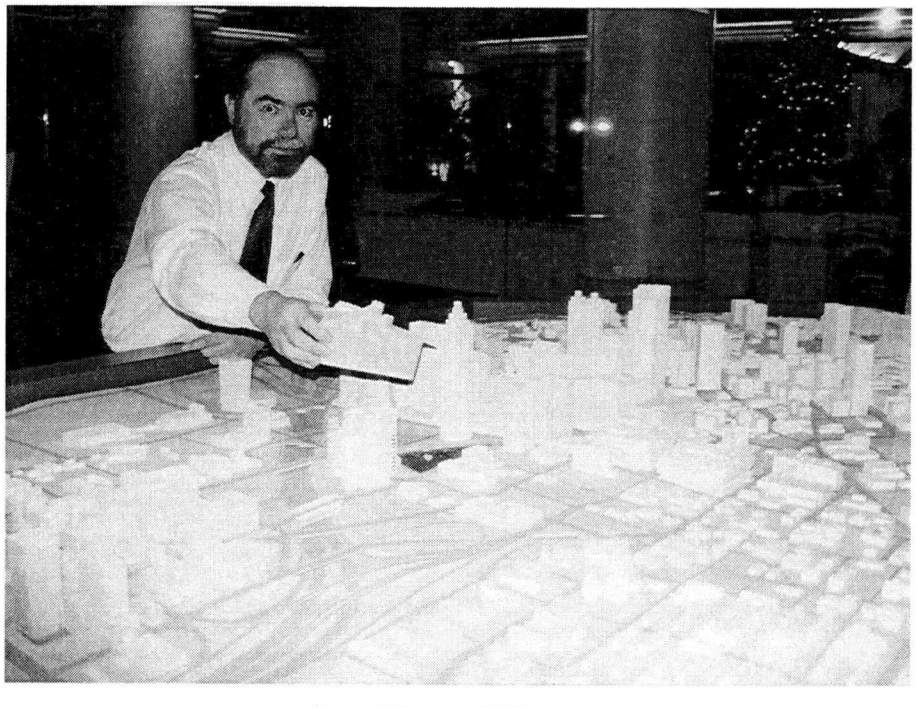


Figure 5.22
The Cutout in which to Insert the Plug Model of the Proposed Bramalea Development

plastic pocket attached to the model's base. The project binder features: aerial photos, plans of the site, individual floor plans, and facade renderings. Also included are photographs of a highly detailed Bramalea building model; some showing the model superimposed upon photographic images of the real Downtown Atlanta.

At the time CAP took possession of the model, a deal was also made with the model's builder, AMEI, to provide updates as needed. Bramalea did this in order to maintain the high quality of the model (Lom). This was considered a wise investment, since the table model had an estimated cost of $100,000, in 1991. Overall, the model seems to be well constructed and is currently in excellent condition.

Programs

Central Atlanta Progress targets three main groups with its models. Those groups include, central city businesses, government entities, and potential developers. In conjunction with the lobby's wall maps (Figure 5.23) and photographs, the models have primarily an explanatory function. They are also commonly used as backdrops for interviews and public announcements. According to Paul Kelman, although the models are displayed quite prominently, they are used somewhat sparingly, and have never been used in coordination with snorkel cameras or other simulation techniques (Kelman, personal interview).

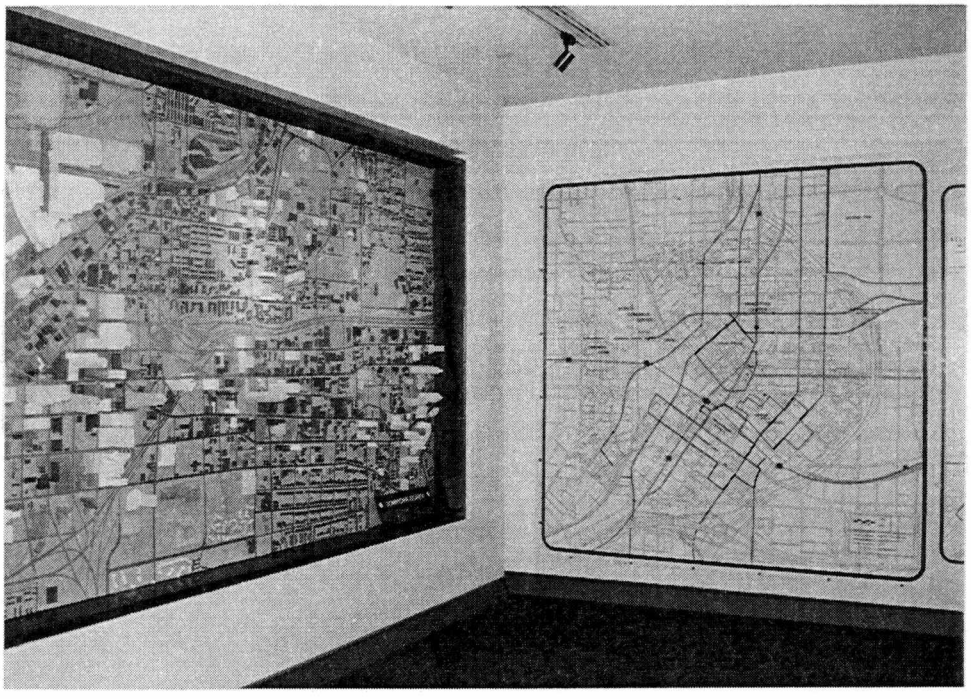


Figure 5.23
Wall Maps and Other Graphics Help to Interpret CAP's Two Models

With regard to the educational community, CAP has yet to develop any established programs to utilize the models. Neither is there any marketing directed at students groups. Thus, only a limited number of students get to learn how the models are used.

By far the largest group of students exposed to the models are those involved in undergraduate and post-graduate studies. This includes students in planning, architecture, and landscape architecture from among universities such as Auburn, Clemson, Florida State, Georgia State, and Georgia Tech. Very few elementary and secondary students see the models; and, no feedback is requested from these groups when they visit (Kelman, personal interview; Young survey).

The U.S. Army Engineer Waterways Experiment Station

The Waterways Experiment Station in Vicksburg, Mississippi is one of four major research centers operated by the U.S. Army Corps of Engineers. These facilities help the Corps of Engineers meet its two-fold mission. Their first command is to "provide engineering support to the Department of Defense." Second, the Corps is to "work on a wide range of projects which benefit primarily the civilian community." To this end, the Army Corps of Engineers utilizes a vast array of technologies, ranging from simple physical models to complex computer generated simulations. The Waterways Experiment Station (WES) features dozens of facilities for modeling, and has been at the forefront of this type of research for well over half a century (US ACE WES Essayons).

The History and Background of WES

The U.S. Army Engineer Waterways Experiment Station was established in 1929. It was created in response to the disastrous 1927 flood along the Mississippi River and its tributaries. Its original charge was to test flood control plans on the Lower Mississippi River. It still performs that duty (Figure 5.24), along with literally hundreds of other programs. These programs are part of WES' present day "six laboratory research, development and testing complex located on [its] 700 acre reservation in Vicksburg" (US ACE WES Fact Sheet).

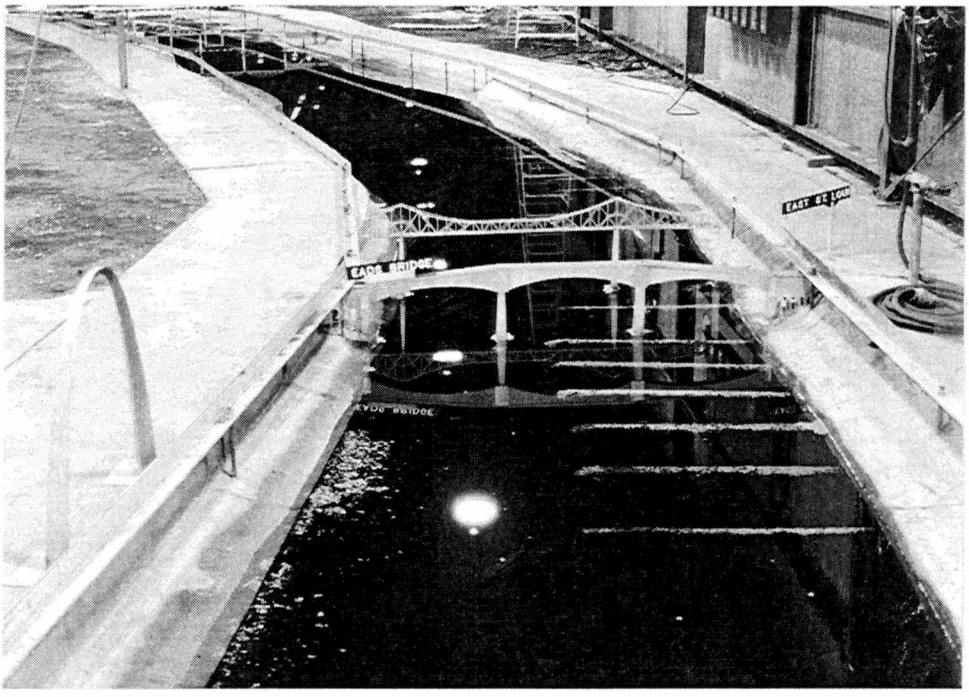


Figure 5.24
An Indoor Mississippi River Model at the Waterways Experiment Station in Vicksburg

The six research laboratories are as follows: Hydraulics, Geotechnical, Structures, Environment, Information Technology, and the Coastal Engineering Research Center. The two that most commonly use three-dimensional models are the Hydraulics Laboratory and the Coastal Engineering Research Center (CERC). The Information Technology Laboratory (ITL) specializes in computer generated cartography and models, as well as other activities. "As a Defense Department resource, ITL has been designated a DoD High Performance Computing Center, with two state-of-the-art [Cray] supercomputers and the Tri-Service CADD/GIS Technology Center" (US ACE WES Essayons).

The annual work program at WES typically has a budget of over $360 million. This money is paid for by "sponsors," who reimburse WES for its research on specific projects. According to a 1993 report, WES' most recent annual work program included over 2,100 projects for more than 250 different sponsors. Over the years, the most consistent project sponsors have been the three main branches of the military, the Federal Emergency Management Agency, the Environmental Protection Agency, the U.S. Department of Transportation, and the Department of Energy. Numerous other state and federal agencies also contract with WES.

The WES complex features approximately 60 scale models; but, at any given time only 10-12 are operational. Being operational means that these models are actively measuring a wide range of primarily water related impacts (Figure 5.25). Because the models compress size, they also compress time. This allows the models to "run for a month and get years of data." Thus, certain models are only operated when a new variable needs to be introduced (Stroupe interview).

The Hydraulics Laboratory and Coastal Engineering Research Center

The Hydraulics Laboratory is considered the "world's largest, best-equipped facility for research and practical application of experimental hydraulics" (US ACE WES Fact Sheet). With its numerous hanger-like warehouses, it features the majority of WES' scale models. The work performed in this lab helps the Corps better its understanding

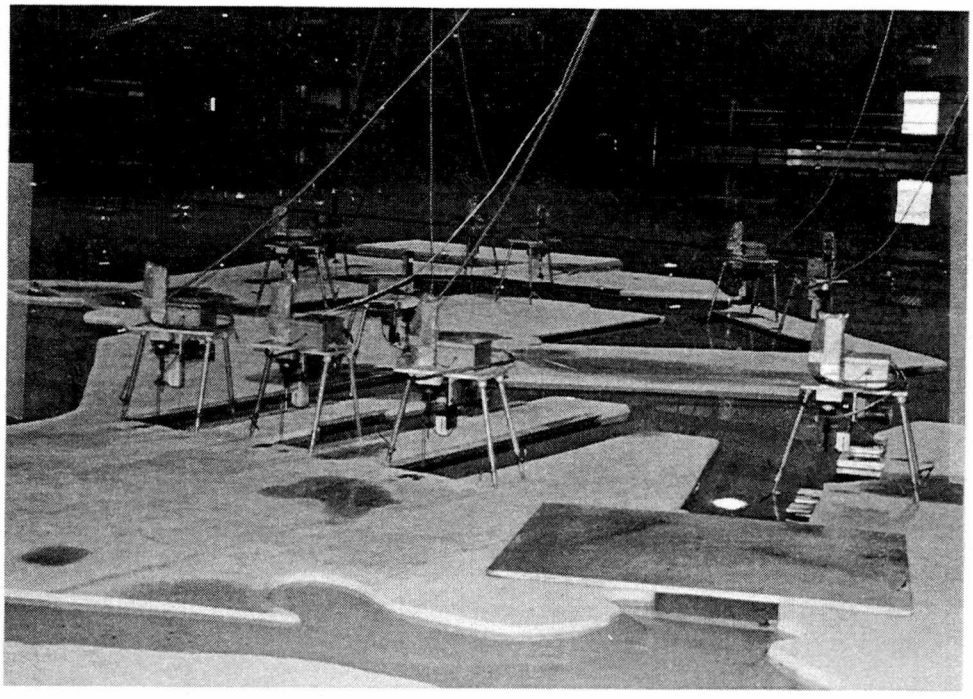


Figure 5.25
Some of the Varied Measuring Devices Used at WES' Facility

of erosion control, navigation, hydraulic structures, flood management, dredging, reservoir operations, water supply, and riverine and estuarine processes.

The models used in Hydraulics either simulate a real setting or focus on a certain ubiquitous problem. An example of a "problem" model would be the 1:50 scale model that was developed to explore the impact of disposing dredged materials. This model helped provide guidance for creating a numerical model. And, the numerical model was provided with data sets based on experiments run on the physical model. Recently run, location-specific, scale models include: Snake River's Lower Granite Dam (1:80), the Guadalupe River Bypass Conduit (1:25), the Montgomery Point Lock

and Dam Project on the Arkansas River (1:20 vertical/1:80 horizontal), and the Sagus River, Massachusetts, Flood Control Project (US ACE WES Fact Sheet Activities Summary).

The Coastal Engineering Research Center focuses on how tides, currents, waves, and wind effect beaches, inlets, the inner-continental shelf, and man-made structures within the coastal zone. The specific issues that demand most research are erosion control, dredging, storm protection, navigation, and environmental construction design. As with the Hydraulics Laboratory, the CERC models are both subject and site related (US ACE WES Fact Sheet).

A number of CERC's current and ongoing projects cover some of America's most dynamic coastlines. The scale model (1:100 vertical/1:400 horizontal) of Los Angeles-Long Beach Harbor (Figures 5.26-5.28) is considered to be "the world's largest wave action model" (Stroupe interview). Other CERC models include: California's Morro Bay Harbor (1:90), Burns Harbor on Indiana's Lake Michigan shoreline (1:36), and Barbers Point Harbor in Oahu, Hawaii (US ACE WES Fact Sheet Activities Summary).

CERC has also done models of San Francisco Bay Harbor and Chesapeake Bay. A current hydraulic model of the San Francisco Bay-Delta Tidal area is operating at the U.S Army Corps of Engineers' San Francisco District facility in Sausalito, California.

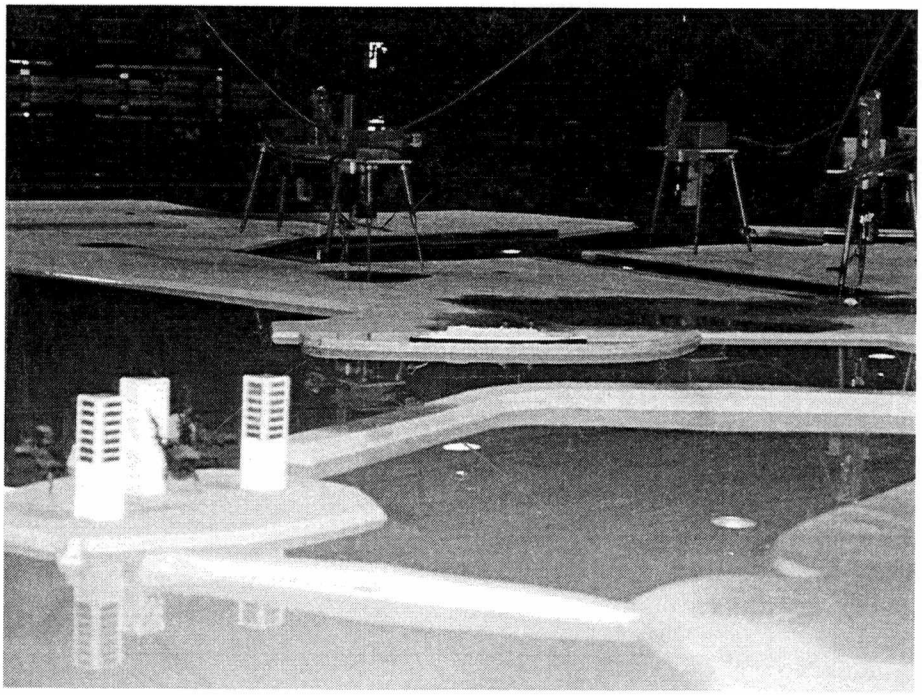


Figure 5.26
Los Angeles-Long Beach Harbor Model at the Coastal Engineering Research Center

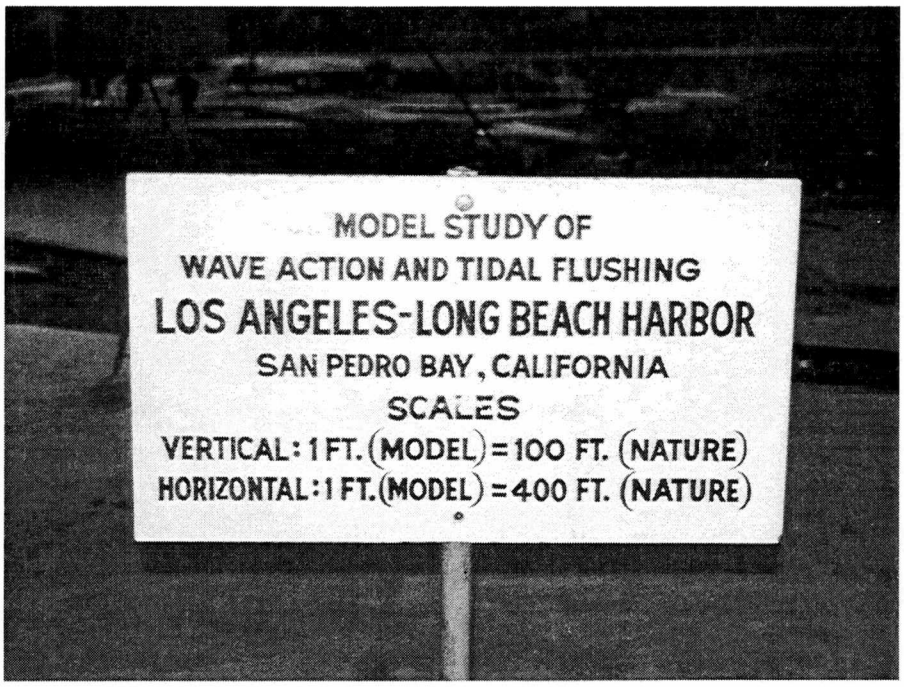


Figure 5.27
Interpretive Signage Intended for Visitors

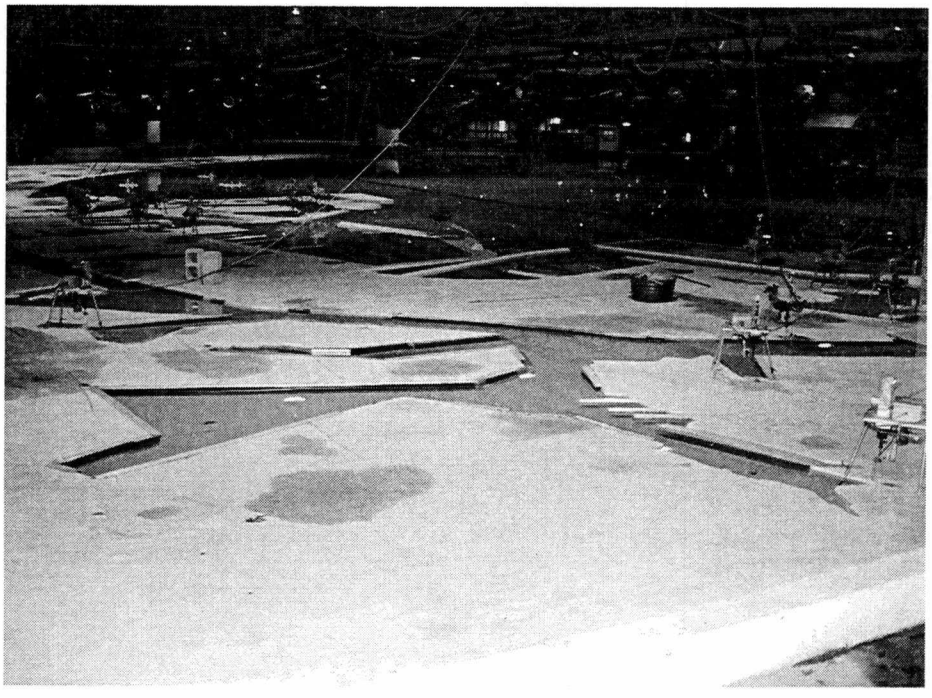


Figure 5.28
"The World's Largest Wave Action Model"

As with the Vicksburg site, the Bay Model Visitor Center allows "scientists, educators and citizens" an exceptional opportunity to experience the world of simulations. Complementing the Bay Model are special educational programs, tailor-made tours, meeting facilities, a gift shop, and a research library (US ACE San Francisco District). The enormous Chesapeake Bay model was decommissioned in the early 1980s, and is located in a five acre warehouse in Maryland (Stroupe interview).

The Mississippi River Basin Model

Another defunct model is the Mississippi River Basin Model (MRBM). At one time the MRBM was considered the world's largest small-scale working model (US ACE WES Mississippi Basin Model). Today, however, its future is very much in jeopardy. Started in 1943, the model proved quite useful for several decades until operations and maintenance costs out grew its need and demand. Its primary purpose was to evaluate flood control procedures on the Lower Mississippi River and its tributaries.

The enormous outdoor model sits on an 800-acre site just inside the city limits of Jackson, Mississippi, 40 miles east of WES' Vicksburg office. It was designed with the distorted scales of 1:2000 for horizontal dimensions and 1:100 for vertical dimensions. Thus, it was to have a time compression of one real day equaling 5.4 minutes on the model (@1:267). The MRBM was constructed almost entirely out of molded concrete featuring thousands of linear feet of sewer and drainage pipes. When the simulation was operational it had a water discharge scale of 1:1,500,000.

The model's history is fairly unusual, in that it was constructed in part by a group of 300 German prisoners of war. The majority of the POWs stationed at the nearby camp were from George Rommel's Afrika Korps. While on the project from 1943 to 1946, they worked primarily on grading and molding the terrain's topography. By the early 1950s, the model was fully operational and featured an extensive series of

hydraulics and automated instrumentation (Stroupe, "German POW Visits"; US ACE WES Mississippi Basin Model).

The outlook for the Mississippi River Basin Model is not nearly as colorful as its past. This is due primarily to the high costs associated with running the model. Several years ago WES estimated the MRBM's annual operating expenses as being between $300-$500,000 (Stroupe interview). On January 8, 1973, WES, through the U.S. Department of Interior, Bureau of Outdoor Recreation, donated the model and part of the surrounding property to the City of Jackson. Within months, however, WES had to lease the model back in order to deal with the major flood that year. The 20 year, $1/year lease expired in 1993, and WES opted not to renew it.

Jackson officials understand the price of rehabilitating the model, as well as the difficulty in marketing it. As noted by one City of Jackson employee, who has family ties to the site, the future of the model is in limbo. "A task force a couple of years ago couldn't come up with a way to keep it open...including using it as a tourist attraction" (Ewing interview). Thus, the present day status of the model reflects the many years of neglect and abandonment. Although it is surrounded by a well groomed park with soccer fields and a golf driving range, the large, fenced off, model area is overgrown with weeds and is susceptible to vandalism. The site of this once vital research tool now features: vacant experimentation buildings, misplaced and

corroded signs, a rusting 5-story lookout tower, broken down pumping devices, and few if any bright prospects in sight (Figures 5.29-5.37).

Programs

The public relations and education programs at WES are very broad based. Three target groups that WES tries to focus on include elementary and secondary students, graduate and post-graduate students, and the public at-large. These programs range from providing packages for tourists to offering university accredited engineering courses. Since WES' activities are so varied, the focus for this study will be on scale models and the programs targeted at younger students.



Figure 5.29
The Mississippi River Basin Model (MRBM) in 1995: Forty Years of Wear and Tear



Figure 5.30
Looking "West" towards the Viewing Tower, Research Buildings, and Water Tank



Figure 5.31
Looking "East" from the Top Floor of the Viewing Tower



Figure 5.32
Pumping Stations and Measuring Devices along the Upper Mississippi



Figure 5.33
Tower View of the 4' Wide Walking Bridge near the Mississippi and Ohio Confluence



Figure 5.34
Evansville, Indiana along the North Bank of the Ohio River



Figure 5.35
Looking "South" towards Louisiana Bayou Country and the Gulf of Mexico



Figure 5.36
The MRBM Site Is Now Part of a Municipal Park: Soccer Fields in the Distance



Figure 5.37
Overgrown Weeds and Rusted Equipment Are Foreboding Signs for the MRBM

Through its Public Affairs Office, WES provides both guided and self-guided tours of its facilities. The self-guided tours include full color brochures with maps, photographs, and text. Both tours cover basically the same stops, which include two sites with automated models. The first of these sites is the Water Resources Demonstration Model (WRDM) adjacent to the Visitor's Facility (Figures 5.38-5.39).

The automated WRDM depicts the effect of rain and nature on a typical waterway. It then shows how the Army Corps of Engineers addresses concerns relating to these effects. The model uses lights and an audiotape to highlight levees, reservoirs, hydroelectric dams (Figure 5.40), and an estuary. The estuary comes complete with its own tide and wave generators. The model itself is approximately fifteen feet long by

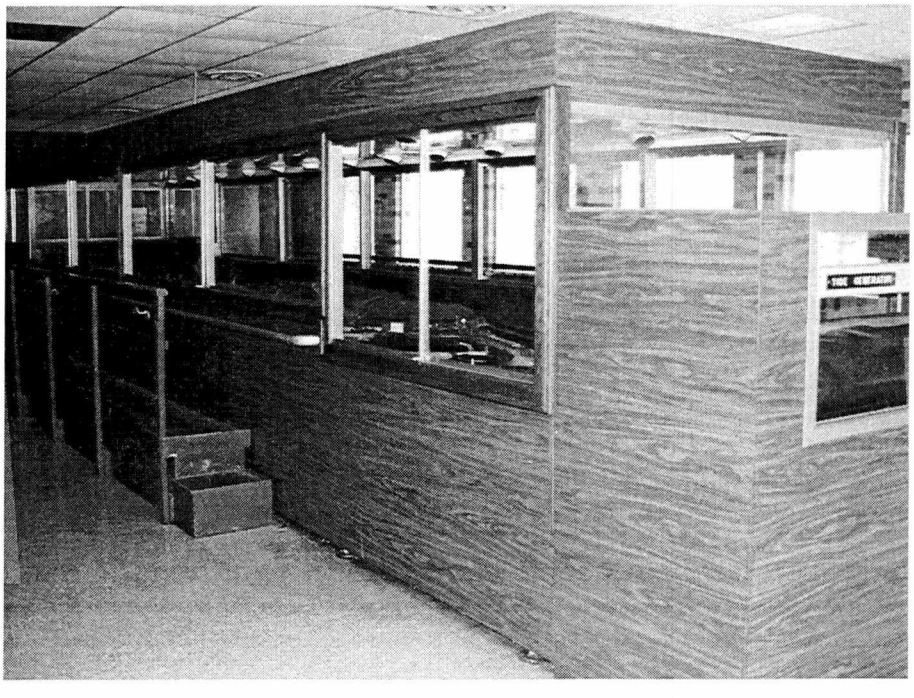


Figure 5.38
WES' Water Resources Demonstration Model (WRDM)

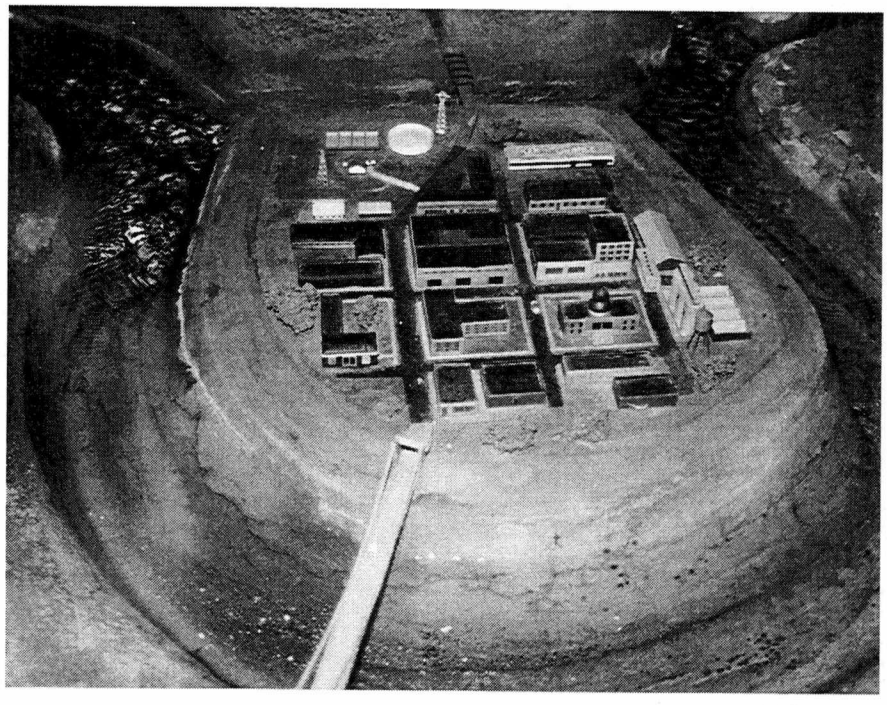


Figure 5.39
Closeup of the WRDM's River "City"

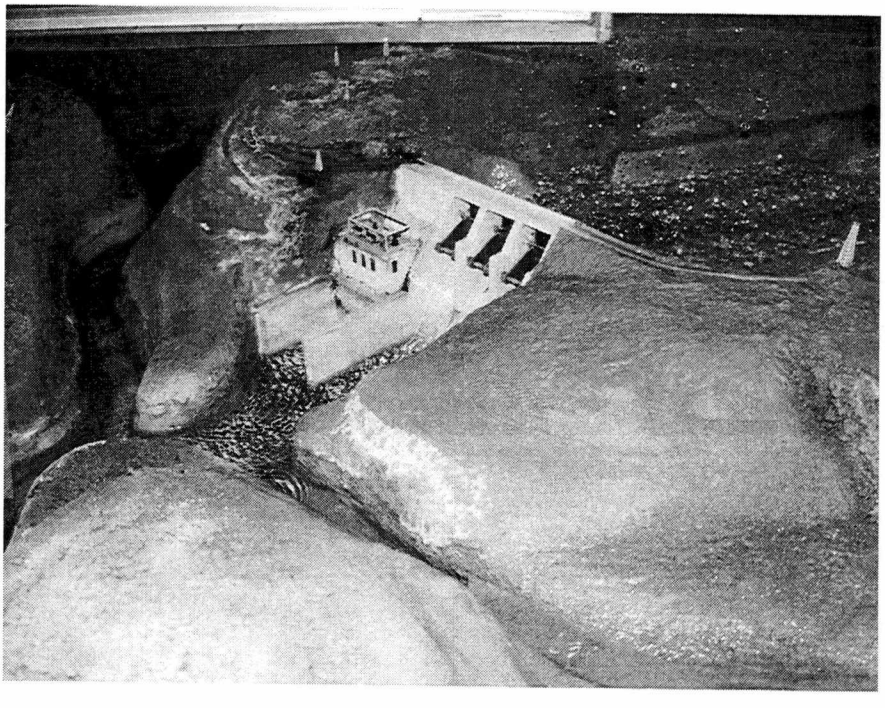


Figure 5.40
A Hydroelectric Dam on the WRDM

four feet wide (15' x 4'), and is set in a panel and glass enclosure. The WRDM is made operational by a switch activated by the visitor. No specific scale was indicated on the model.

The second site open to the public features the Niagara River and Falls Model, and assorted individual case models (Figure 5.41). Also showcased, is a small representation of the Mississippi River basin. Through a photographic history, this exhibit illustrates the development of the MRBM in Jackson. During the author's December 1993 site visit, this table-top model (Figure 5.42) was in the process of being renovated.

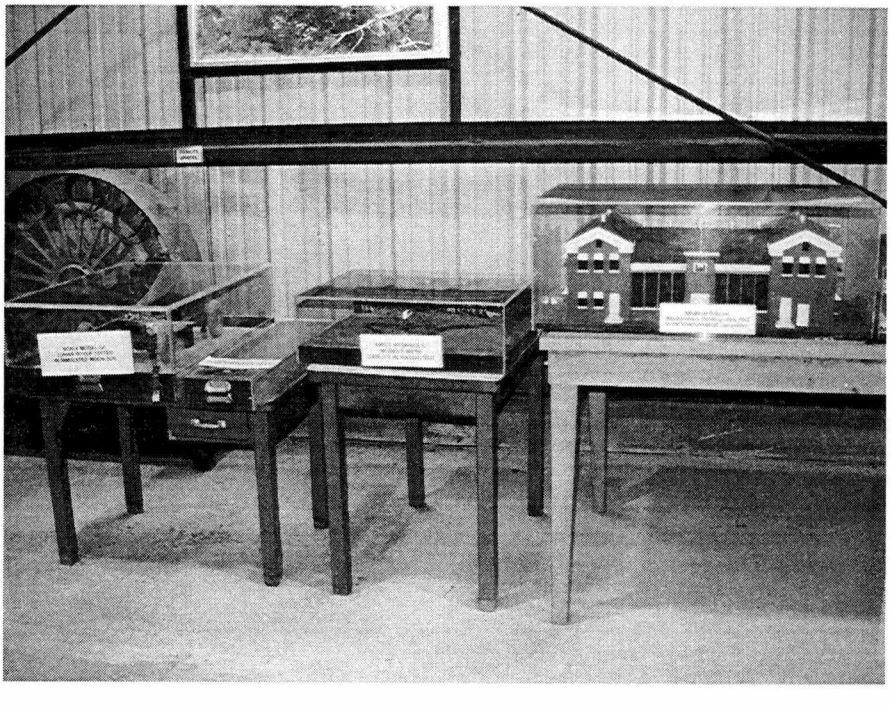


Figure 5.41
Individual Case Models within One of WES's Visitors Sites

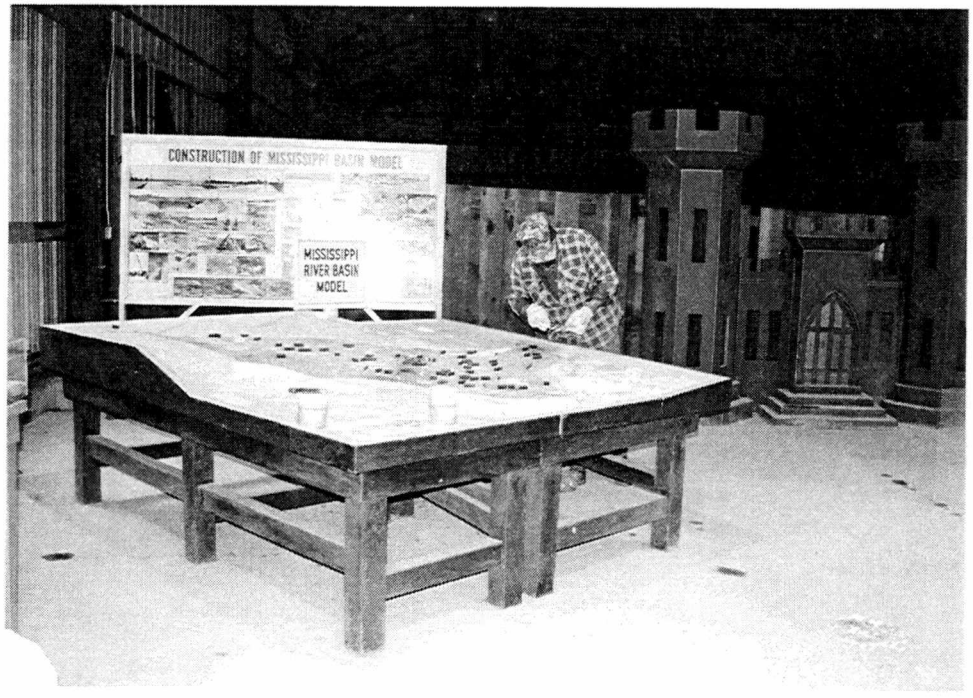


Figure 5.42
A Tabletop Model Depicting the Mississippi River Basin Model's Layout and History

The Niagara model (Figures 5.43-5.44) is the only formerly operational model now open to visitors. It features an accompanying taped narration, which describes mixing environmental preservation with flow diversion for hydroelectric power. All of these models are housed in a utilitarian warehouse containing several additional simulations and educational artifacts. Across the street from the warehouse is the Outdoor Model Area, which visitors can view from a distance.

"Each year over 30,000 people visit WES, including more than 500 foreign nationals" (US ACE WES Fact Sheet). According to Wayne Stroupe, WES' Assistant Chief of Public Affairs, at least 2,000-4,000 of these visitors are children. The majority of

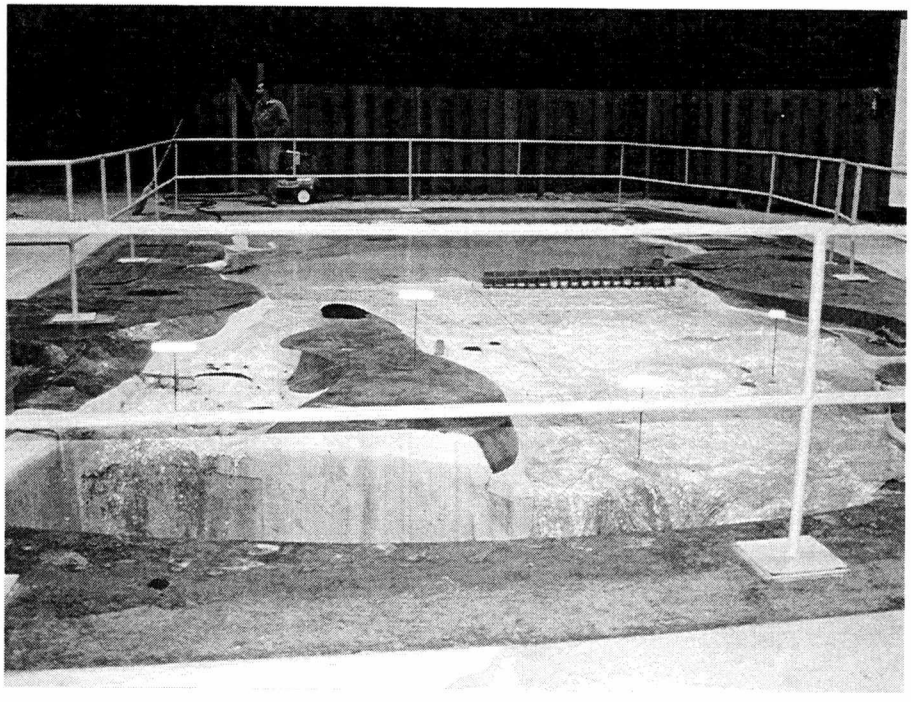


Figure 5.43
The Niagara Falls Model: Formerly Used as an Experimental Simulation Tool



Figure 5.44
A Closeup of the "Operational" Niagara Model

these are elementary and secondary students, ranging from third to ninth grade. Many of these students come on field trips or as part of an outing for a graduating class. WES also targets "family trips" for families in town to see Civil War history or for riverboat gambling. Both written and verbal feedback is requested from all of their visitors (Stroupe interview; Stroupe survey).

WES has developed a number of programs under the umbrella of "education partnership." As part of their Mentor Program, a WES engineer or planner will work with a specific school, class, or even individual student. They also work with schools in several different states, which have recently begun teaching a course on the many "cultural aspects and research areas" of the Mississippi River. WES actively participates in such activities as Career Days, Engineering Week, and Conservation Carnivals. They provide a speakers bureau listing for local schools and clubs. The local public television station also works closely with the people at WES (Stroupe interview; Stroupe survey).

For university students, WES opens its facilities for such things as engineering camps and student research projects. Also, "the WES Graduate Institute provides on-site educational opportunities with three major universities (Louisiana State, Mississippi State, and Texas A&M) offering graduate courses in science and engineering subjects" (US ACE WES Fact Sheet). WES is linked via satellite to the nationally accredited

National Technological University. This technology transfer provides courses from over 40 of the country's leading engineering schools and other organizations.

Summary

Although these three organizations share the common element of having their models open to the public, they share little else in regards to these models. This is especially evident in their emphasis toward educational programming. These efforts range from the broad based endeavors at the Waterway Experiment Station, to the continually expanding tours and workshops at the Queens Museum of Art, to the complete absence of programs at Central Atlanta Progress, Inc.

Much of this difference is based on the initial functions for each of the organization's models. Even so, it has been each group's evolving mission statement that has determined if and how these models are being used as educational tools. Both the Panorama of New York and the models at WES are being utilized due to an organizational charge for a planning oriented education. However, due to a lack of such a commitment the two urban scale models at Central Atlanta Progress continue to be underutilized by students and teachers alike.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Introduction

Dynamic forces are constantly redirecting the focus of American education. Particular events, such as the Bicentennial or the two hundredth anniversary of the U.S. Constitution, typically encourage spurts in civics, planning, and current events oriented curricula (Fiske). Since such educational programs are intended to create a more informed and accountable citizenry, one question remains. If it's good to teach these lessons part of the time, then why not all of the time?

As noted in earlier chapters, there has been a select group of individual teachers and design professionals who have committed to this focus of study. The educational resources are available. However, whether these resources are used on a more broader basis, depends solely on how much importance is placed on them. It is simply a matter of determining the priority level of a built environment education within a student's overall learning experience. Therefore, educators, administrators, parents, and professionals, should evaluate the successes of such organizations as the Center for

Understanding the Built Environment (CUBE), and then decide how the programs provided by such groups can benefit their community.

A major reason for the success of these groups is they have typically incorporated interaction with a scaled environment that is unintimidating and appealing to children. They simulate homes and business, places to worship and places to play, all of which are vitally important in a child's small, but growing world. As Ernest Burden surmised: "The purpose of these simulations is to communicate through visual means - a process that has been going on for over 25,000 years" (Burden, Preface). If this means a greater ability to capture a students attention and interest, then the educational system is enhanced and communities will only gain. As alluded to in the video, Planning Education Kid Style, programs such as Box City are invaluable because; "the more everyone knows about the planning of our towns, our cities, our regions, the better will be our future. And, that's a goal worth working for" (Prochaska).

The Future of Built Environment Education

The surveys and mini-case studies indicate that a planning-oriented education is not typically a high priority for many organization, even though their primary function may be directly related to the built environment. This is especially true when it comes to incorporating their existing three-dimensional simulations into the learning process. Several organizations, however, have succeeded in customizing their missions around

their resources. Among the more noteworthy groups who have developed such educational programming are: the Queens Museum of Art (Panorama of New York City), Madurodam, the Colonial Williamsburg Foundation, Vicksburg's Waterways Experiment Station, and the Children's Museum of Tampa at Safety Village.

What drives such groups as these to invest time and effort into built environment education? It seems that most recognize the critical path children must follow in order to become well-informed, civic-minded adults. This means providing children with whatever tools are necessary, so in the future, they have the ability to make important decisions about their surroundings. In this spirit, Anna Sanko contended that such programs, as the "Call to Visionary Artists," offer "a generation of students a means to become responsible and informed inheritors of our cities' and nation's built environment" (Georges).

Few educators in the areas of planning and architecture have worked more diligently at stressing the importance of a built environment education, as professors Carl Patton, Eugene Cizek, and Kevin Lynch. These highly recognized leaders in the design field have realized the tremendous value of providing school children with an urban design oriented curriculum. Each in his own way has been very successful in creating innovative approaches to sharing information about the built environment. Thus, the following three statements come from dedicated individuals who have seen first-hand

the benefits of committing to a child's education. To a great extent, these bits of wisdom summarize the purpose behind this study.

Regarding the roles children will eventually have as full-fledged citizens, Carl Patton wrote:

> "While it is true that few of today's elementary and secondary school students will become planners or government officials, during their lives most of them will certainly come into contact with several aspects of city planning and governance. Many will serve on boards and commissions, and even on city and county councils. They will vote on bond issues and referenda related to city development. Some will become realtors or developers. Others will be involved in urban development in many as yet unknown ways" (Patton 1).

Eugene Cizek has noted that curricula such as, his "Education Through Historic Preservation" program, prepare children for life after school. This is done by helping children to establish long range goals, and by giving them an overall sense of purpose as members of the community. Cizek explains:

> "The program has always related what is taught to real world situations. It organizes the curriculum in a manner that exploits the connection of art and architecture with other subjects. The program has also been an important tool for teaching citizenship and community service. More importantly, the program has had a positive impact on the student's self concept, their future ambitions, their appreciation of the past and how it affects the present and the future and their ability to make critical decisions about the environment, both natural and man-made" (Cizek 5).

In "The Spatial World of the Child," Kevin Lynch is adamant about empowering children through a built environment education. He states that only through the assistance of planning and design professionals can children be given a voice in their

future. And in turn, these professionals must be committed to implementing what *they* learn *from* the children. Lynch expresses his feelings as follows:

> "I am a city planner and a teacher. I am primarily interested in changing the world. True, I have not gotten very far in that. But if I am interested in making a better world, then, necessarily I must be begin with an understanding of what the environment means to people, how they use it, how they value it, how it prevents them from what they want to do, how it facilitates them, how it increases their confidence. The value of any place lies in the relationship between the person who uses it and the place itself....[M]any different overlapping groups in the city have different purposes, use the city in different ways, and therefore evaluate the city by different criteria. Moreover, among those groups, there are some which control the environment whether through money, political power, or sheer technical expertise. There are many other groups that have little control, and are subject to the environment so created. It is those latter groups which are most interesting and most crucial...children are one of these important groups. They have few ways of expressing their feelings about the world or how they use it, have almost no power, and are extremely sensitive to what surrounds them, in terms of physical health, but also in the way the world prevents them or helps them grow" (Michelson, Levine, and Michelson 102).

It is this manner in which children are assisted in their growth, that is at the heart of a well-rounded education. If having a built environment curriculum in the schools helps children develop into better student-citizens, then it should be mandated. Critics may argue about such a program's overall relevance, or that it is only being used to promote certain "liberal" or "conservative" viewpoints. Such a concern was raised in the article entitled "Enviro Education: Is It Science, Civics - or Propaganda?" Although this piece positively promoted such educational programming, it acknowledged; "in an age when social issues of all types find their way into the curriculum, environmentalism has become a mainstream political force" (Poore 26). It

may take strong political action, however, to guarantee children the best education possible.

Politics aside, this is also a time when many reports reveal: the average American is geographically illiterate; high school dropout rates continue at alarming rates; and, that the fast growing groups of applicants to the nation's universities, in the fields of architecture, planning, and engineering, are from outside the United States. However, as a recent Wirthlin Group survey indicates, this does not mean that most American students are filled with apathy, or disinterested in improving their surrounding environment. On the contrary, the vast majority of teenagers surveyed (95%, +/- 3.3%), felt it was "important" to them to have "greater opportunities to help fix community problems" (Henry). It seems that what is needed is a way for these youths to be able to refocus their energies. This may mean requiring schools to establish more civic-oriented curricula. A program such as Box City would be ideal in meeting this mandate; and, Box City has the extra added appeal that not only is it educational, it's also fun.

LEGO's long-time, "in-house philosopher," Olaf Thygesen Damm, asserted that it is quite essential to combine fun activities as part of the learning process. Damm stated: "It's a demanding process to be a child, to try to fit into society. There are many conflicts, many problems to solve, many defeats on the way to becoming a grown-up. It's a very hard time. Children need tools for their creative play; what we call toys

could be called tools for play. And the better the children play, the better they will master the world" (Wiencek 84). Thus, a built environment curriculum featuring an enjoyable interactive component may be the best way to assure a student's comprehension of the subject.

Administrators and local school boards need to investigate communities that have adopted built environment curricula. They should evaluate them on whether their educational programming can be directly related to such concerns as; better academic scores, lower crime rates, higher levels of voluntarism, stronger voting records, and greater numbers of college bound students. These investigations should focus on international school systems, as well as those across America. If a significant percentage of these communities show positive results, then local school districts across the nation should begin mandating planning-oriented studies.

As part of this recommendation, participation in such activities as CUBE's "Teach the Teachers" program, would be either required or strongly encouraged. This would further guarantee that the students were receiving the best possible, built environment education. Also, as Ginny Graves, Eugene Cizek, and others have noted, such in-service training sessions typically reinvigorate teachers, by providing them with a new sense of purpose. This renewed motivation is often the only missing link in ensuring a truly exceptional learning environment. Cizek maintains; "it is the teacher's inspired

presence which makes the classroom a special place and learning a unique experience" (Cizek 9).

However, until the time that planning-oriented studies are mandated, interested parties will need to continue working with individual educators, curriculum advisors, and administrators, to seek out innovative ways to teach children about the built environment. One of the main keys to this success will be a knowledge of what resources are available and how to develop programs around them. This may include joint efforts with groups that focus on urban design issues such as local APA and AIA chapters, municipal agencies, and institutes of higher learning. The recent proliferation of children's museums and other interactive attractions may also provide many new sources for joint educational activities.

Good relationships are especially important when considering that very often organizations, not schools, are responsible for enlisting funds. A perfect example is a recent initiative by the Queens Museum of Art. During the summer of 1995, QMA received an Institute of Museum Services (IMS) grant to further their built environment educational programming. The museum had identified this funding as a way to develop a particular, site-specific, outreach program. This $20,000 IMS grant establishes a museum partnership with the nearby elementary school, PS 143 (Louis Armstrong School). The intent of this partnership is to teach these local children, many of whom are underprivledged, about the numerous resources within their

community. These lessons will be taught primarily through the use of the newly renovated Panorama of New York City (Vatsky, interview, 6 Sept. 1995).

In their book Educational Renaissance: Our Schools at the Turn of the Century, Marvin Cetron and Margaret Gayle stress the need for one more significant alliance, the partnership between schools and the business community. The authors believe that schools be persistent in creating and nurturing these partnerships, seeking "help from business whenever it can be had" (Cetron 185). Assistance can be provided through such things as financial support, lecture series, field trips, and the donation of materials (i.e. unused models). This will require the involvement of architects, planners, and urban designers, as well as a host of other concerned business persons.

Not only do such partnerships help the students, they can also be quite beneficial to the members of the business community. Dean Graves, FAIA, an advisor to CUBE, has indicated there is one very important reason why design professionals should spend time with teachers and students. Graves declared: "Without training in the understanding of what a quality built environment can be, we will continue to fight the same design battles over and over. What CUBE and others like CUBE are doing is 'bringing up' a new audience for a quality built environment" (Graves, "Why Professionals"). Walter Browder, of the Los Angeles-based development firm, Pardee

Construction Company, explains why he and his associates have gotten involved with local schools by sponsoring the "Built Environment Education Program" (BEEP); "we build good houses, but we're interested in building good communities" (Woodcock 78).

As indicated in the following excerpt from Philadelphia's "Parkway Education Program," the resources for a good built environment education are readily obtainable. However, it is a matter of educators and administrators rearranging their priorities in order to reach out and form new, potentially invaluable partnerships. Then, it will be the duty of these new allies, whether they be design professionals, universities, small or large businesses, nonprofit organizations, and/or governmental agencies, to ensure that they provide the best possible learning experience available.

> "The city offers an incredible variety of learning labs...although schools are supposed to prepare for life in the community, most schools so isolate students from the community that a functional understanding of how it works is impossible...Since society suffers as much as the students from the failures of the educational system, it [does] not seem unreasonable to ask the community to assume some of the responsibility for the education of its children" (Ward 177).

The intent of these educational partnerships is to inspire school children and expand their horizons. This is exactly what Robert Moses had in mind with his plans to use the Panorama of New York City as a teaching tool. Another one of America's most influential planners, Edmund Bacon, also shared this vision. Bacon was convinced

about the positive impact created by his model of Philadelphia. He once professed: "the citizens who have had the opportunity to see this exhibit, go back with new vigor and interest in developing a newer and better city" (Bacon). Perhaps a renewed commitment in cities is exactly what education-minded planners are seeking; and, if models and other simulations can serve as the necessary catalysts, then educators should follow the examples of Moses and Bacon by fully utilizing these tools.

Although both the New York and Philadelphia models were developed over a quarter-century ago, the increased levels of comprehension simulations provide does not diminish over time. The only thing different now is there are more technologies and interactive teaching tools which further enhance the learning experience. Thus, what Edgar Dale proposed 50 years ago is still applicable today. A past president of the National Education Association's Visual Instruction Department, Dale suggested that students make three-dimensional simulations of urban environments in order to learn how cities operate. As part of this process, teachers would ask questions about how the students interpreted different impacts on their modeled communities (i.e. "Would it be better to re-route the main trucking highway?" and "How can city planning be correlated with democratic objectives?"). Dale wrote:

> "Models can be used in civics wherever they make the subject more clearer and meaningful. A class in city planning will not merely want to see various plans and read about them: the pupils ought to have to do some city planning of their own. They need not be gems of craftsmanship - what they lack in artistic perfection they more than make up for in clarity, interest, and realism (Dale 365-366).

Maximizing the Educational Benefits of Three-Dimensional Simulations

One of the best ways to develop an out of school partnership is to ask for the donation of unneeded models or building materials for use in the classroom. An example of such a commitment made the initial KnoxBox City program possible. In coordination with the school, the firm, Community Techtonics, funded the construction materials, as well as gave freely of their time and expertise. Professionals can also help offset the modeling costs incurred by college architecture students, so that their projects can be donated to area schools, instead of being dismantled for their parts. Such an action could have been used with Catholic University's model of Seaside, Florida, or with the Fourth and Gill neighborhood models, produced at the University of Tennessee-Knoxville. In the latter case, these simulations would have provided local school children with a one-of-a-kind opportunity to learn about their historic neighborhood.

Most of the architectural models developed by private firms seem ideal for this partnering process. As Akiko Busch has affirmed: "These models are constructed for temporary use. Because the architectural firms or developers that have commissioned them rarely have the storage space or the incentive to keep them, models are frequently dismantled or destroyed after they have served their purpose" (Busch 14). Therefore, instead of bringing them to the landfill, these models could be given to

schools, museums, community centers, or any other place involved in teaching about the built environment. Also, with regard to models currently in storage (e.g., Philadelphia's Center City model), they could be lent/leased to an educational institution. An interested party, such as a local APA chapter, could pick up the associated costs of transporting and installing the model.

There are numerous pros and cons associated with using scale models, the cost factor being a primary one. In his book, Visual Simulation: A User's Guide for Architect, Engineers, and Planners, Stephen Shepherd notes such additional "functional considerations" as: accessibility, portablilty, ease and speed of preparation, durability, flexibility, and capacity for storage (Shepherd 105). There are also several other concerns that may directly relate to how models can be used as teaching tools in elementary and secondary schools. Among these issues are: the model's overall context; the ability of scaled representations to increase comprehension levels; the reality of an authentic environment versus its idyllic nature in miniature; and, the facility with which an individual can either alter and/or interact with the simulation.

Although a good education is invaluable, most of the hard costs can be easily determined. Therefore, in addition to such things as financial support from the business community, other cost factors must be addressed. The following two

examples indicate that simulated urban environments (at least large ones) can indeed be a cost effective part of the learning process. The first such example is the Box City Festival Pack. For under $500, this exciting curriculum can provide a full day's worth of activity (or more) for dozens of children. This amount seems in-line or even low compared with other festival costs such as; musical entertainment, children's artists, amusement rides, and other staged events.

The enduring nature of Madurodam shows that places, such as miniature villages, need not be out of the financial reach of most schools or parents. Madurodam has extremely low ticket prices, averaging under $3.00 per person (Schild, MINI-USA!, 26). Such accessibility has made Madurodam the most highly visited attraction in Holland. In turn, this has allowed Madurodam to undertake its current expansion, permitting them to share even more lessons about architecture, planning, and governance. It should also be noted that even with the proposed average ticket price of $10 (inc. $6.00 per person for groups of 20 or more), MINICITY, USA! will be as affordable or more so, than many of America's other educational/entertainment attractions.

Most critics (and even proponents) argue that scale models can be used to distort reality. The following quotes elaborate on how and why this perceived deception occurs.

"A model has its own characteristic properties, and these may often be unrelated to actual architecture. Just like a drawing, a model is an expression of the thought behind a design. The expert who has to make a reasoned judgement can be misled by the appearance of a model into approving a design which he or she may no longer recognize once the actual building has been completed" (Knoll 8).

"Complaints about simulations take the form of uncertainty ('I can understand it but I don't know whether to believe it'), or skepticism ('I don't believe it, and think the real scene would be different')" (Shepherd 54).

"Models represent projects in their idealized state, often in a manipulated context or out of context altogether. The model offers us a Gulliver's view of a lilliputian world, its seduction of scale reinforcing the sense of our powers to control the environment, whether it be unbroken countryside, a city block or the interior of a room" (Lebensohn 34).

There is a "question of how much, if indeed at all, a model can evoke the more subtle, atmospheric qualities of architecture and its environment" (Busch 93).

In contrast, there are those that believe models are an ideal tool for depicting real environments. Such sentiments are evident in the following statements.

"Scale models represent the closest simulation to the real thing, since the project is already in a three-dimensional mode" (Burden, Preface).

"The point of all this work and money is not to marvel over the miniatures, captivating though it may be, but to get a preview of real life" (Jacobs 192).

"The model purports to present architecture, not *re*present it" (Institute for Architecture and Urban Studies, Hubert, "The Ruins of Representation" 17).

"For certain understandings, a wisely edited version of reality can be better than the un-edited reality itself" (Dale 83).

> "Models can, however, provide an illusion of reality, without being compromised by it. The value placed on reality and the conceptions of it, not the medium of the representation, are the essential matters" (Institute for Architecture and Urban Studies, Pommer, "Idea as Model," 5).

The main objective of this work is to determine how these conflicting arguments apply to teaching elementary and secondary school students. Thus, it is important to note that most of these comments, regarding the misleading nature of models, were made in the context of employee/client relationships. In these settings, misunderstandings typically evolve around such issues as, hidden cost overruns and unplanned design changes. Although such concerns are obviously important to a developer or an investor, they should hardly affect school children, who are learning the basic elements of planning and design.

Addressing why many miniature environments are viewed as being almost idyllic, Akiko Busch remarked; "in the model world, buildings are stilled, pristine" (Busch 27). This, however, is no different than the state of most photographs, books, and other similar teaching tools. Scaled models presented in such a fashion are actually useful in that they can eliminate certain "real" distractions. The buildings of the Acropolis can be showcased in their original form, for instance, and not as ruins of modern day Athens. Further, children can study the design elements of an unsafe inner-city neighborhood, without being subjected to harm. Any number of other

obstacles can be overcome through the use of models, including building proximity and property accessibility (e.g., Sequoyah Nuclear Plant). Nonetheless, not all urban settings need to be depicted in an idyllic manner, as illustrated by the New York City street scene at Tobu World Square (see Figure 2.39).

Children must also be given some credit for their ability to discern between what is real and what is not. For even the youngest of elementary school students would not confuse the Panorama at the Queens Museum of Art with the authentic New York City. This concept of judging what is real is of particular importance in light of other educational attractions such as Massachusetts' Plimoth Plantation and Lincoln's New Salem Illinois State Historic Site. These types of museum villages, along with other anachronistic collections of buildings, are often loosely referred to as "building zoos."

Such places typically try to reproduce history, albeit in many cases without proper interpretation. Their buildings are commonly (although not always) either reproductions or non-historic reconstructions. Other "villages" feature structures that have been relocated, and thus, are out of context. Many of these sites, however, are being portrayed as a true snapshot of American history. Although these sites may offer some educational benefits; they commonly relay conflicting messages about historic preservation and planning. In contrast, with the depiction of the Jamestown

Settlement at MINICITY, USA! or a similar miniaturized historic locale, the implication of replication is obvious (Figures 6.1-6.2).

Few mediums can present a subject as comprehensively as a miniature without being overwhelming. "In introducing the exhibit 'Miniature Environments' shown at the Whitney Museum of American Art at Philip Morris, Josephine Gear wrote, 'The miniaturization of scale is a strategy for making art unintimidating and approachable and for inducing physical- and emotional-proximity'" (Busch 13). It is this ability to make subjects such as architecture and city planning fascinating for children, that makes models so useful.



Figure 6.1
The Real Acropolis?

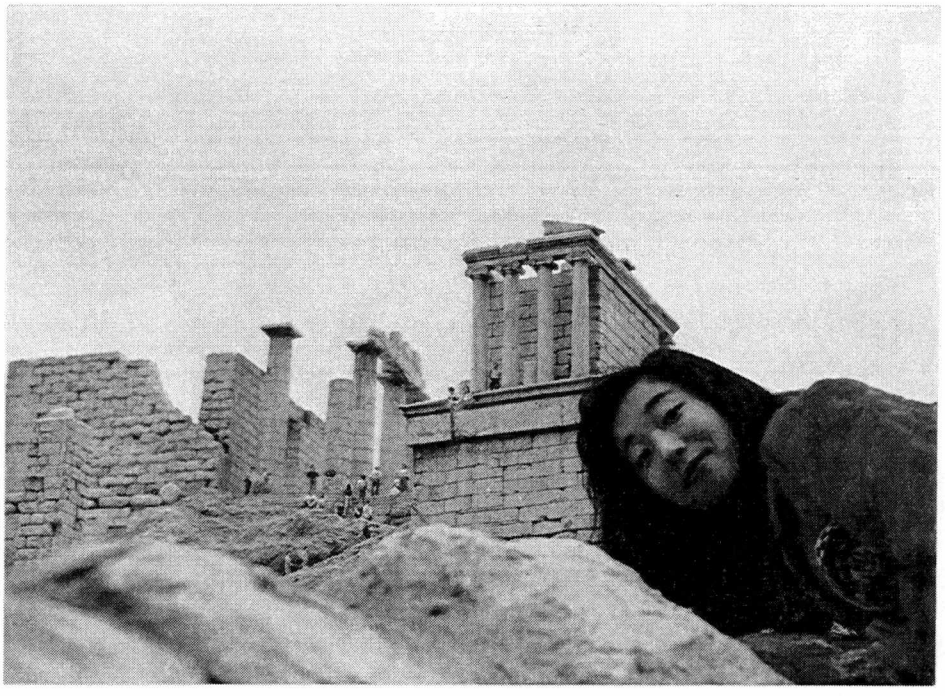


Figure 6.2
The "Real" Acropolis in Miniature

Obviously many urban design concepts are easier to understand when they can be studied from a bird's-eye view. The design intent of an interchange cloverleaf or a formal French garden would be nearly impossible for a child to comprehend, if the child were only experiencing it at full-scale. However, the geometric simplicity of these designs becomes much clearer when they are viewed in their entirety. Thus, a miniature village or Box City layout can illustrate dozens of urban ideals, where school children can quickly detect these concepts, because of the setting's overall scale and format.

Although almost unheard of in the United States, miniature villages have proven to be one of the best overall tools in teaching children (and adults) about the built environment. Their comprehensive nature is perhaps the main reason for this success. Because of this comprehensiveness, miniature villages can typically explore the realm of relationships. It is this overall understanding of how structures relate to one another, as well as to the natural environment, which distinguishes the fields of planning and urban design from that of basic architecture. Consequently, Madurodam and other miniature villages have been able to develop educational programs which address such varied concepts as: environmental stewardship, transportation networking, contextualism, municipal governance, historical development, and land-use zoning.

Most miniatures villages feature a marvelous blend of national and/or international landmarks. Even though some collections are displayed anachronistically (Figure 6.3), miniature villages generally provide an excellent setting to relay the story of human achievement. These storied images can represent scenes going back hundreds of years and across thousands of miles. Through the use of videocameras these same stories can be captured for audiences who are otherwise unable to visit these sites. Not only would such video presentations be able to provide fascinating close-ups and "aerial" shots, they would also allow for a direct comparison of otherwise unrelated buildings and design features. Further, the cost savings in travel could help justify the use of



Figure 6.3
Mixing Occidental and Oriental Architecture at LEGOLAND

the miniatures, as opposed to the real structures. Such images, however, must be clearly interpreted as simulations.

Why miniature villages have been almost completely absent from American culture is still unknown. Perhaps as noted earlier, it is because of the popularity of more traditional amusement parks; or, maybe it is due to the fact that when compared to our European and Asian counterparts, Americans in general have placed little importance on their national heritage. Nonetheless, with the development of such miniparks as

Splendid China Florida, LEGO Family Park, and MINICITY, USA!, this void is finally in the process of being filled. These new sites, and similar future ones, will hopefully provide American school children with a new and exciting educational tool; one which has been used successfully in other countries for well over half a century.

As useful as miniature villages and other simulated environments may be, all teaching tools, no matter what their scale or medium, need to be used in a collaborative effort. That is why many scale models are complemented by maps, photographs, drawings, full scale settings (i.e. Splendid China's marketplace), and other assorted audio, visual, and tactile devices. The intent of using all these things together is to make the learning experience as full-sensory as possible. With the technologies currently available, a student visiting a miniature village could activate the audio-histories of Philadelphia, Detroit, and Radburn, New Jersey; and, if interested they could receive a comparative analysis of the orthogonal, radial, and "superblock" plans that influenced their designs. Then, with the swipe of a computer card, the student could print out any necessary data, enabling him or her to prepare a school report on the subject (Kinscherf; Nesbit).

These other media are vitally important; although, none are capable of providing the same overall experiences as a three-dimensional simulation. Akiko Busch noted; "architectural models are supportive devices" (Busch 14), just as are all of these other

tools (Figure 6.4). Wolfgang Knoll states, this even includes the sometimes seemingly omnipotent computer. As a substitute for tangible simulations, computers "cannot replace the actual material experience, the physical shape and the build-up of spatial relationships. Neither the computer nor the sketchpad can replace the function of the conceptual model" (Knoll 8).

In addition to these shortcomings, many computer programs are based on having one student, at one terminal, at one time. Although this separation may be appropriate for certain purposes; it is in total contrast to developing relationship skills, which is at the



Figure 6.4
The Sequoyah Energy Connection Experience: Models Plus Other Educational Tools

heart of such curricula as Box City. One person who is convinced of the need for such interaction is Robert Nelson. While working in the aero-space industry (Lockheed), Nelson developed the multi-unit "Game-Sim" curriculum. This Junior High-oriented program was the forerunner to Piney Mountain Press' "Think Tank." Nelson contends; "paper and pencil" activities are more beneficial than computers, in that they allow children to "mediate and negotiate." Thus, he believes, they "more closely resemble real life situations" (Nelson).

Nonetheless, it appears the long term forecast for using computer simulations in built environment education is quite good. Possible scenarios range from developing simple drawing programs, to taking a group of students on a virtual reality "field trip" of ancient Rome. But, for the near future, most schools will be unable to use these more complex programs due to their overall cost and availability, including the necessary data to run them. According to Malcolm McCullough, author of Digital Design Media, these are the same constraints which are preventing most municipalities from sharing in this technology. McCullough explains:

> "The capacity of computer technologies such as CAD, geographic information systems, and interactive multimedia has reached the sophistication where detailed representations of urban forms and systems may be very practically manipulated. But these computer applications to urban design have not yet reached widespread practice...The main reason for this situation is the difficulty of assembling the vast amounts of information required for urban design projects" (McCullough 115).

The few successful examples of such programs are indeed promising. An "approach to computer-based neighborhood models has been explored recently at Harvard's Graduate School of Design. Detailed data prepared for the City of Pittsburgh's geographic information systems (GIS) has been converted into a three-dimensional model depicting terrain, major transportation arteries, and several thousand buildings" (McCullough 117). With computer programs like these, working in harmony with real three-dimensional models, school children should start being exposed to a full image of the environment in which they live; and, hopefully, each of them then can begin to discern exactly what roles they have within it.

There is at least one more significant "tool" that should be utilized in conjunction with teaching through models. That being, what most models strive to simulate,...the actual built environment itself. Two educators, who thoroughly understand this, are Eugene Cizek and Lloyd Sensat. They realize their Education Through Historic Preservation program has "made the River Road and New Orleans a virtual comprehensive learning laboratory" (Cizek 3). Perhaps the best summation of this importance is provided by Colin Ward in his book The Child in the City. Ward writes: "The city is in itself an environmental education, and can be used to provide one, whether we are thinking *through* the city, learning *about* the city, learning to *use* the city, to *control* the city or to *change* the city" (Ward 176).

The Interactive Link

If a picture is worth a thousand words, then maybe a model is worth a million. Add to this the fourth dimension, interaction, and the vocabulary is limitless. Thus, it is absolutely critical to incorporate some connective activities into a child's overall education. School age children already engage in a range of such activities as: household chores, family meals, swimming practice, music lessons, classroom lectures, nightly homework, and arguably the most significant endeavor of all, play. This latter activity is so important; because, if children enjoy what they're doing, they will be that much more likely to gain something from it. Whether it's interacting through organized sports, a board game, or role playing as cowboys and indians, each action will help further fuse the experience into the child's memory.

Regarding this need for children to interact through play, Olaf Damm stated: "Play is the dominating activity of children, as work is the dominating activity of grown-ups. Play is very important, because in play children use their senses, their brain, imagination, social ability - all kinds of resources are activated in the play process" (Wiencek 82). Box City and similar curricula have been so successful; because, they have been able to create such highly sensory experiences. Viewed out of context, however, Box City may be perceived as just a frivolous game, perhaps some sort of enlarged version of Monopoly. Yet, in reality it is a carefully crafted teaching tool capitalizing on a child's innate desire to be adventurous and have fun.

The following two quotes from the book, The World of LEGO Toys, stress how a good learning experience must feature the necessary tools to foster learning; and, as with any tool, it is useless unless a person interacts with it.

> "Children need to be active. You will never see healthy passive children. A healthy child is always looking for something interesting to do....It is important that the material they get in their hands is not finished, not ready-made. LEGO bricks invite the children to be active, to do something, they *call for* activity" (Wiencek 82).

> "Play is a powerful aid to conceptual development. For example, making a model by copying a photograph shows the children that a two-dimensional photograph stands for something real, and that it can be converted into a three-dimensional object. The powers of memory develop as children learn to recall what they have built from one-day to the next" (Wiencek 90).

Many educators and other interested parties have had to fight long and hard to bring "non-traditional" teaching techniques into the mainstream. This struggle has been even further exacerbated when the subject matter (i.e., urban planning) is non-traditional as well. Nonetheless, most of these supporters of interactive teaching tools, such as models, games, and building blocks, remain thoroughly convinced that such devices are an essential part of the classroom experience. One such individual once noted:

> "We forget that doing something just because one wants to do it can be a very strong force for motivating a child. If toys stimulate creative activity, and the children like playing with toys, what can be the harm? Many parents remain unconvinced...a teacher wrote: "The parental complaint is often, 'They're not at school to play, but to learn.' My usual reply is, 'Exactly'" (Wiencek 89).

Children view miniature villages and other scaled simulations as environments in which they are welcome. They immediately understand that these settings have been designed to encourage interaction, whether it be through work, study, or play. Most children are curiously aware of their surroundings; and, they recognize when they fit properly within them. Perhaps children have this heightened awareness; because, as Kevin Lynch noted, they exist for the most part in a "big person's" world. Beyond their classroom's coat closet, their own desk, and the water fountain in the hall, they may wonder if any other elements of the built environment were designed with them in mind. Thus, it might be this constant contrast in a child's environment that fosters an enthusiasm for certain programs and educational attractions, especially ones developed specifically for them.

One of America's oldest and most enduring child-oriented environments is Safety Village. For over 25 years children have been drawn to this "pint-sized town" in order to act out their preconceived notions of adulthood. Now that the village is part of the Children's Museum of Tampa, its services have been expanded, with more and more exciting opportunities to explore the built environment (Figure 6.5). As detailed in a recent promotional brochure; "The Museum's hands-on cultural arts and daily life exhibits broaden the horizons of children by making learning lively, participatory and most of all *irresistibly* fun. It also gives stimulating clues as to who we really are and what our world is about!" (Children's Museum at Safety Village, brochure).

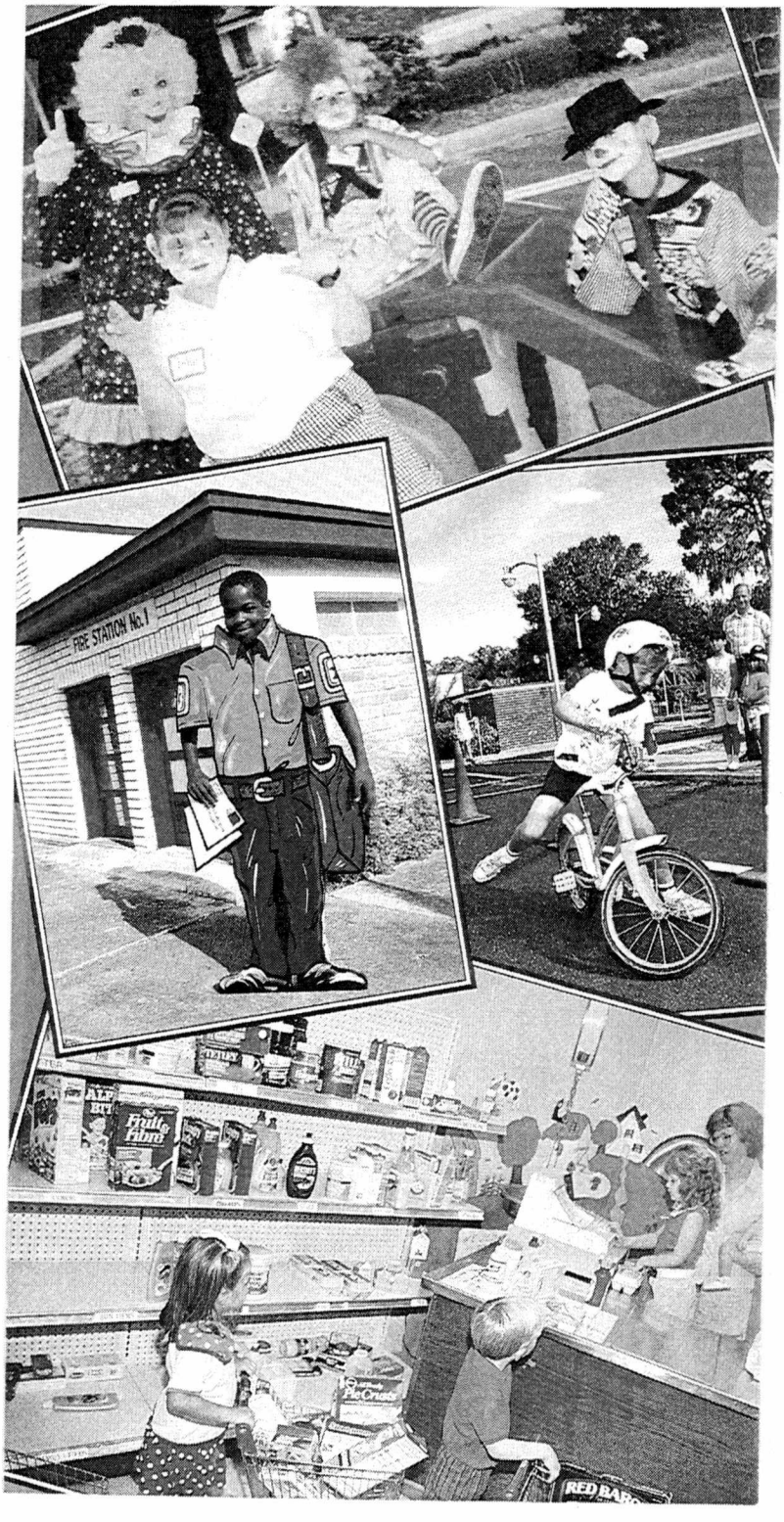


Figure 6.5
The Children's Museum of Tampa at Safety Village: Making Learning Fun!

The Summation

Many of the theories developed by Anton Nelessen, author of Visions for a New American Dream, have evolved around using scaled urban environments as tools for interaction. Nelessen has explained: "We get people to understand their own human dimension" by having them image themselves into specific miniaturized spaces. This requires an ability to mentally incorporate the fourth dimension - movement - as a function within these three-dimensional town models. Although Nelessen works primarily with adults, he has found that children between the ages of 3-7 are by far the "most fluid" in this process (Nelessen interviews).

This being the case, it would seem only logical for educators to build upon these strengths and provide children with whatever tools are necessary to facilitate their learning. In most cities, these teaching tools are likely to be limited only by the amount of time invested in searching for them. These may include a neighborhood model in the city's planning department, or perhaps a collection of historical dioramas in a local museum. Most importantly, however, are the people behind these resources. For who better to explain the essence of the built environment than a city planner, an urban designer, or a landscape architect. Obviously a majority of design professionals are in their fields because they love what do; and, most would be willing to share this love if only they were asked.

In order for a city to have a more responsible populace, community leaders must begin preparing "their" children to be conscientious citizens as early as possible. The futures of our cities, towns, farms, and suburbs, and thus our nation as whole, are completely dependent on such a strong foundation. As Ginny Graves reflected upon the importance of CUBE's programs, she declared: "We **are** 'bringing up' a future audience to facilitate the planning and caring for our historic resources, our important buildings, sites and landmarks" (Graves, "Why Professionals"). And, hopefully in the spirit of Wacker's Manual, some of these lessons might just rub off on a parent or two along the way.

Johannes Schild sees this educational evolution or perhaps revolution as being at the heart of MINICITY, USA!'s mission. He believes children will be so captivated by certain miniatures they will want to learn more about these landmarks, and thus go see the genuine article (Schild, telephone interview, 21 Aug. 1995). This first step in relating a simulated environment to an authentic one is very important. However, it is the next transition that is truly the watershed in learning, the development of nominative thought. In other words, based on a child's newly gained knowledge, he or she is now able to make critical decisions about what ought to be the condition of his or hers surroundings.

This rite of passage might be something as simple as questioning a parent about the lack of landscaping in the mall parking lot; or, it might entail writing a letter to the

mayor (under the child's own volition), to state that additional bicycle paths to an area park will provide a greater number of children with safer and easier access. It does not matter what the initial action is. The important thing is that the process of critical thinking is born, and the child is on the way to becoming a full-fledged, participatory citizen.

This thesis has detailed numerous resources, both physical and organizational, which have helped children get started along this path. However, there is a very strong, potentially negative pattern that relates to how these resources are currently being used. What is evident from the surveys and other research, is that a large majority of these educational programs and teaching tools are vastly underutilized. Even the ones reaching their potential have not flourished, because of some grand educational mandate. On the contrary, they are doing well in spite of the fact that few if any of the curricula associated with these resources are presently required in America's classrooms.

Up to this point, nearly all of the successes in teaching children about the built environment have come about through the voluntary efforts of a very limited group of people. This modest collection of committed individuals includes, parents, school administrators, and museum officials, as well as concerned professionals in the fields of architecture and planning. But mostly these successes have depended on an ever-growing number of dedicated teachers, who understand the value of planning-oriented

studies. These teachers also recognize that using three-dimensional simulations and other teaching tools are excellent ways to enhance the learning experience.

Thus, only one major question remains to be answered. What will it take to finally convince local school boards and other governmental bodies of these proven merits? For until this happens, such lessons in urban stewardship will occur sporadically; and, as fellow citizens we should feel blessed when they do (Figure 6.6). Because, without stronger support, such an essential education will continue to be the sole responsibility of a small, but devoted, band of classroom instructors, volunteers, and visionaries.



Figure 6.6
Professional Planners and Dedicated Volunteers Can Make a Difference

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APPENDICES

APPENDIX A

THESIS QUESTIONNAIRE

Instructions: *Check (X) only one answer per question unless otherwise noted. Please return by* **October 1, 1993**. *Thank you!*

1. **Group/Organization Name** _____

_____

2. **Type of organization:**

City/County Agency ___ State/Regional Agency ___ Federal Agency ___

Museum ___ Tourist Attraction ___ Other/Private (please explain) ___

_____

_____

3. **How many scale models does your organization have?**

1 ___ 2-3 ___ 4-5 ___ 6-10 ___ More Than 10 ___

4. **What model types does your organization primarily feature:**

Individual Building/Site ___ Neighborhood ___ City ___

Region ___ Other (please explain) _____

_____

5. **What is the model of and why was it built?** (If more than one model exists please note)

_____

_____

_____

6. **Does your model simulate a place that is:**

   Real ___ Imaginary ___ A Planned Development ___

7. **At what ratio scale is your model designed?** (If more than one scale is used please note the one that's most often used) *Note that 1"=1' is 1:12 scale, and 1/10 is 1:10 scale.

   1:10 ___ 1:12 ___ 1:15 ___ 1:20 ___ 1:40 ___ 1:100 __

   1:200 ___ 1:500 ___ 1:1000 ___ Other: _____

8. **Do you feel scale has an impact on the ability to absorb information?** Yes __ No __

   How: _____

   _____

9. **Are the scale models open to the public?** Yes __ No __

10. **Are the scale models open to private groups?** Yes __ No __

11. **Do school children visit your facilities?** Yes __ No __

    How often: 1/year ___ 2-5/year ___ 1/month ___ 1/week ___

12. **How many school children visit your facility annually (average)?** _____

13. **What do you feel are some of the educational benefits of using scale models?**

    _____

    _____

    _____

    _____

14. **Do you feel models are more effective than maps, photography, and drawings in teaching school children about the built environment?** Yes __ No __

Why? _____

_____

15. **Do you advertise or market your facilities?** Yes __ No __

16. **Do you target school age children?** Yes __ No __

17. **What type of promotions do you have?** _____

_____

18. **Are specific groups targeted in your educational program marketing?** Yes __ No __

If so, which ones and why? _____

_____

_____

19. **Does anyone on your staff deal specifically with educational programs?** Yes __ No__

20. **What type of educational activities do you have?** _____

_____

_____

21. **What if any elements of planning are discussed through the use of your model(s)?**

Zoning ___ Urban Design ___ Architectural Styles ___

Housing ___ Open Space ___ Transportation ___ N/A ___

22. What other planning ideas do you think could be focused on by using your model?

_____

_____

_____

23. Beyond physical planning issues how are the scale models used to educate students about neighborhoods, cities and regions? _____

_____

_____

24. Are students, teachers, or parents asked to comment on the educational programs?

Students: Yes__ No__ Teachers: Yes__ No__ Parents: Yes__ No__

25. What are the most common comments? _____

_____

_____

26. Besides three dimensional scale models do you have any other types of simulations or models that are used to teach students about the built environment?

Yes __ No __ **If yes, please explain:** _____

_____

_____

27. Has your organization ever participated in Box City? Yes __ No __

28. What other programs would you like to do with your resources?

_____

_____

_____

29. Does your group belong to any organizations that assist in your educational programming? Yes __ No __

Please list: _____

Name and title of individual who completed this questionnaire:

Name: _____

Title: _____

Please use the following page if necessary for any additional comments.

A return envelope has been provided for your convenience.
Please see the cover page for any further assistance.

Again thank you for your time and effort. I look forward to hearing from you by October 1.
VPG

ADDITIONAL COMMENTS

(6)

VPG

431 Highland Hills **Knoxville, Tennessee 37919-4211** **(615) 558-8550**

August 28, 1993

Charles Montooth, AIA, AICP
Taliesin Preservation Commission
Spring Green, WI 53588-9304

Dear Mr. Montooth,

My name is Vincent Gauthier and I am writing to ask for your assistance regarding my Master's thesis. **It is my hope that your organization can help by filling out the enclosed survey.** The survey is an important part of my urban planning degree requirements at the University of Tennessee. My thesis focus is on the relationship between planning education and scale models.

Through research I have discovered that your organization has an architectural or planning related model (Broadacre City and others). The purpose of this survey is to determine how this scale model is being used. Hopefully the results of this survey can be used to help promote scale simulations as a teaching device, and thus increase understanding of the built environment. Perhaps these results will also be helpful in furthering the mission of your organization.

A number of different groups are receiving this survey, and therefore some questions may be more applicable to you than others. **If someone on your staff works "closely" with the model, especially in a public relations capacity, please consider having them complete the survey.** A commitment of 20-25 minutes should be all that is necessary for the survey. Brief instructions are on the survey.

Please put the completed survey in the enclosed self-addressed stamped envelope. Any additional information on the model or your organization is also welcomed. **Many thanks** for all of your assistance...everyone's contribution is a big help.

Sincerely yours,

Vincent P. Gauthier
Graduate Student
The School of Planning
University of Tennessee

VPG

431 Highland Hills **Knoxville, Tennessee 37919-4211** **(615) 558-8550**

August 28, 1993

The Holy Land Hotel
Bayit Vegan
Jerusalem, Israel

Dear Holy Land Hotel,

My name is Vincent Gauthier and I am writing to ask for your assistance regarding my Master's thesis. **It is my hope that your organization can help by filling out the enclosed survey.** The survey is an important part of my urban planning degree requirements at the University of Tennessee. My thesis focus is on the relationship between planning education and scale models.

Through research I have discovered that your organization has either a miniature village or an architectural related model. The purpose of this survey is to determine how this village or scale model is being used. Hopefully the results of this survey can be used to help promote scale simulations as a teaching device, and thus increase understanding of the built environment. Perhaps these results will also be helpful in furthering the mission of your organization.

A number of different groups are receiving this survey, and therefore some questions may be more applicable to you than others. **If someone on your staff works "closely" with the model, especially in a public relations capacity, please consider having them fill out the survey.** A commitment of 20-25 minutes should be all that is necessary to complete the survey. Brief instructions are on the survey.

Please put the completed survey in the enclosed self-addressed stamped envelope. Any additional information on the model or your organization is also welcomed. A crisp one dollar bill from the United States has been enclosed to help with the cost of postage. **Many thanks** for all of your assistance, everyone's contribution is a big help.

Sincerely yours,

Vincent P. Gauthier
Graduate Student
The School of Planning
University of Tennessee

APPENDIX B

GROUPS SURVEYED

Introduction

The following list features the 65 recipients of the Thesis Questionnaire. They are grouped by how they responded to the questionnaire. The first group includes those organizations that returned a fully or partially completed questionnaire. The second group includes the five questionnaire recipients, who responded with a letter and/or a publication (i.e. tourism brochure), but did not return a completed questionnaire. The third group is comprised of the questionnaire recipients that did not respond in any written fashion.

Each individual listing contains the name of the organization and a mailing address. Other additional information such as a phone number, fax number, and contact person(s) were available only on a sporadic basis, and are included as provided. In most cases, for the groups that responded the contact is the either person that completed the questionnaire or sent a letter.

Responded with Completed Questionnaire

The Alamo
Alamo Plaza
San Antonio, Texas 78205
Contact: Wallace Saage, Curator of the Alamo

Ave Maria Grotto
1600 Saint Bernard Drive SE
Cullman, Alabama 35055
Phone #: 205-734-4110
Contact: Brother Augustine Campion, O.S.B., Director

Baltimore Development Corporation
36 South Charles Street, Suite 1600
Baltimore, Maryland 21201
Phone #: 401-837-9305
Contact: Barbara J. Bonell, Director of Information

Bekonscot Model Village
Warwick Road
Beaconsfield
Bucks, England HP2PL
Phone #: 0-1144-494-672-919
Contact: Barry Newman, Managing Director

Central Atlanta Progress, Inc.
50 Hurt Plaza
Hurt Building, Grand Lobby
Atlanta, Georgia 30303
Phone #: 404-658-1877
Contacts: Paul Kelman, Vice President of Planning
Doug Young/Denise Wright/Courtney Carroll, Student Interns
Paul Lom, Atlanta Models and Exhibits

The Chattanooga Southern Model Railroad
The Chattanooga Choo-Choo Terminal Station
1400 Market Street
Chattanooga, Tennessee 37402
Phone #: 615-266-5000
Contact: Nicki Lynn Hovan, Attendant-Chattanooga Area Model Railroad Club

Chautauqua Institution
The Holy Land in Palestine Park
P.O. Box 29
Chautauqua, New York 14722
Phone #: 716-357-6200/800-836-2787
Contact: Alfreda L. Irwin, Historian

The Children's Museum of Tampa, Inc.
7550 North Boulevard
Tampa, Florida 33604
Phone #: 813-935-8441
Contacts: Paul Todd, Program Coordinator
Jerilyn Goldsmith, Former Program Coordinator
Marian S. Winters, Former Executive Director

The Colonial Williamsburg Foundation
P.O. Box 1776
Williamsburg, Virginia 23187-1776
Phone #: 804-229-1000
Contact: Scott Spence, Director of Architecture

Denver Planning, Zoning, and Community Development
200 West 14th Avenue, Room 203
Denver, Colorado 80204
Phone #: 303-640-4778
Contact: Dick Farley, Deputy Director of Urban Design,
Planning, and Community Development Office

Downtown Council of Kansas City
1101 Walnut, Suite 1600
Kansas City, Missouri 64106
Phone #: 816-421-1539
Contact: Ann Robertson, Planner

Frankfurt am Main Historisches Museum
Saalgasem #19, D-60311
Frankfurt, Germany
Contact: Wolfgang von Wolzogen, Museums Padagoge

Franklin County Convention Facilities Authority
400 North High Street
Columbus, Ohio 43215
Phone #: 614-645-3900
Contact: Linda G. Ready, Community Relations Coordinator

Hellmuth Obata & Kassabaum, Inc. (HOK)
1831 Chestnut Street
St. Louis, Missouri 63103
Phone #: 314-421-2000
Contact: Rick Wood, Model Shop Director

The Holy Land Hotel
Bayit Vegan
Jerusalem, Israel
Phone #: 011-972-2-437777 Fax #: 011-972-2-437744
Contact: H. Chekvi

The House on the Rock
Spring Green, Wisconsin 53588
Phone #: 608-935-3639

Indianapolis-Marion County Building Authority
311 City/County Building
200 East Washington Street
Indianapolis, Indianapolis 46204
Phone #: 317-327-4141
Contact: Ron Reinking, P.E., General Manager

Knoxville, Department of Community Development
P.O. Box 1631
Knoxville, Tennessee 37901
Phone #: 615-521-2120 Fax #: 615-521-4298
Contacts: Wayne Blasius, AICP, Deputy Director
Dave Collins

Louisville Central Area, Inc.
555 Brown and Williamson Tower
Louisville, Kentucky 40202
Phone #: 502-583-1671
Contact: James R. Baines, Jr., Research Associate

Madurodam
Haringkade 175
2584 EE Den Haag/ Scheveningen, Holland
Phone #: 070-3553900 Fax #: 070-3512185
Contact: F.J. Gossink, Director

Mini-Europe
Brupark
B-1020
Bruxelles, Belgium
Fax #: 32-2-478-2678
Contact: Thierry Meeus, Managing Director

Minimundus
Villacher Strasse
A-902
Klagenfurt, Austria
Contact: Dr. Josef Kleindieus

Old Salem, Inc.
Box F, Salem Station
Salem, North Carolina 27108
Phone #: 910-721-7300
Contact: Gene Capps, Vice-President and Director of Interpretation

The Portman Companies/One Peachtree Leasing
225 Peachtree Street, Suite 300
Atlanta, Georgia 30303
Phone #: 404-220-3400
Contact: Wendy Giddes, Director of Marketing

The Quincy Society of Model Engineers
The Chesapeake & Lake Erie Model Railroad
Good Samaritan Home
2130 Harrison Street
Quincy, Illinois 62301
Contact: Robert Turek, Registered Agent

San Diego Centre City Development Corporation's Downtown Information Center
255 G Street
San Diego, California 92101
Phone #: 619-235-2222
Contact: Sheila Hardin-Burnett, Public Information Coordinator

Skidmore, Owings & Merrill
Suite 1000, 224 South Michigan Avenue
Chicago, Illinois 60604
Phone #: 312-554-9090 Fax #: 312-554-9090
Contacts: Elizabeth Engels, Marketing Coordinator
Michelle Grunau, Former Marketing Coordinator
Fil Vaccaro, Model Shop Director
Paul C. Decelles, Project Manager for Planning and Urban Design

Smithsonian Information Center
Smithsonian Institution Building, #153
MRCO10
1000 Jefferson Drive SW
Washington, D.C. 20560
Phone #: 202-357-2020
Contact: Mary Grace Potter, Director of Visitor Information and
Associate's Reception Center

Taliesin Preservation Commission
Spring Green, Wisconsin 53588-9304
Phone #: 608-588-2511
Contacts: Charles Montooth, AIA, AICP
Terry Kerr, Director of Tours

Tennessee Valley Authority Sequoyah Energy Connection
200 Igou Ferry Road
Soddy-Daisy, Tennessee 37379
Phone #: 615-843-4100 Fax #: 615-843-4133
Contact: Richard F. Salisbury, Public Relations Specialist

U.S. Army Corps of Engineers-Waterways Experiment Station
WES Public Affairs Office
PO Box 631
Vicksburg, Mississippi 39180-0631
Phone #: 601-634-2502
Contact: Wayne A. Stroupe, Assistant Chief, Public Affairs

University of California-Berkeley, Environmental Simulation Laboratory
College of Environmental Design
316 Wurster Hall
Berkeley, California 94720
Phone #: 510-642-4818/510-642-2961
Contact: Peter Bosselmann, Professor of Urban Design

The University of Tennessee
Carolyn P. Brown Memorial University Center
1502 West Cumberland Avenue
Knoxville, Tennessee 37996
Phone #: 615-974-3455
Contact: Mark M. Alexander, University Center Director

Written Response without Questionnaire

Fine Scale Miniatures
The Franklin & South Manchester Model Railroad
49 Main Street
Peabody, Massachusetts 01960
Phone #: 508-531-9418
Contact: George Sellios

Minidomm
40885 Ratingen-Bretscheid
or
c/o Tourism Office, Bitte Weiterleiten (Please Forward)
Minoriten Strasse 3A
40878 Ratingen
Germany

Mud Island
River Walk
125 North Front Street
Memphis, Tennessee 38103-1713
Phone #: 901-576-7230
Contact: Susan Elliot, Museum Coordinator

Museum of London
London Wall
London, England EC2Y 5HN
Phone #: 071-600-3699 Fax #: 071-600-1058
Contact: Geoffrey Toms, Head of Education

Walt Disney Attractions, Inc.
1375 Buena Vista Drive
P.O. Box 10000
Lake Buena Vista, Florida 32830-1000
Phone #: 407-824-2222
Contact: Chris Moore, Director of Communications and Special Initiatives

Woodleigh Replicas
P.O. Box 59
Kensington, COB 1M0
Canada
Phone #: 902-836-3401
Contact: Cathy Simmons

No Written Response

American Museum of Science and Energy
300 South Tulane Avenue
Oak Ridge, Tennessee
Phone #: 615-576-3200

Barn Museum
South Amana, Iowa 52334
Phone #: 319-622-3058

Bavaria National Museum
Prinz Regenten Strasse
80538 Munich
Germany

The Boston Tea Party Ship and Museum
Congress Street Bridge
Boston, Massachusetts 02210
Phone #: 617-338-1773
Contact: Rene Meyer, Operations Manager

Breakers Hotel
Long Beach CBD
210 East Ocean Blvd.
Long Beach, California 90802
Phone #: 310-432-6700

The Children's Museum of Indianapolis
P.O Box 3000
Indianapolis, Indiana 42606

The Children's Museum of Oak Ridge
461 West Outer Drive
Oak Ridge, Tennessee 37830
Phone #: 615-482-1074
Contact: Selma Shapiro, Director

Cleveland Planning Commission
501 City Hall
Cleveland, Ohio 44114
Phone #: 216-664-2210
Contact: Maurice Rulens, Planner

Confederama Hall of History
3742 Tennessee Avenue
Chattanooga, Tennessee 37409
Phone #: 615-821-2812

Cooper-Hewitt Museum
2 East 91st Street
New York, NY 10028
Phone #: 212-869-6868

Detroit Planning Commission
202 City/County Building
Detroit, Michigan 48226
Phone #: 313-224-3009
Contact: Marcus Loper, Deputy Director

Knott's Berry Farm
Mott's Miniatures
Buena Park, California 90620

Land of Legend Model Village
The Old Forge
Polpero
Cornwall, England

Los Angeles Community Redevelopment Agency
San Fernando Building
400 South Main Street
Los Angeles, California 90013
Phone #: 213-977-1600
Contact: John Spaulding, Director of Planning and Design

LEGOLAND
DK 7190
Billund, Denmark

Meiji Mura
Uthiyama #1
Inuyama City
Aichi Prefecture
Japan
Phone #: 0568-67-0314

Museo Della Civilta Romana
Piazza G. Gagnelli, 10
00100
Roma, Italia

Portugal dos Pequenitos
Santa Clara
3000
Coimbra, Portugal

The Queens Museum
The Panorama of New York City
New York City Building
Flushing Meadows-Corona Park
Flushing, New York 11368
Phone #: 718-592-9700
Contact: Sharon Vatsky

St. Louis Development Corporation
300 North 15th Street
St. Louis, Missouri 63103
Phone #: 314-622-3400
Contact: Carlene Peterson

Splendid China
Honey Lake Holiday Resort
Shennan Road West
518034
Guandong, China
Phone #: (HLCC) 22-898 Fax #: 745045

Smith Hinchman and Grills
150 West Jefferson
Detroit, Michigan 48226
Phone #: 313-983-3600
Contact: John Bell, Model Maker

Swiss Miniature, S.A.
6815
Melidi, Switzerland
Phone #: 011-41-91-687951

Tennessee Valley Authority Energy Museum
1101 Market Street
Chattanooga, Tennessee 37402
Phone #: 615-751-7599

The Washington Dolls' House & Toy Museum
5236 44th Street NW
Washington, D.C. 20015

Yorktown Museum
1974 Commerce Street
Yorktown, New York 10598
Phone #: 914-962-2970
Contact: Patrick McCarty

APPENDIX C

THE LAST WORD

Introduction

The following excerpts and quotations were not included within the main body of text. Nonetheless, the images/notions that these words provoke make them still worthy of recording. Among those quoted are professional planners, design critics, educators, and,even an ancient Japanese philosopher. Many of these individuals seem to share certain important values. These values are rooted in either: establishing a built environment curriculum for children; utilizing three-dimensional simulations as teaching tools, and/or making education more challenging and fun through whatever means are possible. Together, they allow one final opportunity to stress the need for planning-oriented studies. For such a background is absolutely essential in order to ensure our future generations become fully responsible participants in the stewardship of our world.

The Words

"All things small, no matter what they are, all things small are beautiful." Sei Shonago (c. 1000)

"An architect is trained in 'spatial thinking,' but the people who hire an architect are not." Suzanne Hilton

"Architectural models are not simply patterns for the built landscape...they can work as miniature dioramas, showing us how we define and plan our cities and, more important, our places in them." Akiko Busch

"Architectural models are rarely made for permanent use or display. As a step in the process of developing a design and securing approval or sales, they are more often discarded than saved." Jeremy Lebensohn

"There can be magic in incongruity and a greater intelligence drawn from absorbing two seemingly contradictory ideas at once. This duality in the nature of model making does not necessarily lessen the value of the model. Rather, this paradox gives them their beauty and complexity, ultimately bestowing upon models their own singular identity." Akiko Busch

"Cherish your visions and your dreams as they are the children of your soul; blueprints of your ultimate achievements." Napoleon Hill

"As children we develop our notions of the environment-and our place in it-through miniatures. Dollhouses, barnyards, fortresses, battlegrounds, and complex railway systems are the dwarf landscapes upon which we act out our childhood discoveries and revelations." Akiko Busch

"Children are surprisingly eager to learn about complicated mechanical principles when they can build examples with their own hands." Henry Wiencek

"Children are the world's best teachers when it comes to imaginative play. No one needs to tell them how to have fun or how to be unique. just a little extra *spark* can send a child on a magical imagination snowball. The Children's Museum at Safety Village is that spark." Children's Museum at Safety Village informational brochure

"Children like to use dolls, cars, toy houses, boats, and animals to help them act their roles, because toys add an element of reality to the imagined stories." Henry Wiencek

"Children, of course, are used to models." Edgar Dale

Instead of "coming to me with one right answer, I would like for a student to show me five ways to solve a problem." Ginny Graves

"As a device that critically influences the final shape of our built environment, the architectural model has a value that far exceeds its miniature scale." Akiko Busch

"Education is hanging around until you've caught on." Robert Frost

"Education is the ability to listen to almost anything without losing your temper or self-confidence." Robert Frost

"The Education Through Historic Preservation program...is a good way to teach and an exciting way to learn...which is very important since it is commensurate with our philosophy that if an historic site or landmark has the interest of young people, then it has a future!" Eugene Cizek

"The empires of the future are the empires of the mind." Winston Churchill

"The environmental simulator is a versatile...tool for many professional people. The architect uses it with scale-model houses. A sociologist might use it with scale-model slums. The traffic engineer uses it with scale-model highways." Suzanne Hilton

"Even the more sophisticated methods of simulation represent a tiny fraction of the total cost (and potential profits) of project development in most cases." Stephen Sheppard

"In every real man a child is hidden that wants to play." Friedrich Nietzsche

"Father, Lord of heaven and earth, to you I offer praise; for what you have hidden from the learned and clever you have revealed to the merest children." Matthew 11:25

"I am imagination. I can see what the eyes cannot see. I can hear what the ears cannot hear. I can feel what the heart cannot feel." Peter Nivio Zarlenga

"It is far less costly to recycle a city than to build a suburb." Carla Hills

"In the lexicon of youth, there is no such word as 'fail.' Certainly we had all this confidence at one time in our lives, though most of us lose it as we grow older. Perhaps, because of my work, I've been lucky enough to retain a shred of this youthful quality. But sometimes, as I look back on how tough things were, I wonder if I'd go through it again. I hope I would. When I was twenty-one, I went broke for the first time. I slept on chair cushions in my 'studio' in Kansas City and ate cold beans out of a can. But I took another look at my dream and set out for Hollywood. Foolish? Not to a youngster. An older person might have had too much 'common sense' to do it. Sometimes I wonder if 'common sense' isn't another way of saying 'fear.' And fear too often spells failure." Walt Disney

"Lord, thank you for the teachers that have - **Wisdom** to teach principles as well as acts; **Persistence** to teach again and again, and then again; **Vision** to know that results will show far down the years; **Love** for the unloveable as well as the lovely child; **Patience** Lord, patience, forever and unending." Anonymous, C.T.A.

"Men may find God in nature, but when they look at cities they are viewing themselves." Paul Ylvisaker

"Models of the unbuilt city indicate that the urban landscape as it might have been is only as fantastic as the one that is." Akiko Busch

"Not only is the territory of the architectural model on a diminutive scale, so too is the time it inhabits. Models take up little space and brief time, factors that together intensify their message all the more." Akiko Busch

"The only limits are, as always, those of vision." James Broughton

"People need to be educated to expect the use of simulations in planning and to realize that they have a choice in how simulations re prepared." Stephen Shepherd

"Relevance is an intangible requirement that may have been overstressed of late, but a miniature exhibit would be welcomed by history teachers only if it were pertinent to some phase of the curriculum." Betsey Beeler Creekmore

"There seems to be little on earth-and above earth-that a scale model cannot do. As long as man keeps thinking up projects, it looks as if scale model will be right in there pitching." Suzanne Hilton

"Small-scale demonstration models of historical town-scapes obviously occupy a special position, since they provide information about spatial relations and also the particular character of towns." Rolf Janke.

"So here, in this little model and in its collaterals, you have a definite cross section and new form for everything needed for a complete modern USONIAN civilization. A *true* culture. But the model you see here is only for this particular type of ground in these particular circumstances. Never would the same plan be imposed on land that is otherwise or when the circumstance changed. Instead, the resources of the land would be brought out and new forms wrought according to the circumstances." Frank Lloyd Wright speaking about his Broadacre City model

"This child whose life I touch with mine is like a piece of clay." Muriel Blackwell

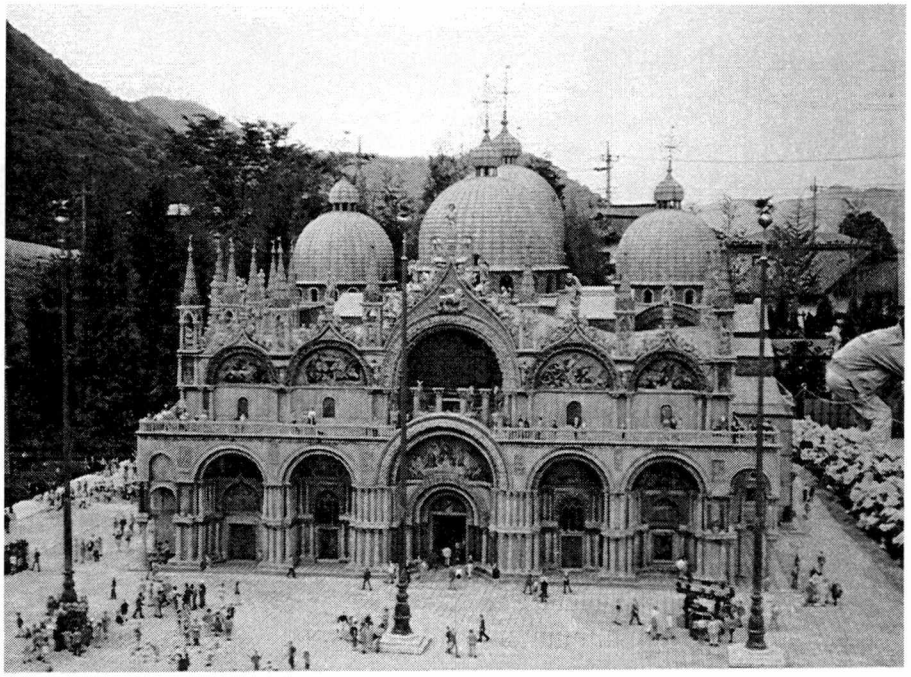
"A truly wonderful gesture for humanity. A fine example." Gertrude J. Locke speaking about Portugal dos Pequenitos

"The truth of the model does not lie in its referential nature since as simulacrum the model denies the possibility of its own objecthood and establishes the building as the ultimate referent, as a reality beyond representation." Christian Hubert

"The uniqueness of Education Through Historic Preservation continues to provide us with opportunities for real-life experiences while our schools are being restructured to seek such opportunities. A forerunner of educational practices just now emerging throughout the country, this program remains fresh each year as new students realize the value of their own homes and families as they bond with the dwellings and happenings of others that have lived before they." Eugene Cizek

"The vehicle to improve the American city is the American corporation - that's where the money is." Gerald Hines

"While what we want or aspire to may often be larger than life, what is smaller than life is generally more easily negotiated. Our enchantment with the miniature is rooted in the sense of power it instills in us. The world in miniature grants us a sense of authority; it is more easily maneuvered and manipulated, more easily observed and understood." Akiko Busch



VITA

Vincent Paul Gauthier was born at Georgetown University Hospital in Washington, D.C., February 28, 1962. He spent his youth in Quincy, Illinois; the place Mark Twain describes in Life on the Mississippi, as a "model New England town." While in Quincy, he attended St. Peter's Elementary School and Quincy Notre Dame High School. Gauthier matriculated at Tulane University in New Orleans, receiving a degree in Humanities with an emphasis in Architecture.

Since the early 1980s, Gauthier has been very active in historic preservation and urban design. He has served as a preservation planner in Quincy; Natchez, Mississippi; and Knoxville, Tennessee. During 1991 and 1992, he was employed as a staff architect with the State Historic Preservation Office in Illinois. This position provided him the opportunity to work closely with buildings designed by Frank Lloyd Wright, Ernest Wood, and many other important architects. Gauthier has also been active in the planning disciplines of solid waste, housing, and economic development. His other varied employment has included: developing built environment programs for elementary and secondary schools; portraying Huck Finn at the 1984 World's Fair; serving as a Mississippi River tour guide for an international film crew; and repairing lighting and satellite dishes on telecommunications towers.

Gauthier has been a board member of such organizations as the Dr. Richard Eells Home, Quincy German Village Society, Great Mississippi River Balloon Race, and Natchez/ Adams County Chapter of Habitat for Humanity. He served on the Quincy Planning Commission and as Secretary for the Quincy Riverfront Commission. Gauthier maintains an active membership in the American Planning Association, Center for Understanding the Built Environment (CUBE), Gardner Museum of Architecture and Design, National Trust for Historic Preservation, and Preservation Action.

Since being a Sunday featured columnist ("Architectural Legacy") for the Quincy Herald-Whig, Gauthier has written for numerous publications, including Historic Illinois. He has also spoken to professional and civic groups on varied subjects such as: the Underground Railroad, cemetery restoration, the Americans with Disabilities Act, rehabilitation tax incentives, and the impact of Japanese tourism on America. Gauthier has visited over 20 countries on three continents, retaining personal and business contacts in many of these places.

While at the University of Tennessee, Gauthier served as President of the Collegiate Institute of Planners. He was honored with a Chancellor's Citation for Professional Promise, and along with his classmates was a recipient of a Tennessee APA student award. Since 1994, Gauthier and his wife have lived in Natchez, where he operates a private consulting firm, Urban Stewardship Associates. Among his current undertakings is the development of a U.S.A.-based miniature village.