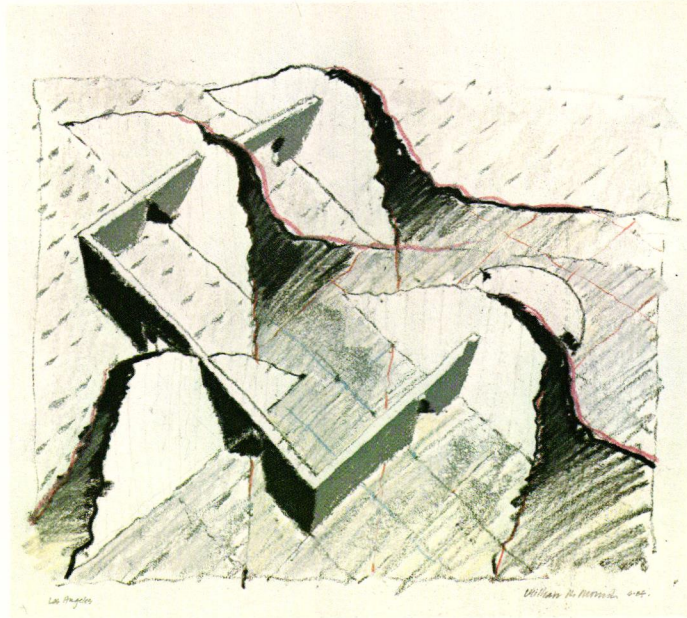


MODULUS 17



The University of Virginia Architectural Review

H O U S T O N
2 2 O C T 8 5

M O D U L U S 1 7

The University of Virginia Architectural Review

The University of Virginia School of Architecture
Charlottesville, Virginia

1984

The University of Virginia School of Architecture
Campbell Hall, Charlottesville, Virginia 22903

© 1984 by the University of Virginia School of Architecture
All rights reserved
Printed in the United States of America

Distributed by Rizzoli International Publications, Inc.
712 Fifth Avenue, New York, New York 10019

ISSN 0191-4022

Cover: Drawing by William R. Moorish
Endpiece: Veduta di Roma Antica by Giovanni Battista Piranesi

We would like to express our appreciation
to our past adviser Thomas Schumacher

Editor

David Gobel
Mary G. Mead

Production Editor

Mary G. Mead

Marketing Director

John Knickmeyer

Copy Editor

Rosanna Liebman

Business Manager

David Amundson
Patrick Pierce

Division Editors

Katherine Willson Chappell, Architecture
Steve Dawe, Architectural History
Karen Fischer, Planning
Marion Waller, Landscape Architecture

Staff

Alice Blank
Brian Broadus
Nellie Coe
Anne Ellett
Anne Reilly Fahim
Vladimir Gavrilovic
Karen Heller
Ann Kamara
Jamie Karn
Anne Lacouture
Sara Amy Leach
Sarah Lejeune
Dan McDaniel
Ralph Muldrow
Holly Nelson
Susie Nutt
Tom Roby
Mark Schara
Eugene Schettini
Kathy Sullivan
Carlos Valdenegro

Contents

Introduction 1

David Gobel

**Notes on the Urban Symposium: The Politics of
Design** 3

Nathan Glazer

**Architecture and The Public Works in Metropolitan
Amsterdam** 9

Helen Searing

Dams: Photographs from the Depression 35

Richard Guy Wilson

Urban Spring:

Formalizing the Water System of Los Angeles 45

William Morrish

Noble Structures Set in Handsome Parks:

Public Architecture of the TVA 75

Marion Moffett and Lawrence Wodehouse

Placing the Dead:

Burial Sites in Early Boston and Beyond 85

Richard Becherer

**Honor of Sacrifice: The Evolution of the Arlington
National Cemetery** 107

Jill Bretherick

The Defense of New Orleans:

Colonial Forts of the French and Spanish Regimes 121

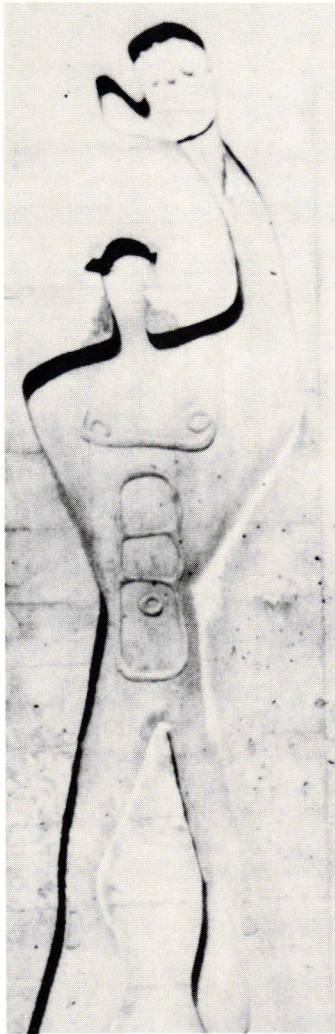
Willard B. Robinson

The Modern Medieval City:

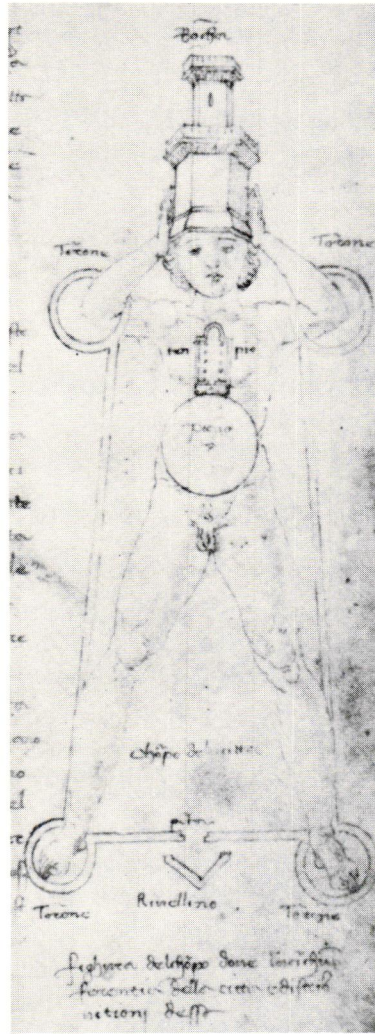
Public Space in Florentine-Founded Towns 143

David Friedman

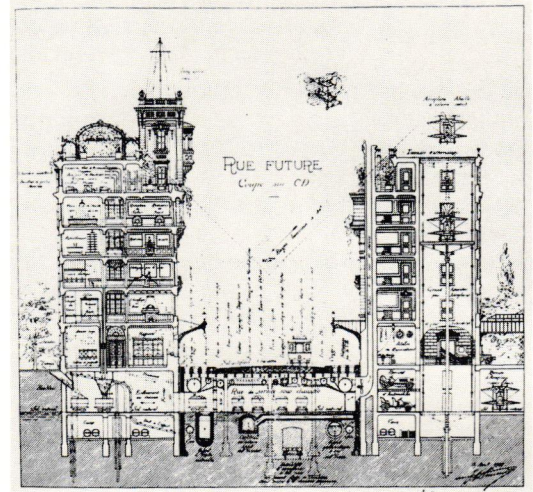
- 1 *Le Modulor, Unité d'habitation.*
 2 *"Figura del corpo", Francesco di Giorgio.*
 3 *Rue Future from Eugène Hénard, "The City of the Future" in Transactions Town Planning Conference, (London, RIBA, 1911).*
 4 *Ideal City Plan, Daniele Barbaro.*



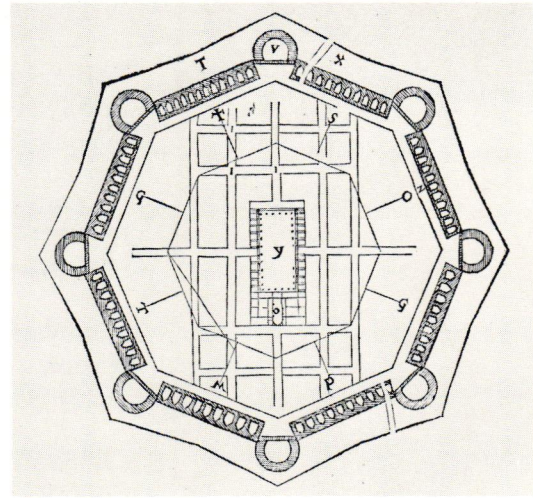
1



2



3



4

Introduction

David Gobel

The city is a complex, ever-changing organism. In an analogy to the human body, the successful operation of the city depends upon a set of interactive, functional components. For example, transportation networks are akin to our circulatory system, communication networks to our nervous system. To describe these cohesive components of the city, we have, in the last 20 years, introduced the term *infrastructure*. This rubric efficiency accounts for the synthetic dynamism, for the technologies and complex overlays of function, of the whole. The modernist holistic idea of infrastructure is applicable not only to physical planning, but also to military operations, economics, philosophy, and linguistics. Like their colleagues in those fields, urbanists in the modernist city, regardless of ideology, are recognizing that infrastructural dysfunction must be addressed before problems of superstructural chaos.

The human analogy underlying this approach to modern city planning stems from the 19th-century notions of Herbert Spencer, which were popularized by his disciples, primarily Patrick Geddes and Lewis Mumford. Yet, 15th-century Francesco di Giorgio observed that “just as the eyes, ears, nose, mouth, large intestines, and other interior parts of the body are organized according to their own needs and wants, so too should the city be arranged.” While seemingly similar, di Giorgio’s analogy is quite unrelated to Spencer’s. Di Giorgio was concerned with proportion and disposition of material parts as they serve the city’s purpose. Thus, he wrote that “the city has the reason, proportion, and form of the human body.” This was the classical analogy inherited by di Giorgio from Plato, Aristotle, Vitruvius, Augustine, and Leonardo Bruni. Here, the human body and body-politic are different from those found in the modern analogy. Here, the bodies are important only to the extent that they clothe the soul.

Embracing the classical view as we do does not condone ignoring the modern problems of urban infrastructure. Instead, it forces us to question what the proper role of the infrastructure is. What is its relationship to the meaning of the city? If we were to follow Spencer’s analogy—or Marx’s or Chomsky’s—we would be led to conclude that the infrastructure *is* the meaning. Meaning, however, is purpose, and the purpose of the city cannot derive its meaning from the infrastructure—the water supply, sewers, bridges, or even the information networks. We learn from the classical city that these

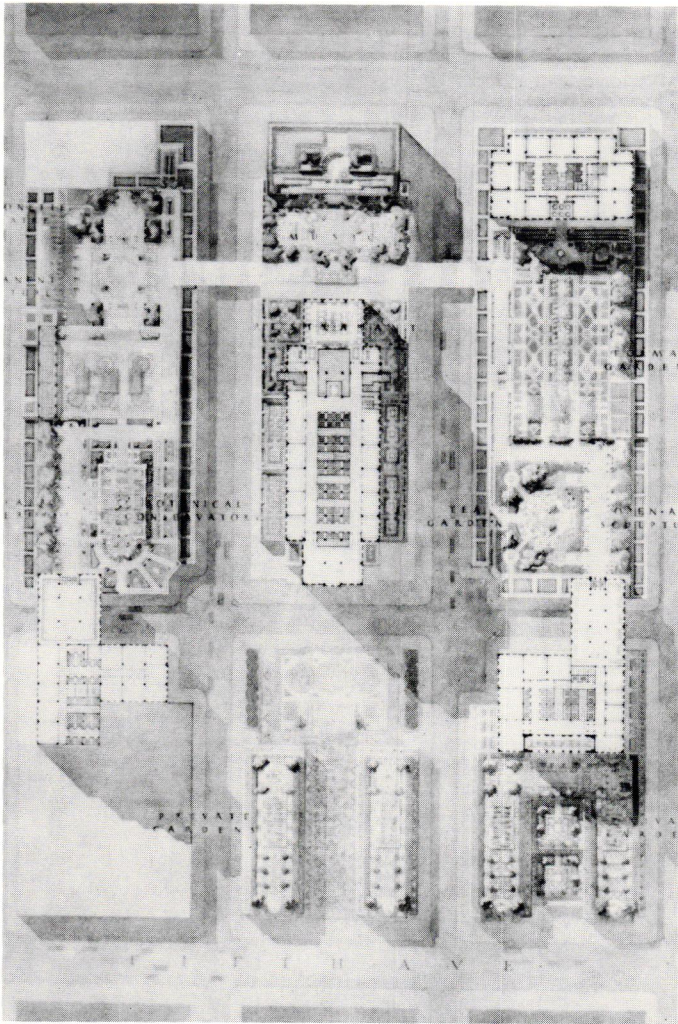
infrastructural components—while vital—derive their meaning from the city when they properly serve the end of the polis, which is to promote the common good. When they so serve, they are worthy of our attention.

When we abandon the modernist idea of infrastructure, we are left without a neat category for study. The closest classical equivalent is in the term *public works*. The ancients never clearly defined the term, but Vitruvius provides a sketch of what we consider public works. He states that the first division of building (*aedificatio*) is “the construction of fortified towns and works (*operum*) for the general use in public places.” He divides this category into three classes:

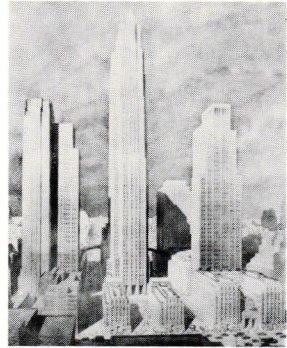
“. . . The first for the defensive, the second for religious and the third for utilitarian purposes. Under defense comes the planning for walls, towers, and gates, permanent devices for resisting against hostile attacks; under religion, the erection of fanes and temples to the immortal gods; under utility, the provision of meeting places for public use, such as harbors, markets, colonnades, baths, theaters, promenades, and all other similar arrangements in public places.” (I, iii [Morgan])

We have here used Vitruvius’s categories as a guide. Fortifications, for example, throughout much of urban history, were public works; these communicated the virtues of the city to its neighbors and itself. Today the physical presence of forts and outposts have lost their significance, and stop neither missiles nor the press. Architectural fortification has become technological hardware. Cemeteries, in a society of private religions are, perhaps, the only example of transcendental public works. The cemetery’s location and form reveals its meaning.

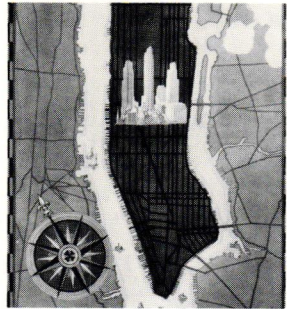
Public city planning has lost sight of the common good. The polis has become too large and fractured to function efficiently and economically. The means of obtaining and distributing water, for instance, plays a dominant role in shaping the material city. Yet it is not an evident presence. The meaning of our cities should not be allowed to evaporate. We should recognize the source from which they sprang. Our ability to control and reshape the natural order demands a sensitivity that will not divorce the city from its organic source.



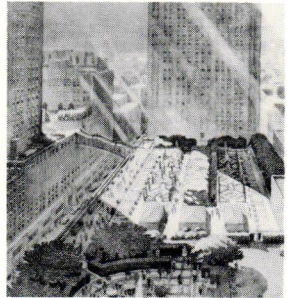
1



2



3



4

Notes On The Urban Symposium: The Politics of Design

Nathan Glazer

“Great cities—those that are practical, elegant, just, and popular—just don’t happen: they are achieved. Good city building takes time, money, political leadership and skill, will, patience, and passion. It also requires commitment to some higher and more uplifting vision. Whether they are judged as social processing plants or merely as centers of commercial exchange, cities are both the practical and the symbolic setting for our lives; they reflect our values and priorities as well as the effectiveness of our processes.

“Since cities cost a great deal of money and we spend most of our time in or around them, it would seem logical that we should take a great deal of care in their planning, design, construction, and presentation. But we cannot get too romantic or too political or too cute about cities. They are big, serious, adult things that require the most responsible and courageous decisions. Like war they cannot be left to the inattentive, the unskilled and the uncommitted. Great city building must always combine economic vitality with public amenity, technical ingenuity with symbolic commemoration, commerce with art. Cities can be measured by the quality and aspiration of their public works and their capacity to induce joy and wonder.”

—Jaquelin Robertson

The future of our cities is an issue frequently addressed by Jaquelin Robertson, dean of the School of Architecture at the University of Virginia, who organized “The City: Politics and Urban Design,” a symposium held at the school in April 1984. Sharing a vital commitment to the question of urban design, invited participants included: John Lindsay, lawyer and former mayor of New York City; Edward Logue, former president of the New York State Urban Development Corporation and current president of the South Bronx Corporation; and Joseph Riley, mayor of Charleston, South Carolina. Nathan Glazer, professor of education and sociology at Harvard University and co-editor of The Public Interest, moderated the symposium and here offers his observations.

Summing up the ideas put forth by Edward Logue, John Lindsay, Mayor Joe Riley, and Dean Jaquelin Robertson is no simple problem; one risks losing the crucial detail in the

large generalization. And, in urban design, that is a disaster. Here is one enterprise in which heaven is both in the details and in the large concept. What would Rockefeller Center and the Lawn at the University of Virginia be, if they consisted only of placement of structures of a given bulk on a site, without the Art Deco detailing of the former, the classical details of the latter? I am sure participants in the conference will remember specifics of experience—of conflicts, of solutions—more than they will remember any large principles. And yet education is an effort to be more than stories and the recounting of experience, educational as they may be, so we must try to sum up under several large rubrics. (And indeed, these large rubrics are not my invention; they were again and again emphasized in the presentation.)

Three terms seem to me to sum up what we were told at the conference: process, commitment, education. And now for the specifics, which may put a bit of flesh on these bones.

During the conference, the term “process” seemed to have replaced “planning.” Is planning out of favor? Is it unnecessary? Of course not. But what happened in the course of the 60s and 70s was that the classic notion of planning, taught in schools of city planning or architecture, simply ceased to work. “Process” is a messier word, but it evokes better what really happens. There are now far more participants shaping the city. The plan, as in master plan, just doesn’t seem to work anymore. The reasons why would take us far afield. But the fact is that the planner, considered professionally, is likely to be rather a modest figure at the banquet table of urban design. The developer, the mayor, the federal and state governments, the neighborhood organization (probably created ad hoc just to fight the project), the unions, the architect—all play a larger role than the planner.

The process of shaping and rebuilding the city has become disorderly, not only as compared to an ideal and abstract

(frontispiece)

1. *Rendered plan of Rockefeller Center.*
2. *View of Rockefeller Center from the east.*
3. *Rockefeller Center—set in the center of Manhattan Island.*
4. *Garden rooftop—Rockefeller Center.*

4 image of what it should be, but also as compared to what it once was in the American city. At the time of the building of the great works of the City Beautiful movement, committees of businessmen with enlightened public officials were able to put up, with only minimal obstruction, enormous enterprises that we do not dream of matching today—and if we dream of doing it, we often can't. The system of lakeshore parks and drives in Chicago. The girde of parks and drives for Boston. The great railway terminals with their associated works. The great libraries and museums. In one sense, our scale today is larger. We put up taller skyscrapers, taller apartment houses, greater tracts of housing, but we do much less in creating foci for the city—shaping elements that define the city and make its citizens proud of its beauty and grandeur. The skyscrapers of Houston will swell the breast of the various architects who have created them, but they will do nothing to shape an image of the city as the works of the City Beautiful movement did.

One reason, only one, why our works of urban design today cannot achieve this defining character is that the process has become more complicated. Ed Logue has referred to the importance of the Internal Revenue Code. At the turn of the century there was—hard as it is to believe—no Internal Revenue Code. No income tax. No corporation tax. Resources were concentrated in the hands of great entrepreneurs who did not have to consult a host of public agencies to undertake great works. The role of the federal government was nonexistent, that of the state minor. Even the city was happy to go along with what its men of substance—the master architects and planners—had determined. There was no environmental movement, no preservation movement (who knows if Grand Central Terminal would have been built if such a movement had existed to preserve the old terminal it replaced?), no local community organizations with the various means we have created today giving them the power to challenge, to be heard, and to obstruct.

It is clear I have revealed a certain nostalgia for the past. And yet which of us would go back to a period when wealthy individuals and corporations paid no federal taxes, when there was no federal role in urban development, and no environmental, preservation, or neighborhood protection movement? We must live with these realities, and work within them. They mean, as Ed Logue pointed out, that at his first closing for a big project, the legal papers were only a fraction of an inch high, and at his last closing the necessary documents measured a foot high. These realities also call upon us to use these instruments so that we do manage to create, in parts of our cities at least, an urban fabric to be proud of. One can guide and limit the processes for the better, for example, through the subtle and creative use of zoning and building controls. A number of us think that Washington as a city is better off because of its rigid height limit of 10 or 11 stories. It does not guarantee good design, but it limits density, provides a defining framework for the city, and gives attention to the main public structures and complexes. Controls and zoning will not give us that grand, uniform sweep of Park Avenue, now destroyed below 59th Street, because that requires more than controls. It requires a consensus among architects as to how to build a luxury apartment house, plus the existence of a certain kind of market, responded to by a certain kind of developer. But controls will help. And Park Avenue needed a certain structure of taxes and interest rates that no longer exist. The Internal Revenue Code, as Ed Logue has pointed out, has probably done more to shape our cities than all the planners and architects. But it can also be used for the good: Consider the special tax breaks for historical preservation that have made it possible for the important historical density of a city to be evoked, for us to save examples of good construction and excellent craftsmanship in stone, brick, wood, and metal.

But the Internal Revenue Code also does other things. To what extent has it contributed to the fact that the apartment houses of New York City are so often built of cheap and light

materials that do not keep out noise and do not measure up to those of the past? Apartment houses were once built for long-term investment; the present-day apartment house, it appears, is built for rapid depreciation to swell income. Is there a way of managing our tax system so that more people do find it worthwhile to build well, even under present conditions that have magnified the costs of labor, materials, and money? These are the kinds of things we mean by process, yet they are only several examples of a host of factors that must enter into any great work of urban design. But the point is they are not factors that had to be taken into account to the same extent 50 or 75 years ago. We have to become imaginative as architects, planners, urbanists, to recognize these forces, and to use them for better design.

Jaquelin Robertson and his urban design group, in New York City under Mayor Lindsay, tried to use controls and incentives creatively, to encourage placing a theater or arcade in a building, in exchange for permission to build higher. Cities take time, as Dean Robertson pointed out, and it has taken us a while to figure out how to get these things done well. At first, some of the ground floor public areas that were designed to bring people (instead of banks) to an office building were bare and empty. In time, we have seen real triumphs of design and a bit more specification in the controls. Anyone who has walked through the new ground-level space at the Olympic Tower in New York, or a number of other open spaces for relaxation and shopping and getting out of the rain that have been built in New York office structures, will see how much we have learned. We do, however, make mistakes in this use of incentives. One of the worst occurred when New York offered more floors for plaza space. We were inspired by Rockefeller Plaza, and even thought the Seagram's Building Plaza wasn't too bad. We didn't realize how bad a plaza could be, how perfunctory one could make a gesture, simply to get the extra floors. But we did learn, after painful errors that we will live with for many decades. Thus, the new zoning district for Madison Square eliminates the plaza bonus—buildings must rise

directly from the building line, and the sense of enclosure that is so important for a city square or small park will be retained.

Time has given us the hindsight and experience to attempt to control the process that has become so complicated. But who will control it? Only one person in the city has sufficient authority and power (restricted as that may be today) to provide an overall guidance, and that is the mayor. It is the mayor from whom we expect commitment. At that level of authority, there must be a desire for good design, a recognition of who can help provide it, and finally commitment: that good city design is important enough to spend time on, important enough so that one says "no," to major enterprises that could bring jobs and taxes to the city, but are not appropriate for the city. We have seen wonderful examples of this commitment in the presentations of Mayor Joe Riley of Charleston. We know there was such commitment by former Mayor Lindsay, on a much larger and more difficult scene; we have seen a great example in Ed Logue of the necessary right-hand man for the mayor. Mayor Riley has demonstrated that nothing is too small for mayoral interest: how public housing fits into the fabric of the city; the color of terra cotta on a masonry wall; the means of hiding the side of a huge garage, and what plantings might best complement it. It is a rare mayor who cares how public housing looks, as long as he gets it for his city. And if he tries to delay things by getting involved in design and saying no again and again, he will get no credit—no thanks from the builders ready to start, the workers in the building trades looking for jobs, or the low-income people ready to move in. Yet the results of not saying no will be disastrous—as in the case of Boston's semi-abandoned public housing, which is now being remodeled at enormous expense to look more like the housing of the Boston working class.

During a recent stay in Paris, I was impressed by the fact that in that great and beautiful city it is the president of France himself who selects the designer and design of the

6 new opera house, the expansion of the Louvre, a new park, or a new government complex. In principle this struck me as admirable. Here was an example of the commitment I favored, cutting through the complexity of modern process. But what if the president, or the mayor, makes the wrong decision? We deal here, of course, with matters of taste, and yet I am convinced that some things would be wrong for a given city in a given place, other things would be right. Nelson Rockefeller was one of our great political builders, an example of "commitment." How do we explain that members of the same great family who built Rockefeller Center, so right for its city and its location, could also build the Albany Mall, so wrong for its city and location? A triumph of taste, a disaster of taste, in the same family. There are undoubtedly those who think the Albany Mall is beautiful and an ornament for the city, but I believe there are principles of urban design that would tell us—any of us—that it is wrong.

We can cite another case of commitment in which one decision was right, another wrong. Mrs. John F. Kennedy intervened to prevent the construction of two enormous government buildings in front of the White House, on charming Lafayette Square. With the help of friend William Walton and access to the highest source of power—the president—the design was changed so that the townhouses along the sides of Lafayette Square were preserved, at least as facades, and the square was not overwhelmed by having the bulk of these huge buildings put directly on it. But the same Mrs. Kennedy supported the Edward Durell Stone design for the Kennedy Center in Washington. I will not try to explain the principles that to me make this a bad way to provide concert and theater facilities for Washington, compared to the opportunity, for example, to place these facilities along Pennsylvania Avenue. The fact is that nothing could be done about this decision to build a huge dead-white block of a building to house three theaters, and to place it where it was inaccessible to pedestrian traffic.

In the end, however, we manage the process. Whatever the degree of commitment at the top, the decision can be awful. And what can we do about that? Perhaps the answer lies partly within the third of my general headings: education. Education is important because urban design is not just a matter of taste, in which one person's taste is as good as another's. There are differences. And unfortunately even education isn't the answer—very sophisticated and even great architects can have terrible ideas, such as Le Corbusier's proposal to level the center of Paris for skyscrapers in a park. This was not a matter in which one could say one opinion was as good as another. One opinion—keep Paris—*was* better than the other. How do we develop that sensitivity to each city, the kind we have seen displayed here by Mayor Riley, who seems to know what's right for Charleston? Here I will be somewhat optimistic and say that I think we do have an improvement of taste in the United States, effected largely through processes of education. This education is not, for the most part, formal and taught in schools; it is the kind of education, for example, that takes place in the historical preservation movement, where people must argue as to why a building or an area should be preserved. They know what they like, but in the course of making a reasoned defense, they learn why they like it: because its scale is right, or because its construction is good, or because the ornamental details are attractive, or because the relation of building height to street width preserves sunlight. People in general are becoming more sophisticated about urban design, and the historic preservation movement has done a great deal to create this sensitivity because it too has become more sophisticated. I would guess we would not do Williamsburg again the way it was done; we would not want to recreate it just as it was, or rather, just as it never was. We have expanded from thinking about individual structures to the ambience they are part of, and we have become less rigid about retaining structures of different epochs and different styles. I doubt today if we would level all the buildings around Independence Hall in Philadelphia.

That is part of the education we have received in considering problems of preservation.

Architectural journalists on daily newspapers are also engaged in developing taste. Although the number of such journalists is still low, their efforts are rewarded by a revival of public interest in architecture—never have so many books been published, or so much attention been given to architectural controversy in the press. This, too, is a form of education. Controversy forces people to think of buildings, of large projects, in ways that transcend the vulgarly functional.

And, of course, essayists are educators too. Who can exaggerate the enormous educational impact of Jane Jacobs' *Death and Life of Great American Cities*? She taught us that a complex urban texture had many virtues, and warned us against the wholesale destruction of what had grown up over decades and even centuries.

I also see this education operating through the expansion of tourism. Visiting Europe can be an education in urban design. It is inevitable, it seems to me, that seeing the tightly built, complex cities of Italy, or the great expanses of Paris, or the central squares and substantial public buildings of the provincial cities of France, or the new transportation facilities and their excellent graphics in Germany, will impel people to ask, "Why can't American cities do as well?" As tourism extends, to Egypt, China, India, North Africa, there will be other city-types to look at, other lessons to be learned.

This education also operates through the environmental protection movement. We may think of that as anti-city, but the point is it teaches people to see. And the person who sees that a pastoral landscape is beautiful is likely to have the sensitivity to discern what kind of urban landscape is also beautiful.

So I think education is taking hold. We are learning. I wonder sometimes whether this architectural and design boom—it is a boom in terms of publications and media interest—is only a way of plugging the latest fashion in architecture, rather than developing a sound sense of good urban design. Undoubtedly much of what we see in public discussion is fashion and of the moment. But there is a way in which a truth emerges, even in fields like architecture and urban design, where there can be no truly scientific judgment; truth in these fields emerges by consensus over time. It is the kind of consensus that, 50 years after it was built, leads us to write more and more about Rockefeller Center, to use it as a touchstone for other center city developments that hope to create an emblem, a meeting place, a symbol of a city. It is the sort of consensus that over time leads more and more of us to respect the genius of the creator of the University of Virginia.

The issue is not to let our cities be shaped by default, so that if we do construct something we and our children will have to live with for 50 and 100 years and more, it will be done with thought, with sensitivity, with some insight into the nature of the place we are dealing with, and the kind of place we are trying to make. In the end, the best guarantee for good urban design is neither ingenious management of the process, or even the commitment of the policy maker: It is the level of understanding among the people.

Figure Credits
1, 2, 3, 4 From *Rockefeller Center* (New York, 1932).



The Architecture and Politics of Public Works in Metropolitan Amsterdam

Helen Searing

Public works are often taken for granted, noticed more for their absence than for the positive contributions they make to the image of a city. But there are situations where they loom large in shaping the perception of a given place, becoming symbols as well as servants of a metropolis. It is this larger vision of the formal no less than the functional potential of public works that has held sway in Amsterdam at key periods in its history, most notably in the 17th and 20th centuries.

Dutch cities are peculiarly dependent on the kinds of physical interventions that fall under the rubric of public works for, together with the countryside that surrounds them, they are man-made artifacts to an unparalleled degree, won from an environment which in its natural state is extremely inhospitable to human settlement.¹ Since its first emergence as a nation, the Netherlands has been compelled to adopt a variety of governmental apparatus on the national, provincial, and above all, on the local level, to initiate and coordinate the communal projects necessary merely to sustain, let alone to enhance, existence in that land.

A long tradition of local autonomy in the Netherlands has meant that the sphere and mode of operation of the agencies charged with carrying out public works differs from city to city. Nevertheless, in a considerable number of instances, these agencies have in common the will and the means to make an unparalleled impact on the cityscape. Besides being responsible for infrastructural necessities like streets, bridges, electric cables, and water and sewage lines, which in themselves contribute to the physiognomy of a given place, they control the design of everything from extension plans and major groups of buildings (fig. 1, 2) to street furniture (fig. 3). Furthermore, at various times in the 20th century, these agencies have played host to practitioners advocating a specific architectural philosophy, endowing the city in question with a distinctive stylistic character.² The most striking Dutch example of this phenomenon is Amsterdam, where such distinguished figures as H. P. Berlage (1856-

1934), Michel de Klerk (1883-1923), Pieter Lodewijk Kramer (1881-1961), Cornelis van Eesteren (b. 1897) and Aldo van Eyck (b. 1918) have been attached at some point to the *Dienst Publieke Werken* (Public Works Service; henceforth PW).

This is not to say that during the modern era unanimity has reigned in Amsterdam about the role of public works. Some of the city fathers and functionaries have believed that they should be exclusively technical in nature and chiefly serve the developmental activities of private enterprise. Others, viewing the city as both an embodiment and instrument of democratic, cultural, and socio-economic goals, have seen public works as the means of outfitting the community with physical services parallel to the social services they advocated to support its burgeoning and diverse population. Their ultimate goal was to make 20th-century Amsterdam the consummate social work of art, spiritually as well as materially representative of a more democratic epoch. Aesthetically it would rival the 17th-century city, but yet it would now serve not only wealthy merchant families, but also members of the working and lower middle classes.

The modulation of a purely technical outlook to a more artistic point of view has determined the fluctuating destinies of the agencies involved with public works in Amsterdam. Among the agencies involved are the *Gemeentelijke Woningdienst* (Municipal Housing Service) and the *Bouw- en Woningtoezicht* (Office of Building and Housing Inspection), as well as PW itself. The focus of this essay, however, will be on PW, with two topics selected from a rich body of pertinent material. Part I traces PW's origins and fortunes from the mid-19th to the early 20th century, and discusses its relationship to public and private interests and to the physical growth of Amsterdam. Part II offers a closer study of PW's activities, particularly in the architectural arena, during a very important period of its history—1915-1930—when it contributed immeasurably to the urban fabric of Amsterdam as we know it today.

(frontispiece) *Bridge and Transformer housing Amstel Canal and Amsteldijk, 1928.*

1 *Vrijheidslaan, Amsterdam South, air view from east toward west. Laid out by Dienst Publieke Werken (PW). Privately constructed dwellings with facades designed by the Amsterdam School. Schools upper right and center right by*

PW. Bridge in foreground by Berlage, 1932.

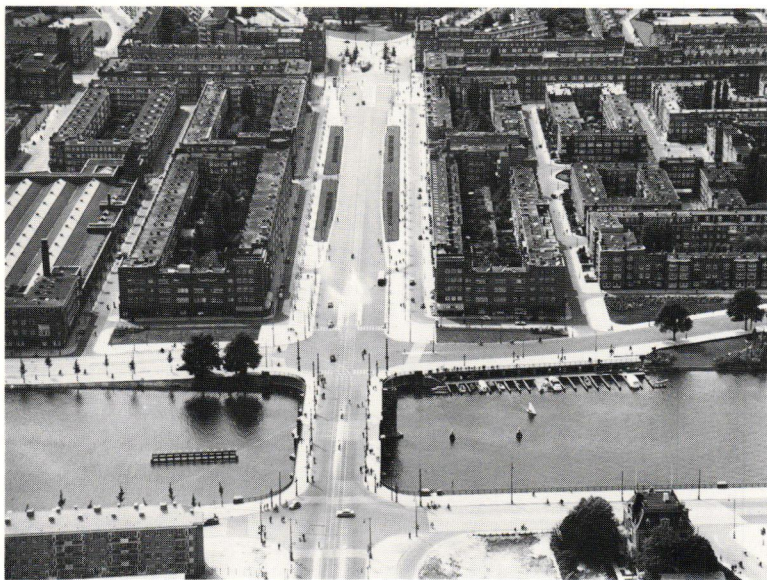
2 *Transvaalbuurt, Eastern Amsterdam, previous to preparation of land by PW.*

3 *Municipal Girobox (for payments to the municipal caisse for city services). Designed by PW, c. 1926.*



3

10



1



2

I. General History of Dienst Publieke Werken, Amsterdam

The pace and sophistication of public works programs in the industrialized nations dramatically increased during the 19th century. The Netherlands, in economic decline since the late 17th century, experienced the effects of urbanization and technological change much later than many other continental countries, but by the 1870s its cities were also faced with the new problems and possibilities spawned by the Industrial Revolution.³ The tradition of local autonomy noted above, dictated, however, that the effectiveness and timing of public works, as well as the organizational structures for executing them, varied throughout the Dutch kingdom.

In Amsterdam, the foundations of the modern organization of public works were laid on 13 February 1850, when the city council voted to delegate to one alderman sole authority over the two agencies that dealt with the maintenance and occasional construction of roads, canals, quays, bridges and sanitation facilities, *viz.*, the *Stadswaterwerken* (City Water Works) and the *Stadsfabrijksambt* (Municipal Building Bureau).⁴ In 1856 these were subsumed under a new *Dienst Publieke Werken*, but each retained its own chief officer, the city engineer, and the city architect, respectively. In 1873 these functionaries were placed under the director of PW and the way was paved toward a single, independent service directly responsible to the municipal government. It was not until 1896, however (a fateful year for Amsterdam on many fronts, as will be shown below), that a major reorganization allowed the scattered activities constituting public works to be smoothly coordinated by the department. Further administrative refinements were made in 1904, resulting in a PW ready for action on a broad urban front.

The initial steps taken to create PW had come at an appropriate moment. A thorough inspection made in 1852 showed the urban infrastructure to be in a sorry condition. At the same time, Amsterdam was beginning to stir from its somnolent economic state. Some private construction had

already begun to encroach upon the area outside the old fortification walls, and the local authorities realized that they would have to take the route of many other European cities and break through previous boundaries to acquire land for expansion.⁵ The ramparts that had contained Amsterdam since the early 17th century were gradually levelled. The ensuing development, which took the form of a girdle around the disappearing walls, was the first outward extension since the renowned Plan of the Three Canals, which had provided sufficient space for the city's needs for two centuries.⁶

The realization of the Plan of the Three Canals was accomplished in two stages; the first commencing in 1612; the second in 1658. The plan established a compelling precedent for municipal initiative with regard to urban development. The oligarchy, which ruled Amsterdam until constitutional changes introduced more democratic procedures into local governance, played a definitive part in determining the expansion.⁷ The regents expropriated property outside the obsolete 16-century fortifications, had it drained and heightened to make it ready for construction, parcelled the land into regular plots, which were then sold. Proceeds from the sale were used to finance the layout of streets, canals, bridges, and new defensive bastions, and for the construction of public buildings—warehouses, market halls, produce and stock exchanges, and an imposing city hall—which were deemed necessary to maintain Amsterdam's hegemony as an international center of trade.⁸

The merchants who purchased property in the new section made available through the Plan of the Three Canals found themselves strictly regulated.⁹ Minimum plot sizes were specified, as were building materials. Covenants that had to be observed by succeeding generations forbade the owners to subdivide the plot or to cover more than a certain percentage of it with construction, and ruled out certain types of industry such as brewing, barrel-making and stone-cutting.¹⁰ The Plan of the Three Canals was thus a model of long-range preparation, enlightened communal coopera-

tion, and municipal participation in the architectural process. It would often be appealed to in the 20th century when the local government needed sanction for similar actions.

Yet in the 17th century an antithetical *modus operandi* came into play, one that would foreshadow the unregulated and speculative practices characteristic of the second half of the 19th century. This took place in a rump area called the Jordaan, just to the west of the third canal, the Prinsengracht. The farmland that originally comprised this area had not been acquired by the city beforehand, but was purchased by individual entrepreneurs and built up in a haphazard and constricted manner. Intended for manufacturing premises and for the accommodation of the workers and *petite bourgeoisie*, the Jordaan was, and remains, a lively and picturesque part of the city. But its vitality, to borrow a term from Robert Venturi, is "messy," and certain sections might today be considered slums.¹¹ Thus its evolution set a very different precedent from that of the Plan of the Three Canals.

Somewhat ironically, the example of the Jordaan was followed when the Amsterdam PW first came into existence in the 1850s, and this fact limited the nature and extent of its activities for a time. In the Netherlands, as elsewhere during that period, the liberal doctrine of *laissez faire* was dominant. This meant that private entrepreneurs, rather than the local authorities, were to take the initiative with regard to urban development (fig. 4). The provision of gas and subsequently of electricity, of drinking water, and of transit facilities like the horse-drawn tram, was left to private monopolies that received concessions from the city for introducing and operating these services. Even the first parks were financed by groups of private citizens. In addition, what one might consider the first, albeit modest, "extension plan" since the 17th century, was proposed by Dr. Samuel Sarphati for the area around the Paleis voor Volksvlijt (Palace of Industry), a ferrovitreous exhibition

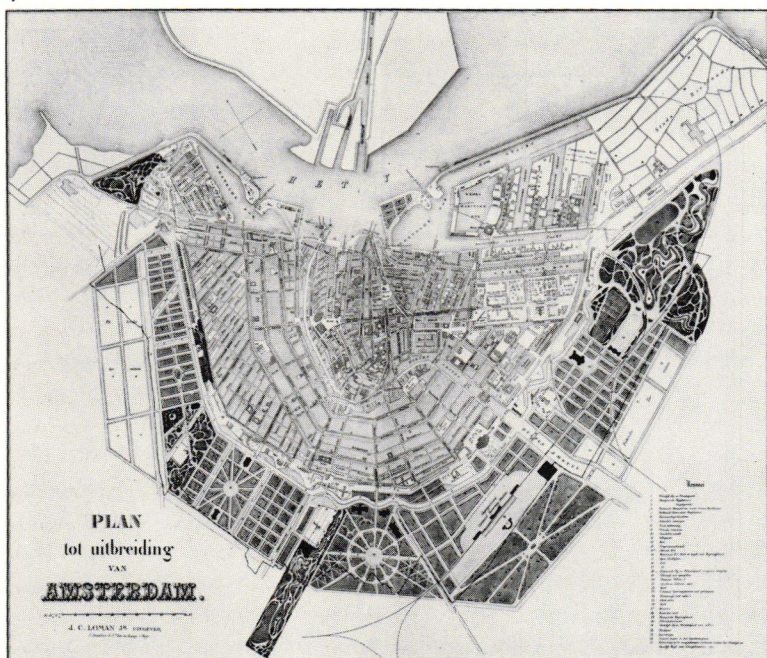
4 Map of Amsterdam contrasting development on privately owned land (black) and on land leased by the municipality (gray).

5 Plan for extension southward. J. G. van Niftrik, 1866-67.

12



4



5

building based on the Crystal Palace, which through his efforts had been constructed in 1864.

Since the municipal authorities were passive during this epoch, the more progressive members of the upper-middle class took responsibility for new development. The Rijen Wandelpark (later renamed the Vondelpark after the great 17th-century Dutch author, Joost Vondel) was opened in 1865. It was extended in 1877, penetrating deeply into the previously unbuilt area (it can be seen at the southwest in the maps in figs. 4 and 5); during the 1870s it became the focus for a fashionable neighborhood of expensive mansions. Dr. Sarphati is a good example of a progressive liberal. His Palace of Industry served as a combined exposition-recreation center. The municipality granted him a concession to develop the area around it with housing, as well as small parks fore and aft of the Paleis voor Volksvlijt. His funds were inadequate to carry out the project, however, and he sold the land to less public-spirited developers.

Housing was the most lucrative arena for private enterprise. In 1879 the population of Amsterdam showed the first increase since the Golden Age, and there was an avid desire for dwellings. Speculators, who obtained land from the municipality at very low prices, and the so-called *revolutiebouwers* (jerry-builders), responded to this appetite.¹² On this occasion it was the builders rather than the community who reaped the profits. PW was directed to demolish the defensive walls, prepare the land for construction, and lay out the streets and roads necessary to serve the areas being developed by the private sector, all at public expense. Thus PW's task was seen as facilitating the activities of the capitalists, following rather than taking the lead in urban development.

Although in thrall to the doctrine of *laissez faire*, the city made some tentative efforts to control the stirring growth. A modest building code was passed in 1858, and in 1866 city engineer J. G. van Niftrik, who held the post from 1864-

1900, offered a carefully thought out and aesthetically ambitious plan for the swathe of land encircling the former fortifications to the south (fig. 5).¹³ It was conceived on a grand scale, incorporating broad boulevards and elegant *rond-points* in the manner of Napoleon III's Paris. Van Niftrik zoned his plan according to land use. Parks separated industrial areas from residential, and the latter were distributed according to the level and type of housing—private villas in one section, tenement blocks in another. For a variety of reasons the proposal came to naught,¹⁴ and the council installed the Advisory Committee for the Preparation of Public Works. The committee was to establish more mundane guidelines before the half-moon-shaped rim that lay immediately west, south, and east of the historic city was completely built up.

Following the uninspired recommendations drawn up by the advisory committee, J. Kalff (director of PW from 1873-1881) devised a plan which he presented to the council in 1876 (fig 6). It represents the efficient but dreary technocrat's approach to city planning during this period.¹⁵ Monotonously regular streets were laid out according to the maxim that a straight line is the shortest—and therefore the cheapest—distance between two points. Had the plan been filled in with architecture of good quality, some of the harsh and tedious effects would have been mitigated, but the utilitarian three- and four-story tenements that would spring up along these streets brought no visual relief. Executed for the most part by *revolutiebouwers*, they had little merit either in terms of comfort or beauty. To make matters worse, the unimaginative treatment of the new sections was accompanied by depredations visited on the existing city.

While the council recognized the necessity for improving communications *between* the city center and the new neighborhoods, it also sought to accommodate greater traffic flow *within* the existing 16th- and 17th-century core. This was accomplished in a brutal way. Historic buildings were razed to permit the broadening of streets, and many of the

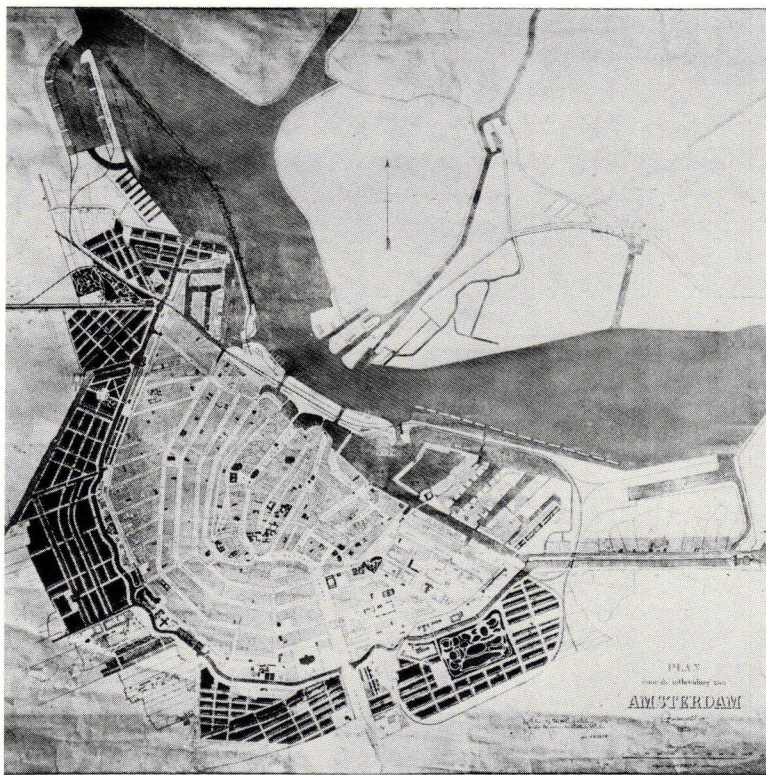
canals were filled in (*gedempt* is the evocative Dutch word) to become ordinary roads. This is one of the sorriest episodes in the history of Amsterdam's public works program; sparkling waterways that had mirrored rows of streets and changing skies were replaced by dull pavement. One justification for the *demping* (filling-in) was hygiene; many of the canals were used as sewers until new techniques of sanitary engineering were employed by PW to keep them clean. Not only did many of the old canals disappear, but neither was provision made in the new sections for the waterways that had endowed Amsterdam with so much of its traditional charm.

In the last decade of the 19th century, however, a number of political events allowed the PW to orient its efforts towards the creation of community works of art. This resulted in a coherent architectural style that came to be known as the Amsterdam School. Within the municipal government, radical politicians made significant inroads into the city council, and their urban policy was markedly different from that of the liberals. Rather than leaving it to private enterprise, they believed in aggressive municipal interference when the interests of the larger community were at stake. Thus, in 1896 PW was reorganized to give the director more discretionary power; in the same year the important system of *erfpacht* (leasehold) was introduced. With *erfpacht*, the city abandoned its previous practice of selling land at modest prices to private speculators who profited enormously when the property appreciated in value, as happened almost inevitably in this period. Instead, the city retained ownership of the sites but offered them on a long lease in exchange for realistically calculated yearly payments. Leasehold also meant that development of the land was subject to perpetual control by the local authorities. Coincident with the introduction of *erfpacht* was the passage of a stricter building code, to be supervised by the new Department of Building and Housing Inspection.

Another important event of 1896 was the annexation by

6 Plan for extension southward. J. Kalff, 1876.

7 Extension Plan Zuid (south). Berlage, 1915. Compare right side of fig. 7 with fig. 1.



6



7

Amsterdam of undeveloped territory on its southern border, which had previously belonged to three other municipalities. This would have important implications for future expansion, and would provide a geographic center for the first significant extension plan of modern times. Finally, 1896 also saw the city government seize control of the water supply. This was the second in a series of municipal takeovers of existing utilities engineered by the radicals. The privilege of operating the telephone service (1895) was first withdrawn from the private concessionaries, then the gasworks (1897), and finally, the tram (1900). Understandably, these actions broadened the sphere of PW's responsibilities, and rendered the department's impact on the city more visible.

Collateral decisions taken in the same decade include the creation in 1898 of an advisory commission to approve the design of all buildings to be erected on leased land. This paved the way for the establishment of a *Schoonheidscommissie* (Aesthetic Commission) that controlled architectural design throughout the city. It also signalled that Amsterdam, the first Dutch city to authorize such a body, was emerging from its 19th-century obsession with technical invention at the expense of beauty, and was ready to make the new parts of the city worthy successors to the historic core. This resolution was strengthened in 1900 when H. P. Berlage, the Netherlands's most renowned architect, was appointed aesthetic adviser to PW.

Berlage had already been chosen by the municipality to design its new Beurs (Produce, Grain and Stock Exchange, 1897-1903).¹⁶ His major task as aesthetic adviser was to design a major extension plan for the area south of the 19th-century development (*Plan Zuid*). While his maiden effort, completed in 1904, was rejected as being impractical, his second definitive design was approved in 1917 (fig. 7). In a sharp break with late 19th-century practice, the intricately patterned streets, squares, and perimeter blocks make *Plan Zuid* a striking example of "city planning according to artistic principles."¹⁷

Berlage was associated with PW from time to time throughout his career, as designer of bridges as well as extension plans.¹⁸ The importance of professional architectural input was soon recognized, and there were repeated calls for the regular employment of individuals trained as architects to take a place in PW beside the technical personnel.¹⁹ At first this was accomplished through the post of aesthetic adviser: from 1909-1912 another architect just achieving prominence, Joan Melchoir van de Meij (1878-1949)²⁰ occupied the position. Gradually, more and more architects were drawn into direct service with PW, as will be recounted in Part II.

National as well as local priorities enlarged the realm of PW. The passage in 1901 of the *Woningwet* (National Housing Act) strengthened the apparatus Amsterdam was putting in place to guide its physical development toward socially responsible ends, including the provision of a comfortable, healthy, and attractive environment for all its citizens.²¹ By making funds available at modest interest rates to municipalities and to special workers-housing societies for the erection of sound and handsome dwellings, the *Woningwet* bred a demand for appropriate sites. This directly concerned PW, whose task it was to make the parcels *bouwrijp* (ready for construction) by draining the marshy land and piling it with sand until it offered a firm foundation and lay at a height sufficiently above sea level to withstand flooding (fig. 2). In addition, PW made available the necessary utilities and drew up the broad layouts for these future *Woningwet* neighborhoods.

The *Woningwet* would affect PW indirectly as well, from a more equivocal standpoint. In 1915, in order to take full advantage of the financial and juridical measures of the National Housing Act, the city council of Amsterdam approved the establishment of the *Gemeentelijke Woningdienst* (Municipal Housing Service; WD). WD was empowered to perform a number of new tasks, such as keeping a census of dwellings and operating the municipal housing

that the city had pledged to build. But WD would also encroach on PW's domain. Under the directorship of Ary Keppler (1876-1941) WD assumed from PW the layout of those sections of the city where the housing societies and the municipality were to erect dwellings on a large scale.²² PW continued to prepare the land and to design public amenities and buildings, but it relinquished some control over the detail distribution of building parcels within such neighborhoods. It remained in charge of planning the areas where construction was carried out by private contractors; since the participation of the private sector in the housing market accelerated markedly after 1920, PW was not left idle.²³

The competition between the two services and their directors—Keppler, who ruled WD from 1915-1937, and A. W. Bos, head of PW from 1907-1926—was to some extent political in nature.²⁴ Keppler, an outspoken social democrat, wanted all housing to be public, preferably in the form of garden suburbs. Bos saw advantages in using private capital for development plans, and accepted the necessity of denser, four-story development. This is not the forum to belabor the details of their enmity, but it is relevant to the general issue of public works in Amsterdam since, for a time, PW shared responsibilities with WD. During the first ten years of Keppler's tenure, in fact, *Woningwet* housing must be counted among the city's *publieke werken* in the larger sense.

The bureaucratic rivalry that existed between the two men did not hamper their common vision of Amsterdam as an urban work of art. Both drew on the same local group of architects to make that vision tangible. It was under W. A. de Graaf, director of PW from 1926-1946, however, that WD's authority declined, and a new view of the ideal 20th-century city was adopted. In 1928, PW's mandate was markedly broadened. The leasing and operation of municipal land, previously lodged in a separate service, was placed under its aegis, and a new division of City Development (*Afdeling Stadsontwikkeling*, henceforth SO) was set up within its ranks to develop all subsequent extension plans.

16 SO was staffed by a cadre of men who introduced an approach to urbanism diametrically opposed to what had previously prevailed in Amsterdam. A discussion of that momentous change will form the conclusion of Part III.

II. *PW and Architecture in Amsterdam, 1910-1930*

When the first director of Amsterdam's PW was named in 1856, the rehabilitation of existing facilities was the foremost item on the agenda. Soon, new works were undertaken by PW, but for the remainder of the 19th century these were primarily technical and utilitarian in nature. For example, when construction of a new Beurs was contemplated in 1884, the design was not entrusted to PW and the municipal architects. Instead, an international competition was held. The premeditated design was never realized, and when the city council decided in 1896 to go ahead with the project, the commission was given to private architect Berlage.²⁵

The subsequent appointment of Berlage as aesthetic adviser was a signal that Amsterdam intended to upgrade the architectural quality of municipal works, executed by a service which itself continued to be directed by engineers. Throughout the first decade of the 20th century, various architects and councillors pleaded that a major architect be given a leading role *within* PW so that artistic excellence would become a priority in all municipal construction. This goal, first envisaged by the radicals, was realized when the social democrats won sufficient political power in the second decade to carry out their strategy of making architecture the tangible record of their socio-cultural program.

The 1910s were a propitious time to attract talented designers into public service. For a variety of reasons,²⁶ the supply of well-trained and ambitious architects was at an all-time high, while the demand was low due to the stagnation in private construction brought about by World War I. Within PW two divisions in particular benefited from this situation, which coincided with the determination of those in government to enhance the quality of municipal

design: the Division of Bridges (*afdeling Bruggen*) and the Division of Buildings (*afdeling Gebouwen*), headed by A. R. Hulshoff (1880-1958). What is remarkable is not the fact that PW finally obtained a full complement of gifted architects, but that the majority of these men were the adherents of a single and rather extreme trend, that of the Amsterdam School.²⁷

Twentieth-century architectural movements have often claimed to operate at one or the other end of a spectrum of antithetical extremes. In attempting to summarize the credo of the Amsterdam School, it is only a slight exaggeration to say that it emphasized aesthetics, feeling, and subjectivity, as opposed to utility, reason, and objectivity. The members of the group insisted that architecture was first and foremost an art, and that functional and structural considerations must be transcended in the final work through the architect's powers of formal invention and mastery of building techniques. At the same time, somewhat paradoxically for those desirous of a strikingly personal imagery, they clung to the ideal of a *gemeenschapskunst*, an art symbolic of the community it served, and believed that this would arise precisely through the inspired efforts of talented individuals. For this reason, their approach was not as ill-suited for municipal service as might first appear. Furthermore, despite the impulse to create a new solution for each project, there is a family resemblance among the works of the Amsterdam School which enhances their appropriateness within the urban context.

The resemblance resides in that craftsmanlike employment of traditional materials (brick, tile, and wood) for novel ends, in the dynamic articulation of the various functional volumes, and in the suggestive and often elaborate detailing of elements like windows and entrances. Ornament remains an important feature, judiciously placed and executed in wrought iron, stone, or brick. Exuberant curves are characteristic, as are striking silhouettes—simple rectangular configurations are avoided at all cost. In current

architectural jargon, the Amsterdam School is inclusivist in its consumption of diverse visual sources. References to the Art Nouveau (including the native rectilinear version, *Nieuwe Kunst*)²⁸ with its organic decoration abound, as do allusions to vernacular, medieval, and exotic structures and motifs. Perhaps the crowning testimony to the assimilative appetites of the group is the absorption of formal devices used by other avant-garde movements. Not surprisingly, there is a two-way relationship with German Expressionism, but disarmingly—if not disconcertingly—borrowings from the inimical De Stijl are admitted into the repertory as well. While spokesmen for the architectural wing of De Stijl found nothing to admire in the work of the Amsterdam School,²⁹ the latter adopted certain stylistic ploys of De Stijl for its own expressive purposes, such as hovering planes and interpenetrating volumes. Both groups often made recourse to harmonic systems of proportion, a compositional method in vogue among Dutch architects of divergent allegiances from the 1890s through the 1930s.³⁰

The Amsterdam School received its name in 1916, and commentators have noted two phases during its 15-year reign:

“The first is that of youthful inspiration, unbridled individuality . . . characterized by a superabundance of fantasy . . . after that [1923] came the second phase, calmer in effect and more conventional in the application of the idiom—laddered windows, corner accents, artistically laid-up masonry, roofs shaped like a chain of mountains, little towers.”³¹

Three men were identified as the leaders and as the coiners of its stylistic vocabulary during the school’s first phase. The most important of them was Michel de Klerk, who was supported by Piet Kramer and Joan van der Mey (or Meij; 1878-1949).³² They had received professional notoriety through their collaboration from 1912-1916 on the *Scheepvaarthuis* (Marine Office Building; fig. 8), and like many among their followers, they would experience various

8 *Scheepvaarthuis* (Marine Office Building). Van der Meij with de Klerk and Kramer; sculpture by Krop and others, 1912-1916.

9 Bridge over Waalseilandgracht. Van der Meij for PW, 1914.

10 Wrought-iron railing, detail of figure 9.



8



9



10

11 Main facade.

12 Bridge, Keizersgracht-Vijzelstraat.

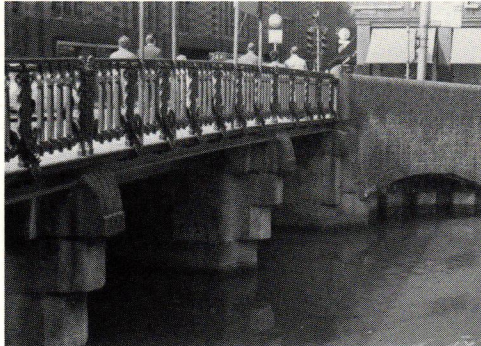
Kramer and de Graaf for PW, 1919-22.

13 Detail of figure 12.

18



11



12



13

degrees of involvement with PW. But whether the trio devoted the major part of their design energies to the service or worked sporadically for it while maintaining a private practice, such was the tenacity of shared convictions that the term *Public Works Style* (*Publieke Werkenstijl*) can often be used synonymously for Amsterdam School (*Amsterdamse School*).

The oldest, van der Meij, was aesthetic adviser to PW from 1909-1912 and, during and after his tenure in that position, designed several fine bridges (e.g., figs. 9, 10). The taut brick surfaces smoothly dressed by stone derive from Berlage, but the replacement of the expected semicircular arches by unusual triangular openings is typical of the practice of the Amsterdam School, as is the complementary intricacy of the wrought-iron railing. De Klerk's association with PW was much briefer; he worked there in 1915, the year he was honored at the annual exhibition of the influential Amsterdam architectural organization, *Architectura et Amicitia*.³³ His hand can be traced in the details of one or two of the public schools for which the Division of Buildings of PW was responsible (fig. 11); motifs such as the splayed pedimental forms should be compared with similar features on the *Scheepvaarthuis*. But the plastic extravagance and luxuriant decoration that, to judge from an unexecuted project made in 1915, de Klerk was determined to bestow on this building type, evidently surpassed anything the municipal purse could reasonably afford. After several months the fiery genius severed the connection with PW, although his influence within the service remained potent for more than a decade. De Klerk turned elsewhere to realize his dream of an archetypical *gemeenschapskunst* which, in the case of his superb blocks of *Woningwet* dwellings, would still be dedicated to the community that had nurtured him.³⁴

Kramer's affiliation with PW was much longer and more fruitful. He was employed by the Department of Bridges as aesthetic adviser and designer from 1917-1952, allegedly producing more than 400 individual projects. His most

14 *Detail of Bridge, Raadhuisstraat. Kramer and de Graaf, 1923 note date carved in stone.*

15 *Detail of bridge, Raadhuisstraat. Kramer.*

16 *Detail of Kramer bridge.*

successful bridges resulted from collaboration with the structural engineer, W.A. de Graaf, who became director of PW in 1926:

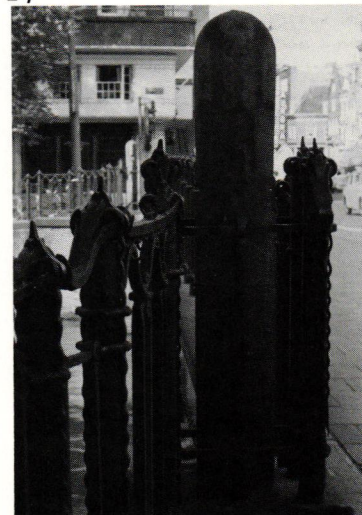
“Kramer always expressed special respect, esteem and admiration for his chief, to whom he was greatly indebted. De Graaf can justly be called the “bridge builder of Amsterdam,” for he solved the problems caused by new traffic requirements with extraordinary insight and energy. With each bridge a new difficulty arises which the layman neither sees nor understands but which costs the engineer some sleepless nights. . . . It is foolish to speak only of “Kramer’s bridges,” as Kramer would be the first to agree. Nevertheless, the architect can make of a good and a practical bridge a beautiful bridge, related organically to its surroundings through its form and decoration. It was an act of perspicacity to have engaged Kramer as aesthetic advisor to the Department of Bridges because he comprehends as few others the character of Amsterdam.”³⁵

While de Graaf’s technical expertise is integral to the structural effects of the bridges, many of the ornamental effects were achieved in alliance with decorative artists. Although Kramer designed his own exotic ironwork, he often turned to sculptors like Johan Polet (1894-1971) and Hildo Krop (1884-1970) to complete the bridge with their stone carvings. Krop, already well known to Kramer through his work on the Scheepvaarthuis, was named sculptor to PW in 1916, as further testimony to Amsterdam’s faith in the valuable contributions contemporary artists could make to its public image.

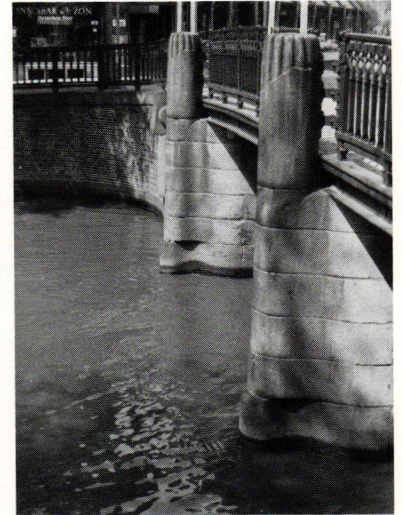
In both the old and new quarters of the city, these bridges (figs. 12-17) make a stroll across Amsterdam’s canals a magical experience. One is accompanied on the journey by playful and often mysteriously creature-like architectural and decorative forms. In keeping with the aims of the Amsterdam School and its supporters in PW, each bridge is an individual member of a species, one that in its materials and some of its forms shows kinship to previous ancestors, and yet each has undergone permutations which speak of



14

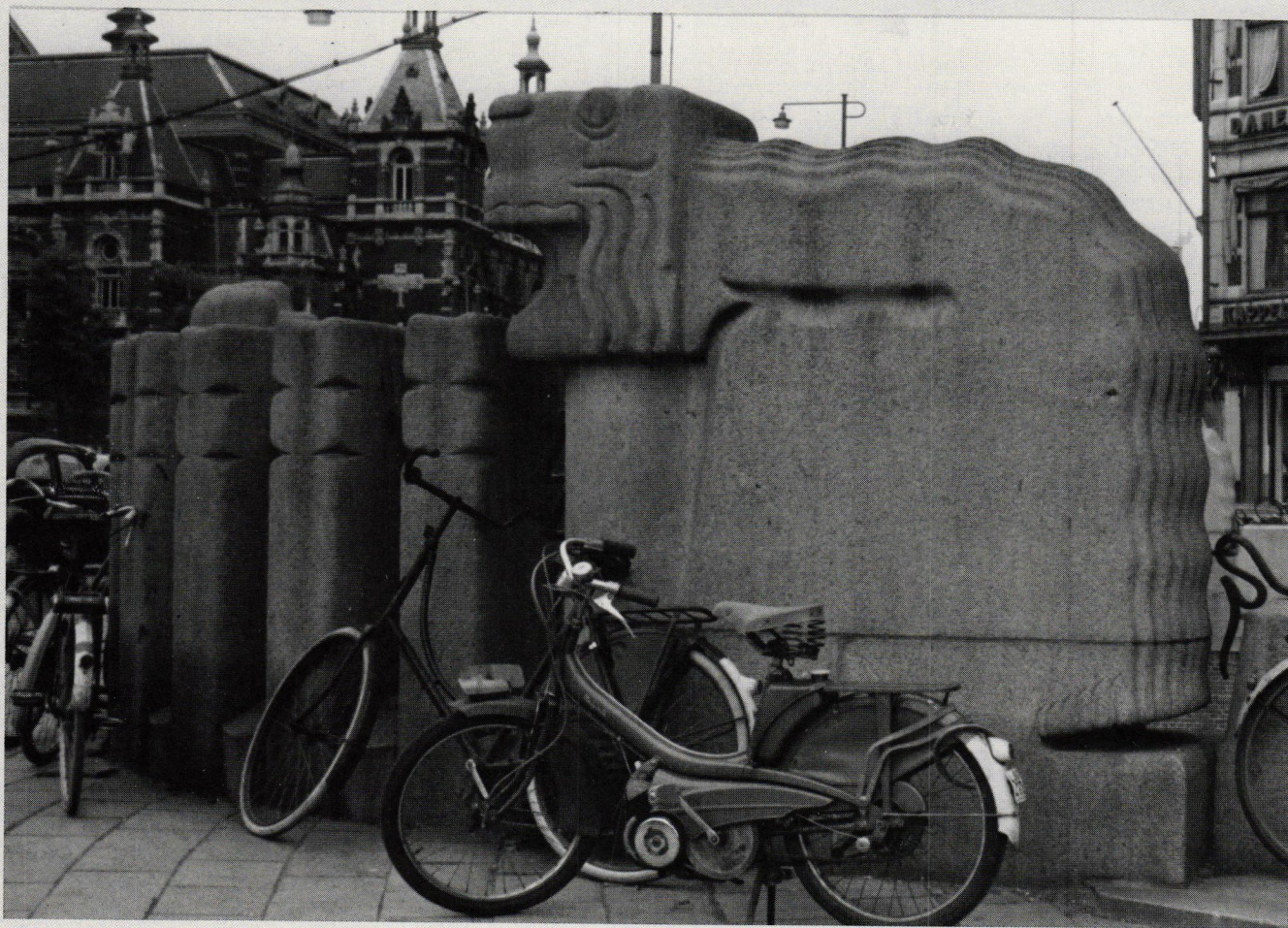


15



16

17 *Detail of Bridge, Singelgracht-
Leidseplein, Kramer and de Graaf;
sculpture by Polet.*



a newer age. To be sure, the bridges are dated, in the same way that the 16th- and 17th-century canal houses are; evoking a specific epoch, they nevertheless can be appreciated by successive generations. Essential paths that bind together different parts of Amsterdam, the structures designed by Kramer and his colleagues lighten the heart and enhance the rich poetic content of this *grachtenstad* (canal city).

Kramer's position at PW did not preclude his participation in other projects; this was also true in the case of other members of the Amsterdam School, such as A.J. Westerman (1884-1966; active with the Division of Buildings from 1914-1922) and N. Lansdorp (1885-1968; served in the Division of Buildings from 1920-1932). Housing, whether erected by private contractors (figs. 18, 19) or through the *Woningwet*, was the main source of outside commissions and was totally compatible with employment at PW. Public works were an integral and highly visible part of the new neighborhoods that arose with such rapidity and verve that Amsterdam, during the 1920s, was called "the mecca of housing."³⁶ The Public Bath building on the Diamantstraat and Smaragdplein of 1920-1921, by Westerman, is a perfect example (figs. 20, 21, 22); with its sensual form and flowing brick and tile surfaces, it is an ideal companion for the dwelling complexes that surround it (fig. 23). In addition, it is an excellent illustration of the type of proportional system in vogue among the most progressive Dutch architects of the time.

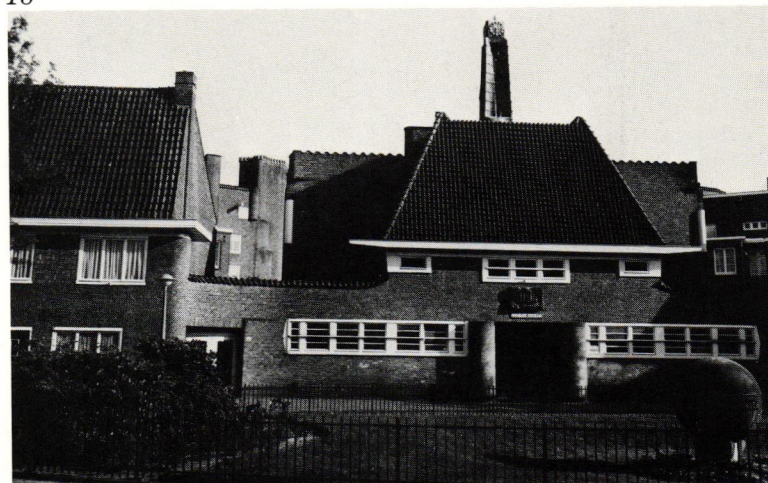
Geometric systems became popular in the Netherlands at the turn of the century as a way of harmonizing the various parts of a design and give it universal appeal; the most widely publicized use was in Berlage's Beurs. Regulating lines determined the site and distribution of volumes, and the placement of details and openings in the elevations. Such systems were seen by members of the Amsterdam School as a means to balance the subjective side of architectural inspiration by a more objective method, which nonetheless remained mystical in its effects. Westerman's application of

18 Housing block for Amstelsbouwvereniging, a consortium of private builders. Lansdorp, 1922. (This complex appears at the center far right of figure 1, just above the school.)

19 Public library with dwellings of Onze Woning to either side. Kramer for PW, 1926.



18



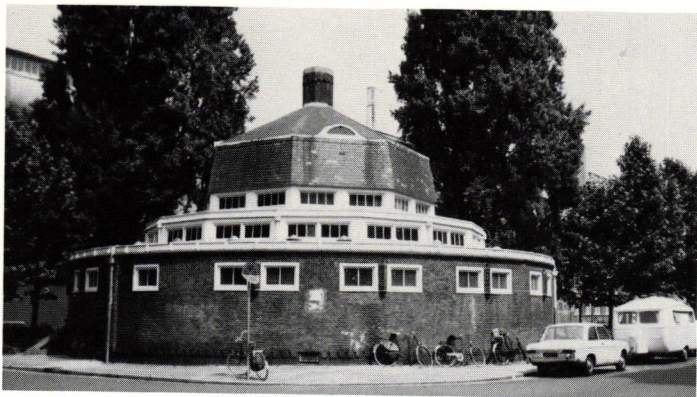
19

20 Public baths building, Amsterdam south. Westerman for PW, 1922. View from Smaragdplein.

21 Same as figure 20. View on Diamantstraat.

22 Diagram showing use of proportional system.

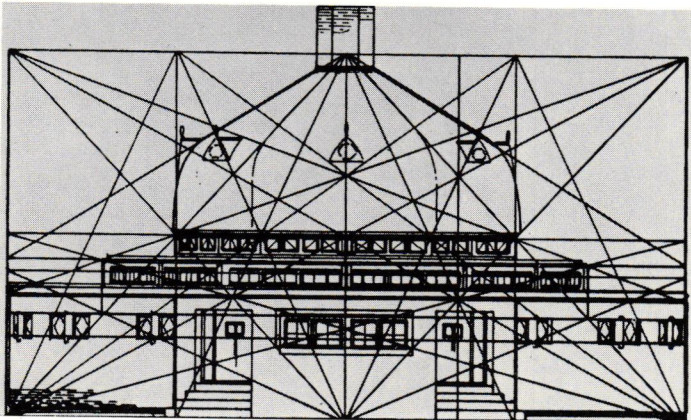
22



20



21



22

geometric proportions in the bathhouse is a sign of the care he lavished on a relatively humble building type. He would not have been financially remunerated for the extra time and energy invested in making the design conform to the sophisticated triangulation devised for the project, but that did not matter; what was important to him was that a building which was communal in function should be communal in spirit, a work of *gemeenschapskunst*. This point should be remembered when the Amsterdam School is criticized for being self-indulgent or for taking advantage of publically financed projects for their own formal experiments.³⁷ Furthermore, buildings like this bathhouse were evidently appreciated for their symbolic as well as their pragmatic purpose: in this case, individual ablutions are raised to the level of a shared and joyful ritual.

Another silk purse made from a sow's ear is the 1925 kiosk-public toilet on the Weesperplein (figs. 24, 25). Its intricate and organic plan, with different interior spaces dramatically articulated in the massing, is characteristic of the Amsterdam School. Yet this little gem also demonstrates the openness of Amsterdam's architects to unexpected sources; were it not for the circumstance that some of the volumes are heretically curved, one might claim this for De Stijl. The spaces seem projected centrifugally outward in a way that suggests familiarity with the 1924 manifesto *Towards Plastic Architecture*.³⁸ The affinities with Neo-Plasticism are heightened because the surfaces are of gray stucco rather than the brick so pervasive in Amsterdam but condemned by De Stijl.

The kiosk is attributed to P.L. Marnette (1888-1948) although, as Hulshoff, the head of the Division of Buildings cautioned, it is unfair to assign credit to one person for works executed by PW, because in that organization the cooperation of a number of hands and minds is essential.³⁹ Nevertheless, Marnette stands out among PW's personnel because of the duration of his service—he was attached to the *Afdeling Gebouwen* from 1908 until his death—and his

23 Dwelling blocks for *Algemene Woningbouwvereniging*, a *Woningwet* housing society. J. C. van Epen, c 1926. Note bath building at rear of photo, on *Smaragdplein*.

24 Project for kiosk/public toilet on *Weesperplein*. Drawing by P. Marnette, 1925.

25 Photograph of executed project, figure 24.

almost exclusive dedication to municipal architecture. He owes his reputation to PW, and, more than any other architect except Kramer, he contributed to a distinctive Public Works Style.

Krammer was a leader of the Amsterdam School, however, while Marnette belonged to the larger category of follower. His works illustrate that rather paradoxical aspect of the Amsterdam School whereby a collective rhetoric arose from phrases and syntax that were initially highly personal. Some of Marnette's buildings, regrettably, are pastiche, but at his best he achieved a credible and even exciting coherence.

The offices of the *Gemeentetram* (Municipal Tram Service) on the *Stadhouderskade*, 1921-1923 (figs. 26-30), exemplify the tendency to consume motifs from a variety of sources without quite digesting them. The trapezoidal window is not in accordance with the cubic prisms of the stairwell fenestration, and the taut and curved envelope enclosing the side wings clashes with the low-relief structural grid of the main facade. Taken in and of themselves, however, many of the details are charming and thoroughly representative of the whimsy sought by the Amsterdam School, and of their delight in ornamental effects achieved at a small scale.

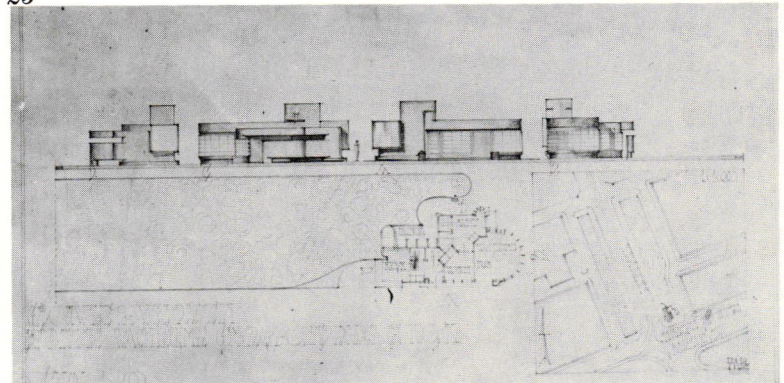
Marnette's former headquarters for the traffic police (*Bureau Verkeerswezen*) on the *Overtoom*, 1924 (fig. 31), is a more mature work. The surfeit of uncongenial motifs noted in *Gemeentetram* has disappeared, and the overall conception is more coherent. The dynamic expressive content generated by sweeping curves that encompass windows and walls alike is completely in keeping with the duties of the municipal officers who once occupied this public building.

The maturation process continues in the works that date from the following year—the kiosk already mentioned, and two academic buildings in the old city center. One, a domestically scaled structure for the university (fig. 32), has been inserted into a row of older buildings on the *Klove-*



23

23

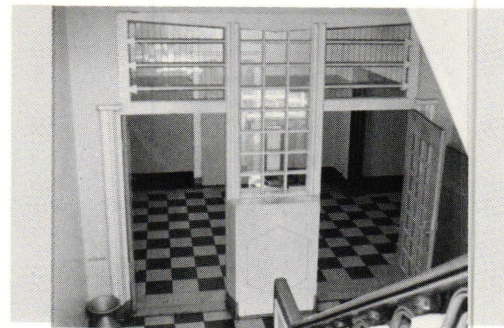


24



25

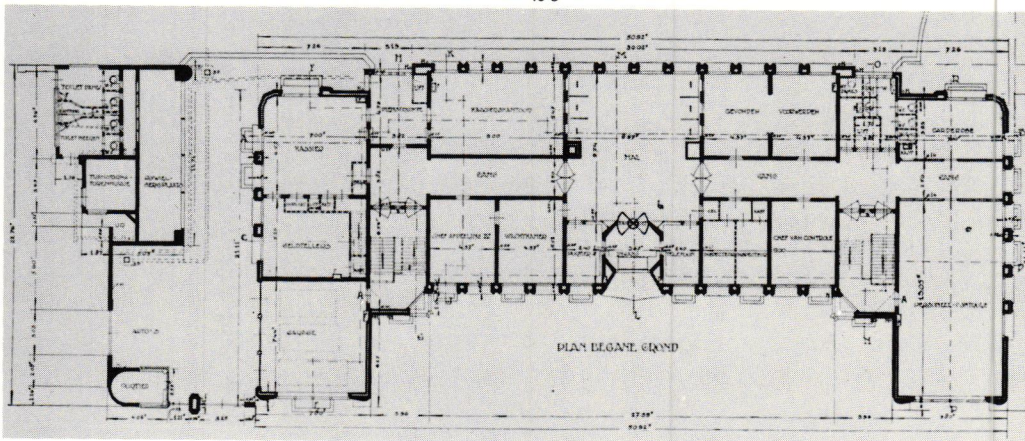
- 26 Gemeentetram. Interior of stairhall.
 27 Detail of entrance of Gemeentetram.
 28 Gemeentetram (Offices of the Municipal Tramways). Marnette, 1921-23. Plan.
 29 Detail of facade and stairhall.
 30 Gemeentetram. Overall view.



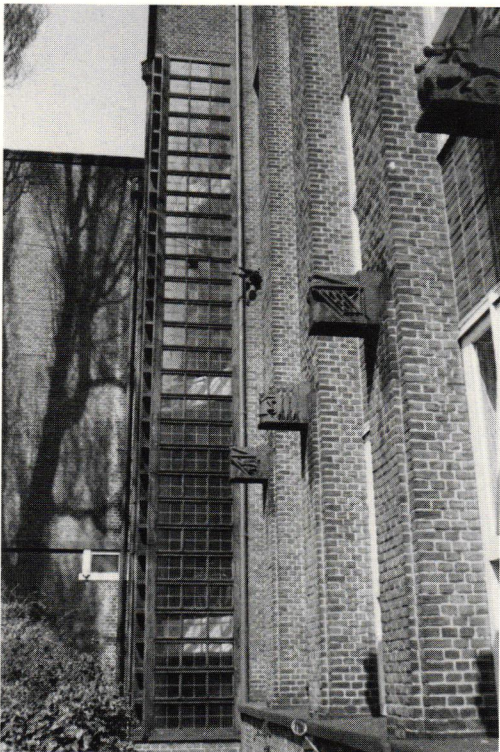
26



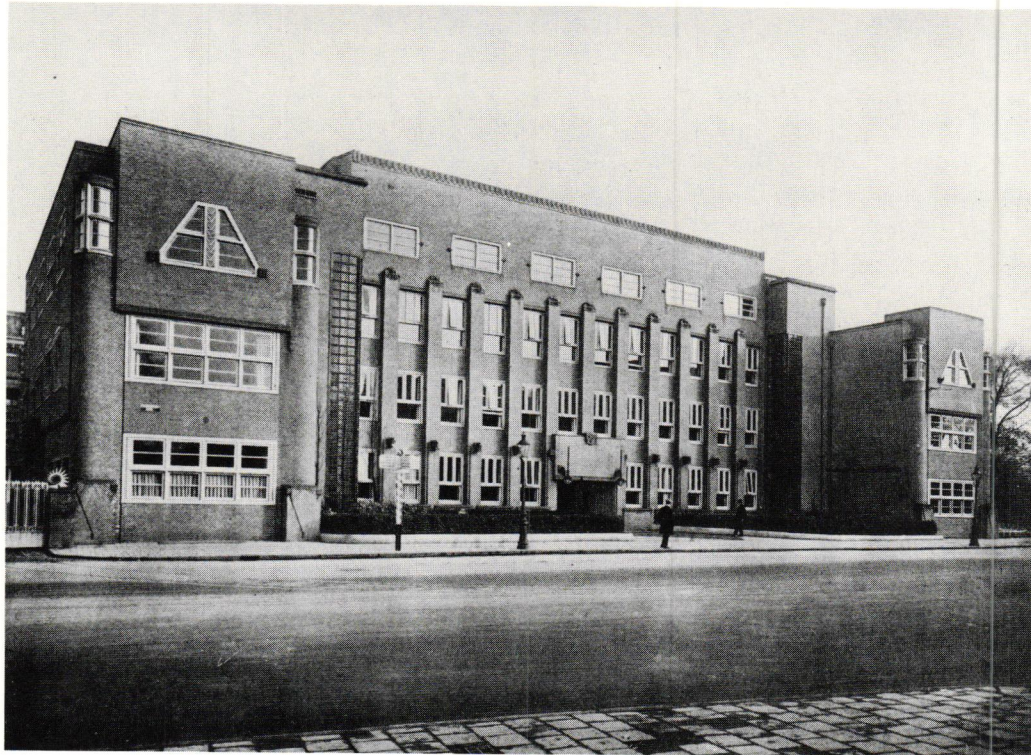
27



28



29



30

31 *Bureau Verkeerswezen (Offices of the Traffic Police). Marnette, 1924. Overall view.*

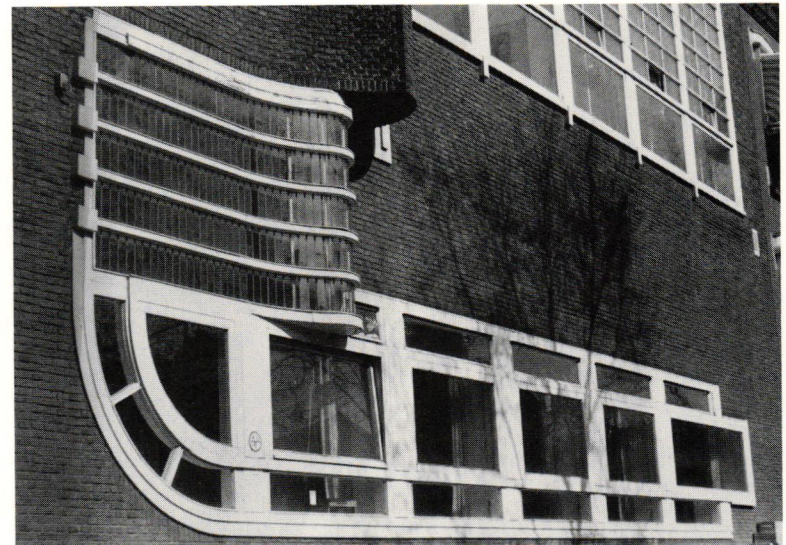
32 *Detail of university building, Kloveniersburgwal. Marnette, c. 1925.*

niersburgwal. Marnette's design makes a contemporary statement, especially in the expressionistic handling of the ground-story window band but, thanks to the materials and the proportions, it is not a disturbing intrusion into the historic core. The work reveals the capacity of the Amsterdam School to integrate new with old, and explains, perhaps, why the style of this group has been described as thoroughly bourgeois.⁴⁰ It certainly does not represent that revolutionary break with the past offered by De Stijl and functionalism (known in the Netherlands as *nieuwe bouwen* or *nieuwe zakelijkheid*).⁴¹ Nor were the social democrats of Amsterdam who supported the style, believing it manifested their goal of incremental improvement of the workers' lot, revolutionaries in the communist or Bolshevik sense.



31

Also in the center of the city and dating from 1925 is one of Marnette's finest achievements, the school for bargemen's children on the Droogbak (fig. 33). Brick, stone, glass, and wood are played off against one another with deft artistry, while the balanced interplay of curved and rectangular volumes and the judicious distribution of the fenestration suggest that Marnette at last has mastered his diverse sources. The design, which not only touches base with local idiosyncracies, but also alludes to formal innovations made by architects throughout the Netherlands, illustrates the impetus toward consolidation rather than the confrontation that sets the Amsterdam School apart from its antagonists. In this design, Marnette seems to have taken to heart suggestions made by the sympathetic architect Jan Gratama (1877-1947), in an article on the Division of Buildings written in 1923 for *Wendingen*, the mouthpiece of the Amsterdam School.⁴²



32

Gratama first of all praises the municipal authorities of Amsterdam for taking the lead in reviving the Dutch tradition, as the public buildings undertaken at their behest become the finest jewels in a city's architectural crown. He extols their boldness in accepting on behalf of the *Dienst Publieke Werken* the motto "Die Zeit ihre Kunst, die Kunst

33 School for Bargeman's children,
Droogbak. Marnette, 1925.

34 School on Zaandammerplein,
Spaarndammerbuurt. PW, 1923.

26



33



34

ihre Freiheit" (To each epoch its art, to art its freedom). Gratama goes on to acknowledge that if one is to give art its freedom, school buildings in particular present certain difficulties, but these very difficulties encourage "interesting architectonic solutions." By grouping the passageways and cloakrooms behind one facade, a "monumental wall can arise in which the small windows of those spaces become beguiling motifs." In addition, "the various volumes of the classrooms and stairs lend themselves naturally to a cubistic architecture full of high and low, of projecting and recessed parts."

While many other building types—swimming pools, pumping stations, libraries, electric transformer stations—were executed in the Public Works Style during the 1920s, schools were certainly the most numerous. Stylistic siblings to the vast sea of dwellings erected north, south, east, and west of the 19th-century city, they bear the stigmata of the Amsterdam School. Each school building has its own recognizable identity, but at the same time it is akin to others throughout the city, resulting in a sense of solidarity among the far-flung neighborhoods. Often the schools are an integral part of the perimeter blocks which contain the dwellings (fig. 34), but many are free-standing and act as dramatic focal points in the cityscape, like the Trade School on Baarsjesweg in Amsterdam West of 1922 by Westerman (fig. 35). He also designed the pair of schools on the Josef Israëlskade of 1923 (fig. 36), which acts as the gateway to a particularly notable *Woningwet* district. A comparison illustrates the range of individuating features that can be summoned by a single architect. Stone sculpture is an important presence throughout, as are the windows which are simultaneously decorative and, in their generous admittance of light, functional. But the curving facade of the Trade School acknowledges the major intersection that it climaxes, while the composition of the twin schools on the canal is more static and thus fitting for the propylaeum to the P.L. Takstraat and the dwellings of De Dageraad.⁴³

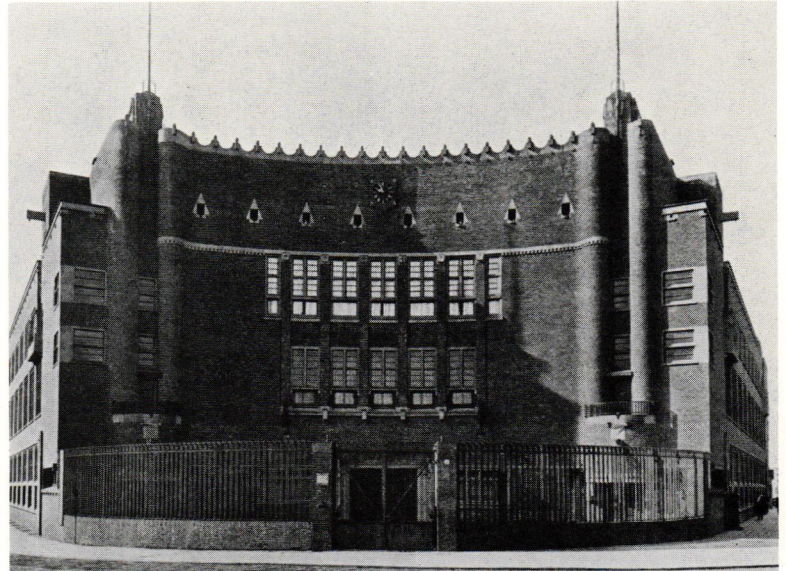
The design premises of the Amsterdam School and, by

35 Trade School, Barsjesweg, Amsterdam West. Westerman, 1922.

36 Schools on Josef Israëlskade and P. L. Takstraat, Amsterdam South. Westerman; sculpture by Krop, 1923.

27

extension, those of PW, increasingly became the subject of polemical attacks at the end of the 1920s. The fiercest and most successful onslaughts were internationally launched by advocates of functionalism, who argued that the architects were more concerned with formal factors, such as rhythmically placed windows, than with the physical and psychological well-being of the children whom the building should serve. "A school belongs to the children. Were you aware of this when you built 156 schools?" The architect Ben Merkelbach's criticism was quoted by the historian, Richter Roegholt, who grew up amid a decor fashioned by the Amsterdam School, which he assumed to be an entirely natural milieu. He describes how, after glimpsing the stark concrete structure and transparent walls of the privately commissioned Open Air School of 1929-1930 by Johannes Duiker (1890-1935), he found the "so-called playfulness" of the school he had attended "heavy and pretentious."⁴⁴



35

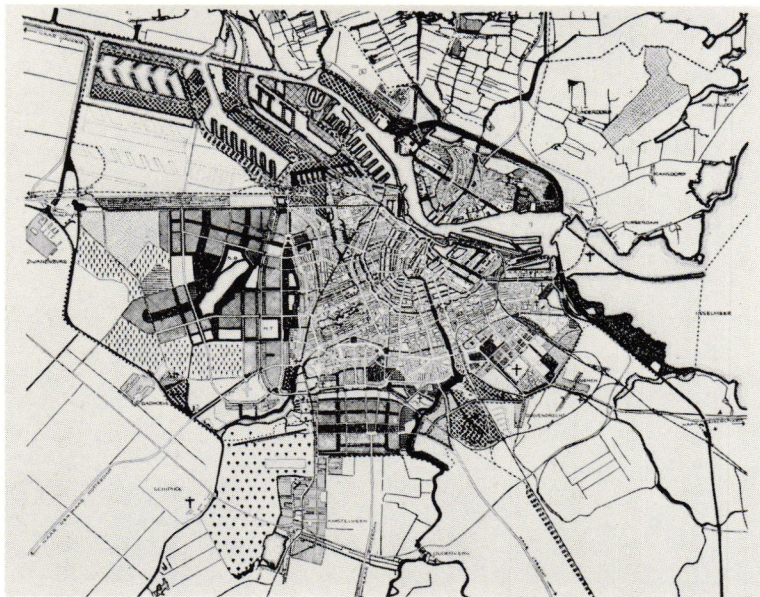
III. *The End of an Era: PW After 1928*

Duiker's school and Merkelbach's criticism were symptomatic of the changing attitudes that would bring PW under a new dispensation with regard to its responsibilities not only for bridges and buildings but for the entire city. Urbanistic concepts in marked contrast with those that prevailed during the 19th century had been ushered in by Berlage when he became aesthetic adviser, but an even more drastic revolution on this front took place when SO (Division of City Development) was established in 1928 with van Eesteren at the helm. The assumptions fundamental to each approach have been exhaustively analyzed elsewhere,⁴⁵ and thus the differences will merely be summarized here.

Broadly speaking, in Amsterdam from the late 1890s to the late 1920s, the city was conceived primarily in terms of its *institutions*; the purpose of planning was to provide a sympathetic and evocative setting for the structures housing those institutions, be they individual buildings or blocks of dwellings. Visual criteria were paramount, as can be seen



36



in Berlage's Plan Zuid and the neighborhoods laid out by PW and WD.

After 1928, coincident with the founding of the Congrès Internationaux d'Architecture Moderne (CIAM) and its *Declaration of La Sarraz*,⁴⁶ the city was conceived primarily in terms of its *functions*; the purpose of planning was to provide for the logical development and distribution of those functions by anticipating the economic and demographic realities that would affect them. "Heading 2" of the declaration asserts:

"Town planning can never be determined by aesthetic considerations but only by functional conclusions. The ordering of the functions—Dwelling, Work, Recreation—takes pride of place. The means for fulfilling the functions are land organization, regulation of traffic, and legislation."⁴⁷

CIAM's international scope and its links with SO through van Eesteren, who was president of CIAM from 1930-1947 and a dominant presence in SO from 1929-1959, prompted the author to turn to the 1928 La Sarraz declaration for a summary of the new functional conception of the city. But many of the ideas about urbanism laid down there and in subsequent CIAM pronouncements were already current in the Netherlands among professional town planners, who in 1926 published an influential critique of the type of plan that, until then, had constituted Amsterdam's answer to the need for expansion:

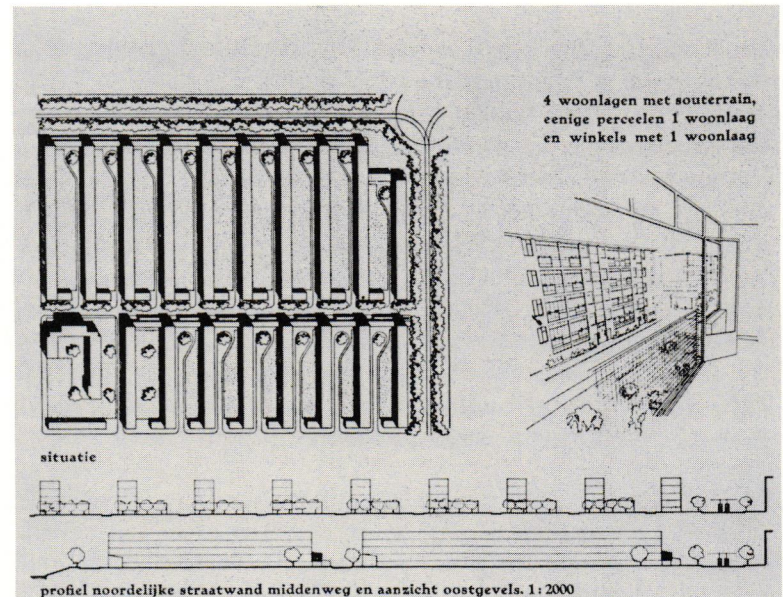
"City planning means more than the layout of charming squares, the construction of beautiful 'traffic walls' along streets, the indication of sites where the most important buildings should be located. City planning above all means taking full account of the demands of the varied life of the city in its myriad expressions."⁴⁸

Amsterdam's next extension plan, the AUP (*Algemeen Uitbreidingsplan*; General Expansion Plan, fig. 37), unveiled by SO in 1934, can be seen as a response to this critique, a response that profoundly changed the nature of PW. A new type of functionary, the *planoloog* or town planner, became

an indispensable component as SO grew to be the most powerful division within the service.

The AUP was a master, or allocation, plan based on extensive research that generated enormous quantities of data. The entire city—past, present and future—was brought within its purview, and was divided into zones according to whether the functions to be accommodated were primarily residential, industrial, or recreational. The zones were bound together by major traffic arteries; no local street patterns were indicated. These would come later, when more detailed, or partial plans, of the type Berlage, WD, and PW had once devised, were to be provided for specific areas incrementally targeted for development. The detailed plans, however, had nothing in common with those of the 1910s and 1920s. No longer were new neighborhoods dense and romantic configurations that achieved a reciprocity between building, street, and square; they proffered instead an open, park-like setting with buildings set down in regular, orderly fashion. No longer did dwellings occupy intricately arranged perimeter blocks (*blokbouw*); they were situated instead in simple slabs laid out in parallel rows (*strokenbouw*, the equivalent of *Zeilenbau*). No longer were the inhabitants stirred, stimulated, or piqued by buildings, bridges, and street furniture in the old Public Works Style; instead, they were confronted with architecture of the repetitive and reductive sort deemed desirable by the reigning group of international functionalists (fig. 38).

Changing times create changing needs—or changing perceptions of fundamental human needs. New agendas for a viable city periodically arise, and the organs charged with realizing that city are necessarily transformed. Neither the technically oriented PW of the 19th century nor the aesthetically oriented service of the first quarter of the 20th century could satisfy the needs of Amsterdam as they were prescribed in the 1930s. No longer were architects faithful to the credo of the Amsterdam School welcome to realize, via PW, their cherished visions.



30 Scarcely had the AUP received the requisite approval from the national government than the Netherlands suffered Nazi occupation. After the conclusion of World War II, however, the AUP guided Amsterdam's development for 20 years and has shaped, at least in quantitative terms, the image of the city encountered today. One can conclude with Richter Roegholt that follows his reminiscences (see above, p. XX) on the liberating effect of his youthful sensibilities, of the new ideas on architecture and planning that shaped Amsterdam under the AUP. After contrasting the fruits of these ideas—like Duiker's Open Air School—with the urban backdrop of his own adolescence, he acknowledges that the tides of taste have once again turned and that today:

“those who grew up in a neighborhood of pure Duiker [buildings] or, what unfortunately is more likely, of works by his conventional imitators, thirst for the picturesque solidity [of Amsterdam Zuid] . . . and are intoxicated by the sight of a round bathhouse on the Smaragdplein.”⁴⁹

Notes

1. The classic account remains Gerald Burke's *The Making of Dutch Towns* (London, 1956), but see also E.A. Gutkind, *Urban Development in Western Europe: The Netherlands and Great Britain* (New York, 1971).
2. For example, Hilversum, where Willem Dudok (1884-1974) was the director of public works from 1915 to 1927. Interestingly, the “Public Works Style” that reigned in Amsterdam and is described in Part II of this essay influenced municipal architecture and works during the 1920s in nearby Utrecht, and in distant Groningen and s'Hertogenbosch. See Giovanni Fanelli, “L'Architettura, l'Arredo urbano dei Pubbliche Werken e il Consumo del Linguaggio Della Scuola di Amsterdam,” in *Wendingen 1918-1931: Documenti dell'Arte Hollandese del Novecento*, ed. G. Fanelli and E. Godoli (Florence, 1982), pp. 43-48. Municipal and national public works are generously represented in the 20 volumes of *Moderne Bouwkunst in Nederland*, Rotterdam, 1932-35, ed. H.P. Berlage et al. (Rotterdam, 1932-35), see especially vols. 12, 13, 14, 16, 17, 18, 19 and 20.
3. Public works on a national scale, such as the North Sea Canal, which opened in 1876, and the Canal linking Amsterdam with the prosperous German cities of the Rhineland, completed in 1892, contributed significantly to bringing the Netherlands into the modern industrial age.
4. The municipal executive body is comprised of a major (*Burgemeester*) and aldermen (*wethouders*); this body, called the *College van B en W*, is responsible for carrying out decisions of the council (*raad*), and it may also initiate proposals. Each of the aldermen is responsible for a certain municipal activity or department, and it was an important development for public works when one alderman was assigned exclusively to oversee this activity, for the alderman acted as an advocate for the service before the council and the *College van B en W*. For this account of the history of the Public Works Service of Amsterdam, I am especially indebted to J.E. van Heemskerck van Beest, “Honderd Jaar Publieke Werken,” *Ons Amsterdam*, (February, 1950), pp. 25-121, and Wouter Bolte and Johan Meijer, *Van Berlage tot Bijlmeer* (Nijmegen, 1981).
5. Egbert J. Hoogenberk, *Het Idee van de Hollandse Stad* (Delft, 1980), passim.
6. Many surveys of city planning analyze and describe the plan and its execution. Among the more useful references in the English language are Burke, Chapter IX, and Katherine Fremantle, *The Baroque Town Hall of Amsterdam* (Utrecht, 1959), pp. 5-19.
7. The Constitution (*Grondwet*) of 1848 and the Municipal Act (*Gemeentewet*) of 1851 gave the municipality more power than it had previously exercised. Its members were elected directly (though the electorate remained for the second half of the 19th century a restricted group; universal suffrage was adopted only in 1919). While the king continued to select the mayor, the aldermen were now chosen from among the councillors and the administra-

tion was no longer co-opted by the regent families.

8. Burke, pp. 147-152 and Fremantle, pp. 10-19.

9. The ancestor of the first building code was an ordinance after the disastrous fire of 1452, which required buildings to have masonry party walls and roofs of tile rather than thatch or timber. The first comprehensive building regulation, of 1565, was sufficiently effective to endure until the French occupation of the early 19th century.

10. Burke, p. 151.

11. Hans Davidson, "The Jordaan and Haarlem Neighborhoods," in *The Conservation of European Cities*, ed. Donald Appleyard (Cambridge, 1979), pp. 221-235.

12. *Revolutiebouwers* were small-time contractors without capital who borrowed from mortgage banks (Sarphati was among the first to introduce this type of financial institution into Amsterdam) to buy materials and labor to erect tenements. These had to be sold as quickly as possible to pay off debts and get more capital to build again, hence the image of revolution. The dwellings were purchased by landlords who squeezed as much profit as possible from them—hence, they in turn were called *huisjesmelkers* (house-milkers). The quality of housing was poor and because rents were high in relation to income the dwellings were often overcrowded.

13. The truly definitive study of the various attempts to make extension plans for this southern area is Francis F. Fraenkel, *Het Plan Amsterdam-Zuid van H.P. Berlage* (Alphen aan de Rijn, 1978), with a summary in English and a remarkable collection of maps and photographs.

14. The council considered that the parks would be too expensive and the canal and road system inadequate. A major blow to van Niftrik's plan was the decision of the national government to build the Central Railroad Station on a specially built island north of the historic core, instead of in the south where van Niftrik had placed it.

15. See George R. and Christiane Crasemann Collins, *Camillo Sitte and the Birth of Modern City Planning* (New York, 1965).

16. For an exhaustive and brilliant study of this seminal building, see Peiter Singelenberg, *H.P. Berlage: Idea and Style* (Utrecht, 1972).

17. The term comes from the title of the influential book by Camillo Sitte (1843-1903), which had a major impact on Berlage.

18. His first Amsterdam bridge over the Ceintuurbaan, dates from 1906, and his wonderful bridge that spans the Amstel River to connect Plan Zuid with the eastern part of the city, named in his honor, was executed in 1932.

19. In 1900, G. van Arkel, a city councillor, wrote to the *College van B en W* complaining that there was no money in the department's budget for an architect, a terrible thing for a city of 500,000 inhabitants aiming to be a metropolis (reported in *De Bouwwereld*, Vol. I [1901], p. 218). In 1907, when it was time to name a new director of PW, the architectural periodicals ran articles favoring increased architectural input into the service.

20. These dates are based on the biographical information in

Giovanni Fanelli, *Moderne Architectuur in Nederland, 1900-1940* (The Hague, 1978). The chronology, updated by Wim de Wit, is usually very reliable. Suzanne S. Frank, in her superb dissertation of 1970, *Michel de Klerk, 1884-1923: An Architect of the Amsterdam School*, which has just been published by the UMI Research Press (Ann Arbor, 1984), adds that "van der Meij was employed for half-days by PW, serving as advisor on the design of various buildings, bridges, and street plans, from 1911 until 1919" (note 26 on p. 237). Presumably van der Meij moved from aesthetic adviser to part-time employee; he was not the only architect to work in that capacity.

21. For a brief history of the *Woningwet* and its impact on Dutch architecture, see H. Searing, "With Red Flags Flying: Housing and Politics in Amsterdam, 1915-1923," in *Art and Architecture in the Service of Politics*, ed. Henry Millon and Linda Nochlin (Cambridge, 1978), pp. 230-269.

22. In 1915 the city council passed a resolution, submitted by the social democrats, obliging it to fund the construction of municipal dwellings for those workers who could not afford the rents of buildings erected by the housing societies. The national government, via the *Woningwet*, assisted with funding. The first groups of dwellings were designed by Berlage and by K.P.C. de Bazel (1869-1923), like Berlage a leader among Dutch architects. For de Bazel's work, see W. Reinink, *K.P.C. de Bazel* (Leiden, 1965); for Berlage see H. Searing, "Berlage and Housing: 'the most significant modern building type,'" *Nederlands Kunsthistorisch Jaarboek*, 25 (1974). It is characteristic that Amsterdam and its WD went to the two major designers of their generation.

23. In 1920 the federal government instituted a system of *premies* (grants) to private contractors to erect moderately priced dwellings; the housing seen in fig. 2 is an example of this. In 1925 the municipality of Amsterdam passed a bill lending money to a consortium of private builders to erect 6,000 dwellings in a new western section of the city laid out by PW.

24. Bolte and Meijer, pp. 74-86, and Richter Roegholt, *Amsterdam in de 20e eeuw*, Part I (Utrecht, 1976), pp. 14-83. For Keppler's politics see, in addition to the article cited in note 21, H. Searing, "Amsterdam South: Social Democracy's Elusive Housing Ideal," in *VIA IV: Culture and the Social Vision* [Architectural Journal of the Graduate School of Fine Arts, University of Pennsylvania], pp. 58-77. The competition between the two directors (Keppler of WD and A.W. Bos, head of PW from 1907-1926) was played out in the *College van B en W* as well. The Alderman for Housing, F.M. Wibaut, was a staunch social democrat, like Keppler, and wanted housing and the exploitation of city property as much as possible to be operated for the public good. He accused PW and its alderman of thinking too much of commercial gain and playing into the hands of the private sector.

25. Perhaps the council remained wary after the experience with A.W. Weissman (1858-1923), municipal architect in the service of PW from 1891-1894. Weissman was forced to resign from that position after he designed the undistinguished Stedelijk Museum

(Municipal Museum), completed in 1895. I. Haagsma, *Amsterdamse Gebouwen 1880-1980* (Utrecht, 1981), p. 22.

26. Most important was the democratization of the profession through organizations that had the interests of architects/draftsmen as their concern, and through the increased availability of design training. Until late in the 19th century, architects were "gentlemen" (*heren*); only members of the middle or regent classes could entertain the notion of studying for the profession. But beginning in the late 19th century, trades and crafts schools were set up throughout the country to train designers and draughtsmen who could continue to advance through evening courses offered by the local architectural organizations (Amsterdam's was called *Architectura et Amicitia*, see note 33). It is symptomatic of this change that a man like de Klerk, the son of a Jewish diamond worker, could rise to the top of his profession.

27. There is a book in English devoted to the Amsterdam School, published in connection with the exhibition held at the Cooper-Hewitt Museum in New York in 1983: Wim de Wit, ed., *The Amsterdam School: Dutch Expressionist Architecture, 1915-1930* (Cambridge, 1983). See also the book by Suzanne Frank cited in note 20.

28. The best introduction to Art Nouveau architecture in the Netherlands is provided by R. Padovan, "Building towards an Ideal: Progressive Architecture in Holland," in *Art Nouveau Architecture*, ed. Frank Russell (New York, 1979), pp. 137-157. Padovan's article includes a sensitive discussion of the ideal of *gemeenschapskunst*, as does the essay by Wim de Wit, "The Amsterdam School: Definition and Delineation," in the catalogue cited in note 27. Searing, in the same catalogue ("The Formative Years of Michel de Klerk: Inspiration and Invention,") traces the *fin-de-siècle* sources of de Klerk's motifs.

29. In 1926, J.J.P. Oud (1890-1963) described the work of the Amsterdam School in the following words: "A licentiousness pushed to extremes. . . the use of entirely unsuitable materials for the pure love of color; a conception of mass that is . . . irrational. . . . This virtuoso architecture reveals itself as the result of an architectural *Weltanschauung* existing only by and for itself, whose representatives have become too wrapped up in the precious potentialities of their own talents" (*Holländische Architektuur* [Bauhausbuch 10], Munich, 1926, pp. 42-47). And the founder of De Stijl, Theo van Doesburg (1883-1931), wrote in 1928 that "the modern movement in Holland is formed of two entirely opposed groups: the group called *Wendingen*, in Amsterdam, and the group De Stijl, which had its seat in The Hague. These two principal movements are very different in their tendencies as well as in their realizations . . . the artists of the *Wendingen* group love above all decoration, individual caprice, and bizarre and illogical constructions. They sacrifice all to the facade and the picturesque and pictorial effect of exteriority" (quoted by Bruno Zevi, *Poetica dell'Architettura Neoplasticista*, Milan, 1953, p. 82). Nevertheless, Fanelli, p. 349, is correct, in my opinion, when he observes that while on "a theoretical level there was controversy, the actual works emanating from the two

schools are in reality integrated in a valid architectural culture. The polemic was carried on mainly by De Stijl . . . the Amsterdam School, by its very origins, was more disposed to accepting varied tendencies [but] both movements . . . are founded on a common principle: the search for an absolute authenticity of experience."

30. For proportional systems, see Reyner Banham, *Theory and Design in the First Machine Age* (London, 1960), *passim*, Suzanne Frank, pp. 25-29, and Pieter Singelenberg, pp. 101-111. A later summing up of such systems and their use was published by J.C. Slebos, *Grondslagen voor esthetiek en stijl*, Amsterdam, 1939, which is the source for fig. 22.

31. *Roegholt*, p. 32.

32. The three were initially regarded as a triumvirate through their collaboration on the *Scheepvaarthuis* by Jan Gratama, who was apparently the first to use the term *Amsterdam School*. See K.P.C. de Bazel, Jan Gratama *et al.*, eds., *Dr. H.P. Berlage en zijn Werke* (Rotterdam, 1916), pp. 49-50. Significantly, the three had emerged from the same office, that of Eduard Cuypers (1859-1927); see H. Searing, "Berlage or Cuypers? The Father of Them All," in *In Search of Modern Architecture: A Tribute to Henry-Russell Hitchcock* ed., H. Searing (Cambridge, 1982), pp. 226-244.

33. This organization was founded in 1855; from the turn of the century onward, it was the stronghold for those who emphasized the artistic aspects of professional practice. Its importance may be gauged by the fact that there were continual struggles on the part of one or another group to seize control of the club's leadership. *Architectura et Amicitia* nominated members to serve on the powerful Design Review Committee, and published, among other periodicals, *Wendingen* (Turnings or Changing) from 1918 to 1931.

34. For that housing, see Wim de Wit, ed., *The Amsterdam School: Dutch Expressionist Architecture, 1915-1930*; Suzanne Frank, "Michel de Klerk's Designs for Amsterdam's Spaarndammerbuurt," in *Nederlands Kunsthistorisch Jaarboek*, 22 (1971), pp. 175-213; Fraenkel, *passim*; H. Searing, "Eigen Haard: Workers' Housing and the Amsterdam School," *Architectura*, I (1971), pp. 148-175; and the articles cited in notes 21 and 24.

35. W. Retera Wzn., *P. Kramer* in the series *Nederlandsche Bouwmeesters*, (Amsterdam, 1927), pp. 27-28.

36. The term appears, for example, in the English periodical, *The Builder*, 21 April 1922, p. 594. Keppler proudly resorted to it when defending his energetic activities as housing chief.

37. The classic attack on the Amsterdam School appears in a manifesto issued in 1927 by a functionalist group calling itself De 8. E.g. "De 8 wants no extravagant architecture proceeding from the formal voluptuousness of talented individuals . . . the architect *à la mode* is taking us toward a tradition of expense and luxury." The entire manifesto is translated in H. Searing, "The Dutch Scene: Black and White and Red All Over," *Art Journal* 43 (1983), 170-177.

38. Cf. "The new architecture is *anti-cubic*, which specifies that it does not attempt to combine all functional space-cells into a closed cube but projects the functional space-cells centrifugally, or from

the core of the cube "outward" point 11 of van Doesburg's "Towards Plastic Architecture," in Joost Baljeu, *Theo van Doesburg* (New York, 1974), p. 144.

39. A.R. Hulshoff, "Werk van de 'afdeeling Gebouwen' van den dienst der Publieke Werken Amsterdam," *Wendingen* (January, 1918), p. 3. It is not without relevance to the identification of the Amsterdam School with the Public Works Style that the very first issue of the organ dedicated to propagating the beliefs of the Amsterdam School published this as its first article, immediately following the introduction by *Wendingen's* editor, H. Th. Wijdeveld (b. 1885).

40. This concept is especially popular among Italian art historians; see, for example, Guido Canella, "L'Epopoea Borghese della Scuola di Amsterdam," *Casabella*, 215 (1957), 77-91. Roegholt, p. 43, makes the point that both social democrats and members of the Amsterdam School wished to raise the workers, in terms of their aspirations and their environment, to a bourgeois level. What could be more natural in the Netherlands, where the bourgeoisie virtually arose?

41. In 1983, the Netherlands Documentation-Center for Architecture mounted five exhibitions, each accompanied by a catalogue, devoted to the *Nieuwe Bouwen* (the Dutch equivalent of the *neue Sachlichkeit*). For the first time, the catalogues included an English translation of the Dutch text. All are published by the Delft University Press, Delft: F. Bless, M. Bock, *et al.*, *Het Nieuwe Bouwen-Voorgeschiedenis* [Pre-History]; Auke van der Woud, *Het Nieuwe Bouwen - CIAM*; G. Andela, E. Bergvelt, *et al.*, *Het Nieuwe Bouwen - Amsterdam 1920-1960*; W. Beeren, R. Dettingmeijer, *et al.*, *Het Nieuwe Bouwen - Rotterdam 1920-1960*; and U. Barbieri, C. Bokraad, *et al.*, *Het Nieuwe Bouwen - De Stijl*. For the *nieuwe bouwen* see also the article cited in note 37.

42. Jan Gratama, "Bouwwerken van afdeeling Gebouwen der Publieke Werken te Amsterdam," *Wendingen*, July, 1923, *passim*.

43. For De Dageraad see Frank, pp. 71-72, and the articles cited in notes 21 and 24.

44. Roegholt, pp. 39-40.

45. For Plan South, see Fraenkel; for the AUP, see van der Woud, and Helma Hellinga, "The General Expansion Plan of Amsterdam," in G. Andela, E. Bergvelt, pp. 52-111.

46. Martin Steinmann, ed., *CIAM Dokumente 1928-1939* (Basel, 1979), and van der Woud, pp. 54-108.

47. Cited by van der Woud, p. 56.

48. Cited by Hellinga, p. 56.

49. Roegholt, pp. 40-41.

Figure Credits

3, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 29, 31, 32, 34, 35, 36 courtesy of the author.

1 KLM Aerocarto: Reproduction Forbidden.

2, 23 Gemeentelijke Woningdienst.

4, 6, 37 From *Honderd Jaar Publieke Werken*.

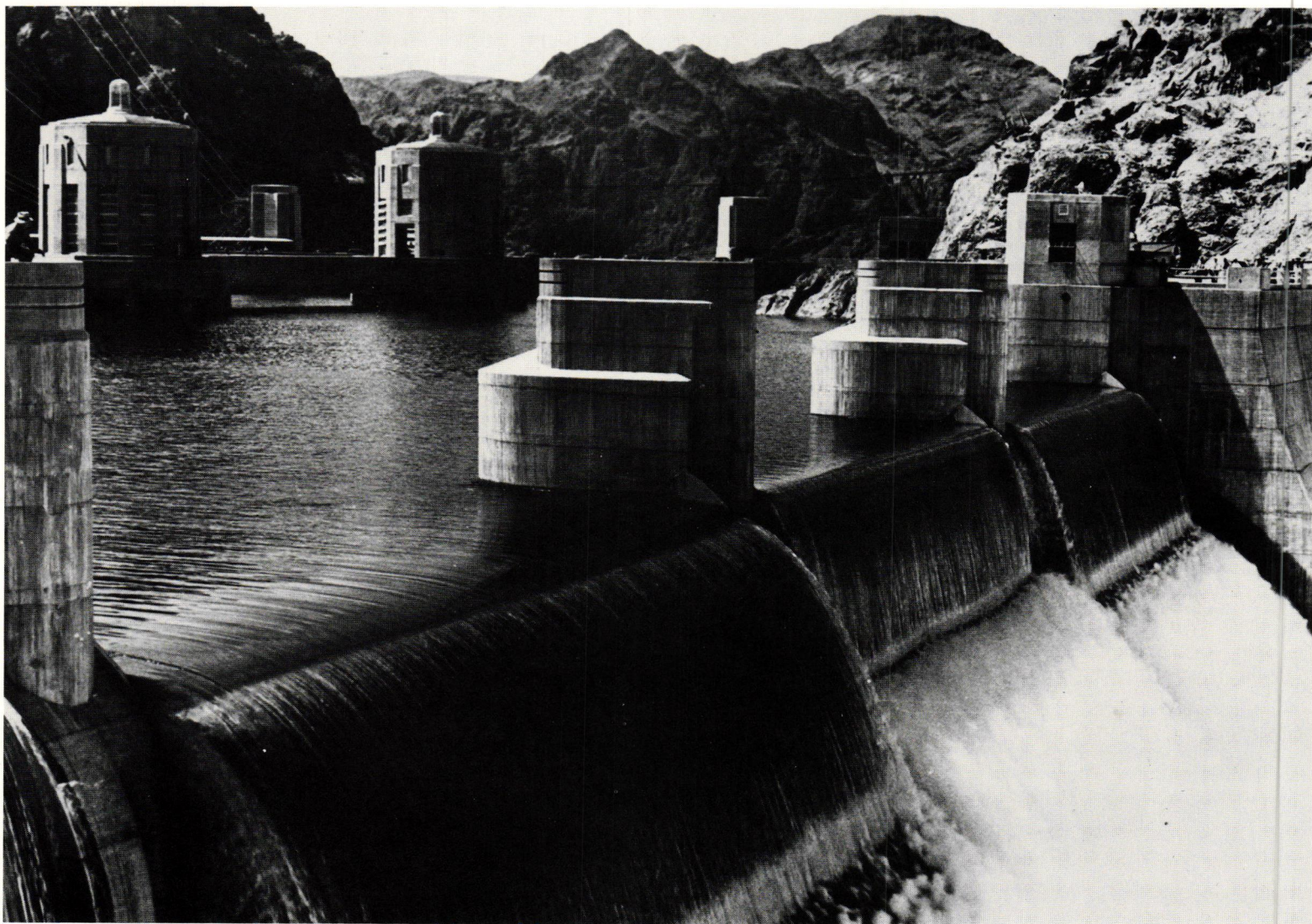
5, 7 From *Historisch Topografische Atlas*, Gemeentelijke Archiefdienst.

22 From Slebos, *Grondslagen voor aesthetiek en stijl*.

28 From J. P. Mieras and R. Yerbury, *Dutch Architecture of the XXth Century*, London, 1926.

30, 33 From J. G. Walljes, *Modern Dutch Architecture*, London, 1928.

38 From Goedkooppe Arbeiderswoning, Rotterdam, 1926.



Dams: Photographs From The Depression

Richard Guy Wilson

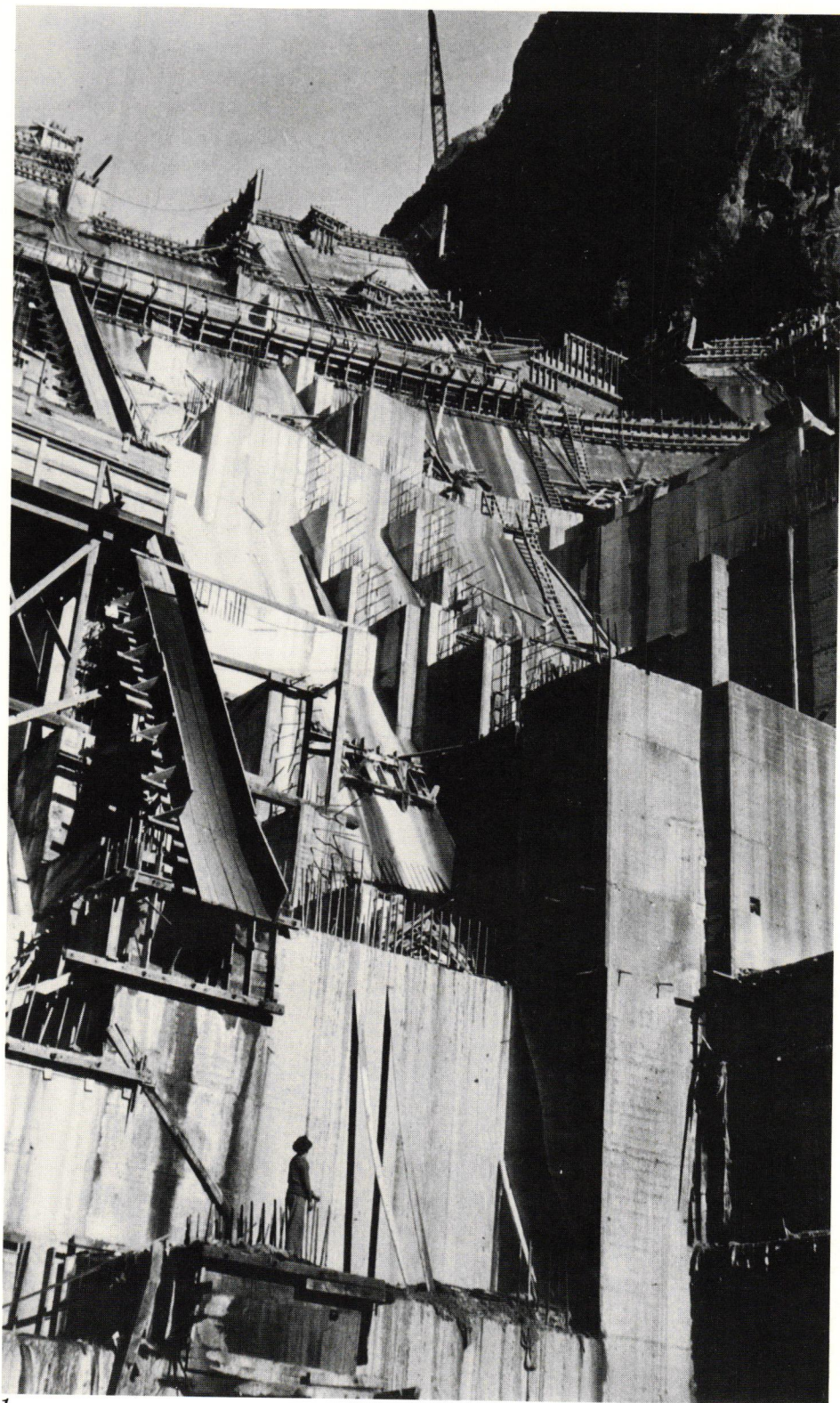
The construction of a series of massive dams during the Great Depression ranks as the most impressive public works project to have been carried out in the history of the United States. This accomplishment is impressive because of the planning, financing and labor involved, not to mention the sheer size of the dams themselves. The dams also represented the commitment of the government to public service, for they bettered the lives of countless millions. Throughout the 1930s and into the 1950s, dams were frequently listed as the most unique and important example of American architecture and engineering. In the decade following the construction of Hoover (Boulder) Dam on the Colorado River in 1930, construction was begun on the Tennessee Valley Authority dams in the East, and the Fort Peck, Grand Coulee, Bonneville, and Shasta dams in the West.

The dams conveyed many meanings and were admired from many points of view. From a political standpoint, of course, they meant jobs for a depressed America. Their size and capacity meant the control of rivers, the irrigation of farmland, and the generation of power. The *New York Times* claimed that Hoover Dam's "pioneering is that of the machine age," while *Collier's Magazine* editorialized that dams were "remaking the world." Behind such obvious messages, dams symbolized the transition from the age of steam to the age of electricity. Steam power usage declined in the 1930s, and dams, with their tremendous hydroelectric potential — which was not fully utilized in some cases until the 1960s, when the last turbines came on line — came to be seen as powerful images of the new, clean, silent power.

Large dams were perhaps the most modern structures being built in America. The dams went far beyond the trivial stylistic polemics of much architecture of the 1930s; they

were functional, and constructed with the most advanced technology available. Direct in their statement, they were a major influence upon architecture in the post-World War II era. Finally, dams summed up the new social ideology of the American government in the 1930s, for they represented the vast regional planning schemes of which they were a part and brought 20th-century technology to formerly depressed areas.

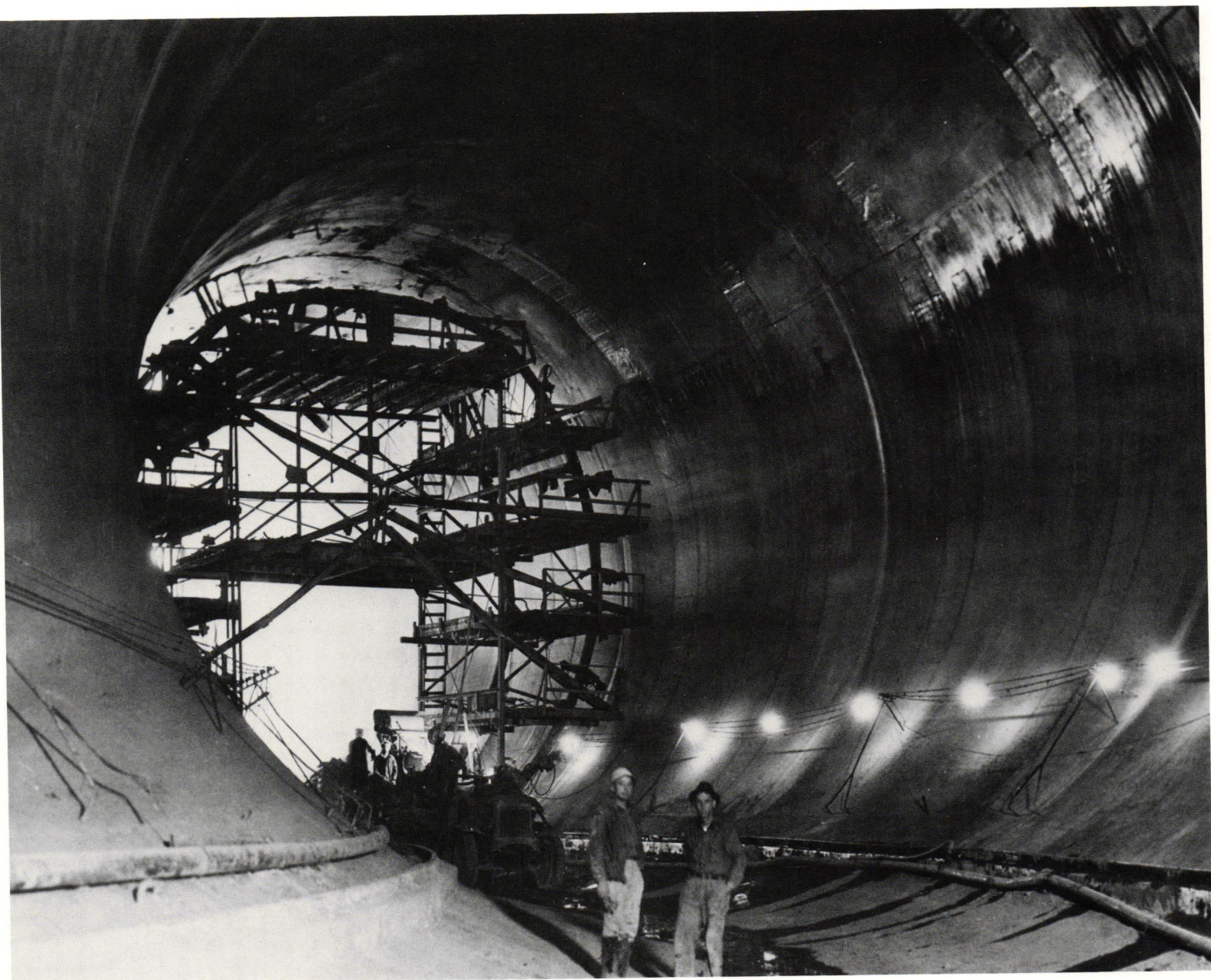
The following period photographs help to convey more than words can what dams meant.



(frontispiece) Hoover Dam, 1940.
 Photograph by Clifford Segerblom.
 (Courtesy of Bureau of Reclamation)
 The water level was allowed to rise in the dam in order to test the floodgates. Segerblom captures the drama of a man opening the gates. The smoothly textured, regularly shaped machine piers and gates, in contrast with roughly textured, irregular nature, are overwhelming. The scale is superhuman, as if giants or intelligent machines had created this monument in the middle of nowhere.

1. Hoover Dam, 30 January 1934.
 Photograph by B.D. Glaha. (Courtesy of Bureau of Reclamation)
 Ben Glaha, whose work was exhibited widely in the 1930s, was the official photographer for the Bureau of Reclamation during the construction of Hoover (also known as Boulder) Dam. Concrete work on the dam was an involved process of mixing and then lowering by buckets. The thermal properties of concrete meant that the dam was constructed of concrete piers built up with different pours. They were interlaced with piping for cooling water to speed the drying process. Glaha's photograph from the roof of the power house captures the cliff of concrete as it is slowly being put into place. The total height of the dam is 726.4 feet.

2. Hoover Dam, 26 October 1932. Photograph by B.D. Glaha. (Courtesy of Bureau of Reclamation)
 Diversion tunnels were cut through solid granite to allow the Colorado River to bypass the dam site during construction. After the dam was completed, the tunnels served as overflow bypasses and as conduits for the penstocks for the turbines. Pictured here is diversion tunnel number four, which is 56 feet in diameter and lined with three feet of concrete. A jumbo rig is applying pressure grouting at the seams.



3. Hoover Dam, 17 May 1940. Photograph by Clifford Segerblom. (Courtesy of Bureau of Reclamation)

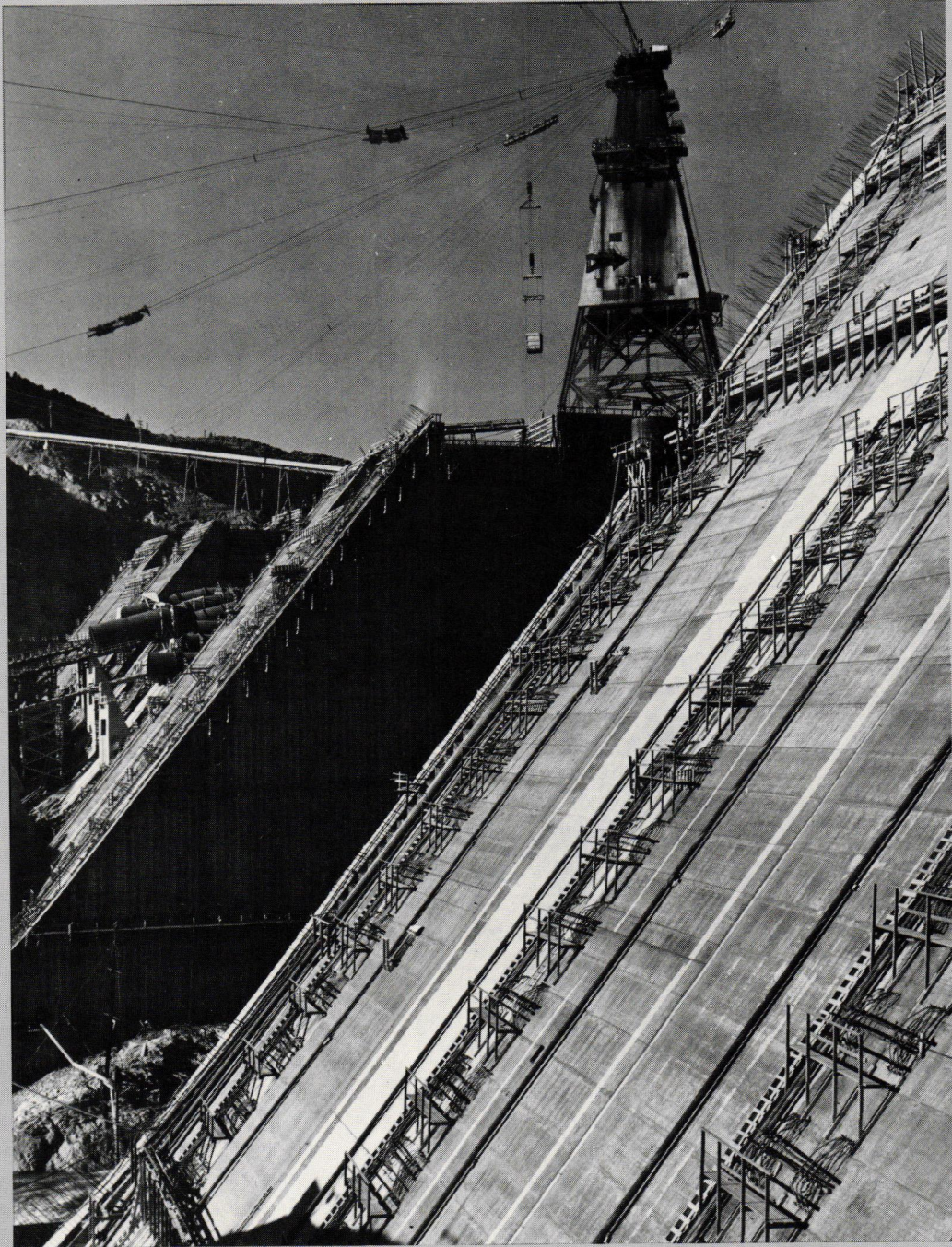
Clifford Segerblom took over from Ben Glaha as dam photographer in the late 1930s. This photograph, taken from the Arizona side, shows the upper face of the dam and the intake towers at night. An almost futuristic effect is created by the brilliantly lighted towers and their reflection in Lake Mead.

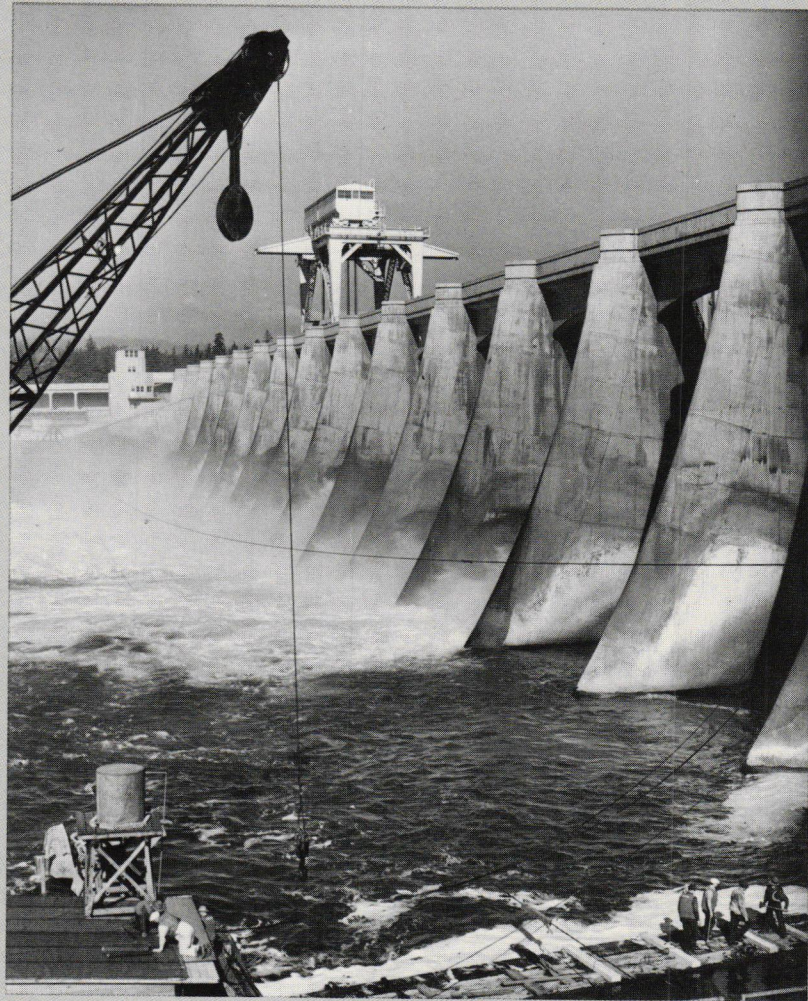
4. Shasta Dam, December 1941. Photograph by Russell Lee for the Office of Emergency Management. (Library of Congress)

Russell Lee was one of the photographers of the famous Farm Security Administration, which was set up in the 1930s to record the impact of the depression on rural life. He was "loaned" to the Office of Emergency Management in 1941 to take pictures dramatizing

American war preparedness. He was photographing Shasta and Bonneville dams when Pearl Harbor was attacked. The huge head tower used for cranes has a vernacular aspect frequently associated with contractors's site buildings. The scaffolding perched up the side of the dam provides texture and scale to what otherwise would be a scaleless mass of concrete. The dam stands 602 feet above the riverbed.









5. Bonneville Dam, October 1941. Photograph by Russell Lee for the Office of Emergency Management. (Library of Congress)

41

The equipment attached to the dams often had a futuristic, science-fiction look. The large travelling crane, with its boxcar control house and thin arms and legs, sparkles in the sun, seemingly coming from a world of and for machines. Against this huge machine environment of concrete and metal, diminutive man struggles in the foreground with the construction of a powerhouse.

6. Fort Peck Dam, 1936. Photograph by Margaret Bourke-White, for LIFE Magazine. (LIFE Magazine © 1936 Time Inc.)

The first cover of LIFE provides ample testimony to the great symbolic status of dams in the 1930s. Margaret Bourke-White, one of the great American photographers of the 20th century, took this photograph as part of a photo essay on life in the construction camp on the Montana frontier. She contrasts the large pylons of the dam-control gates with the diminutive workmen in the foreground. The Fort Peck Dam is among the largest in the world, and was the largest built in the 1930s.

7. *Pickwick Landing Dam, Tennessee Valley Authority, ca. 1939. Photograph by TVA Graphic Staff, Charles Krutch, Chief. (Courtesy of Tennessee Valley Authority)*

Roland Wank was the chief architect for TVA and undoubtedly played a personal role in the selection of furniture and decor for the visitor's lobby at Pickwick Landing Dam. The efficiency of the

modern technocratic state is epitomized by the room and the guard.

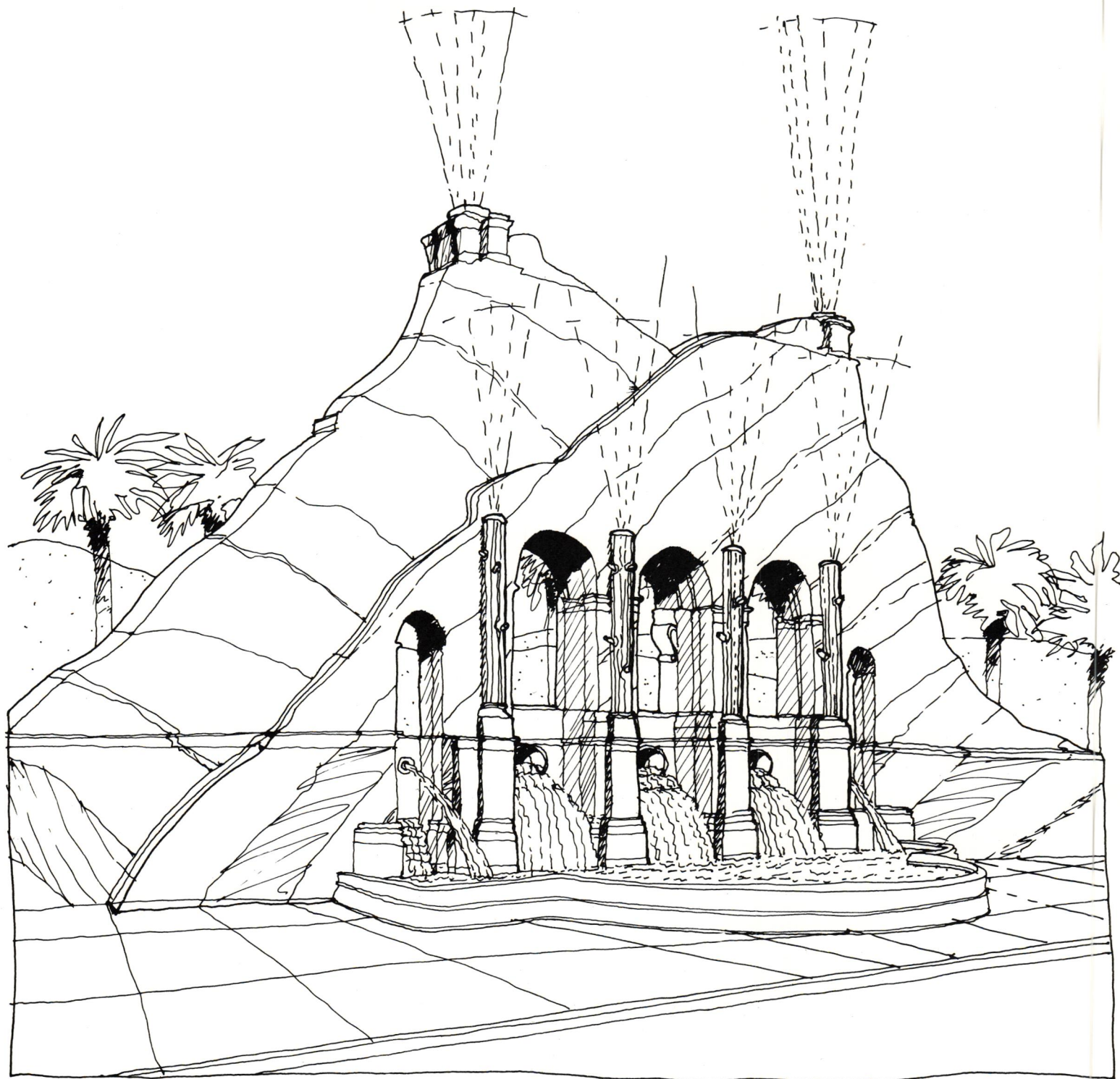
8. *Pickwick Landing Dam, Tennessee Valley Authority, ca. 1939. Photograph by TVA Graphic Staff, Charles Krutch, Chief. (Courtesy of Tennessee Valley Authority)*

The generators at the Pickwick Landing Dam are perhaps the finest expression

of the clean-lined, functionalist ideology of the 1930s dam designers. These in particular, with stainless steel shrouds and the sparse interior, provide a decided contrast to the onlooker.







The Urban Spring: Formalizing the Water System of Los Angeles

William Morrish

Western Civics

"To a considerable extent, the problem of water in Southern California is a cultural problem. By this I mean that newcomers to the region, who have always made up a majority of the population, have never understood the crucial importance of water. Crossing the desert, they arrive in an irrigated paradise in which almost anything can be grown with a quickness and abundance that cannot be equaled by any other region in America. There does not seem to be a water problem. Nor are they told there is such a problem, for Southern California has always been extremely reluctant to discuss its basic weakness."

Carey McWilliams (1946)¹

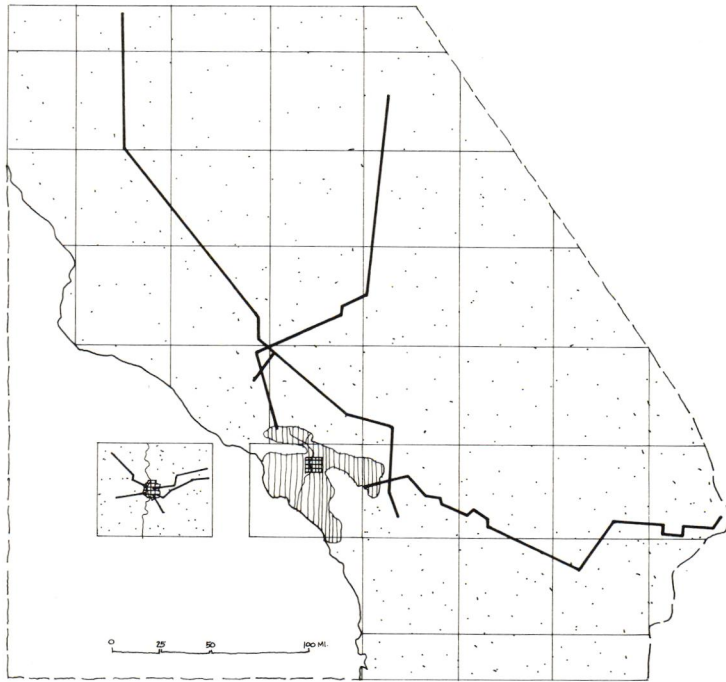
Los Angeles is a city finally awakening to its basic weaknesses. With more frequency than ever before, the issues of water quality and supply are making front-page news. Developers interested in expanding their projects, as well as residents who want to insure the environmental quality of their homes and neighborhoods, are beginning to realize that the issue of water is synonymous with city building in Los Angeles. The city of the angels is now entering a phase of maturity. Its history of speculative growth is being left behind; developers, residents, and city architects must now answer questions regarding the city's image and identity. These questions cannot be addressed apart from a consideration of the water supply that makes the city possible. To many, Los Angeles and its environs are one large, sprawling, homogeneous city. Upon closer view, one can begin to see a diverse set of neighborhoods which are defined by geographic, microclimatic or ethnic features. The existing fabric of the city, however, does little to support this diversity. As Los Angeles evolves into a mature city, identification and orientation of its separate neighborhoods will become more critical.

The water aqueduct system created the basic pattern of the sprawling Southern California gridiron. The gigantic scale of the three-water aqueduct system has combined with the availability of flat, cheap land to create a city with a disparate hierarchy of spatial orders. The city is separated into two scales: the individual home and the freeway. These

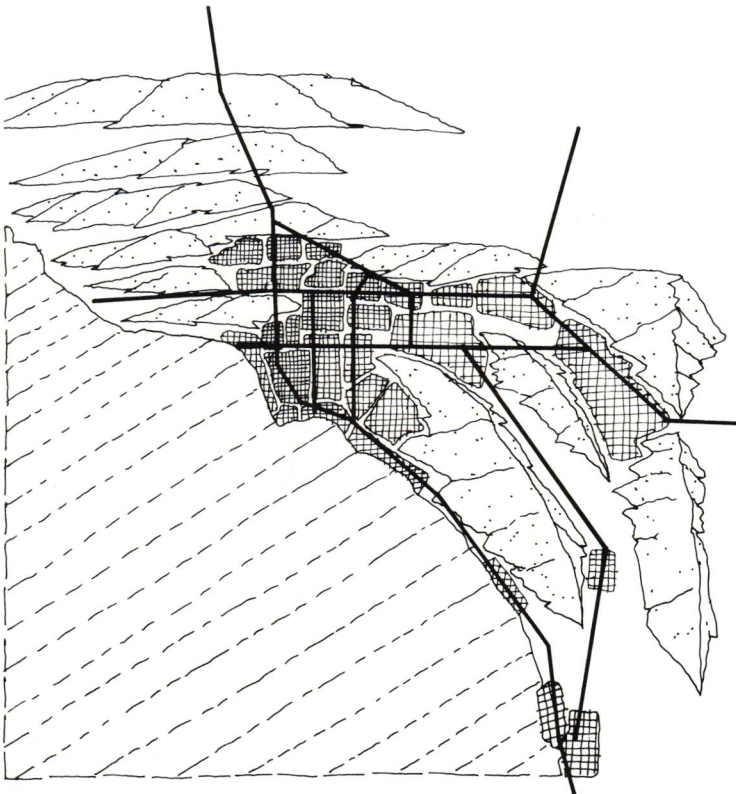
two scales are mediated by linear strip commercial zones, office centers, and neighborhoods, but the intermediate zones tend to relate either to the residential scale or the freeway scale.

The freeway, the most famous symbol of Los Angeles, hovers over the landscape like the aqueduct system of ancient Rome. In contrast to the freeway, the water system of Los Angeles, which is much older and fundamentally more critical to its existence, is not as well known. One key reason is that the freeway is a public space and the water aqueduct is not. Daily, thousands of drivers keep their eye on the road and their ear to the radio, listening for *SIG ALERTS*, warnings of accidents ahead on the freeway. The ritual of the freeway is an everyday activity for residents of Los Angeles. The consumption of water is also an everyday ritual, but one which has been removed from our daily consciousness. This loss of consciousness is primarily due to the removal of the aqueduct from public sight. The ritual of water is no longer a public activity like commuting.

Los Angeles is an excellent example of a man-made desert oasis. Its present day physical form, however—like that of Phoenix, San Diego or other cities in the American Southwest—does not effectively celebrate the water system that nurtures its existence. Most residents thoughtlessly assume that their garden paradise merely comes from "turning on the tap." In reality, a gigantic system of aqueducts, pumps, reservoirs, canals, and pipes delivers water from 500 miles away. To the average person's perception of the city, this labyrinth remains hidden from view, except when he receives the monthly water bill or when he has to vote on water-related bond issues. Here we offer a design exercise with two purposes in mind. The first and more specific purpose is to reintroduce the water system to public view. To do this, we will explore the possibilities of externalizing the hidden water aqueduct system into a set of public spaces, activities, and monuments. Potentially, these new public spaces could be the articulated interme-



1



2

(frontispiece) *The Neighborhood Water Park for Beverly Hills, which is supplied with Colorado River Water.*

1 Ancient Rome and Los Angeles, a comparison of the size of the ancient aqueduct system of Rome with the present-day system of Southern California.

diate scale of urban spaces now missing from the Los Angeles landscape. New and existing developments can begin to infill and reorient themselves to the water places, rather than to the scale of the home or freeway.

Our second and more general purpose is to identify city design principles, which are inherent in the formal structure of the western American city. Intuition suggests that cities like Los Angeles might be translating the universal principles of city building through their own vocabulary, what I call the *Western Dialect*. This is more than an expression of regionalism; it is a specific set of city design principles which are inherent to the formal construct of the western city typology. Because Los Angeles's form is so fundamentally tied to the transportation of water, it provides a unique opportunity to understand the factors that control the translation of universal design principles into the formal spatial structure called Los Angeles.

Introverted City: 1781-1888

In the late 18th century, water management was a principal concern of Southern Californians. From San Diego to Santa Barbara, the Spanish Franciscan padres employed Indian labor to build systems, sometimes elaborate ones, for the conservation and distribution of water. The availability of arable land and water was a basic requirement for successful settlement of the missions. So it was that when the Spanish authorities determined to establish a pueblo in the south, they chose a low-lying alluvial terrace adjacent to that portion of the Los Angeles River through which the water flowed year round. With its founding on 4 September 1781, the *Pueblo de Los Angeles* began its enduring relationship with the river.

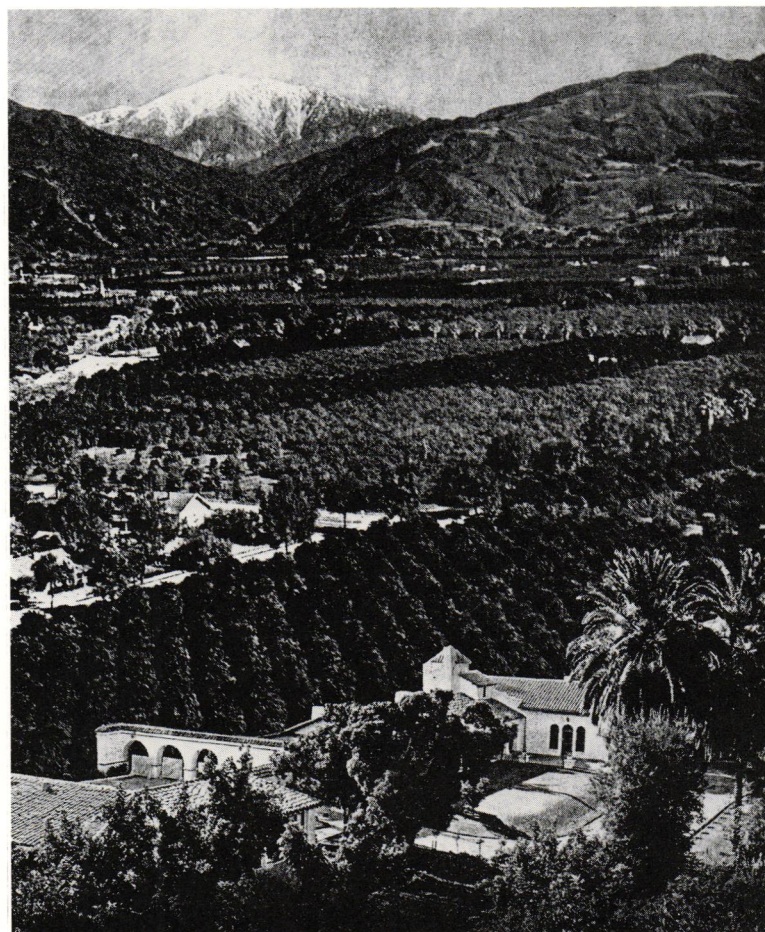
The pueblo was an introverted community centered on the mission and plaza. The water was distributed from the center of the city to the outlying agriculture. The first

2 *Los Angeles and its grid of water distribution in the Southern California Basin.*

3 *Southern California, near Pasadena in the 1930s.*

settlers erected a brush diversion dam and excavated a *zanja madre* (main ditch) along the base of the hills, past the northeast corner of the plaza. A ditch master was appointed, and rules established for the operation of the system, which supplied water to the residents and surrounding agriculture. In 1868, the Spanish water distribution system was leased by a private company for a period of 30 years, during which the company constructed a system of supply lines, cast-iron and steel water mains, and storage reservoirs. By 1888, almost 3,000 acres of irrigated farmland lay within the town's borders. The adobe *Pueblo de Los Angeles* had grown to a city of almost 50,000 persons, the state's second-largest urban place. The water systems established by other missions in California had been dismantled or had fallen into disrepair by the 1830s.

Various urban observers have put forward the idea that Los Angeles was, in its pueblo days, a dispersed but homogeneous environment. I propose that before the large water projects of 1913, Los Angeles and other communities in Southern California were a set of quite separate and different ranchos. Each community attempted to create its own urbanity in the desert; but the links which fused Anaheim (a German colony in late 1800s), San Bernadino (a Mormon settlement of 1857), and Los Angeles were the water systems of 1913 and 1938. The *super-grid* of cheap water and its subsequent standardization connected the communities in a way not seen again until the coming of the freeway in the 1950s when the grid of auto transportation would further tie the pueblos, colonies, and communities into an irrigated megalopolis.



47

3

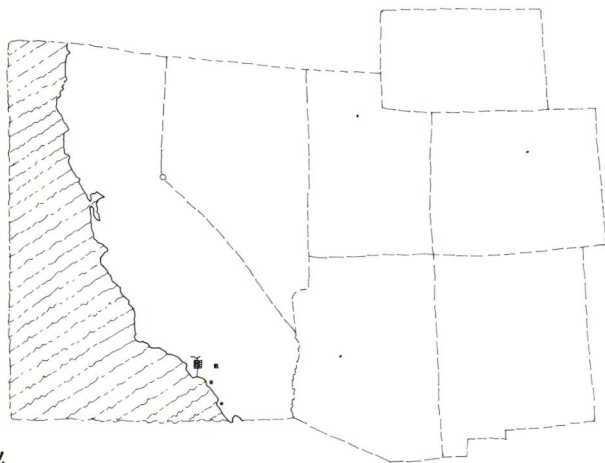
The Boom City: 1888-1968

The two forces which changed the pattern of water distribution and, in turn, the urban fabric of Los Angeles, were the acquisition of the water system from the private water company by the city of Los Angeles, and the cheap and efficient transportation provided by the railroad, and

4 *The Introverted city, Pueblo de Los Angeles in 1781 and its relationship to the Western United States.*

5 *Pueblo de Los Angeles in 1781 in the Southern California Basin.*

48

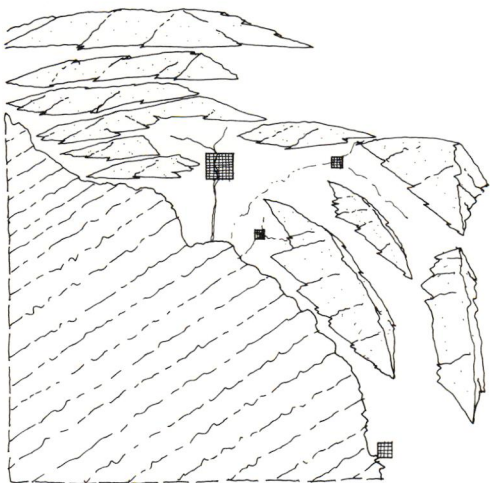


eventually by the automobile. Cheap land with access to transportation lines, and irrigated by an abundant source of water, supplied the formula for success.

Due to widespread disenchantment with private water-system operators, the city, under public pressure, acquired the system for \$2 million on 2 February 1901. Three days later the city's first Board of Water Commissioners was established to manage that system. William Mulholland, a talented, self-trained engineer, retained his position as system superintendent, and would later become the chief engineer and visionary of the future aqueduct system from Owens Valley and the Colorado River.

During the boom years, the growth of Los Angeles was constrained by the dwindling supply of artesian wells and river water. California land speculators needed more irrigation water to transform the desert into the vision of lush gardens advertised in magazines in the Midwest and on the East Coast. Immigrants dreamed of their own orange trees and gardens in the sun; syndicated real estate developers envisioned the lucrative possibilities of a moist San Fernando Valley.

Both dreams required quantities of water which far surpassed the limited supply of the existing water system. In a series of unprecedented political and legal maneuvers, the city and land speculators gained access to waters from the Owens Valley, located 300 miles to the north. At the turn of the century, the Owens Valley was a flourishing cattle and agricultural community, nurtured by the waters of the Inyo and Mono basins of the eastern slopes of the Sierra Nevadas. Before their intentions were publicized, land speculators from Los Angeles acquired much of the land surrounding the Owens Valley from the farmers, with the intention of channeling the water to their land holdings in the parched San Fernando Valley. Following a vicious court fight and actual violence over the rights to the water resources, the syndicate and other politicians put the city



5

6 Owens Valley Aqueduct in relationship to Los Angeles and the Western States, 1923.

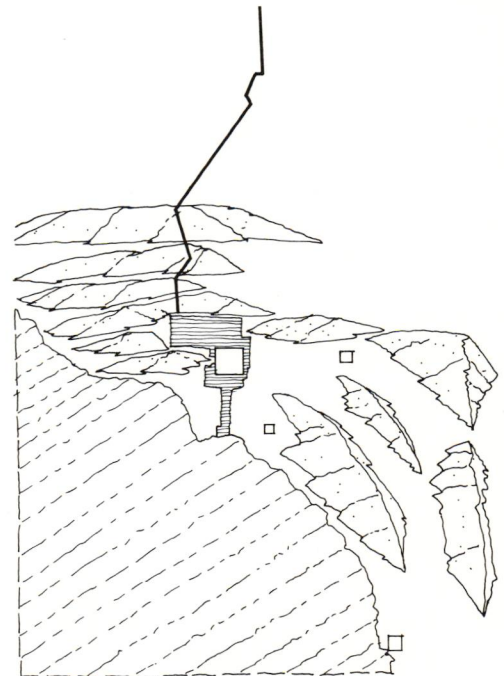
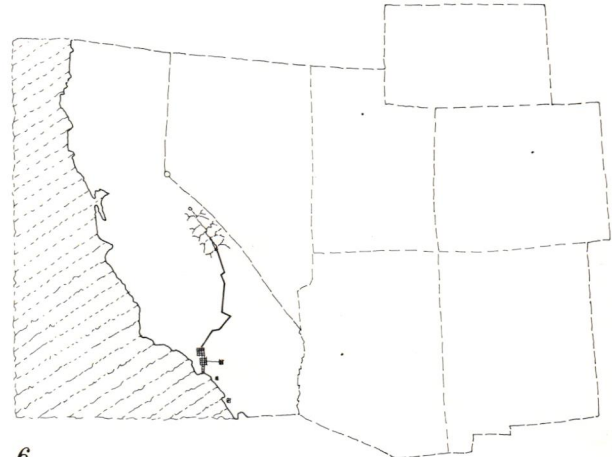
7 Los Angeles in 1923 and its growth in the Southern California Basin.

of Los Angeles in a position to pay for the land acquisition and the construction of the system through a public bond of \$24 million in order to supplement the existing city water supply.

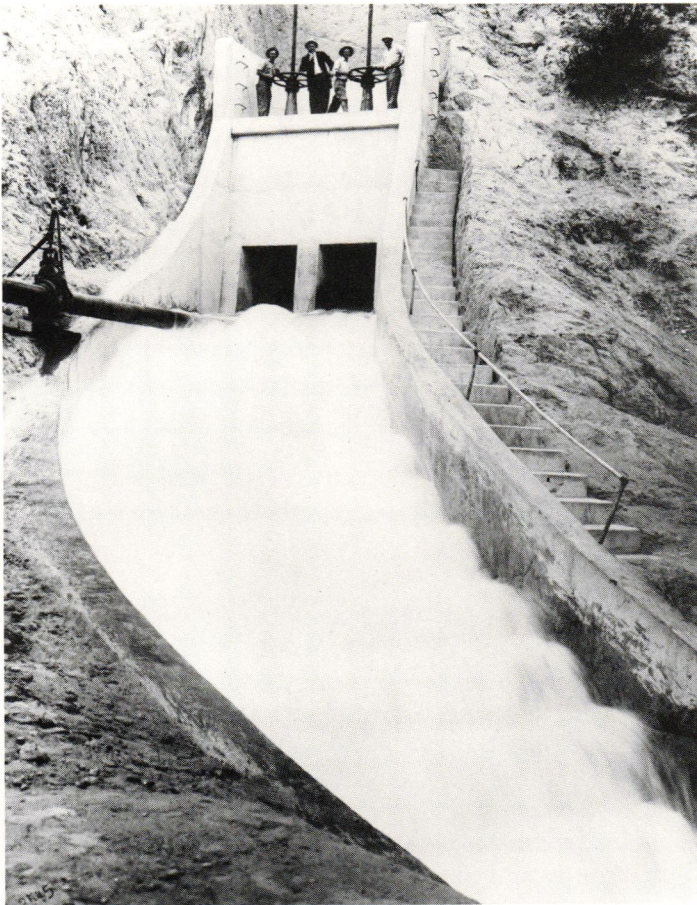
In 1905, the city of Los Angeles hired 5,000 men to build the Owens Valley Aqueduct, with the purpose of bringing water, not to the city, but to the edge of the San Fernando Valley. People *still* argue as to whether the water brought by the residents of Los Angeles from the Owens Valley was for their use, or was intended only to turn the dry land of the San Fernando Valley into a speculator's dream. On 5 November 1913, the aqueduct opened, and immediately began delivering four times as much water as the city of Los Angeles was then capable of consuming for domestic purposes.

The city's ability to dispose of this water surplus was severely restricted by federal law. In response to allegations concerning the land syndicate's role in planning the project development, President Theodore Roosevelt attempted to ensure that water from the public enterprise would not be used to benefit the syndicate's holdings in the San Fernando Valley. As a condition for his approval of the aqueduct's right-of-way in 1906, Roosevelt stipulated that no water from the aqueduct could be offered to a private interest for resale as irrigation water outside the city limits.

City officials, encouraged by land speculators, responded to the restrictions by rapidly extending Los Angeles's political boundaries. Between 1914 and 1923, Los Angeles initiated a series of annexations which nearly quadrupled its land area and eventually embraced all of the syndicate's holdings. Once annexed by water-rich Los Angeles, the San Fernando Valley blossomed into fields of beans and groves of citrus. The aqueduct, as an urban water development, initially operated for the principal benefit of agriculture. With the opening of the Panama Canal in 1914, the city of Los Angeles became a major seaport for agricultural exports. But, in







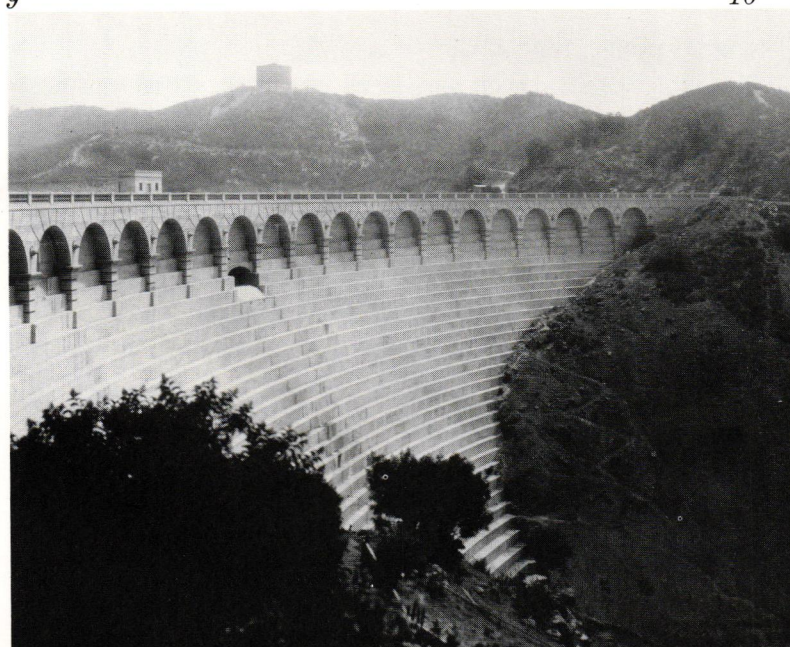
9

8 Los Angeles Aqueduct from Owens Valley, under construction.
9, 10 Opening the Los Angeles Aqueduct from Owens Valley, 1913.
11 Hollywood Reservoir 1933, Los Angeles Aqueduct.



10

51

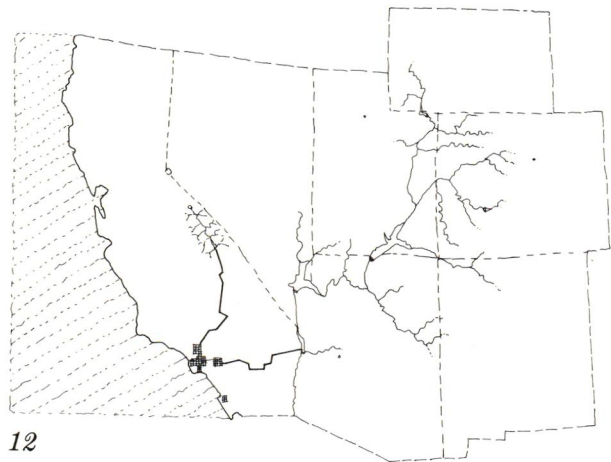


11

12 *Colorado River Aqueduct in relationship to Los Angeles and the Western States, 1938.*

13 *Los Angeles in 1938 and its growth in the Southern California Basin.*

14 *Colorado River Aqueduct, profile, section and plan, 1939.*

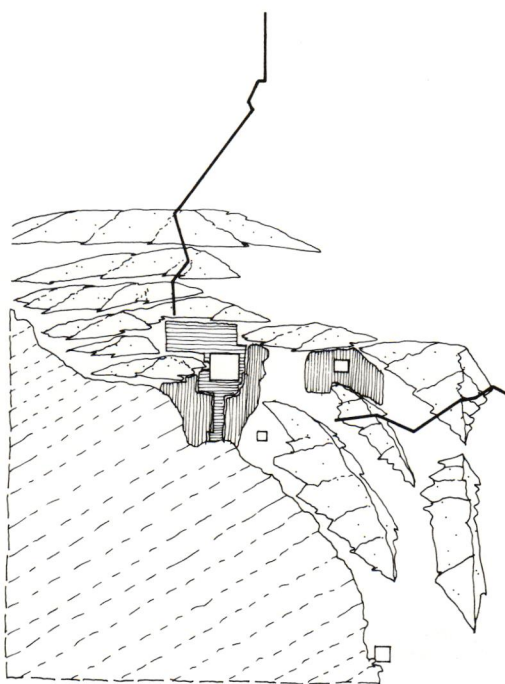


time, the notion of a strictly agricultural valley gave way to a more domesticated agrarian vision—that of homes within a garden city. At the end of World War I, Los Angeles was flooded with immigrants. The water system and irrigated infrastructure of the future city was waiting for the 100,000 immigrants per year to create their own gardens in the desert.

Los Angeles is equipped with an elaborate and expensive infrastructure. Because the city requires large areas of land to irrigate before the expense of a system is feasible, each new system is overscaled to anticipate future growth. This usually means that the new system is in place long before urban growth catches up. Unlike a typical city where urban density radiates outward, Los Angeles grew along points on the irrigated distribution pattern. Later, the introduction of the automobile would enable more and more people to live in a dispersed pattern along the water system.

In the 1930s, the collective community spirit of getting America back on the road to recovery provided the basis for building the Colorado River Aqueduct, an idea originated by engineer William Mulholland of the successful Owens Valley Project. The Colorado River Aqueduct would provide water not only to back up Los Angeles's Owens Valley water system, but also to supply water to other Southern California cities, which were rapidly growing even in the depression years. Since the Department of Water and Power served only the city of Los Angeles, a new agency was established: The Metropolitan Water District (MWD).

The Colorado River Aqueduct was part of an elaborate water, power, and flood-control plan. One of the major dams constructed, Hoover Dam, was proposed to provide cheap electrical power to the growing cities of the Pacific Southwest. Down river, Parker Dam was built to create a lake from which water for Southern California would be drawn. Originally the water was used for agriculture, but





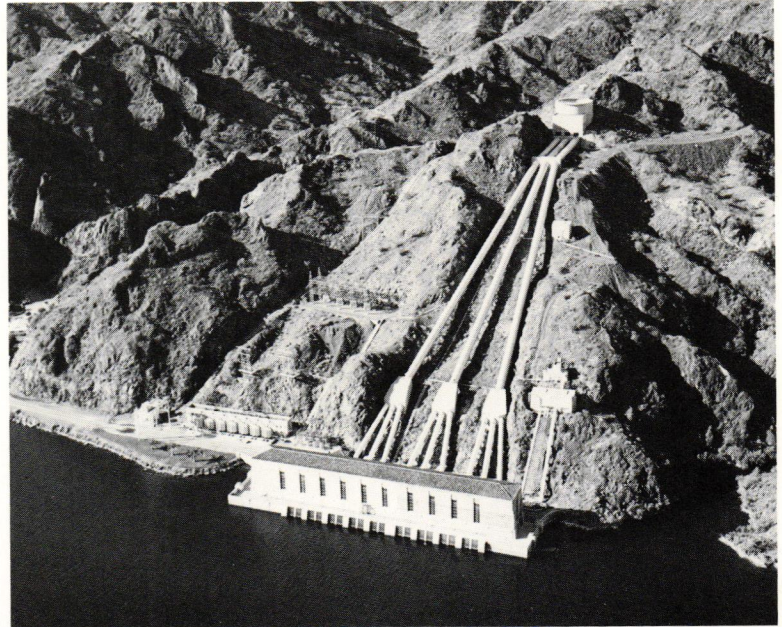
again, as in the Owens Valley Aqueduct, the result was to spread urban growth out across the now-fertile land.

In the late 1950s, the state of California, responding to arguments over the adequacy of water supplies to booming postwar agribusiness and urban expansion, decided to create a comprehensive statewide water plan which would manage the limited resources. This project, dubbed the California Water Plan, was developed to build dams and control the rivers, to store water for use during dry months, generate electric power, and to move the surplus water to the San Francisco Bay area, the San Joaquin Valley, and Southern California. A proposal favoring Southern California industry, homes, and agriculture with a majority of the water resources put the MWD in the middle of a heated debate. Many people in the south saw the water as fuel for yet another real-estate boom. Others saw water availability as a threat to delicate negotiations between neighboring states over Los Angeles's rights to the limited water resources of the Colorado River. Then, as now, this debate reflected a divided state. Northern Californians view Los Angeles, and the expanding Southern California communities, as wrongly placed development. They often claim that sending "their water" to the south (which claims two-thirds of the state population) not only encourages a poor pattern of development, but also threatens the environment and the general quality of life.

Worried about its position in the negotiations of water resources from the Colorado River, the MWD wanted to accept water supplied by Northern California, but such a decision could hold the MWD hostage to the anger of the Northern Californians. To get the support of the MWD, the State Legislature passed the Burns-Potter Act, guaranteeing proposed water-delivery contracts subject to ratification by voters in the 1960 general election. This, and other assurances, finally turned the tide: several days before the election, the MWD came out in support of the project. On 8 November, the Burns-Potter Act and the construction

bonds for the project were ratified by fewer than 200,000 votes out of a total of almost 6 million votes cast. The vote, carried by the larger population in the southern part of the state, was approved in only one county in the north. In 1968, the California Water Project began delivering water to the south San Joaquin Valley and Southern California. To this date, the project, only half completed, is still the focus of emotional arguments between environmentalists—who are concerned about the water equality of the Sacramento/San Joaquin River Delta—and the developers of the homes, businesses, industry, and agribusinesses of the south.

Boom City now extended beyond the 1781 pueblo ordinance boundaries and even beyond the dry mountain ranges. Through its water system, Los Angeles was tied to the politics of distant states across their valleys and delta regions. As growth patterns developed in Southern California, they became issues of discussion in San Francisco, Denver, and Phoenix. Extending urban fingers out into the surrounding wilderness, the garden city carried the identity of Los Angeles far beyond its topographic and political boundaries. Aqueducts now tie Los Angeles into a network that flows in both directions. The irrigated city of Los Angeles has become the irrigated megalopolis of Southern California in the irrigated region of the American Southwest.



16

Paris in the Desert: Present and Future Prospects

Los Angeles, like its sister cities, has evolved from an introverted settlement to an extroverted, sprawling conglomeration. Many architects of the city's future now wish to repent for past sins and transform this conglomeration into a *real* city, like Paris, or maybe more realistically, Barcelona. Whatever model prevails, the future shape and form of that city will necessarily be closely tied to its water system. Juxtaposing the geometry of the water system against the order of the city is a steppingstone which can begin to

56 *17 Colorado River Aqueduct crossing
the desert.*



establish an urban order which is not just a memory of past heroic cities, but is rather a blend of future excitement and past traditions of city building.

The *City of Gardens* seems assured of adequate water supplies and a long-term flow of national and international capital. This new, mature growth cycle allows the city to become wiser in its development strategies. This cycle still responds to short-term problems, but more importantly, it provides the time to explore the long-term ramifications of its actions. Unfortunately, anti-tax legislation like California's Proposition 13 has curtailed city government involvement in the public sector. Therefore, the burden of this exploration is transferred to individual designers. The city's future will be based on whether or not individual developers question the history of urban evolution in Southern California. Any design solution must conform to the specific site, and, one hopes, connect with the whole of the city. This sort of design reflection will, hopefully, replace the generalized speculative answer with one which translates and shapes general typologies of architecture and city building into the specifics of the environments called Los Angeles and Southern California.

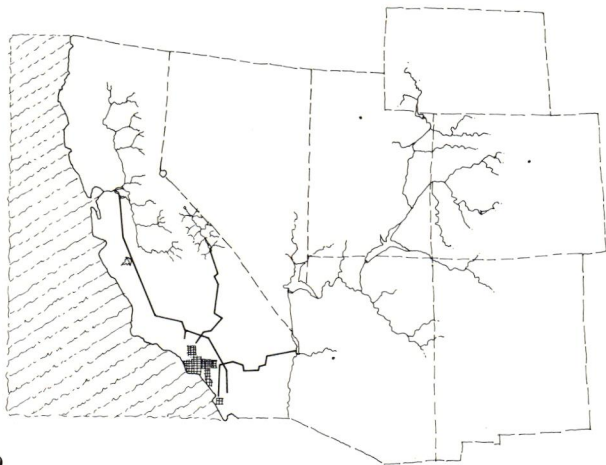
At this point it might be useful to embark on a tour through a series of design exercises which explore the possibilities of this new urban outlook. Using the water aqueduct system as a test case, the goal of our design is to create a set of specific urban sources in and around Los Angeles, which will simultaneously provide utilitarian service, spatial clarity, and ritual places which celebrate a city created from water and sand. The method for this search we can call the *design scenario*—a process by which statements of policy are translated into three-dimensional architectural or city-building programs. Our method takes the statements of policy and poses the question: What if the information were expressed as architectural spaces or public monuments? The results of this process will generate two types of information. From the first, we can begin to see the effect a policy has



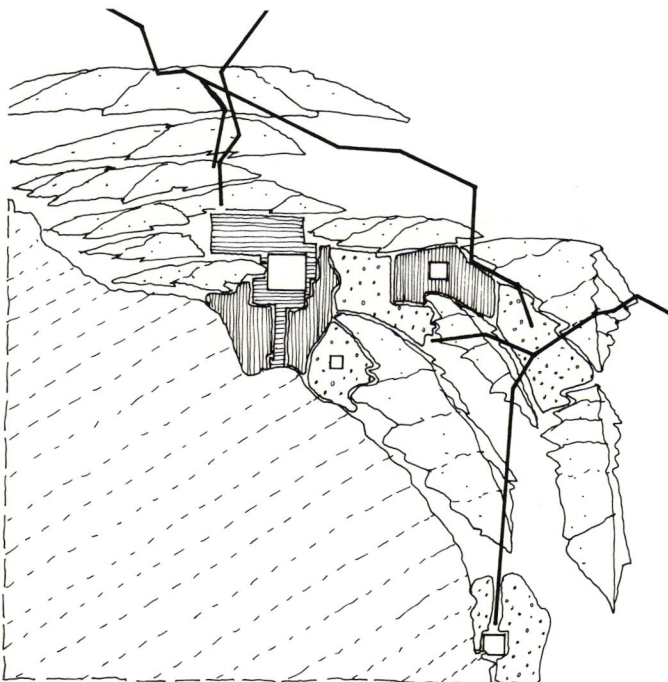
19 California Aqueduct in relationship to Los Angeles and the Western States, 1968.

20 Los Angeles in 1968 and its growth in the Southern California Basin.

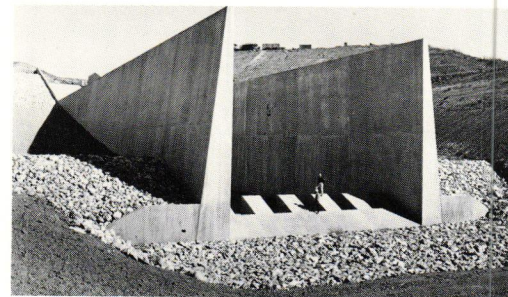
21 California Aqueduct, reservoir spillway.



19



20



21

upon the physical structure of a place. From the second, we can identify a spatial vocabulary. The following design scenarios look at the potential ritual places which can be created to celebrate both the spiritual and the utilitarian relationship of the city to its water system.

The First Ritual: The Point of Intake

The aqueduct begins hundreds of miles away from the city boundaries. At the *Point of Intake*, water is pooled from the natural water courses into holding channels. At one end, the large pumps of the aqueduct lift station draw water up out of the pool, into the pipes of the aqueduct, and on to the distant city. At this point of transference, the water leaves the wilderness, or rural state, and enters the geometry of the city. To many, the lift station can be seen as the gateway to the city. To others, it is the outermost tentacle of the city as it stretches into the countryside.

The lift station, or Point of Intake, also symbolizes the battle for control of water resources, in which there are two participating parties. The first is composed of those who feel they have control over the water because of *riparian rights*. Since they own land from which the water originates, they feel that they should be in control of its future. The other party usually lives outside the area of the water origins and argues that an area's water resources should not be limited and controlled by the few who own the land at its source. The water should be put to maximum use. They claim the need for *appropriation rights*. Two hundred years of litigation, legislation, and emotional arguments have been generated by this conflict over the control of limited water resources. This argument is rooted in the historic American conflict between rural virtue and urban intellectualism.

In order to ensure that no other remote region would face the fate of the Owens Valley, the State Legislature passed the County of Origin law in 1931, prohibiting the draining of one area's water in order to supply other areas. This law

helps small counties stop larger municipalities from looting local water resources.

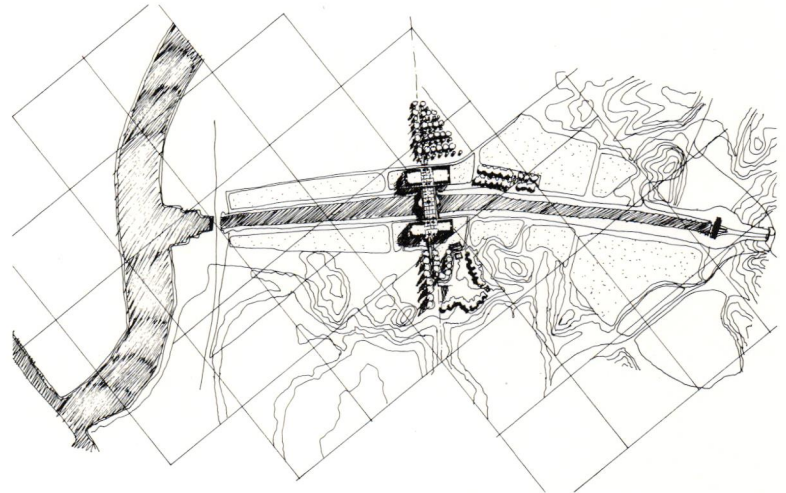
In interpreting the law, the Point of Intake can be seen as the middle ground of the debate. It is proposed that a line be drawn between the intake lift station and the water pool of the natural water system, on which a building called the *Basilica of Origin* will reside. From this point, the basilica mediates between the values of the rural and wilderness landscapes and the geometric aqueduct lines of city, which terminate here.

In the Basilica of Origin there would be two icons representing the two sides of the water debate: those of the city and those of the county of origin. The basilica would create a place for the debates about balancing water supplies. It would be the formal space where the process of deciding the amount of water entitlement would take place annually.

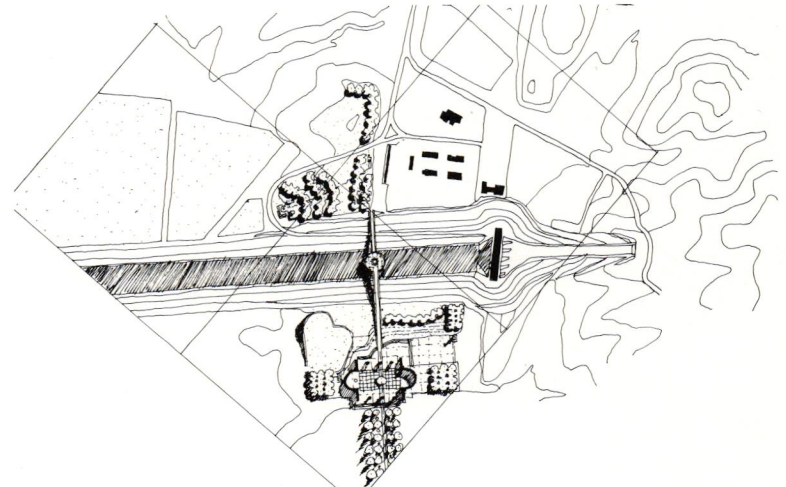
Each year, lawyers, officials, and citizens from both sides would gather at the Basilica of Origin and act out the ritual of balancing the area's water resources. This *Act of Entitlement* would be debated and recorded within the Basilica of Origin at each aqueduct. These basilicas would be created at the Delta, the Colorado River, and the Owens Valley, and each would represent the debate particular to that area of origin.

The Second Ritual: Lines of Transport

As it leaves the Point of Intake, tunnels, canals, conduits, and siphons carry the water across the dry landscape of the Southwest. These *lines of transport* tell the story of the land they traverse—a dry landscape marked by broad, open valleys which lie between high rocky mountains. The lines of transport zigzag across the desert floor, and at times lift their cargo up and over rocky routes. These are the same routes taken by early settlers; today they are followed by travelers on the freeways which parallel the water system.



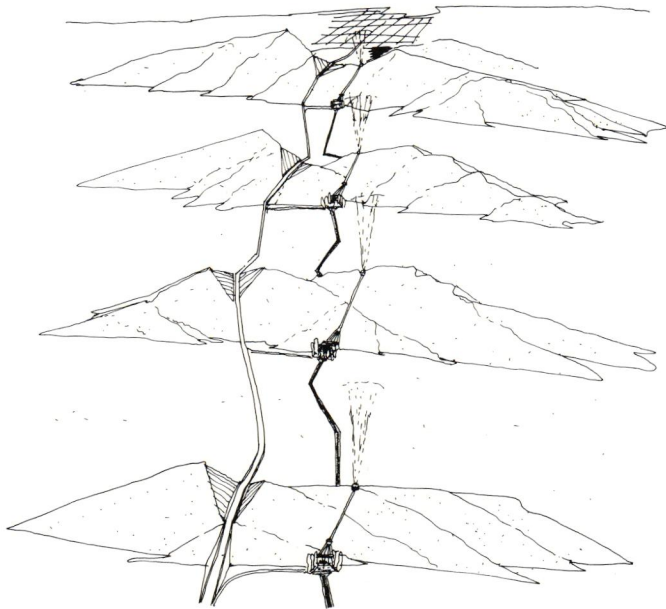
22



23

24 "City Fingers" Lines of Transport,
transversing the desert landscape with
the interstate paralleling the path.

60



24

These lines of transport act as ritual passageways from the open land and its ridges to the garden cities of Southern California.

The lines of transport unleash their power onto the landscape, a power which has been contained and withheld from the parched land it has just passed over. Each line is unique in its technology, its historical moment of construction, and the terrain it traverses. With its own rite of passage, each is perceived differently by the participants of the passage. To some, the Owens Valley Aqueduct represents a period of ruthless political exploitation. To some, the Colorado River Aqueduct represents the collective work spirit of the WPA. Finally, there is the California Aqueduct, which, to those of Northern California, represents the power and the insatiable thirst of the southern part of the state. Whatever the image, lines of transport act collectively as fingers extending the city into the distance, carrying with it the image and characteristics of that city. The symbolic functions of the *city fingers* are to demarcate the distance and passage of time across the landscape, and to inform the traveler of the past and present effect of the city upon the land, by creating a three-dimensional time line.

This scheme can be realized by visually externalizing the system on the land. During the day, at the bases of these ridges, the lift station can be landscaped with compact stands of trees, creating an oasis that demonstrates the life-giving power of the cargo carried in the lines. At night, when the drive across the landscape can be quite monotonous, the lift station can be lighted to create a focal point in the darkened landscape. The traveler counts off the illuminated ridges, assuring himself, "Only a few more before I get home." It is a point on the horizon, marking time and distance, and extending a fragment of the city into the desert. Thus the monotonous landscape takes on meaning and texture.

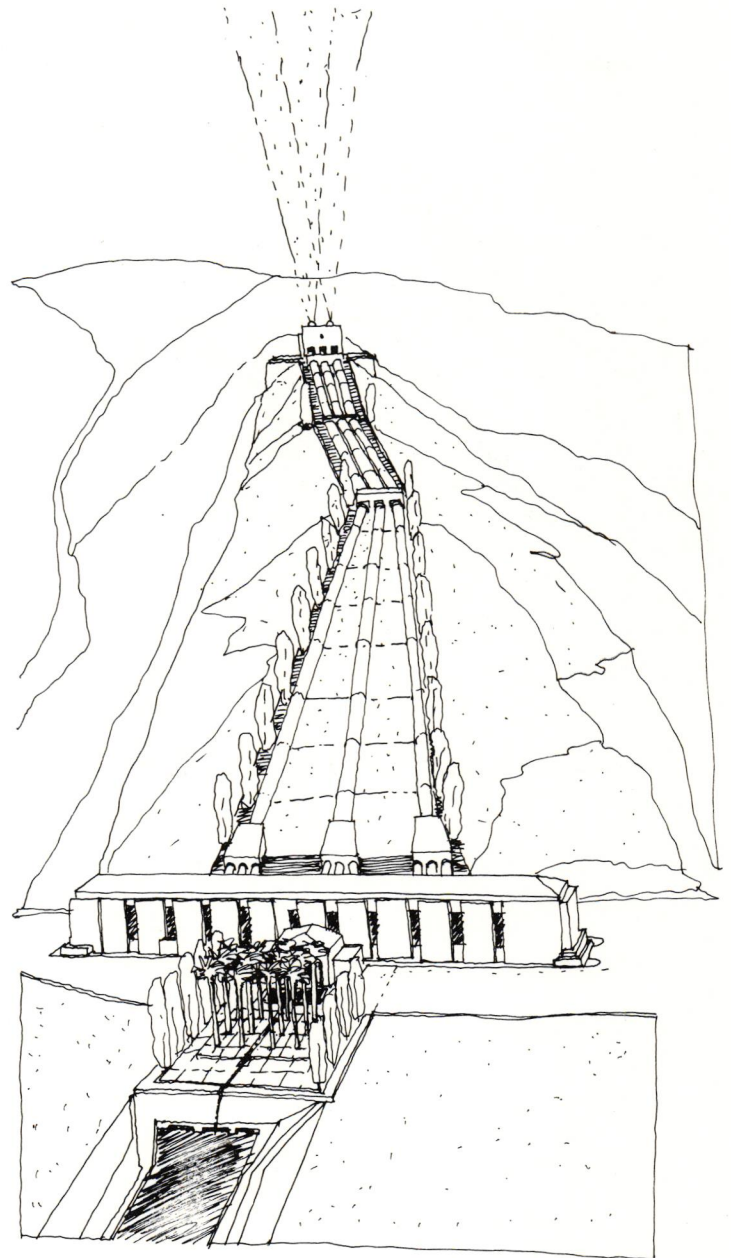
The Third Ritual: Pools of Collection

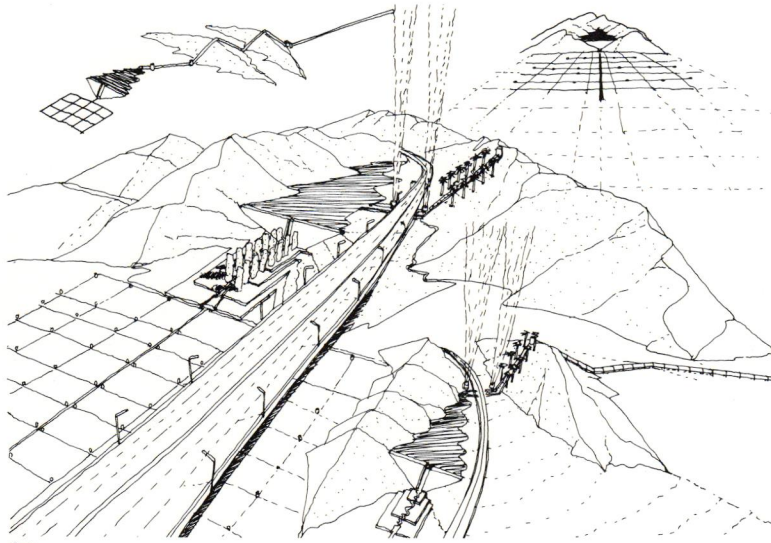
Each aqueduct delivers its water to a reservoir. Like the water cisterns and fountains of Rome which collected, stored, and distributed the water from the aqueducts, the Los Angeles reservoirs can represent both urban-entry landmarks and neighborhood fountains.

Located at the outer edge of the city, reservoir pools perform a utilitarian function by distributing the aqueduct's water to the homes and gardens of the city. They also represent a transition from the linear aqueduct axis of the lines of transport to the spreading grid of the distribution system. A transition from the open, expansive scale of the surrounding mountains and desert to the more articulated individual scale of the irrigated city—from wilderness to civilization. Paralleling the terminus reservoir, the major interstate freeways breach the surrounding mountain walls of Southern California and Los Angeles. At this point, where water and traveler pass into the garden, the terminus pool can be developed into a formal entry space. This pool would be emblematic of both the land it is entering and the journey taken to get there.

Like the previous two rituals, these junctures can celebrate each aqueduct differently by representing the unique qualities of the particular system they serve—for instance, their geographic and historical origins. To the east of the city, the Colorado River Aqueduct greets those who have just crossed the desert. To the north, the terminus pool can be formed to greet the traveler who has traversed the mountain pass from the agricultural grid of the San Joaquin Valley. Finally, the terminus pool represents a potential gateway to the presently inarticulated sprawl of Southern California cities.

Spread out over the landscape of the city are *Pools of Collection* which could articulate distinctly different areas in the environment. As part of the distribution system, each





terminus pool passes water into a series of smaller distribution reservoirs. These Pools of Collection are interrelated as parts of a larger distribution system, yet each should be distinct. Physically, they could be seen as landmarks, perhaps as super-scaled fountains like their antecedents in ancient Rome.

The Fourth Ritual: The Grid of Distribution

Fed by the Pools of Collection, the *Grid of Distribution* transports water to the individual consumer. It further reduces the scale, breaking down into a fine-grained complex of pipes and pumping stations which bring water to each house and garden.

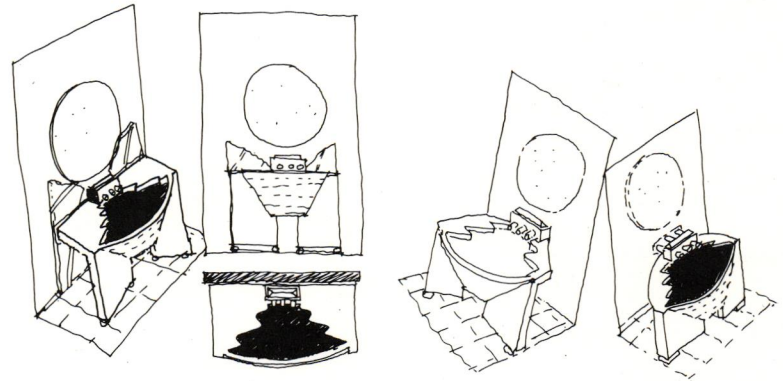
Los Angeles and its environs are created by three overlapping grid systems: one from the Owens Valley Aqueduct, one from the Colorado River Aqueduct, and another from the California Aqueduct. Each is operated by a separate agency, but they are tied together to provide supplementary water as needed. Historically, city development has responded to the grid pattern of each system. At the smaller scales, growth has clustered around the major supply lines of the distribution system. Field patterns of agriculture have become large blocks of residential neighborhoods. At a larger scale, the shape of the cities of Southern California have followed each aqueduct system. The Owens Valley Aqueduct system caused the city of Los Angeles to extend northward from the original pueblo site rather than to the coastline in the west. The Colorado River Aqueduct allowed development to fill in the valley extending from the coastline on the western edge and eastward to Riverside. Rather than follow the Jeffersonian or Spanish grid, the city of Los Angeles, and other cities of Southern California, follow the Grid of Distribution pattern of the irrigation and water distribution.

The Grid of Distribution is the lifeblood of the city. It could be said to represent the dialogue between the natural

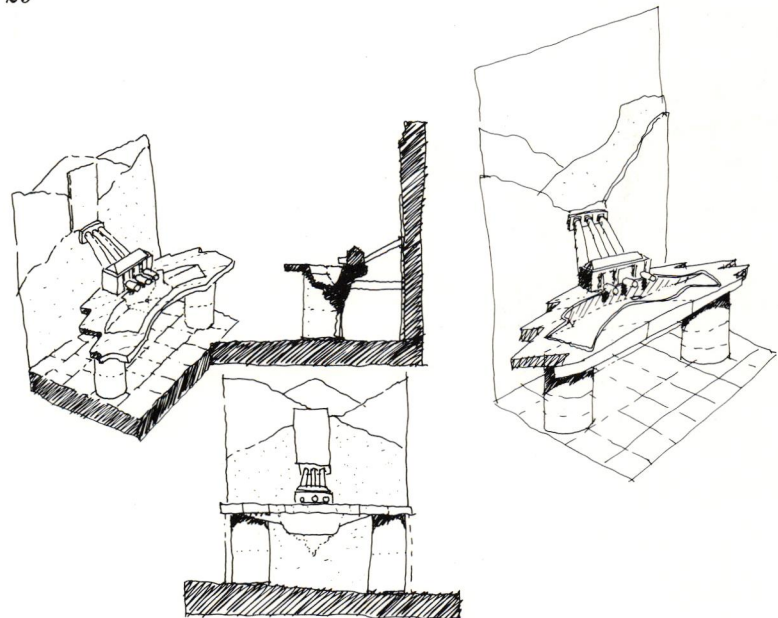
are simultaneously universal in principle, and specific in response to locale. For example, each aqueduct might have a Basilica of Origin, but the articulation of that building would be different for the California aqueduct than for the Colorado aqueduct, since the former has its source in the lush river delta, and the latter is located on the edge of the desert.

The final step of the design exercise was to build a scale model. The model reassembles the aqueducts of the Los Angeles water system in relation to the elements of its landscape. It illustrates, in abstract geometric forms and patterns, how the city is structured by three similar aqueduct systems that have been constructed at different times over different terrains, and which flow from different sources. Their combination results in the distinctive pattern of Los Angeles. The model is composed of three formal elements: the three aqueducts, the mountains which surround the city of Los Angeles, and the freeway system entering the city. The model illustrates how circumstances of time, terrain and social interaction can translate similarly functioning systems into radically different spatial structures. For example, the zigzag pattern of the Colorado River Aqueduct is very different from the long line of the Los Angeles Aqueduct from Owens Valley. The forms in this model illustrate the concept of the *Western Dialect*: the aqueduct model is a vernacular expression of a universal principle of transporting water. It should be noted that the term *Western Dialect* is used to emphasize that there are very specific factors at work in the West, factors that usually are bypassed by using the words *regional* and *contextual*.

In thinking about the design of a western city like Los Angeles, three issues must be addressed. The first issue is that of context. The dominant contextual elements of Los Angeles are not architectural, but natural. In the model, the mountains surrounding Los Angeles are viewed as part of the formal vocabulary of the urban landscape. The mountains protect the city, create its major gateways, and provide



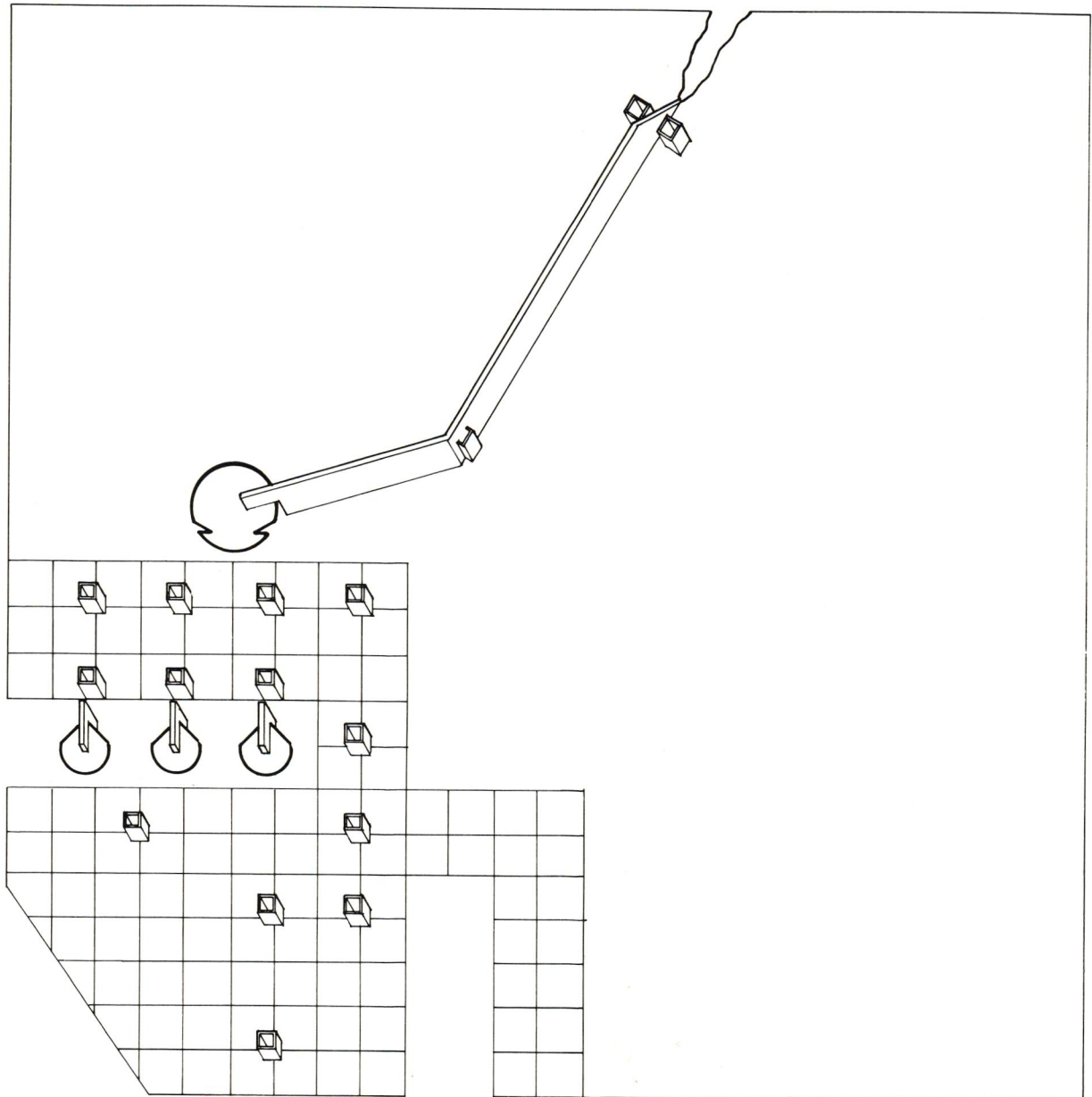
29



30

31 Los Angeles Aqueduct connects city neighborhoods to Owens Valley in Sierra Nevada Mountains.

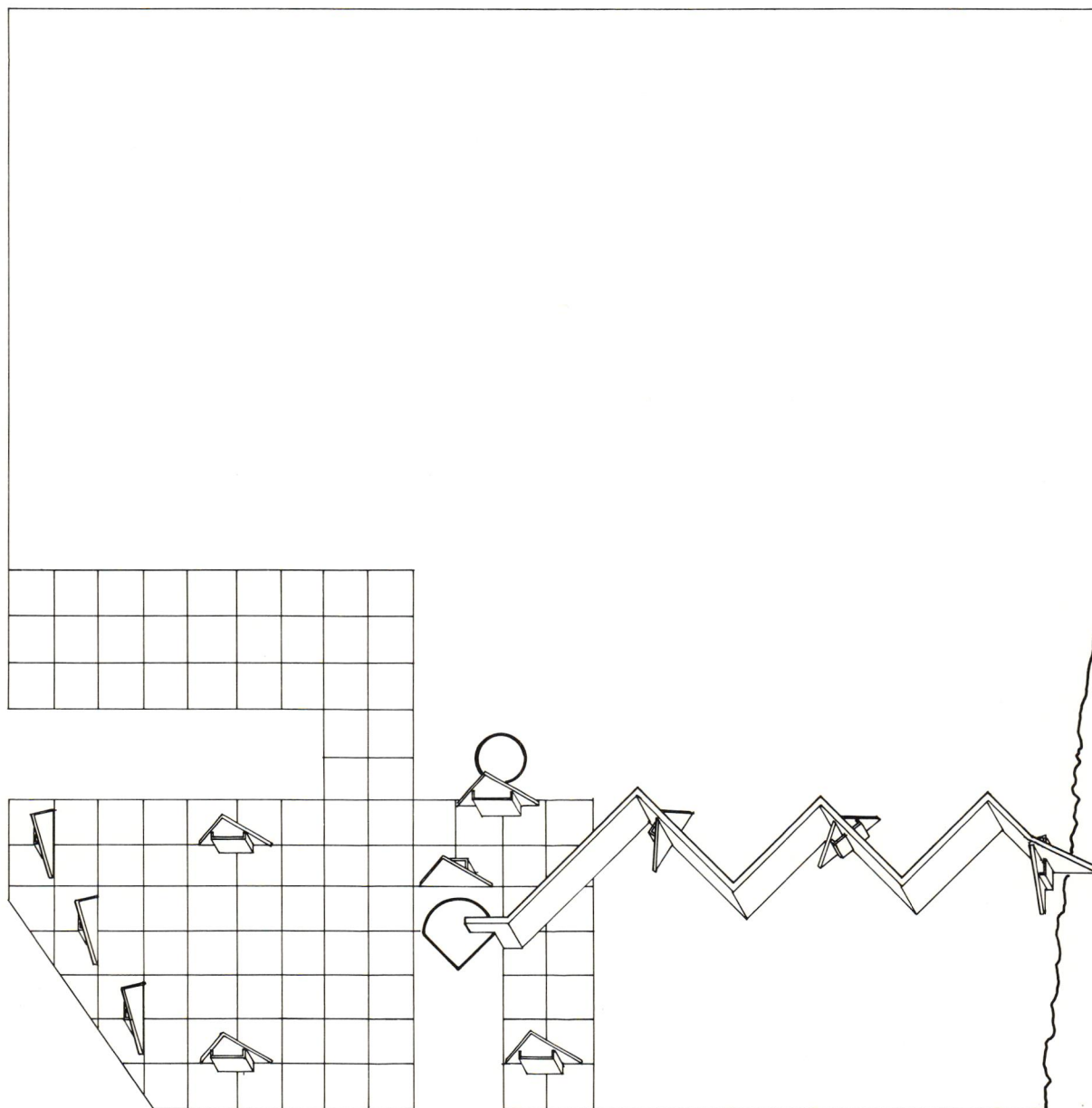
66



31

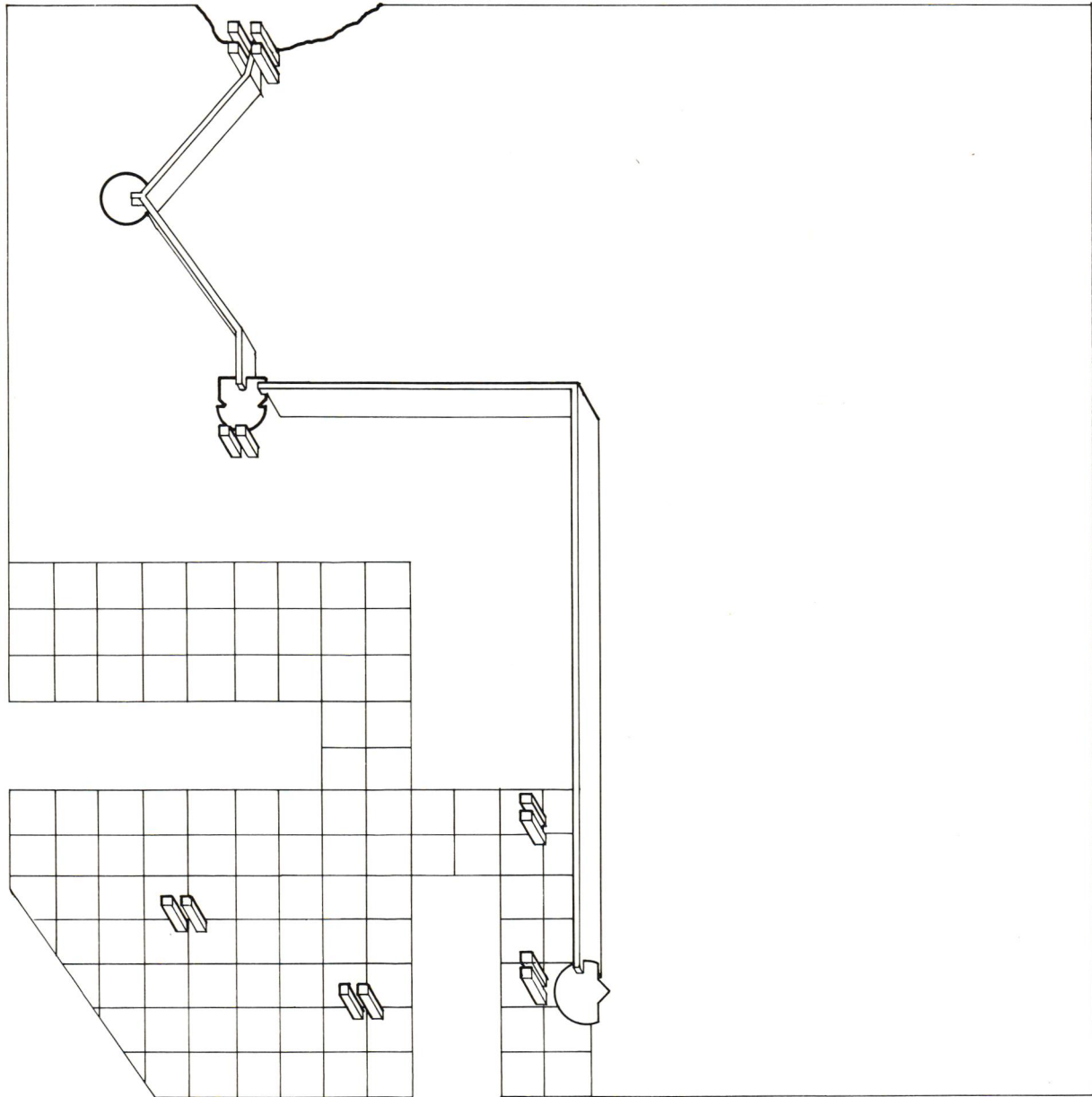
*32 Colorado River Aqueduct connects
city neighborhoods to Arizona border of
California and the Colorado River.*

67



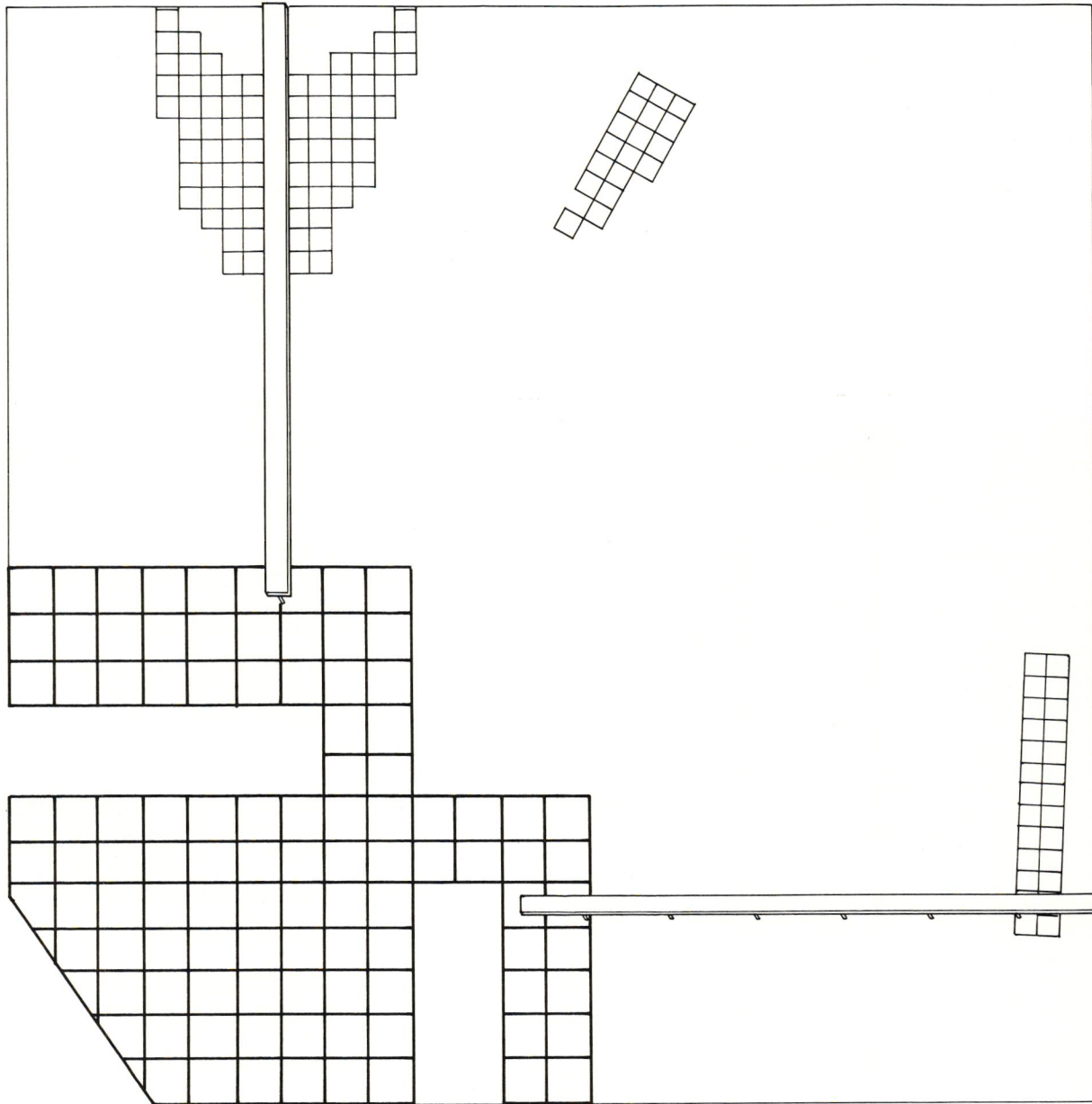
33 California Aqueduct connects city neighborhoods to Sacramento/San Joaquin River Delta in Northern California.

68



33

34 Freeways crossing the open landscape connects the city to distant towns.





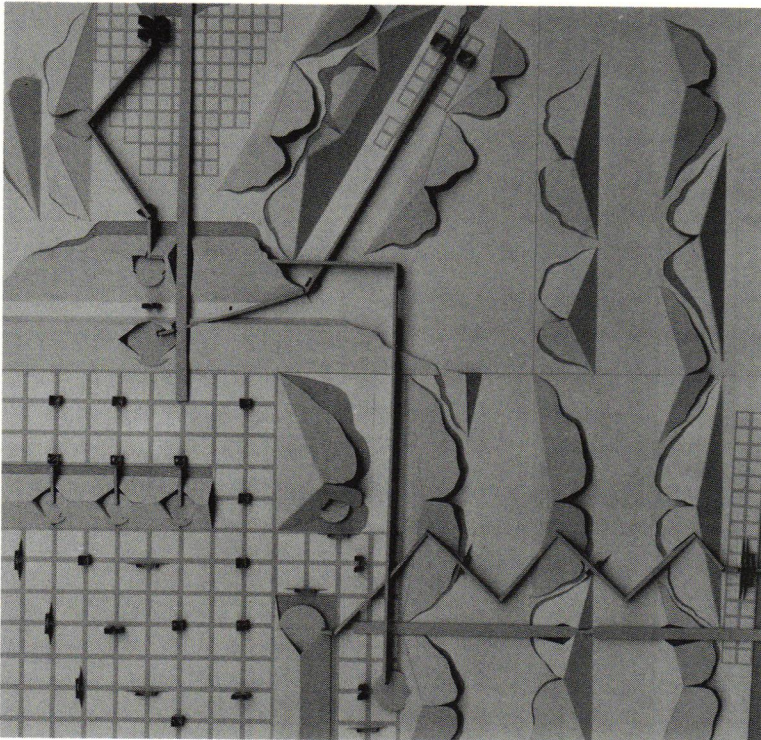
35 Coastal Mountains to the north, Sierra Nevada Mountains to the northeast, and mountains and deserts of the Mojave to the east, all create a wall around the city of Los Angeles.

36 Model of the three Aqueducts, points of origin and distribution pattern through the mountains and deserts to various towns and neighborhoods of Southern California.

a backdrop to its architecture. In many ways they suggest elements of the ancient walls of a glorious past civilization. The mountains are a resource for a literal translation of new forms, and provide a metaphorical basis from which to translate prototypes from other places.

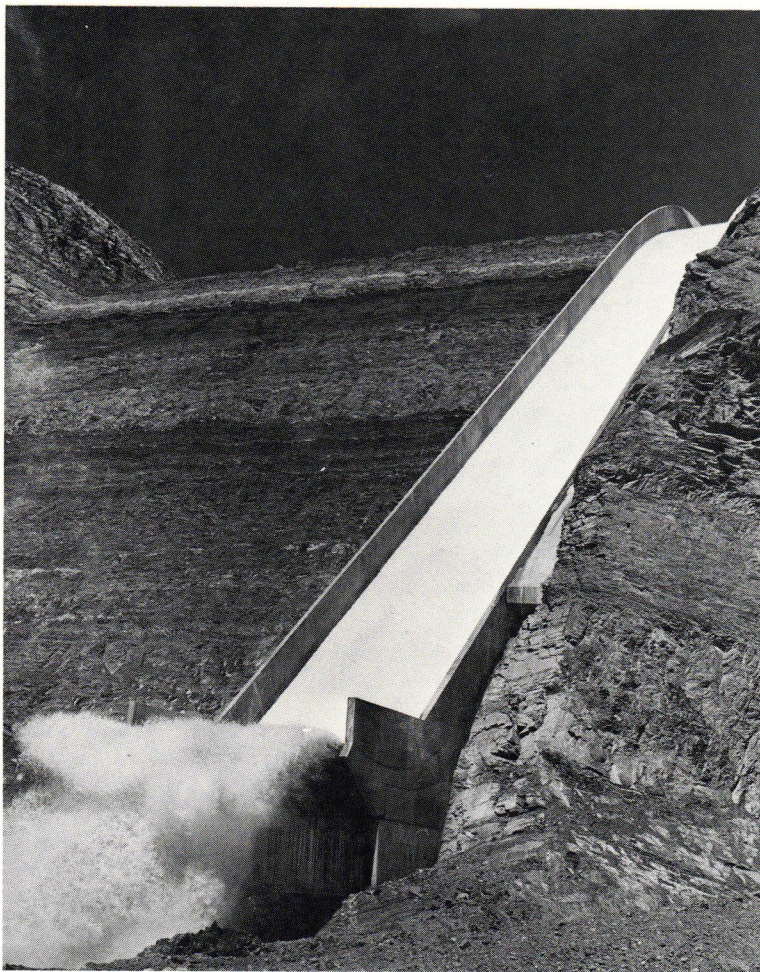
Second is the issue of scale. In the western city, time, distance, and proportion exist on an extremely large scale. Los Angeles and its sister cities cover 5,000 square miles of land. The land is defined by cloudless blue skies combined with the broad horizon of the city grid, receding to the 3,000-foot high mountains in the distance. Within this colossal environment, the placement of a single office tower or house implies that Los Angeles is described by the dynamics of its setting and not by the particular style of its architecture—unlike New York City, where the setting is described by its architecture. This is not to say that architecture can never comfortably fit in the Los Angeles landscape. Rather, I propose that a building in Los Angeles relies on the issues of site planning more than on its architecture. In Los Angeles, the unique positioning of the building in terms of the site—simultaneously tying it to the distant mountains, to the horizon, or to the sprawling grid of the city—becomes the dominant issue of the building's form. The formal structure of the aqueduct system illustrates this point. Since each ritual has a corresponding function in each of the three different aqueducts, there is a basic set of organizing principles which ties the distant parts together. There is a sense of the whole over their 300- to 500-mile lengths; the unique formal identity of each is retained. All respond to the intersection of a particular water system crossing a specific piece of terrain.

The third issue is the dialogue between technology and art in the landscape. The *engineering* structures of the aqueduct system provide an excellent design laboratory for studying the interrelationship of natural and man-made forms found in the western landscape. The juxtaposition of the earthen dams, the sinuous lines of the gravity-flow canals, and the



37 California Aqueduct, San Luis Reservoir, aqueduct water storage.





geometric forms of the lift stations create an incredible environmental sculpture from which to draw architectural inspiration.

The aqueduct system of Los Angeles, the principles of a western dialect, and the five ritual sections of the water celebration are design elements that provide inspiration for the future planning and shaping of the city and its architecture in the western oasis of Southern California. This exploration, which is not typically part of the architect's repertoire, redirects traditional elements of architecture into new relationships. The West is a gigantic unyielding landscape: it should be used as an architectural context from which to develop the future shape of the city.

Notes

1. Carey McWilliams, *Southern California: An Island on the Land* (New York, 1946), p. 192.

Figure Credits

2, 3, 14, 15, 16, 17, 18, 21, 37, 38 Courtesy the Municipal Water District.

1, 4, 5, 6, 7, 12, 13, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36 Courtesy of the author.

8, 9, 10, 11 Courtesy the Department of Water and Power.

“Water Facts”

“The Angels do everything with water, in fact, but drink it.”

—Carey McWilliams

73

1. The same quantity of water exists on the planet as there existed on the earth 5 billion years ago. (All water that we use is recycled.)

2. Annual rainfall in Los Angeles ranges from 11 inches to 25 inches, with an average of 15 inches.

3. It can easily “cost” between 500 and 2,000 gallons of water to produce a typical American meal. For example, it takes the use of 408 gallons to get a serving of chicken to the dinner table, 12 gallons for a baked potato, 18 for a serving of green beans and six for a salad (dressing is extra). A dinner roll takes 26 gallons of water, plus 100 gallons for the pat of butter on it.

That adds up to 570 gallons—a bargain when you consider that a steak, by itself, costs 2,607. On average, it takes about 1,630,000 gallons of water to feed one American for a year.

4. Water use in the home averages 150 gallons per day for each person in the United States.

5. California’s water use: 91% irrigation
5% domestic
3% manufacturing
1% other

6. Water use in the Los Angeles home is: 44% exterior use
23% toilet
18% bath
8% laundry
7% kitchen

7. Los Angeles, in addition to the small amount of well water, is served by three aqueducts, each run by separate agencies:

The Department of Water and Power, city of Los Angeles:
The Owens Valley Aqueduct

The Metropolitan Water District, composed of 27 different communities and groups including the city of Los Angeles:
The Colorado River Aqueduct

The State Water Project, Department of Water Resources, state of California:
The California Aqueduct

8. Owens Valley Aqueduct is 338 miles long. The system extends from Los Angeles to the Eastern Slopes of the Sierra Nevada. Completed in 1913, the aqueduct was the first to be built in Los Angeles. Water travels through 142 tunnels and across nine major canyons. It provides 80% of the water supply to the city of Los Angeles.

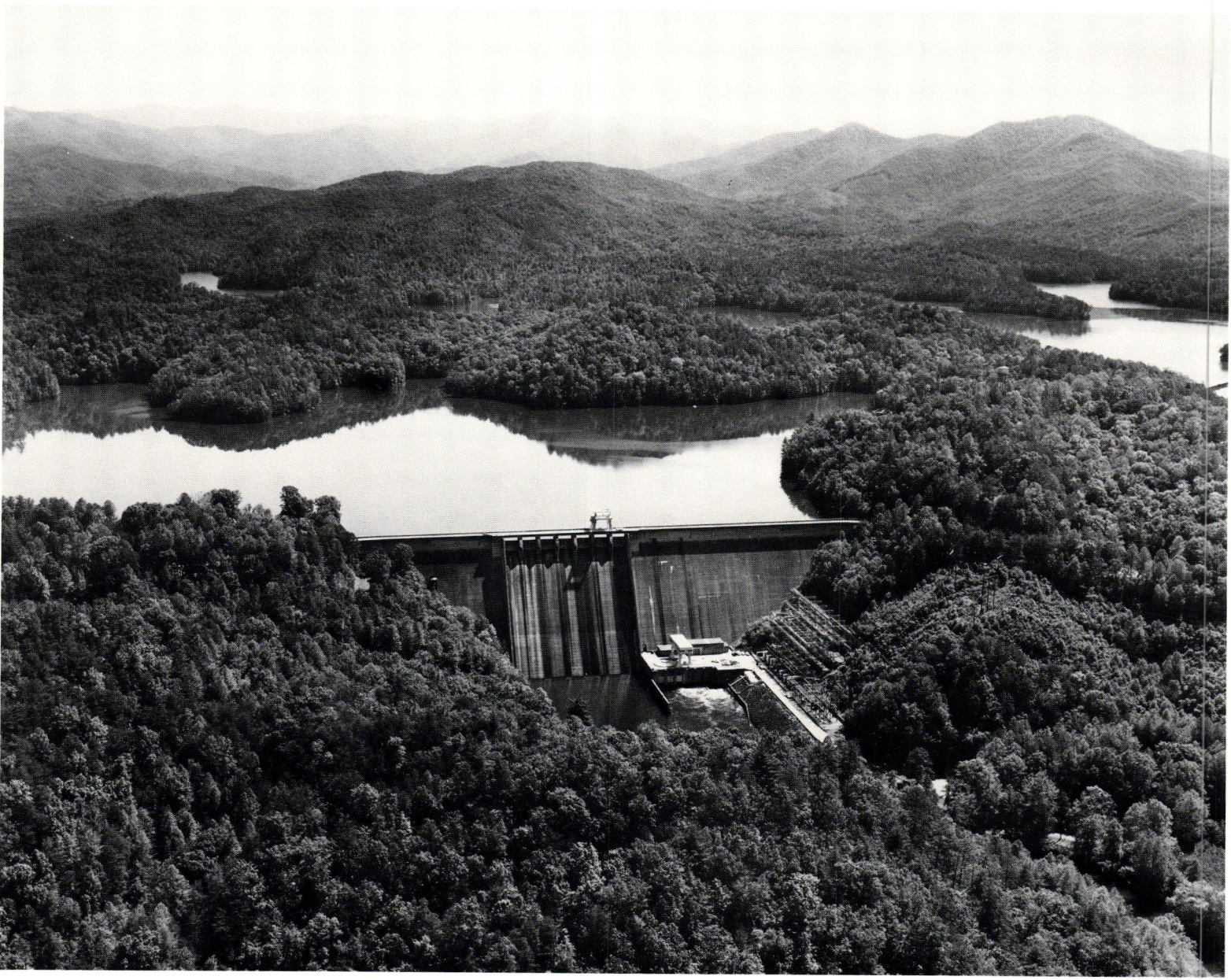
9. Completed in 1941, The Colorado River Aqueduct extends 242 miles from the intake plant on the Colorado River across varied desert terrain and over several mountain ranges. This is accomplished by means of five pumping stations which pump the water a total of 1,617 feet to convey it to the Metropolitan Water District. The water is pumped along:

92.1 miles of tunnels
62.8 miles of concrete lined canals
54.5 miles of concrete conduit
28.5 miles of inverted siphons
and two reservoirs

The aqueduct has an annual capacity of 1,212,000 acre feet, allowing the MWD to provide service to cities and water districts representing 11 million people over 5,105 square miles.

The Colorado River, from whence the water is pumped, is 1,400 miles long. Its basin drains an area of 242,000 square miles including parts of Wyoming, Utah, Colorado, Nevada, Arizona, and New Mexico, or about 1/12th the area of the contiguous United States as well as an additional 2,000 square miles in the Republic of Mexico. The “entitlement,” or agreed water allotment for the state of California, is equal to the combined area of the other six Colorado Basin states.

10. The California Aqueduct was completed in 1968, traveling 444 miles from the Delta of Northern California to Lake Castaic and Lake Perris in Southern California.



Noble Structures Set in Handsome Parks: Public Architecture of the TVA

Marian Moffett and Lawrence Wodehouse

Few agencies of Roosevelt's New Deal have had a longer life than the Tennessee Valley Authority, which in 1983 observed its 50th anniversary. In recent years the TVA has been in the news for controversies over the snail darter, an endangered species threatened by the closing of Tellico Dam, and the cutbacks of its extensive nuclear power program, once among the most ambitious in the nation. Environmentalists have been concerned about pollution contributed by TVA's enormous coal-fired steam plants, equipped with thousand-foot stacks that discharge sulfurous gases into the upper atmosphere. These headlines, while reflecting real and important concerns, bring attention to the power-generating responsibilities of the Authority and reinforce the widely held view that TVA is little more than the nation's largest public utility. TVA is far more than a source of electric power. It is the intent of this paper to focus on the design and construction programs that distinguish the TVA as a federal agency without parallel in the 20th century.

The act creating the Tennessee Valley Authority was signed into law on 18 May 1933, culminating nearly 50 years of debate about the potential of the Tennessee River, a 640-mile watercourse extending from Knoxville to Paducah, Kentucky, which drains portions of seven southern states (Virginia, North Carolina, Georgia, Mississippi, Alabama, Tennessee, and Kentucky) (fig. 1). Industrial developers had recognized the generating capacity of the river, while conservationists had argued for the coordinated management of an entire natural system. The interests of both groups were merged in the TVA Act, which charged the Authority with broad powers to plan for the industrial and agricultural development of the region, with particular attention given to the use of the Tennessee for flood control, navigation, and power generation. Government action on such a large scale was justified as the only means available to improve the land and living conditions of the people of the Valley, who even before the hardships of the Depression had ranked among the most deprived population groups in the United States. Poor farming practices had devastated

the soil and impoverished the farmers; inadequate roads and seasonal low water on the Tennessee River hindered contacts with the outside world; and floods threatened communities located on the river. Man and nature had combined to create a cycle of hardship that left most of the Tennessee Valley outside the progress experienced in other regions.

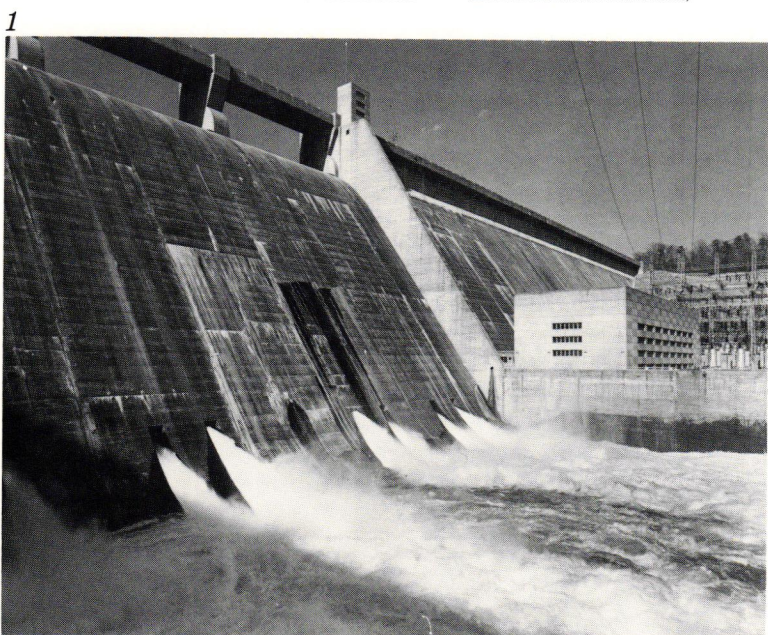
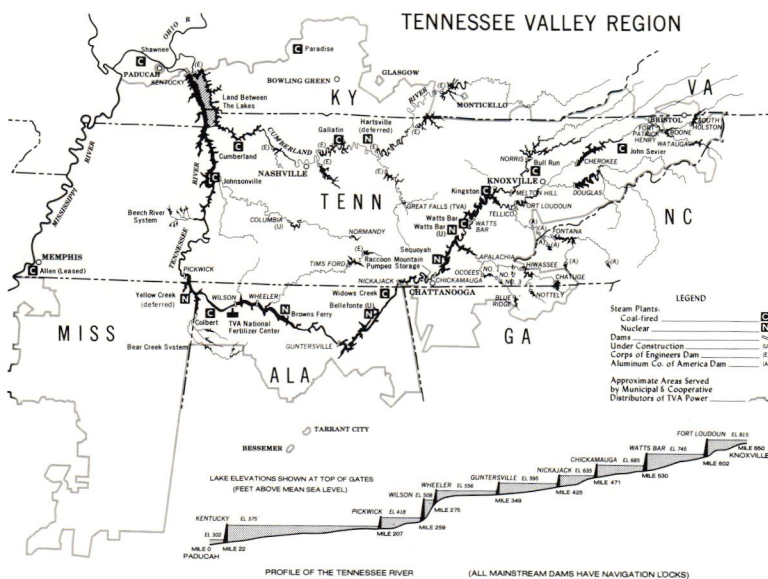
If the challenges were great, so too were the possibilities. Roosevelt selected for the first Board of Directors a chairman, Dr. Arthur E. Morgan—a civil engineer with considerable experience in large-scale reclamation projects, who was then president of Antioch College. He was joined by David Lilienthal, a lawyer with experience in public-service power, and Harcourt A. Morgan, an agriculturist then serving as president of The University of Tennessee. Morgan had primary responsibility for engineering works, and it was under his direction that the first TVA projects, Norris Dam on the Clinch River and Wheeler Dam on the Tennessee, established the tradition of integrating man-made structures with the natural environment so as to enhance the quality of both.

As preliminary studies and plans for Cove Creek Dam had already been made by the U.S. Corps of Engineers and the Bureau of Reclamation prior to 1933, actual construction on the dam began in October 1933. (The project name was changed from Cove Creek to Norris Dam in honor of the Nebraska senator who had worked tirelessly for a dozen years in support of legislation establishing public ownership of power-generating facilities in the Tennessee Valley.) The existing proposal was not built without modification, however, and the changes made by TVA account for the design significance of the completed project.

Norris Dam (and all subsequent TVA projects) was built by force account, with TVA hiring workmen and directing construction, rather than letting the job to general contractors. Based on the Bureau of Reclamation studies, this method of working permitted a rapid start, reduced

(frontispiece) Hiwassee Dam
 1 Tennessee Valley Region and profile
 of the Tennessee River.
 2 Norris Dam.

76



2

construction costs, and, more importantly, facilitated changes in the plans as work progressed. At Norris, alterations were made both for improved engineering performance and for aesthetic considerations (fig. 2). The cluttered appearance of the Bureau's design—detailed with pseudo-Classical pilasters applied across the face of the powerhouse and shallow arches along the upper edge of the dam to support the roadway—was simplified considerably into a design without overt historical allusions. The barge lift proposed in the Bureau's scheme was omitted, as economic analysis of commercial shipping could not produce justification for its cost, and the wide concrete spillway set to the east of the powerhouse was shifted to the center of the dam itself. In the dam built by TVA, the impressive slope of the spillway dominates the downstream elevation. The three-drum gates at its top are set between shaped concrete piers, which rise from the face of the spillway to become supports for the road bridge over the dam. An access tower, integrated with the spillway side wall, serves as a vertical element to balance the horizontal mass of the powerhouse below. In the powerhouse, proportions and details were carefully studied to harmonize with the great concrete structure of the dam. Window units are stacked in an orthogonal grid, four rows tall and eight windows wide, with the long dimension set horizontally. Exterior concrete retains the texture of its formwork, which was composed of a checkerboard pattern in panels of rough-sawn boards with the edges between panels emphasized by raked concrete joints. Interior concrete surfaces are smooth and unpainted. Subdued industrial colors were incorporated in both the visitor reception room and generator room: matte-gray paint for the exposed steel framework, terra-cotta quarry tile on the generator room floor, and brushed aluminum for the door, window frames and hardware, all illuminated by sunlight filtered through ribbed glass set in the downstream powerhouse window wall.

The transformation of the physical appearance at Norris was the work of Roland Wank, a Hungarian emigré with

architectural training and professional experience in Germany and the United States. Prior to joining TVA, he worked for seven years in the office of Fellheimer and Wagner, an architectural firm specializing in major industrial and commercial buildings. Wank was responsible for design work on their masterpiece, the Cincinnati Union Terminal, and his demonstrated capability with large and complex buildings recommended the young architect to Chairman Morgan. While Wank was at first given projects related to the construction camp established near the dam site, his design skills were soon reassigned to architectural treatment of the dam itself. His intervention in this, the first of TVA's eventual 42 dams, established the precedent for straightforward design in all TVA power projects. His intention was "to make the dams look as functional as the engineers have designed them." To achieve this goal, carefully rendered large-scale drawings were made as proportions were considered, altered, and compared. The uncomplicated lines of Norris give it a timeless quality associated with the best designs of any historical period. Its integration of practical engineering functions and sophisticated architectural massing comes as close as any major work to defining a particularly American architecture of the 20th century.

It has never been TVA's policy to single out the accomplishments of individuals for special recognition. Thousands of people contributed to the design and construction of the dams and steam plants, and no one person—architect, engineer, foreman, or board member—has ever been given credit for the work of so many. The plaque found in most public buildings, listing directors, legislators, and others instrumental in a building's commissioning or construction, is thus absent at TVA projects. Instead, the inscription, "Built for the People of the United States," is prominently displayed in the reception lobby or generator room to reflect the sincere commitment to regional pride and material progress inherent in even the earliest TVA projects.

As part of this social commitment, TVA has always welcomed visitors at its installations. (Recent exceptions are the nuclear-powered steam plants, where public access poses insurmountable security problems.) The dams have, in fact, become major attractions for visitors from all over the world; the design of the roads leading to them, together with dramatic overlooks, information panels, comfort stations, picnic areas, and reception facilities, has been carefully studied by TVA's architects and landscape architects. Dam construction involves substantial intervention in the natural environment, which has been used by site designers as an opportunity to create a naturalistic setting in the tradition of the 18th-century English romantic landscape (fig. 3). Access roads wind gently, following contours of the terrain, while roadside plantings control the view to permit a distant vista followed by a dramatic sighting as one arrives at the actual dam. So successful has the landscape treatment been that it is difficult to imagine most sites without the dam and powerhouse in place. English architect and city planner, Sir Raymond Unwin, remarked after visiting several projects that TVA had indeed been fortunate to be able to locate its major installations in such handsome parks, not realizing that there were neither parks nor lakes in this part of Tennessee before the coming of TVA.

Just as the Authority was a pioneer in watershed management and public power, it was also a leader in the creation of recreational areas in a region that had almost none at the time. In 1933 the state of Tennessee had just one state park, and even the U.S. National Park system was in its infancy, with only one park east of the Mississippi. During the 1920s, North Carolina and Tennessee began the process of land acquisition which led to the creation of the Great Smoky Mountains National Park in 1934. In the decades since, that park has become the most frequently visited in the national system, and it is one of the few recreational areas in the Tennessee Valley to which TVA did not contribute. Except for Reelfoot Lake in west Tennessee, the state had no natural lakes before TVA dams were built, and the

Authority's planners anticipated the recreational advantages that the chain of new lakes would provide. Land purchased for reservoir clearance included acreage in excess of that which would normally be underwater, so that TVA could determine development along the lake's perimeter. This margin was necessary to create a floodway zone and to insure water quality, but it also provided an easement that could be planned for water-related activities.

Given that the shoreline-miles of TVA's lakes exceed those of the Great Lakes in the north-central United States, TVA's land-acquisition policy provided an immense area to monitor. Relatively little of the lake frontage today is directly maintained by the Authority; most has been leased or sold to private individuals who must adhere to TVA development standards. TVA designed and built demonstration waterfront projects to indicate to local and state governments how recreational facilities for boating, fishing, swimming, camping, picnicking, hiking, and nature study could be incorporated into public parks. At Norris, these facilities were turned over to the state to become Norris Dam State Park, and it has since followed the lead established there by creating nearby Big Ridge State Park. In addition, a marina constructed in the former Norris Dam quarry (excavated for concrete aggregate) provides moorings and supplies, servicing a fleet of houseboats that are populated year-round; and TVA maintains a swimming beach, numerous boat-launching ramps, and some campsites adjacent to the lake. At Fontana Dam, the former construction camp has become a popular summer resort community with rental cabins and a lodge (fig. 4). More recently, a large peninsula between Kentucky Lake and Lake Barkley has been developed as Land Between the Lakes, an ambitious complex encompassing water-based recreation and natural history studies. TVA's farsighted policies have thus stimulated the emergence of both major parks and smaller reserves, enriching the lives of the Valley's residents and enhancing the region's tourism industry.

Together with the Authority's concern for integrating its constructions with the natural environment is a parallel concern for the quality of life experienced by people living in the Tennessee Valley. Particularly in the early years, when so many Valley residents came from marginal farms and poor communities, TVA represented a vision of hope for the future. The architects and planners in the Division of Land Planning and Housing were well aware of the symbolic importance of their designs. Wank felt that many visitors to Norris Dam would be experiencing for the first time the architecture of the future, buildings that were honest, efficient, and well-designed. Individual workmen who contributed to the construction effort could take justifiable pride in their achievement and, by extension, feel increased pride in this geographic region. In retrospect, this sentiment may appear excessively paternalistic, but the sincerity of TVA's desire to uplift one of the most depressed regions of the United States cannot be denied. Though the region's elected officials had been lukewarm to hostile when TVA was first proposed, most people in the Valley were delighted with the opportunities for employment and improved living conditions. Initial skepticism gave way to enthusiastic approval as electrically powered equipment replaced kerosene lamps, wood-burning stoves, iceboxes, hand-hauled water buckets, and washboards. In the isolated coves and farm communities, everyone wanted to drive the first tractor. The crews stringing electric lines were cheered.

Again, the case of Norris Dam provides the earliest demonstrations of humanistic policies in action. Chairman Morgan was determined that the dam's construction camp would not become the dreary, squalid scene so commonly associated with temporary living in makeshift quarters. He had seen many such camps in the reclamation work done in the West, and he wanted the first TVA project to reflect the dignity of the worker, not his degradation. Morgan envisioned a permanent settlement to house families of the construction workers, which would in time emerge as a self-sufficient agricultural and industrial community. Hilly

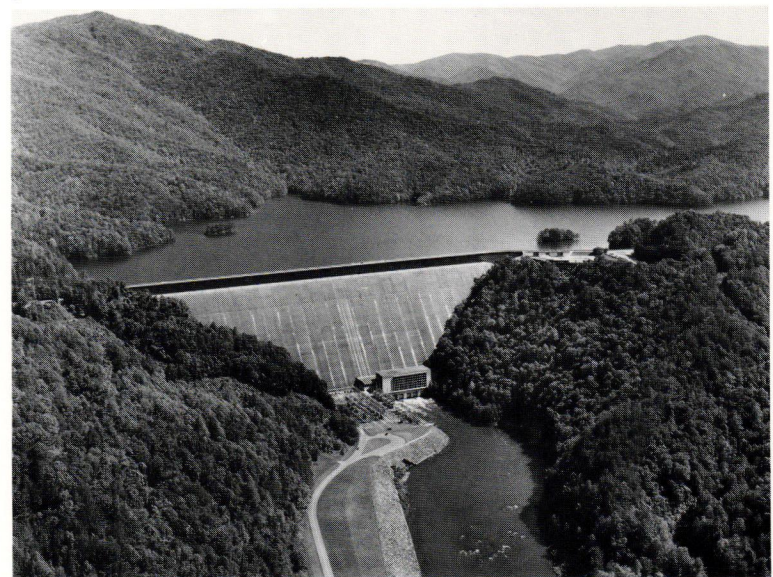
*3 Norris Dam.
4 Fontana Dam.*

woodland about three miles from the dam was selected as the most hospitable terrain for the town, named Norris, and the earliest architectural studies were done for residences in the new settlement, not for the dam itself (fig. 5). In order to ensure that ordinary people would feel at home, the house exteriors were consciously modeled on vernacular prototypes, using information gathered by TVA architects who traveled the Tennessee and North Carolina mountains to document existing dwellings. An informal, meandering town plan was designed to fit the landscape, with gentle curves and minimal disruption of existing vegetation. Houses were sited with concern for orientation and view rather than a uniform setback from the road (fig. 6). Residences had a traditional appearance, but interiors incorporated efficient planning arrangements, modern electrical appliances, and frequent use of both native and innovative building materials. All houses were small, but there was a considerable diversity of types.

The town of Norris provided a wide range of social and educational services for its inhabitants. Educational programs included a lending library, basic literacy classes, high school completion courses, and workshops in woodworking and other handicrafts. Local clay was used experimentally to evaluate its suitability for porcelain manufacture. Medical care was provided through mobile health vans and social interaction was promoted through recreational programs and clubs. By design, the town was not stratified according to income level; two of the three members of the original board of directors resided there, though their offices were in Knoxville, 25 miles away. While the town definitely provided a civilized environment for the construction workers, Morgan's ideal of a cooperative agrarian-industrial community never really materialized. Although many other small towns in the Valley have evolved economies based on both agriculture and manufacturing, Norris has become more of a bedroom community for nearby Knoxville and Oak Ridge, lacking substantial employment opportunities within its town limits. Its present-day population of about 1,200



3



4

5 Norris Freeway.

80



6 *Town of Norris: typical street.*
7 *Prefabricated housing: type E-2.*

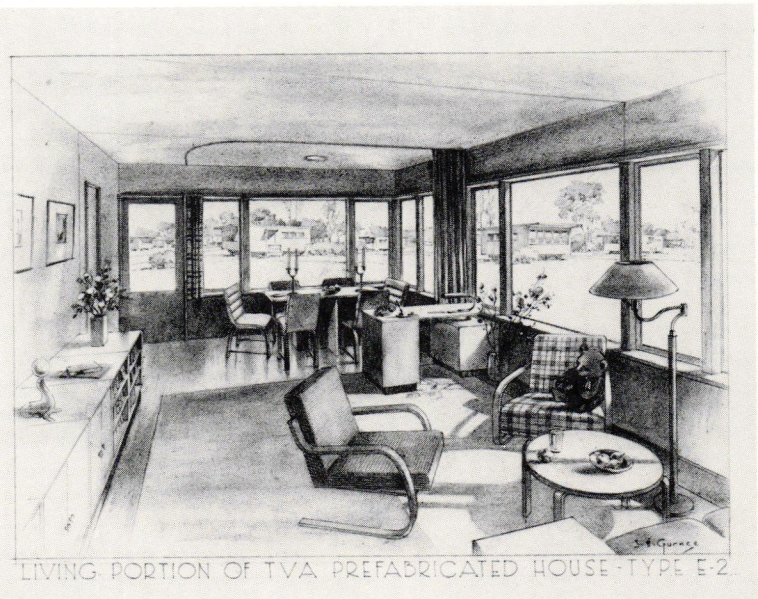
people includes many retired and current TVA personnel.

TVA never built another permanent town, in part because other construction sites were located in less remote areas and because later dams were built under far more urgent time schedules. To some degree, housing workers remained a problem at most subsequent projects, however, and TVA's designers explored a variety of reusable dwellings that could be moved from construction site to site, including trailer homes, demountable houses, prefabricated units, and panelized constructions. The Fontana project employed all these housing types in an effort to attract and retain scarce labor during World War II. The dam's generating capacity was needed for the aluminum plants at Alcoa and the unspecified "mystery" plants at the Clinton Engineer Works (the uranium enrichment facility at Oak Ridge), yet the dam's location in the North Carolina mountains was as isolated as any in the Valley. The rapidly built construction camp at Fontana had dormitories and community buildings of traditional stud-wall construction, set alongside strikingly modern family houses composed of two prefabricated units trucked in separately and then joined together on foundations prepared at the site. The houses were ready for occupancy with minimal on-site erection time. It was said that families frequently moved into the very unit they had followed up the winding access road to the dam site. TVA provided for recreational and cultural activities, including churches and schools, and supplied such amenities as flower seeds for the raw hillside lots. Portions of this construction camp remain today as a vacation resort.

The Authority's expertise in the design of manufactured housing contributed to other war-related projects, including some houses for Oak Ridge and units that were shipped to England to shelter families whose London homes had been bombed out. An elegant set of International-style modular prefabricated houses was designed for the Department of War; it included one-, two-, and three-bedroom units together with suggested neighborhood groupings, but there is no



6



7

It was as daring in its concept as the great dams at Norris, Fontana, and Hiwassee must have been to the mountain people and farmers of Southern Appalachia in earlier years. While some of its design details may not prove to be as enduring as earlier projects, it demonstrates that TVA's commitment to the artful integration of natural features and sophisticated engineering has survived.

It is ironic that the very works which made TVA the embodiment of conservationists' ideals in the 1930s have provoked the ire of environmentalists in the last 10 years. Whereas manipulation and replenishment of land and water resources for man's continuing benefit were the goals of conservation pioneers such as Gifford Pinchot, environmental groups of more recent times have championed non-interference in natural systems as the best way to maintain the world's ecosystem. Dam construction by its very nature involves large-scale intervention in the landscape, but to many, the social and environmental costs are greatly outweighed by the benefits of the completed project. Recent court cases filed on behalf of endangered aquatic species—the snail darter and the pearly-faced mussel—have challenged this belief, forcing public consideration of the relative value of a small fish against flood control for Chattanooga or drinking water for several middle-Tennessee towns. Two decades ago, stacks at one of the largest coal-fired steam plants were raised to 1,000 feet to reduce sulfurous emissions; it now appears that pollutants discharged into the upper atmosphere may be contributing to acid rain in New England and eastern Canada. (All TVA coal-fired steam plants are now in full compliance with the Environmental Protection Agency's clean-air regulations. TVA's nuclear program, once among the most extensive in the country, has been scaled back dramatically, in part because of widespread uncertainty about the safe disposal of nuclear waste.)

Thus, a federal agency, inspired by the altruistic ideals of Norris and Roosevelt and implemented by able directors and outstanding designers, has in latter days lost some of its

sensitivity to changing social concerns. By entering adversarial proceedings with environmentalists, TVA has been fighting groups it formerly would have had as allies. The Authority's claim that as a federal agency it was exempt from the endangered-species law was denied in the courts, the first major legal ruling against the Authority. Recent directors have stressed the need to cut costs and hold down electric rates, statements more appropriate to politicians than to people whose job it is to provide leadership for the nation's only regional development agency. The architectural design staff, bigger now than it was in the days of large-scale projects, is buried near the bottom of the bureaucracy, and its opportunities to communicate with top management are equally remote. Given perspicacious leadership and imaginative design talent, however, the opportunity exists to demonstrate once again that governmental architecture does not have to be mediocre, that major projects can be built in an environmentally responsible way.

Figure Credits

All photographs Tennessee Valley Authority.
6 drawn by Seth Harrison Gurnee.



Placing the Dead: Burial Sites in Early Boston, and Beyond

Richard Becherer

During the past twenty years, American studies have witnessed a growing appreciation of the Puritan gravestone as a significant index of colonial culture.¹ The gravestone is seen to be a meaningful expression of fundamental attitudes toward family and civic life. At the same time, current scholarship regards this visual means of expression as paradoxical, given the well-known climate of Puritan iconophobia.

It is curious that while the Puritan gravestone is laboriously examined, its site—i.e., the burial ground—is ignored. No one has yet suggested that the graveyard itself might elaborate upon those expressions proffered by the images and words inscribed upon the vertical slate. Oversight is perhaps responsible for this gap in contemporary scholarship; however, it is more likely that scholars still suffer from the century-old belief that Puritan burial grounds are unworthy of concentrated attention. In contrast, I believe that the graveyard, as well as the gravestone, merits conscious, formalistic evaluation.

Prejudices against Puritan graveyards can be traced back to 19th-century writings on cemetery reform. One example of such prejudice is provided by Boston's 1823 Graveyard Controversy. A leading figure in this controversy was Jacob Bigelow, physician and distinguished professor of natural history at Harvard University. Bigelow was one of a group of reformers newly interested in matters of urban hygiene. His writings from this period exemplify the attempt made by Boston's intellectual and political elite to censure the colonial burial ground on the basis of its disease-causing properties.

Bigelow elaborated scientific arguments concerning the insalubrity of the burial ground, proposing that the *miasmata* and *effluvia* frequently emanating from graveyards were potential causes of disease. This contention was contradicted, however, by other scientists who found that Boston's epidemics were transmitted by contagion. Burial

grounds, though disagreeable in appearance, had little to do with the spread of urban disease.² 85

Undaunted, Bigelow took a new tack, advocating cemetery reform on the basis of aesthetic rather than scientific considerations. In 1823, he wrote:

"Our burial places are, in the cities, crowded till they are full, confining the remains of the departed to the smallest portion of earth that will hide them. Trees, whose inexpressible beauty has been provided by the hand of the Creator as the great ornament of the earth, have rarely been planted about our graveyards, the enclosures are generally inadequate and neglected, the graves indecently crowded together and the whole appearance as little calculated as possible to invite the visits of the seriously disposed, to tranquillize the feelings of surviving friends, and to gratify the disposition that would lead us to pay respect to their ashes."³

Bigelow thus denounced the old burial grounds as unseemly abodes for the dead, criticizing the carelessness with which Bostonians had memorialized their forebears. It would appear that Bigelow concurred with the prevailing belief that Protestant forefathers, particularly the Puritans, were iconophobic, regarding any sort of gravestone memorial (and by extension, graveyard) in merely practical terms. It was Bigelow's claim that modern man, in contrast to his Puritan forebears, possessed both a sense of duty toward and a reverence for his ancestors and, hence, had a deep aesthetic imperative to memorialize his past. This drive, according to Bigelow, called for burial places which differed formally from traditional graveyards. To satisfy this modern aesthetic drive, Bigelow designed a new type of burial place, which he dignified with the neoclassical term *cemetery*, signifying *place of repose*. We now know Bigelow's Mount Auburn Cemetery to be the first comprehensively planned "rural" cemetery.

Bigelow and his circle labored under traditional understandings of Puritan aesthetics. Accepting the idea that Puritan culture barred representational art from the religious

(frontispiece) *The Granary Burial Ground. Photograph by Michael Cornish.*

1 *View of Marblehead Burial Ground belvedere.*

2 *View looking out from Marblehead Burial Ground belvedere toward the harbor.*



1



2

practice of burial, the reformers exploited the notion of iconophobia to buttress their arguments, calling for a new, artistically conceived rural cemetery suitable to modern tastes. Bigelow demonstrated his disdain for Puritan art by excluding from Mount Auburn Cemetery the inartistic slate gravestones characteristic of colonial burial grounds.

Unlike Bigelow, scholars today recognize in the Puritan gravestones, aesthetic and edifying properties which surpass mere utilitarianism. Against this background, a question arises: Did the impulses leading to the creation of these artifacts also assist the colonials in determining the form of their setting—the graveyard? In order to respond adequately to this question, we must review some of the basic arguments by which recent scholars have attempted to explain the paradoxical appearance of the gravestone within the supposedly iconophobic puritan culture.

In *Graven Images*, Allan Ludwig discerns in Puritan culture a yearning to visualize a belief system in sensate ways. Ludwig sees this yearning as generating a psychological tension resolved only by the creation of a work of art, particularly, the gravestone.⁴ This “pressure theory” of Puritan art constitutes, it seems to me, a kind of Protestant Freudianism in which the gravestone is usefully interpreted as the sublimation of fundamental spiritual appetites.

A very different sociological approach to the paradoxical status of the Puritan gravestone is taken by Dickran and Ann Tashjian. In *Memorials for Children of Change* (1974), they argue that gravestones were not religious in function at all, but rather were civic artifacts of a didactic nature. According to the Tashjians, gravestone art was religiously conditioned, but was not bound by the dictates of religion *per se*; hence, it existed outside those restrictions which proscribed representational art in religious practice.⁵

These two arguments—one which rationalizes Puritan art in terms of ‘sublimation’, and the other which sees it as a

species of civil institution—might help to illuminate not only the gravestone but also its setting. A considerable quantity of documentation exists to support Ludwig's contention that Puritans found spiritual value and meaning in the gravesite. For instance, in 1696 Samuel Sewall described a telling mixture of emotions aroused by a visit to the family tomb on Christmas Day:

"'Twas wholly dry and I went at noon to see what order of things were set; and there I was entertained with a view of, and converse with, the Coffins of my dear Father Hull, Mother Hull, Cousin Quinsey, and my Six Children . . . 'Twas an awful yet pleasing Treat."⁶

One hundred years later, Lucius Sargent had similar feelings while witnessing a crypt burial:

"The body was carried into a dimly-lighted vault. I was so small and short, that I could see scarcely anything. But the deep sepulchral voice of Mr. Parker . . . filled me with the most delightful horror. I listened and shivered . . ."⁷

The emotions experienced by these early spectators upon viewing the tomb—awe, horror, delight—appear to have little to do with the melancholic appreciation which, according to men like Bigelow, should accompany a visit to the gravesite. The feelings expressed here most likely derive from a source other than the picturesque aesthetic which shaped so many of Bigelow's attitudes. Instead, these sensations more closely resemble a strain of romanticism qualitatively different from the picturesque, i.e., the sublime.

We owe our understanding of the sublime and its visual depictions to Edward Burke. For Burke, sublimity provided the ultimate transcendental experience, whereby man could contact the ideal nature of things.⁸ As suggested by the reminiscences of Sewall and Sargent, Burkean notions of sublimity can be attached to Ludwig's idea that Puritan artworks are the result of a psychological tension and the consequent sublimation of spiritual feelings. A Burkean understanding of the sublime supports Ludwig's idea by suggesting that the artwork can provide a spiritual release

for the observer—as it does, in Ludwig's view, for the creator—by allowing an elevation of perception thereby drawing the viewer close to the godly.

Burke's ideas might similarly illuminate our present-day experience of graveyard sites. For example, the eminences upon which are located the graveyards of Plymouth, Ipswich, Newburyport, and Marblehead, Massachusetts, provide dramatic, far-ranging vistas into surrounding landscapes (figs. 1, 2). These views are today somewhat confined by modern habitation; in the colonial period, however, they must have been extensively panoramic, and free of human intervention. To the Puritan eye the vistas must have evoked infinite solitude, a quality which would be attached by Burke to the perception of a sublime landscape.

In Burke's terms, sublime settings are implicitly theophanic: they are locations where the mundane and the divine meet. Theophanic qualities are also ascribed to the rural cemetery by commentators like Blanche Linden, who claims that traditionally, God and man meet in the cemetery.⁹ Historically speaking, this quality has its roots in the earlier burial site, as is evidenced in the testimony of Nathaniel Morton, who, in his *New England Memoriall* (1669), writes of the graveyard:

"He hath guided his people by his strength to his Holy Habitation, and *planted them in the Mountain* of his Inheritance..."¹⁰

The *Mountain* is essential here, for it both suggests the location of the graveyards and calls to mind the *cosmic mountain*—a site whose elevation enables man to overcome the earthly and discover the godly.¹¹ Thus it appears that there is a natural congruence between the theophanic site and the spiritual intention of the Puritan gravestone. The burial ground is an appropriate setting for the transcendental experience which these Puritan artworks could evoke.

Up to this point I have interpreted the graveyard in light of Ludwig's notion of sublimation and Burke's understanding

88 of the sublime. Now, taking the route selected by the Tashjians, I wish to discuss the Puritan graveyard as a civic institution. In this regard, the question arises as to the forms by which the institution is recognized. In "The Cemetery as Cultural Institution," Stanley French argues that the American burial place is institutionalized only with the advent of the 19th-century rural cemetery. French's argument is propelled along esthetic lines; he believes that the cemetery must have a distinctive, "artistic" physical form in order to be a legitimate institution.¹² Other commentators note, however, that certain very important Puritan institutions were not particularly noteworthy for the artistry of their forms. For example, Abbot L. Cummings indicates that in its style, the Meeting House—the most fundamental institutional structure—lagged far behind contemporary domestic architecture, at least in Boston.¹³ It would appear then, that early 18th-century Boston felt no need to clothe institutional ideology in uplifting form.

Let us assume that the colonial world assessed the importance of an institution less in terms of its distinctive form than in terms of its impact upon society at large. Then the architectural effect of the institution should be even less apparent than the subtle web of connections which the institution establishes with its surrounding community. This consideration would speak to a scale of interest at once larger and more abstract than the architectural. Colonial institutions' ideological effects would be manifested in the formal relationships existing between the institutions and their urban environs.

On the basis of these assumptions, I look to the relationship between the burial ground and colonial Boston for evidence of the burial ground's institutional nature in the city. The colonial burial ground, like the meeting house, served as a unifier of social and urban form. The process of unification continued during the 18th century, to the degree that a campaign of urban regularization was initiated. As we shall see, the campaign soon turned back upon its sponsor: the

culture newly shaped by the graveyard in turn applied its values to the graveyard. By the late 18th and early 19th centuries, the process of formalization engendered by the city's key institutions came to shape those institutions themselves. Aged structures were clothed in forms befitting their cultural significance. For example, at the very moment when Boston's first "stylish" Meeting House was erected (Stone Chapel as designed by Peter Harrison), Common and Granary burial grounds were given their first set of public embellishments.

In Boston, public interest in the graveyards increased as the century progressed. Formal and hygienic measures were introduced to improve the physical aspects of the burial ground. The graveyard, no longer viewed as an institution whose existence was established externally—i.e., by the network of relationships it established with Puritan urban culture—came to be regarded as a thing in itself, and thus underwent a number of new formal investigations. This is evidenced by the improvements made in Boston burial grounds in the first three decades of the 19th century, and, more importantly, by the formal innovations made at Mount Auburn Cemetery. As I will demonstrate later, Mount Auburn Cemetery legitimized its own cultural importance not so much by criticizing colonial burial practices as by observing certain key intellectual themes implicit in the form of the earlier burial grounds. By repeating these themes, Mount Auburn established its cultural relevance in the minds of the public, thereby successfully laying claim to the designation of *institution*.

I turn now to specific case studies. As I have already stated, the colonial graveyard is recognized less for the beauty of its external forms than for its location and its didactic civic function. Graveyards in the New England city fall into two classes: those that serve as public forum, and those that provide urban entry. John Reys argues that the fundamental institutionality of the New England burial place was derived from its physical and symbolic association with the Meeting

4 Map of Boston indicating locations of major burial grounds. Key: A-Copp's Hill, B-King's Chapel, C-Granary, D-the Common.



5 Interior burial ground King's Chapel basement.

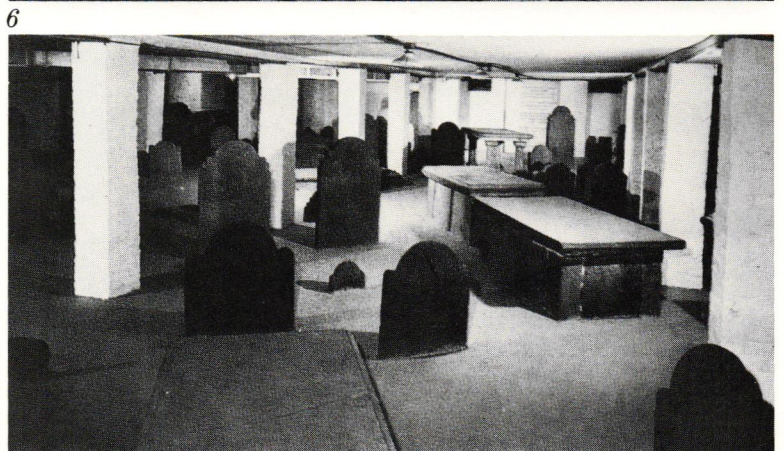
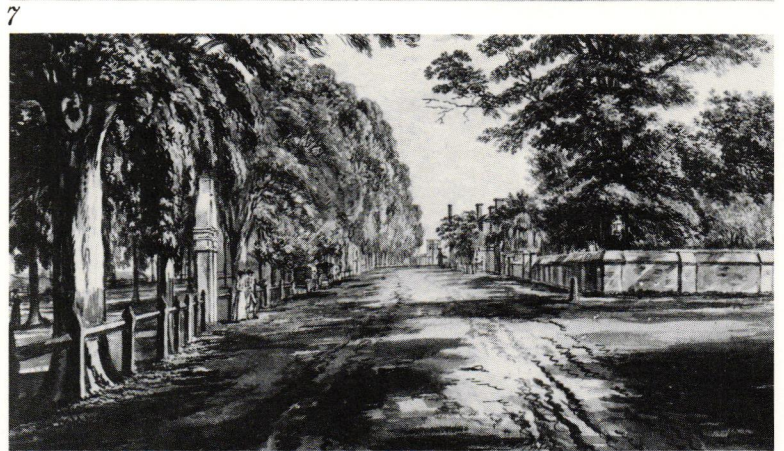
6 View up Tremont Street toward King's Chapel, ca. 1800.

7 View up Park Street toward the State House.

Formalistic considerations support my contention that during the colonial period, graveyards were valued as edifying institutions. The fact that they were valued as such was eclipsed during the 19th century by controversies surrounding the "rural" cemetery. Those who favored the modern rural cemetery naturally expressed great disfavor of the colonial graveyard, and sadly, this prejudice survives. Current scholarship might therefore aim at a more informed reconstruction of the rural cemetery's beginning in the graveyard by studying the objective properties of the graveyards as they exist today, and by reevaluating monumental 19th-century urban histories like Nathaniel Shurtleff's *Topographical and Historical Description of Boston* (1871), works which continue to affect our appreciation of the graveyard.¹⁵

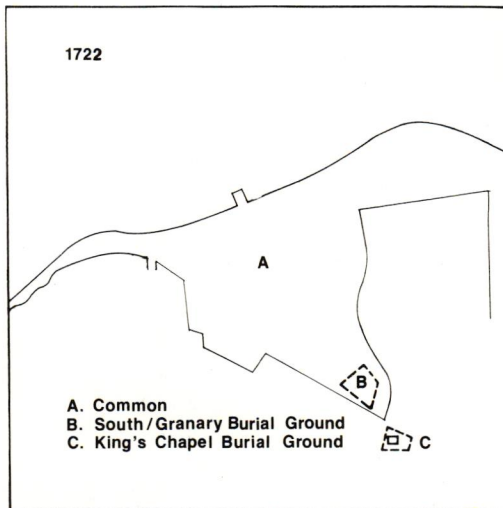
Valuable though Shurtleff's work is in studying the history of Boston's civic institutions, it bespeaks a general misunderstanding of the institution of the graveyard. A telling example is provided by his discussion of King's Chapel and Central burial ground. The burial ground was originally positioned at the intersection of Tremont and School Streets. Governor Andros, in order to exert the influence of the Church of England over local Puritanism, decided to use a portion of this burial ground for a new Anglican church. Shurtleff faults this decision, failing to notice the graveyard's rise in status that this new construction accomplished.¹⁶

This elevation is accomplished in two ways. First, by absorbing part of the burial ground into its form, the church attached itself to the graveyard. In fact, its basement became a crypt holding the remains of not only those disinterred by the new construction, but also of church worthies through the years (fig. 5). Hence, King's Chapel served early Boston as a kind of Puritan Pantheon. Second, the church's two orientations, one on School and one on Tremont Street, have both served to embellish the shape of the graveyard. The original School Street position centered Andros's chapel on the graveyard; the new location of Tremont Street, where

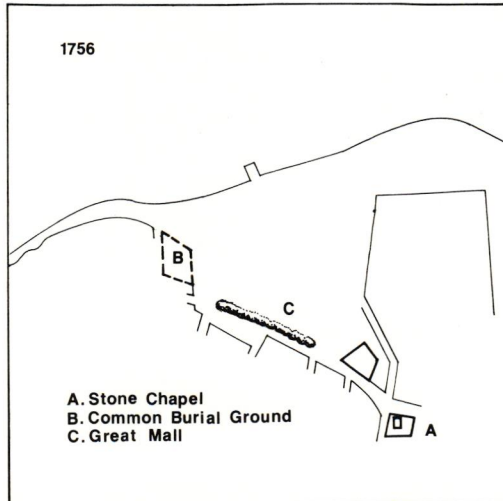


*10 View of Granary Burial Ground.
Baldwin Coolidge photo, 1918. Note:
Table tombs assembled to the left are
against side wall of present-day Park
Street Church.*

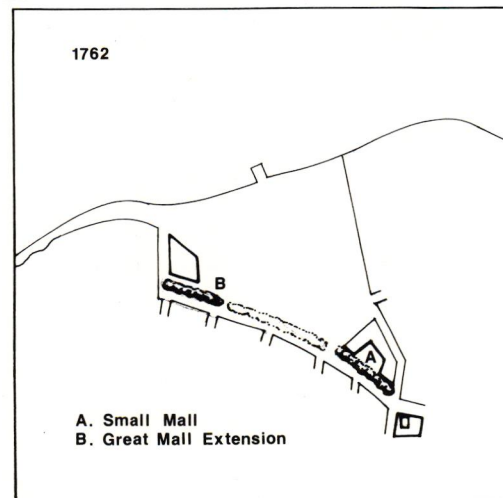




11



12



13

11 Diagram indicating positions of burial grounds around Common, ca. 1722.

12 Diagram indicating positions of burial grounds, ca. 1756.

13 Diagram indicating positions of burial grounds, ca. 1762.

which would surely assist in establishing a visual harmony appropriate to the place's civic importance.

The institutional quality of the early burial grounds was further strengthened by its association with Boston's primary public realm. King's Chapel, Granary, and later Common burial places are proximate to the Common (fig. 11). By extension, they are associated with the space's public services: the armory, the powder house, the stocks, the almshouse, the bridewell, the granary, the ropewalks, the parade ground, the malls, and later, the State House. Burial grounds are essential features of the general urban landscape, and, like their neighboring institutions, they serve the public well-being.

The Common also assists in establishing the symbolism of the graveyard as well as its meaning within the life of the city. M.A. De Wolfe Howe, in his *Boston Common*, describes the space in dramatic terms, likening it to an outdoor stage.¹⁸ R.L. Midgely's *Sights in Boston and Suburbs* (1857) further describes the drama contained within this setting:

"The Common stretching in front of the capitol, with its numerous walks and flourishing trees, 'where the rich and the poor meet together,' and the humblest have the proud consciousness that they are free, and in some respects, (if virtuous), on a level with the learned and the opulent, adds greatly to the whole scene."¹⁹

Midgely ascribes to the Common a didactic function, that of elevating the mind to Virtue. The panorama of life here is diverse; there is something for every age. Children play, lovers dally, soldiers march, and the old, of course, die. The graveyard is an essential part of the tableau, perhaps even *the* essential part of the tableau, for it supplies the Common with the moment when the public realm assumes an instructional role. As active participant in the scenario of life, the graveyard transforms the Common from comic tableau or genre scene into a complex, large-scale depiction of *vanitas*, a manifestation of life in its many activities, its transience, and its end (fig. 17).²⁰

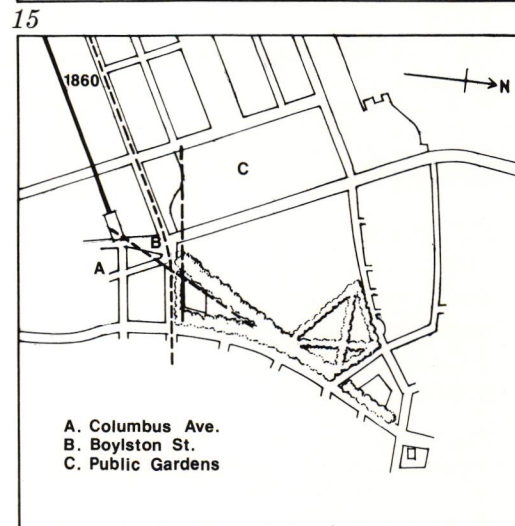
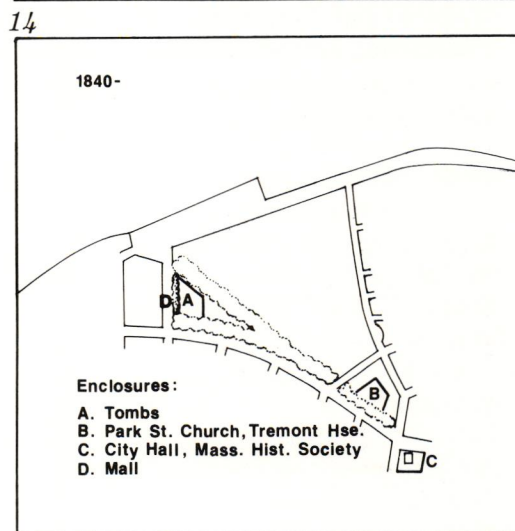
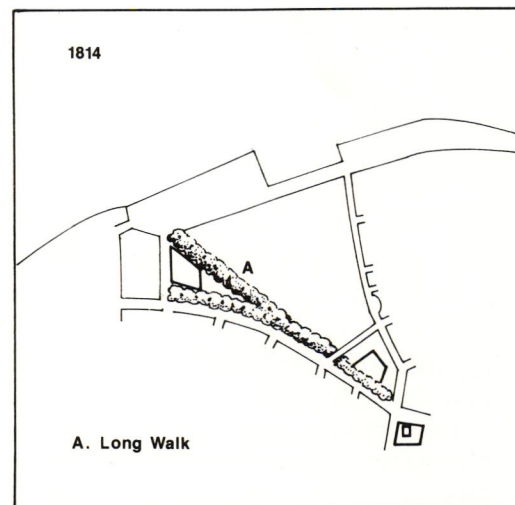
14 Diagram indicating positions of burial grounds and improvements around Common, ca. 1814.

15 Diagram indicating positions of burial grounds and improvements around Common, ca. 1840.

16 Diagram indicating positions of burial grounds and improvements around Common, ca. 1860.

In addition to playing formal and didactic roles within the context of the city, the graveyard as an institution has participated in schemes of urban regularization, implicitly affecting patterns of life in the city of Boston. This coordination began in 1728 around the Boston Common by means of the tree-lined promenade or mall on the Tremont Street side of the Common (fig. 12). Soon after the establishment of Common burial ground in 1756, the Long Mall was extended to the southwest. In 1762 this Great Mall, as it was called, was further lengthened by the Paddock Elms, or Small Mall. Together the Long and Small Malls comprised a reach of trees connecting burial grounds at either end of the Common. They likewise assisted in regularizing the eastern edge of the Common as well as the west side of Tremont Street (fig. 13). Malls and burial grounds inflected the streetscape by a conscious modulation of spaces and enclosure elements, embellishing Tremont with a sequence of artistic urban moves consonant with the street's increasing importance as the city's primary east/west artery.

As the Common became regularized by its malls, so too were the graveyards coordinated. This was accomplished by both landscape and architectural devices. With the establishment of the Boylston Street Mall (1836), Common burial ground was diminished in size and altered in shape (fig. 14). Its southern edge was defined by the Boylston Mall itself. The western side was strengthened by a new linear crypt designed to received the 200 bodies disinterred by urban improvement (fig. 15). Once established, this edge connected Common burial ground with the Common's Park Street entrance, and by extension, with the Paddock Elms. The Common burial ground was thus cradled within a setting of public amenity. Granary burial ground served as a destination across the Common, axially focusing the movement of people in and around the great public space. In the 1830s and 40s, all burial places were landscaped in the picturesque manner of Mount Auburn Cemetery, and were further regularized by granite, and eventually cast-iron fences.



The influence of the Granary and Common burial grounds extended beyond the immediate vicinity of the Common. Not only did the westernmost edge of Granary account for the orientation of Park Street, but the Common's south and west boundaries also assisted in determining the position of Boylston and Columbus Avenues, a pair of streets whose orientations proved essential to the final layout of Back Bay and certain landscape features within Boston's Public Gardens (fig. 16).

As the 1823 Graveyard Controversy illustrated, early 19th-century urban critics often denounced Boston's graveyards. In 1830, Supreme Court Justice Story, for example, accused the old burial places of "wounding the sensibilities of the living." If the living were wounded, the blow was hardly fatal. Sensibilities recovered enough over the next 30 years to be able to appreciate the noble simplicity of the graveyards, an estimation not unknown in the 17th and 18th centuries. Typical of a rekindled interest in the graveyards was Wilson Flagg's essay, "Old Grave Yards," included in his *Mount Auburn: Its Scenes, Its Beauties, and Its Lessons* (1861):

"There are few places which we visit with more interest than old burial grounds, so frequent in our early settlements, and in which the dust of our ancestors is laid. We observe in their appearance a charming simplicity, that attracts the attention of all visitors, enlists their sympathies with the dead, and excites a tender veneration for their memory."²¹

The attitude expressed by Flagg reveals that the 19th century appreciated the burial grounds as institutions embodying its ancestry and civic history. Contemporaries of Flagg, like Thomas Bridgman, suggest that the graveyard's monumentality was enhanced by the silence and stability it seems to enclose and protect from the agitation of the city:

"Within a recent period, a feeling and no doubt a well-founded one, of opposition to intramural burials has been gaining strength. But there are few persons who would be willing to see this ground, where are the sepulchres of our fathers, disturbed. It is almost the sole memorial which remains of them. . . . Nothing remains the

same, but the places of the dead . . . The graveyard remains unchanged in the center of this Maelstrom of busy and fevered life which whirls around it."²²

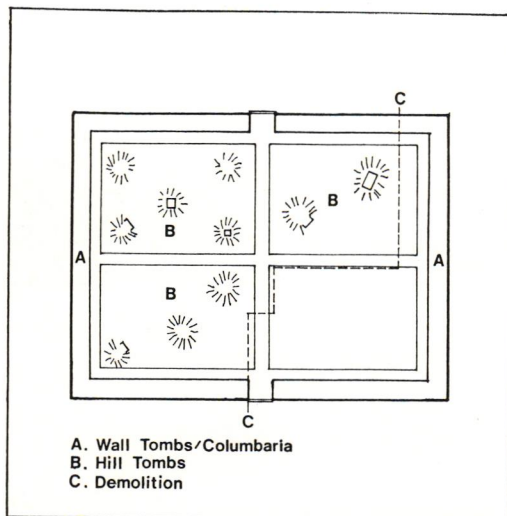
The 19th century thus rediscovered the spirituality from which emerged the forms of the colonial graveyard. Like Nathaniel Morton, these later commentators regarded the graveyard as a cosmic location connecting the present with the past. As summarized by Bridgman, the graveyard is "like a narrow peninsula; it connects the world that is new with the world that was."²³ The attention paid by the 19th century to the spirit of the graveyard thus implies an awareness of life's transiency, and further, suggests that the graveyard serves the 19th century as an emblem of *vanitas*. In its ability to transcend the momentary, the graveyard is perceived as a microcosm of time itself.

The comments of Flagg and Bridgman thus indicate that by the mid-19th century, certain key philosophical and spatial preoccupations descending from the 17th century are at last formally addressed. The institutional nature of the burial ground is no longer solely a matter of its attachment to other recognized institutions such as the church. Now known as *cemetery*, the burial place came to be a distinct entity. By its independence the cemetery posed significant design problems that called forth new solutions.

The most noteworthy of these solutions was Mount Auburn; an early experiment in establishing appropriate imagery for the cemetery. Among its precedents was James Hillhouse's Grove Street Cemetery in New Haven. Designed in 1798, this was the nation's first planned cemetery. Boston quickly followed with the Washington Street (Old South) burial ground. Dating from 1810, this little-used graveyard was completely redesigned in 1818 by Boston's Superintendent of Burial, Samuel Hewes. Shurtleff, in his *History*, describes the Superintendent as a man fascinated with symmetry and regularity.²⁴ Hewes began by crisscrossing the site with a pair of paths, establishing four rectangular sections for burial. In 1827 he surrounded the perimeter with ranks of

17 *Joseph Tapping Slate, 1678. King's Chapel Burial Ground. Important to the stones' meaning are Fugit Hora and Memento Mori, motto's addressing death and the passage of time accompanying vanitas imagery—winged death's head, scythe and hourglass. Slate carvings probable work of the "Boston Stonecutter." Photograph by Daniel Farber.*





18 Samuel Hewes, plan of the redesigned Washington Street burial ground.

19 Samuel Hewes's diagrammatic plan of improved Copp's Hill Burial Ground, ca. 1840, including the later river terrace by F. L. Olmsted, ca. 1900.

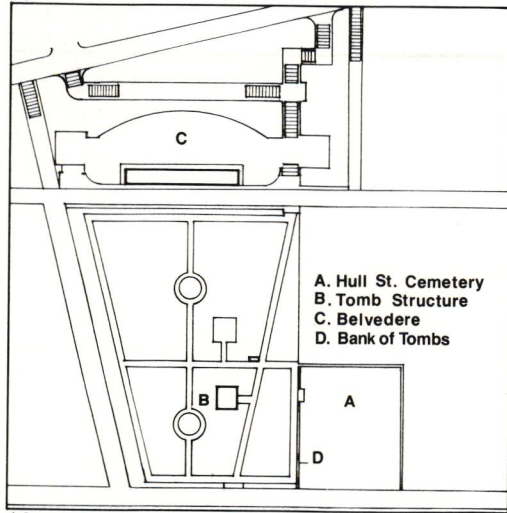
20 Postcard view of Copp's Hill burial ground, ca. 1900.

tombs modeled on the Roman *columbaria* and ornamented the internal quadrants with picturesque hill tombs and trees (fig. 18). Clearly, Washington Street burial ground was comprehensively planned and consciously composed, and thus can be said to have bridged the gap between all Boston's colonial graveyards and the modern rural cemetery.

To Hewes we owe not only the design of the Washington Street burial ground, but also the rearrangement of gravestones in King's Chapel, Copp's Hill, and Granary burial grounds—rearrangements which were criticized by Shurtleff and Bridgman. It seems that Superintendent Hewes would have liked nothing so much as to overlay his paradigm of a rational cemetery onto Boston's historic, but disorderly, burial sites. Although his efforts were least successful in their application to Granary and King's Chapel—where Hewes's new walkway planning, even after subsequent rearrangement of headstones, still seems chaotic—they bespeak Hewes's will to order (fig. 20). Copp's Hill, from a purely formalistic point of view, is somewhat more successful. Here Hewes controls the irregular shape of the site by separating the lower Hull Street burial ground from the upper, using a bank of tombs to mediate the height differential. This boundary turns the graveyard's main section into a trapezoidal space with walks surmounting tombs along the figure's splayed ends (fig. 19).

The scenic aspect of this view should not be overlooked in Hewes's appreciation of Copp's Hill. Although I have described the shape of the redesigned graveyard's space as trapezoidal, it might be more accurately termed a kind of false perspective, with twin vistas directed outward along the two major walkways. The state of the burial ground after the completion of Hewes's major architectural improvements of the 1830s is depicted in an 1851 plate from Thomas Bridgman's *Epitaphs from Copp's Hill* (fig. 21). The aerial portrayal describes the burial ground's major architectural features: crypts, tomb structure, *parterres*. It also portrays the result of Hewes's new scenographic interests, evidenced

18



19



20

21 *View of Copp's Hill, Boston, looking toward Charlestown, including the dark columbarium tomb structure in the center and bank of crypt-like tombs in the foreground.*

22 *Rendering of Copp's Hill belvedere and river terrace by Jules Guérin.*

23 *Plan of Mount Auburn Cemetery.*

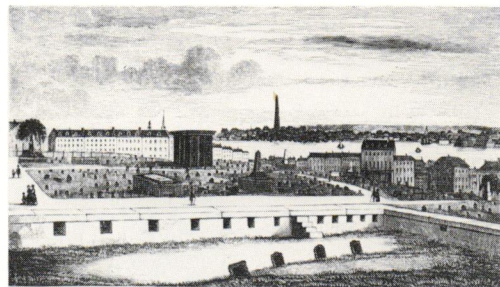
by the numerous strollers populating the print's foreground, interested not so much in contemplating gravestones as they are in walking. The promenaders enjoy the view.

Hewes's improvements to Copp's Hill direct vision across the Charles River toward Charlestown. Many urban features are discernible—houses, wharves, churches, and the Bunker Hill Monument. The panorama that Copp's Hill provides is moving, and even sublime in a domesticated way. It is significant to note that Hewes's reorganization of Copp's Hill emphasizes Boston's near and distant urban topography, fostering a long-lived appreciation of this panorama in Boston. Some sixty years later the office of Frederick Law Olmsted attached a terraced promenade, complete with a belvedere, to Copp's Hill Burial Ground, from which one could obtain an unobstructed view of the Charlestown skyline (fig. 22).²⁵

Mount Auburn Cemetery shares in the institutional attributes of these earlier burial grounds. It is an elevated burial place, and as such, it draws upon the mystical symbolism of the cosmic mountain in order to communicate its spiritual function. It also displays those institutional characteristics which graveyards derive from their interactions with the city.

At first glance it might be said that the plan of Mount Auburn is a uniform, non-hierarchical aggregation of wandering paths and roadways whose order derives from hidden topographical features (fig. 23). This observation is true only to a degree. Certainly the plan, as designers Jacob Bigelow and Gen. Henry Dearborn asserted, exploited the location's natural features and contours. Yet other compositional factors, less concerned with site contingencies, also shaped the cemetery's form.

Upon examining the site plan, the viewer's eye is inexorably drawn to a visual center in the site: a tightly woven net of roads and pathways which seemingly spiral



21



22



23

24 *Washington Tower, Mount Auburn Cemetery.*

25 *View from Washington Tower toward Boston, Mount Auburn Cemetery.*

100



24



25

outward from the summit of Mount Auburn. This spot is clearly the physical center of the plan and, I propose, is the spiritual center as well. It was at this point that Bigelow erected the Washington Tower, a 70-foot tall belvedere which still commands spectacular views of the Boston region (figs. 24, 25).

Bigelow has high regard for the view from this site, which:

“commands from its summit one of the finest prospects which can be obtained in the environs of Boston. On one side is the city in full view. . . . The serpentine course of the Charles River . . . occupies another portion of the landscape. The city of Cambridge, with its venerable edifices of Harvard University, is situated about a mile to the eastward . . . Country seats and cottages seen in various directions . . . add much to the picturesque effect of the scene.”²⁶

Bigelow’s appreciation of this view was based, in large part, upon the concordance of the physical aspects of the site with the picturesque aesthetic which now underlay appropriate cemetery form.

Wilson Flagg also esteemed this view. But Flagg’s understanding stemmed from an appreciation of sublime landscape, which, as we have seen, shaped his interpretation of the colonial graveyard. He wrote:

“Ascend but a few steps, and what a change of scenery to surprise and delight us. We seem, as it were in an instant, to pass from the confines of death, to the bright and balmy regions of life. . . . There is therefore, within our reach, every variety of natural and artificial scenery, which is fitted to awaken our emotions of the highest and most affecting character. We stand, as it were, upon the border of two worlds, and as the mood of our minds may be, we may gather lessons of profound wisdom by contrasting one with the other.”²⁷

Flagg sees this attribute of the cemetery—the belvedere—as emblematic of its *genius loci*. The eminence becomes, for Flagg, the cosmic mountain, the space between heaven and earth where vision is transformed into understanding, and sensations into belief. Flagg perhaps unwittingly exposes the thematic connection extending from the colonial burial ground through Hewes’s improvements at Copp’s Hill to

Mount Auburn: the cultivation of the sublime visual experience as key to the burial place's meaning.

In addition to being the visual center of the scheme, the belvedere also clarifies the cemetery's relationship to the city. Recently it has become popular to speak of the "rural" cemetery as a species of "middle landscape," a spatial entity separate from both city and countryside.²⁸ However, it seems equally reasonable to imagine Mount Auburn Cemetery as part of a substantially larger concept of the city than that which had existed before. Walter Benjamin argues that a new, larger-than-life understanding of the city was key to the development of 19th-century urbanism *per se*. The belvedere, or rather the panoramic view from the belvedere, is one of the elements he proffers as evidence of this new awareness. Additionally, Benjamin partially characterizes the new urban awareness by an increased appreciation of the aerial panorama as a sublime visual experience which supersedes man's customary, vignетted perceptions of the city.²⁹

Although Mount Auburn Cemetery was physically separate from 19th-century Boston, the cemetery was part of a network of towns that already extended from Charlestown on the east to Watertown on the west. The cemetery was originally placed into an undisturbed landscape. However, its immediate surroundings were being developed rapidly. For example, Brattle Street, which terminated at Mount Auburn's gates, had been the customary location of grand country seats since the mid-18th century. The area around the site was nothing if not domesticated. It is not insignificant that George Brimmer, one of Jacob Bigelow's circle of cemetery reformers, purchased "Sweet Auburn", the cemetery's future site, as a defensive measure to protect its being usurped by adjacent development. Brimmer subsequently sold the land to the Massachusetts Horticultural Society in the hopes that Mount Auburn would, in time, provide a retreat from the metropolis that was very close indeed.

It would seem then that the relationship between Mount Auburn and the new city would not be unlike that which existed between earlier public spaces and their respective urban settings. In his cemetery improvements of the late 1850s, Jacob Bigelow drew upon the precedent of the Boston Common to inform design decisions at the new Mount Auburn Cemetery. Bigelow probably believed that Mount Auburn would be the great space, the Common of the town that must inevitable come—just as the Common had been the great space of old Boston.³⁰

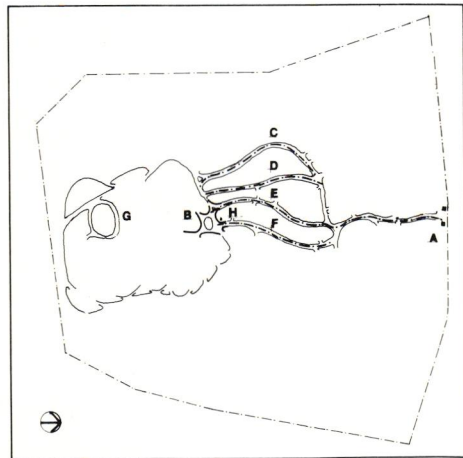
It is said that the 1830 site plan of Mount Auburn is the work of General Dearborn, who envisioned it as an English garden. Dearborn, president of the Horticultural Society, reserved part of the site for an arboretum. The remaining land was devoted to the cemetery, whose topographical and water features were meant to emphasize the picturesque qualities of the site. Although we have no reason to believe that Bigelow criticized the early plan, it is clear, that over time, he grew increasingly dissatisfied with the proliferation of vegetation on the site. This dissatisfaction was due, in part, to the increasing friction between the Horticultural Society and Bigelow's circle during the cemetery's first years. It may also have stemmed from Bigelow's personal aesthetic preferences.

Bigelow's cemetery improvements on Dearborn's scheme give some indication as to his preferences. He assailed the current state of planting in Mount Auburn Cemetery and directed the clearing of underbrush and the thinning of trees. He also sought to line the cemetery's primary avenues with rows of trees on the model of the Boston Common. Thus it is apparent that Bigelow often returned to that great Boston precedent of civic space and drew schematically upon its formal properties. For example, the tree-lined pattern of circulation which latticed the Common, and connected key points in the plan, appears in Bigelow's revised plan of Mount Auburn Cemetery.

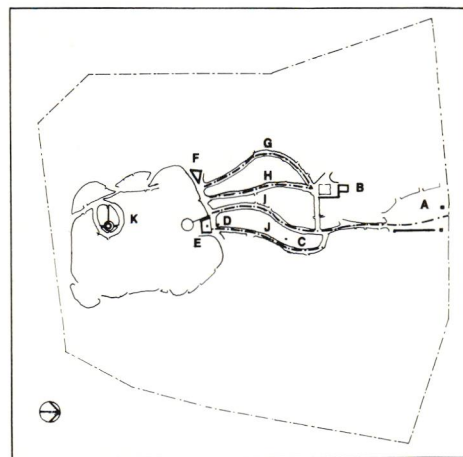
26 Diagrammatic plan of Mount Auburn indicating major features, ca. 1840. Key: A-Main Gate, B-Central Square, C-Cypress Avenue, D-Cedar Avenue, E-Central Avenue, F-Beech Avenue, G-Mount Auburn, H-Hannah Adams Tomb.

27 Diagrammatic plan of Mount Auburn indicating major features, ca. 1860. Key: A-Main Gate, B-Bigelow

Chapel, C-Site of Bigelow Tomb, D-Hannah Adams Tomb, E-Park Street Church Lot, F-Scots Charitable Society Chapel, G-Cypress Avenue, H-Cedar Avenue, I-Central Avenue, J-Beech Avenue, K-Mount Auburn.



26



27

The 1830 project focused on one primary north-south artery, Central Avenue, and three smaller paths which roughly paralleled the first: Beech, Cedar, and Cypress Avenues (fig. 26). Central Avenue commenced at Bigelow's Egyptian gate and led first to a triangular slice of land, comprising a visual and circulatory obstacle before terminating at Central Square. The view from Central Square, as it appeared in 1845, is illustrated in James Smillie's engraving for Cornelia Walter's *Mount Auburn and Its Beauties* (fig. 28). By the removal of the triangular piece of land the direction of Central Avenue became solely focused on Central Square. This new eastern focus may be explained by the increasing importance of Beech Avenue in the plan due to the erection of the cemetery's first tomb, that of Hannah Adams, a noted historian of religion. Later, Jacob Bigelow himself requested to be buried on this street, marking it as an esteemed location for burial (fig. 27).

Central Square came to spatially link Beech and Central Avenues and to mark on the south the entire zone between the streets. This linkage was further reinforced by 1860 when the shape was transformed from an oblong to a rectangle, and was renamed the Park Street lot as it became the burial site of those disinterred from the crypt of the Park Street Church. This lot is noteworthy within the context of the cemetery for its absence of vegetation and headstones. Only one granite marker (1862) interrupts the otherwise neutral space of the Park Street lot (fig. 29).

The rectangular shape of this lot recalls the hard perimeters of old Boston graveyards, and the dearth of vegetation and markers is reminiscent of the emptiness and silence which men like Flagg admired in the colonial graveyard. The Park Street lot attempts to orchestrate the space surrounding its perimeter in a way similar to that of Boston's old burial grounds: first, as a clear orthogonal spatial field, the lot connects the cemetery's two primary arteries. Second, it terminates southerly vehicular movement from the cemetery's front gate to the Mount itself. Third, it acts as a spatial

28 View of Central Square, by James Smillie.

29 Park Street Church lot, Mount Auburn Cemetery.

103

foyer which introduces the pedestrian to other spatial episodes which, in turn, lead to the summit of Mount Auburn and its belvedere.

Other features in Mount Auburn recapitulate themes discussed in regard to Central Avenue and Park Street lot. Cypress and Cedar Avenues are similarly controlled by key spatial events. On the north, we observe the streets' termination in Bigelow's Chapel and square. On the south, they end with another institutional lot. This area belonging to the Scots Charitable Society, dates from 1841 and marks the westernmost access to Mount Auburn (fig. 30). A remarkable lot, it contains some 239 bodies and is surrounded by a cast-iron fence which encloses nothing. Unlike the Park Street lot, whose space provides an appropriate setting for an emphatically rhetorical marker, the Scots lot is the quintessence of contained emptiness—sublimity in microcosm.

In general terms, we might say that the central section of Mount Auburn Cemetery is composed of a regular system of streets, and is inflected at key moments by specific events, particularly, by important spaces. It is not insignificant that these spatial moments are, by and large, given over to communal burial on the order of the colonial burial ground, and that they are characterized not so much by magnificence of ornamentation as by formal neutrality, artistic humility, and exaggerated emptiness.

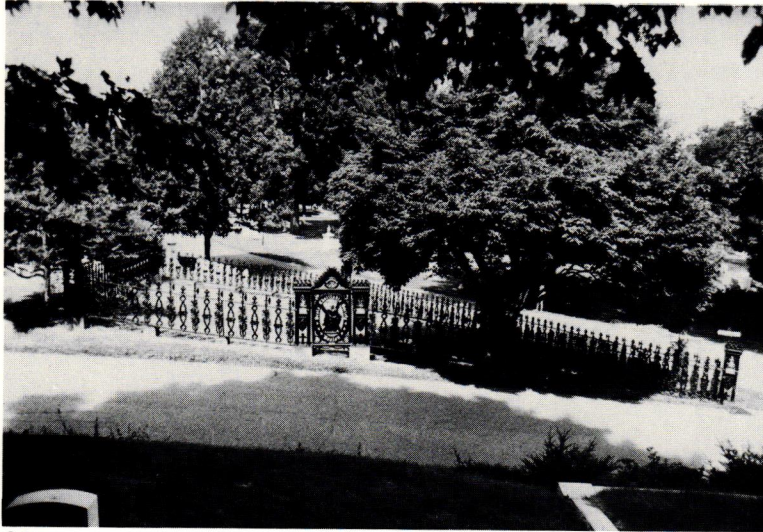
We can see that in much the same way that Mount Auburn is a spatial attribute of an enlarged city conception, its plan might be seen as urbanism in microcosm. It proliferates with enclosures which can be seen as reduced and refined versions of the colonial graveyard—i.e., family and institutional plots—which are interconnected by an enormous armature of planting and pathways. For such lots, the cemetery itself becomes the shadow of a city which hitherto has given meaning to the cemetery. It is a city of the dead, ironically fabricated from living vegetation.



28



29



Mount Auburn Cemetery exploits a set of institutional attributes by establishing a formal relationship with the new, extended, 19th-century city. In its spatial nature, Mount Auburn serves as a foil to city form in a way similar to the operation of colonial Boston's public spaces, particularly its graveyard and Common. Mount Auburn furthers its relationship with the civic history of the burial grounds by exploiting formal operations internal to its own plan. Again, the Boston Common and adjacent graveyards were useful precedents in establishing the cemetery's sense of comprehensive design.

Finally, Mount Auburn officially introduces a concern with the planning of the cemetery as an end in itself. To this end, the institution of the cemetery is coherently and convincingly defined for the first time. A paradigm is established, and then clothed in forms compatible with making the ideal real. Mount Auburn's philosophical concerns paralleled its formalistic. Justice Story, in his "Dedication Address at Mount Auburn Cemetery," declares that in the cemetery, the "truth" of death "must be embodied in a visible, tangible, and practical form. It must be felt as well as seen. It must warm, as well as convince."³¹

Thus it could be said that Justice Story and Mount Auburn's creators, sought to draw the divine nature of death earthward, where it would be accessible to the modern mind. This understanding of the art forms of death is so different from that of the Puritans as to be inversely related, for, as I have discussed, the Puritans sought to sublimate the reality of death. Artistic means notwithstanding, the artistic ends are the same: to invest places with a mystical presence that moves between the worlds of man and God.

Notes

1. See Harriet Forbes, *Gravestones of Early New England and the Men Who Made Them, 1653-1800* (1927), to which all subsequent scholarship is indebted.
2. With regard to the 1823 burial controversy, I refer the reader to Blanche Linden, *Death and the Garden: the Cult of Melancholy and the 'Rural' Cemetery* (Diss. Harvard University, 1981).
3. Jacob Bigelow, *A History of the Cemetery of Mount Auburn* (Boston and Cambridge, 1860), p. 137.
4. Allan Ludwig, *Graven Images: New England Stonecarving and Its Symbols, 1650-1815* (Middletown, CT, 1966), pp. 17-20. Dickran Tashjian coins the phrase "pressure theory" in his critique of Ludwig's methodological assumptions. See his article, "Puritan Attitudes toward Iconoclasm," *Puritan Gravestones Art II*, ed. Peter Benes (Boston, 1978), pp. 27-28.
5. Dickran and Ann Tashjian, *Memorials for the Children of Change: the Art of Early New England Stonecarving* (Middletown, CT, 1974), pp. 7-12.
6. Samuel Sewall cited by Margaret M. Coffin in *Death in Early America* (Nashville and New York, 1976), p. 126.
7. Lucius Sargent cited by Coffin, p. 127.
8. Edmund Burke, *A Philosophical Enquiry into the Origin of our Ideas of the Sublime and the Beautiful* (London, 1757), pp. 155-156.
9. Linden, see note 2.
10. Nathaniel Morton cited by Tashjian, p. 24.
11. The concept of the "cosmic mountain" is elaborated by Mircea Eliade, *The Sacred and the Profane: the Nature of Religion* (New York, 1961), pp. 38-41.
12. Stanley French, "The Cemetery as Cultural Institution: the Establishment of Mount Auburn and the Rural Cemetery Movement," *American Quarterly* 26 (1974), 39.
13. Abbott L. Cummings, "Meeting and Dwelling House: Interrelationships in Early New England," *New England Meeting House and Church: 1630-1850*, ed. Peter Benes (Boston, 1979), pp. 4-5.
14. John Reys, *The Making of Urban America*, (Princeton, 1965), pp. 124-125.
15. Nathaniel B. Shurtleff, *A Topographical and Historical Description of Boston* (Boston, 1871), p. 248.
16. Shurtleff criticized Governor Andros's decision to position the new church on the burial ground, rather than to place it on vacant land across School Street. He reasons: "it was because he [Governor Andros] preferred to contend with the dead rather than with the living, and so invaded the tenements of the former." (p. 248.)
17. Shurtleff, p. 369. Linear crypt construction was also used at Common and Washington Street burial grounds.
18. M.A. De Wolfe Howe, *Boston Common: Scenes from Four Centuries* (Boston and New York, 1921), p. 7.
19. R.L. Midgeley, *Sights in Boston and Suburbs* (Boston and Cambridge, 1857), p. 62.
20. Tashjian proposes a similar idea in "Puritan's Attitudes", p. 30. We are both indebted to Phillipe Aries's discussion of the iconography of *vanitas* in *The Hour of Our Death*, trans. Helen

- Weaver (New York, 1981), particularly chapter 7, "The Vanities."
21. Wilson Flagg, *Mount Auburn: Its Scenes, Its Beauties, and Its Lessons* (Boston and Cambridge, 1861), p. 114.
22. Thomas Bridgman, *Memorials of the Dead in Boston: Containing Exact Transcripts of Inscriptions on the Sepulchral Monuments in the King's Chapel Burial Ground* (Boston, 1855), pp. 17-18.
23. Bridgman, p. 18.
24. Shurtleff, p. 245.
25. Sylvester Baxter, "Public Squares in City and Village," *The Century Magazine* 71 (1906), 870.
26. Bigelow, pp. 15-16.
27. Flagg, pp. 161-162.
28. For example, see Thomas Bender, "The Rural Cemetery Movement: Urban Travail and the Appeal of Nature," *New England Quarterly* 47 (1974), 208.
29. For an important discussion of the panorama and, by extension, the belvedere as giving rise to a new urbanistic awareness, see Benjamin, "Paris, Capitale du XIX Siècle" in *l'Homme, le Langage, et la Culture*, ed. and trans. Maurice Gandillac (Paris, 1971) pp. 121-123.
30. Bigelow, pp. 120-123.
31. Justice Story cited by Bigelow, p. 157.

Acknowledgements

I wish to thank Ruth Butler and her NEH Summer Seminar "Nineteenth Century Funerary Sculpture: Memorials to the Family," which afforded me the opportunity to study colonial graveyards and their artifacts. I also wish to thank my wife Charlene Castellano for her contributions to the final form of this article.

Figure Credits

(frontispiece) Courtesy of Michael Cornish.

- 1, 2, 5, 9, 11-16, 18, 20, 24-27, 29, 30 Courtesy of the author.
- 3 From Shumway and Hegel, *New Haven: An Illustrated History*, p. 31.
- 4 From *Boston Almanac* (Boston, 1840).
- 6, 7, 10, 19 From the Society for the Preservation of New England Antiquities.
- 8 From Thomas Bridgman, *Epitaphs in King's Chapel Burial Ground* (Boston, 1853).
- 17 Courtesy of Daniel Farber.
- 21 From Thomas Bridgman, *Epitaphs from Copp's Hill* (Boston, 1851).
- 22 From Baxter, "Public Squares in the City and Village," *The Century Magazine*, 1906.
- 23 From Cornelia Walter, *Mount Auburn Illustrated* (Boston, 1848).
- 28 From Wilson Flagg, *Mt. Auburn: Its Scenes, Its Beauties, and Its Lessons* (Boston, 1861).

In Solemn Procession

The horse-drawn carriage bearing the body of John F. Kennedy turns onto the Memorial Bridge on the way to Arlington National Cemetery.



Honor of Sacrifice: The Evolution of Arlington National Cemetery

Jill Bretherick

The monumental program in Washington, D.C., from its conception by Washington, Jefferson and L'Enfant, has assumed surprising formal complexity during its relatively short history. The development of this program, and especially of the sequence initiated by the Capitol and its Mall, is marked as much by fortune and circumstance as by conscious planning.¹ The formal termination of this sequence is, perhaps, the most revealing of all its monuments: Arlington National Cemetery. It is our purpose here to ponder the message taught by this, our nation's premiere war cemetery.

The war cemetery is a particular class of public work that serves both a literal and monumental function. As monument, a war cemetery is a didactic emblem of an aspect of a constitution. In the United States the war cemetery teaches the civic virtues of service and sacrifice as well as the costs of national unity and national defense.²

The institution of honorific burial for fallen warriors traces its origins as far back as the specter of war itself. There is, however, a clear precedent found in antiquity for the American war cemetery. The Greek statesman Solon is traditionally recognized as the promulgator of a law requiring a panegyric during the state funeral of the first Athenian war dead retrieved from any conflict. A product of this statute is the famous funeral oration of Pericles, delivered over the first fallen of the Peloponnesian War and recorded by the historian Thucydides:

"So died these men as became Athenians. You, their survivors, must determine to have as unfaltering resolution in the field . . . you must yourselves realize the power of Athens, and feed your eyes upon her from day to day, till love of her fills your hearts; and then, when all her greatness shall break upon you, you must reflect that it was by courage, sense of duty, and a keen feeling of honor in action that men were able to win all this. . . . For this offering of their lives made in common by them all they each of them individually received that renown which never grows old, and for

a sepulchre, not so much that in which their bones have been deposited, but that noblest of shrines wherein their glory is laid up to be eternally remembered. . . . For heroes have the whole earth as their tomb; . . . These take as your model, and judging happiness to be the fruit of freedom and freedom of valour, never decline the dangers of war."³

Two millennia later, Abraham Lincoln delivered a similar oration with words now commonly known: "We have come to dedicate a portion of that field [the battlefield of Gettysburg] as a final resting place for those who here gave their lives that that nation might live." This dedication shows the Gettysburg battlefield-turned-cemetery to be an important example of a monument illustrating the virtue of sacrifice to democracy (fig. 1).⁴ That sacrifice invests the constitution with greater value. The citizen is thus exhorted to live up to the ideals for which his fellow citizens died. As Lincoln continued in his Gettysburg Address:

"But in a larger sense, we cannot dedicate—we cannot consecrate—we cannot hallow this ground. The brave men, living and dead, who struggled here, have consecrated it, far above our poor power to add or detract. The world will little note, nor long remember, what we say here, but it can never forget what they did here. It is for us the living, rather, to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us—that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion."

The war cemetery as monument serves the living as well as the dead; its didactic task is weighty indeed. Perhaps it is appropriate then, that the ideals set forth in Lincoln's address are most poignantly conveyed by a cemetery situated at the monumental and constitutional center of the nation.

Still in service today and operated by the U.S. Army, Arlington National Cemetery honors the dead from every American war and has expanded to offer a memorial both

108 to veterans and to civilians who have given outstanding service to their country. Although as a national monument Arlington has taken on a form that teaches democratic unity, it began, ironically, as the result of animosity born in the Civil War. Arlington's subsequent growth and reformation chronicles the developing images and ideals of a reunited America.

In 1802 George Washington Parke Custis, the adopted grandson of George Washington, began building a home on his family's land. Sited on a high hill, Arlington House commanded a majestic view of the new capital city across the Potomac River. The house's Doric portico, with its oversized columns, was designed to be seen best from the District of Columbia (fig. 2).⁵

The 1,100-acre estate became the property of Custis's daughter and her husband, Robert E. Lee, in 1857. When tension between the northern and southern states erupted into violence in 1861, Robert E. Lee left Arlington House to establish his allegiance to the Confederate cause. During the Civil War, the protection of Washington, D.C., located perilously close to southern territory, was of paramount importance. The earlier retrocession of Alexandria and Arlington from the District of Columbia prompted federal troops to occupy strategic positions in both areas for the defense of Washington. Mrs. Robert E. Lee left the estate shortly before military occupation of the grounds later that year.

Its strategic position and its notorious Confederate owner made the Custis-Lee estate a certain spoil of war. Many buildings in Washington had been converted into makeshift hospitals to care for the wounded from nearby battles. The problem of accommodating the remains of those soldiers who died from injury and disease soon arose. In 1864, Secretary of War William Stanton ordered Quartermaster General Montgomery C. Meigs to find a site for the burial of these dead. Meigs, an associate of Lee prior to the war, viewed

Lee's allegiance with the Confederacy as treason, and determined that the use of the Custis-Lee Estate for burial of the war dead would forever prevent him from returning home. Stanton was amenable to this retaliatory gesture and the first soldiers were buried there on 13 May 1864. Arlington Cemetery was thus pressed into service as an arrangement of convenience and as a vehicle for wartime retribution.

During the war, real estate in insurrectionary districts was assessed with a special federal tax. When Mrs. Robert E. Lee, widely known to be an invalid, was unable to pay the tax in person, the government formally attached the property it was already using as a burial ground.⁶ A suit brought by George Washington Custis Lee in 1882 resulted in a U.S. Supreme Court decision that returned the estate to him as rightful heir.⁷ Congress then paid Lee \$150,000 compensation for the cemetery property and the government claimed clear title to land it had occupied for the previous 22 years.

With the war's end in 1865 a new struggle perpetuated the bitter national division of the United States. The actions of sectionalist politicians belied their reconciliatory speeches; corruption in government delayed the healing of the nation.

To many, however, the democracy seemed to be strengthened by the outcome of the war. Nationalism increased as the economy accelerated. Participation in the war had been, for the industrial north, at least, economically invigorating. The postwar increase in the economic role of industry, and the 1869 completion of the transcontinental railway laid the foundation for a unified, prosperous, populous, and geographically expanding nation. Woodrow Wilson, the next wartime president, in evaluating the Reconstruction era, wrote that the Centennial Exposition of 1876 held in Philadelphia "marked not only a point of sentiment in the completion of 100 years of independence, but also a real

1 Monument at Gettysburg Battlefield, 109
Pennsylvania.

2 View of the Arlington House above
Memorial Gateway.



1

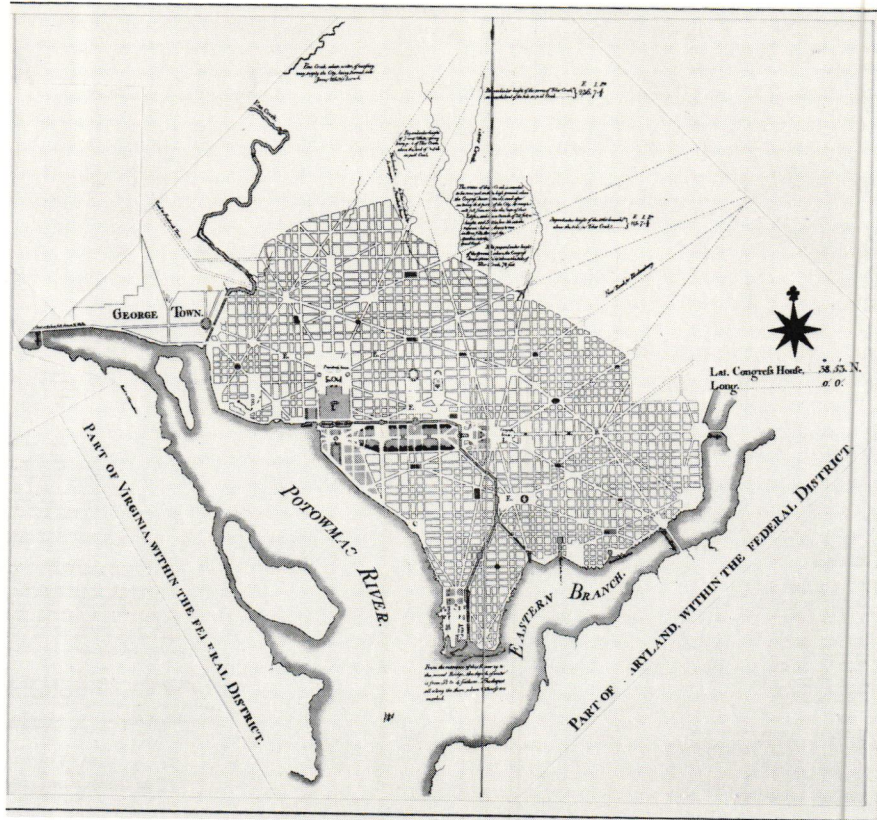


2



4

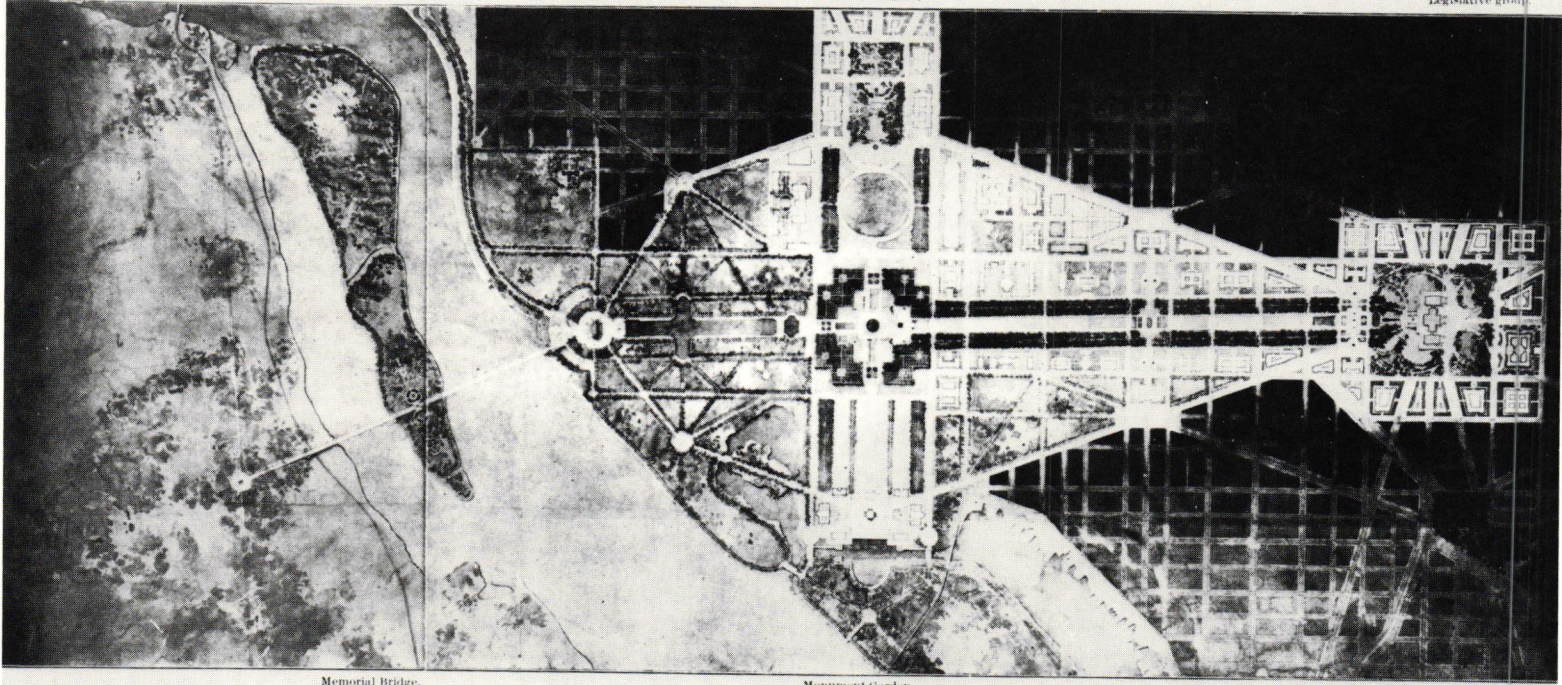
Annapolis Island.



3

Executive group.

Legislative group.



Memorial Bridge.

Monument Garden, Washington Common.

Union Square.

5

3 *Pierre Charles L'Enfant's scheme, showing the radial axes extending into the countryside following the model of Versailles.*

4 *19th-century Mall model of existing conditions of the Romantic landscape with meandering pathways.*

5 *1902 Proposal of the McMillan Commission linking the Arlington Cemetery to the Mall.*

turning point in the history of the country. Normal conditions of government and intellectual life were at last restored.⁸

Reconstruction of the democracy was paralleled by the reconstruction of Arlington Cemetery as a national institution. Initially conceived as a conveniently vengeful location for burying dead soldiers, it began to be seen, toward the end of the century, as a focus for unification. Union occupation of the estate exploited its strategic location within Confederate territory adjacent to the Union capital. This same location could be transformed and exploited as a link between the ideals of the nation's political center and those of the people in the country beyond. As one commentator stated: "Out of this welter of spite and hate, out of the notions of lesser men, grew something big."⁹

As we have seen, the site of Arlington Cemetery was chosen before any inclination developed toward granting it a monumental quality. Its initial urban form resulted not from deliberate manipulation, but through response to unrelated circumstances. Its significant formal design comes from subsequent recognition and development of this suggestive siting in relation to the surrounding context, especially during the turn-of-the-century redevelopment of the city of Washington.

In 1791 Pierre Charles L'Enfant submitted his design for the new federal city of Washington, which would, by use of radial avenues, extend the government beyond the city and into the countryside (fig. 3).¹⁰ The McMillan Park Commission's 1902 revitalization of L'Enfant's scheme tied Arlington Cemetery—"in the country"—into the network of extended axes. The commission was organized to prepare a development and improvement plan of the entire park system of the city focusing on the Mall, which had become a romantic landscape of meandering paths and dense gardens (figs. 4, 5).

After studying numerous proposals, the commission, made

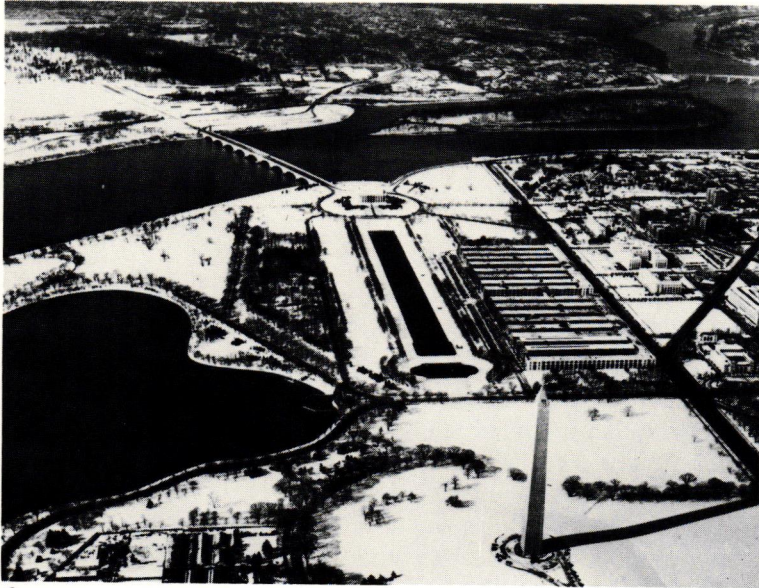
up of Daniel Burnham, Frederick Law Olmsted, Jr., Charles McKim, and Augustus St. Gaudens, working with Senator Charles McMillan and Charles Moore, issued a final proposal that aimed to "restore, develop, and supplement" the features of L'Enfant's plan of 1791 as an expression of the democratic system.¹¹ The Mall would finally become the "grand avenue" that united the principal monuments of L'Enfant's capital city: the executive mansion, the Capitol, and the memorial to the nation's first leader and the city's founder, George Washington. They proposed to lengthen the Mall and add to it a memorial to Abraham Lincoln, and to extend from the latter structure another axis that would literally bridge the Potomac; the Mall would then be connected directly to Arlington Cemetery (fig. 6). As the 1902 Park Commission Senate Report stated:

"The proposed Lincoln Memorial . . . on the axis of the Capitol and the Washington Monument makes a starting point for the bridge . . . the establishment of this concourse allows for the bridge to cross the river . . . taking into consideration the main objective point—the mansion house at Arlington. . . . The interest excited by the superb view from the heights, and the feelings of patriotism awakened by the vast field of the hero dead, known or unnamed, all call for such a treatment of the entire reservation as shall enhance the effect produced on the visitor."¹²

The culmination of almost three decades of activity following the Senate Report was the 1931 dedication of Arlington Memorial Bridge as a memorial to those who died in military service for the country. As a symbolic introduction to the cemetery, the bridge became yet another formal reinforcement of Arlington's urban significance. As Frederick Newell's 1932 account of the bridge dedication observes:

"A decision was reached to build the bridge leading from the city of the living to the last resting place of the men and women honored by the nation. It is a symbol of the union of North and South as well as the pathway between Lincoln and the soldier dead."¹³

Thus it was that 70 years after the Civil War the division



6



7

between the Union and the Confederacy was symbolically bridged. That bridge, moreover, led from the center of the government to a reminder of the conflict that almost ended that government—a reminder embellished to properly terminate the most important monumental sequence in the United States. The place of constitutional action is axially connected with the place reserved for those who died protecting that constitution.

Just as Arlington Cemetery as a whole is linked physically and ideologically to the nation's capital, so too is each element within the cemetery related to larger themes. The element that best expresses the relationship of the cemetery to the capital, and the relationship of individual elements to the cemetery's larger whole, is the Memorial Gateway designed by McKim, Mead, and White. The apsidal stone structure sits at the end of the axis from the Lincoln Memorial and replaces three smaller, less dominant eastern entrances (fig. 7).

The most obvious and uniformly repeated element within the graveyard is clearly the military gravestone, which has retained the same design since the early 1870s. It has remained an unadorned white marble slab with a curved top, subtly articulated by the chiseled name of the dead soldier beneath it. In the rolling hills of the cemetery, these markers in the "field of the dead" stretch on and on in orderly rows (fig. 8). As one descriptive account has it: "the forest of miniature white stones suggests the arrangements of a vast army by battalions and regiments."¹⁴

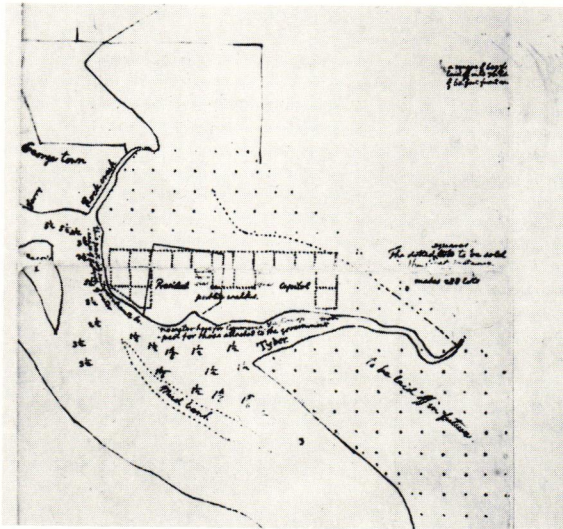
Reminiscent of Jefferson's early sketches for the design of the District of Columbia—showing a regular city grid applied to the irregular countryside—the imposition of order on the pastoral landscape at Arlington reveals a coexistence of the individual and the collective, one in which both are apparent but neither is subordinate (fig. 9). The implicit suggestion is that democracy, the cause for which the "honored dead" gave up their lives, is in harmony with a



6 *Aerial photograph of the Washington Monument and the Lincoln Memorial axially connecting the bridge and cemetery.* 113

7 *Memorial Gateway McKim, Mead & White.*

8 *"Field of the Dead" on Memorial Day.*



9



11

9 Jefferson's grid for the Federal city.
 10 Circle of Confederate graves rearranged in 1900, with the amphitheater in the distance.

11 Statue of Peace by Moses Ezekiel, a memorial to confederate dead. The inscription reads: "Not for fame or reward not for peace or for rank not lured by ambition or goaded by necessity but in simple obedience to duty as they understood it these men suffered all—sacrificed all—dared all—and died."



10

natural order, one superior to the internecine struggles from which the cemetery was born.

Amid this linear arrangement of gravestones, the concentric arrangement of one particular group of graves calls attention to itself (fig. 10). These are the graves of Confederate dead whose distinctive yet simple Gothic Revival headstones were originally scattered through the cemetery. The relocation of these graves in 1900 was actually the first significant formal intervention at Arlington. In 1914 a colossal statue of Peace by Moses Ezekiel was placed in the center of this grouping (fig. 11). She holds in her hands the laurel wreath of honor and the plowshares and pruning hooks of reconciliation. On the base of the statue is an inscription describing the Rebel warriors as soldiers who acted "in obedience to duty as they understood it."

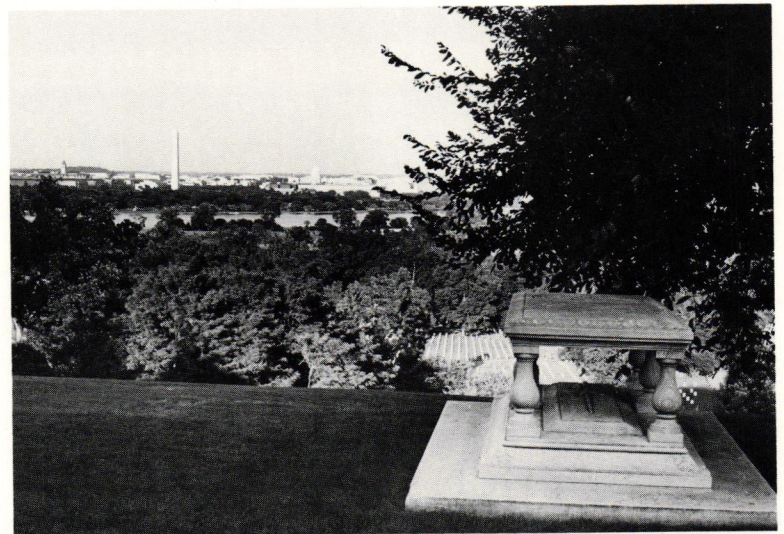
Another significant relocation of a grave occurred in May 1911 when the tomb of Pierre Charles L'Enfant was moved from an obscure Washington farm to a cemetery plot directly below Arlington House. Engraved with L'Enfant's 1791 plan of Washington, the marble table tomb overlooks the capital city (fig. 12, 13). There the architect of the city rests eternally in a visual and conceptual extension of his design.

The Memorial Amphitheater was added to the cemetery after World War I—a period of heightened public sensitivity to the cause of democracy. Designed in 1917 by Carrere and Hastings, and dedicated in 1920, the Amphitheater is used for selected memorial services including those on Memorial Day (fig. 14). Its classical vocabulary is thoroughly in keeping with the character of monumental Washington and tightly binds the cemetery to the capital city.¹⁵ The theater's function is not unlike that of its Hellenic predecessor, though it serves a modern democratic state. The citizen-spectator at a public funeral is simultaneously presented with a moral lesson and treated to a view of the city below.

The Tomb of the Unknown Soldier, dedicated in 1921, is



12



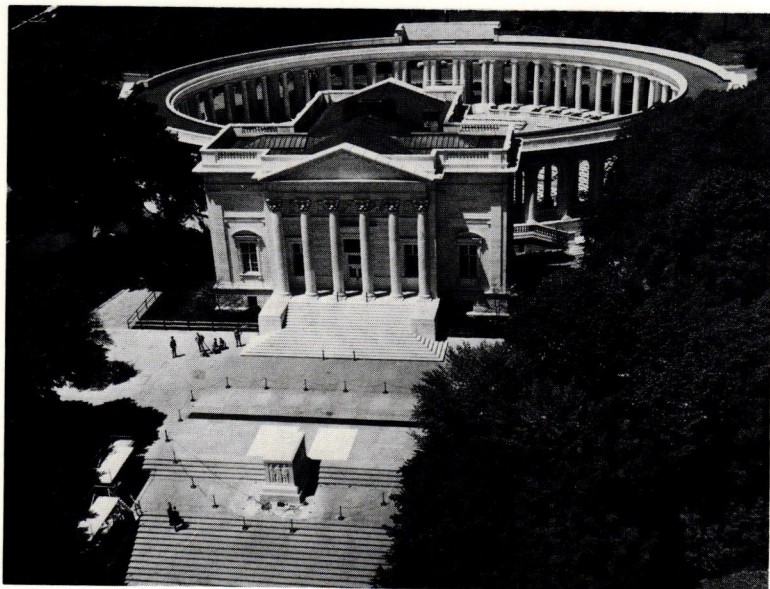
13

14 Tomb of the Unknown Soldier and the Memorial Amphitheater.

15 Tomb of the Unknown Soldier overlooking Washington.

16 "Visual isolation" among the rows of graves.

116



14



16

located at the base of the east stairs approaching the Memorial Amphitheater. The formal juxtaposition of these elements emphasizes their unique function within the cemetery. While the encircling theater is a center in which citizens convene for memorial ceremonies, the Tomb is a three-dimensional object around which an individual may move. The individual directly relates to the anonymous soldier, whose sacrifice encourages empathetic, individual participation in his cause. The unknown soldier is, ironically, an appropriate balance to the field of subordinate individuals; he was an individual whose value as such was recognized by his countrymen.¹⁶

The Tomb of the Unknown Soldier also acts as a setting for ritual in a way similar to the Memorial Amphitheater. The ceremony of the *Changing of the Guard* offers an exemplary lesson for the citizen. As a sanctified agent of the government, the military here enacts the virtues of honor and the respect for sacrifice. This ceremony encourages commitment to the state. This periodic drama is likewise seen against the backdrop of the city of Washington (fig. 15).

The siting of these key elements within the cemetery capitalizes on the visual reference to the District of Columbia originally intended by the McMillan Commission. The view of the capital from L'Enfant's tomb, from the Memorial Amphitheater, and from the Tomb of the Unknown Soldier, is effectively juxtaposed against the viewer's isolation within the foliage and hills of the fields of the dead (fig. 16). The moments of awareness of the cemetery's role in the larger context are effectively centered by time spent in contemplative introspection amid endless rows of tombstones.

For a young nation, the United States is rich in monuments and memorials. These range from preserved battlefields to the honorary dedication of calendar dates. Through these monuments one can trace the history of the nation and the evolution of its democratic virtues, among them honors and sacrifice in service of the nation itself.¹⁷ The American



118 military cemetery has become a recognized part of sustaining our nation's vital history.¹⁸ Distinct from the religious and civilian cemeteries, military cemeteries share unique formal qualities that enhance their effectiveness. The chilling magnitude and uniformity of orderly rows of countless identical headstones may also be found in soldiers' cemeteries at Gettysburg and Chattanooga, and in American military cemeteries in France, Luxembourg, Belgium, and England.¹⁹

The ability of a public work such as Arlington to serve as a memorial to national reconciliation rests in its urban and architectural form. Evolving from an instrument of Civil War antagonism into an institution honoring the sacrifice of all the country's soldiers and encouraging a similar devotion to duty among the general citizenry, the architectural and the urban forms of the cemetery in Arlington have developed concurrently. Although much of the character of this memorial was created by circumstance, Arlington's potential was recognized by the McMillan Commission and it has been maintained intentionally. From an expedient of strife to a restful park, Arlington National Cemetery has become a monument to the nation's ability to overcome divisiveness and to the memory of the cost of unity. Its formal maintenance is likewise dependent upon the citizens' willingness to agree upon the value of democracy and to share in its costs. The military cemetery's ultimate purpose is to illustrate both the fabric of the constitution and the sacrifice necessary to keep it perfectly whole.

Notes

1. The clearest survey of the history of planning in the District of Columbia is found in John Reps, *Monumental Washington* (Princeton, 1967).
2. See "The Necessity for Ruins," in J.B. Jackson, *Landscapes* (Amherst, 1970) for a discussion of the qualities of monuments that communicate issues of the past as concerns of the present.
3. Thucydides, II. 43. The translation is from Richard Crawley, *Thucydides, History of the Peloponnesian War* (London, 1874).
4. An evaluation of the process and motives involved in the preservation of the Gettysburg Battlefield as a cemetery and memorial is made by Rueban Rainey, "The Memory of War: Reflections on Battlefield Preservation" in *The Yearbook of Landscape Architecture: Historic Preservation* (New York, 1983), pp. 69-89.
5. See Charles Burr Todd, *The Story of Washington* (New York, 1893), p. 352.
6. The tax on insurrectionary districts was passed into law by Congress on 7 June 1862. The commissioners for collecting the tax made the peculiar stipulation that it had to be paid by the owner to the tax office. Mrs. Lee's cousin appeared with the \$92.07 owed, but the payment was refused.
7. *United States v. Lee*, 106 U.S. 196 (1882).
8. Woodrow Wilson, *Division and Reunion, 1829-1889* (Princeton, 1898; reprint ed. Glouster, MA, 1974), p. 227.
9. John Vincent Hinkel, *Arlington: Monument to Heroes* (Englewood Cliffs, NJ, 1970), p. 24.
10. Pierre Charles L'Enfant's report to Washington (22 June 1791) was initially published by the Columbia Historical Society and can be found in the collection of his documents in *L'Enfant and Washington*, ed. Elizabeth S. Kite (Baltimore, 1929), p. 53. Also included in Kite's book is L'Enfant's accompanying document to his 1791 plan of Washington (p. 66) that describes the features of the proposed city. Interestingly, L'Enfant mentions the areas within the city proper "intended for use of all religious denominations, on which they are to be admitted within the limits of the city, an appropriation being intended for without." With the boundaries of Washington extending ten square miles from beyond the developed area into Arlington and Alexandria, one wonders whether L'Enfant's initial intention was that this burying ground exist in one of these related outer districts.
11. Charles Moore, ed. *The Improvement of the Park System of the District of Columbia*, S. Rept. 166, 57th Cong., 1st Sess., (Washington, 1902). See Reps's chapters 4-6 for an account of the events surrounding the McMillan Commission proposal.
12. Moore, S. Rept. 166, pp. 56-58.
13. Frederick H. Newell, ed., *Planning and Building the City of Washington* (Washington, 1932), p. 113.
14. John B. Osborne, *The Story of Arlington* (Washington, 1899), p. 34.

15. Moore writing in 1929 felt a need to defend this vision of classicism. He called it "the language of the ages—the language of classical design deliberately selected by Washington and Jefferson as the appropriate architecture of the great and powerful nature they foresaw. . . . Classical architecture has become the universal language of monumental work from the days of the Parthenon to the present; it is understood by all men." *Washington Past and Present* (New York, 1929), p. 294.

16. On Memorial Day, 1984, an unknown soldier from the Vietnam War was interred at Arlington. He joined the remains of soldiers from the Korean War and from World War II in front of the ornate upright tomb containing a soldier from World War I. The iconography of the tomb is described by James M. Goode, *The Outdoor Sculpture of Washington, D.C.* (Washington, 1974), p. 199.

17. It is interesting to note the way in which the character of our war monuments reflects changing American attitudes toward war as the protector of democracy. The debate spawned by the Vietnam Memorial, the newest addition to the Washington Mall, represents such a change.

18. See Rainey, *passim*.

19. American military cemeteries are discussed briefly in Moore, *Washington Past and Present*; and Reynolds, *Washington Standard Guide*. Examples of the evolution to a more formal landscape arrangement in the American military cemeteries abroad can be found in John Francis Marion's *Famous and Curious Cemeteries* (New York, 1977). The shape of the tombstone and its repetitive use is also found in later European war cemeteries such as Lutyens's English war cemeteries in Etaples (1920) and in the Faubourg d' Amiens, France (1929).

Figure Credits

(frontispiece) Courtesy Wide World Photos, Inc.

1 From *American Landmarks: Collections of Pictures of Our Country's Historic Shrines*, George Cleaveland and Robert Campbell (Boston, 1893).

2 Courtesy of M.G. Mead.

3, 9 Courtesy of the United States Library of Congress.

4, 5 From Sen. Rept. 166.

6, 7, 9 Courtesy of the National Archives.

8, 10 Courtesy of the Defense Audiovisual Agency (DAVA).

11, 12, 14 Courtesy of Carlos Valdenegra.

15, 16 Courtesy of the author.

The Defense of New Orleans: Colonial Forts of the French and Spanish Regimes

Willard B. Robinson

When the French journeyed into the Louisiana wilderness, defense by both art and nature was considered vital to survival. Camp positions fortified by water, steep surrounding declines, or depressions were considered advantageous to defense. These were then strengthened, however primitively, with art.¹

Characteristic application of skills in the art of fortification was demonstrated in the wilderness by the intrepid French explorer Cavelier de La Salle. When exploring the Mississippi River in 1680, LaSalle's expedition fortified itself in the Illinois country by selecting an eminence that was partially protected on one side by the river bank while two other sides were flanked by ravines.² This position was then improved by completing the encirclement with a palisade of timbers 25 feet long and by revetting the steep slopes with vertical timbers. Contained within were several lodgings, a magazine and a forge. Built in 1680, this assemblage was named Fort Crèvecoeur.

The appearance of outposts such as Crèvecoeur, carrying the appellation of "fort," must have pleased the military-minded King Louis XIV. However, many contained little in the way of actual fortifications. Established about 30 miles south of the site where New Orleans was later founded, Fort de la Boulaye (at first called the Mississippi Fort) was only a two-story blockhouse set up under the direction of Pierre Le Moyne d'Iberville.³ Begun early in 1700, shortly after English ships were found on the Mississippi and repelled, the house was 28 feet square and was located near an eight-foot square powder magazine, several shelters roofed with palm leaves, and a battery of cannons.⁴ Observing the absence of fortifications, however, one visitor, Father Jacques Gravier, noted there was "neither fort nor bastions, nor intrenchments, nor redoubts."⁵ Similar to many early posts, this work was abandoned in 1707 after a short period of use.⁶

In 1721 at the mouth of the Mississippi, work on another

outpost, the Balize, was begun under the direction of the French engineer, Adrien Pauger. He was one of several engineers sent to Louisiana to strengthen colonial defenses against foreign encroachment (fig. 1).⁷ To prepare for the construction of the fortifications of wood and earth which had been projected for the unstable site, Louis Pierre Leblond de la Tour, engineer-in-chief, developed a list of essential tools and materials which included: "One hundred spades, 100 pickaxes and 100 axes; 500 pounds of nails of all kinds . . . equipped with pile drivers and rammers to drive large piles."⁸ As was typical of most colonial fortifications, whether primitive or permanent, progress on new construction was slow and maintenance of completed work poor. As late as 1742, although it had been reported the island was in a state of defense, fortifications were still incomplete and shortly after England obtained the territory through the Treaty of Paris, everything was in ruin, with the barracks the only structure remaining.⁹ Later the island was claimed by the river.

While de la Tour's drawings for projected works for the Balize showed fortifications on an irregular plan conforming to the shoreline of the river, other military architecture projected for the lower Mississippi was characterized by geometrical and mathematical regularity, an attribute that increased the strength of the works (fig. 2). Evidently having learned either from previous military experience or from treaties on the art of fortification, leaders of expeditions were familiar with the basic theories on bastioned fortifications developed in their homelands. While this system of military art had begun in Renaissance Europe as defense against artillery, the French, English and Spanish all employed it for primitive enclosures designed for Indian defense as well as for permanent strongholds intended for defense against other colonial aggression.

Methods of laying out bastioned forts were well formulated. After a polygon was traced upon the ground, bastions were carefully laid out at the angles. The main objective of this

122 geometry was to develop a trace whereby every part of the exterior could be seen and defended from some position within the *enceinte*. According to the French master of the art of fortification, Sébastien Le Prestre de Vauban (1633-1707), the intent of this, as any defensive work, was to strengthen the position through nature and art so “that the small number of soldiers which defend the place may be able to hold out for some time.”¹⁰

Although the French had built Fort Carolina, Florida, in 1564 on a triangular trace with bastions,¹¹ most early colonial bastioned works were quadrangular. Compared to a four-sided figure, the triangle enclosed little area and the bastions were necessarily narrow. To be sure, Vauban wrote it was “impossible to fortify a triangle after the regular way. . . .”¹²

The square or rectangular trace with bastions at each corner appeared at numerous locations along the Gulf Coast. Fort Maurepas (1699), erected on the Bay of Biloxi by Pierre Le Moyne, sieur d’Iberville, “was made with four bastions, two of them squared logs, . . . placed one upon the other. . . . The other two bastions were stockaded with heavy timbers . . .”¹³ East of this position, Fort Louis de la Mobile (1702) and its successor, Fort Louis de la Louisiane (1711), both consisted of square bastioned enclosures of wood.¹⁴

Though common, the bastioned type of fortification was not universal in colonial Louisiana. Perhaps due to expedience of saving labor in construction, several works were polygonal enclosures, often of impermanent material.

Several such stockaded forts, evidently without bastions, appeared on the banks of the lower Mississippi at strategic locations for the defense of New Orleans during the mid-18th century. At English Turn (Détour à l’Anglais) where the path of the Mississippi nearly forms a circle, the French constructed forts—St. Léon and Ste. Marie—on both sides of the river.¹⁵ Although Pittman noted these were “only enclosures of stockades and a defence against small arms,

the batteries on each side, which [were] ten 12-pounders, [were] more than sufficient to stop the progress of any vessels.”¹⁶

While work was under way on these and other early wilderness defenses, engineers had been working on the fortifications around the town of New Orleans. Located over 100 miles from the passes at the mouth of the Mississippi, this site, along with New Biloxi and Mobile, had been founded to secure Louisiana from Spanish and English intrusions. Named to honor the Regent of France, Philippe duc d’Orléans, it was established in 1718 under the leadership of Jean-Baptiste Le Moyne, sieur de Bienville. The location for the new town, which was to control communication with the Mississippi Valley, was selected strategically to command the portage between Lake Pontchartrain and the Mississippi River—a position which, a century later, would prove expensive to defend.¹⁷

As was common with towns of military importance, numerous engineers were associated with the development of fortifications of New Orleans. In 1718, sieur Périer was ordered from France to Louisiana to direct the establishment of a citadel and the development of a fortress—a town enclosed with elaborate fortifications.¹⁸ However, Périer died before arriving in Louisiana and in 1720 Leblond de la Tour, a trained military engineer who had been appointed engineer-in-chief, was sent to lay out the streets and develop the fortifications.¹⁹

A year later Pauger began laying out New Orleans according to the plan developed by de la Tour.²⁰ Characteristic of many French colonial towns, streets were laid out in a gridiron pattern around the *place d’armes*, a space that served for military drill and assembly (fig. 3). This block, along with the church facing it, was the nucleus of activity of the community. Surrounding these were barracks and other government buildings, then the dwellings. The whole was then enclosed within fortifications. Early drawings show

1 *Plan des ouvrages projettés à faire à l'Isle de la Balise avec les logements nécessaires. Drawing by Leblond de la Tour, 1723.*

2 *Plan, profil et élévation de la batterie projetée à faire en terre sur l'isle le plus audehors de l'embouchure du fleuve St. Louis. Drawing by Pauger, 1724.*

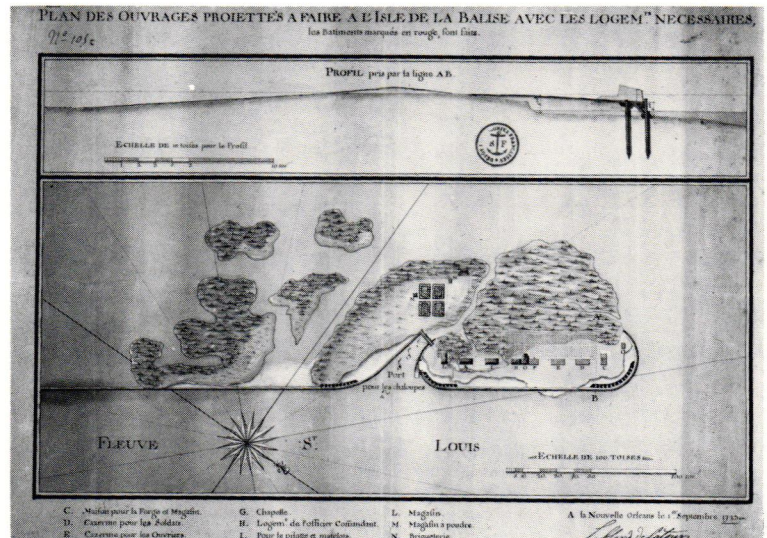
123

elaborate projected fortifications consisting of a polygonal enclosure with regular bastions at the angles. Since the distance between the corner bastions exceeded the range of musketry from the flanks from which position the curtains were enfiladed, flat bastions were to be located along the sides. To provide a further obstacle, plans were made to surround the wall with a ditch.

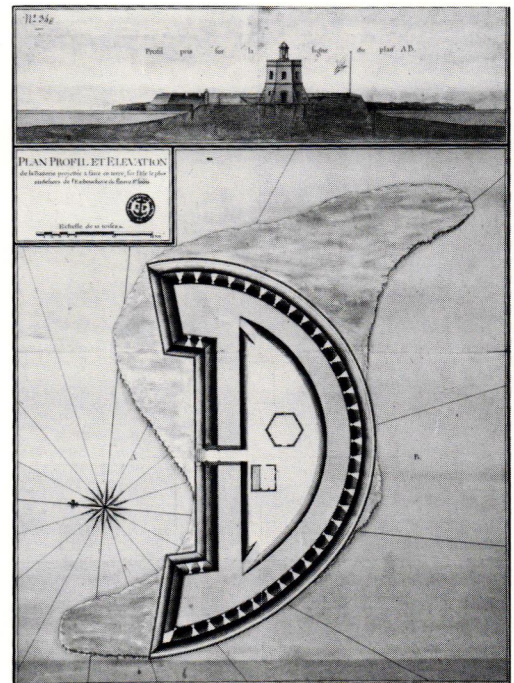
Work on the site was much retarded during the settlement's early years, but in 1729 was given some impetus by the Fort Rosalie massacre. Fearing the Natchez Indians who had attacked Rosalie, work to enclose the town with a palisade was commenced. After a short time the Natchez were destroyed, however, and lack of laborers, along with expense, further slowed progress. In 1732 the king was informed that work had been suspended for two years and that the ditches, which were to be 60 feet wide, were never more than a mere two feet deep; in some places filled in such a way that no trace of them was visible. Engineer Baron had evidently undertaken them only to assure the citizens who feared the Natchez.

Interest in developing works of defense for New Orleans waxed and waned with political conditions. Near the end of the French regime war again motivated work on the defenses. In 1758, Governor Kerlérec restored early fortifications,²¹ and in 1764, M. de Vergès, engineer of the colony, developed additional plans for an enceinte with "ditches, palisades, bastions, platforms and curtains."²² Although work proceeded during the French and Indian War, the results were hardly formidable.

New Orleans and the Louisiana territory west of the Mississippi were ceded to Spain in 1762 by secret treaty. Throughout the years of the Spanish regime, in response to fears of aggression by the English, the fortifications of the city along with forts controlling avenues of communication were improved. Several Spanish governors, including Bernardo de Gálvez and Don Francisco Luis Hector, baron



1

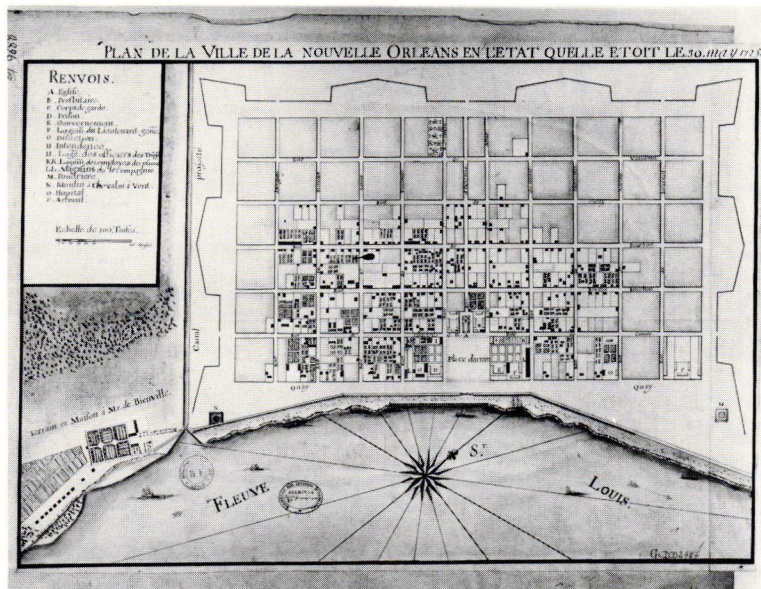


2

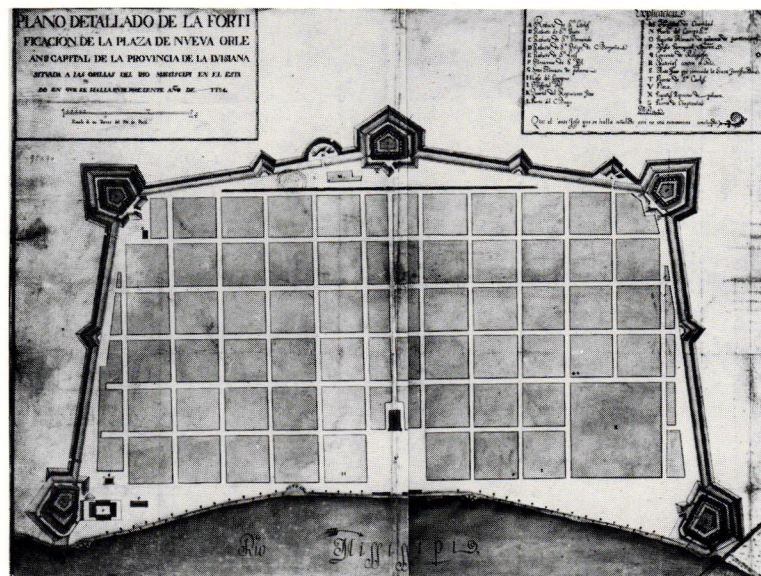
3 *Plan de la Ville de la Nouvelle Orléans en l'Etat quelle étoit, 1725.*

4 *Plano detallado de la fortificación de la de Nueva Orleans, 1794.*

124



3



4

de Carondelet, maintained or strengthened some of the works erected by the French but also set up new defenses. During the American Revolution the batteries were repaired.²³ Then, in 1791, Carondelet ordered the French fortifications designed by De Vergès destroyed and replaced by works consisting of five redoubts and a circumvallation designed by the military engineer, Gilberto Guillemard (fig. 4).²⁴ Each redoubt plan was pentagonal, a form determined by the geometry of the bastioned system of fortification, and each was dependent upon its neighbor for protection by reverse fire. The two redoubts situated at the corners of the town adjacent to the river—San Carlos and San Luis—were the strongest. In 1796, according to observations of General Georges Collot, these works had parapets 18 feet thick, surrounded by ditches eight feet deep and 20 feet wide. American engineer James Gadsden noted the interior parapets of San Carlos were revetted with masonry, the exterior with sod and the scarp and counterscarp with planks.²⁵ This construction was also characteristic of San Luis, which was damaged in 1794 by a fire.

Located on the northwest side of the city and connected to San Carlos and San Luis by a 40-foot-wide ditch were the redoubts of San Juan, San Felipe de Borgoña, and San Fernando, each of which provided for enfilade of the ditch. These were positioned to protect against attack from the country, although they were not considered as strong as the river works. To complete the defenses, a line of pickets seven feet deep was placed between the town and the ditch. Several engineers reported on the lack of strength of this system. Collot noted they looked “rather like mock fortifications.”²⁶ By 1806, it was reported that the city was surrounded, except at the front, with a mere mud wall with the five redoubts “incapable of sustaining a siege, or of affording any considerable protection against assault.”²⁷

Considered more important than the fortifications around the city were the works positioned to control the gateways to the avenues of communication, including Bayou St. John,

5 Plan, profiles of Fort St. Philip at Plaquemines Bend. Drawing by G.T. Poussin, 1817.

6 Topographical plans of Pass Rigolets and Pass Chef Menteur, projected, Simon Bernard, engineer. Drawing by G.T. Poussin, 1817.

English Turn and the Plaquemines. At these locations, Spanish engineers improved or developed fortifications containing batteries of cannons.

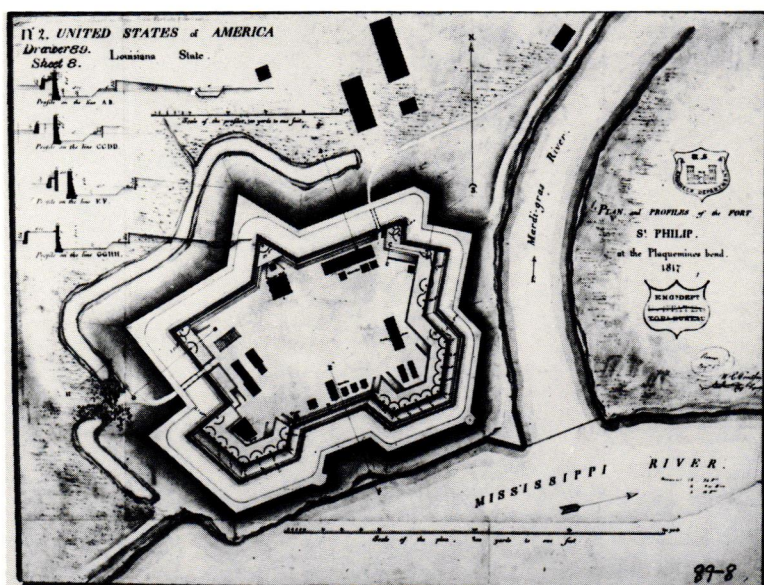
Probably the most significant work to be undertaken during the Spanish regime—and the only colonial work to be eventually retained by American engineers—was Fort San Felipe de Placaminas (Fort St. Philip) on the left bank of the river at the mouth of Mardi Gras Creek (fig. 5). Established about 1786, it had an irregular plan consisting of a bastion and a series of salient and re-entrant angles, an attribute that later was much criticized. With revetments of brick and wide parapets overlooking the river, it was built over long piles driven into the mud and was protected from assault by a broad ditch filled with water.

Throughout the subsequent century, this Spanish work would be retained as a key defense, although nature made it one of the most difficult for engineers to maintain. Built on marshy “floating” soil, settlement continually caused cracks in the walls, plant growth persistently encroached, mud steadily filled the ditch, and the parade was inundated frequently.²⁸

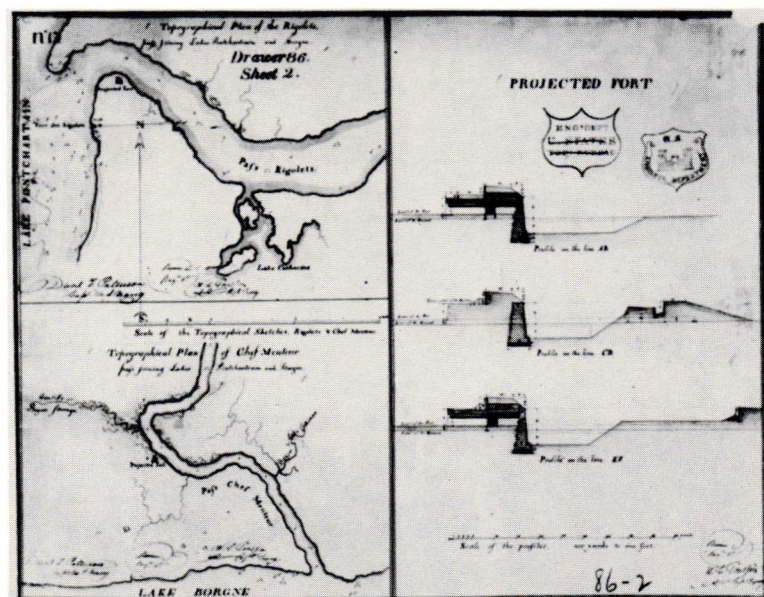
Likewise, across the river nature imposed considerable hardships upon engineers when they established Fort Bourbon. Designed to mount cannons that would cross fire with St. Philip, the fort was destroyed by a hurricane in 1795,²⁹ was rebuilt, but disappeared in the 19th century with the site’s erosion.

Early Federal Works

New Orleans and Louisiana were retroceded to France in 1801 by the Treaty of San Ildefonso, and in 1803 they were purchased by the United States. Americans considered the defense of New Orleans key to the control of the vast Mississippi Valley, however, with the purchase few fortifications were acquired that would be effective in the defense of Louisiana. Of all the works set up previously for the



5



6

9 View of waterfront casements, Fort Jackson.

10 View of casement embrasure, Fort Jackson.

127

tions and projected new works.³³ Gadsden posed two possible systems of defense: fortification of “every avenue into the state” and “a partial system of defense, as may delay an invading foe until the strength of the West can be brought into operation.”³⁴

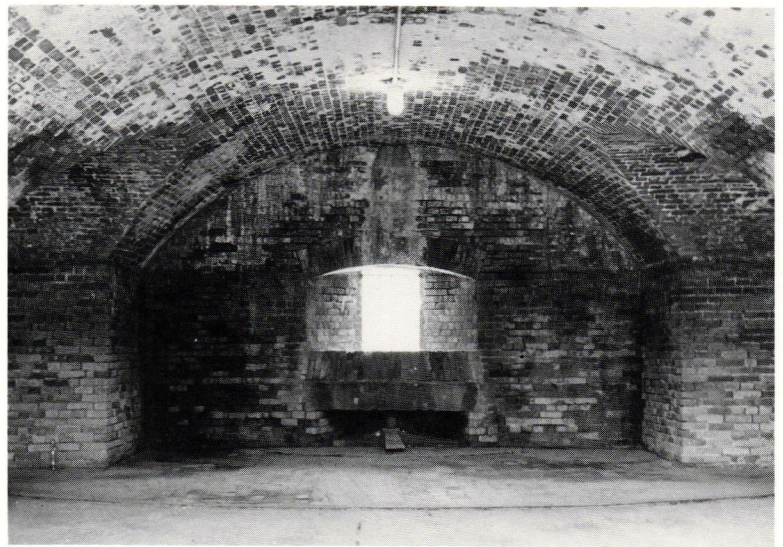
Although Gadsden’s work was certainly viewed with respect and interest, it was superceded by proposals of Simon Bernard (1779-1839), a French military engineer. Bernard had been placed at the head of a board of engineers charged with the development of the national system of defense. The decision to hire him was made in 1816 when Congress authorized the president to employ an assistant in the corps of engineers.³⁵ The president appealed to France, where Lafayette recommended Bernard, a graduate of the *École Polytechnique* who had served with Napoleon. President Madison, “reposing special trust and confidence in [the] valor, fidelity, and abilities” of Bernard, awarded him the rank of brigadier general—a rank naturally resented by American officers.³⁶ He was then placed at the head of a board of engineers charged with the prestigious responsibility of developing the national system of defense.³⁷

Accompanied by the French topographical engineer Captain Guillaume Tell Poussin, Bernard began his survey of the Mississippi at the delta. After about a year, during which time drawings were made for projected fortifications as well as existing works, the team returned to Washington. The drawings were exhibited before members of Congress. Rendered in watercolor with skillful technique, these showed configurations of water, marshes, agricultural areas and dense forests. The Congress subsequently approved the commencement of the regional system of defense for Louisiana.

The regional fortifications for Louisiana were conceived as integral links of the extensive national chain. Noting that earlier U.S. forts had defended only single points, Bernard conceived a comprehensive national system that consisted of



9



10

a navy, regular army, interior communications and an extensive line of forts along with a militia to defend them. This concept of seacoast fort defended by militia had been employed in France.³⁸ The objectives of military architecture were: to protect the major cities against attack; to protect the avenues of interior navigation from blockade; to close important harbors to enemy ships and secure them for the U.S. Navy; to deprive an enemy of positions from which he could direct operations of war; to cover coastal and interior navigation and to give the U.S. Navy the means necessary for protecting this traffic; and to cover the great naval establishments.³⁹

Bernard's recommendations reflected French training and European experience, yet were based upon considerations for American defense that differed from his homeland. Here attack would come by sea, rather than by land, as was common in Europe. Therefore, instead of surrounding entire cities with fortifications, Bernard recommended fortifying the navigable approaches to cities. Works would be located as far as possible from the city toward the sea, yet far enough inland to control the expanse of the waterway with cannonfire.

The survey by Bernard and Poussin revealed that the only extant works capable of defense along the entire Gulf of Mexico were Fort St. Philip and Fort Bowyer. Yet, too, the former was too small and weak to defend the lower Mississippi and the latter, a work thrown up in 1813, could not hold out three days against regular attack. Extensive new works were mandatory to secure New Orleans.

To protect the approach up the Mississippi River, a work later named Fort Jackson was projected for the Plaquemines, opposite Fort St. Philip, which was to be retained in the system. To defend the northern water communication to New Orleans through Lake Borgne and Lake Pontchartrain, works were projected, respectively, for Rigolets Pass (Fort Pike) and Chef Menteur Pass (Fort Wood, later

renamed Fort Macomb) (fig. 6). To defend Barataria Bay, a feature considered to be a potential objective for an enemy seeking a harbor for a "floating force," a work was projected for Grand Terre Island (Fort Livingston). To defend the pass used by the English in 1814, a work was projected for Bayou Bienvenue (Battery Bienvenue), and to defend a channel leading to New Orleans to the south of Bienvenue, a tower was projected for Bayou Dupré (fig. 7).⁴⁰ Of these, the works for the Plaquemines, Chef Menteur, Rigolets and Bayou Bienvenue, along with the extant Fort St. Philip, were all labeled first-class works, a designation reserved for the most important defenses in the system. The cost of the entire New Orleans group was estimated to be \$1,566,515.42,⁴¹ ranking these fortifications among the most expensive in the nation.

Several conditions required the large expenditure necessary for these works, including the policy on permanence of construction set forth by the U.S. War Department. In 1818 it was determined that all fortifications constructed along the Atlantic and Gulf of Mexico frontiers would be permanent—new works as well as repairs to existing forts should be effected with quality workmanship and durable materials to reduce deterioration caused by the elements, hence the high cost. Because of expense and shortages, complete realization of the fortifications around New Orleans, along with the others in the national system, would require many years. Yet with patriotic dedication it was observed the works would endure for ages and "future generations [would] owe the preservation of their country to their forefathers."⁴²

Noting natural barriers that could be incorporated into the defenses of each position, Bernard developed plans for works that conformed to the French school of fortification—the same system of military architecture that determined the forms of the defenses for Paris. The bastioned system, favored by the French and taught at the École Polytechnique, was the form used for Fort Jackson, the largest in the New Orleans system (fig. 8).⁴³ The fort was a pentagonal

11 Ditch, curtain and flank, Fort Jackson.

*12 Work in progress, at Fort Jackson.
Drawing by H.L. Smith, 1841.*

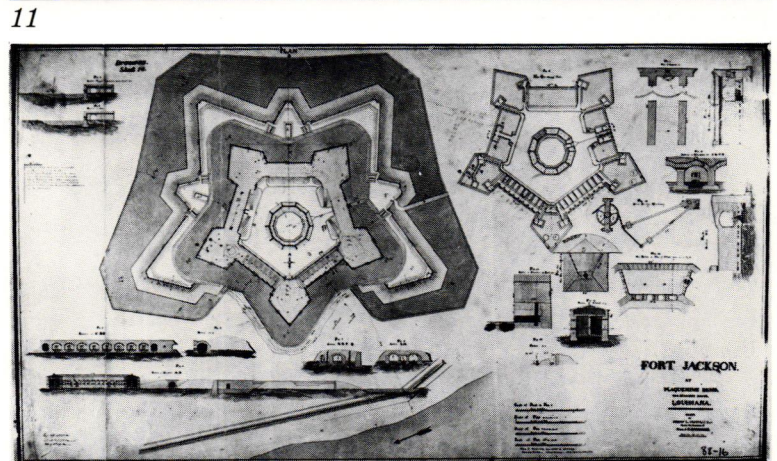
bastioned work measuring 130 yards between the salients of the bastions. In each of the two fronts designed for defense of the river were eight casemates (fig. 9) with embrasures (fig. 10) providing bombproof enclosures for men and cannons; in the three fronts designed for defense against a land siege, the curtains were without casemates for artillery. To defend the water-filled ditch against surprise attack, casemates were also provided in the flanks of the bastions (fig. 11).

The design of Fort Jackson essentially conformed to the variation of the French school known as the “modern system” of fortification, the theory for which had been innovated by Louis de Cormontaigne (1692-1752), a disciple of Vauban.⁴⁴ Among the elements of this system were a ditch 30 yards wide at the tip of the bastion; curved counterscarp, which was established by swinging an arc from the tip of the bastion; the straight section of the counterscarp, which was established online tangent to this arc and connecting to the flanked angle of the crest of the rampart—enabling the entire ditch to be enfiladed from the flank. However, the lengths of the faces of the bastions, which were established at two-sevenths the length of the polygon, defined by lines connecting the salients of the bastions, conformed to the practice of Vauban, rather than Cormontaigne. Located about 65 miles below New Orleans, Fort Jackson was officially begun with the collection of materials in 1822. The following year land around the site was cleared and drained, and building materials stockpiled. Workers several years later completed excavation of the ditches and advanced the brick work of the citadel. With frequent interruptions, work continued for several decades on the brick casemates and scarp. It was 1843 before the drawbridge was completed and the paving of the casemates was advanced (fig. 12). Thereafter, renovation and modification continued for several additional decades.

As with Jackson, the forts designed for the Rigolets, Chef Menteur and Grand Terre Island were brick, conforming to



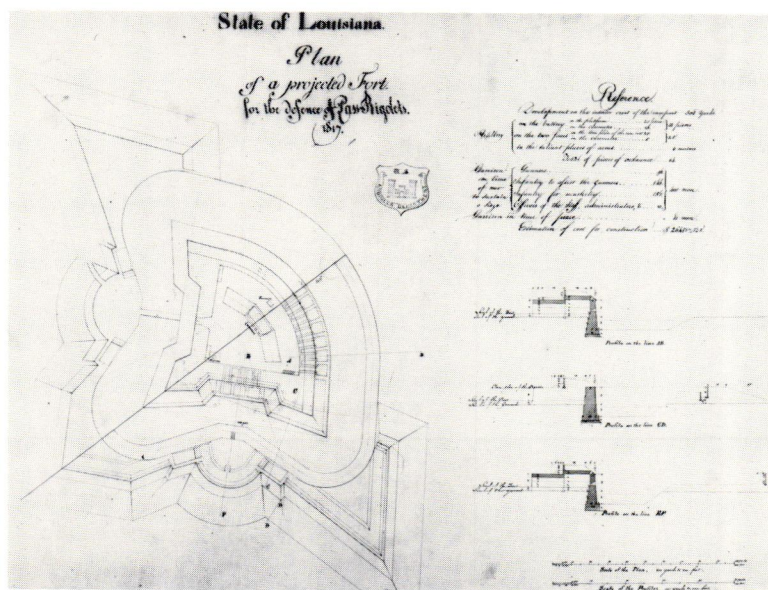
129



12

13 Plan for fort projected for defense of Pass Rigolets, Simon Bernard, engineer. Drawing by G.T. Poussin, 1817.
 14 Nomenclature of elements of fortification in plan.

130



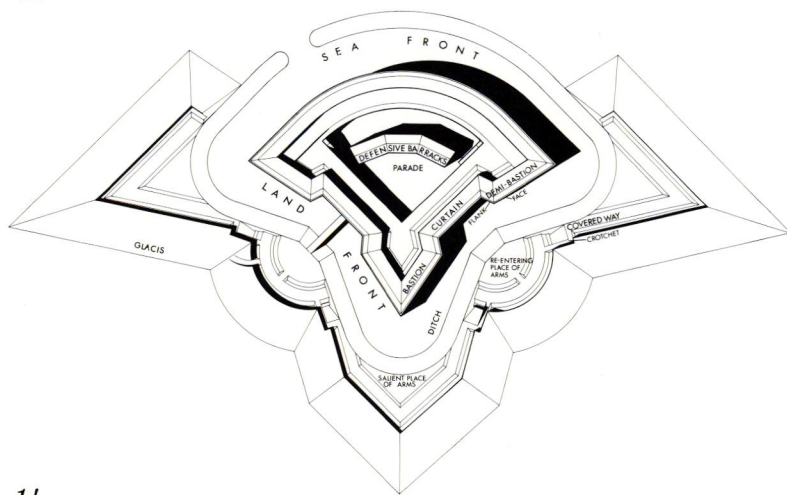
13

the French school (figs. 13, 14). However, in contrast to the work at the Plaquemines, other masonry forts incorporated forms specifically developed for water defense. Since defensive functions were similar, virtually identical plans were projected for each position.⁴⁵

Combining theories of both sea and land defense, Bernard's plans for these forts were unique in the United States, although interestingly, the earthworks of Fort Bowyer were on a similar plan. Described technically as crescent batteries with gorges that were closed by two short fronts of bastioned fortification, the curved sea front was intended to provide a uniform sweep over the water with artillery (fig. 15); land fronts were designed for defense against either an assault or a regular siege (fig. 16).

Other aspects of the designs also conform to the French school. The length of the bastion face was one-third the length of the polygon, which complied with the modern system, as did the forming of the crotchets *en cremaillère* at the re-entering places of arms. Also conforming to the French tradition were land fronts formed with a glacis and covered way (fig. 17). The enceinte was entirely surrounded with a wet ditch which was defended from flank casemates (fig. 18). The only access to the enceinte was across a drawbridge (fig. 19). An aspect of design that distinguishes these forts, along with Fort Jackson, from others in the United States was the use of an earth incline—which was eventually revetted with wood—instead of a masonry counterscarp at the outer perimeter of the ditch.

Consistent with Bernard's other work, details of casemate design in crescent forts also reflect European practice. The casemates were approached from the parade through a long narrow tunnel, the only new forts in the permanent system with this arrangement. Although Bernard's original design for Fort Jackson and Fort Morgan, Alabama, show this configuration of vaulted bombproofs, the tunnels were later eliminated in favor of casemates extending the entire width



14

15 *View of sea front, Fort Macomb.*
16 *Land fronts and ditch, Fort Pike.*
Photograph by E. Barkemeyer.

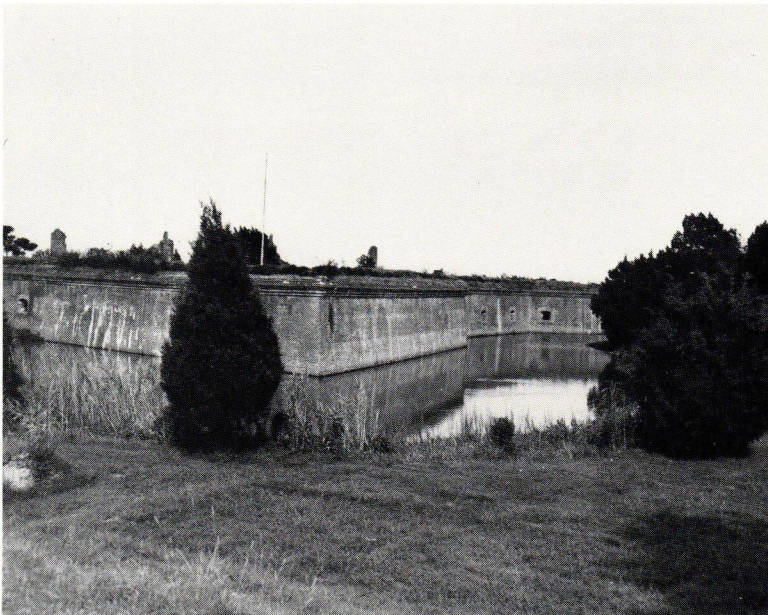
of the enceinte, thereby making the ventilation of gunsmoke more positive. Since the New Orleans forts were remotely situated—making succor difficult in time of attack—Bernard designed citadels, or defensive barracks, for the Lake Pontchartrain and Mississippi River forts. These features distinguished Gulf Coast works from those along the Atlantic Coast.⁴⁶ Serving as barracks, they were intended also as a “place of last resistance,” hence loopholes for musketry were formed in the brick walls (fig. 20). In theory, these would have made possible a prolonged defense, during which time reinforcements could reach the forts. While the citadel was decagonal at Jackson, at the crescent forts they were formed in three contiguous sections, following the curvature of the sea fronts (fig. 21). All were originally designed as one-story structures, but around mid-century, a second story was added to Fort Pike and Fort Wood, thereby increasing the number of accommodations for the soldiers.

On 20 July 1818, a contract for labor and materials for the construction of both Fort Pike and Fort Wood was awarded to James Bennett and Peter Morte.⁴⁷ Both were unaware that the work was destined for immense hardships imposed by the remoteness of the sites, unstable soil, inclement weather, and serious health hazards. To begin, in 1820 the original site selected for Fort Pike was abandoned because the marshy ground appeared incapable of supporting the massive work. In 1821 it was reported that foundation excavations were inundated by water which had risen eight feet above normal water lines. The difficulties encountered by the contractors were of a magnitude to cause them to terminate work on Fort Wood and devote all efforts to the completion of Fort Pike, officially accomplished by 1827.⁴⁸

As Fort Pike was nearing completion, work resumed on Fort Wood, but obstacles continued to inhibit the work on all the New Orleans forts. In 1825 it was reported 120 days of rain and three violent storms produced 107 inches of water, considerably retarding work at Chef Menteur and the



15



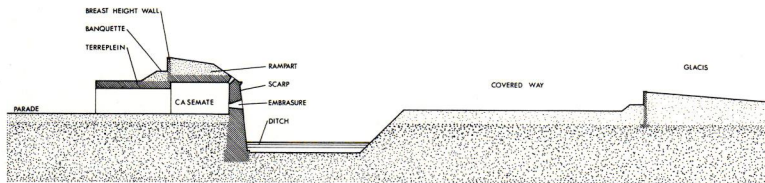
16

17 *Nomenclature of fortification elements.*

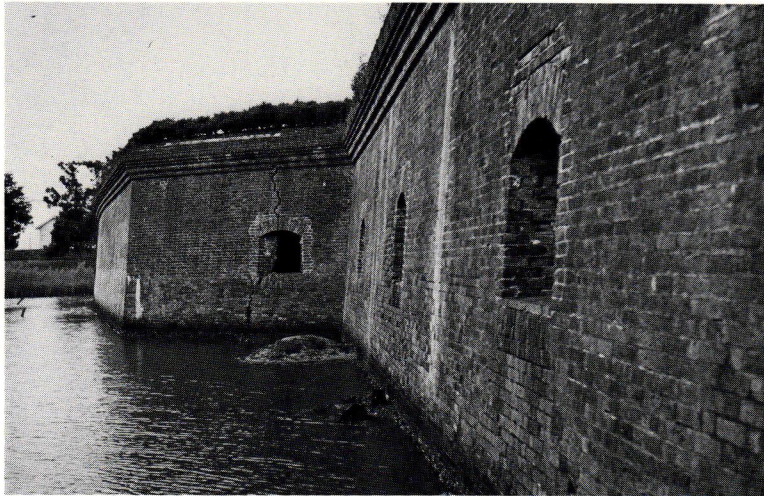
18 *View of ditch, curtain and flank, Fort Pike.*

19 *View of gate, Fort Pike. Photograph by W. M. Cline Co.*

132



17



18



19

Rigolets, as well as at the Plaquemines.⁴⁹ In addition, fevers, cholera, dysentery and catarrh, often resulting in fatalities, retarded progress.⁵⁰ In 1825 and subsequent years, illness brought on by the miserably hot climate caused suspension of work at Fort Jackson and thereafter, interruptions were common during the "sickly season" when swarms of mosquitoes added to the adversities.

These fort sites were by nature well fortified. Marshes and prairies would make movement and establishment of siege works by potential aggressors difficult, but at the same time this terrain imposed considerable handicaps on the construction of foundations for heavy brick walls and massive early ramparts. The walls of the forts were supported entirely on grillages of logs and planks, a practice that was to prove problematical over the years. In 1824, because of uneven settlement, openings began appearing in the masonry of Fort Pike. As late as 1836, installation of the ramparts of Fort Jackson awaited stabilization of the work from settlement, and in 1841 work was suspended because of unstable foundations. Across the river, renovation of cracked walls of Fort St. Philip continued for a number of years. Spanish engineers had employed piles to support the walls but these were little more successful than grillages.⁵¹

Although grass and wild shrubbery continually caused difficulties, settlement was evidently not so problematical at Tower Dupré, situated near Lake Borgne at the mouth of Bayou Dupré. This tower, a work on a hexagonal plan, had been projected by Bernard in 1817, although the construction contract was not awarded until 1829. The following year work was reported complete on this tower, the last work in the New Orleans vicinity to be erected according to the French engineer's plans. Often incorrectly labeled a Martello tower,⁵² it was designed to house six carronades, a magazine and barracks. At the base was a battery of heavy cannons mounted behind earth ramparts and connected to the tower by a stockade. With walls 30 feet high and six feet thick

at the base, this was a massive work. As in the other forts, it was supported upon a wooden grillage.

Although all of the works designed by Bernard incorporated excellent craftsmanship and the best technology available,⁵³ numerous problems developed upon completion. In the casemated works, the lead covering of the vaults, which had been installed to waterproof the masonry, had deteriorated by the 1840s. Cracks that opened in the masonry due to uneven settlement contributed to the waterproofing problems.

Despite the problems, these forts were remarkable achievements. Through experience gained in the New Orleans vicinity, American military engineers improved their knowledge of construction and progressively improved later work. The federal works built during the period in the decade preceding the Civil War reflect not only better technology and craftsmanship but also new theories on the art of fortification.

Federal Forts Incorporating New Theories

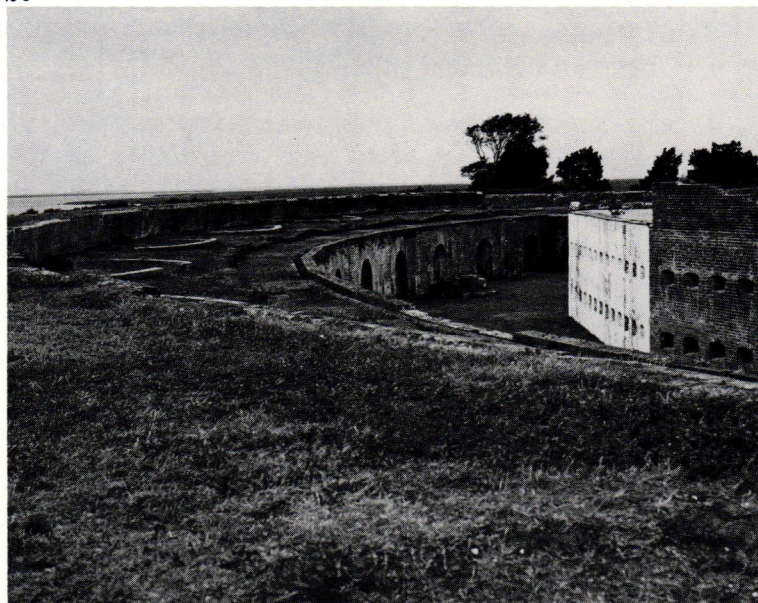
The French system of fortification had become deeply embedded in American military architecture, both in practice and in theory. In addition to being embodied in the early federal works of the permanent system, it also formed the basis for academic work at the U.S. Military Academy where engineers who supervised construction on the permanent forts had graduated. In fact, according to one enthusiastic critic, the academy followed the French system so rigorously "that its dimensions [were] insisted on to eighths of an inch."⁵⁴ Interestingly, the American fortifications conforming to this system were praised for their uniqueness in answering the peculiar needs of national defense, for adherence to scientific principles, and for the beneficial manner in which they were adapted to site and locality, but not a single example of works projected or realized was included in the studies at West Point. Instead, European works were used as models.

20 View of defensive barracks, Fort Macomb.

21 View of sea front, rampart, terreplein and defensive barracks.



20



21

134 Near mid-century, this obsession with French military genius was questioned by James St. Clair Morton, a first lieutenant of the engineers and an outspoken critic of American fortifications. He noted that French principles had been developed in response to the exigencies of land defense required in Europe rather than the seacoast defense required in America. He then observed that new weapons with greater capacities for destruction had been developed, along with armor-clad vessels with shallow draft. In part, at least, inspiration for this new approach might come from a study of the German school of fortification, a system based upon the use of polygonal enceintes without bastions.

With respect to changes in the theory of fortification, Morton echoed developments that had already occurred. Following Simon Bernard's return to France, plans he had developed for forts not yet under way were replaced by new projects incorporating the polygonal system, designed by Joseph G. Totten (1788-1864), who became chief engineer in 1838. Grand Terre Island, a position that had remained without defenses during the early decades of the development of the national system, received a polygonal fort.

Construction on the defense for Baratavia Bay was delayed by a number of circumstances, all of which worried the residents of New Orleans, since the Crescent City was considered to be entirely defenseless on the west side of the Mississippi River.⁵⁵ By 1834 the site had been purchased but there was evidently no engineer available to supervise the work.⁵⁶ In 1841, operations were finally under way, following construction of a wharf, setting up of temporary buildings, and laying of a railroad track from the landing to the site. The previous year, Totten had submitted to the board of engineers for approval a new design for the work, named Fort Livingston, and had received approval. The enceinte consisted of a four-sided polygon surrounded by a ditch with a masonry counterscarp, a radical departure from Bernard's original plan for a crescent battery. For close-in defense, the ditch was enfiladed from reverse-fire casemates and a

gallery with loopholes located behind the counterscarp, rather than from bastion flanks.

Typical of the New Orleans forts, progress on Livingston (fig. 22) was encumbered by much adversity. The remote location, about 60 miles from the city, was approachable only by water, handicapping transportation of materials. Nonetheless, by 1843 it was reported that 1,721 cubic yards of brick work, 1,421 cubic yards of concrete, and 28,239 cubic yards of earth work were in place.⁵⁷ When these materials were placed, however, the wells and piers of the fort began settling unevenly, resulting in the appearance of cracks in the masonry. In 1848 work was suspended indefinitely to allow the work to complete its subsidence, though settlement had not yet abated at the beginning of the Civil War.

Fort Livingston incorporated up-to-date building technology. Although performance of the material was uncertain at the time, concrete was used extensively, in part because of economy. The casemates were roofed with concrete, sealed with asphalt. Concrete was also employed for the loopholes and for the floor of the counterscarp gallery. While new philosophies on military architecture and improved technology were being incorporated into the forts of the 1840s, the entire system of seacoast defense was being re-evaluated in light of new developments in naval architecture. A number of sites overlooking channels that were previously considered too shallow for navigation were added to the network to defend against the passage of steam-powered vessels with light draft. In the revised system for the protection of New Orleans were Proctor's Landing on Lake Borgne, 28 miles from the city, and Ship Island, 12 miles off the Mississippi coast.

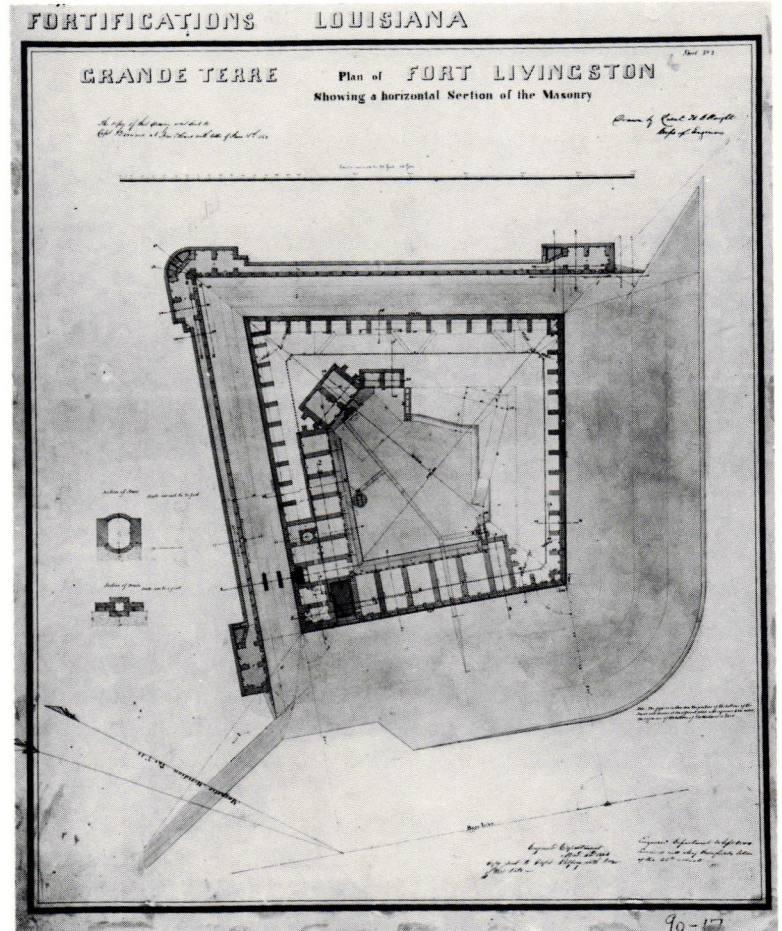
Appropriations for a tower at Proctor's Landing was requested in 1847 but funds were not made available for nearly a decade, a delay caused by skepticism over the system's strength. During the late 1840s and early 1850s, pending reassurance on capabilities for defense of the forts,

22 Plan of Fort Livingston, Joseph G. Totten, engineer. Drawing by H.G. Wright, 1842.

appropriations for the individual forts were small or nonexistent; new work was postponed and completed work poorly maintained. During this period the existing New Orleans forts were either abandoned or placed in the care of fortkeepers.

It was finally determined that the national system should be continued and in 1856 work was under way on the tower at Proctor's Landing according to a design similar to twin towers in the vicinity of Fort Taylor, Florida, ca. 1861. Developed on a concept inspired by Martello towers, they were three-floor works with massive walls of masonry, about 44 feet high. On the top level, open to the sky, were mountings for four cannons; on the intermediate floor, where the walls were perforated by loopholes and iron-faced embrasures, were quarters; and on the ground floor, where the spaces were most secure from bombardment, was the magazine, as well as additional quarters. Below this bottom floor were four cisterns filled by rainwater conducted from the cannon platform. The only access to the tower was at the first floor through an opening closed by a drawbridge.

Work was retarded in 1860 by a hurricane but construction progressed satisfactorily in the early years and by 1858 the scarp of the tower had been raised 27 feet.⁵⁸ Nonetheless, when the state seized the fortification at the beginning of the Civil War it was yet unfinished. When finally completed, the tower at Proctor's Landing was a masterpiece of masonry incorporating sophisticated structural techniques (fig. 23). Supporting the barbette cannon platform were nine groined quadripartite vaults. The first and second floors were structured with iron beams supporting segmented barrel vaults, a technique developed several decades earlier in England for mill buildings. Near the base of the tower, the walls were splayed outward to distribute the bearing over a large area, while the weight on the interior piers was spread uniformly by countervaults (inverted vaults). All this was then supported by wooden piles driven into the mud. Consistent with the finesse exhibited in other parts of the



136 work, these timbers were protected from deterioration by constant submersion in water retained by a levee built around the work.

Continuing evaluation of the national network of fortifications resulted in the recognition of Ship Island as important to the defense of New Orleans. In 1841 it was surveyed and two years later fortifications were recommended, although plans had not been completed by 1851. In 1857 an appropriation of \$100,000 was made by Congress.⁵⁹ Two years later the site for the fort was ceded by the state of Mississippi to the federal government and work was begun.

The projected trace of the fort for Ship Island was in the form of a horseshoe, with the opening, or gorge, closed by a land front consisting of a curtain and two demi-bastions—a form often called a castle (fig. 24). Reminiscent of Fort Wood and Fort Pike, the circular section—devoid of flank protection since it faced the water—was designed to mount one tier of cannons in casemates and another en barbette. The curtain, in the center of which was the only gate controlled by a drawbridge, was enfiladed from the flank casemates by howitzers firing through embrasures and by muskets firing through loopholes.

This design appears to reflect the concepts on military architecture of the French officer, Marc-René Montalembert (1714-1800), acclaimed as the first writer to give special treatment to the defense of seaports.⁶⁰ According to Montalembert, who wrote on three systems of fortification—polygonal, perpendicular, and circular—“*des forts circulaires*” required less masonry, were well adapted to confined sites, and were appropriate for seacoast defense where flanking arrangements were not mandatory.⁶¹ Then, to produce heavy concentrations of gunfire, cannons were mounted in multiple tiers.

Forms similar to the work on Ship Island had been used early in the 19th century for the defense of New York City

and Charleston. Among the works appearing with circular fronts closed by curtains were Castle Clinton, New York, and Castle Pinckney, South Carolina. Early in his career, Joseph G. Totten, to whom the design of the Ship Island work is attributed, worked on the construction of Castle Clinton and Castle Williams, another circular work in New York Harbor.⁶²

While they appeared to be efficient to construct, these castles were criticized by some military experts. According to James St. C. Morton, they were “in all cases contracted and weak, owing to the difficulty of joining strong land fronts with casemated sea fronts of small development.”⁶³ Moreover, he advocated their small size was inadequate to hold ammunition sufficient to resist prolonged bombardment and the open casemates were vulnerable to fragments from shells bursting in the parade. In any event, the work on Ship Island was among the most beautiful and well-constructed masonry forts in the country. The parados was interestingly sculptured from earth, penetrated by access tunnels. Supported upon concrete foundations, the curved scarp and wedge-shaped casemate vaults incorporated excellent workmanship. The stair to the terreplein of the circular front was contained within a brick cylinder, creating a beautiful composition of geometrical forms. However, as with the other late works for the defense of New Orleans, all these had not yet been completed when the secession of the South occurred.

Following the war, damaged New Orleans forts were restored. The defensive barracks of Jackson, which burned during the bombardment, was removed and other incomplete works were finished. While American forts were considered to be the most efficient in the world in 1860, the War Between the States proved the material with which they were built was incapable of withstanding the impact of missiles fired from high-powered rifles and the cannons mounted within were incapable of stopping iron-clad steamers from passing.

In retrospect, it seems remarkable that the government would restore and complete works that now appeared to be obsolete,⁶⁴ yet there was a natural reluctance to abandon completely theories on an art of fortification that had required centuries to evolve. To some, it appeared the forts could be strengthened. After observing the power of the iron clads, it was considered that the scarps in front of the casemates might be covered with wrought-iron shields—as was tried in Europe.⁶⁵ However, no practical plan for accomplishing this was ever devised. In any event, the Ship Island fort was completed ca. 1870. It was eventually named Massachusetts, after the federal gunboat of that name.

The war had proven that pliable earth was more effective than brittle masonry in resisting cannonfire. As a consequence, in 1869 the board of engineers developed a program for modification of the existing forts with the installation of earthen batteries wherein large-calibre artillery was mounted. These were designed to work in conjunction with systems of torpedoes, depressing gun carriages, mortars of large-calibre placed within old works, obstruction, and floating batteries.⁶⁶ Projects were prepared for Forts Jackson,⁶⁷ St. Philip, Pike, Macomb and Livingston. Those for the Plaquemines forts were commenced in 1872 but were never completed; lacking appropriations, those for the others were never begun.

Little work was done thereafter until the 20th century. Meanwhile, the wood, earth and brickwork of all had deteriorated from weather and nature, and in 1887 a fire destroyed the wooden parts of the defensive barracks of Fort Pike. It was concluded, finally, that maintenance was higher than the strategic value of the works justified. In 1877 it was recommended that Tower Dupré be abandoned as a fortification, and then it was recommended that Battery Bienvenue be disposed. In subsequent decades the towers, crescent batteries and polygonal work were liquidated.

Meanwhile, the Board of Fortification, known as the

Endicott Board, had been organized in 1885. The following year, in cooperation with the Board of Engineers, a new plan for national defense had been organized.⁶⁸ Basic to the new system were the following:

“Armaments of the heaviest rifled guns mounted on disappearing carriages, which . . . can concentrate their fire on the enemy’s vessels. . . .

“A well-developed system of submarine mines planted in the channels and roadways. . . .

“The protection of these mined areas . . . by batteries of rapidly firing guns of small calibre.”⁶⁹

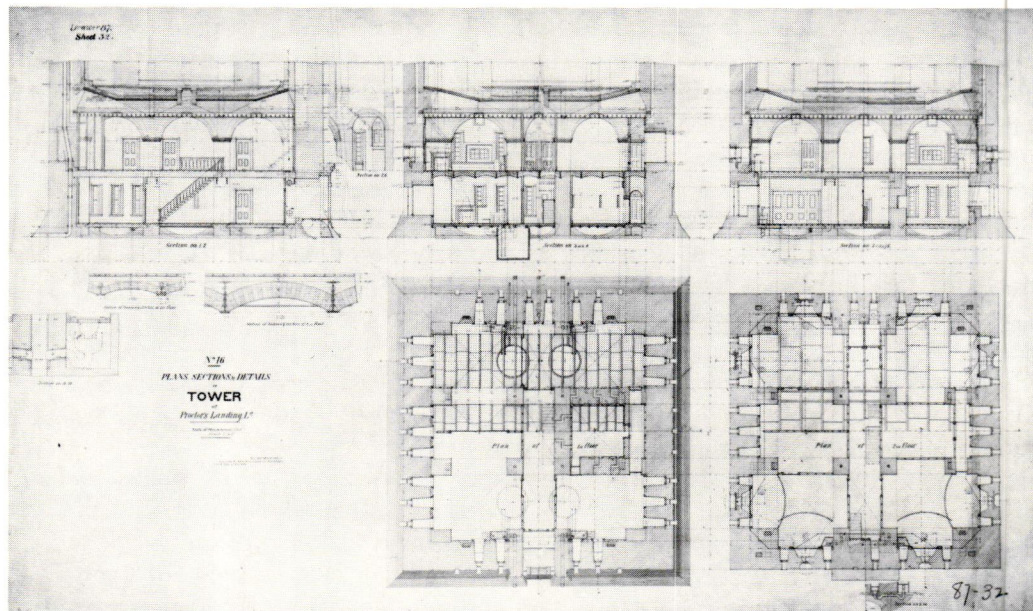
Old works were still considered valuable adjuncts of this system since the barracks, cisterns, and casemates were often usable. In response to the necessity of establishing an order of urgency in fortification, New Orleans was ranked sixth in the country, after New York, San Francisco, Boston, Great Lakes points and Hampton Roads.

With appropriations made in 1890, by 1893 a project had been partially prepared for New Orleans. Two years later a battery of two 10-inch guns on disappearing carriages was adopted as the official Endicott plan for the defense of the Crescent City. Although none of the New Orleans forts was garrisoned during this period, work proceeded on the battery with funds appropriated in 1896. Reminiscent of earlier times, completion the following year was prevented by unstable soil. Nonetheless, at this location, as elsewhere in the country, the war with Spain gave impetus to the completion of these batteries. Works begun shortly after the turn of the century included the addition of rapid-fire weaponry in addition to what had existed. Electric light and search light plants, erected by the Edison Electric Company of New Orleans, added to night-time efficiency.

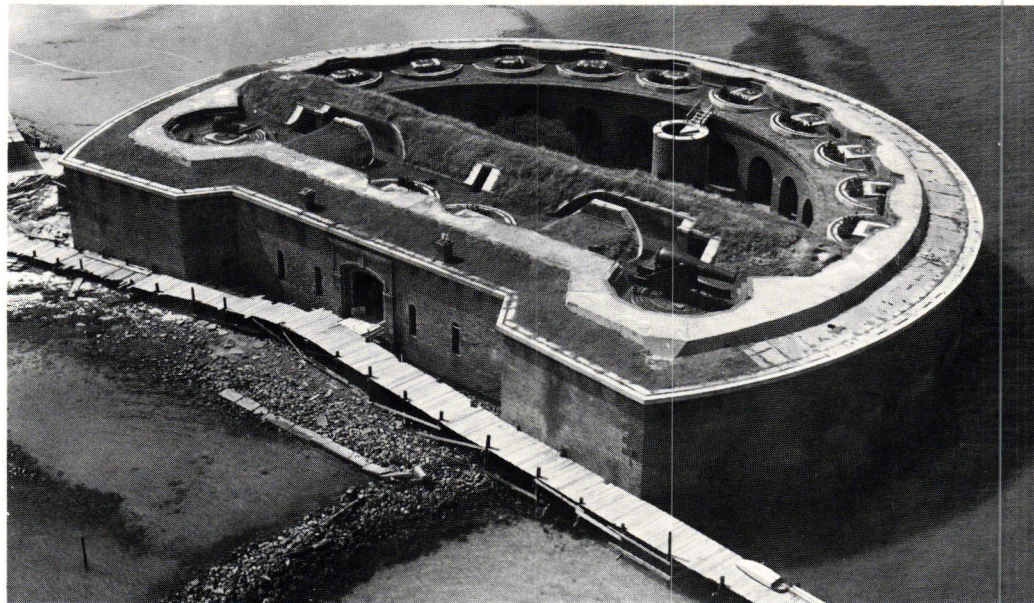
In the 20th century, the permanent masonry works embodying centuries of development in the art of fortifica-

138 23 Plans, sections and details of tower
at Proctor's Landing, Joseph G. Tot-
ten, engineer.

24 Aerial view, Fort Massachusetts.
Photograph by Chauncey T. Hinman.



23



24

tion originally designed to defend Louisiana were entirely abandoned by the federal government. Vacated in 1920, Fort Jackson has become a state historical park as has Fort Pike. Fort Massachusetts is now a part of the Gulf Island National Seashore under jurisdiction of the National Park Service. The forces of nature threaten to overtake Fort Livingston and Fort Macomb. However, it is hoped that all might be preserved for the appreciation of the architectural beauty as well as the manifestations of national dedication to freedom. They mark the end of a millennium for military architecture. Today missiles and supersonic aircraft fill the role in national defense that once belonged to monoliths of masonry.

Notes

1. This article appeared in the journal *Louisiana History*, published by the Louisiana Historical Society (Winter 1977) pp. 5-62, under the title "Maritime Frontier Engineering: The Defense of New Orleans."
2. Robert Cavelier de La Salle, *Relation of the Discoveries and Voyages of Cavelier de La Salle from 1679 to 1681: The Official Narrative*, trans. by Melville B. Anderson (Chicago, 1901), pp. 113-115. Pierre Margry, *Découvertes et établissements des français dans l'ouest et dans le sud de l'Amérique septentrionale (1614-1754)* (Paris, 1879-82), II, p. 49.
3. For a history of Fort de la Boulaye, see Maurice Ries "The Mississippi Fort called Fort de la Boulaye," *Louisiana Historical Quarterly*, XIX (1936), pp. 829-899.
4. Margry, *Découvertes et établissements*, IV, p. 364, IV p. 403, Nellis M. Crouse, *Lemoyne d'Iberville: Soldier of New France* (Ithaca, New York, 1954), pp. 208-209.
5. Reuben G. Thwaites, ed., *The Jesuit Relations and Allied Documents* (Cleveland, 1896-1901), LXI, p. 161.
6. H. Mortimer Favrot, "Colonial Forts in Louisiana," *Louisiana Historical Quarterly*, XXIV (6, 1946), p. 726.
7. At the same time, engineers Pauger, Sieur de Boispinel and Franquet de Chaville were sent to the colony, arriving in 1720. Boispinel was appointed engineer-in-chief in 1723 but died that year, after which time Pauger was made engineer-in-chief, a position he held until his death in 1726. In 1724, Chaville returned to France. Margry, *Découvertes et établissements*, V, p. 610; Willard B. Robinson, "Military Architecture at Mobile Bay," *Journal of the Society of Architectural Historians*, XXX (May, 1971), pp. 121-122. Samuel Wilson, Jr., "Colonial Fortifications and Military Archi-

ture in the Mississippi Valley," in *The French in the Mississippi Valley*, ed. by John Francis McDermott (Urbana, Illinois, 1965), pp. 111-112, 115.

8. Minutes of the Superior Council of Louisiana, 4 December 1722, *Mississippi Provincial Archives*, III, pp. 336, 338. Early drawings show several variations of projected plans. Apparently none was ever fully realized.

9. Philip Pittman, *The Present State of the European Settlements on the Mississippi*, reprint of 1770 ed. (Cleveland, 1906), p. 38.

10. Sébastien Le Prestre de Vauban, *The New Method of Fortification as Practiced by Monsieur Vauban* (London, 1693), p. 1.

11. See René Laudonnière, "The Second Voyage into Florida," in Richard Hakluyt, *The Principle Navigations, Voyages, Traffiques and Discoveries of the English Nation*, III (London, 1810-1812), p. 392.

12. Vauban, p. 22.

13. "Narrative of the Expedition Made by Order of Louis XIV, King of France, under Colony in Louisiana," *Historical Collections of Louisiana and Florida, including Translation of Original Manuscripts Relating to Their Discovery and Settlement with Numerous Historical and Bibliographical Notes*, by B.F. French, 2nd series (New York, 1875), p. 112. See also Margry, IV, p. 125.

14. Journal de Sieur d'Iberville, in Margry, *Découvertes et établissements*, IV, p. 521; Relation of Pénicaut, in Margry, *Découvertes et établissements*, V, pp. 423-424, Plan de la Ville et Fort Louis de la Louisiane établies par les Français en 1711, D/950, Map Division, Public Archives of Canada, Ottawa.

15. Cf. Wilson, p. 118. A reproduction of one of several projected plans was published in Samuel Wilson, Jr., "Louisiana Drawings of Alexander De Batz," *Journal of the Society of Architectural Historians*, XXII (May, 1963), p. 86. According to Wilson, work began on the fort on the north side of the river in 1747. These forts were designed by Bernard Deverges, who also designed works for Plaquemines Bend.

16. Pittman, p. 39.

17. Jean-Baptiste Bénard de la Harpe, *The Historical Journal of the Establishment of the French in Louisiana*, The USL History Series No. 3, trans. by Joan Cain and Virginia Koenig (Lafayette, Louisiana, 1971), p. 41.

18. Wilson, p. 111. Numerous reproductions of plans for the town have been published. For a plan of the concept with the citadel, see Baron Marc de Villiers du Terrage, *Histoire de la fondation de la Nouvelle-Orléans* (Paris, 1917), p. 54. Other plans appear in Baron Marc de Villiers du Terrage, *Les dernières années de la Louisiane française* (1903), p. 129, p. 153. Dumont, *Mémoires historiques sur la Louisiane* (Paris, 1753), II, p. 54, also published a plan.

19. Leblond de la Tour arrived in New Biloxi late in 1720. He was born in France late in the 17th century and in 1703 he was appointed "engineer." Following military service in several European sieges, in 1720 he was appointed "engineer-in-chief" of

- the Province of Louisiana. However, along with Boispinel, he died in Louisiana after only three years of service. Margry, V., p. 610, "Le Blond de la Tour," *Dictionary of American Biography* (1933), II, p. 19; La Chaise to the Directors of the Company of the Indies, 6 September 1723, *Mississippi Provincial Archives*, II, p. 373.
20. Wilson, p. 114.
21. Favrot, "Colonial Forts in Louisiana," p. 730.
22. Villiers du Terrage, *Les dernières années*, p. 107.
23. These were repaired during the tenure of Bernardo de Gálvez. Favrot, p. 741.
24. Wilson, p. 122.
25. James Gadsden, "Report upon the Defenses of the Gulf of Mexico," 10 November 1817, Reports by Officers on Fortification and Surveys, 4 January 1816-11 October 1820, National Archives, Washington, D.C., Record Group 77, p. 8. Cf. also *American State Papers: Military Affairs*, I, p. 246.
26. Report of Georges Henri Victor Collot, p. 746.
27. *American State Papers: Military Affairs*, I, p. 196.
28. Descriptions of the problems appear frequently in the annual reports of the chiefs of engineers. See, for example, J.G. Totten, "Report of the Chief Engineer," U.S. Congress, Senate, Sen. Ex. Doc. 1, 29th Cong., 1st Sess. (1845), p. 264.
29. Favrot, p. 750.
30. *American State Papers: Military Affairs*, II, p. 306.
31. In 1809 the amounts expended on fortifications ranked only behind New York and Carolina. *American State Papers: Military Affairs*, I, p. 247.
32. *Military Affairs*, I, p. 383.
33. See James Gadsden, untitled report on the defense of the Mississippi, May 1816, "Reports by Officers on Fortifications and Surveys," 4 January 1816-11 October 1820, Office of the Chief of Engineers, National Archives, Washington, Record Group 77; and "Report upon the Defense of the Gulf of Mexico," 10 November 1817, Reports, 3 July 1812-4 October 1823, Office of the Chief of Engineers. See also, Cartographic Branch, Dr. 133, Sh. 8, Record Group 77, National Archives, Washington, D.C.
34. Gadsden, "Defense of the Gulf of Mexico," p. 6.
35. *Public Statutes at Large of the United States of America* (Boston, 1846), II, p. 342.
36. "The President of the United States of America: To all who shall see these Presents, greetings," National Archives, Record Group 77, Entry 20, File G, No. 213.
37. Bernard and two American officers were officially appointed to the board on 16 November 1816. Other original members of the board were Colonel Joseph G. Totten and Lieutenant-Colonel William McRee. McRee resigned shortly after the board was established and General Joseph G. Swift was assigned, but he also resigned in 1818. Totten served until 1817 and then, after a brief absence until 1819, remained permanently on the board. J.D. Elliott, captain in the U.S. Navy, served on the board in 1821-1822. After 1822 the board consisted of only Bernard and Totten, with engineers who superintended construction on the forts serving as *ex officio* members. J.G. Barnard, "Eulogy on the Late General Joseph G. Totten," U.S. Congress, House, House Ex.Doc. 102, 39th Cong., 1st sess. (1866), 142, p. 153.
38. "Board of Engineers Report," 7 February 1821, *American State Papers: Military Affairs*, II, p. 310.
39. "Board of Engineers Report," p. 305.
40. Bernard et al, "Report of Board of Engineers on the Defense of the Seacoast," 24 March 1826, National Archives, Washington, Record Group 77, Entry 223, n.p.
41. "Report of Board of Engineers on Defense of the Seacoast," 24 March 1826, National Archives, Washington, Record Group 77, Entry 223, pp. 51-53. Of course estimates varied. In 1821 the estimate was \$1,375,540.00, *American State Papers: Military Affairs*, II, pp. 310-311.
42. "Report of Board of Engineers," 7 February 1821, p. 308.
43. Designed for a siege garrison of 750 men and a peace-time garrison of 100, the fort had a perimeter circuit of 650 yards at the crest of the ramparts.
44. This system has been published in numerous treatises on fortification, among them A.F. Lendy, *Treatise on Fortification* (London, 1862), pp. 304-311; and Thomas Cook and John T. Hyde, *Treatise on Fortification and Artillery* (London, 1858), pp. 186-192, Cormontaigne set forth his philosophy in *Mémorial pour la fortification, l'attaque et la defence des places* (Paris, 1809), an edition of which, incidentally, was in the library of R.E. De Russey, engineer in charge of supervising the construction of the forts along the Gulf in 1824-25. Cf. R.E. DeRussey, Semi-Annual Return of Public Works, 1 December 1821, National Archives, Federal Records Center, East Point, Georgia, Record Group 77, Entry 1,237.
45. Each was designed for a siege garrison of 400, a peace-time garrison of 80 and each had a perimeter at the crest of the rampart of 308 yards.
46. In European works, the citadel was ordinarily incorporated into the main fortifications. In contrast, Bernard's plans for works for the defense of New Orleans, as well as Mobile, placed them freestanding in the parade.
47. Contract between Joseph G. Swift and James Bennett and Peter Morte, 20 July 1818, National Archives, Washington, Record Group 77, Microfilm No. M417. See also *American State Papers: Military Affairs*, I, p. 859.
48. Edmund P. Gaines, "Report on a Tour of Inspection," *American State Papers: Military Affairs*, IV, p. 112.
49. For a narrative of the difficulties created by the water, see R.E. DeRussey to Alexander Macomb, 1 July 1821, National Archives, Federal Records Center, East Point, Georgia, Record Group 77, Entry 1,237.
50. "Report of Alex. Macomb," 20 November 1824, *American State Papers: Military Affairs*, II, p. 713.
51. Favrot, p.748. Both piles and grillages were used in colonial work and apparently both were, in many cases, unsatisfactory.
52. *American State Papers: Military Affairs*, IV, p. 165. Martello towers were round or elliptical with roofs supported by annular

vaults. The top platforms were enveloped by thick masonry parapets, behind which cannons for water defense were mounted on barbette. Without vaults and barbette platform, the form and structure of Tower Dupré did not conform to this arrangement. The cannons for defense of the water were mounted at ground level. For a brief history of Martello towers in America, see W.B. Robinson, "North American Martello Towers," *Journal of the Society of Architectural Historians* (XXXIII, 1974), pp. 158-164.

53. Edmund P. Gaines, "Report on a General Inspection of Military Posts of the Western Department and Remarks Concerning the Militia of the United States," 27 February 1829, *American State Papers: Military Affairs*, IV, p. 112. According to the section of this report relative to the fortifications of New Orleans, "Each of these fortifications exhibit in their *location, projection* and *construction*, the most conclusive evidence of superior talents on the part of the engineers to whom the duties were confided, as well as a high degree of skill and fidelity in the mechanical execution of the work."

54. "Report submitted to the Board of Visitors of the United States Military Academy by James St. C. Morton," U.S. Congress, Senate, Sen. Ex. Doc. 11, 35th Cong., 1st Sess., (1857), vol. II, pt. II, p. 215.

55. J.S. Johnson to James Barbour, 20 January 1828, *American State Papers: Military Affairs*, III, p. 806.

56. *American State Papers: Military Affairs*, V, p. 388.

57. "Report of Joseph G. Totten," U.S. Congress, Senate, Sen. Ex. Doc. I, 28th Cong., 1st Sess. (1843), vol. I, p. 114.

58. G.T. Beauregard, "Annual Report for the Fiscal Year Ending 30 June 1858." Records of the Office of the Chief of Engineers, Letters Received, National Archives, Washington, Record Group 77, B 7856.

59. U.S., *Statutes at Large*, II, p. 192.

60. J.G. Barnard, "Eulogy on the Late Joseph G. Totten, Brevet Major General," U.S. Congress, House, House Ex. Doc. 102, 39th Cong., 1st Sess. (1866), p. 158.

61. Marc-René Montalembert, *La fortification perpendiculaire, ou essai sur plusieurs manières de fortifier la ligne droite le triangle, le carré et tous les polygones, de quelque étendue qu' en soient les côtes, en donnant a leur défense une direction perpendiculaire*, (Paris, 1776-1786), III, p. 41.

62. Barnard, "Eulogy of the Late Joseph G. Totten," p. 139.

63. James St. C. Morton, "Memoir on American Fortification Submitted to the Hon. John B. Floyd, Secretary of War," U.S. Cong., Senate, Sen. Doc. 2, 36th Cong., 1st Sess., vol. II, pp. 515-516.

64. Even before the Civil War, some critics of the national system had predicted that the masonry forts were not so strong as supposed. To this criticism, the chief of engineers replied: "The facts simply are, that the walls of none of our forts can be battered down by guns, however large, otherwise than by lodging their shots in a systematic manner, which means that successive shots are to be so lodged as to cut a horizontal trench through the wall of the length

required for the breach." "Report of the Chief Engineer," U.S. Congress, Senate, Sen. Ex. Doc. I, 33rd Cong., 1st Sess. (1853), Vol. II, p. 161.

65. "Report of the Chief of Engineers," U.S. Congress, House, House Ex. Doc. I, 41st Cong., 2nd Sess. (1869), vol. II, p. 5.

66. For a plan of the modifications for Fort Jackson and Fort St. Philip, see National Archives, Washington, Cartographic Branch, Record Group 77, Dr. 88A.

67. "Report of the Chief of Engineers," U.S. Congress, House, House Ex. Doc. I, 41st Cong., 3rd Sess. (1870), Vol. II, pp. 5-7.

68. "Report of the Board on Fortifications or other Defenses appointed by the President of the United States under the Provisions of the Act of Congress, Approved 3 March 1885." U.S. Congress, House, House Ex. Doc. 49, 49th Cong., 1st Sess. (1866).

69. T.L. Casey, "Report of the Chief of Engineers," U.S. Congress, House Ex. Doc. I, 51st Cong., 1st Sess. (1889), Vol. II, p. 5. The Endicott Board recommended for the passes the use of "... two floating batteries, submarine mines, and other torpedoes."

Figure Credits

1, 2 Courtesy Archives Nationales, Paris.

3 Courtesy Bibliothèque Nationale, Paris.

4 Courtesy Servicio Histórico Militar, Madrid.

5, 6, 8, 12, 13, 22, 23 Courtesy National Archives, Washington, D.C.

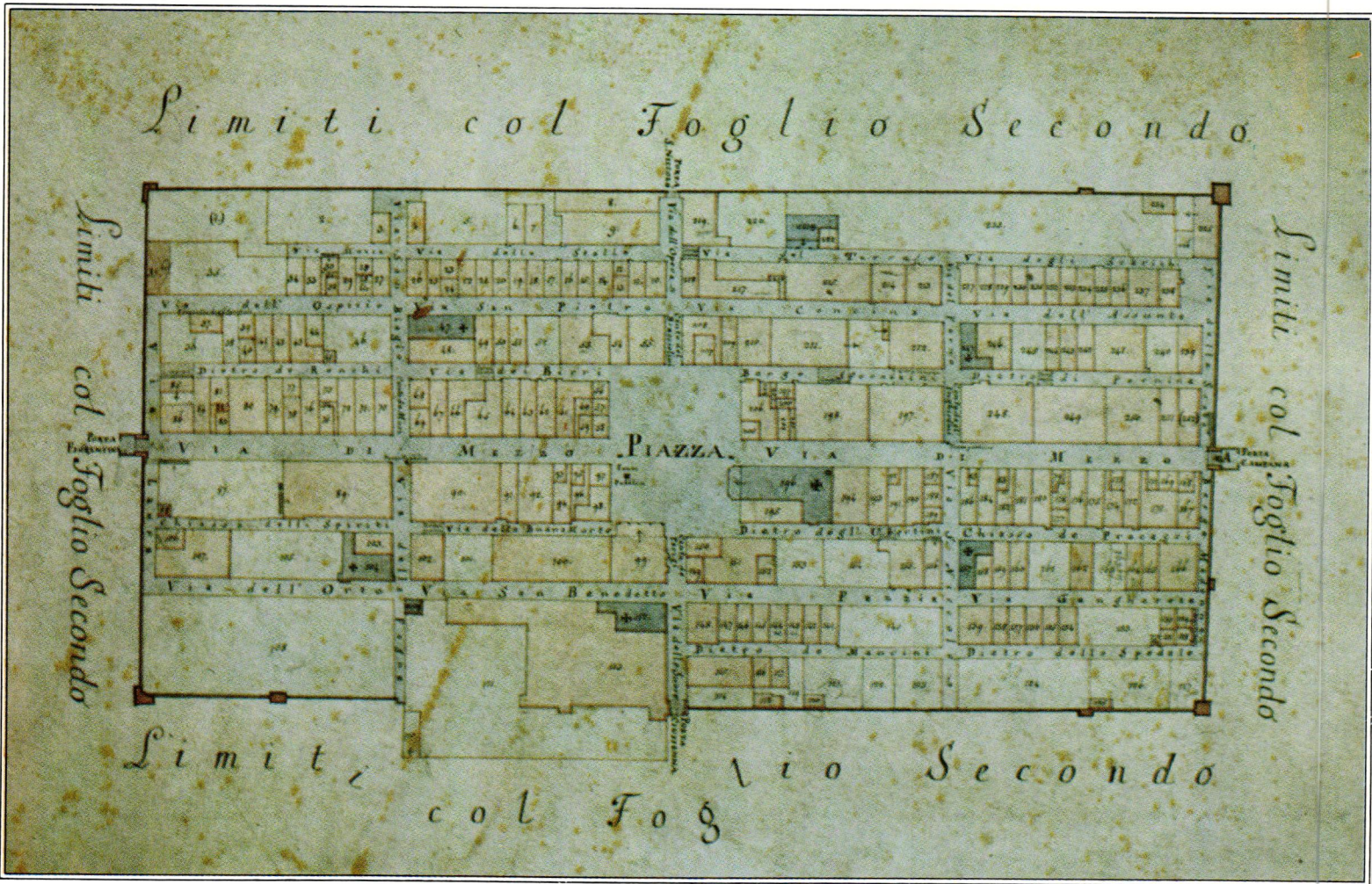
7, 14, 17, 21 Courtesy the author.

9, 10, 11, 15, 18 Courtesy Amon Carter Museum of Western Art, Fort Worth, Texas.

16, 19 Louisiana State Parks, Baton Rouge.

20 Louisiana Tourist Development Commission, Baton Rouge.

24 Photograph courtesy Chauncey T. Hinman, Gulfport Mississippi.



The Modern Medieval City: Public Space in Florentine-Founded Towns

David Friedman

There are no public buildings without public space. The idea of a courthouse isolated within the grounds of a private home contradicts the modern understanding of architecture and the city. In our experience, buildings that serve the public are accessible to it; we expect them to be easy to enter and always visible. In cities, this kind of setting depends upon the open environment of a public street system. A street or square provides the site for the building itself; the system as a whole connects it with the rest of the town. The most basic of public laws protect the network against the encroachment of private building and as a result the paths to public institutions are controlled only by the government.¹

In Western civilization, this physical situation was forged during the late Middle Ages and is the mirror of a new relationship between the individual and the law. The communal governments of Italian cities were the first, in the 13th and 14th centuries, to attempt to establish a uniform authority over the entire urban population. While in previous centuries the bishop, emperor, and even weak, early communes had been content with a limited domination of the city, the strong governments of the latter period tried to eliminate the independent spheres of authority that had flourished under the earlier system. The noble family clan was the first target of the communes' campaigns for internal expansion. Composed of blood relatives, allies sworn to protect common interests, and large bodies of retainers, the clans acted as buffers between their members and the rest of the city. Clansmen participated in citywide activities—such as defense and foreign military expeditions—as a unit. The head of the clan signed documents for the group and an internal system of justice settled disagreements between clan members. This social relationship was enforced by close physical proximity. Clansmen lived in extensive building complexes; city versions of the nobilities' castles in the countryside. They were defensible—with tall stone or brick towers anchoring the fortifications—and at least potentially isolated from their surroundings. The Ugurgieri compound in Siena, just north of the Campo, preserves something of

this fortress-like appearance. It forms an independent block, entirely surrounded by streets in a thickly settled part of the city. Its exterior walls, battered for extra strength at their base, are penetrated by passages to an interior court. This "curia," isolated from the city's system of public streets, is circled by entrances to the houses that make up the enclosing ring. A spare architecture complements the castle's military character.

Other aspects of this feudal urbanism are preserved in rare examples scattered throughout Italy. In Genoa, where the noble families held their power longer than elsewhere, the Doria compound exhibits a unique formality. The focus of the clan's life was the open space at the center of the family's houses. The once-private square is surrounded by palaces that belonged to the most powerful branches of the family—all of them revetted with uniform black-and-white banding. The family church of San Matteo dominates the square from its position atop the slope and it, too, features the stripe motif. The petition to found the church in 1125 gives vivid testimony to the fractious character of the clan-dominated city. The family needed a church within its compound, it claimed, because the tombs of its ancestors in the cathedral were the subject of constant attack by clan enemies. In addition to the palaces and church, the square boasted a tower, now destroyed, entrance to a garden, and vaulted *loggie* beneath the palaces where formal ceremonies, like the signing of contracts, were staged for public audiences.²

Noble families were not the only ones to build castle-like enclosures inside the city. During the early Middle Ages, bishops had fortified their residences and adjacent cathedrals with separate sets of walls. Monasteries built their own defenses, as did the viscount who represented the local lord. Even the oldest town halls, like those at Novara (1206) and Milan (1228), sat inside their own walled precincts called *Broletti*. Here, as in the cathedral close, monastery, or feudal castle, a special law applied. The unity of space and law that characterizes the modern city was unknown

(frontispiece), Terranuova Bracciolini,
Catasto Plan, 1822, Ufficio Tecnico
Erariale, Arezzo.

144 to the nucleated settlements of the early Middle Ages.

Today, Siena and Genoa are modern towns. Public streets, not private precincts, dominate the physical environment. The transformation began more than 700 years ago when merchants and artisans increasingly came to control communal governments. They created an office, the *Capitano del Popolo*, to protect themselves from armed attacks of a nobility trained in military skills. They sometimes even excluded the nobility from government. In Florence, the city of special interest here, the government began dissolution of the clan compounds after 1250 by legislating reduction of the family towers to a maximum height of 90 feet; while at the end of the century, a new town hall and cathedral rose to dominate the skyline. The city's building agencies cleared the space around these public monuments and built straight, wide streets to connect them. An ambitious set of city walls enclosed a huge amount of new land, which its owners began to develop for housing. Lots about 20 feet wide and 60 or more feet deep were surveyed in long rows that faced onto public streets. These were in direct communication with the center of town via a public street system.

The physical city of the communal era did not, however, achieve perfection in the 13th or 14th century. Old buildings, like the clan compounds, occupied too much ground. However energetically the new government fostered reform, the result was necessarily a compromise. To understand the urban ideal of the late Middle Ages, it is necessary to look beyond the great cities. This essay examines two types of information that bear on the Florentine vision of the ideal city in the 14th century.³ One is a series of descriptions of the city, both verbal and visual, that represents perceptions of three different elements of the city's ruling class. The other is a set of towns, planned for populations of between 1,000 and 3,000 settlers, founded by Florence in the first half of the century. The towns, which have survived and prospered, give a much more complex account of urban life than the

emblematic descriptions. Like them, however, the towns are rigorously organized according to one simple formal pattern. In the case of the towns, the pattern is articulated by a system of public streets and, because of that, they realize almost perfectly the ideal of the open, undivided city.

The first of our descriptions of Florence, written in 1324, comes from Giovanni Villani's chronicle of the city's history.⁴ Unlike the usual iconographic picture of the city, such as the 1342 view of Florence in the *Misericordia* fresco in the Loggia del Bigallo (fig. 1), which represents the city by its major monuments set in a forest of unindividualized private buildings, Villani's description concentrates on the town's structure. He traces the encircling city walls, then the course of its two main streets. Their intersection, he says, is the center of the town, "*il punto della croce e del centro del giro della cittade.*" He defines the spot further as "on the Via Calimala, about where the hall of the consuls of the wool guild stands today." This is the only building in the city to which he makes specific reference. He does so not because it actually marks the intersection of the two streets—indeed he admits it is a bit displaced—but as the seat of the industry that employed 30,000 persons, this was the most important place in town for the poet laureate of the bourgeois state.⁵ In Villani's ideal view the functional center of the city also had to be its geometric center. From it expands the streets that define the city's major divisions, and around it rotates the circle of the city's walls.

In the picture of Florence in Leonardo Bruni's *Laudatio Florentine Urbis* of 1403-4,⁶ the functional and physical structures of the city are coordinated by an even more radical transformation of the actual topography; again this is based on a centrally focused geometric structure. Bruni was not a businessman like Villani but chancellor of the Florentine Republic, so he places the Palazzo della Signoria at the center of his ideal city. The rest of the environment, in this case including the whole Florentine state, is imagined as a series of concentric circles—the city, walls and suburbs,

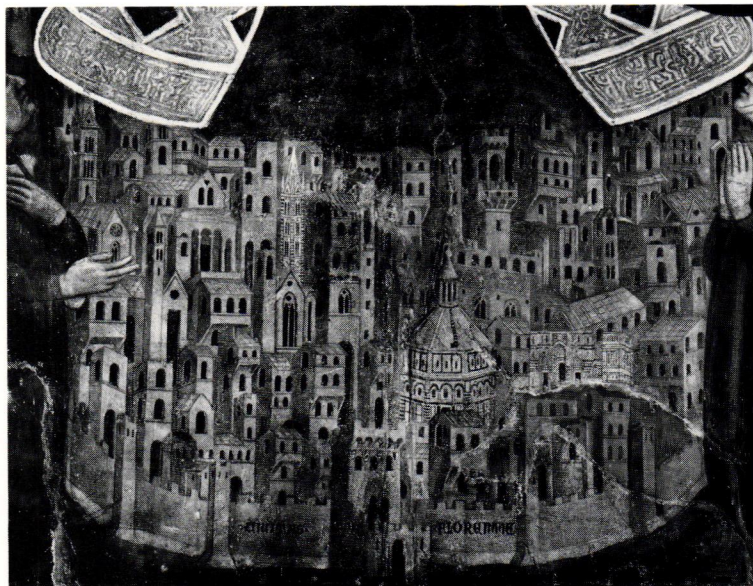
1 *View of the city of Florence. Detail of the Misericordia Fresco, residence of the Compagnia del Bigallo, Florence, 1342.*
 2 *Fresco in the vaults of the ground floor Udienza, Palazzo dei Giudici e Notai, Florence, 1366. Photograph G.F.S.G. Florence.*

ural estates, and dependent towns—expanding out from this crucial point.

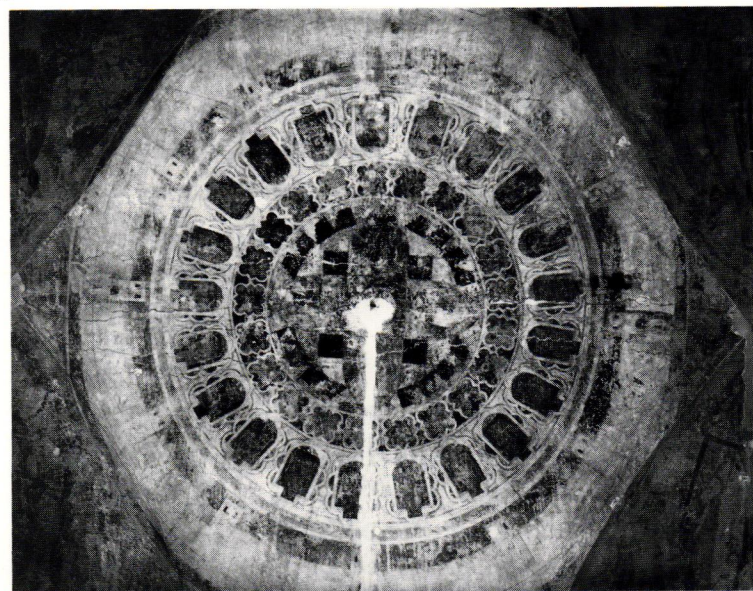
The hierarchal and geometric order of these two written descriptions is given visual form in a fresco of 1366 in the vault of the ground-floor audience chamber of the guild hall of the lawyers and notaries on the Via Proconsolo in Florence (fig. 2). This is not a view or a plan of the city, but a symbolic image of its political structure. The arms and images of the 21 guilds—political institutions because membership in one was a prerequisite for participation in government—and the arms of the geographic divisions of the city—the four quarters and 16 gonfalone from which the priors were selected, taxes raised, and armies levied—are arranged in a series of concentric circles around the emblems of the Comune (lily), Parte Guelfa (eagle), the Popolo (cross), and possibly the combined Florentine and Fiesolan communities (a vertically divided red and white shield). Surrounding the five rings, cementing the relationship between image and real city, is one more band in which the walls of the city, complete with eight towers, four gates, a moat, and bridges to cross it, are naturalistically represented.⁷

An emblem that may have stood at the center of this construction has been lost due to the fresco's deterioration and so the most important element of its message could be missing. Nonetheless, enough remains to conclude that the nature of the image is no different from Villani's or Brunni's. In all three, the organization of an aspect of the city's life is represented through the metaphor of an imaginary structure of the physical city. In each case the structure is hierarchal and geometric. The center of the structure is the most important area and the most significant feature, in two cases represented by a building, is placed there. The other elements of the town take their shape around this core.

The same formal pattern structures are used in the six full-scale new towns founded or projected by Florence between 1299 and 1350. Here the elements of the real city—piazza,



1



2

146 main and side streets, residential quarters—are grouped in the same heirarchical way. There is even a geometric substructure, less obvious than in the imaginary views but more rigorously applied, that condition their positions.

The towns are San Giovanni, Castelfranco, and Terranuova in the upper valley of the Arno; Scarperia and Firenzuola in the Apennine area between Florence and Bologna; and Giglio Fiorentino, planned for a site in an upland valley close to Arezzo but never built.⁸ All are located between 25 and 50 miles from the city, at the centers of areas only recently liberated from the feudal magnates who had controlled the Tuscan countryside until then. With the new towns, the city hoped to maintain its conquests. Scarperia, for one, was founded “to check the pride of the Ubaldini (a local noble family) . . . who have rebelled against the commune of Florence” and to “destroy the very roots of their strength.”⁹ The towns fulfilled their purpose in three ways. First, they acted as a fortress. Regularly manned only by local militia, in an emergency the towns were reinforced by soldiers from the city.¹⁰ Second, they were stations on the international roads that connected Florence with its most important allies and trading partners.¹¹ The third and truly revolutionary aspect of the foundations was their role in the reorganization of the rural population.

The new towns were settled by families from the villages of the area. Many of them had only recently come under Florentine domination. The population of Scarperia, whose foundation was declared on 29 April 1306, was drawn from the towns taken from the Ubaldini in a war of the same year. Giglio Fiorentino was to have been populated with the residents of six towns that had been ceded to Florence by an abbey near Arezzo six months before the date of the foundation act. Immigration to the towns meant release from old feudal obligations. The magnates themselves were excluded from the new settlements; neither they nor anyone faithful to them was allowed to own land within a mile of the town walls.

Relocation of the population also meant the destruction of government and social institutions that were part of the pre-Florentine situation. Reconstructed in the new towns, these public institutions were given a very different orientation. Government, of course, was remade with close connections to the mother city. Each new town had a Florentine official at its head and three of the five that were built also became capitals of larger territorial units in the Florentine state.¹² The newly founded, or refounded, churches of the new towns were free of the patronage and thus the control of local magnates. Although the parish structure could not always be reorganized at the time of the foundation, all the new towns received their own church and very soon these were granted full baptismal and burial rights. At Giglio Fiorentino, where all the old villages of the territory were to have been destroyed, this was to have taken place with the foundation. At Scarperia, located in the parish of Santa Maria di Fagna, it was 60 years before the church on the square of the new town was freed from its dependence on the older church and given complete control of a parish that consisted of the entire area within the town walls.¹³ At San Giovanni and Terranuova, churches from the neighboring area were rebuilt inside the new town almost immediately after the foundation.

There are three plan types on which all six of the new Florentine towns were laid out. They were best realized and best preserved at San Giovanni (figs. 3-5) and Castelfranco of 1299, and Terranuova (frontispiece & fig. 6) of 1337. These are also the projects for which the plans were developed. Scarperia and, it seems, Firenzuola, are workman-like adaptations of the San Giovanni plan. Giglio Fiorentino reinterprets, but basically repeats, the layout of Terranuova.

The plans are all organized around two town features, one central and the other axial. The first is the piazza located at the geometric center of the area enclosed by the town defenses. The square was dedicated to the most solemn public occasions: Religious feasts, swearing in of government

officials, and the biannual reading of the town's statutes to the assembled population all took place here. The *palazzo* of the Florentine official, the *casa* of the local council, the principal church, the oratories of at least the earliest religious confraternities, and, in two cases, the buildings of the first convents, were sited in the central square (figs. 7-9). In some towns the weekly market was also held in the square, while elsewhere a field outside the town walls served that function.

The plan element of greatest economic significance was the section of long-distance road enclosed within the walls. In addition to its connecting Florentine town to mother city, the road brought in travellers and money. In Scarperia and Firenzuola in particular, but also in San Giovanni and Castelfranco, an important hotel trade developed. In 1393, for example, Scarperia had more members of the Florentine hostellers guild than any other town in the mountains between the city and Bologna.¹⁴

Because of its importance, the road was adopted as the backbone of the plan. It is the widest street in town and the axial center of the development of house blocks and streets that fill out the area inside the walls. To allow as many settlers as possible frontage on the main street, building lots are rectangular and oriented with their short sides onto the street. They are combined in long rows with few interruptions for cross streets. The other blocks, for a total of four rows on either side of the central longitudinal axis, are laid out parallel with them, separated from each other by secondary streets and narrow alleys.

The lots, and thus the blocks, become less deep the further they are from the central spine. At Terranuova those on the main street are approximately 17.8 meters deep; those in the next row, 15 meters deep; in the next, 11.9; and in the last, 9.3. This organization is based on practical economic sense. Business opportunity was much greater on the main street¹⁵ and space was needed to take advantage of the

3 *San Giovanni Valdarno, plan re-drawn from 19th century Catasto.*

4 *San Giovanni Valdarno, main street, looking north toward the central square.*



147



4

5 *San Giovanni Valdarno, central square, looking east toward the palace of the Florentine official and, on the right, the parish church of S. Lorenzo.*

6 *Terranuova Bracciolini, central square, looking east toward the parish church of S. Maria di Piazza and, to the right of the street in the middle of the photograph, the palace of the Florentine official.*



5



6

situation. Also, larger lots were required for the richer immigrants, those who were used to better quarters in the old villages and who expected special treatment in the new town. These were the people who would have the capital to exploit the sites on the main road.

Neither the economics nor the sociology of the situation though, can account for the secondary stages of the diminution of the lots. According to the town business regulations, one was either on the main road or off it. Certainly being on one side of a back street or the other cannot have made much difference to one's prospects, yet the lots on the outer side of the first back streets at both Terranuova and San Giovanni are only four-fifths the size of those on the inner side. Indeed, at Scarperia and Giglio Fiorentino, there are just two lot sizes: large ones on the main street and smaller ones off it. The system of graduated diminution is a result not of function alone, but also of the geometry used to plan the town.

The system employed is based on the division of the circumference of a circle. The center of the circle is made the center of the town, the circumference is divided into 15 or 30-degree segments and at each of the divisions a line is drawn parallel with the axis of the main street. This line becomes the boundary of one unit of the plan. Different numbers of blocks and streets can be fitted within it, but the line determined by geometric construction always coincides with a line of demarcation between space used for one purpose or the other.

The system is most comprehensive at Terranuova where it controls not only the divisions across the town but also those along the main longitudinal axis (fig. 10). The radius of the circle centered in the middle of the piazza is the distance to the end of the first block, 83.4 meters. Twice that, actually 167.05 meters to the south and 168 meters to the north, is the distance to the town wall. The circle is divided into 15-degree segments. The layer generated by each division

contains the width of one street and the depth of a block of houses. The last segment, originally filled completely only by the street next to the wall, is an exception. Though there is no contemporary testimony that such methods were used, the system's close fit over the rather unusual and sophisticated new town plans is extremely suggestive.¹⁶

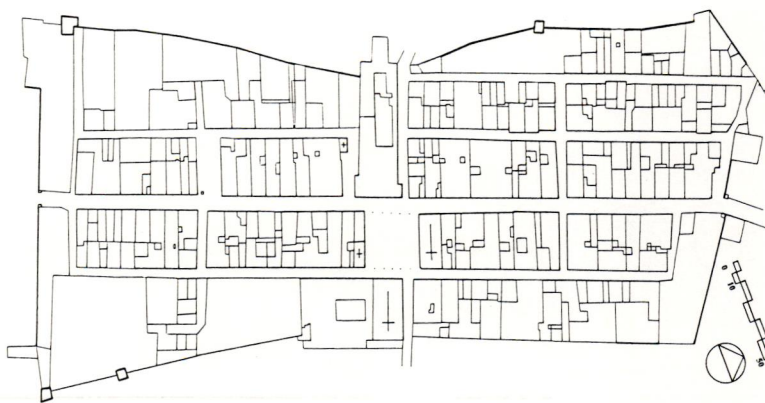
There are five divisions of the long axis of the Terranuova plan, as there are in all the Florentine plans. Two of them are at the ends of the main street where they connect the side streets with the main gates and form part of the military road that circles the town inside the walls. Two others were placed at the points halfway between the gates and the central square. The fifth one intersects the center of the plan. At Terranuova this primary cross axis is a 5.7-meter-wide street. Elsewhere it takes a more imposing form. At San Giovanni the central piazza, 46.8 meters wide, extends across the entire width of the town.

Split by this transverse axis and again by the main street, the towns are firmly divided into quarters, each of which has its own internal structure. The main street of the quarter is the street midway between the central street—to which it is parallel—and the walls. Private buildings that serve as workshops, warehouses, and stores at ground level and as residence in the upper stories face it on both sides. These streets have none of the extra mural orientation of the street formed by the long-distance road that runs through the center of the plan. They are the neighborhoods of the town and bustle with a more intimate, local activity. The center of each quarter is the intersection of this street with the transversely laid streets at the mid points between the square and the town gates. At San Giovanni the significance of the spot was marked with a series of wells, one for each quarter. At Terranuova there is a church at each intersection.

The division of the new towns into quarters was not simply a formal organization of the area on which the town was built. The quarters were administrative subdivisions of the

7 Scarperia, plan redrawn from the 19th century Catasto.

8 Scarperia, central square, looking east toward the parish church of SS. Iacopo e Filippo (left), the conventual church of S. Barnaba (center), and the oratory of the Compagnia di Piazza (right).



9 Scarperia, central square, looking west toward the palace of the Florentine official.

150



9

community. As in Florence, armies were raised, taxes levied, and members of government elected by quarters. The residents of the new towns—like those of modern day Siena whose Palio, where the city's neighborhoods compete in a horse race, still commands great passions—seem to have had a strong attachment to their quarters. In the early 15th century the quarters division in Scarperia had caused so much trouble that the Florentine Signoria ordered its official to unite the town “to a single body.”¹⁷

The full character of the division of the new towns is suggested by the quarter churches at Terranuova. This new town was founded in answer to a petition from 12 villages in the upper Arno valley asking the city to build a town in their area in which they could live in safety from the local barons.¹⁸ Three of the quarters' churches repeat the dedication and site name of the churches from villages involved in that petition. The center of the fourth quarter is occupied by the church of S. Biagio ai Mori, which is said to have occupied its site before the new town was laid out. The churches are much rebuilt (yet in two cases some trace of the original decoration preserves a very firm reference) for their 14th century date. The situation, then, would seem to be very similar to the one in Alessandria in Piedmont, where the seven communes that came together in the 12th century to form this city each preserved their own customs, individually elected representatives to the city government, and had their own church.¹⁹ In the same way, the quarters of the Florentine new towns may have been assigned to settlers from single villages or specific groups of villages, whose identity was, to a certain extent, preserved by the arrangement.

Even this brief examination of city views and new towns reveals important principles of Florentine 14th-century urban planning. Merchants, lawyers, and humanists imagined the physical form of the city as a mirror of the society that inhabited it. Centrality was the primary element of a formal paradigm that all of these men shared. The

1. Parts of this essay appeared in the journal *Archeologia Medioevale*, I (1974), pp. 231-247 under the title "Le Terre Nuove Fiorentine." My thanks to the editors for allowing re-publication here. The *Archeologia Medioevale* text, in Italian, includes a more extensive scholarly apparatus.

2. Genoa is the city for which the social institution of the family clan and the architectural complex in which the clan group lived is best documented. The literature on these subjects is therefore best approached through the work done there. For the family clan see J. Heer, *Family Clans in the Middle Ages* (Amsterdam and New York, North/Holland, 1977). For the clan compound see E. Poleggi and L. Grossi Bianchi, *Una città portuale del Medioevo: Genova nei secoli X-XVI*, (Genoa, Sagep, 1980).

3. The medieval urbanism of Florence, indeed of all Italy, was pioneered as an art historical subject by Wolfgang Braunfels in a classic study: *Mittelalterliche Stadtbaukunst in der Toskana* (Berlin and Mann, 1953), still, unfortunately, available only in German.

4. G. Villani, *Cronica*, Book IX, Chapters 256 and 257, ed. F. G. Dragomani (Milan, 1848) II, pp. 300-304.

5. G. Villani, *Cronica*, Book XI, Chapters 91-94, ed. F. G. Dragomani (Milan, 1848) III, pp. 319-326.

6. H. Baron, *Crisis of the Early Italian Renaissance* (Princeton, 1955), I., pp. 168-171 and II., pp. 517-8, note 16. For the dating of the essay: I, pp. 178-189.

7. The Florence "figure" is related to the abstract schemata used to demonstrate the laws of Aristotelian science in European illuminated manuscripts from the 6th century on. (See H. Bober, "An Illustrated Medieval School-Book of Bede's 'De Natura Rerum,'" *Journal of the Walters Art Gallery*, XIX, pp. 56-7, 65ff and "In Principio, Creation before Time" in *De Artibus Opuscula XL, Essays in Honor of Erwin Panofsky* (New York, 1961), pp. 13-28. It is particularly close to representations of the universe like the one in the Campo Santo in Pisa of 1389-1391, in which the earth is shown in the center of a series of concentric rings representing the elements, the planets, the stars and the nine grades of angels. (M. Bacci et al, *Camposanto Monumentale di Pisa* (Pisa, 1960), p. 103 and illustration 99.) The poor state of the Florentine fresco's preservation, visible even in photographs, means that identification of some of the symbols is necessarily tentative.

8. In an excellent article on the Florentine new towns, Maina Richter ("Die 'Terra Murata' in Florentinisches Gebiet," *Mitteilungen des Kunsthistorischen Institutes in Florenz*, Heft 6, Band V, 1940, pp. 351-386.) discusses, and publishes the foundation documents for the first five of these towns. The sixth, Giglio Fiorentino, has been mentioned only in T. Cini, *Appunti Storici sulla Valle dell'Ambra* (Montevarchi, 1907) where the foundation document for this abortive project is paraphrased. The original of this document is in the Florentine State Archives, Provvisione 38, cc51 recto-53 recto, 2 June 1350. Two other copies may be found

in *Archivio di Stato, Florence [ASF], Capitoli*, 4, cc 63 recto-66 recto and 120 recto-122-recto. The subject of Florentine town foundations has also been treated by Charles Higounet, "Les 'Terre Nuove' Florentines du XIV Siècle" in *Studi in Onore di Amintore Fanfani*, III (1962), pp. 3-17, E. Guidoni, *Arte e Urbanistica in Toscana, 1000-1315* (Rome, 1970), and I. Moretti, *Le "Terre Nuove" del Contado Fiorentino* (Salimbene and Florence, 1979).

9. Richter, "Terra Murata," document 3.

10. Scarperia, for example, had only a castellan and 12 soldiers in its keep in the peaceful year of 1392 (ASF, *Camera del Comune* 70, c. 51 recto) and in 1401 the castellan had only four aides (ASF *Ufficiali delle Castella e Rocche*, 2, c. 7 verso). During the Visconti siege of the town in 1351, however, the city was able to pack 630 soldiers inside its walls (M. Villani, *Cronica*, Book II, Chapters 14 23, ed. F. G. Dragomani (Milan, 1848, V, pp. 133-4, 144-45).

11. D. Sterpos, *Comunicazione Stradali attraverso i Tempi Bologna-Firenze* (Rome, 1961), pp. 58-67 outlines the connection of the foundation of Scarperia and Firenzuola with a new Florentine road to Bologna.

12. Scarperia was made seat of the vicarate of the Mugello on 11 April 1415 (ASF, *Provvisione*, 105, cc. 3 recto-5 verso). San Giovanni became the seat of the vicar of the upper Valdarno on 1 December 1408 (ASF, *Provvisione*, 97, cc. 140 verso-141 verso). Firenzuola was the seat of the vicarate of the *Alpe*, from at least 14 October 1392 (ASF, *Camera del Comune*, 70, c. 53).

13. ASF, *Notarile Antecosimiana*, L 35 (Lando Fortini), at 19 September 1364.

14. In the list of the members of the *Arte degli Albergatore* of that year (ASF, *Albergatore* 5, c. 33), 11 men from Scarperia and four men from San Giovanni appear. The 1409 list (c. 50) contains the names of five men from Scarperia and nine from Firenzuola.

15. In a rubric beginning, "Because no one ought to become rich at the expense of others but rather be content with his just share," the 1418 statutes of Scarperia (ASF, *Statuti di Comuni Soggetti* 831, cc. 37 verso-38 verso) outline a series of regulations prohibiting any sort of active advertisement of an inn's services. The innkeeper was allowed to advance only 2 braccie (1.16 meters) beyond his threshold to converse with prospective customers and he was specifically enjoined against salesmanship deemed too aggressive. This was obviously an advantage to the hostellers on the main street whose establishments were immediately obvious to any passerby and for whom a 2-braccia range of operation could be sufficient.

16. The accuracy of construction may be checked by trigonometric calculations. The height of the first segment, or distance from the center of the main road to the far side of the first block, should equal the sine of a 15-degree angle times the radius of the circle of the construction; here the distance from the center of the square to the outer end of the first block. The height of the second segment should equal the radius, times the sine of a 30-degree angle, and so on. In fact, the actual dimensions of the town conform very well

to the ideal ones. Enrico Guidoni was the first to suggest the geometric basis of the Florentine new-town plans. (*Arte e Urbanistica in Toscana, 1000-1315* (Rome, 1970), pp. 219-234 and more importantly figs. 116-118.) His constructions of superposed polygons on the plans of San Giovanni and Terranuova were inspired by the marble incrustation patterns on Tuscan Romanesque buildings. My contribution has been to tie the geometric construction more carefully to an archeologically-based reconstruction of the original plans. I would also propose, and argue in a publication now in preparation (1984), a different source for the geometry. The sine scale engraved on late Medieval scientific instruments is constructed with just the system of parallel lines at diminishing intervals, which the new-town planners used for their compositions. Its association with the astrolabe and other instruments used by astronomers for taking the measure of the universe and by astrologers to uncover the course of future events, gave it a high meaning whose significance would not have been lost on men laying out the sites for new civilizations.

7. ASF, *Signori Missivi, I Cancelleria*, 26, at 18 March 1407. The government of Florence writes to its officer in Scarperia: "Honored colleague. In order that the men (of Scarperia) may live in harmony, and to avoid the inconvenience and damage caused by the division of the community of Scarperia into four quarters, we have decided to remove that division and to unite the town to a single body."

8. ASF, *Provvisione*, 28, cc. 152 recto and verso, 2 April 1337. Published, in part, in Richter, "Terre Murate," Document 6.

9. Gina Fasoli, "Ricerca sui Borghi Franchi dell' alta Italia," *Rivista di Storia del Diritto Italiano*, XV (1942), fascicolo II, May/August, pp. 174-5.

Figure Credits

1, 2, 3, 4, 5, 6, 7 Courtesy of Alinari/Art Resources, NY.

8, 9, 10 Courtesy of G.F.S.G., Florence.

11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

1, 5, 6, 8, 9, 10 Courtesy of the author.

**Richard Becherer**

Richard Becherer was born in East St. Louis, Illinois, in 1950. In 1974, he received a B. Arch. and a B.A. in French, fine arts and art history from Rice University. His 1977 M.A. in architectural history was followed by a 1980 Ph.D. from Cornell University. He has authored a number of scholarly articles as well as a book, *Science Plus Sentiment: Cesar Daly's Formula for Modern Architecture*. He has taught at Cornell University, Auburn University, and the University of Virginia, where he is presently an Associate Professor of Architecture. A Junior Fellow at the Society for the Humanities, Cornell University, he is currently pursuing research on Napoleonic urbanism.

Jill Bretherick

Jill Bretherick was born in Bucks County, Pennsylvania, in 1960. She received her B.S. in architecture from the University of Virginia in 1982. After working for a year in a Philadelphia architectural firm, she returned to the University of Virginia to pursue a M. Arch. She is currently enrolled in her final year of graduate study.

David Friedman

David Friedman was born in 1943 in Allentown, Pennsylvania. He received a B.A. from Brandeis University in 1966 followed by a Ph.D. from Harvard in 1973. He has taught at the University of Pennsylvania (1973-78) and is presently an Associate Professor in the Department of Architecture at MIT. He was a fellow of the Villa I Tatti, Florence, from 1969-71. He has lectured extensively in the United States, Canada and Italy and his publications include articles in *The Journal of the Society of Architectural Historians*, *The Art Bulletin* and *L'Arte*. He is currently preparing a manuscript about late medieval urbanism and the Florentine town.

Nathan Glazer

Nathan Glazer was born in 1923 in New York City where he completed his undergraduate study at the City College of New York. He received his M.A. in anthropology and linguistics from the University of Pennsylvania in 1944 and his Ph.D. in sociology from Columbia University in 1962. He has taught at the University of California at Berkeley (1957-58, 1963-69), Bennington College (1958-59), Smith College (1959-60) and the Ecole des Hautes Etudes en Sciences Sociales, Paris. He has also been a Fulbright Lecturer in Australia (1977) and in India (1982-83). His numerous academic honors include two Guggenheim Foundation Fellowships and several presidential appointments. He has authored several major books and monographs including: *The Lonley Crowd with David Riesman and Ruele Denney* (1950), *Beyond the Melting Pot with Daniel P. Moynihan* (1963), *The Social Basis of American Communism* (1961) and *The Urban Predicament with co-editor William Gorham* (1976). He joined the faculty of Harvard University in 1969 where he is a Professor of Education and Sociology and co-editor of *The Public Interest*.

William R. Morrish

William R. Morrish was born in Fresno, California, in 1948. He received a B. Arch. from the University of California at Berkeley in 1971 and a M. Arch. in urban design from Harvard in 1978. He has practiced architecture and urban design since 1972, and is presently a principal at Citywest in San Francisco. Citywest is a non-traditional planning and design firm committed to the "design-scenario" technique espoused in his article. In addition to his professional practice, Morrish has taught architecture at the University of California at Berkeley, Tulane University and Morgan State University.

Willard B. Robinson

Willard B. Robinson was born in Sheridan, Wyoming, in 1937. He received is B. Arch. from Montana State University in 1958 and his M. Arch. from Rice University in 1960. He is presently a Professor of Architecture at Texas State University. He served on the board of directors of the Society of Architectural Historians from 1978 to 1981 and was a faculty member of the Institute of Texas Studies, the University of Texas at Auburn, from 1976 until 1984. His articles have appeared in numerous magazines including *The Journal of the Society of Architectural Historians* and *Southwestern Historical Quarterly*.

Helen Searing

Helen Searing was born in New York City in 1933. She received a B.A. from Vassar and a Ph.D. from Yale. She also studied economics at the University of Copenhagen on a Fulbright fellowship and did graduate study in art history at the University of California at Berkeley. She is the Alice Pratt Brown Professor of Art at Smith College, where she has taught since 1967. She has been a visiting professor at the Graduate School of Architecture and Planning of Columbia University, where she presented the *Mathews Lectures* of 1983-84. She has been guest curator of two architectural exhibitions, *Speaking a New Classicism: American Architecture Now*, which opened at the Smith College Museum of Art in 1981 and was circulated subsequently by the *Building Museum*; and *New American Art Museums*, which was presented by the *Whitney Museum of American Art* in 1982. She is author of the catalog that accompanied the *Whitney exhibition*, and editor of *In Search of Modern Architecture: A Tribute to Henry-Russell Hitchcock* (1983). She has long been interested in housing, especially in Amsterdam, and has contributed articles on diverse aspects of modern Dutch architecture

and urbanism to a variety of professional journals.

Richard Guy Wilson

Richard Guy Wilson was born in Los Angeles, California, in 1940. He received a B.A. from the University of Colorado in 1963 and continued his study at the University of Michigan where he received his M.A. (1968) and his Ph.D. (1972) in American studies and art and architectural history. He is presently an Associate Professor of *Architectural History* at the University of Virginia and he is a *Guggenheim Fellow* for 1984-85. His publications include *The Prairie School in Iowa* (1971), *The American Renaissance* (1979), *McKim, Mead, and White, Architects* (1983), *AIA Gold Medal* (1984) and several articles. His article in this journal is an offshoot of his current work on a major exhibition and a book, *The Machine Age in America*.

Lawrence Wodehouse & Marion Moffett

Lawrence Wodehouse (M.Arch., Ph.D.) is a Professor of Architecture at the University of Tennessee. He has published numerous articles and information guides in the fields of American, British, and indigenous architecture, as well as an annotated bibliography of the writings of Ada Louise Huxtable. Marian Moffett (M.Arch., Ph.D.) is an Associate Professor of Architecture at the University of Tennessee. She has done research in architecture education and regional architecture. Moffett and Wodehouse have collaborated to research, write, and produce two exhibitions, one on TVA architecture and the other on East Tennessee cantilever barns.

Special thanks to:

Joan Baxter
Mike Berry
Alice Clark
Mary Craig Crockett
Janet Cutright
Pauline Page
Jaquelin T. Robertson
Kirk Train
The University of Virginia School of Architecture Design Council
Mario di Valmarana
Theo van Groll
C.W. Westfall
Cathy Wilcoxson

Send editorial correspondence to:

MODULUS
The University of Virginia Architectural Review
Campbell Hall, University of Virginia
Charlottesville, Virginia 22903

Printing: Carter Printing Company, Richmond, Virginia
Composition: University of Virginia Printing Services
Edition: 2,000
Typeface: Century Expanded
Text paper: Mead Black & White 100 lb.
Cover: Mead Black & White 80 lb.

We would like to give special recognition to the following people for their generous contributions.

157

Ebert, Hannum & Volz, Inc.
Mr. and Mrs. Richard C. Hannum
David Howerton
Mead Paper Corp., Inc.
H.T. Mead

Patrons

Anthony Ames
Samuel M. Brody
John Burgee
Architects with Philip Johnson
Katherine Willson-Chappell
L. William Chapin, II
Benjamin Clavan
Robert Dripps
James M. Glave
Don Gobel
Mitchell/Giurgola Architects
William Moorhouse
James Mount
Jaquelin T. Robertson
Colin Rowe
Kenneth Schwartz
Henry Smith-Miller
Robert A.M. Stern
Mario di Valmarana
Jock Wick

Donors

Bruce Abbey
Paul H. Barkley
Edward Larrabee Barnes
L.B. Baughan
Larry Booth
J. Norwood Bosserman
Gunter P. J. Buerk
Alexander Cooper
Warren J. Cox
Dagget & Grigg Architects/Planners
James Dupree
Charles Gwathmey
Mr. and Mrs. Fred J. Hannum
William Hubbard
Don M. Jones
Thomas A. Kamstra
R.M. Kliment
J. Christopher Lang
Peter C. Little
William Marshall, Jr.
Charles T. Matheson
Edward Mills
Charles W. Moore
James Nagle
William C. Newman
Russell K. Perry
Paul C. Quigg
Steven W. Semes
John R. Strang

