# Reconsidering Concrete Atlantis: Buffalo Grain Elevators

Lynda H. Schneekloth, Editor

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The Urban Design Project
School of Architecture and Planning
University at Buffalo, State University of New York

Cover Graphic: Elevator Alley, Buffalo River
(Photo by Lynda H. Schneekloth)

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The Landmark Society of the Niagara Frontier
Buffalo, New York

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CREDITS


The Grain Elevator Project was initiated in 2001 by the Urban Design Project, School of Architecture and Planning, University at Buffalo, SUNY, in collaboration with the Landmark Society of the Niagara Frontier. It was funded in part by the National Endowment for the Arts through the Urban Design Project, and by the New York State Council on the Arts/Preservation League through the Landmark Society of the Niagara Frontier.

The Project was managed by Lynda H. Schneekloth from the Urban Design Project, and Jessie Schnell and Thomas Yots of the Landmark Society.

Members of the Advisory Committee included: Henry Baxter, Joan Bozer, Clinton Brown, Peter Cammarata, Frank Fantauzzi, Michael Frisch, Chris Gallant, Charles Hendler, David Granville, Arlette Klaric, Francis Kowsky, Richard Lippes, William Steiner, Robert Skerker, and Hadas Steiner.

We would like to especially thank Claire Ross, Program Analyst from the NYS Office of Parks, Recreation and Historic Preservation for her assistance. Thanks also to all of those who, through the years, have worked to protect and preserve the grain elevators, including Reyner Banham, Susan McCarthy, Tim Tielman, Lorraine Pierro, Jerry Malloy, Timothy Leary, and Elizabeth Sholes.

Thanks to Laura Scarisbrick and Kathy Petrinec for the book design and layout, and Rachele Schneekloth for copy editing.





This book is dedicated to the H-O Oats grain elevator and daylight factory. Your presence on the Buffalo skyline will be missed.

# Reconsidering Concrete Atlantis: Buffalo Grain Elevators

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# Preface

The binational Niagara region of Southern Ontario, Canada and Western New York in the United States is emerging as one large landscape park. Imagine an interpreted landscape extending approximately forty miles north to south along the Niagara River, and east to west from Hamilton, Ontario to Lockport, New York. No official body has declared this area a "park," there are no rangers yet, no new maintenance crews are needed to mow the lawns, and there is no superintendent. Even so, in the popular imagination of the citizens of the region, it is emerging as a beautiful and, frankly, powerful place of municipalities, heritage trails, urban and state parks, suburban and rural landscapes, a world biosphere reserve, an Important Bird Area, industrial, educational, and medical campuses, and cultural and tourism destinations.

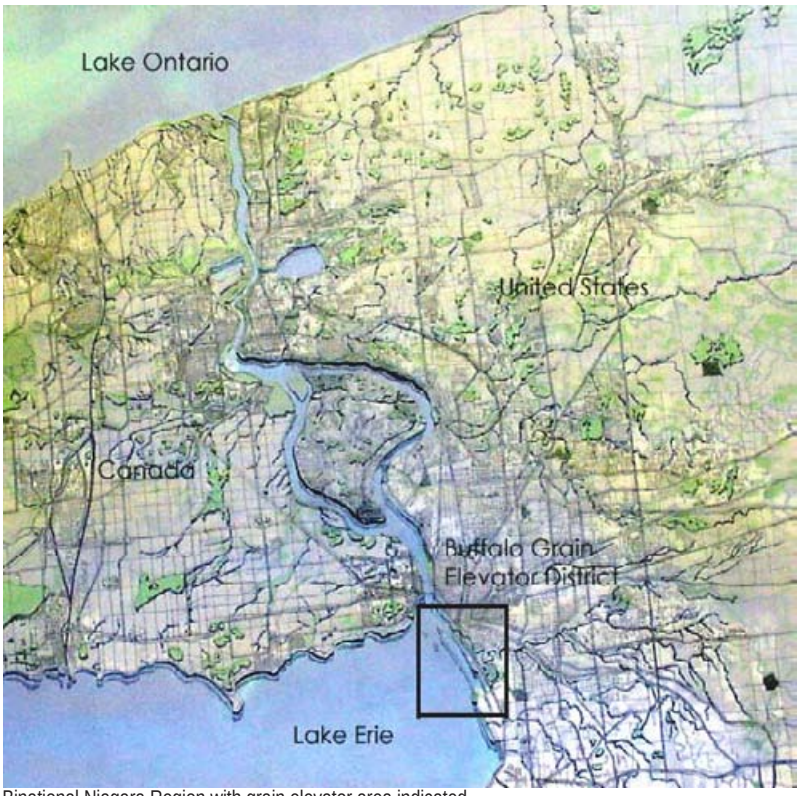
This binational region is the site of an amazing collection of heritage and cultural interpretation sites. Thematically, these sites are a part of the region's role in "the wealth of nations" that establishes the home for the story of *Reconsidering Concrete Atlantis: Buffalo's Grain Elevators*. The grain story was one of many in "the wealth of nations," including our history of steel-making, electric power generation, the commerce enabled by the Erie and Welland Canals, manufacturing Pierce Arrow automobiles, and more. Related to this theme are four other ways of understanding the conceptual park, including its "natural landscape," "enterprise and the arts," "the bounty of nature," and "war, peace and freedom." Together these five themes and the history they organize establish the context within which Buffalo's grain industry was born, flourished, and all but died.

No one story is complete without understanding its relationship to this broader context. Individually, the stories represent themes that portray the available heritage and cultural resources, but braided together in our region as a park, they present a richer and deeper understanding of our place.

All of the themes are a blending of the reality of the border between the United States and Canada and a blurring of that border. Canadians investing in the Erie Canal and U.S. entrepreneurs investing in the Welland Canal tell a story of shared economic goals and international cooperation as well as competition. The story of grain in our region is not limited to the ensemble of structures on the Buffalo River but extends north to Niagara Falls and west to the Niagara Peninsula in Ontario.

The Urban Design Project in the School of Architecture and Planning at the University at Buffalo is on a mission to interpret the regional landscape and give form and substance to the idea of a binational regional identity. Toward this end, we have published *Rethinking the Niagara Frontier* (2001) with the Waterfront Regeneration Trust of Toronto, *A Canal Conversation* (2001) in collaboration with the National Trust for Historic Preservation, *Achieving Niagara Falls' Future* (2001) with the City of Niagara Falls, David Carter International and Foit-Albert Associates, and more recently the *Queen City Hub: A Regional Action Plan for Downtown Buffalo* (2004) with the City of Buffalo and Buffalo Place Inc. In 2005 we helped produce *A Cultural Tourism Strategy: Enriching Culture and Building Tourism in Buffalo Niagara*, a report of the Buffalo Niagara Cultural Tourism Initiative working with the University at Buffalo's Institute for Local Governance and Regional Growth. All of these publications and still more in process affirm the regional base of our "place experience" here in the Niagaras. The collaborative base that constructed them provides a mirror reflecting who we are and how we choose to be.

The exploration of the history of Buffalo's grain industry and elevators recorded in these pages is a collaboration between the Landmark Society of the Niagara Frontier and the Urban Design Project. The effort has enjoyed support from the National Endowment for the Arts through a grant submitted by the Urban Design Project. A second grant from the New York State Council on the Arts to the Landmark Society provided for assembling the




Binational Niagara Region with grain elevator area indicated
(Courtesy of Urban Design Project, University at Buffalo)

historic documentation and successfully nominating two specific elevators in the Buffalo ensemble to the State and Federal Register of Historic Places.

This Urban Design Project and Landmark Society collaboration continued in the evolution of a comprehensive plan for historic preservation in the City of Buffalo. This important planning initiative has been requested by the Mayor, managed by the Office of Strategic Planning and the Buffalo Preservation Board, and engaged by a large cross section of community interests. A significant part of the imagination of our region is vested in more fully understanding, interpreting, and protecting its stories and historic resources.

The story, however, is not just local or regional. Buffalo's grain industry and elevators have played an important role in nation-building as the country found ways to feed the populations to the east from the bread baskets of the Midwest. Internationally, the elevators were an inspiration to modernist architects from all over the world, influencing functional expression in modern architecture. *Reconsidering Concrete Atlantis* offers a significant contribution to the interpretation of the grain industry and elevators for local, regional, national, and international audiences. It further demonstrates the historic connections of Buffalo and the surrounding binational Niagara region to the world.

Robert G. Shibley, AIA, ACIP, is a Professor in the School of Architecture and Planning and the Director of the Urban Design Project at the University at Buffalo, SUNY. He participated in this project both in his position at the University, and also as past president of the Landmark Society of the Niagara Frontier.

August 2005

# Introduction

*They do have an almost Egyptian monumentality . . . and in abandonment and death they evoke the majesties of a departed civilization. Or so it used to seem to me, looking downstream on the Buffalo River . . . It was a privilege to know them in their ravaged antique grandeur . . .*

Reyner Banham

The Buffalo grain elevators have always brought attention to themselves, whether as examples of strategic economic infrastructure, technological wonders, architectural icons, or as objects of historic preservation. The sheer size, geometry, and functioning of these forms arrest many observers, who have stood in awe before their sublime beauty or have decried them as ugly monsters.

The Buffalo Grain Elevator Project,[1] begun in 2001 with grants from the National Endowment for the Arts and the New York State Council on the Arts/Preservation League, was built on the work of many people and organizations. Its goals were to take the next step in the preservation of the elevators through their nomination to the National Register of Historic Places and to renew a conversation about the future of these artifacts and their role in the changing economic and cultural structure of the region.

Marine Legs on the Concrete Central Elevator
(Photo by Lynda H. Schneekloth)

Over three years, a group of dedicated scholars and community members nominated and received a National Register designation for two of the elevators, the Concrete Central and the Wollenberg, and prepared the documentation for the Multiple Property Designation that will facilitate the nominations of other elevators as they are prepared in the future. We, as individuals and as a community, have worked to bring the elevators into the public consciousness through a series of public events that included an International Symposium in October 2002,[2] and through public advocacy and publications. Whatever views one holds of the elevators, their presence is known.

## Economic Infrastructure and Innovative Technology

Since the very first urban wooden silos were erected in Buffalo to hold grain for transhipment between the Midwest and eastern ports, the elevator has engaged the minds and hands of creative engineers and entrepreneurs. The grain industry was instrumental in the development of the Erie Canal, and the combination of the canal and elevators transformed a 3,000 mile journey to one of 450 miles from the farmer's field in the heartland of America to the Port of New York for international trade. The challenge to store and move the grain efficiently spurred many innovations, including Joseph Dart and Robert Dunbar's design of the Marine Leg Conveyer System in 1843 and a series of material changes in the storage containers themselves. The entire history of the transformation of the urban elevator – wood to tile to steel bin to reinforced concrete – is represented by the elevators in the Buffalo.

Francis Kowsky, in "Monuments of a Vanished Prosperity: Buffalo's Grain Elevators and the Rise and Fall of the Great Transnational System of Grain Transport," writes that the elevators were described by writers such as Anthony Tollope and Rudyard Kipling in the mid 19th century. Trollope describes them as being "as ugly

BUFFALO'S GRAIN ELEVATORS Included in Multiple Property Listing, 2003
Based on Chart by Henry Baxter, 2002

| ELEVATOR | SECTION | BUILT | DESIGNER | BUILDER |
|---|---|---|---|---|
| Agway / G.L.F. | "A" | 1942 | AEBECO | JSCO |
| " (Wheeler) | "B" | 1908 | H.R. Wait | Monarch |
| " | "C" | 1936 | AEBECO | Hydro |
| American | "A" | 1906 | JSCO | JSCO |
| " | "B" | 1931 | H.R. Wait | Monarch |
| (Cargill) Superior | "A" | 1915 | H.R. Wait/AEBECO | Monarch |
| " | "B" | 1923 | H.R. Wait/AEBECO | Monarch |
| " | "C" | 1925 | JSCO/AEBECO | JSCO |
| Cargill Pool | "A" | 1925 | C.D. Howe | Monarch |
| (Saskatchewan Pool) | "B" | 1926 | C.D. Howe | Monarch |
| Concrete Central* | "A" | 1915 | H.R. Wait | Monarch |
| " | "B" | 1916 | H.R. Wait | Monarch |
| " | "C" | 1916 | H.R. Wait | Monarch |
| " | "D" | 1917 | H.R. Wait | Monarch |
| Connecting Terminal | "A" | 1914 | H.R. Wait | Monarch |
| " | "B" | 1954 | T. Green | Hydro |
| Electric | | 1897 | W.E. Winn | SS&ECC |
| Annex | | 1942 | H.G. Onstad | H.G. Onstad |
| Great Northern | | 1897 | D.Robinson | D. Robinson |
| | | | Max Toltz | |
| H.O. Oats | "B" | 1931 | H.R. Wait | Monarch |
| (Spencer) Kellogg | "A" | 1909 | C.B. Foster | SS&ECC |
| " | "B" | 1912 | ? | ? |
| " | "D" | 1936 | ? | ? |
| Lake and Rail | "A" | 1927 | J&H | J&H |
| " | "B" | 1928 | J&H | J&H |
| " | "C" | 1929 | J&H | J&H |
| " | "D" | 1930 | J&H | J&H |
| Marine "A" | | 1925 | JSCO/AEBECO | JSCO |
| Perot Malting | "A" | 1907 | JSCO | JSCO |
| " | "B" | 1933 | H.R. Wait | Monarch |
| Standard | "A" | 1928 | AEBECO | JSCO |
| " | "B" | 1942 | M-Hague | M-Hague |
| Washburn-Crosby | "A" | 1903 | Johnson-Record | Barnet-Record |
| (General Mills) | "B" | 1909 | JSCO | JSCO |
| " | "C" | 1909/ | JSCO | JSCO |
| " | | 1925 | | |
| Wollenberg* | | 1912 | C.H.A. | ? |
| | | | Wannenwetsch | |

***Demolished 2006***

**National Register of Historic Places 2003*
Sources: HAER Study and Report, 1992; AEBECO Archives

Abbreviations:

| | |
|---|---|
| AEBECO | A.E. Baxter Engineering Co., Buffalo, NY |
| H.R. Wait | Harry R. Wait, P.E., Buffalo, NY |
| Hydro | Hydro Construction Co., Buffalo, NY, T. Green, President |
| JSCO | James Stewart Co., Chicago, IL |
| J&H | Jones-Hettelsatter Co., Kansas City, MO |
| M-Hague | Mckensie Hague Co., Chicago, IL |
| Monarch | Monarch Engineering Co., Buffalo, NY, H.R. Wait, President |
| SS&EC | Steel Storage and Elevator Construction Co. |

a monster as has been yet produced" even while admiring the functionality of the workings, the motion and lifting and dropping and storing, all done by the machines and their attachments.

Engineers such as A.E. Baxter and Harry R. Wait worked to improve the type until the current reinforced concrete elevator with its innovative slip form construction became the norm. With the exception of two of the remaining seventeen large elevator complexes along and near the Buffalo River, all of them are built of reinforced concrete. In 1980, when the Buffalo and Erie County Historical Society published Henry Baxter's *Buffalo's Grain Elevators*, many recognized that most the elevators were no longer functioning and would soon be lost. Baxter describes his book as an opportunity to educate people about the engineering and technology of the elevators.

As of 2006, only two of the elevators are in operation: the Standard used by ADM and the elevators of General Mills. The grain storage and ship-based transhipment industry in Buffalo was challenged in the 19th century by the introduction of the train but recovered because of increase in demand. In the 20th century, the requirement for transshipment was eliminated first by the opening of the Welland Canal in 1932, and in 1959 by the opening of the St. Lawrence Seaway. Grain no longer had to be housed in elevators in Buffalo and elsewhere for transfer between modes of transport but could be shipped directly from the heartland to eastern and European ports. Many grain elevators across North America are no longer in use, but they were built to last and remain standing, silent and abandoned.

## Icons of Modernism

As articulated by Reyner Banham in *A Concrete Atlantis* (1986), the grain elevators in general and those in Buffalo in particular were an inspiration to modern architects in Europe. Le Corbuiser declared, "Thus we have the American grain elevators and factories, the magnificent FIRST FRUITS of the new age." In her piece, "Silo Dreams," Hadas Steiner revisits Banham's work in light of more recent scholarship to focus on the power of the representations in the formation of modern architecture. The circulation of drawings and photographs of these structures helped shape both the form and theory of modern architecture, even if many of those using the images had neither visited the grain elevators nor understood how they worked.

It was the power of the visual image that moved these architects, and the adoption of their formal qualities had a long term effect on modern architecture. The simple but powerful geometric structures and the ideology of practical design without ornamentation conformed to the purposes of modernism. But, as Steiner suggests, it was the power of the image of function and practicality that seduced the modernists.

## Preservation Movement

Historic preservation almost always begins after a building, place, or machine has ceased to serve the purpose for which it was designed and usually has ceased to make an economic contribution. The story of the preservation of grain elevators in Buffalo and elsewhere, such as Minneapolis, Akron, Tasmania, Montreal or Madrid, follows this pattern.

By the mid 1960s, many of the elevators in Buffalo had ceased to function. Some were inexpensively sold to private owners, others remained in the hands of the original corporations but simply sat idle. A flurry of activity regarding the preservation of the elevators occurred in the 1980s and early 1990s when it became clear that they were endangered either through actual demolition (Cargill Electric in 1984) or proposed demolition (Great Northern). Led by the Preservation Coalition of Erie County and their subgroup that later became the Industrial Heritage Committee, a community of people formed to make these artifacts and their landscapes visible.

In 1981, *Buffalo Architecture: A Guide* was published by MIT Press. William Clarkson wrote in the preface to that publication that, "[t]he City of Buffalo is an outdoor

museum of extraordinary architecture, developed over the one hundred fifty years of its history" (xii). The grain elevators were prominently presented as an important part of the architectural heritage of the region. This guide was followed in 1986 by Banham's book, *The Concrete Atlantis*, a scholarly treatise on the role of the elevators and daylight factories in the emergence of modern architecture. More local guides and publications included *Waterview Guide to Buffalo Harbor* (1989) that placed the buildings in context, along with Tielman's *Buffalo's Waterfront: A Guidebook* (1990) and *Maritime Buffalo* (1990) by Vogel and Redding.

Significant national attention was brought to the elevators in the early 1990s with the preparation of documentation for the Historic American Engineering Records (HAER) now stored in the Library of Congress. Timothy Leary, John Healey, and Elizabeth Sholes, along with Jet Lowe, photographer, prepared detailed historic records of the remaining elevators. There was no longer any question about the national, even international, significance of the Buffalo Grain Elevators in many circles. However, proposals for demolition of the Great Northern continued in the early 1990s until it received a local designation by the Buffalo Preservation Board, largely through the work of Susan McCartney and the Preservation Coalition.[3] Yet, as late as 2001, none of the elevators were listed on the National Register although most of them were eligible for that designation.

The grain elevators were born to support an emerging economy of transhipment that put Buffalo and the Niagara region at the center of a national and international economy. With the loss of that position and shifts in the global economy that led to the process of deindustrialization of the northeast U.S., including Niagara, the economy has sagged and the elevators, as a symbol of the economic strength of the region, now stand as negative icons to a glorified past. However, the winds are shifting again and a new economy is emerging in Niagara, indeed, in the binational region. The grain elevators may again play a role as infrastructure in the new economy.

Tourism is now one of the largest industries in the world, and heritage tourism is one of its major components. The Niagara region, centered on world famous Niagara Falls, is an area filled with stories of industrial heritage from the grain industry, to hydropower, to the chemical industry. Because we have the largest extant collection of the elevators in the world and they collectively represent the history of grain storage and technological innovation, it is likely that these magnificent structures will again be used to support the economic infrastructure of the region. Much work remains to be done, but as Michael Frisch proposes in his article "Where is the Fun in a Grain Elevator?" there are many stories to tell and ways to tell them that include the elevators as central artifacts. There is fun to be had with the elevators through their stories, and through imaginative explorations of possibilities offered in "Projects and Proposals" and Thomas Yot's "Challenging the Imagination."

The Buffalo Grain Elevator Project was officially completed in 2004, but work has continued in the preservation community through a small working group to both protect and reuse the elevators. We have won some and lost some. The most exciting development is the planned reuse of four of the elevators: Marine A, Lake and Rail, Perot, and American, to store grain for a new ethanol plant, a project of RiverWright Energy, LLC, a new Buffalo based alternative fuel company. This project should be producing ethanol by 2007. On the other hand, in 2006 the H-O Oats Elevator and daylight factory were demolished to make way for a controversial casino. The Preservation League led the legal battle to save it, but was unsuccessful. It is to this elevator that we dedicated this publication.

*Reconsidering Concrete Atlantis* is a record of the community effort on behalf of the Buffalo grain elevators through a project by the Landmark Society of the Niagara Frontier and the Urban Design Project of the University at Buffalo/SUNY. It describes the efforts of academics, preservationists, community people and funding agencies; it builds on the efforts of those who have been working for many years; and it

gives hope to all who will continue in this project. We believe that the State and National Register status conferred on two of the elevators and the multiple property documentation prepared for all of the elevators is the beginning of a new era in which the Buffalo grain elevators will again be considered an important and critical part of the physical fabric of the city, and of our image of ourselves.

Lynda H. Schneekloth, ASLA, is a Professor in the Department of Architecture, University at Buffalo, SUNY and associate at the Urban Design Project. She managed the Buffalo Grain Elevator Project and is president of the Buffalo Niagara Riverkeeper.

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ENDNOTES

1. The Buffalo Grain Elevator Project was cosponsored by the Urban Design Project of the School of Architecture and Planning, University at Buffalo, with Lynda H. Schneekloth as Project Director, and the Landmark Society of the Niagara Frontier with Jessie Schnell and later Thomas Yots serving as co-directors.

2. "Industrial Heritage in the Working Landscape" was held on October 12, 2002 in Buffalo, New York, with presentations on the Buffalo grain elevators, presentations on other industrial landscapes, and a boat tour that offered a waterside view of the elevators.

3. ADM again proposed demolition in 2002, although it appears that the conditions set by the local Preservation Board were not met and the structure is still protected by local landmark status.

# Monuments of a Vanished Prosperity:
## Buffalo's Grain Elevators and the Rise and Fall of the Great Transnational System of Grain Transportation

Elevator Alley on the Buffalo River
(Photo by Lynda H. Schneekloth)

*Francis R. Kowsky*
*SUNY Distinguished Professor of Art History*
*Buffalo State College, SUNY*

# Monuments of a Vanished Prosperity

## Introduction

During the first half of the twentieth century, Buffalo had the nation's largest capacity for the storage of grain. Over thirty concrete grain elevators rose along the city's inner and outer harbors on the Buffalo River and Lake Erie. These concrete grain elevators represented the culmination of fifty years of development in grain elevator design. Joseph Dart built the first wooden elevator in Buffalo in 1842. Late nineteenth-century tile and steel elevators paved the way for the mammoth reinforced concrete elevators, the first of which went up in Buffalo in 1906. The last one constructed here was erected in 1954.[1]

## Part I: The Development of Buffalo as a National Center of the Transshipment of Grain Prior to 1860

### *The American Grain Trade before the Opening of the Erie Canal*

Wheat was one of the first agricultural products planted by European colonists in the New World. In colonial times it not only was a staple of life but also became an item of internal and foreign trade. By the time of the American Revolution, there existed a "bread belt" in the Middle and Southern colonies that extended northward into New York's Hudson Valley and westward into the Mohawk Valley. Much of the corn, wheat, and rye that was grown fed homeland consumption, but some was shipped abroad, mainly through Philadelphia, to the West Indies and Europe. In 1765, Philadelphia, which was the leading commercial port in colonial America and the continent's most prosperous city, exported over 360,000 bushels of wheat. In the same period, nearly 110,000 bushels of American wheat began its journey to foreign ports from New York City.[2] From these small beginnings, grain was destined to become the premier American agricultural crop.

The westward movement of population accelerated after the Revolution, as "pioneers" moved into the territory beyond the Appalachians. Settlers devoted much of this newly cultivated land to raising grain. In 1800, the Appalachians from Virginia to central New York marked the western boundary of American civilization. Before the middle of the century, the line had moved to the Mississippi River. By the time of the Civil War, the future great Midwestern grain-growing regions of Minnesota, Wisconsin, and Lower Michigan were under cultivation.

Raising grain on the frontier was one thing; getting it to market was another. Yet despite the slow and lengthy routes the products were forced to follow from farm to market trade, grain and flour from recently cultivated western lands became a flourishing business in the new republic. During the Revolution and just after, a considerable amount of the wheat raised in Western Pennsylvania began to be shipped to Pittsburgh and then down the Ohio River to the Mississippi River to New Orleans. By the time of the Louisiana Purchase in 1803, New Orleans had become the most important trading center for wheat, corn, and flour from the new farmland in the Ohio Valley and Kentucky. New Orleans would remain a major transshipment point for the export of western grain to Europe until the opening of the Erie Canal in 1825.

Even Western New Yorkers depended on New Orleans for marketing their grain. Grain (and other goods) bound for New York City from the western part of the state often went first south to New Orleans. There it was placed on ocean-going vessels that carried it to its final East Coast destination. This voyage of 3,000 miles proved less expensive than the $100 per ton cost (a sum three times the value of the grain) of overland transportation.[3] As one can imagine, the transport of grain from the upper Mississippi region to New Orleans was long and arduous. Loaded onto barges manned by the "flatboatmen" celebrated in the paintings of George Caleb Bingham, barrels of grain and flour made their way down the Ohio to the Mississippi and then southward to New Orleans. The journey was fraught with the dangers of

shifting channels and other vagaries of wilderness river travel. And the return trip back north, against the current, could take up to three months. Frequently, at the end of his journey, a barge owner would sell his boat in New Orleans and take passage on a ship to Philadelphia or Baltimore rather than face an upriver trip. There he would purchase manufactured goods and a wagon to carry him home over an increasingly reliable network of interior roads. Such a round trip could take as long as six months. From the late eighteenth century until 1825, many residents of the new western lands carried on this cycle of transport, which had more in common with the Roman world than with modern life.

Such journeys, however, became less and less difficult during the first half of the nineteenth century as road building came to supplement river travel in the country's interior. Important early westward roads and turnpikes were constructed between Philadelphia and Pittsburgh, across the Cumberland Gap to Kentucky, and from Baltimore to Wheeling. In some cases, new highways allowed northern farmers to bypass the shipment of grain to either Philadelphia or New Orleans. One such exception to the southerly movement of grain took place in New York. Much of the grain from the fertile Genesee Valley -- one of the nation's principal wheat growing areas -- went east to Albany via the Mohawk Valley Road. From there, boats carried it down the Hudson to New York City. Such trade contributed to the increased importance of New York City as a grain port.

Concurrent with road building, another factor that would figure prominently in later grain transportation came into existence. Steamboat service began on the Ohio-Mississippi route in 1811, when the first paddle wheeler left Pittsburgh for New Orleans. By 1820, steamboat freight and passenger service, an aspect of the American experience immortalized in the writings of Samuel Clemens, began competing seriously with flatboat traffic. By the end of the 1840s, it had completely replaced the older form of water transport. Steamboats also began plying the waters of the Great Lakes in the 1820s. These new types of large vessels were destined to play a significant role in the success of Buffalo as grain port after the opening of the Erie Canal. Conditions were ripe for a major improvement.

***Opening of the Erie Canal in 1825***

When the Erie Canal was opened in 1825 with Buffalo as its western terminus, the course of grain transshipment from the west to the east altered drastically. Located where the Niagara River flows out of Lake Erie toward Lake Ontario, Buffalo stood at the easternmost point of navigation on four of the Great Lakes and at the westernmost point of the new canal. (Niagara Falls, some fourteen miles down river from Buffalo, precluded a navigable link between Lake Erie and Lake Ontario and the direct access the latter would have afforded to the Atlantic via the St. Lawrence River.) Henceforth, grain would move across the western Great Lakes to Buffalo, where, unloaded and transferred to canal boats, it was carried eastward 363 miles via the canal to Albany. It was then placed on vessels for the 150-mile journey down the Hudson to New York City. There it could be exported to European and other world markets. What had once been a 3,000 mile journey was now reduced to about 500 miles.

In 1825, Buffalo was a middling village of 2,400 people, barely rebuilt after having been burned by the British during the War of 1812. The town did not even produce its own flour; the nearest gristmill operated eleven miles away in Williamsville. At the beginning of its existence, the canal carried more passengers than goods, for it immediately became the vital water level link in a new highway of immigration to

The City of Buffalo looking straight up Main Street with the Erie Canal seen next to the lake on the left.
(Courtesy of Buffalo and Erie County Historical Society)

the West from the Eastern Seaboard. But local leaders also saw Buffalo's potential as a commercial port as well as a place of human transit. By creating a large harbor out of the sand-clogged mouth of the Buffalo River (a process begun in 1819 by farsighted Mayor Samuel Wilkinson) and protecting it from the often turbulent open waters of Lake Erie by means of a breakwater, the city prepared itself to accommodate increasing lake traffic. By 1830, the transshipment of wheat from the West to New York City via the canal had become significant. In 1831, over 57,000 barrels of flour and more than 173,000 bushels of wheat passed through Buffalo on their way east. These figures steadily increased, and in 1846 more flour and wheat were shipped through Buffalo than through New Orleans. The United States Bureau of Statistics reported that for the year 1860, the "bulk of produce of the Ohio Valley had been diverted to the lakes and Atlantic seaboard; but probably one-fifth of it found its way to New Orleans."[4] And the expense of moving goods had come down dramatically since pre-canal days; it now cost only $15 to carry a ton of grain from Buffalo to New York City (including canal tolls). By the time of the Civil War, Buffalo, which also benefited from the construction in the 1830s and 1840s of a network of smaller canals in Pennsylvania and the Great Lakes region of which the Erie Canal became the hub, was handling over 7,000,000 barrels of wheat and flour annually.[5] This, despite the fact that cold weather closed the harbor and canal during the winter months. By the time that Buffalo's mayor Grover Cleveland became President of the United States in the mid-1880s, the *Buffalo Express* avowed that "Buffalo has long been known as the City of Grain Elevators."[6]

Grain transshipment also stimulated other wheat-related businesses in Buffalo. An active grain market developed here as the city grew into a center of grain traffic. In 1855, the newly formed Board of Trade and Commerce proudly proclaimed that "Buffalo is now universally acknowledged to be the greatest grain market on the Continent, not even excepting the City of New York."[7]

Indirectly, the construction of the Erie Canal also stimulated a nascent flour milling industry at nearby Black Rock, a community some three miles down the Niagara River from Buffalo. By drawing water from the Black Rock harbor, engineers were able to create here what, in effect, was an extended millrace. This waterpower became available for manufacturing in 1824, but it was not until the following decade that significant flourmills were constructed along its banks. "Black Rock has already, by aid of her inexhaustible water power," touted a local newspaper at the time, "become the great flour market of the lakes, and is hereafter to be the principal wheat market of the west."[8] By 1839, lake vessels loaded with grain sailed downriver and docked at the Black Rock harbor, where, by means of newly invented machinery, their cargoes could be unloaded in less than a day. Predictions of Black Rock's future as a major milling center, however, proved overly optimistic, and during the last half of the nineteenth century the area saw little expansion beyond the initial spurt of mill construction. Niagara water power proved unreliable (there were years when, due to low lake and river levels, milling had to be suspended), economic recessions took a heavy toll on development plans, and local millers experienced difficulty in obtaining high quality wheat. In the words of Peter Sweeney, historian of the grain trade in Buffalo, during the period from 1853 to 1907 "Buffalo milling made no sustained advances and at the end its position was not markedly better than at the beginning."[9] Flour milling, which after the opening of the Erie Canal swelled into the premier industry in neighboring Rochester, did not come into its own in Buffalo until after the mid 1890s when hydroelectric power from Niagara Falls began to be transmitted to the city.

### *The Development of the Railroads*

Together with the historic transformation of marine travel by steam power, the early nineteenth century saw the same force recast terrestrial movement. In addition to the Erie Canal and the steamboat, the railroad revolutionized the transportation of goods, including grain, in the early nineteenth century. Indeed, almost from the beginning of its existence, the Erie Canal faced competition from the new

railroad industry. Rail beds began to be constructed parallel to the Erie Canal in the early 1830s. At first, competition was small because early roads were built with iron rails that could sustain only relatively light loads. Furthermore, the early roads had no terminals for loading and stowing grain and other goods. But with the introduction of steel rails and the steady improvement of trackside facilities, railroads began first supplementing and then drawing away business from the canal. Rail travel was faster, and unlike the canal, the railroads could run all year round; they did not shut down when winter ice closed the lakes/canal route.

By the middle of the century, when a number of lines had been absorbed into the New York Central, the rail link between New York and Buffalo was consolidated. The railroad had grown into a major player in the transportation of passengers and goods between the Atlantic seaboard and the Great Lakes region. "This great route almost equaling in importance the Erie Canal," stated a Buffalo business journal in 1854, "and to which it already proves a formidable rival . . . has been yearly extending its operations until it now forms one of the most reliable channels of commerce between the produce of the west and the manufacturers and markets of the east."[10] Other railroads, such as the Pennsylvania Railroad and the Baltimore and Ohio, also built trunk lines to Buffalo from the older ports of Philadelphia and Baltimore. By the middle of the 1880s, twenty different railways started or ended at Buffalo.

Railroads eventually tightened their grip on grain transportation by investing in lake steamboat lines as subsidiaries and by building warehouse facilities and storage elevators on the Buffalo waterfront. Already in the mid-1850s, the New York Central had erected between Ohio Street and the Buffalo River what it touted as the largest depot in the world. This facility allowed trains to receive grain and other freight directly from lake vessels docked in the harbor. The railroad was also by then connected to the two largest grain elevators on the Buffalo waterfront. In 1855, railroads carried twice the amount of flour from Buffalo than moved on the canal and by the end of the decade they threatened the very existence of the canal as a grain route.[11]

Another spurt of railway development came in the 1880s, by which time the International Railway Bridge over the Niagara River to Canada had been constructed at Buffalo. During that decade the city made generous land grants to railroads to encourage their expansion here. Six different routes connected the city to New York, including the New York Central, Lehigh Valley, and Delaware, Lackawanna and Western lines. The transfer yards on the east side of town grew to the largest in the world and new terminal facilities greatly increased storage and warehouse capacity. The Lehigh Valley line alone created a terminal and ship canal at the Tifft farm that added two miles of dock space to the existing waterfront.

### *Joseph Dart, Robert Dunbar, and the Development of the Wooden Grain Elevator and Marine Leg Conveyer System*

As Buffalo's harbor became port of call to more and more vessels arriving to unload grain, it was perhaps inevitable that invention would be applied to the laborious process of transferring grain from lake vessels to canal boats. At first men, chiefly Irish immigrants, carried barrels by hand. Not only was this backbreaking work, but the slow pace was a weak link in the chain of improved efficiency of movement represented by the steamboat and locomotive. When the first bulk shipment of grain (some 1,600 bushels) arrived in Buffalo aboard the *Osceola*, it took a week for longshoremen to unload the cargo.[12]

It was Buffalo entrepreneur Joseph Dart (1799-1879) and engineer Robert Dunbar (1812-1890) who applied the new technology of the age to the handling of grain. Dart had come to Buffalo from his native Connecticut in 1821 and set himself up in the hat and fur business. Dart, whom contemporaries described as a "methodical and industrious man,"[13] had an eye for good business opportunities. As the grain trade began to develop in Buffalo after the opening of the Erie Canal, he turned his sights on this growing

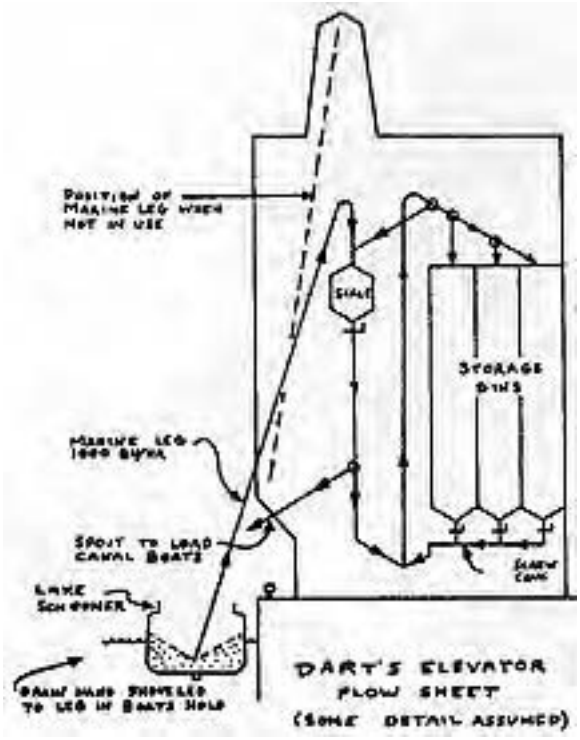
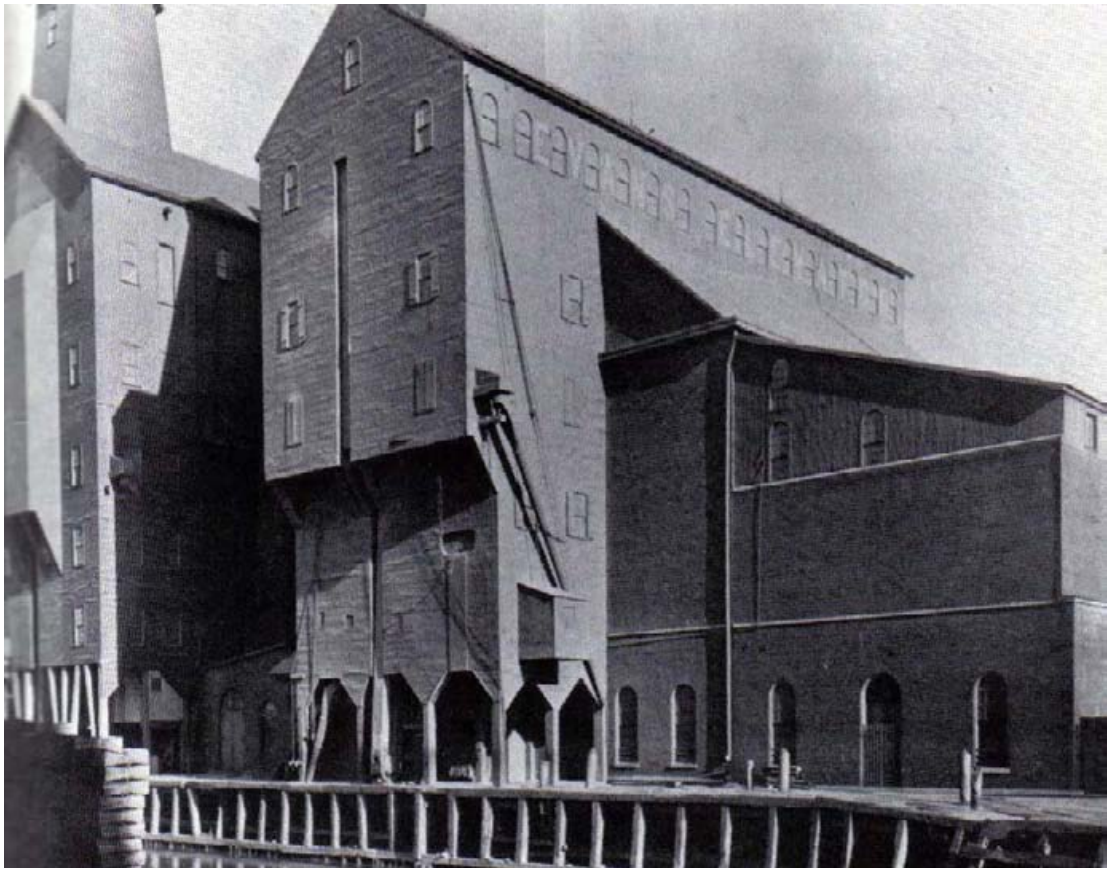



Diagram of the flow of grain in Dart's Elevator.
(Source: Baxter 1980)



The Evans Elevator: one of the wooden elevators that existed on what is now the Erie Basin Marina.
(Courtesy of the Buffalo and Erie County Historical Society)

industry. “It seemed to me,” he said, “as I reflected on the amazing extent of the grain producing regions of the Prairie West, and the favorable position of Buffalo for receiving their products, that the eastward movements of grain through this port would soon exceed anything the boldest imagination had conceived.”[14] In 1842, Dart built the first steam-powered grain elevator. (It is probably more than coincidence that the first shipments of anthracite coal from northeastern Pennsylvania arrived in Buffalo via the canal in the same year that Dart built his elevator. Thereafter, the coal that fueled Buffalo’s many steam-powered industries came in a steady flow by the waterway and later by rail.) In 1843, when the schooner *Philadelphia* unloaded the first bulk shipment of grain at the Dart Elevator, it took only hours to lift the wheat from the hold.[15]

The man who made it possible was thirty-year-old engineer, Robert Dunbar, the unsung pioneer of grain elevator construction. Born in Scotland in 1812, Dunbar arrived in Buffalo in 1834, after having studied mechanical engineering in Canada. At the time of his death in 1890, Dunbar was eulogized as “the father of the great grain elevator system.” His inventions had made possible “all the present improvements of elevators,” proclaimed the *Buffalo Commercial Advertiser.*[16] In addition to the Dart Elevator, Dunbar designed nearly all of the elevators that by the 1880s crowded together along the shores of the Buffalo River. The Evans (1865), Watson, Merchants, Reed, Wilkinson (1863), Wells, and Bennett[17] elevators are now long vanished and known to us only in photographs, yet they were the first landmarks of the new age of grain transshipment in North America. The taciturn Dunbar -- a contemporary described him as a man of “a singularly retiring and undemonstrative disposition”[18] -- enjoyed an international reputation for his remarkable accomplishments in Buffalo. Jobs for constructing elevators came to him from as far away as Odessa, Liverpool, and elsewhere in Europe and Canada.

Dunbar became associated with Dart in his grain elevator enterprise after having erected in nearby Black Rock at least one water-powered flourmill that utilized a new mechanized system for handling grain and flour. In 1842, the two men undertook to erect the fifty by one-hundred foot Dart Elevator on a site near the mouth of the Buffalo harbor at the junction of a small subsidiary waterway called the Evans Ship Canal. (A bronze plaque placed there by the Buffalo and Erie County Historical Society presently marks the location.) By means of a steam-powered vertical conveyer belt made of leather or canvas and equipped with buckets, Dart could unload grain directly from the hulls of a lake vessel moored alongside his storage elevator. Inside the ship, men who before this had carried barrels on their backs from boat to dock now shoveled grain into the conveyor belt buckets. They were the first generation of “scoopers,” as the laborers -- more often than not Irish immigrants or their descendents -- who unloaded the lake vessel cargoes in this way came to be called. (Locals skeptical of Dart’s investment in the new technology taunted him with the jest that “Irishmen’s backs are the cheapest elevators.”) The grain they scooped was carried up this so-called “loose leg” to a scale, where it was weighed before being distributed to large storage bins. There, grain would be stored until sold. At that moment, it would be drawn off through the bottom and raised again to the scale by means of a “stiff leg” conveyer system that occupied a fixed position within the elevator house. Finally, the grain “spouted” down into a waiting canal barge moored where the arriving lake vessel had docked. The process involved the forces of steam power to lift the grain and gravity to spout it. Thus was born a new building type. An early observer defined it as “a collection of elevating, weighing and distributing machinery, placed in and over a building made to fit its size and requirements, this building being a collection of boxes, or bins, of greater or lesser size and depth, fitted for the receipt of grain at the top and for discharging the same through openings in the bottom.”[19]

The most innovative feature of the Dart Elevator was the long, vertical conveyer system that replaced human labor as the means of unloading grain from lake vessels. Housed in a tall wooden sleeve,

the conveyer could be canted outward at the bottom of the elevator structure and lowered directly into the hold of a waiting boat. When not in use, this loose leg conveyer belt was retracted by means of a steam engine to its original vertical position inside the elevator. A hood or cupola, some twenty feet in height, on the roof of the structure provided the extra room needed to store it upright. It was the most distinctive external feature of Dart's elevator and those that followed its example. At first this pioneer "marine leg," as these boat-to-elevator devices came to be called, was equipped with two-quart buckets that were twenty-eight inches apart. Dunbar's original system was able to raise 600 bushels an hour, ten times the amount human workmen had been able to carry. Soon, however, with improvements, the capacity of the marine leg rose to 2,000 bushels an hour and the elevator's storage capacity increased from 55,000 bushels to over 110,000 bushels. Dart and Dunbar owed a serious debt in their invention to miller Oliver Evans, who earlier had devised a similar conveyer system to handle flour and grain in his milling operation in Philadelphia.

While the mechanization of grain handling that went on inside the early elevators represented the application of new ideas to an age-old industry, the materials and methods used to construct the first elevators were not new. Wood, a plentiful material in the Great Lakes basin, allowed for quick and inexpensive construction. (Dart also involved himself in the burgeoning Western New York lumber trade.) Heavy timber frames sustained these early structures that contained rectangular storage bins built on the traditional crib system. In order to support the enormous weight of the stored grain (100,000 bushels weighs about 3,000 tons), and because these elevators were located on mud and sand adjacent to the river, it was necessary to erect them on pilings. Typically, closely spaced log piles were driven deep into the soft earth to form a solid foundation on which the elevator could be raised. A basement course of stone or brick was laid on the pilings to a height of about sixteen feet, above which rose a framed superstructure of oak, elm, or beech. The internal bins were supported on

Grain scoopers emptying a lake vessel.
(Courtesy of Buffalo and Erie County Historical Society)

a series of posts, struts, and girders.[20] With their exteriors covered with boarding, the first elevators resembled enormous sheds or barns. Their tall, ungainly proportions and steeply sloping roofs evoked a decidedly medieval appearance. Perhaps this is what attracted H. H. Richardson to them, for the great Romanesque revival architect, who had projects in Buffalo in the late 1860s and early 1870s, nurtured a keen desire to design a grain elevator.

Despite their old-fashioned look, the new Buffalo elevators increased the speed with which grain could be transferred from boat to barge and made it possible to store safely large of amounts of grain at the site. Dart and Dunbar provided the third element necessary together with motorized lake and rail transportation that brought the age-old grain industry into symmetry with the vastly expanded scale of modern life. By 1860, the Dart Elevator had spawned ten similar structures on the Buffalo waterfront and given the city a storage capacity of over 1.5 million bushels. With an addition of sixteen more elevators by the end of the Civil War, Buffalo surpassed the grain commerce of London, Odessa, and Rotterdam to become the world's largest grain port. Without the invention of the versatile and efficient elevator, this meteoric rise would have been impossible.

"Grain elevators make ideal structures for the storage of grain," writes industrial historian Henry H. Baxter, whose ancestors designed many of Buffalo's later elevators. "In the elevator's bins, grain can be kept dry, cool, free from vermin, and safe from pilferage. Moreover, elevators make it possible to weigh and sample grain to determine the quality, quantity,

and grade as a basis of payment."[21] In addition, Buffalo's early elevator operators developed the ability to dry and clean the grain they received here sometimes in less than optimal condition. Often the grain in ship holds became wet during the lake voyage. In order to prevent damp grain from spoiling, it needed to be dried before being put into storage. Dunbar's Reed Elevator had a typical drying facility (called a Marsh dryer) attached to it. The marine leg lifted the grain from the hold to a large metal surface some 800 feet square that was perforated with tiny holes. As the moist grain was raked across this surface it was dried by a blast of hot air from below. The grain was then drawn through a current of cold air to cool it before being shunted into a storage bin. A system for cleaning grain shipments of chaff and other impurities involved dropping the grain into a large cylinder and drawing off the lighter chaff that rose in the air by means of a steam-powered exhaust fan. A combination drying and cleaning system invented by Buffalonian George Clark was put into operation in the middle of the 1860s in a separate building adjoining the large Richmond Elevator.[22]

## Part II: Increased Grain Trade and the Evolution of Grain Elevator Design, 1860s-1890s

### *The Post-Civil War Era, 1865-1890: The Decline and Rise of Buffalo as a Center of Grain Transshipment*

By 1860, the breadbasket of America had moved from the Ohio Valley to embrace the entire Great Lakes basin. New York and Pennsylvania bordered this vast expanse of wheat production to the east, Iowa and Missouri to the west, and Wisconsin and Michigan to the north. (Corn production had taken over the area to the south, including Illinois, Ohio, and Tennessee.) Much of the grain produced in these areas now found its way north across the Great Lakes to Buffalo. By 1860, American vessels on the lakes totaled over 450,000 tons of carrying capacity. From Buffalo, the grain of the lakes basin traveled by canal or railroad to the Eastern Seaboard. In 1861, Buffalo, which before 1825 had shipped local grain to market via the Ohio and Mississippi to New Orleans, was home to twenty-seven grain elevators and did an annual grain business that totaled more than 50 million bushels.[23] The busiest time of the year for the port was from the middle of September, when the grain harvest began, until the middle of November, when lake traffic ceased due to ice and cold weather.

From the time of the Civil War to the closing of the American frontier in 1890, Buffalo experienced declining and rising fortunes as a center of grain and flour transshipment. Buffalo's prosperity was in large measure determined by developments in national transportation patterns and the shift of the nation's main wheat growing region from the Midwest to the Northwest. From the middle of the 1860s to the middle of the 1870s, Buffalo remained a strategic point in the movement of grain from the West to the Atlantic seaboard. But rivalries between the ever growing railroads and the lake vessels for the transport of grain eastward soon threatened Buffalo's role as a major point of grain transfer from lake vessels to canal and rail transport. In the ten years between 1875 and 1885, Buffalo was severely affected by the diversion of western grain shipments to railroads from lake steamers.

During this period Midwestern railroads were able to siphon off a major portion of the grain transport business from the lake steamers. This was made possible by the consolidation of shorter lines into through lines, the laying of steel rails that permitted heavier loads to be carried by bigger engines, the construction of terminal facilities and railroad grain elevators, and the manipulation of transshipment fees. Shipping by rail became attractive to farmers because it was faster and cheaper than by boat and they could avoid transshipment charges because trains went directly to ports, bypassing Buffalo. By 1872, ninety-nine percent of the flour and sixty-seven percent of the grain shipped eastward from the Midwest went by rail rather than over the lakes.[24] Insurance costs were also much lower to rail shippers and they could be assured that their grain would not be subject to heating the way it

was on slower moving vessels and canal boats. At the same time, the shipment of grain on the Erie Canal steadily declined. Chicago surpassed Buffalo as the leading center of Great Lakes grain trade during this dark period for Buffalo. From 1868 to 1875, Buffalo accounted for over half of the grain that arrived in New York City; after 1875, this amount was reduced to less than thirty percent.[25] To many observers, Buffalo seemed doomed to shrink into insignificance in the landscape of the American grain trade.

But the situation turned around dramatically after the middle of the 1880s. Buffalo was given a new lease on life as a result of the expansion of the hard spring wheat belt across Minnesota and the Dakotas. This major agricultural phenomenon (which was matched by a similar growth of grain farming in Kansas and Nebraska) was to restore Buffalo to its position as the strategic transfer point in the westward to eastward movement of grain and flour. These new grain fields of the Northwest were west of Lake Superior and far to the north of the central Midwestern rail system that was centered on Chicago. At the head of Lake Superior, Duluth, Minnesota now became the great collection point of grain for this new region as well as a major flour-milling center. To get their products to markets, shippers restored wheat and flour traffic on the lakes. The journey by steamer from Duluth at the head of lakes navigation to Buffalo at the foot was about the same distance as from Duluth to Chicago. In addition, new rail lines in Minnesota allowed millers and grain shippers to bypass the congested freight yards of Chicago and to shorten the distance to Atlantic ports by placing grain cargo on lake freighters bound for Buffalo at Gladstone. "The ascendancy of the Northwest," observes Sweeney, "put Chicago off, and Duluth on, the direct line between the wheat areas and the Eastern markets; it also produced adjustments in the location of the flour milling industry which passed the leadership in place and traffic from the Chicago lake and rail routes to the Duluth-Superior lake route."[26]

As a result of these geographic shifts, Buffalo was back in business. By 1893, Buffalo handled two-thirds of the grain and over fifty percent of the flour moving eastward from the thriving Lake Superior region.[27] Moreover, by century's end, Buffalo enjoyed a stronger position than ever before in the advancing saga of west-to-east transport of grain and flour. In actual volume, this meant that 128 million bushels passed through the port in 1891; by 1898 this amount had nearly doubled to 221 million bushels.[28] In 1885, a reporter informed the readers of *Harper's Monthly Magazine* of the marvel of Buffalo's nearly mammoth grain elevators. They formed "an elephantine procession a mile long, with a combined storage capacity of 9,250,000 bushels and a transfer capacity of 3,102,000 bushels, or, in other words, the power of receiving lake vessels and transferring to canal-boats and cars daily 3,000,000 bushels of wheat, a rate unequaled by any port in the country."[29] Optimistically facing the new century, Buffalo's extraordinary collection of thirty-four grain elevators, in the words of industrial historians Thomas Leary and Elizabeth Sholes, "could unload, weigh, sort, and transfer huge amounts of grain from and to ships, or into storage for local use or for future transport to hungry Eastern cities."[30]

### *The Decline of the Erie Canal*

Despite the boost that Lake Superior grain trade gave to the port of Buffalo, it had little effect in arresting the decline of the Erie Canal. Already during the Civil War, the volume of wheat and flour shipped from Buffalo to New York City via the canal began to fall off. After the war, the amount declined precipitously from a high of ninety-six percent in 1868 to a mere twelve percent in 1898. Closed by cold weather in winter, often impassable due to repairs, and generally plagued by mismanagement, the canal fell victim to the superior advantages of speed, reliability, and economy offered by the railroads. New York and Midwestern rail companies experienced great expansion after the Civil War. They now began to erect terminal facilities and even their own grain elevators which served as intermediaries between rail lines and railroad-owned steamboat companies. To capture business away from the canal (and from each other), they would guarantee shippers freight rates and

unbroken shipment from western grain fields to the East Coast. They were also not above practicing rate discrimination to garner business from competitors. Under these circumstances, by the time it was fifty years old, the Erie Canal -- that glorious enterprise that had bestowed the gift of prosperity on Buffalo -- was doomed to obsolescence as a feature in the booming eastward transport of grain from America's heartland to the Atlantic seaboard. By the end of the nineteenth century, rail cars had replaced canal boats on the land side of Buffalo's many grain elevators. "To win the heart of this queen city today," wrote an observer in the mid 1880s,"you must court her in the role of a railway king."[31]

By the 1890s, railroads were also delivering grain to Buffalo elevators, in competition with lake steamers. In fact, so much grain arrived by train that there were often 1,000 cars waiting to be unloaded in Buffalo's freight yards. Often, it took over two months for a boxcar to be unloaded. By 1885, the situation had become so bad that it posed a threat to Buffalo's position as a grain depot; railroads began to divert grain shipments to other places rather than have their rolling stock mothballed for long periods here. Led by S. F. Sherman, the Buffalo grain transshipment industry took significant measures to improve the situation. In 1886, two new large elevators, the Lake Shore and the International, were constructed expressly with rail freight service in mind. The International Elevator was the first important elevator to go up outside of the Buffalo harbor area. It was erected on a site along the Niagara River served by the new Belt Line railroad and near the International Railroad Bridge. A tall, narrow structure with a 1,700-foot-long track side loading dock, as well as an internal rail loading dock, the International Elevator stood between the railroad and the Erie Canal. With a daily capacity of 320,000 bushels, it received grain from Canada's Union Pacific Railroad and the Grand Trunk and Michigan Central roads. It could transfer this grain to canal boats or to the cars of seven other eastward bound rail lines.[32]

To unload boxcars filled with grain, handlers developed a system of mechanized shovels. In 1891, a writer from *Scientific American* visited Buffalo and described this process, which employed a large shovel or scraper suspended from a rope, as follows: "The rope is attached to steam apparatus by which it is taken in at the proper time, as if on a windlass. The operative draws the shovel back into the car of grain and holds it nearly vertical and pressed down into the grain. The rope draws along the shovel with the grain in front of it and a number of bushels are delivered at each stroke. In this way a couple of men can very quickly empty a car." The men who worked these shovels were comparable to the scoopers who unloaded the hulls of grain freighters. And like their marine counterparts, the boxcar laborers were under pressure to maintain a brisk pace. "The movement of the shovels," observed the *Scientific American* reporter, "succeeds one another with sufficient rapidity to keep the men in active movement."[33]

Lake transport also underwent significant changes during the post-Civil War period. Chief among them was the shift from wooden hulled ships to steel-hulled vessels. The *Spokane*, the first such steamer on the Great Lakes, went into service in 1886. It heralded a new fleet of vessels that could carry increased loads of raw materials, including grain, iron ore, and coal. The new freighters also called for improvements to Buffalo's harbor facilities. Docks and slips were enlarged to accommodate their greater size and the enlarged quantities of their cargoes.

In the middle of the 1880s, a major expansion of Buffalo's port facilities was undertaken. A 4,000 foot breakwater was constructed about a half mile from the shoreline, beyond the Buffalo River. By 1903, several miles of new lakeshore dockage had been created behind the breakwater. This area came to be called the Outer Harbor, while the original port facilities that lay inland along the Buffalo River henceforth were known as the Inner Harbor. With this new anchorage in view (and that provided in the Erie Basin, which the city had created in the 1850s behind an earlier breakwater), Buffalo, by now commonly referred to as the Queen


The Grain Elevator District in 1875
(Source: NOAA, U.S. Department of Commerce, Lake Survey Center)

City of the Lakes, would soon, claimed a contemporary, "rival the traffic of the river Mersey and vie with that of Liverpool in number of docks and warehouses."[34]

***Advances in Grain Elevator Design, 1860-1890***

Dart and Dunbar had established the grain elevator as the structure essential to Buffalo's success as a grain transshipment port. In 1861, the British novelist Anthony Trollope visited the Queen City and recorded his impressions of the flourishing grain trade he saw there. "As ugly a monster as has been yet produced," said Trollope, of the elevators that crowded the busy Buffalo waterfront. He likened them to dinosaurs with "great hungering stomachs and huge unsatisfied maws."[35] Yet he admired the efficiency with which these modern-day industrial brutes processed enormous amounts of grain (which, in English parlance, he referred to as "corn.") Trollope found especially fascinating the operation of unloading grain from a lake steamer and depositing it into the hold of a waiting canal barge moored alongside. After observing the performance of the loose leg, which he compared to an elephant's trunk or a mosquito's proboscis that is thrust "into the very vitals and bowels of the ship," Trollope went inside an elevator. His careful description of the inner workings of these extraordinary structures is the best first-hand account we have of how these early elevators functioned:

*Thus the troughs* [the loose leg conveyer belts]*, as they ascend, are kept full, and when they reach the upper building they empty themselves into a shoot, over which a porter stands guard, moderating the shoot by a door, which the weight of his finger can open and close. Through this doorway the corn runs into a measure and is weighed. By measures of forty bushels each, the table is kept. There stands the apparatus, with the figures plainly marked, over against the porter's eye, and as the sum mounts nearly up to forty bushels he closes the door till the grains run thinly through, hardly a handful at a time, so that the balance is exactly struck. The teller standing by marks down his figure, and the record is made. The exact porter touches the string of another door, and the forty bushels of corn run out at the bottom of the measure, disappear down another shoot, slanting also toward the water, and deposit themselves in the canal boat. The transit of the bushels of corn from the larger vessel to the smaller will have taken less than a minute, and the cost that transit will have been -- a farthing.*

*And these rivers of corn are running through these buildings night and day. The secret of all the motion and arrangement consists, of course, in elevation. The corn is lifted up; and then lifted up can move itself, and arrange itself, and weigh itself, and load itself*.[36]

Trollope also remarked on how the grain arrived in Buffalo loose, in bulk, not in sacks. "We in England," he said, "are not accustomed to see wheat traveling in this open, unguarded, and plebian manner. Wheat with us is aristocratic, and travels always in its private carriage."[37]


The Grain Elevator District in 1925
(Source: NOAA, U.S. Department of Commerce, Lake Survey Center)

After the Civil War, Robert Dunbar continued to design and build elevators on the Buffalo waterfront. He constantly made improvements over those Trollope had known. By the middle of the 1880s, the largest elevators could stow one million bushels of grain and elevate stores from boats to bins at a rate of 19,000 bushels an hour. A significant development that made such speed possible and which actually changed the outward form that later elevators would take was the introduction of horizontal transfer systems to move grain to the internal storage bins. The horizontal conveyor system allowed grain to be distributed to bins some distance from a fixed elevator leg. The heads of elevating legs and related weighing equipment were housed in a tall cupola or monitor (often containing windows to light the interior) that ran the length of the structure above the storage bins. And economy dictated that the bins now be lined up in straight rows so that "grain might be distributed to them from the least number of horizontal conveyers."[38] Thus, the long, lateral form of the twentieth-century concrete elevator, with stacks of silos lined up beneath an upper "headhouse," began to replace the tall, vertical shed form of the earliest elevators.

Conveyor belts also were added to the basement level of elevators, which eliminated the need for elevating legs down the length of the structure. By means of this innovation, grain being removed from a bin "could be spouted onto the basement conveying system and taken to some convenient point in the house where elevator legs were located. Fewer legs were required per unit of storage as outgoing grain from any bin could be directed to a single elevator leg."[39] Now elevating legs could be grouped at one end of the elevator only, in a "workhouse." From the workhouse, a "headhouse" or low gallery extended across the top of the elevator and housed the bin floor conveyor system. This headhouse replaced the tall cupola of older elevators. The now demolished Lake Shore Elevator, erected in 1886, was regarded as the first fully evolved example of this forward-looking system. At the same time, the loose leg became housed in a tower that nearly stood separate from the elevator itself. From this soon developed the "marine leg tower," a moveable structure set on wheels housing loose legs that could be moved along the length of the elevator to unload grain from waiting vessels moored alongside. By 1894, four of these moveable marine towers were working parts of Buffalo elevators.

"It was my felicity to catch a grain steamer and an elevator emptying that same steamer," wrote Rudyard Kipling during a visit to Buffalo in the late 1880s. His colorful description of the operation of these mighty new marine towers continued:

*She was laden with wheat in bulk from stem to stern, thirteen feet deep lay the clean, red wheat. . . . They maneuvered the fore-hatch of that steamer directly under an elevator . . . 150 feet high. Then they let down into that fore-hatch a trunk, as if it had been the trunk of an elephant . . . And the trunk had a steel nose to it and contained endless chains of steel buckets.*

*The captain swore, raising his eyes to heaven and a gruff voice answered him from the place he swore at. Certain machinery, also in the firmament, began*

*to clack and the glittering, steel-shod nose of the trunk burrowed into the wheat and the wheat quivered and sunk upon the instant as water sinks when the siphon sucks, because the steel buckets within the trunk were flying upon their endless round, carrying away each of its appointed morsels of wheat.*

*The elevator was a Persian well wheel — a wheel squashed out thin and cased in a pipe, a wheel driven not by bullocks, but by much horse-power, licking up the grain at the rate of thousands of bushels the hour. And the wheat sunk into the fore-hatch . . . till the brown timbers of the bulkheads showed bare. Then men jumped down through the clouds of golden dust and shoveled the wheat furiously around the nose of the trunk and got a steam shovel of glittering steel and made that shovel also, till there remained of the grain not more than a horse leaves in the fold of his nose bag*.[40]

By the early 1890s, Buffalo's wooden elevators had evolved away from Dart's barn-like structure to a form that, internally, anticipated the classic concrete elevators that would soon replace them. The elongated arrangement of rows of bins, the vertical workhouse at one end, the low headhouse extending across the top of the row of bins, and the moveable marine leg tower already were characteristics of Buffalo grain elevators erected by the early 1890s. With Dunbar's Bennett Elevator specifically in mind, architectural historian Henry-Russell Hitchcock observed that while "the battle of styles was fought out uptown and downtown, Dunbar continued to build great elevators along the lake front . . . Their vast, unornamented surfaces, bold cantilevers and clearly organized functional forms suggest architectural possibilities for America which even Sullivan hardly grasped."[41]

The marine towers of late nineteenth-century elevators might be said to have been anticipated by Arunah B. Nimbs's invention of the floating elevator. Nimbs, a Buffalo entrepreneur inspired by the Dart Elevator, built the first of these curious structures in 1866, thus adding another chapter to the unique history of grain transshipment on the Buffalo waterfront. Nimbs's wooden floating elevators, and others built following his example, could hold up to 5,000 bushels of grain. They were seldom used, however, to store grain for any length of time. Rather these floating elevators, which, like their stationary sisters, were equipped with steam-powered marine legs and conveyor systems, were used to transfer grain from one ship to another or, in some cases, to unload grain from vessels calling at stationary elevators and mills that lacked their own mechanical grain moving equipment. According to historians Thomas Leary and Elizabeth Sholes, the huge C. and J. M. Horton floating elevator could handle 72,000 bushels of grain each day, an amount that rivaled the efficiency of some of the city's larger stationary elevators.[42] The heyday of these unusual and picturesque structures, however, was short lived. Few if any apparently survived into the twentieth century.

## Part III: 1890s to 1930s: The Evolution of the Modern Elevator

### *Buffalo's Leading Position in the Wheat Trade, 1890 to 1929*

"It is evident that, considering both primary and secondary markets," says grain trade historian Peter Sweeney, "Buffalo was the leading wheat market of the United States" for the first three decades of the twentieth century.[43] The establishment of the wheat growing in the Northwest and the pattern of grain shipment from that region to Buffalo accounted for this success. Grain receipts continued to increase during the boom years of the 1920s, after which a long and steady decline set in. In 1900, the city handled 111 million bushels of wheat; by 1928 the quantity had risen to 280 million bushels. However, after 1944 a precipitous decline in grain receipts took place. The reasons were complex, but the drying up of the grain trade here was due to such factors as the rise of Pacific coast ports, such as Seattle, Tacoma, and Portland in the United States and Vancouver in British Columbia, the improvement of the Welland Canal and the Oswego Canal, which allowed more and more traffic to bypass

Buffalo by taking the St. Lawrence River route to Montreal, and the general decrease in grain production as demand fell off during the Depression. But the period from 1890 to 1940 might well be considered the city's golden age of commercial supremacy in the grain transshipment industry.

At the same time, the upgrading of the Erie Canal into the New York State Barge Canal made canal transport once again a viable alternative to rail transport between Buffalo and New York City. During the 1930s, more grain actually moved on the canal than on the rail lines. Railroads, however, continued to carry grain to places other than New York City over lines that extended fan-like from Buffalo to the East Coast.

Paralleling the robust trade in grain was a rise in the amount of flour milled in Buffalo. The upward trend began at the turn of the century and continued, with a brief setback during World War I, until it reached a peak in the 1930s. By this time, Buffalo surpassed Minneapolis as the nation's center of flour making.[44] The reasons for Buffalo's ascendancy were several. Among the leading ones were the slower rate of population increase in the Northwest, which reduced consumer demand, and the increase nationally of the number of large commercial bakeries, which caused a reduction in home baking. These mechanized bakeries required less and less of high quality Northwestern flour, which had been the staple of America's kitchen bakers. But perhaps the most important factor working in Buffalo's favor was economic. "Flour milled in Buffalo," explains Sweeney, "from wheat received by lake from Duluth and shipped by rail to New York had a five-cent rate advantage per hundred pounds over flour milled at Minneapolis and shipped rail-lake-rail through Duluth and Buffalo to New York. This advantage had a markedly stimulating effect on Buffalo milling."[45] In other words, it was cheaper for shippers to send grain directly from Duluth to Buffalo for milling and then to New York for export than to send it first to Minneapolis for milling and then to Buffalo for transshipment to New York. Finally, under an agreement with the Canadian government, much Canadian wheat was milled "in bond" in Buffalo. This arrangement provided for the rebate of tariff duties on Canadian grain imported to the United States if, after milling here, it was exported directly to foreign markets.

All of this economic activity called for expanded grain storage facilities in Buffalo and the construction of large-scale flour milling facilities. Engineers met the challenge by literally reinventing the grain elevator. Most of the older wooden elevators were now replaced by ones utilizing new designs and materials. The concrete bins of the new age of elevators greatly improved these structure's fireproof safety and expanded their storage capacity significantly. Just as the period from 1890 to 1940 was a golden age of grain trade and flour milling in Buffalo, it was also a golden age of grain elevator construction. In 1931, Buffalo possessed thirty-eight elevators with a total capacity of more than 47 million bushels of grain. And the world took notice, especially the leading lights of the international architectural profession who were forging a new design aesthetic for the modern era. Many marveled at Buffalo's extraordinary waterfront lined with mammoth concrete silos that foreshadowed an architecture of austere functionalism. Those like Walter Gropius, Bruno Taut, Le Corbusier, and Erich Mendelsohn drew lessons that helped change the course of modern architecture.

### *The Search for Fireproof Construction*

Nearly all the elevators erected in Buffalo before the 1890s were made of wood. While this made for relatively inexpensive and quick construction, it also possessed many limitations as well. The biggest drawback to timber was its flammability. The early elevators often fell prey to destruction by fire. When the Eastern Elevator went up in Buffalo in 1895, it contained eight million board feet of timber. Four years later, all of it was destroyed in a grand conflagration. Combustion might suddenly occur from overheated grain or from grain dust explosions that occurred especially when grain was being loaded into or unloaded from the elevator. There were also threats from exterior causes, chiefly sparks and hot cinders from locomotives, for elevators were located

close to railroads. Cladding the exteriors of the elevators with corrugated metal sheets appears to have done little to prevent fires started by passing trains. Dunbar's Reed Elevator, which was described as "the most complete elevator in all its appointments in Buffalo" when it went into operation in 1862, was probably the first to have employed corrugated iron to protect its marine tower; the rest of the exterior and the roof wore a shield of slate.[46] Boilers needed to generate steam for steam-powered machinery also posed a serious fire hazard. In addition to being easily ignited, timber elevators were prone to settle under the weight of a full load of grain, and rodents and other vermin had little trouble infiltrating their interiors. For all of these reasons, insurance costs for such structures were quite high, a fact that was another incentive for entrepreneurs to search for new materials and construction techniques.

Writing in 1902 in the *Northwestern Miller*, a leading grain industry periodical, E. S. Rollins explained the relationship between insurance and grain elevator economy. Saving on insurance costs, he said, could represent the difference between profitability and loss to an elevator operator, especially in slow economic times. Rollins offered this example:

*Now a fire-proof plant of 1,500,000 bushels capacity would cost $195,000, against $150,000 for the wooden, but would save $13,875 per year on insurance. This is a very good saving, and would pay the difference in the cost of construction in less than four years. Moreover, this saving amounts to over seven percent per year on the total cost of the fire-proof plant. This means that a company might build a fire-proof elevator, borrow the money with which to pay for it, and pay the interest on the bonds with what would be saved on insurance. More than this could be done, in fact, for money can be borrowed at five percent yearly, and as the fire-proof house would be a net savings of seven percent yearly on its cost, there would be a net saving of two percent per year.*[47]

***The Steel Bin Elevator***

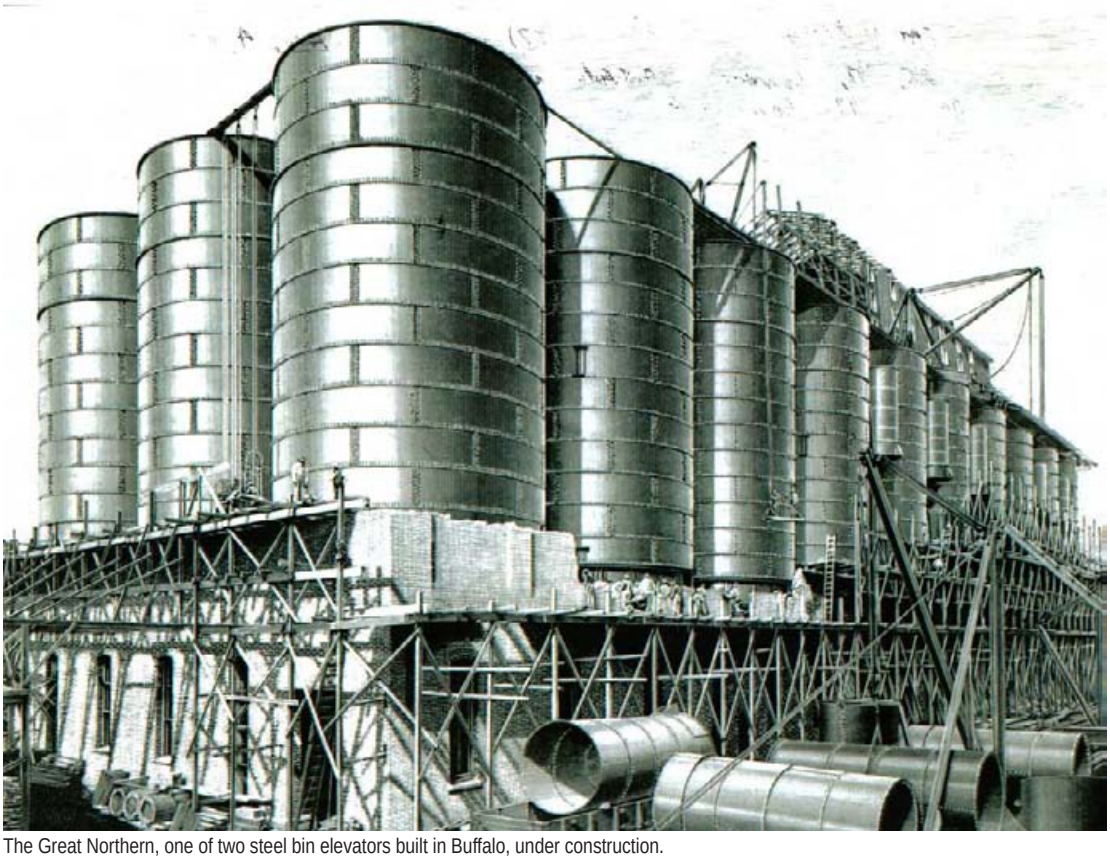
In the 1890s, engineers in Buffalo and elsewhere began to explore seriously the use of new, fireproof materials in the construction of grain elevators. Experiments with fireproof materials centered on steel, tile, and concrete. (By this time, most elevators, even timber ones, rested on concrete pier foundations.) The search eventually led to the revision of the elevator as it had been known up until that time. The first experiments with fireproof construction were made using metal technology. Already in 1861, an elevator with cast iron bins twelve feet in diameter and fifty feet in depth was built on the Brooklyn, New York waterfront. Later in the same decade, steel bins were used for the first time in an elevator that went up in Philadelphia. It appears that the first attempt to construct a fully fireproof, non-timber elevator in Buffalo was the Plympton Elevator. Erected in 1868, it was built of iron and steel components, including cylindrical metal bins, rather than with the rectangular bins of timber framed elevators. It also had an attached workhouse made of brick and iron. The high cost of construction, however, seems to have discouraged imitators of the Plympton, which went down in the early 1890s. Ironically, this was just at the dawn of a new age of metal elevator construction.

During the last decade of the nineteenth century, steel emerged as an important building material. Its most well known application was to the development of the metal-framed skyscraper, the building type that changed the look of America's cities. Designers also saw steel as a material that could be used in the construction of grain elevators to render them virtually fireproof. With improved methods of industrial production, steel became an economical alternative to timber. This was especially true since timber prices began to rise in the 1890s. And investors might recuperate the cost of a steel elevator compared to a timber one solely on the reduced premiums that insurance companies charged for metal construction. In this shift from wood to steel for elevator construction, Buffalo played a major role.

The pioneering examples of steel bin grain elevator construction in Buffalo were the Electric Elevator and the Great Northern

Elevator. Both of these elevators, which went into operation in 1897, also marked the switch from steam to electrical powered machinery. Electricity had become available from the Adams Power Plant in Niagara Falls in November 1896. These two giant elevators represented some of the earliest applications anywhere of electrical energy to industrial use. The Electric Elevator (demolished in 1984) stood adjacent to the Buffalo River and consisted of steel bins resting on concrete foundations with a tall, corrugated iron workhouse at the wharf end and a steel-frame horizontal transfer system for the distribution of grain above the bins. The bins, which had hemispherical bottoms to facilitate the flow of grain, rested above basement conveyor belts that carried grain to and fro below grade. The most striking feature of the Electric Elevator's appearance to the eyes of people familiar with its wooden ancestors would have been its cylindrical bins standing completely exposed to view. Unlike earlier timber grain elevators, the Electric had no structure sheltering its bins from the elements. Exposed bins and machinery would become common practice for many later elevator builders. And the bin design itself departed from the rectangular shape of previous timber crib bins. Cylindrical bins, it was thought, were stronger than rectangular ones and were less likely to suffer damage when grain was emptied quickly from them. Both of these aspects of the Electric's design -- exposed bins and cylindrical silos -- had their limitations in the minds of elevator engineers, but their use here definitely marked a new stage in elevator design and construction. "An experimental and transitional building of unusual form," Reyner Banham, the architectural historian who was the first to study Buffalo's grain elevators, declared of the bygone Electric.[48]

The Great Northern Elevator would have looked less radical in its outward appearance to its contemporaries than did the Electric Elevator. In its shed-like form, it resembles the shape of primitive wooden elevators. Its ninety-nine foot tall steel bins are sheltered inside a vast, 300 foot long structure of brick curtain walls equivalent in height to a ten-story building. Its designers, bridge architect Max Toltz and elevator



The Great Northern, one of two steel bin elevators built in Buffalo, under construction.
From *Scientific American* 77, Dec. 25, 1987 (Courtesy of Buffalo State College)

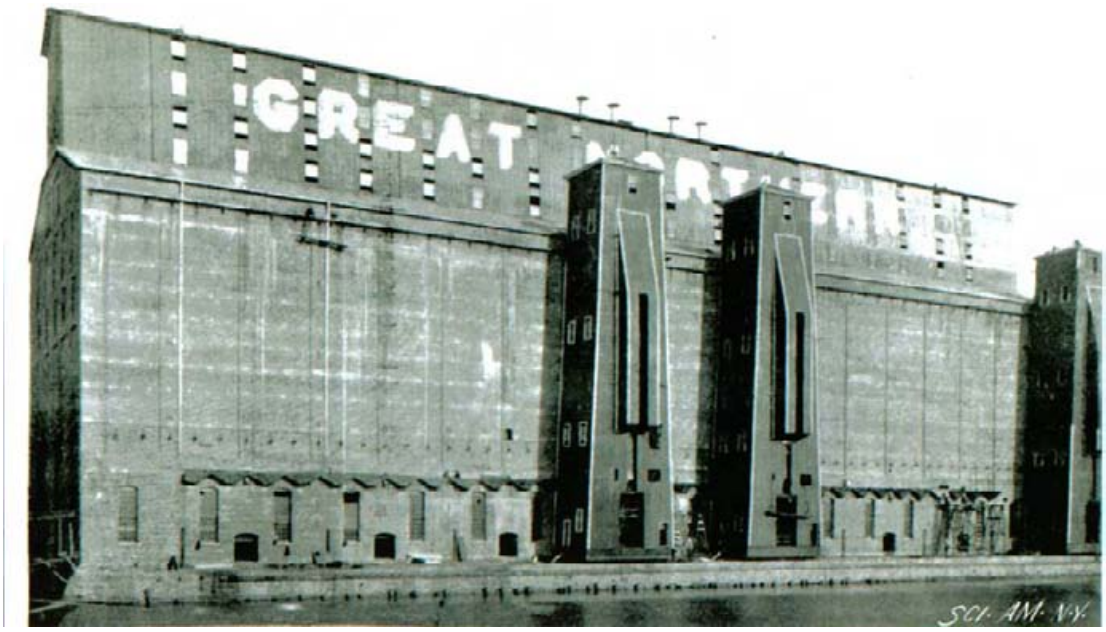
engineer D. A. Robinson (both of whom were employees of the Great Northern Railroad that built the elevator[49]), thought that by enclosing the metal bins they could better protect the grain being stored in them from the extremes of cold and heat. To shield the grain from summertime temperatures was especially important in order to prevent it from overheating and sprouting. The horizontal conveyer system for distributing and weighing incoming and outgoing grain was housed in a four-story-high, corrugated iron headhouse atop the elevator. When this elevator was still in operation, Banham, who I remember as a man who could see drama and poetry in all architecture, described the inside of the headhouse as "almost cathedral-like: long, lit by ranks of industrial windows in the corrugated roofing on either side, filled with a golden-gray atmosphere of flying grain dust sliced by low shafts of sunlight." His description continued:

*The space is laced lengthwise by flat rubber belt conveyors loaded with grain and laced diagonally by more movable chutes for directing the flow of grain. Weigh bins over the heads of the main bins measure the flow, batch by batch, as it goes from bin to bin. The whole is monitored by men who watch steelyards connected to the weigh bins and mounted on desks whose legs are in the form of cast-iron Doric columns . . .* [50]

The internal arrangement of the Great Northern Elevator differs considerably from that of the Electric Elevator. The Great Northern's bins, which are formed of plates of steel riveted and welded together, stand on steel pillars several feet above the concrete floor of the elevator. (Another set of steel I-beams supports the headhouse and the upper level conveyor system.) Some of the bins could hold 70,000 bushels of wheat, while others were subdivided horizontally to accommodate lesser amounts of grain from smaller shipments. (This is a feature of the Great Northern that looks forward to the design of later concrete elevator design.) But the use of cylindrical bins resulted in about a twenty percent loss of storage space over the old rectangular bin system. The engineers mitigated this problem by introducing eighteen narrower bins between the forty-eight main bins. (Later, additional bins of smaller diameter yet were added between the main bins and the outer walls.) Thus, the final storage capacity of the Great Northern reached ninety percent of the available ground space.

After the Electric and the Great Northern, a number of steel elevators went up on the Buffalo waterfront. These included the Great Eastern Elevator (1901), the Iron Elevator (1902), the Monarch Elevator (1905), and the Dakota (1901). (Other than the Great Northern, none of these steel elevators survives.) The most spectacular of the group was the Dakota, which replaced an earlier timber elevator destroyed by fire, and which lasted until the 1960s. Its tall, exposed steel bins and very large headhouse attracted the attention of the early modern German architect Walter Gropius, who published a photograph of it in his essay, *The Development of Modern Industrial Architecture*.

Steel, however, proved to be less satisfactory than originally envisioned as a fireproof material. Fire, of course, would not burn the metal, but heat generated by a grain fire could cause severe structural damage to the bins and the steel support structure. A fire in a steel elevator in Fort William, Ontario, in the early twentieth century demonstrated how vulnerable to heat steel could be. The Fort William fire became so intense that the steel bins and other components actually melted. "Steel is an ideal material for constructive purposes," observed engineering writer E. P. Overmire at the time, "but it requires expensive fireproofing to render it safe from internal, as well as external, attacks from fire." Demonstrating an industry-wide change of heart, the owners of the destroyed Fort William rebuilt their elevator in wood, convinced, said Overmire, "that wood will not be more easily destroyed than was the steelwork."[51] The last steel elevator to go up in Buffalo during the period of significance was an addition made in 1922 to the Kellogg Elevator. By then, reinforced concrete had become universally recognized as the superior material for elevator construction in Buffalo and elsewhere.




The Great Northern: 300 foot long brick curtain wall.
From *Scientific American* 77, Dec. 25, 1987 (Courtesy of Buffalo State College)

***The Ceramic Tile Elevator***

During the first decade of the twentieth century, industrial engineers also experimented with ceramic tile in an effort to make their elevators fireproof. As early as the middle of the 1890s, Ernest V. Johnson (who was the son of the designer of the earlier iron Plympton Elevator) patented a practical system of tile bin construction that was used by the Barnett-Record Company of Minneapolis, a builder of many tile elevators. Some bins were constructed on a rectangular plan, but most ceramic bins were cylindrical with internal steel bands for reinforcement. Those built by the Barnett-Record Company also captured the space between the bins for storage by constructing linking walls of arched tiles reinforced by metal tie rods. This innovation would be important for the later design of concrete elevators, which would usually adopt this practice of reducing wasted space by linking cylindrical bins with intermediate walls.

There were several advantages to ceramic tile bins. They not only were completely fireproof and heat resistant, but their hollow walls were better than steel at insulating grain from the extremes of heat and cold. For this reason, tile silos did not need to be protected from the weather by an enclosing structure; the cylinders could be left exposed to the elements. And the lighter weight of ceramic bins reduced the load that foundations were required to bear. Although many tile elevators were built in the Midwest, Canada, and at East Coast ports, they made little impact on Buffalo's grain storage industry. Only two were constructed in Buffalo: the 150,000 bushel Washburn Crosby "A" Elevator, which consists of tile tanks eighty feet tall and twenty feet in diameter, erected in 1903 according to the Barnett-Record Company patented system (these bins are now part of the General Mills complex),[52] and the 100,000 bushel Maritime Milling Elevator (now demolished).

Despite tile elevators' many advantages when compared to concrete elevators, which were becoming practicable at about the same time, tile structures were expensive to build and maintain. The large number of mortar joints needing to be dressed slowed the process of construction and afterward required constant vigilance to prevent leaks. And because tiles were normally produced in pre-fabricated sizes geared for large bins, it was often difficult to obtain materials with which to build smaller elevators. "Tile bins introduced at the turn of the century," states the Historic American Engineering Record, "were already considered obsolescent by 1913."[53] Nonetheless, architectural historian Reyner Banham regarded their exposed, unadorned silos as an important step

toward the great concrete elevators of the early twentieth century. In his eyes, the tile-bin system represented "an intermediary between the primitive phase of cylindrical bin construction and the classic concrete phase that was to ensue so soon after."[54] Reflecting upon the German art historian Wilhelm Worringer's theory of an American "ultimate Metaphysic of Form," Banham declared that he found evidence of it "in the sight of these grudging, lowering shapes crouched under a leaden winter sky, unlovable but compelling respect." He reflected that they were "the Protestant work ethic monumentalized."[55] He continued:

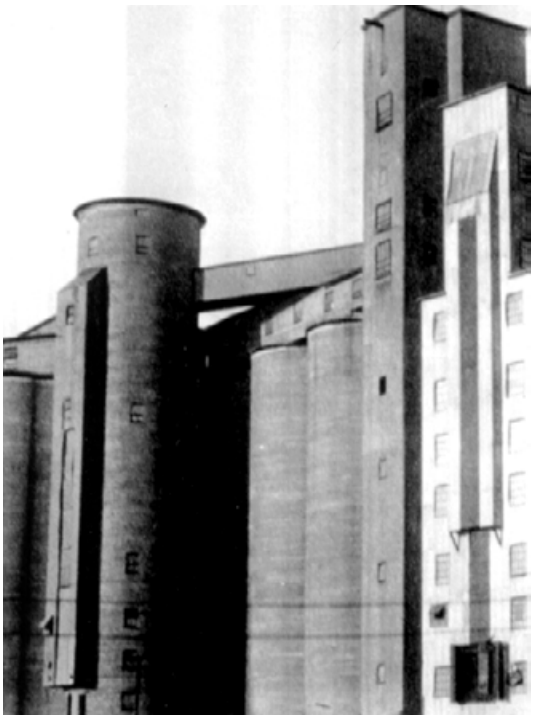
*The age of the steel and tile elevators marked an important chapter in the history grain elevator construction. Developments during this period passed on an important legacy to the age of reinforced concrete elevators that was to follow. First, because of the complex problems involved in building with steel, the highly trained modern structural engineer now took charge of elevator construction. Second, the cylindrical shape became the standard form for bins. (This allowed individual bin sizes to exceed the 15,000-bushel capacity of timber crib bins.) And third, engineers were required to scientifically study and understand the physical properties of grain when at rest and when in motion.*

Experiments in the early twentieth century by various engineers revealed that static grain in storage bins acted like a semi-liquid, exerting less lateral pressure on the bin walls than vertical pressure on the bottom. These pressures were related to the ratio of the diameter of the bin to its height, but after three times the diameter had been reached, vertical pressure increased very little. Thus, it seemed safe to build taller bins than ever before. Physicists also came to understand that vertical pressure was influenced by the angle of friction of the grain and that no excess pressures were created when the grain was moving during draw off if the outlet were in the center of the bin bottom. All of this newly discovered arcane knowledge would be essential to engineers designing the grand concrete elevators that were soon to go up along the Buffalo waterfront.

### *The Concrete Grain Elevators of the Early Twentieth Century*

The search for a durable and economical method of constructing grain elevators

Ceramic Tile Elevator A (1903) built as a part of Washburn-Crosby complex. Photo by Lynda H. Schneekloth



Washburn-Crosby Elevator, presently General Mills, Buffalo, NY From E. Mendelsohn, *Amerika* 1926 (Courtesy of Buffalo State College)

culminated in the early twentieth century when reinforced concrete became the standard material with which these huge structures were built. (Steel bins, however, proved highly practical and remained in common use throughout the twentieth century.) The development represented the climax of an evolutionary process that had gone through wood, steel, and tile elevator design. During the nineteenth century, engineers had selectively applied concrete to foundations and floors of wood, steel, and tile elevators. However, "[T]he era of the true concrete elevator," states the Historic American Engineering Record, "is defined by the application of reinforced concrete to the construction of storage bins."[56] And the Buffalo waterfront came to possess the world's most impressive array of these monuments of early modern engineering.

Concrete had been used to construct grain silos in Europe as early as the 1890s. The Belgian elevator engineer Francois Hennebique enjoyed a wide reputation for his work with concrete. The Waever's Mill Granery at Swansea in Wales was also well-known internationally. Built on a rectangular plan, it contained one hundred, seven-foot-square bins, sixty-six feet deep. In the middle of the 1890s, Minneapolis grain dealer F. H. Peavey sent his engineer, C. F. Haglin, to Europe to study Belgian, Welsh, and other developments there in concrete grain elevator construction. Haglin learned a lot about reinforced concrete from his trip and in 1899 erected at Minneapolis the first reinforced concrete bin elevator in the United States. Known as "Peavey's Folly," it consisted of a single cylindrical concrete bin. While it shared material with its European counterparts, Peavey's Folly's cylindrical design (the legacy of American experiments with steel and tile elevator design) made a radical departure from the rectangular "warehouse" system of transatlantic grain storage facilities. (The silo system was better-suited to the American method of moving grain in bulk rather than in sacks, which was common practice in Europe.) It was the unassuming prototype of the characteristic American concrete grain silos that avant-garde European architects would come to admire in Buffalo and at other grain centers in the United States. Indeed, one can say that Haglin's Peavey's Folly not only revolutionized the construction of grain elevators, but even influenced the course of modern architecture.[57]

Haglin also introduced an innovative system of concrete construction that would be widely imitated. Dispensing with full scaffolding, he substituted a type of formwork called "slip form" that consisted of two rings held apart by sturdy yokes. Once the concrete that had been poured into the formwork had set, the two rings were raised to the next level by means of jacks. Vertical "jacking rods" built into the system of steel reinforcements in the concrete allowed for the steady rise of the slip form until the full height of the silo was reached. Thus the entire silo would "grow" as the concrete set and the formwork moved upward. Peavey's Folly, which had a diameter of twenty feet, rose in this manner to a height of 124 feet with walls twelve inches thick at the base and only five inches thick at the top. This clever method of construction, which would be used extensively in Buffalo, was first employed to erect an actual commercial elevator in 1900. In that year, Haglin built the Peavey Elevator in Duluth. Like later concrete elevators in Buffalo, connecting walls linked the tangential cylindrical bins to create interspace storage bins.[58]

The many advantages of concrete for grain elevator construction accounted for the near universal adoption of this method of construction for large elevators by the second decade of the twentieth century. As the Portland Cement Association pointed out in 1917, concrete provided the surest form of fireproofing for elevators and mill buildings. Perhaps the best proof of that fact, stated the Association, was that "no insurance need be carried on the structure, as it cannot burn."[59] Concrete silos also could be counted on to preserve the grain from damp. In fact, they were so reliably waterproof that manufacturers of Portland cement, a material far more easily ruined by wetness than grain (which could be dried), had adopted the cylindrical concrete grain bin to store this important building material. Concrete also provided unexcelled protection against rodents. And because it would not rot, it also insured

stored grain against the ravishes of insects, which, if they did happen to infest a bin could be easily destroyed by fumigation in the airtight atmosphere. Furthermore, concrete basement tunnels for moving grain were watertight and permanent. "The concrete cylinder elevator," stated Reyner Banham, "is still so omnipresent because it represented an almost excessively good investment when first built. If it was solidly enough made to carry its load, maintain an equable thermal environment, and resist fire for long enough to amortize the original investment, then it had to be well enough made to last more or less forever -- and be well enough made to be extremely costly to demolish."[60]

With improved mixtures of concrete and the adoption of the practice of slip forming, concrete also came to be used to construct the headhouses, workhouses, and overhead galleries as well as the grain bins themselves. In earlier days, these elements were built with structural steel and clad with corrugated iron. The Washburn Crosby C2 Elevator of 1913 was the first in Buffalo to employ a concrete gallery; A. E. Baxter's Ralston Purina workhouse of 1917 had the first workhouse and headhouse constructed of concrete in Buffalo. These were built quickly by the slip forming method that engineers employed to raise the cylindrical bins. Indeed, speed of construction was another important positive aspect of concrete grain elevator construction. "The timetable for the construction of an elevator," states the Historic American Engineering Record, "was usually extremely tight. Slip forming began only when spring was far enough advance, yet the promoters expected the building to be operational by autumn to receive the first of that year's crop and ensure that storage was full at the close of the navigation season in mid-December."[61] By the 1920s, it was common for engineers to erect elevators, headhouses, and workhouses of concrete. (Marine legs, which were mobile, were erected on steel frames and covered with corrugated iron plates.) It is from this period that Buffalo's classic concrete elevators date.[62]

Harry R. Wait designed many of Buffalo's concrete grain elevators. Following the lead of Haglin's work in Minnesota, Wait refined and improved the type, grouping many tall silos together to form the characteristic unadorned corrugated exterior that distinguished the modern elevator from its shed-like predecessors. The largest and finest example of his work is the abandoned Concrete Central Elevator of 1915 to 1917. It shares one of the innovations for which he was known, the raised basement. Grain stored in the great concrete bins fell through funnel-like steel bottoms into a system of conveyor belts. The ground floors of Wait's elevators were impressive open spaces overshadowed by the immense steel bottoms of the numerous bins. Of the twelve foot high, window-lit basement of the Concrete Central Elevator, Reyner Banham (who wrongly attributed Concrete Central to A. E. Baxter) remarked that it "was palatial in size compared with what was customary in the trade."[63] Other designers, however, rarely imitated Wait's generous basement workspaces. The now-abandoned Marine A of 1925, notes Banham, "put the bins on foundations some six feet below grade level and pierce[d] their walls at the bottom to allow the conveyors to pass through."[64]

As the twentieth century progressed, industrial engineers like A. E. Baxter transformed the meandering Buffalo River into a striking corridor of monumental concrete elevators. The story begins in 1906, with the American Elevator (presently Peavey Elevator), the first concrete elevator erected on the Buffalo waterfront and the first anywhere to be constructed by continuously pouring concrete into slip forms.[65] The story effectively ends in 1954, then the Connecting Terminal Annex was constructed. Between these years, some forty-two concrete elevator projects (some of these were additions to existing elevators) were undertaken along the banks of the Buffalo River and on the shores of the outer harbor.[66] Various improvements to the harbor district's infrastructure also followed to accommodate railroad, lake vessel, and truck access to the area. (The present power-driven lift bridge at Ohio Street was built in 1962. A bridge first spanned the Buffalo River at Michigan Avenue in 1873; the current vertical lift bridge there dates from 1960 but replicates an earlier bridge put up in 1933.) Today,

some fifteen elevators remain, including Baxter's handsome Standard and Concrete Central. Of this number, several are still in use for storing grain or other materials.

***The Influence on Modern Architecture***

Together with their significance as monuments of early industrial engineering, Buffalo's grain elevators came to play an indirect role in the evolution of modern architecture.[67] Beginning with the German architect Walter Gropius's essay on modern architecture in the *Jahrbuch des Deutschen Werkbundes* of 1913, Buffalo's grain elevators appeared in publications by advanced European architects. They praised them as examples of modern functional design uncluttered by ornament, picturesque composition, or historical references. Gropius illustrated his remarks with photographs of the Washburn-Crosby complex and the Dakota Elevator. A few years later, Erich Mendelsohn, another influential German architect, published his photographic essay *Amerika: Bilderbuch eines Architeckten*. Among other powerful images of new industrial architecture, it featured views of several elevators Mendelsohn had seen on a recent trip to Buffalo. And in 1927, the great French modernist, Le Corbusier, declared in *Towards a New Architecture*: "Thus we have the American grain elevator and factories, the magnificent FIRST FRUITS of the new age. THE AMERICAN ENGINEERS OVERWHELM WITH THEIR CALCULATIONS OUR EXPIRING ARCHITECTURE."[68] To back up his claim he featured a photograph of Buffalo's exposed-steel-bin Dakota Elevator. Writing for an English-speaking audience, Bruno Taut called attention to Wait's great Concrete Central Elevator in his widely circulated *Modern Architecture*. Perhaps Walter Curt Behrendt spoke for all of these men, when, in 1927 he wrote in his *Der Sieg des Neuen Baustils*:

*To do justice, it is necessary to say, and this will probably surprise the reader, that it was the example of America that gave the impulse to the German architects when they first tried to clarify the problem of structure. To be sure, this impulse did not originate in the skyscraper . . . but the simple structures of industrial building such as grain elevators and big silos . . . These examples of modern engineering, designed for practical use only, and obviously without any decorative assistance from an architect, made a deep impression by their simple structure reduced to basic forms of geometry such as cubes and cylinders. They were conceived as patterns exemplifying once more the essence of the pure form of use, gaining its impressive effect from its bare structure.*[69]

## Part IV: The Decline of Buffalo as a Grain Transshipment Port after 1959

Most historians agree that Buffalo's golden age as a world port of grain transshipment came to an end with the opening of the St. Lawrence Seaway.[70] In 1959, when President Eisenhower and Queen Elizabeth celebrated the opening of the Seaway, no Buffalo business leaders were there to cheer them. It now became possible to load grain in Upper Great Lakes ports such as Duluth, Chicago, or Detroit directly onto ocean-going vessels. By taking the expanded Welland Canal from Lake Erie to Lake Ontario and from there following the St. Lawrence to Montreal, these vessels had direct access to the Atlantic. There was no longer any need to unload grain in Buffalo and put it onto canal boats or railroad cars for surface shipment to East Coast ports. "With no reason for ships bound either for the ocean from the West or from the ocean to the West to ever come to Buffalo," observes historian Mark Goldman,

The Concrete Central elevator showing the raised basement, an invention of Harry R. Wait.(Photo by Lynda H. Schneekloth)

American Elevator (1906), the first concrete elevator erected on the Buffalo River. From E. Mendelsohn, *Amerika* 1926
(Courtesy of the Buffalo and Erie County Public LIbrary)

Dakota Elevator with exposed steel bins, praised by LeCorbusier. From W. Gropius, *Jarbuch des Deutschen Werkbindes* 1913 (Courtesy of the Buffalo and Erie County Public LIbrary)

"the city sat bypassed at the end of a long dead-end street."[71] Gradually, during the 1960s to the 1980s, the storage capacity of many grain elevators became superfluous and their operation, usually controlled by out-of-town ownership, was shut down. Milling also slowed during the last decades of the twentieth century, but, nonetheless, managed to survive as a significant local industry into the present century.

When in 1986 Reyner Banham published *A Concrete Atlantis*, the book that called international attention once again to Buffalo's important legacy of concrete grain elevators, he cast his prose decidedly in the past tense. Many of the structures he wrote about had already disappeared. But a significant number endured, even if unused. "In such spectacular urban scenes as the view down the Buffalo River toward the Ohio Street Bridge," wrote Banham, " . . . one can see that the combination of assured durability and long-sustained functional relevance has given concrete elevators a monumental longevity."[72]

Francis R. Kowsky is a SUNY distinguished Professor in Art History at Buffalo State College. He prepared the National Register of Historic Places Buffalo Grain Elevator Multiple Property Documentation Form.

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1. The text of this article is based on the National Register of Historic Places Multiple Property Documentation Form that the author prepared in 2002. Special thanks are due to Henry Baxter for generously sharing his profound knowledge of Buffalo's grain elevators with me. The author is also indebted to the remarkably complete analysis of grain elevator construction in Buffalo prepared by Thomas E. Leary and Elizabeth C. Sholes for the Historic American Engineering Record.
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17. Dunbar's Bennett Elevator replaced his earlier Dart Elevator.
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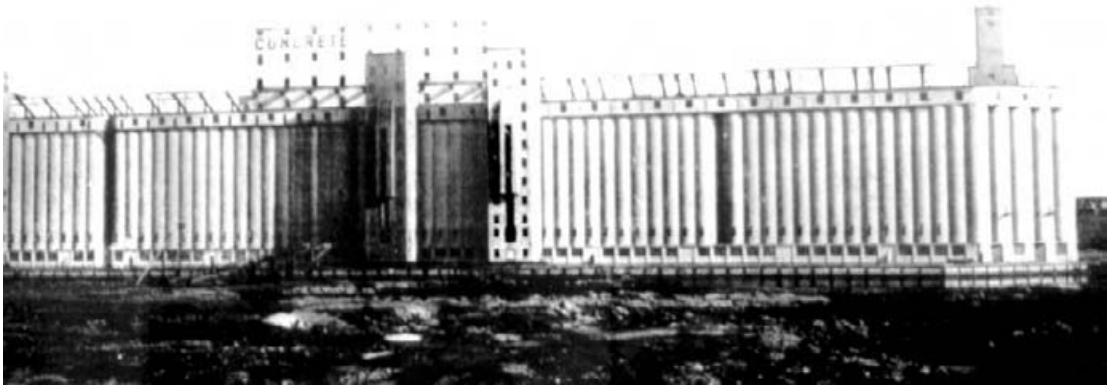

The Concrete Central Elevator, an example of modern functionalist design by European modern architects.
From Bruno Taut, *Modern Architecture* 1929 (Courtesy of the Buffalo and Erie County Public Library)

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25. Sweeney, 129.
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43. Leary and Sholes, 131.
44. Leary and Sholes, 279.
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50. Folwell, 121.
51. Overmire, 1103-4.
52. These were only storage bins related to the adjacent Frontier Elevator; they had no marine legs.
53. Historic American Engineering Record, 12.
54. Banham, 134.
55. Banham, 136.
56. Historic American Engineering Record, 66.
57. Peavey's Folly, which was never enlarged beyond its single silo, still stands and is listed on the National Register of Historic Places.
58. For a detailed description of the construction process, see Historic American Engineering Record, 15-39.

59. *Concrete Bins and Elevators* (Chicago: Portland Cement Association, 1917), 6.
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64. Banham, 156.
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68. Quoted in Banham, 224.
69. Banham, 230-1.
70. Navigational improvements on the Mississippi River also contributed to Buffalo's decline, as more and more Midwestern grain began moving south again to New Orleans. Furthermore, in the 1970s, the Interstate Commerce Commission revised the artificially low rates that it had maintained for decades for shipping grain by lake vessels. This had the effect of making it cheaper to ship grain by rail than by water from the Midwest to the East Coast.
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# The Grand Ladies of the Lake

The Standard, American, and Perot Elevators along the Buffalo River as viewed from from the Ohio Street Bridge.
(Photo by Lynda H. Schneekloth)

*Ivonne Jaeger, Architect*
*Halle (Salle), Germany*

# The Grand Ladies of the Lake

**Introduction**

Consider this a formal introduction to the sixteen* grand grain elevators that sit along or near the Buffalo River in Buffalo, New York. With the exception of three, all of them are concrete silos, many of them complexes built over time.

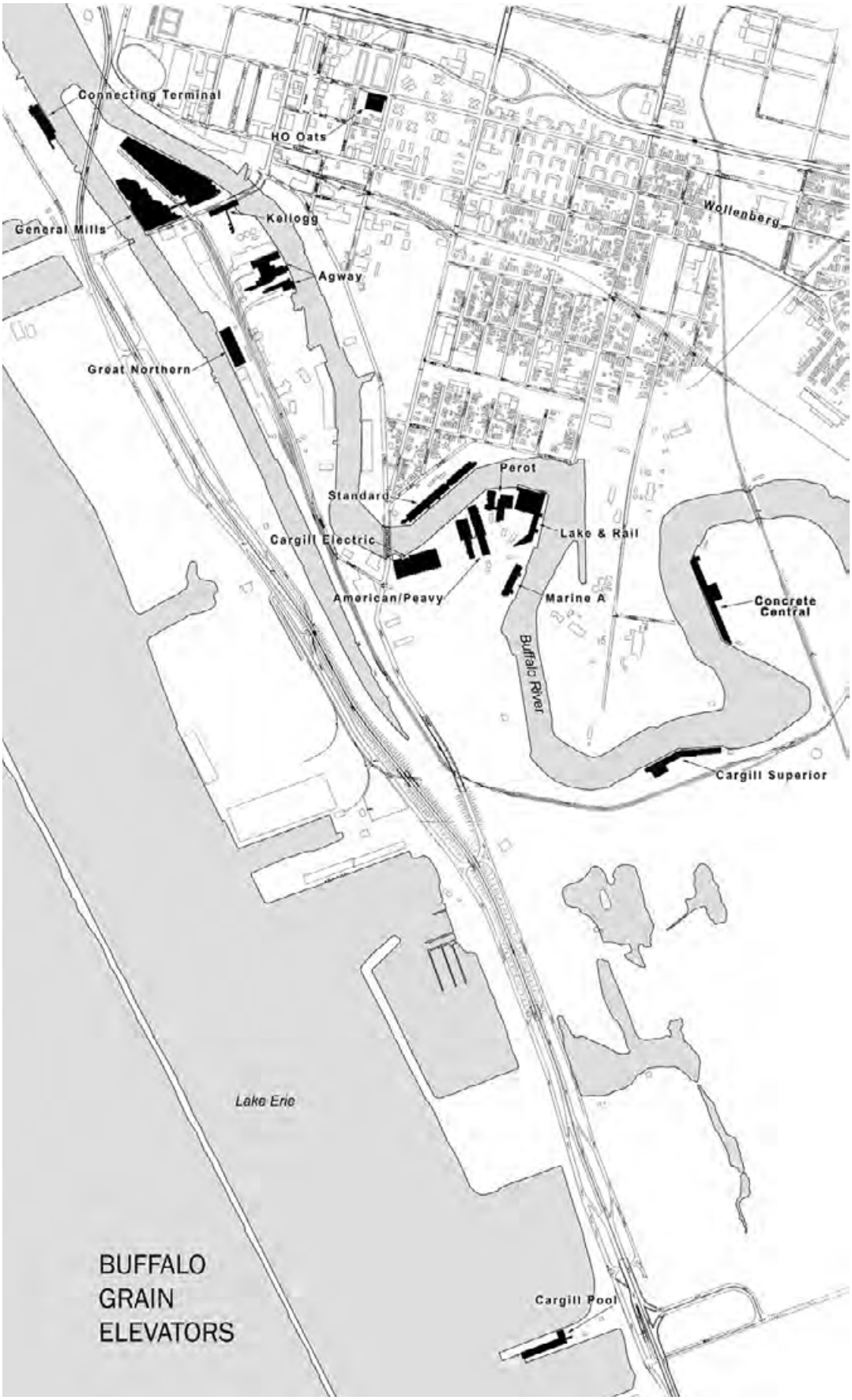
The exceptions are in themselves interesting because they represent the history of grain elevator construction technology from the earliest built in the 1800's through the mid 1900s. The Wollenberg is a wooden elevator built for train transshipment and is not located on the river. It is reminiscent of the cadre of wooden elevators that dotted the river district in the 19th century and similar to the thousands of rural elevators that held grain in local communities. The Great Northern is the last steel bin elevator in the world, and the Washburn-Crosby "A", a part of the General Mills complex, is an example of the tile bin elevators. Both the steel and tile were transitional technologies between the wooden elevator and the concrete and steel elevators.

In this chapter, the elevators are presented geographically, with the farthest Buffalo River elevator, the Concrete Central, introducing the set. This is followed by the series of elevators traveling west along the river. The outlying elevators are then presented, including the Cargill Pool on the Outer Harbor, with the railroad transshipment elevators, the Wollenberg and H-O Oats, last.

**There are now fifteen. The H-O Oats elevator and its daylight factory were demolished in 2005-2006.*

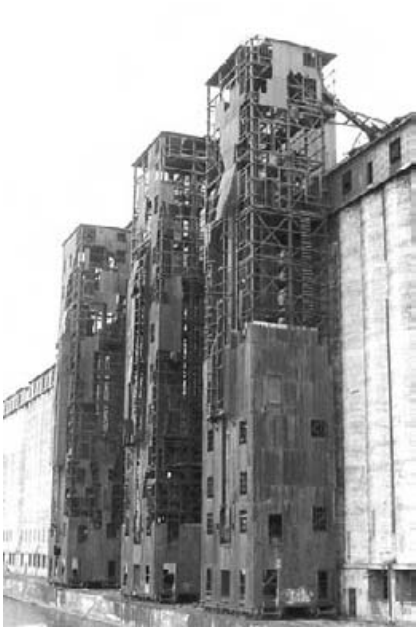
*All photographs used in this section are being published for the first time in this book. They were taken by Lynda H. Schneekloth unless otherwise noted. Material for this brief summary of each elevator was derived from Thomas E. Leary and Elizabeth C. Sholes, Historic American Engineering Record, Library of Congress and Francis R. Kowsky, "National Register of Historic Places Multiple Property Documentation Form," 2002, submitted to the National Park Service in support of the National Historic Register Listing of the Buffalo Grain Elevators.*

Ivonne Jaeger was a Fullbright student at the Department of Architecture, University at Buffalo, SUNY when she prepared this work. She is now an architect in Halle (Salle), Germany.




Map of Buffalo's Grain Elevators, 2005.
(Courtesy of Urban Design Project, University at Buffalo)


# The Concrete Central Elevator



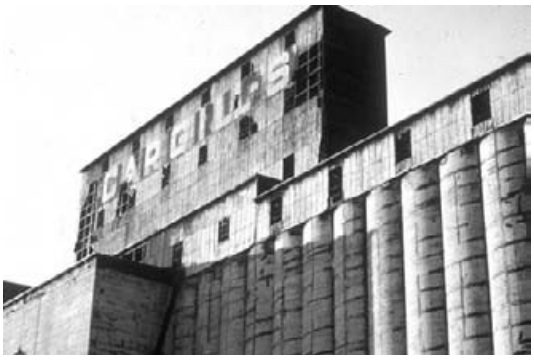
The Concrete Central Elevator, located between the Buffalo River and the track of the former New York Central Railroad, was designed by Harry R. Wait. The elevator, built in three sections from 1915 to 1917, is a quarter of a mile long. It was the largest transfer elevator in the world in 1917. The 268 bins could store 4.5 million bushels of grain. The original Elevator A, built in 1915 below the workhouse, was extended to the north in 1916 by Elevator B. The southward extensions were conducted in 1917 and are known as houses C, D, and E. Originally, the elevator sections A and B were equipped with two 150 foot-high moveable marine towers. A further moveable marine tower in the same pattern was added during construction in 1917. The isolated square concrete tower lying about one hundred yards to the south is a fixed marine tower.

The Concrete Central represents one type of construction: the square pyramid headed pillars in the basement support the overall bin slab on which the bins were raised by the slip form method. The massive structure has been abandoned since 1966. It was placed on the National Register of Historic Places in 2003.

## The Cargill Superior Elevator

This elevator was the first reinforced concrete elevator built by the local engineer A.E. Baxter, who worked for the Monarch Engineering Company. The construction began in 1914. The first section, known as Superior A, had a storage capacity of 1.5 million bushels. In 1919, Superior B was added immediately to the east of the existing Superior A. Both sections are linked, although complex B changes the angle in plan and follows the shore of the river. A further Annex C was built in 1925, likewise on the eastern side. The extension aligns with the existing Superior B, but it is structurally separated from the earlier parts of the elevators. Nevertheless, the bin floors maintain the same height, and a bridge provides a continuous gallery on top of the elevator between section B and C.

The original complex was already started in 1899 by Husted Milling Company with a mill and a wood crib-binned elevator. In 1907, the company built its first concrete elevator that was destroyed by an explosion in 1912. After this event, the Husted Company commissioned the Monarch Engineering Company to build a reinforced concrete elevator, Superior A. During the construction the operating company changed into Superior Elevating Company with E. M. Husted as president. Cargill, a international grain trader, purchased the Superior Elevator in 1939. It closed in the 1960s.



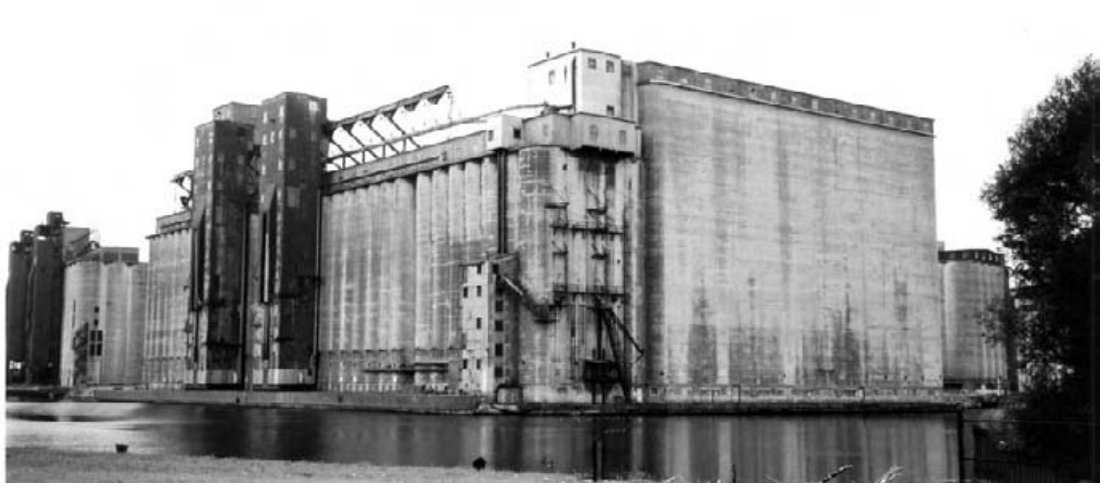
## The Marine A Elevator

The original Marine elevator, a wooden cribbed construction, was built about 1870 for the Buffalo-based Abell Family. An annex followed in 1894. This elevator was equipped with Buffalo's first moveable marine tower. In 1925, the new Marine A Elevator was constructed, and the old building became known as Marine B.

This elevator is the only example of T.R. Budd's construction method that provided an elevator that was slip formed from the foundation slab upwards, including a roomy basement. All loads were direct compression to the foundation slab via bin walls or basement pillars. Former construction raised the bins on a full bin slab above basement columns that bore the weight. Today, the pure simple form of the original construction of Marine A is almost unaltered. After the opening of the St. Lawrence Seaway in 1959, the elevator, which was only a transfer elevator without an associated mill, closed.

This elevator is scheduled to be retrofitted and incorporated into the ethanol plant development by RiverWright Energy, to open in 2007.

Photo by Johannes Runge



## The Lake and Rail Elevator

*The International Milling Elevator*
*The ConAgra Elevator*

The complex was built in four stages between 1927 and 1930 for International Milling, Inc., which had established a milling operation in Buffalo in 1926 and 1927. The elevator was built in conjunction with the mill and was equipped with two marine towers. In 1928, the North Annex was added. A three-story mill warehouse, a railroad loading shed, and a fixed marine tower were built between the mill and the annex soon after the completion of the annex.

In 1929, the Lake and Rail South Annex and the Southwest Annex were built. The South Annex follows the pattern of the North Annex, but the Southwest Annex on Childs Street has a distinctive appearance. The elevator is triangular in plan to provide a maximum storage up to the property line. The final addition, the Northwestern Annex, was built in 1930. To maximize the storage capacity of the outerspace bins, the cylindrical main bins are enclosed by straight exterior walls. This elevator, closed by ConAgra in 2002, was bought by RiverWright Energy in 2006 and will be retrofitted for an ethanol plant to be opened in 2007.

Photo by Ivonne Jaeger

## The Perot Malting Elevator

*American Malting Elevator*
*Genesee Brewing Elevator*

Photo by Ivonne Jaeger

This elevator, built in 1909 for the malting company Perot, was recently operated by Fred Koch Malting Company. The complex consists of two parts, a grain elevator and a building to the east containing germinating compartments for the malting process. The elevator has no marine tower and was connected to the American Elevator by an overhead conveyer.

The plant was built in two sections. Nine bins without interspace bins were built at some distance from the Buffalo River in 1909. The construction of a set of bins with interspace bins along the Buffalo River followed in 1933.

This elevator is scheduled to be retrofitted and incorporated into the ethanol plant development by RiverWright Energy, to open in 2007.

Photo by Ivonne Jaeger

# The Exchange American Elevator

*The Peavey Company Elevator*
*Russel Miller Milling Company Elevator*

This elevator was designed and built by the James Stewart Company for the American Malting Company in 1906. It was one of the first reinforced concrete grain elevators in Buffalo based on the slip form construction. In 1922, Russel Miller Milling Company purchased the complex and converted the malt plant into a mill. The new mill building was completed in 1924 and a further annex to the south of the existing elevator was constructed in 1931. The elevator was equipped with a single fixed marine tower located at the northern end of the building. In 1954, Russel Miller Milling Company was purchased by Peavey Company, one of the largest grain companies in the United States.

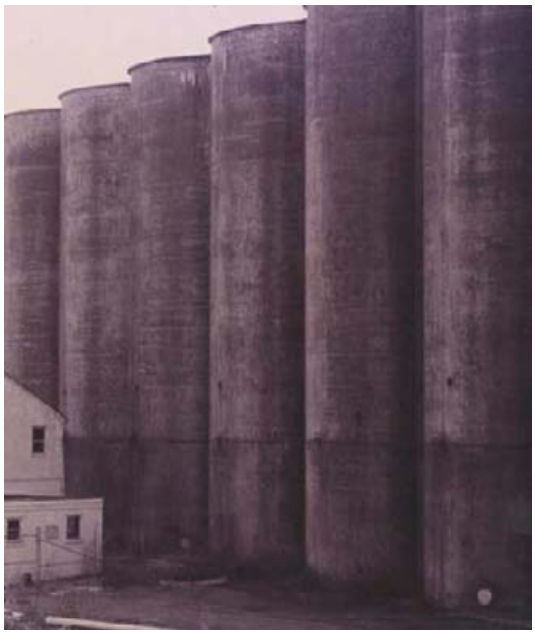
The invention of slip form construction greatly accelerated the speed of erection of an elevator because concrete could be poured constantly. R.H. Forwell and W.R. Sinks, engineers of Barnett Record Company, devised this system of raising slip forms using jacks that acted upon rods incorporated into the bin wall as building progressed.

This elevator is scheduled to be retrofitted and incorporated into the ethanol plant development by RiverWright Energy, to open in 2007.

Photo by Ivonne Jaeger

# The Electric Annex

*The Cargill Electric Elevator*
*The Eastern Grain Elevator*



The Electric Elevator was the first elevator that used electricity as a power source. The original construction consisted of nineteen freestanding cylindrical steel bins. The bins were served from an adjoining workhouse incorporating one movable and one fixed marine leg. The original black steel bins were demolished in 1984.

A concrete annex was built in 1940 and 1941. From the outside, the annex resembles conventional cylindrical bins. However, the whole storage system was a new development that lowered the storage cost. The concrete elevator was equipped with a marine leg, a small elevating leg just for turning the grain. The complex covered six halls with a storage capacity of six million bushels of grain. Between those halls the grain was handled by power shovels. The bins discharged into a sub-basement conveyer tunnel. This construction type is called “tunnel design.”

# The Standard Elevator

*The Hecker Elevator*
*The Nesbitt Elevator*
*The Pillsbury Elevator*

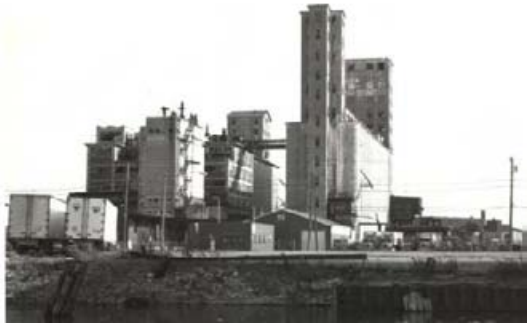
The Hecker Company, a family company, started with a small milling operation in 1913. In 1924 the company became a subsidiary of the Standard Company and built the Standard Elevator.

The elevator, located on the Buffalo River near the Ohio Street Bridge, was erected in two sections in 1928. The construction is not architecturally as pure as other elevators because of the decorative elements like a modulation of wall surfaces, brackets, and a roofline. The first construction phase had sixty main bins with a storage capacity of three million bushels. This phase also included six square bins where grain could be washed and dried. Upon completion, the structure provided the largest single unit of conventional bin storage in Buffalo.

The bins, with a wall thickness of eight inches, rise from the foundation slab to a height of 124 feet. The main bins' capacity of 102,400 bushels was more than four times that of the main bins in the Central Concrete Elevator. A further annex, constructed in 1941, has a capacity of two million bushels stored in sixteen main bins. The Standard Milling complex closed in 1981, but the elevator now stores grain for the ADM Milling facility on Ganson Street.

## The Agway Elevator

*The Cooperative Grange League Federation Elevator (GLF Elevator)*
*The Wheeler Elevator*



This elevator is situated in the south of the Spencer Kellogg complex and occupies the site of a former wood elevator from the 19th century owned by the Wheeler family. The replacement of the wooden elevator began after a fire in 1909. The new concrete elevator was known as the Wheeler Elevator or Elevator B. It was the first concrete elevator with outerspace bins in Buffalo. The complex had a fixed marine leg. In 1929, GLF purchased the Wheeler Elevator. Immediately after the purchase, the company added a new feed mill on the west side of the elevator. Grain often became wet after shipping, so the company built a drier house to the northwest of the Wheeler Elevator in the same year. Elevator C was built in 1936 together with a two-story warehouse and a railroad loading shed. The erection of Elevator A in 1941 was the final phase of elevator construction. Elevator A is very easy to identify, with two tall workhouses on either end of the elevator. The last addition to the east of the main mill was the pellet mill built in 1961. In 1964, GLF merged with the Eastern Farmer Exchange and the new company was named Agway Inc. The plant stopped working in 1974. The current owner is the Great Lakes Fishing Club.

# The Spencer Kellogg Elevator

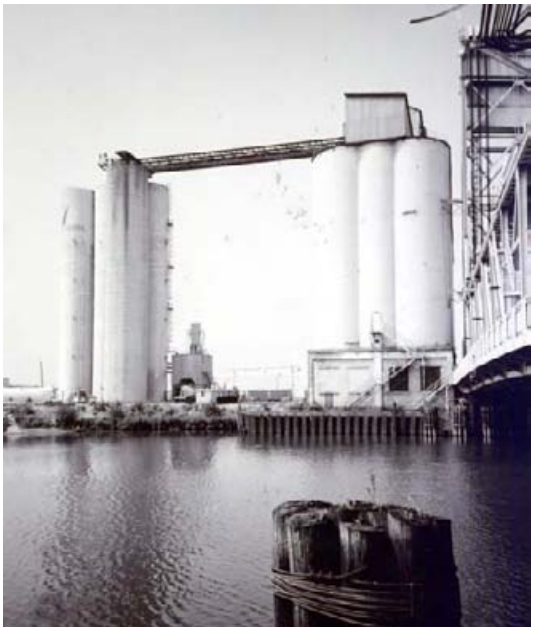
*The St. Mary's Cement Elevator*

The elevator consists of two parts that originally were developed by two different companies. The elevator towers are separated by a former slip, now filled in.

Spencer Kellogg started in the early 1890s to develop a wooden grain elevator on the southern side of the slip. On the northern shore of the slip, Coatsworth built a bigger plant after the wooden elevator burned down in 1984. This complex was purchased by Kellogg, and Kellogg replaced the complex of Coatsworth in 1909 with a new concrete elevator. The old plant on the southern side, also known at that time as Kellogg B, remained until the completion of the new complex. In 1912, Spencer Kellogg demolished Kellogg B and filled the little slip, and the new complex of the northern side became known as Kellogg B. The basement of this new elevator accommodated railroad loading and unloading directly under the bins. This type of basement was a common arrangement in wood elevators. The Spencer Kellogg Elevator is the only known elevator in Buffalo that had this arrangement similar to wooden elevators.

In 1923, the company constructed a loading elevator that consisted of steel storage bins on the southern side. In 1936, three freestanding cylindrical loading bins were added. This complex is used as a cement storage facility and is joined by a head transfer system to a set of bins on the north.

The marine towers and the steel bins of the Spencer Kellogg Elevator have been demolished. The workhouse and the four loading bins remain.

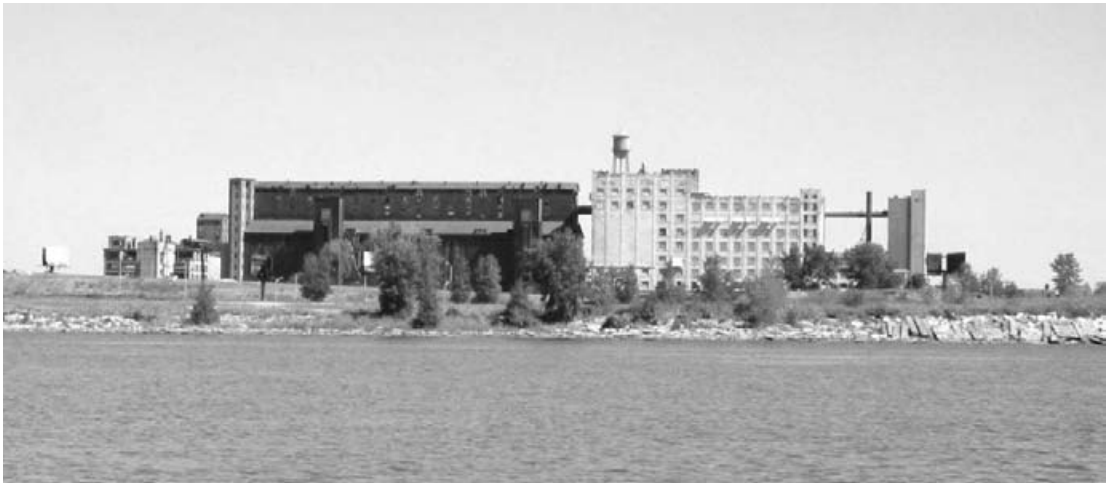



## General Mills

*The Frontier Elevator*
*The Washburn Crosby Elevator*

The site of General Mills was at one time the site of the home and farmstead of Daniel Joncaite, the first entrepreneur in Buffalo. In 1909, Washburn Crosby built a set of nine bins known as Elevator A next to the flour mill on South Michigan Avenue that was already built in 1886. The company used tiles as construction material. In 1909, the company built a further elevator called Elevator B and a flour mill called B Mill. The mill operations were electrically driven, unlike the steam-powered original mill of 1886. An illustration of the Washburn Crosby Elevator formed a part of the photographic collection for Walter Gropius' 1913 publication *Jahrbuch des Deutschen Werkbundes* entitled *Die Entwicklung moderner Industriebaukunst*.

During the next decade, several annexes followed, such as the parts of the Frontier Elevator in 1909, 1913, and 1925 also known as C1, C2, and C3. In 1922, General Mills erected a four story concrete warehouse along the City Ship Canal, and in 1961 the original mill of 1886 was replaced by the C Mill. Mill B was dismantled in the 1960s. Today General Mills still operates. As the pictures show, the storage units receive grain by water and rail through procedures comparable to the classic waterfront transfer elevators of Buffalo's past.



## The Great Northern Elevator

*The Pillsbury Elevator*

The Great Northern Elevator was constructed in 1887 with a capacity of 2.5 million bushels. It was one of the first elevators that used electricity as a power source. The wooden construction was replaced by cylindrical steel bins to provide more fire resistance. The steel bins were enclosed by a 2.5 foot thick brick shell wall. Steel was expensive, and the bins were susceptible to rust and corrosion. The Great Northern is, like the old wooden elevators, the last of Buffalo's "working house" elevators, in which the storage bins, work spaces, and conveying apparatus were all located within a single structure. A typical wooden bin could carry about 5,000 bushels of grain. In comparison, the Great Northern bin could hold 74,000 bushels.

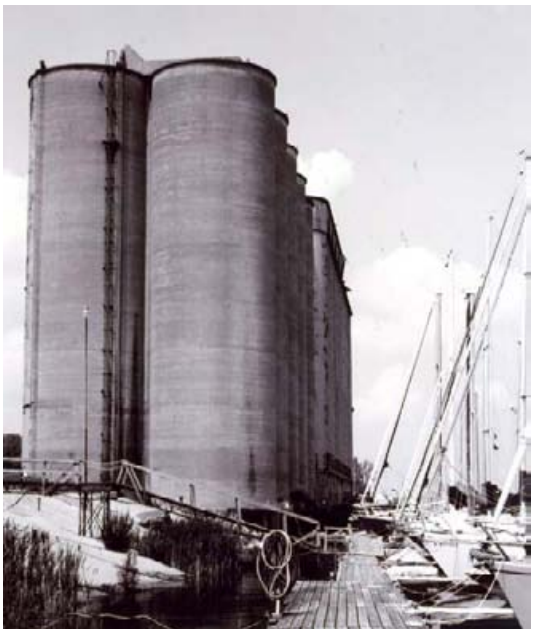
There are thirty bins that are 38 feet in diameter, and eighteen bins that are 15.5 feet in diameter. The present two marine towers were built in 1922 and are not the original ones. Originally, the elevator was equipped with three movable marine towers, but those were destroyed by storm.

Today the Great Northern sits next to the milling facility at ADM.

## The Connecting Terminal Elevator

This elevator is located on the west side of the Buffalo Ship Canal, directly at the confluence with the Buffalo River. The previous wood construction was completely destroyed in 1914. The owner, the Pennsylvania Railroad Company, commissioned a new concrete elevator immediately in 1915.

The original elevator, designed by A.E. Baxter, was only equipped with one marine tower. The second marine tower with the same pattern was added at a later date. In 1950, a drier tower of structural steel was added to the north side. The southern section, slightly separated from the main complex, was constructed in 1954, the last storage facility built in Buffalo.



## The Cargill Pool Elevator

*Saskatchewan Cooperative Elevator*

The Cargill Pool Elevator is the only grain elevator on the lake itself, which allowed a service of deeper draft ships. It was completed in 1925. The storage capacity of the original complex was approximately one million bushels. It is the first elevator in Buffalo built by a Canadian farmer's cooperative, the Saskatechewan Cooperative Wheat Producers. The cooperative was a response to market pricing over which farmers had no control.

A section added one year later doubled the capacity of the existing elevator. The 125 bins (main bins, interspace bins, and outerspace bins) have the length of two football fields. The mainhouse and annex were fixed formed construction; the workhouse above is slip formed.

A railroad loading and unloading shed abuts on the north side. The elevator is equipped with two movable marine towers of structural steel with corrugated iron cladding. Currently, the 200 foot-high elevator is used as a marina and boat storage facility.

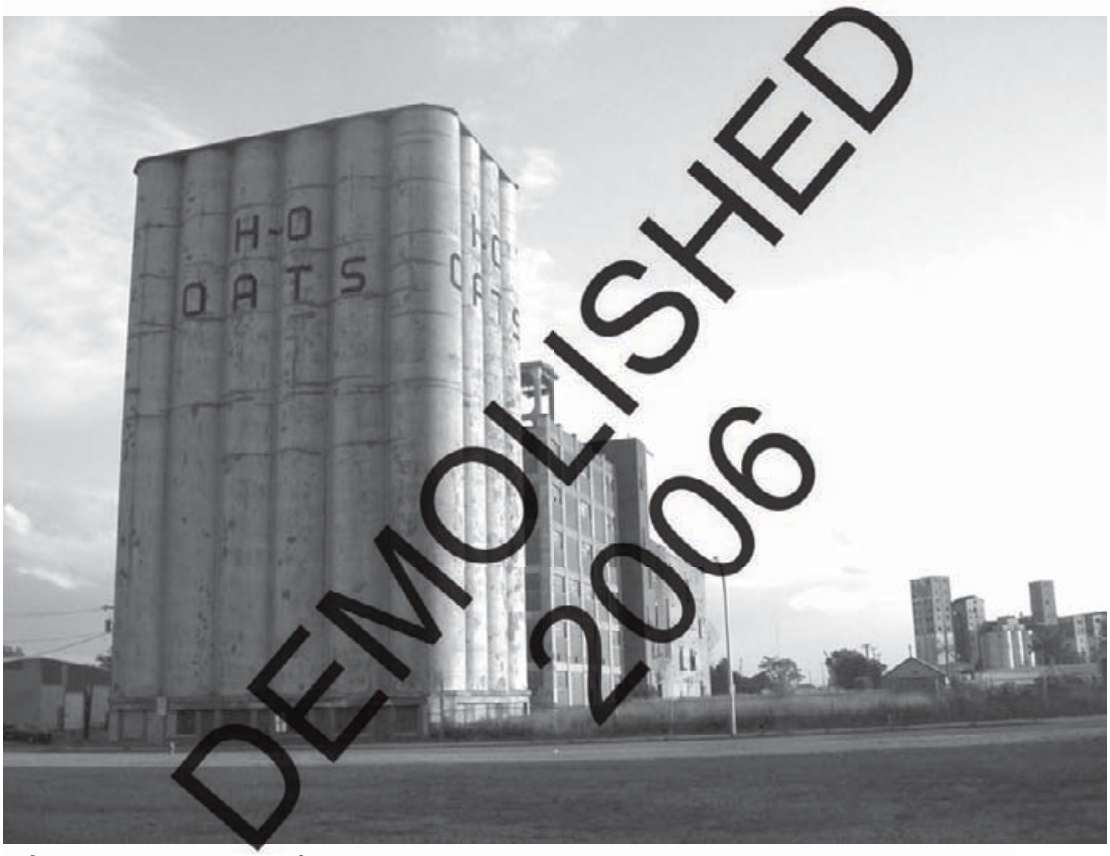
## The Wollenberg Grain and Seed Elevator

This elevator, a typical country elevator, is the only surviving wood crib-binned elevator in Buffalo. It is situated on Goodyear Avenue along the Belt Railroad. These wooden elevators were characteristic constructions of the landscape inland and along the Buffalo River. Except for the foundation, the entire construction of those elevators is of wood.

The Wollenberg Elevator was built in 1912 of second-hand material from the original wood elevator of the Spencer Kellogg Company that the company dismantled to make space for its new concrete elevator. The construction shows traces of this previous use. The accompanying mill on the northwest side of the elevator was constructed in the same year.

The machinery was driven by electric motors. The capacity of 25,000 bushels is accommodated in twenty bins. The Wollenberg was placed on the National Register in 2003.

Photo by Thomas Yots




The H-O Oats Elevator


The development of the street site began in 1893 with the construction of a wood-framed food mill and a wood-framed feed mill. In the same year, the wood crib-binned elevator with exterior brick walls were erected. This original complex burned down. In 1912, a four-story factory was built of brick. The free-standing steel bins were built in 1914. The seven-story high concrete-framed, brick-paneled building, which functioned as store and warehouse, was added in 1928. The concrete elevator, L-shaped in plan on the southeastern corner of the complex was, constructed in 1931. In 2005, the elevator and surrounding nine acres were purchased by the Seneca Nation for casino development. In December 2005, they demolished the 1912 daylight factory that was a part of the complex and in June 2006 they demolished the elevator.

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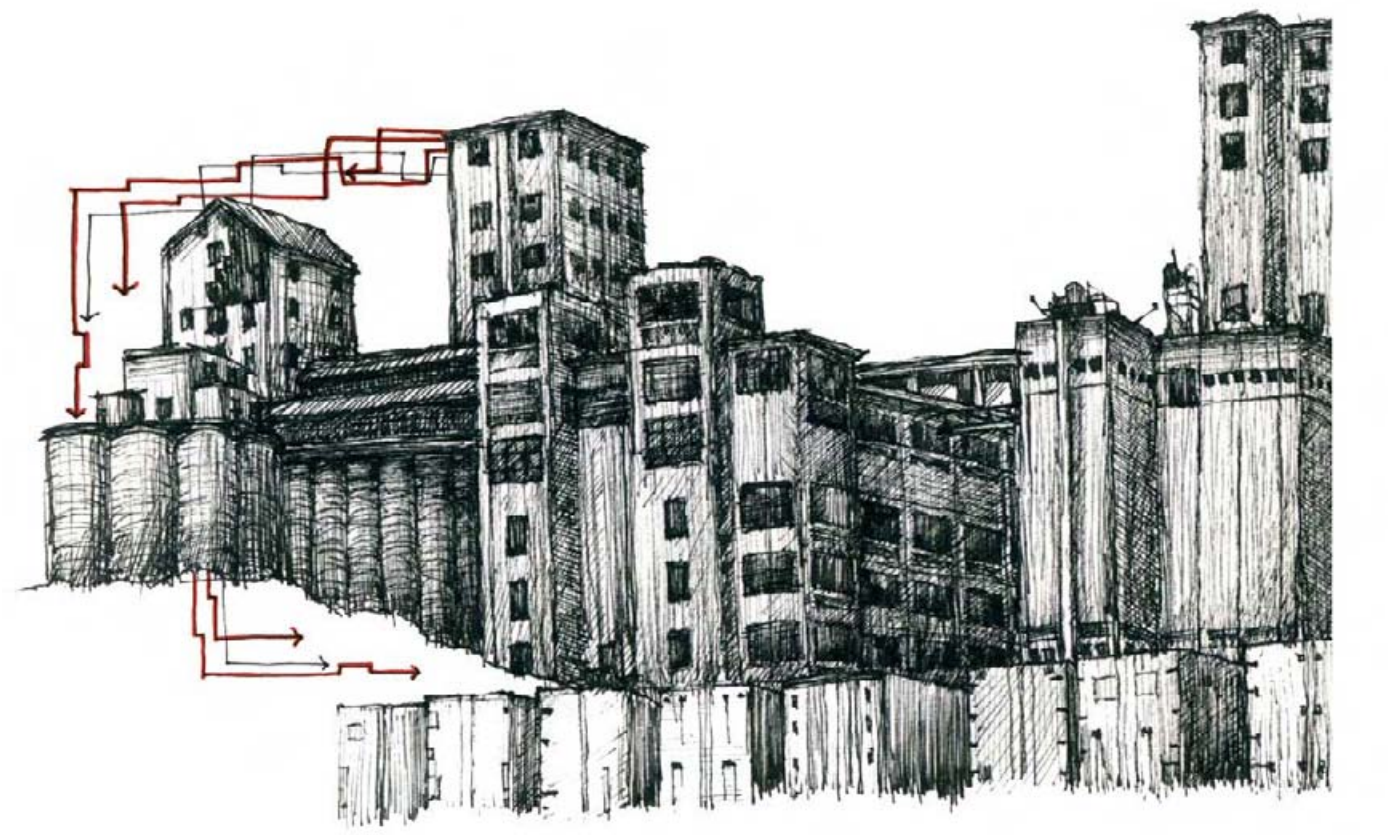
# Projects and Proposals



*(Drawing by Joshua Price)*

# Projects and Proposals

**Introduction**

*They were, however, buildings of great quality and power . . . like an avenue of mighty tombs . . . [C]ertainly, no other city in the world possessed so concentrated a set of historically valuable elevators as Buffalo then did . . .*

R. Banham

The Buffalo grain elevators are seductive. Among others, architects, landscape architects, and photographers are compelled to interact with them, as is evident by the attention paid to them by the early modernists described in the chapters by Stiener and Kowsky.

Now that all but three of the elevators are abandoned and in disrepair, there is contemporary surge of interest in addressing them. Designers and citizens have offered a variety of ideas of how we might interact with them, how to find ways to reveal them, to manipulate them, to reuse them and to celebrate them.

The Buffalo Grain Elevators have been used as the basis for studio projects by archiecture and landscape architecture students at the University at Buffalo, Cornell University and Columbia University in the last few years. It is a privilege to offer the students' proposals and projects for your reveiw.

Lynda H. Schneekloth, Editor

# Buffalo Grain Elevator Heritage Trail

(Photo by Lynda H. Schneekloth)

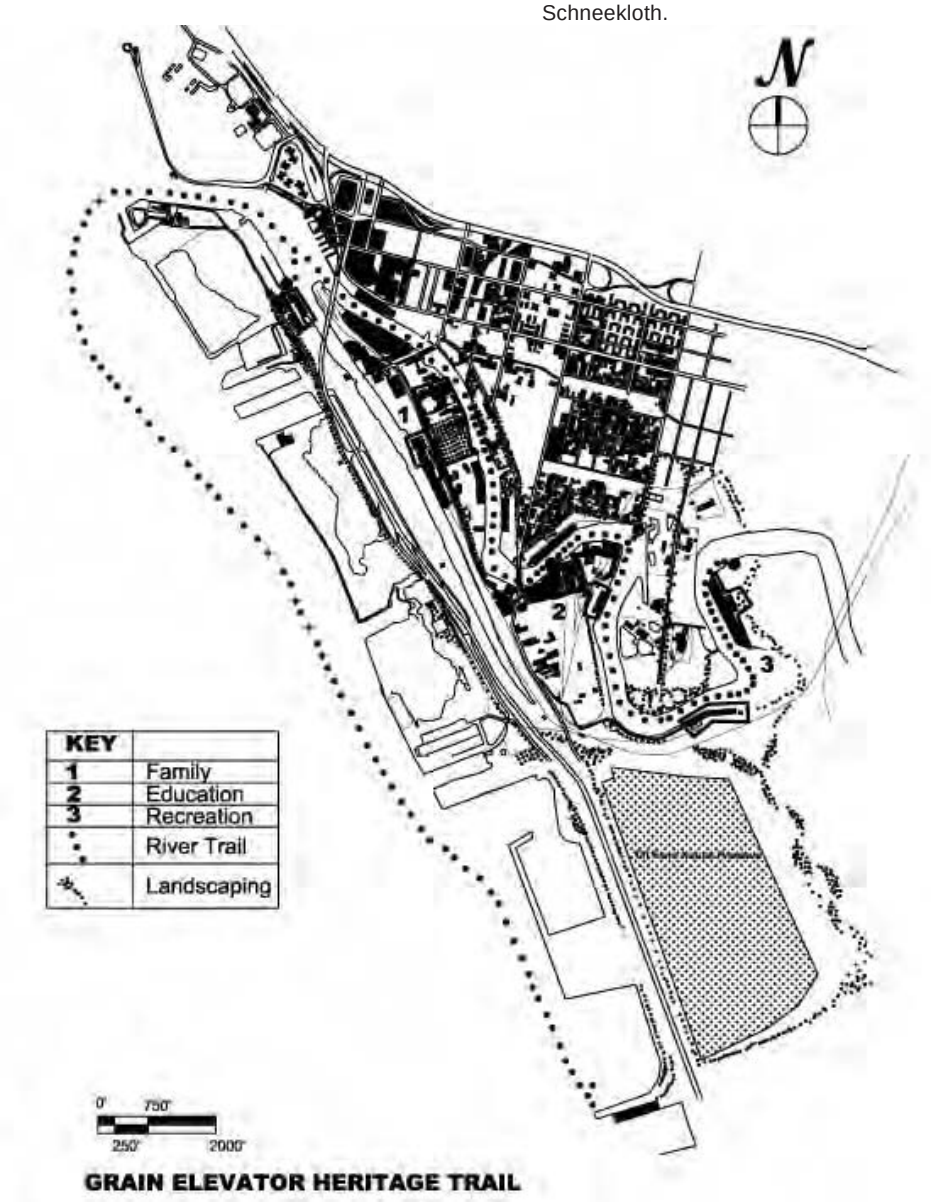
Graduate Design Studio
Lynda H. Schneekloth
University at Buffalo, SUNY

# Buffalo Grain Elevator Heritage Trail

The City of Buffalo is home to the largest collection of grain elevators in the world. Their existence speaks to the central role of Buffalo in the history of grain transshipment from the Midwest to markets on the east coast and beyond. Today only two of the fifteen remaining large elevators are in use. Yet their presence remains and their story waits to be told. As Reyner Banham says in *A Concrete Atlantis*, "It was a privilege to know them in their ravaged antique grandeur."

The assignment for a graduate studio at the Department of Architecture at the University at Buffalo was to design a heritage trail to connect the elevators. The project was not to design the elevators or find adaptive reuses for them, but rather to interpret and transform the landscape around them. The goal of this imaginal exercise was to explore the means by which the elevators could acknowledge the industrial history of the region by making them physically and visually accessible in their current condition.

This studio was taught by Professor Lynda H. Schneekloth.

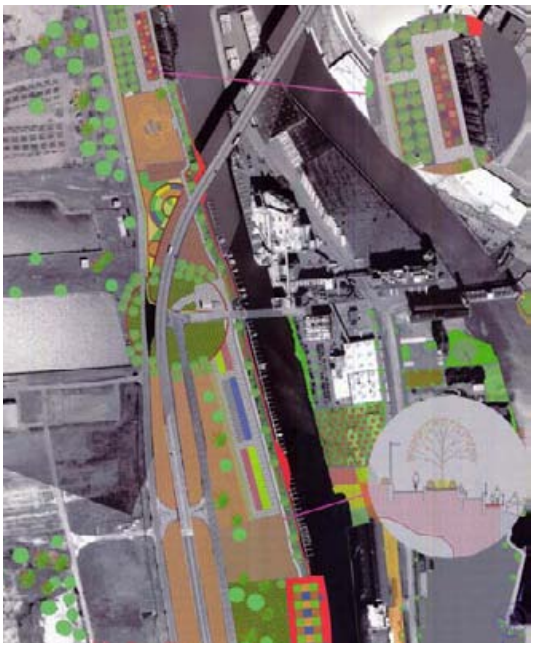


## Strategy One:
## The Agrarian Landscape

Jim Churchill
Sean Friedo
Michael Ross

The industrial landscape of Buffalo's waterfront was based on the transhipment of grain from the Midwest to ports of the east. The grain was a commodity that moved in and out of ships and elevators as it was transported across the nation.

This proposal attempts to reveal the grain origin of the industrial landscape by actually using fields of grain, orchards and medicinal gardens on the vacant land between the huge grain elevators and other industrial buildings. It is anticipated that the use of plants would also serve to bio-remediate the landscape of the contaminated soil left from the industry.



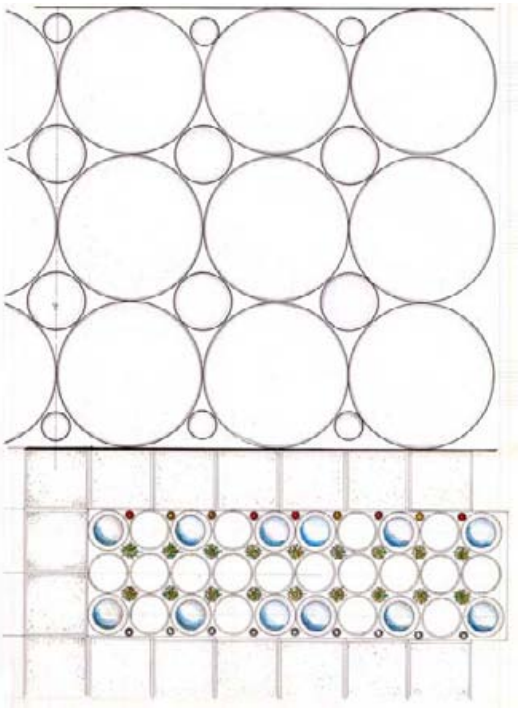
Open spaces on Kelly Island transformed into agricultural fields.

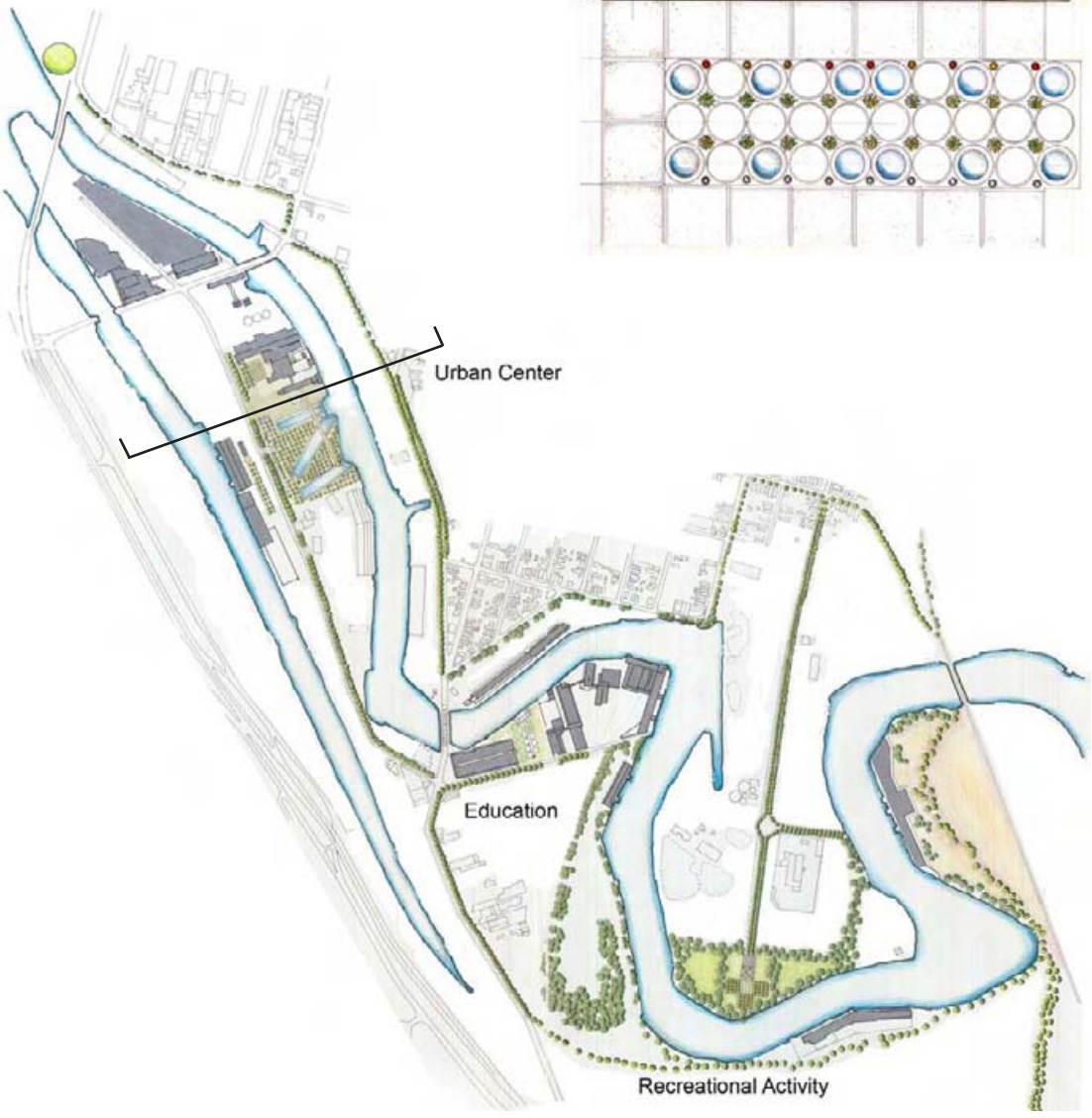
Patterns of plantings using grain, vegetables, and orchards.

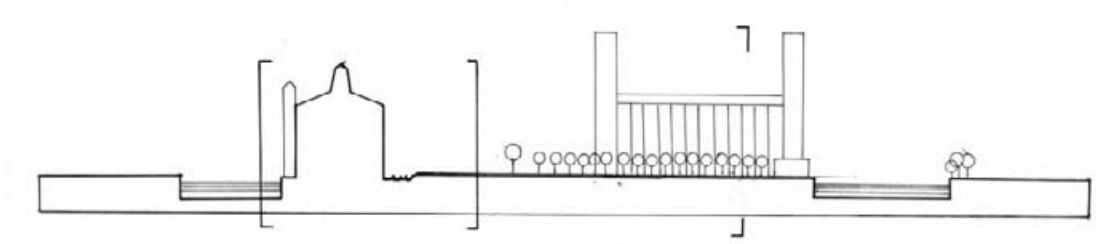
## Strategy Two: Heritage, Education, and Recreation

Julia Kirton
Swapna Kulkarni
Priyanka Gupta

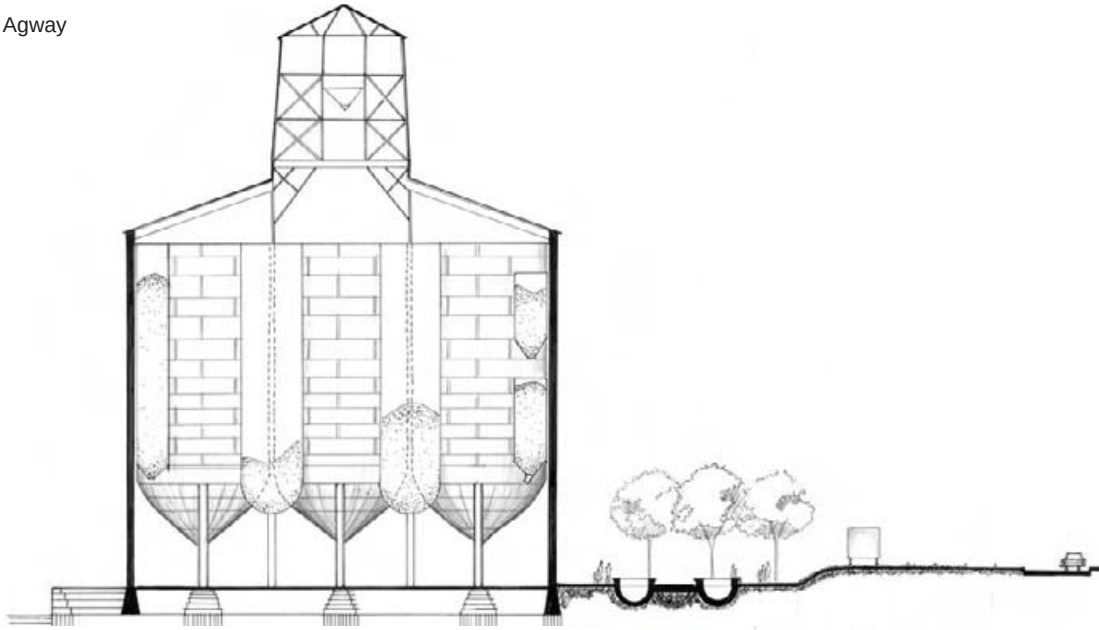
The proposed Grain Heritage Trail moves along the Buffalo River among the various elevators and other industrial buildings. It is suggested that this trail offer diverse experiences. The area near the Great Northern Elevator on Kelly Island serve as the urban center with a formal landscape among the ruins, and a performance space is located near the pools, reminiscent of former slips. The areas near the Cargill and Concrete Elevators are for more active recreation such as biking and rock climbing.



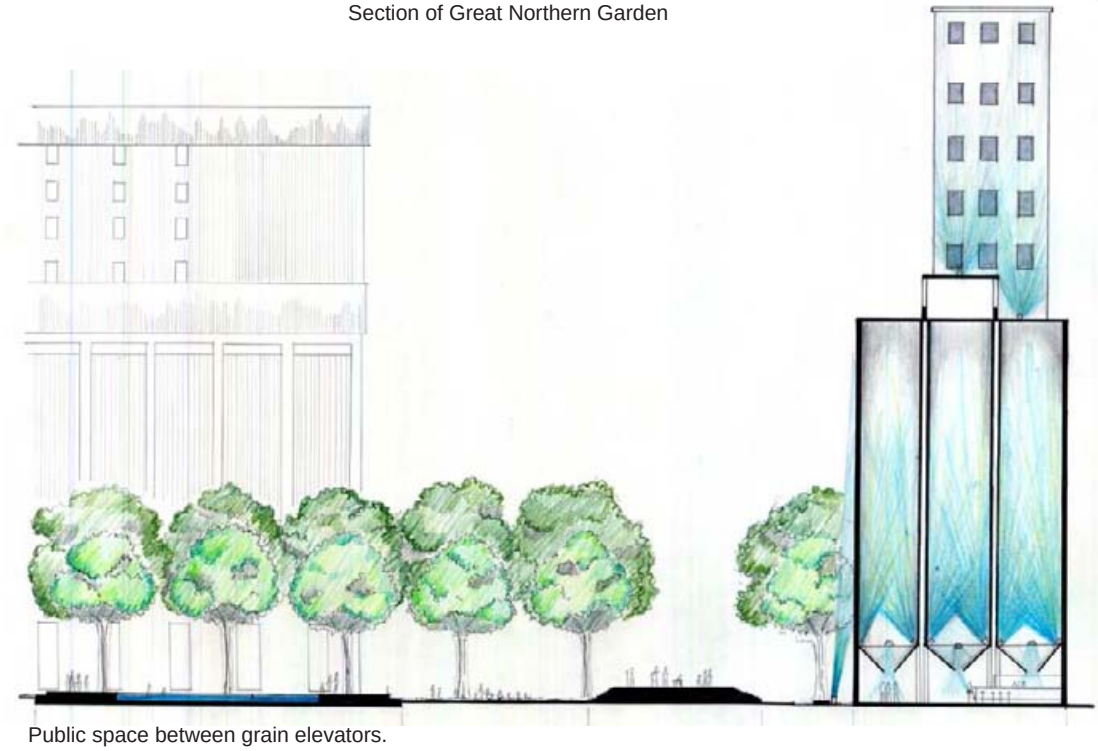




Section through Great Northern and Agway



Section of Great Northern Garden



Public space between grain elevators.

# The Digital Trace:
## Reconstructing Forms and Migrations

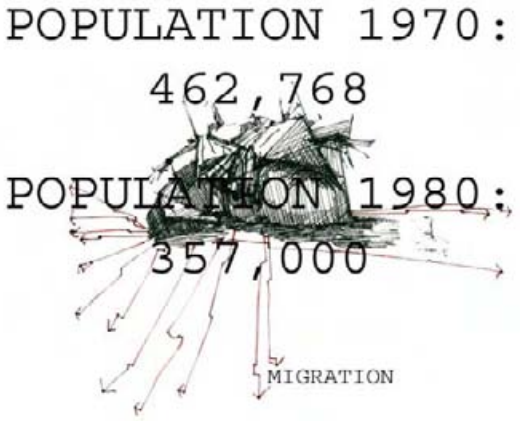

*Joshua Price*
*Cornell University*

# The Digital Trace

Abandoned grain elevators stand as imposing vertical punctuations on Buffalo's wind-swept industrial waterfront. This vast, horizontal landscape was composed at a scale that responded to the national economy and expanding commercial activity of the 19th and early 20th centuries. It was a landscape constructed for international connectivity, for ease of transport, and as a corridor through which goods were stored and moved.

How might this history of progress, transportation, movement, attrition, and decay not only be understood and interpreted, but also represented? One strategy would be to acknowledge that the long and colorful evolution of this place has been tied irrevocably to the notion of "migration." Such a strategy could reflect the movement of industry, people, goods, and money into and out of the city. It could highlight Buffalo's various forms of physical and cultural transportation, specifically the movement of its economy and its population from one place to another. Finally, it could identify a migration of form and landscape, a migration that transcends physical boundaries and subsumes decay.

Critical to this concept of migration is the notion of "movement." People, money, and industry have vacated much of Buffalo's waterfront locations. Currently, one could argue that the inherent possibilities of this landscape lie not in the migration or "movement" of people to this site, but in the interpretation, intervention, manipulation and design of the site as a moving,

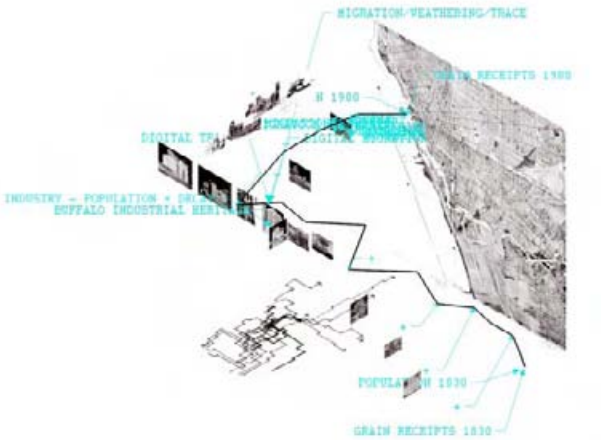



A correlation between attrition, decay, and movement as absence and neglect subsumes change.

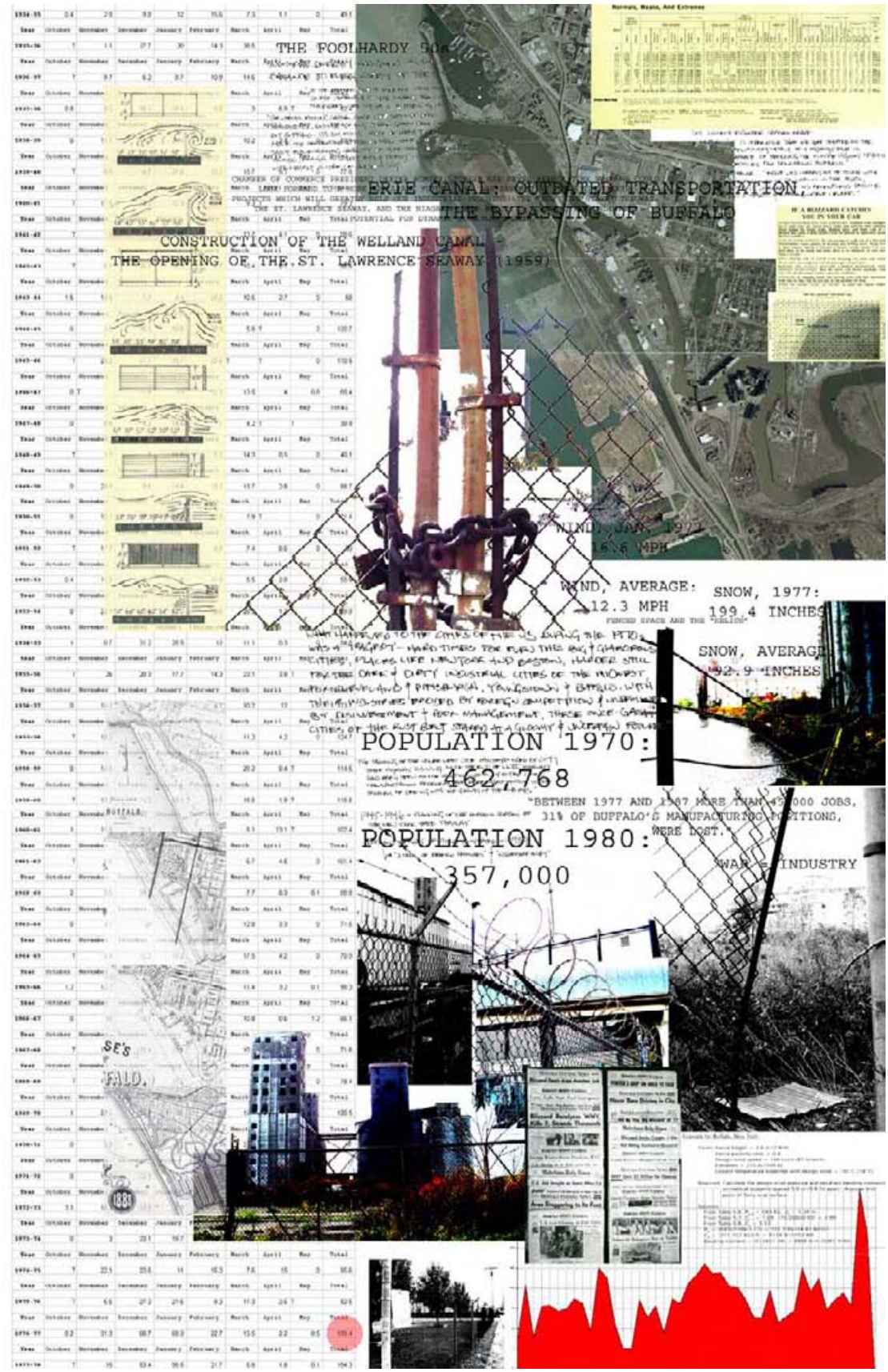
migratory element in and of itself. Like those things which have abandoned this landscape -- people, industry, money -- this site must also "migrate" in order to once more be vital and renewed.

The digital realm (and the Internet) have the potential to allow Buffalo's industrial landscape to migrate across space. It is the proposed vehicle through which the landscape's theoretical and historical form may be realized and its migration accomplished. It is not sufficient to envision the site as a purely visual or textual item. It must also be interpretive, interactive, representative, and also inspirational. A digital construction of Buffalo's industrial waterfront landscape should not be assembled to replace the actual landscape, but rather to provoke interest in it. This digital migration is a first step in establishing a framework for interpretation, design, and rehabilitation of a decaying site.

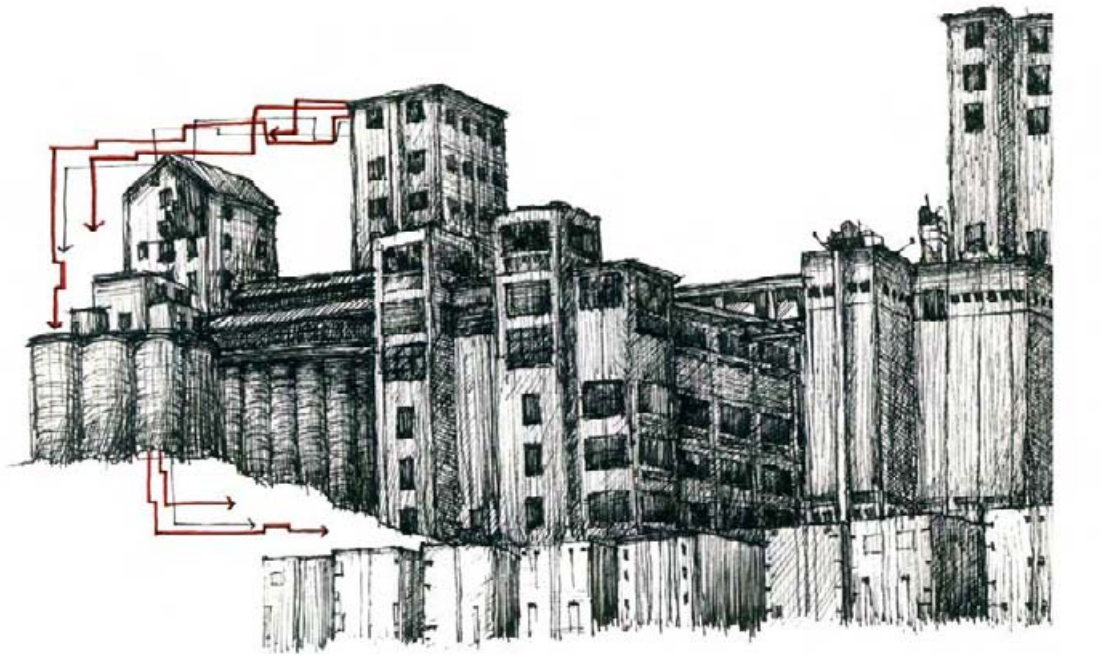
The proposed method for achieving this




In the environment of the digital trace, data creates form, indicates time, and imparts trends and histories.




Invasive plant species line the roads and parking lots adjacent to the grain elevators and grow up through the many fractures in the pavement. The succession of life and the ecological and aesthetic palette from which it was drawn are visceral and tangible. Some things have migrated from the landscape and some have remained to weather and change, representative of a past as much as a current condition.



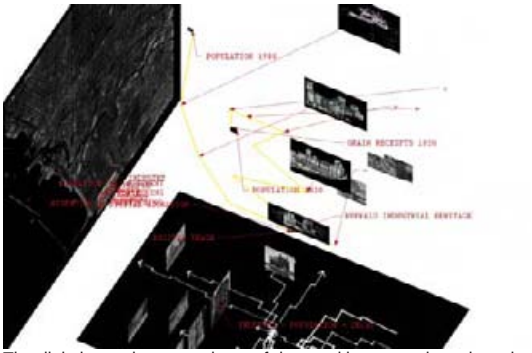
Cycles of movement and transportation.

digital migration is through the creation of the digital trace. The digital trace is a three-dimensional line-form constructed from two two-dimensional datasets. Due to its inherent nature, the digital trace is intrinsically linked to the specific data conditions from which it was created. The significance of the digital trace and its potential to effectively render its original composite information are entirely reliant on two distinct factors: time, and the perspective from which it is being viewed.

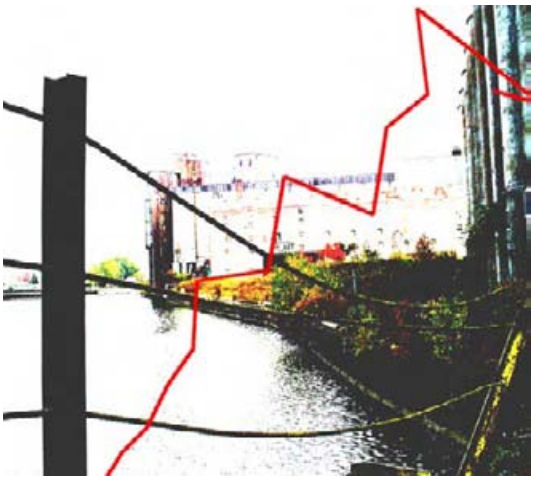
The data used to construct the digital trace reside in specific and separate two-dimensional forms (i.e., line graphs). Each form has a constant of time as its z-axis component, with a variable x-axis and y-axis. The digital trace, then, becomes a single interpretation of these varying datasets in a unique three-dimensional corollary form. When viewed orthographically, it is meaningless regarding the portrayal of source data, but when viewed in section displays a representative two-dimensional dataset/condition.

In Buffalo's industrial waterfront district, each industry's particular history is unique. In this proposal, each digital trace relates to the (subjective) conceptualization of that industry's history as represented through certain datasets and via the line-form of the digital trace. This digital line-form becomes the representative trace of a presently abandoned, weathering, decaying physical form in Buffalo's industrial landscape. Each digital trace may be applicable to only one industry, one grain elevator, one history. It is this trace which possesses the potential to migrate across space and to become the over-arching physical and digital thread through which various applicable data are used to compose an historical interpretation, or digital representation, of a place. The digital trace interprets and designs the landscape of data, the landscape of memory, the landscape of experience, the landscape of weathering, the landscape of decay, and the landscape of migration.

The physical act of viewing Buffalo's grain elevators, comprehending their scale and extent of decay, walking around



The digital trace is a cacophony of data and imagery when viewed orthographically.



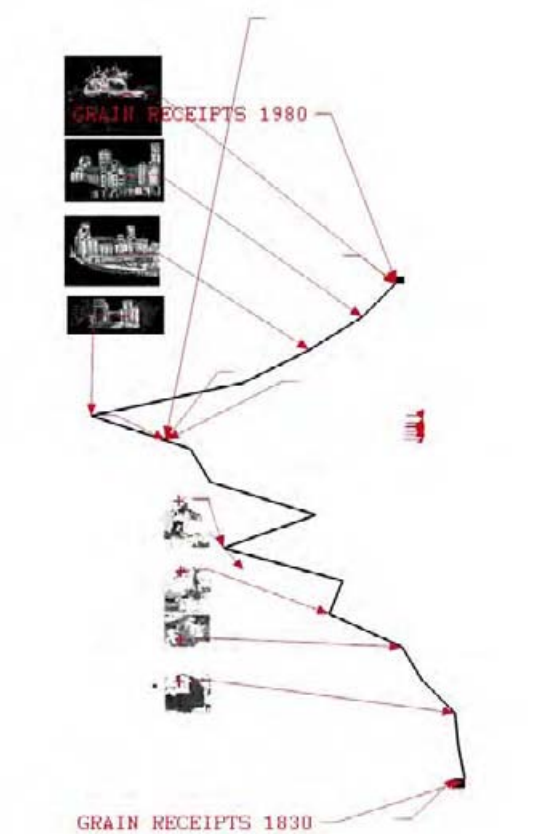
Depictor of a hypothetical digital trace and the relationship between socioeconomic catalysts and the physical forms they generate.

them, and hearing the various latent and explicit sounds and textures inhabiting this landscape – the literal remains of a people and industry – is an experience which is irreplaceable. Buffalo's industrial landscape offers a dynamic, unique quality that cannot be duplicated. In a real sense, it is a landscape of absence, where the physical scale of the components, whether the buildings or now abandoned parking lots surrounding them, reflects a history which is incredibly different from the present condition. But it is this juxtaposition of physical contrasts, scale, and ever-present elements of decay which highlight a very different and very complex past.

The proposed digital trace is not an attempt to replace or recreate these qualities of this site's industrial history or even to generate a history of this place. It is designed, rather, to identify a specific pattern of migration which was, and remains, an inseparable component of Buffalo's industrial waterfront. Through the Internet and other computer technologies, the digital trace and its associated data are intended to provide information regarding a place by creating a unique physical journey across space via the digital realm. Just as money, jobs, goods, and people migrated into, through, and out of Buffalo, so does the digital trace "migrate" through its own distinct mode.

The digital trace is a model for interpretation, representation, and designed migration. Visual, textual, and/or auditory elements may be added to the digital trace to create a designed digital landscape which is both a timeline and a multimedia history contained within an abstracted form, within an abstracted environment.

Joshua Price's proposal was developed in a Landscape Architecture Graduate Studio at Cornell University under the direction of Peter Trowbridge and Aditya Pal.




Digital traces: view in section grain reciepts.

# Reforesting Buffalo's Grain Elevator District

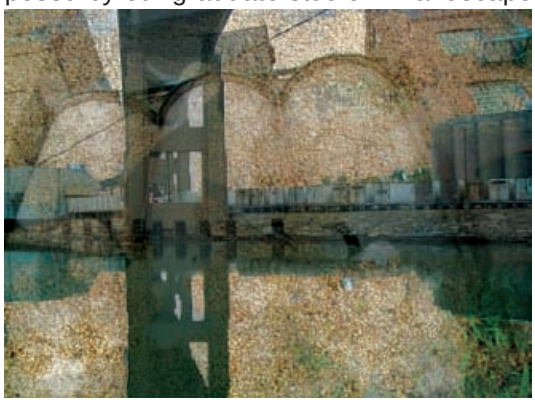
Houses of the Old First Ward Neighborhood, shadowed by grain elevators.

*Catherine Callahan*
*Cornell University*

# Reforesting the Grain Elevator District

Scores of abandoned grain elevators line the banks of the Buffalo River as it snakes its way through the edge of the city toward Lake Erie. Massive buildings of concrete and steel, the elevators stand as silent witnesses to stories of a once bustling industry and its accompanying canal system that connected the Midwest to New York City. Their slow decay provides a haunting backdrop for the empty streets and howling winds blowing off the lake.

What can the city of Buffalo do to revitalize this treasured but dilapidated industrial landscape? This was the principal question posed by our graduate studio in Landscape Architecture at Cornell University, led by Halprin Fellow Aditya Pal and Peter Trowbridge. Our task was to create a historical landscape interpretation for the area that takes into account its rich and unusual history.



Process Collage

## Site Issues and Strengths

The waterfront area has to grapple with issues of limited access, incompatible industrial land uses, and pollution, along with a depressed city economy resulting in a lack of demand for real estate. These issues make the site unsuitable for typical waterfront uses such as parks, residential development, and waterfront recreation that have revitalized other cities. The elevator district, although underutilized, is still a working industrial area, populated by large trucks and loud machinery. Cold winds blow off Lake Erie, rendering the entire district unpleasant in the winter. And much of the waterfront soil is polluted with toxic chemicals.

Nonetheless, the strengths of the district are intriguing. The elevators themselves are impressive constructions that speak of a time when was Buffalo was a prosperous, bustling city. It was the elevators that ushered in Buffalo's heyday, providing a means of storing grain in bulk from the


Elevators along the Buffalo River. The Great Northern is on the right.

Midwest until it could be transferred to New York City and other Northeastern destinations via the Erie Canal.

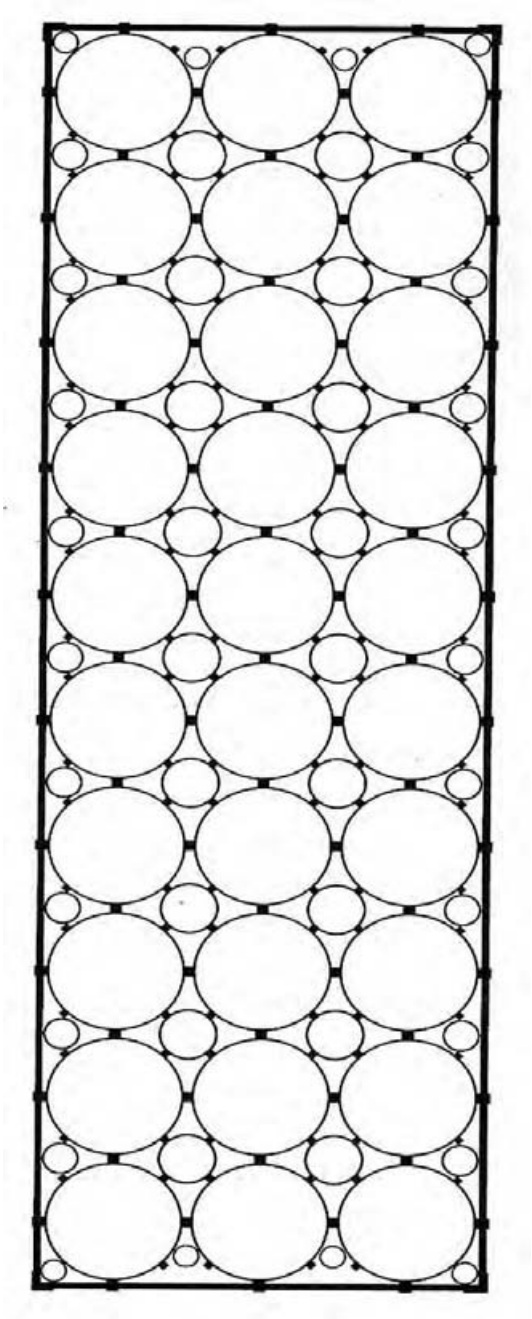
Today the small urban canals that once served the area are filled in and paved over. The New York State Thruway runs above what was once the Erie Canal. The Ohio Street Basin, once a turning basin for large boats, is now a neighborhood park. Along the southeastern edge, the site is bordered by the Old First Ward district. This working class Irish Catholic neighborhood housed the "scoopers" who manned the elevators. Their descendents still occupy the tiny well-kept houses that sit in the elevator's looming shadows. Visitors who know the history can find traces and remnants of the story, but almost no interpretive signage exists.

## Form Follows Function

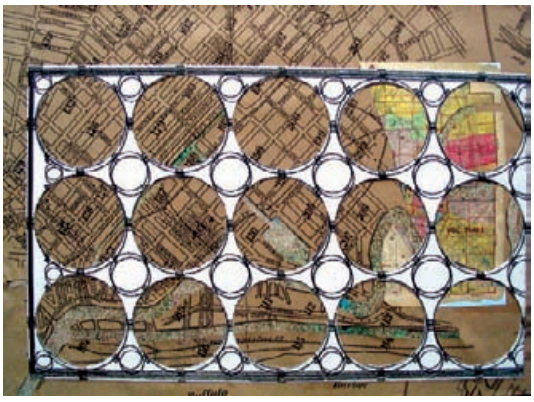
The early European modernist architects such as Walter Gropius and Le Corbusier recognized the stark beauty of Buffalo's grain elevators. They were drawn to the elevators as the embodiment of the "form follows function" ideal, which was a driving tenet of the modernist movement. "Form follows function" held that the aesthetics of a design should be derived from its function. As models of American efficiency, ingenuity, and industrialization, the elevators' design was driven solely by the function of storing grain. The buildings consist of rows of huge cylindrical bins devoid of pretense, decoration, or ornamentation. These bins can be seen today in the exterior shapes of the buildings, and it is these cylindrical forms that are a defining element in the district's landscape.

## A New Function

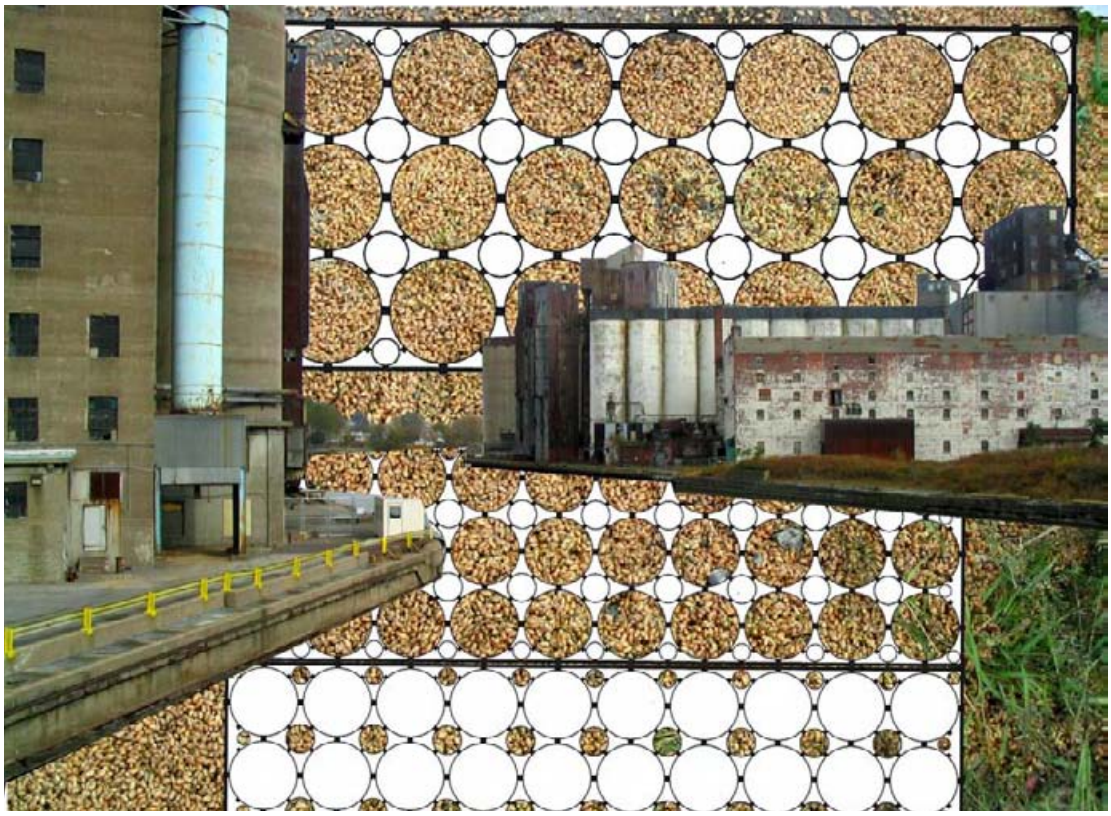
This design proposes a new interpretation for the "form follows function" ideal by revealing the form behind the function. This is done by placing the floor plan of one of the elevators, the Great Northern, over the landscape. By bringing the floor plan out into the landscape, the spatial form behind the function is revealed. But there is a twist here as the form loses its original function or, alternatively, gains a new function. By playing with modernist ideals, we can bring



Great Northern, Floor Plan
(Source: Keplinger 1996)



Process Collage



Process Collage

the essential forms of the elevators into the landscape where they will relate visually to the existing forms.

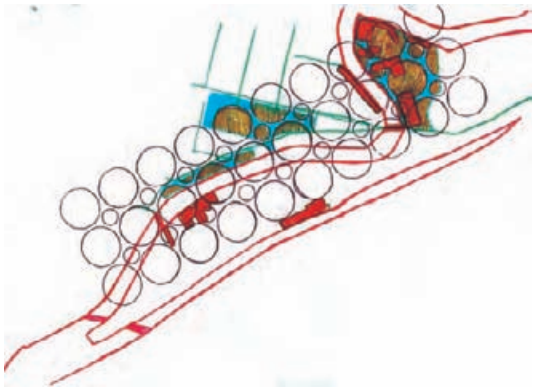
The floor plan of the Great Northern Elevator was chosen as an archetype. Built in 1899, composed of steel and brick, the Great Northern was an engineering advance in its day. Its form was adapted into concrete and used in grain elevators around the world. As such, the cylindrical form of the bins has become a kind of archetype of the grain elevator.

When the floor plan is laid over the site, new relationships become visible, inscribed within circular boundaries.

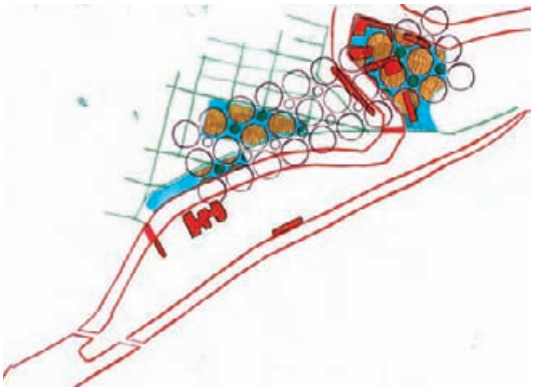
Clusters of existing elevators relate to sections of the Old First Ward neighborhood. The neighborhood relates to the park, the park to traces of historic canals, and the river to the elevators and neighborhoods. Whatever new function these superimposed forms assume, they will create a visual dialogue with the tall forms of the elevators.

## The Final Design

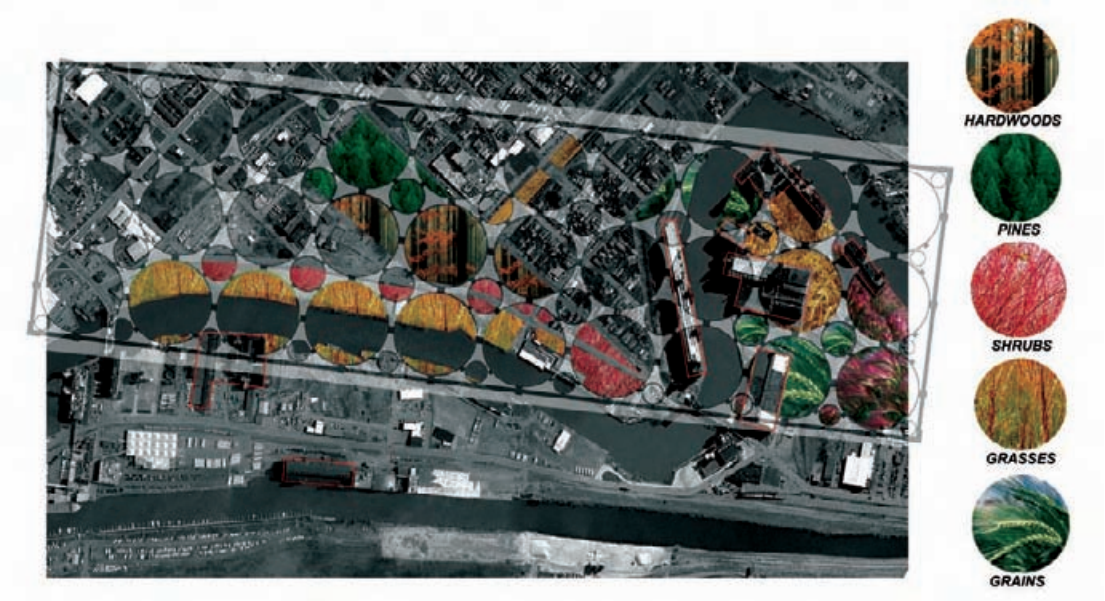
Through a reforestation model, the final design reappropriates the function of the floor plan from that of housing grain to housing plants. The process of revegetation



Process Sketch



Process Sketch

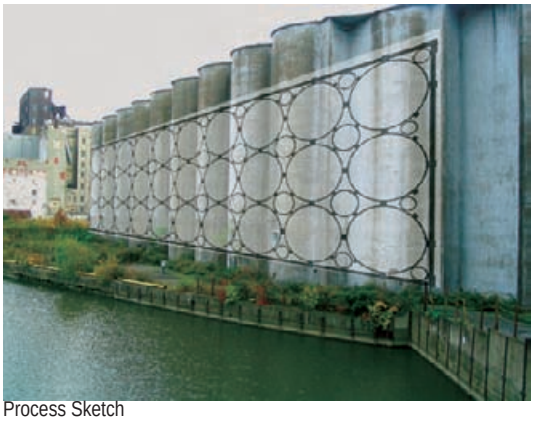



The Final Design

follows a successional mode where annuals (in this case grains) are followed by meadow grasses, which are followed by shrubs, then pines and finally hardwoods. The reforestation proposal has several social and environmental advantages. It provides green space for the residents of the neighborhood and for visitors to the site and a habitat for birds, insects, butterflies, and other wildlife, it filters runoff from area hardscape, and finally, the plants provide a level of phytoremediation in removing toxic elements from the soil.

By inscribing the area in circles, the design connects the grain elevators with the Ohio Street Basin (now a community park) and to the residential neighborhood of the First Ward. Where possible, the connecting spacers between the bins become paving and overhead structures. Other site-specific installations create a dialogue with the grain elevators and their history including the transportation of the area. For example, huge letters, such as are on the sides of the elevators, would be crafted out of steel and placed along the old canals.

The grain elevators themselves remain as an integral part of the design. As a visual witness to the history of Buffalo's heyday, the elevators continue to decay, providing a monolithic backdrop in the new landscape.



Process Sketch


Process Sketch

Catherine Callahan's proposal was developed in a Landscape Architecture Graduate Studio at Cornell University under the direction of Peter Trowbridge and Aditya Pal.

# Vertical Architecture: The Connecting Terminal

Connecting Terminal
(Courtesy of Mauro Cringoli)

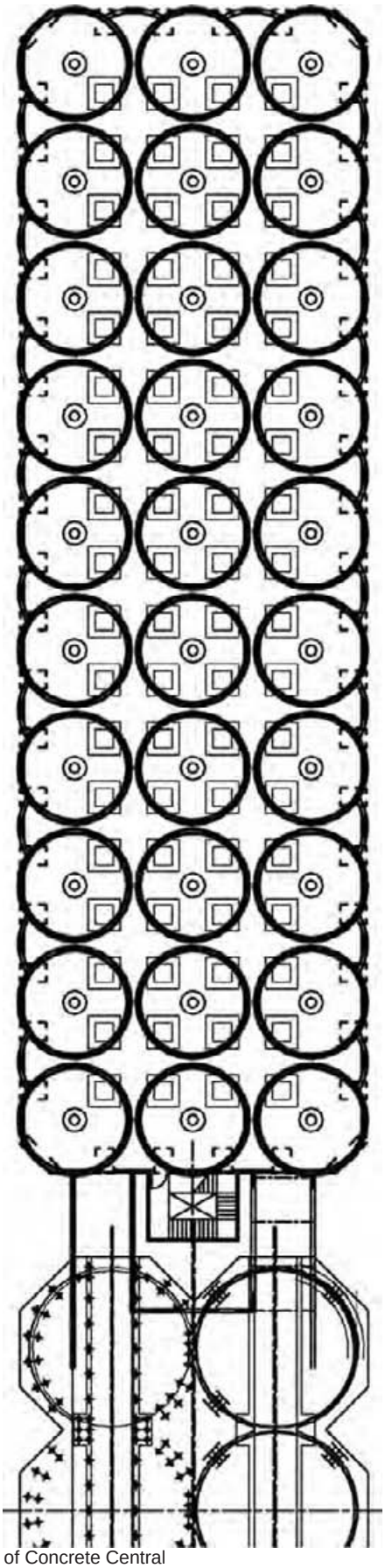
*Mauro T. Cringoli*
*Rhona Vogt*
*University at Buffalo, SUNY*

# Vertical Architecture: The Connecting Terminal

During the Fall 2002 semester, a graduate architecture studio of the University at Buffalo, School of Architecture was organized by Associate Professor Frank Fantuazzi. The studio was named "Farewell Horizontal" after the title of a science-fiction novel by K.W. Jeter, in which he describes a society that lives within a colossal cylinder. The primary focus of the studio, like the novel, was to explore vertical space in relation to the human body.

The studio explored methods and issues stemming from the potential adaptive reuse of grain elevators: the material, structural, and spatial possibilities that re-inhabiting the elevators provides. The Connecting Terminal, located on 100 Furhmann Boulevard, became the specific grain elevator used by the studio. The Connecting Terminal was recorded and documented on site, as this data was vital to the student design processes. The studio was to develop a housing scheme, the provisional program type. The proposals were to provide considerable flexibility in accommodating numerous rehab approaches. Each student selected the specific number and type of units to be included in their projects as their decisions were to be consistent with their design and organizational strategies.

Many different types of projects came out of the studio. Every student focused on a different concept of the mammoth concrete cylinders. Gordon Matta-Clark was evoked in one project, while another focused on transformable living spaces. This article presents only two of the projects, yet clearly indicates the range of what the students produced.



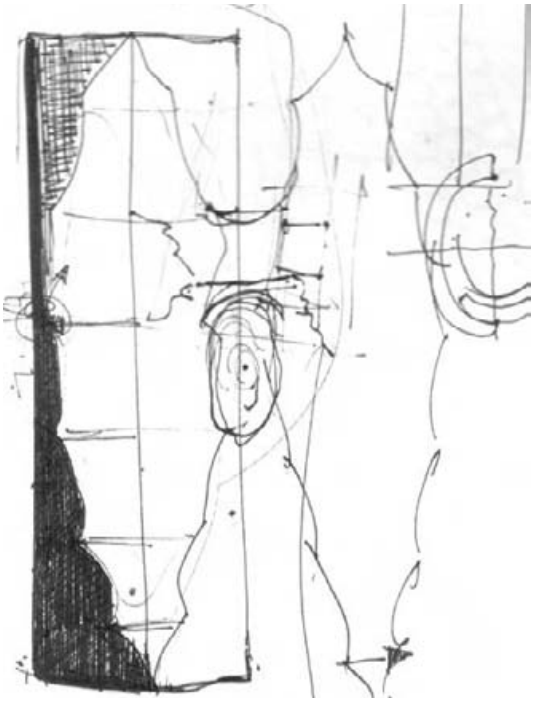
Plan of Concrete Central
(Source: City of Buffalo)

## Project One

Rhona Vogt

This project began with the idea of an endo- and exo-skeleton. New rebar would wrap around the forms of the elevators, creating web of structure. Once this skeleton is in place, new additions can be inserted into it. These additions would bear their weight on the framework rather than that of the original structure. In this case, the original structure can be removed by each individual tenant according to their desires.

Inserted into the cylinders are fabric tent structures. They would be designed to fit the user's needs. The tent skin would attach



to the elevator at the skeletal formwork in the form of tension cables. Since the formwork covers the elevator, there are endless possibilities of connections between the two. This arrangement also gives the user/tenant an endless range of possibilities for rearrangement of their space. Fenestration and entrances would connect to the skeletal formwork and the fabric structure would stretch to meet them.

Once the fabric structures are inserted, the tenants can remove the original concrete of the structure to let light into their space as they please. This in turn would create a constantly evolving form that would be the result of the elevator's inhabitants.

## Project Two

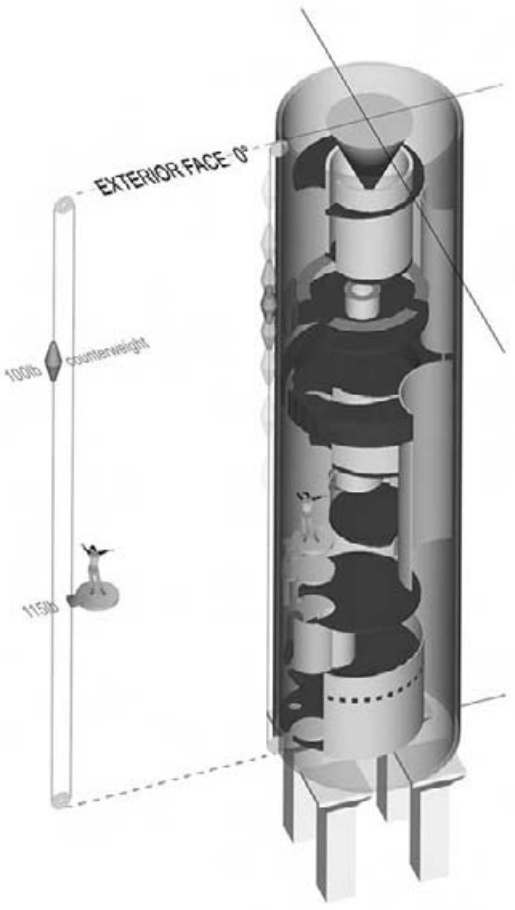
Mauro Cringoli

Because of the grain elevator's repetitive plan, architecture can be developed within the parameters of a single hollow cylinder. This scheme stresses the relationship of machine-like functions to the elevator.

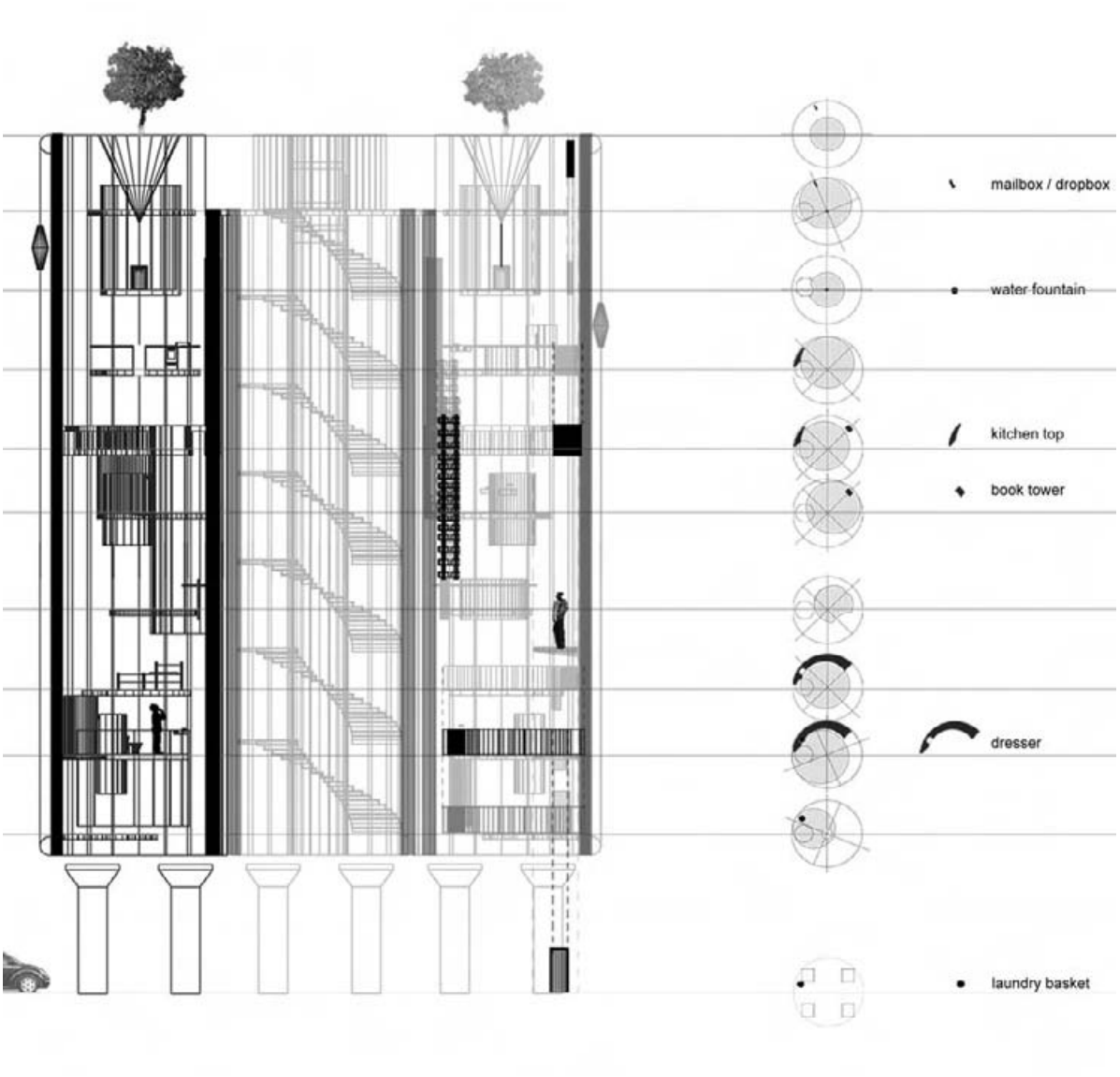
Form and time were equally important factors during slip-form construction, as concrete setting time was vital. The cylindrical form provided the maximum compressive strength to hold grain. The towering height of the elevators also allowed ease of mobility and proximity for the elevator's marine leg as grain was lifted into and stored within each bin. Each cylinder too, allowed workers to monitor and record the quality and life of stored grain at various times of the year.

Architecture proposals were formulated based on human scale and human timing. This was achieved by standardizing the average day or schedule of an inhabitant within their dwelling. For example, the approximate time for brushing teeth is three minutes. This measurement, along with all other necessary tasks throughout a typical day at home, can provide sequence in time, which can be expressed into a spatial order. The spatial arrangement is organized by sequences into individual floors within different levels for consuming, entertaining, cleansing, meditating, and sleeping.

The user engages the dwelling space by inserting themselves from the top of the elevator and proceeding down on a circular five foot diameter elevator through each sequenced level.




This work was prepared in an Architectural Graduate Studio at the University of Buffalo, SUNY under the direction of Frank Fantauzzi.



# A Proposal for Concrete Central

Concrete Central Elevator
(Photo by Ivonne Jaeger)

*Ivonne Jaeger, Architect*
*Halle (Salle), Germany*

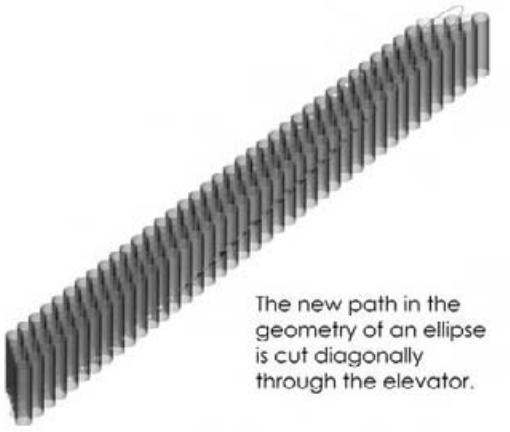
# A Proposal for Concrete Central

*Waste lands are the inverse face of urbanization, the abandoned areas, the unfulfilled obligation of the city, its negative.*
Jacques De Courson

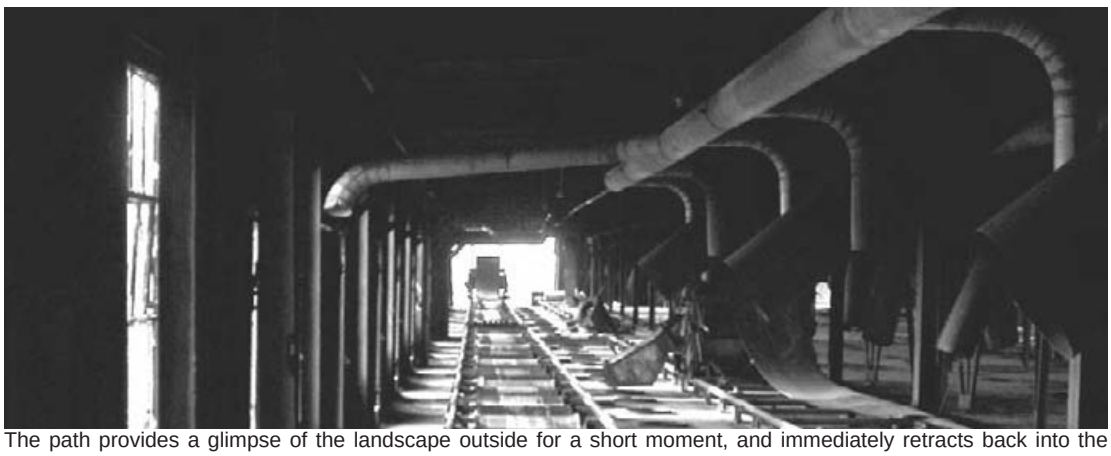
*The buildings [Buffalo's grain elevators] are like individuals with their own history . . . and passing time shapes their personality, like it does with us humans.*
Gerrit Engel

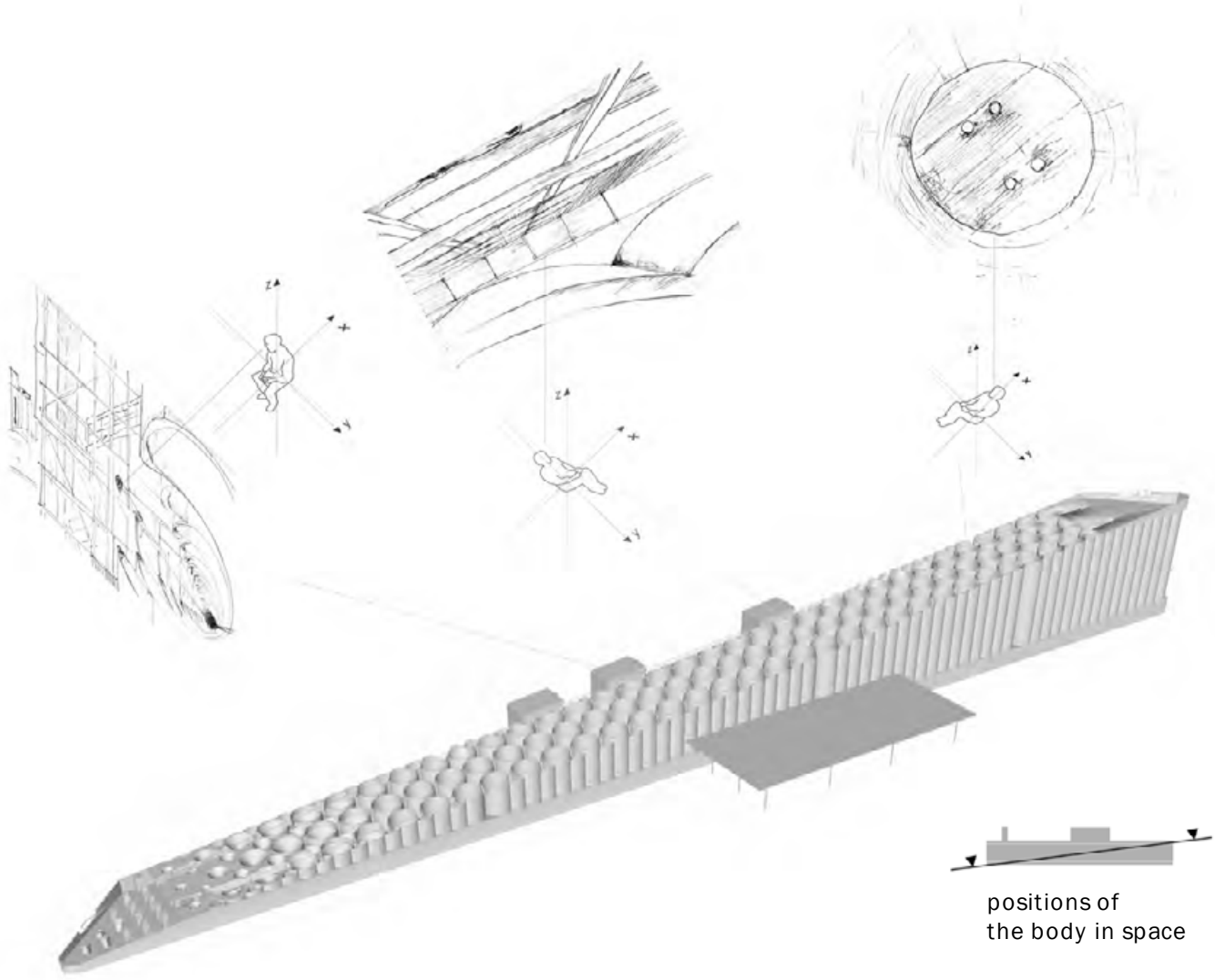
Industrial production in the last century created large volumes of goods for storage and manufacturing that required the unique collection of Buffalo's grain elevators. The elevators also demonstrate that if the economic conditions change, and manufacturing declines, the industrial landscape that remains is seen as useless. Without reuse and investment, solutions for these areas are often seen solely in terms of demolition and new construction. Often, demolition reserves the land without a specific plan; communities create such areas for new investments, though for years no users are found.

Buffalo has a huge potential to lure tourists with its cultural and industrial heritage. Fifteen of Buffalo's large grain elevators remain. Furthermore, the Buffalo/Niagara region, which includes Niagara Falls, attracts approximately twelve million tourists per year. However, just a few of those tourists spend their time in Buffalo itself, and even fewer visit the industrial heritage along the Buffalo River and Lake Erie. The Buffalo River is quiet. Most of the silos, the symbols of Buffalo's industrial history, are completely cut off from their industrial life line. They are dilapidated, and parts have been torn down. The buildings stand neglected, with broken windows and graffiti, and most of them are full of junk. They appear, as Reyner Braham already wrote in 1986, "like an avenue of mighty tombs."[1]

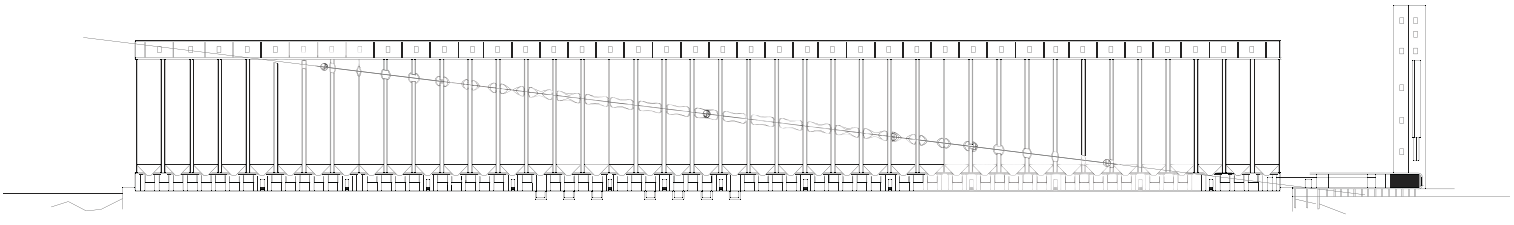



One notable abandoned grain elevator, the largest elevator built on the Buffalo River, is the Concrete Central Elevator. The building, abandoned since 1966, is a museum of silence. It has the particular hollow acoustics and the smell of abandoned buildings built of concrete and steel. The steel skeletons of the marine towers are rusty and peel like a leprous skin. Wall panels of the towers fall apart and reveal the inside of the towers. It gives the impression that the resistance of the building is weakening.

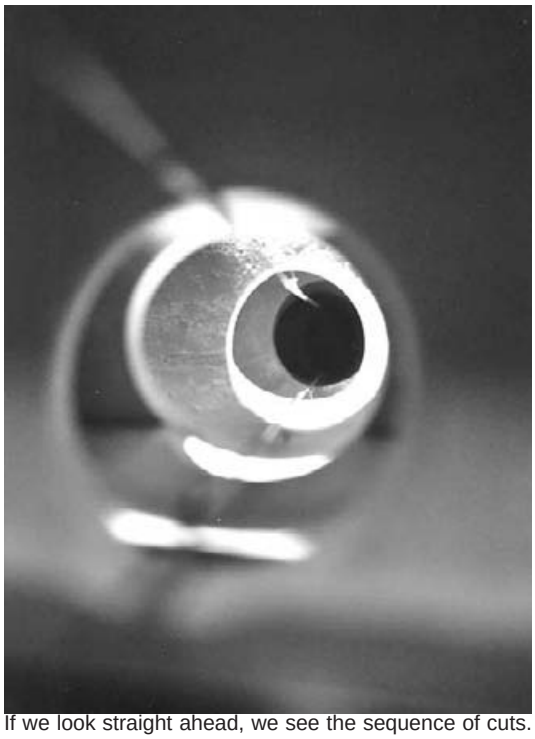

The path provides a glimpse of the landscape outside for a short moment, and immediately retracts back into the darkness of the bin.



positions of
the body in space



section



If we look straight ahead, we see the sequence of cuts. In some locations, the path intersects the outside walls, so that light slices through the darkness of the bins.

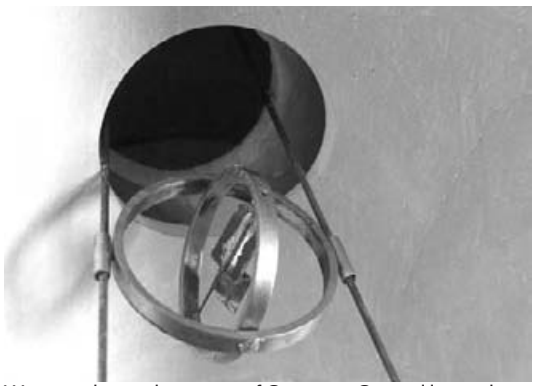
The new program for Concrete Central, I suggest, would transform the elevator into a vibrant place. If citizens and tourists are given a reason to come to the site and experience the elevator, the building would again be filled with movement instead of stillness and emptiness. The project would also keep what is interesting about the elevator: the existing, fascinating character of industrial ruins, their history, and the traces of their past.

Architecture should offer very special spatial experiences that speak to our whole sensory realm. Today's architecture relies heavily only on the visual sense, as Juhani Pallasmaa emphasizes: "[T]he Modernist design has housed the intellect and the eye, but it has left the body and the other senses as well as our memories and dreams homeless."[2] Karen A. Franck and R. Bianca Lepori affirm that "[w]e are distanced both from the past experience and from present sources of sensation."[3] My proposal brings the user close to the life that the building sustains and attempts to awake bodily experiences.

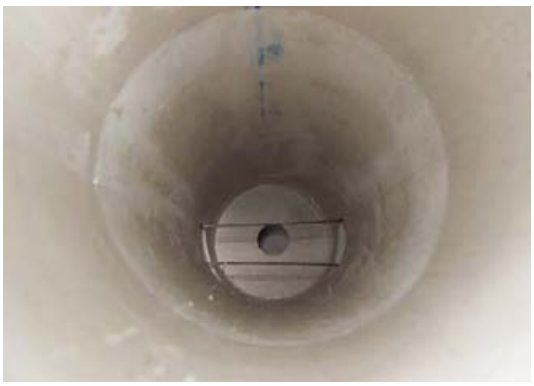
*"We understand our surroundings if we interact with them."*
Franck and Lepori[4]

To understand the elevator, I cut a new path through the building using the geometry of an ellipse that intersects the different physical conditions in the elevator. The ellipse shows various sectional moments in the silos, reveals the inside and the outside, and shows all the different parts of the building including the basement, the bins, the top of the elevator, and the marine towers.

My design aims at images belonging to the industry of grain transshippment and thus to the site: track systems and movement. People experience the space in a moving sphere on a newly installed track system. The sphere designed for one single person can be reoriented. Our relationship to all the cells in the building is structured by the position and the location of our bodies. Depending on the location of the sphere in the building, it turns upwards or downwards, to the left or to the right,



We experience the space of Concrete Central in a sphere that can be reoriented.



Our gaze unconsciously projects the body onto the walls, we recognize the immense size of the void. Imagine the body being turned into the horizontal position in such a bin: we would experience the entire length of the bin.

forwards or backwards. This reorienting of the body calls our attention to special situations and views in the elevator.

The design also recognized the realm of hearing. Being inside the bins, one hears the long sound of an echo. The sound puts one in direct interaction with the physical space. The ear experiences the impact of the cylindrical form and the material of the bins, or, to use Pallasmaa's words, "We stroke the boundaries of the space with our ears."[5]

This work is adapted from Ivonne Jaeger's Masters Thesis at the Department of Architecture, University at Buffalo, SUNY. Mehrdad Hadighi and Frank Fantauzzi served as her Thesis Advisors.

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[1] Banham, Reyner (1986). *A Concrete Atlantis: U.S. Industrial Buildings and European Modern Architecture 1900 - 1925.* Cambridge, MA: The MIT Press, 20.

[2] Pallasmaa, Juhani (1996). *The Eyes of the Skin: Architecture and the Senses.* London: Academy Edition, 10.

[3] Franck, Karen A. and Leponi, R. Bianca (2000) *Architecture Inside Out*. London: Wiley - Academy, 16.

[4] Franck and Leponi, 19.

[5] Pallasmaa 1996 (note 2), 20.

# Childs Street Music Center

(Drawing by Takushi Yoshida)

*Takushi Yoshida*
*Columbia University*

# Childs Street Music Center

## Machine Aesthetic of Buffalo's Grain Elevators

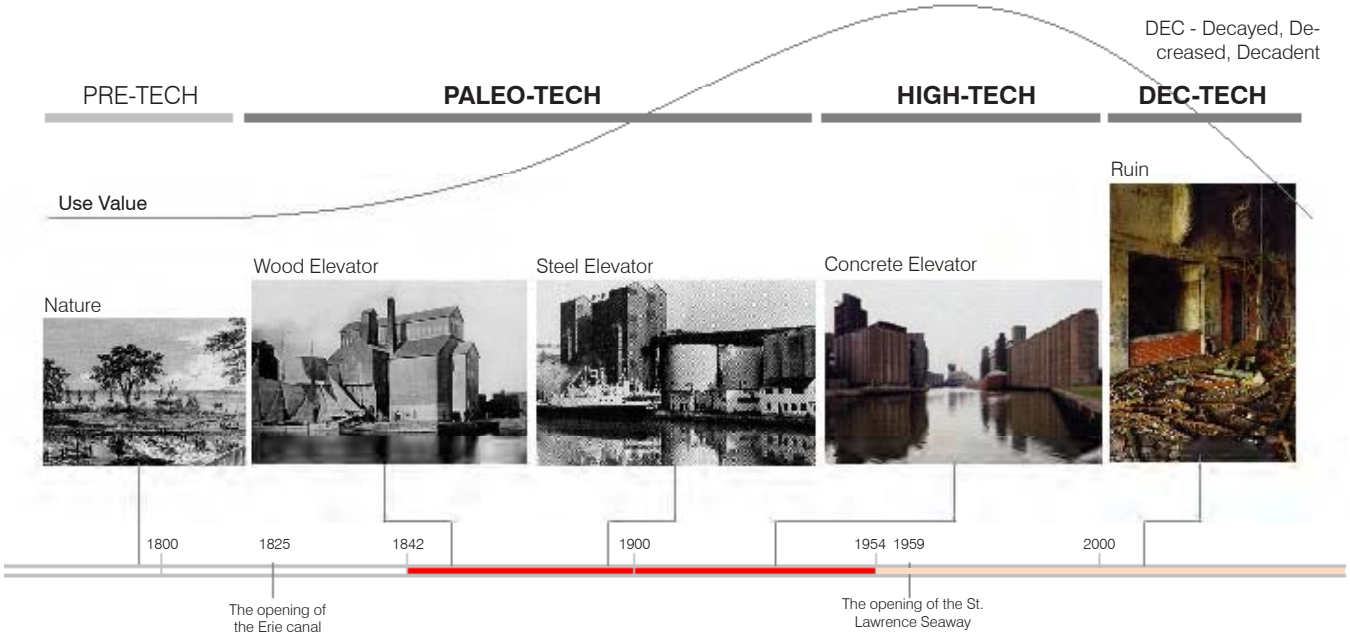
The Buffalo grain elevators are typical examples of abandoned industrial buildings. These are the buildings of "The First Machine Age," and their aesthetics had a large influence on modern architects. It is important to interpret these industrial buildings deeply, first as products of the machine age and second as contemporary monuments whose value will be lost if they are torn down.

I have focused on the aesthetic meanings of the elevators as machines. The grain elevator was invented to handle and store grain in an efficient way; it is a "machine" for grain trading. When we see the grain elevators historically, we can find that they have created distinctive machine aesthetics. These distinctions can be separated into the following phases: Paleo-tech, High tech, and Dec-tech (Decayed, Decreased, and Decadent).

When the grain elevator was invented, it created a new configuration in response to its functions and the new configuration led to a new form. Buffalo's grain elevators in the Paleo-tech period created unprecedented building forms of wood and steel that performed the tasks of elevating, weighing, distributing, and storing. High-tech is the main phase of any machine and in this phase, the building technology dramatically developed in response to increasing demand. As a result, a machine takes on more sophisticated configurations and forms, reflected in the abstract and precise forms of concrete cylinders based on mathematical calculations of the grain elevators. This new aesthetic was powerful, elegant, and musical.

Dec-tech is the final phase of the evolution of a machine. When newer and more efficient machines or processes are created, an old machine is abandoned. Gleaming metal turns to rust, glass shatters, and concrete becomes overgrown with weeds. These signs imply death, impersonality, and as a result, a fear of the machine. The aesthetic experience of death and decay is the reverse aesthetic of life and order.

Dec-tech is an inevitable and very important phase of a machine because it tells us about not only the high time of machines but also their negative side. In rethinking and reusing machines at this stage, it is important to keep and reveal the aesthetics of Dec-tech.



## Project: A Music Center

Considering the size of the buildings, it is more appropriate to accommodate a program that requires large spaces rather than an assembly of many small rooms. The program should also be public, considering the historical and cultural significance of the elevators. I propose converting the complex on Childs Street into a music center. Not all of the buildings on the site are to be filled with new program. Some parts of the buildings are left so that visitors can see and walk through these spaces and learn how grain elevators worked.

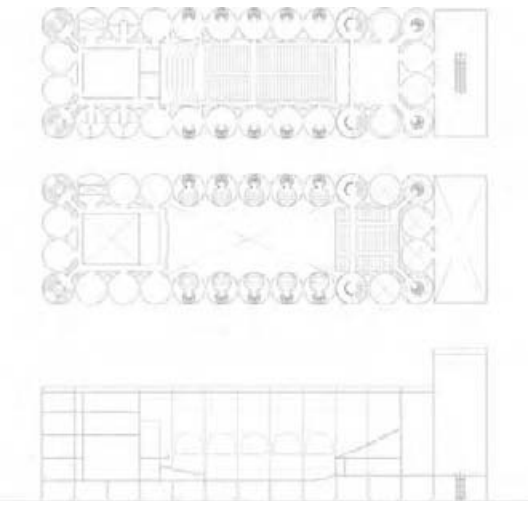
The Music Center consists of a performance theater, a concert hall, a music academy, a museum of musical instruments, and a recording studio. This new Music Center takes advantage of the form of the grain elevator.

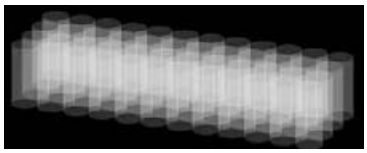
In order to preserve the machine aesthetics of Dec-tech, I have kept the current decayed exterior of grain elevators as intact as possible, including rust on steel and dirt and moss on concrete surfaces. At the same time, I maintained the layer of nature that has already appeared on the site.

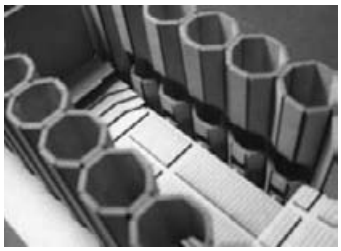
Visitors take moving walks to approach the center of the site and the elevators. The circulation is an interpretation of the mechanism of grain shipping and the enclosed moving walks are designed as curved lines to follow the train tracks. At night, the grain elevators are lighted to emphasize the primary forms of tubes and boxes.

## Design Strategies

I used three strategies to intervene into the existing structures: infilling, imposing, and opening. “Infilling” uses the existing structure as it is, such as a concrete bin’s wall as a wall of the new use. “Imposing” is the method of inserting a new structure inside of the existing structure, independent of, yet enclosed by, the existing structure. As for “opening,” the concrete bins are cut thinly in order to preserve the aesthetics and minimize structural interruption.







## The Peavey Company Elevator

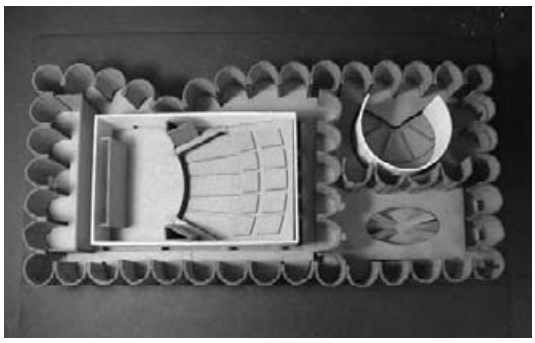
The Peavey Company Elevator consists of twelve by four bins in parallel rows. The diameter of a tube is twenty-four feet and ten inches, and the height is eighty-nine feet and eight inches.

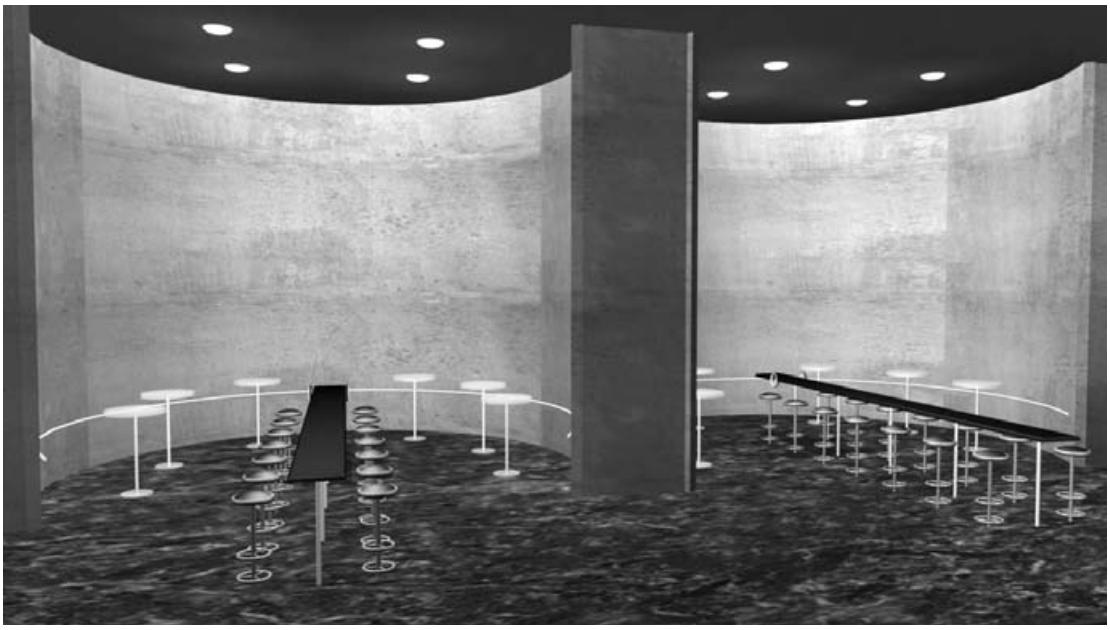
I converted the Peavy Company Elevator into a concert hall for 1,800 people. To accommodate the space, the internal twenty tubes have been removed. In order to make most of this narrow form, the shoe box type traditional audience format like Grosser Musikvereinssaal in Vienna has been adopted, and the outer bins are used for balcony seats.

The new floor is detached from the concrete bins so that visitors can see the whole bins from top to bottom. Below the new floor the old bins exist, visible through the glass used in parts of the main floor. On the ground level, there are existing machineries such as conveyers. The newly installed transparent elevator in the main lobby takes people up to the roof level of ninety feet to enjoy the view of the city.

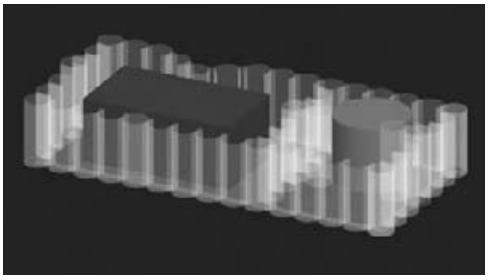
## Electric Elevator Annex

The Electric Elevator annex is a very unusual elevator. It seems to have seven rows of fifteen bins, but inside it is hollow and not filled with concrete tubes. Instead, it is divided into six large rooms. One-third of a tube section is open vertically except the ones in the center row. The diameter of a tube is thirty feet and the height is ninety feet.





I converted the Electric into a performance theater. The adaptive reuse includes one large theater for 2,400 people and one small one for 600 people. In order to accommodate the new structures, some of the concrete tubes inside were removed. Visitors enter on the ground level and take escalators up to the main lobby. This routine mimics the way grain was elevated for shipping.

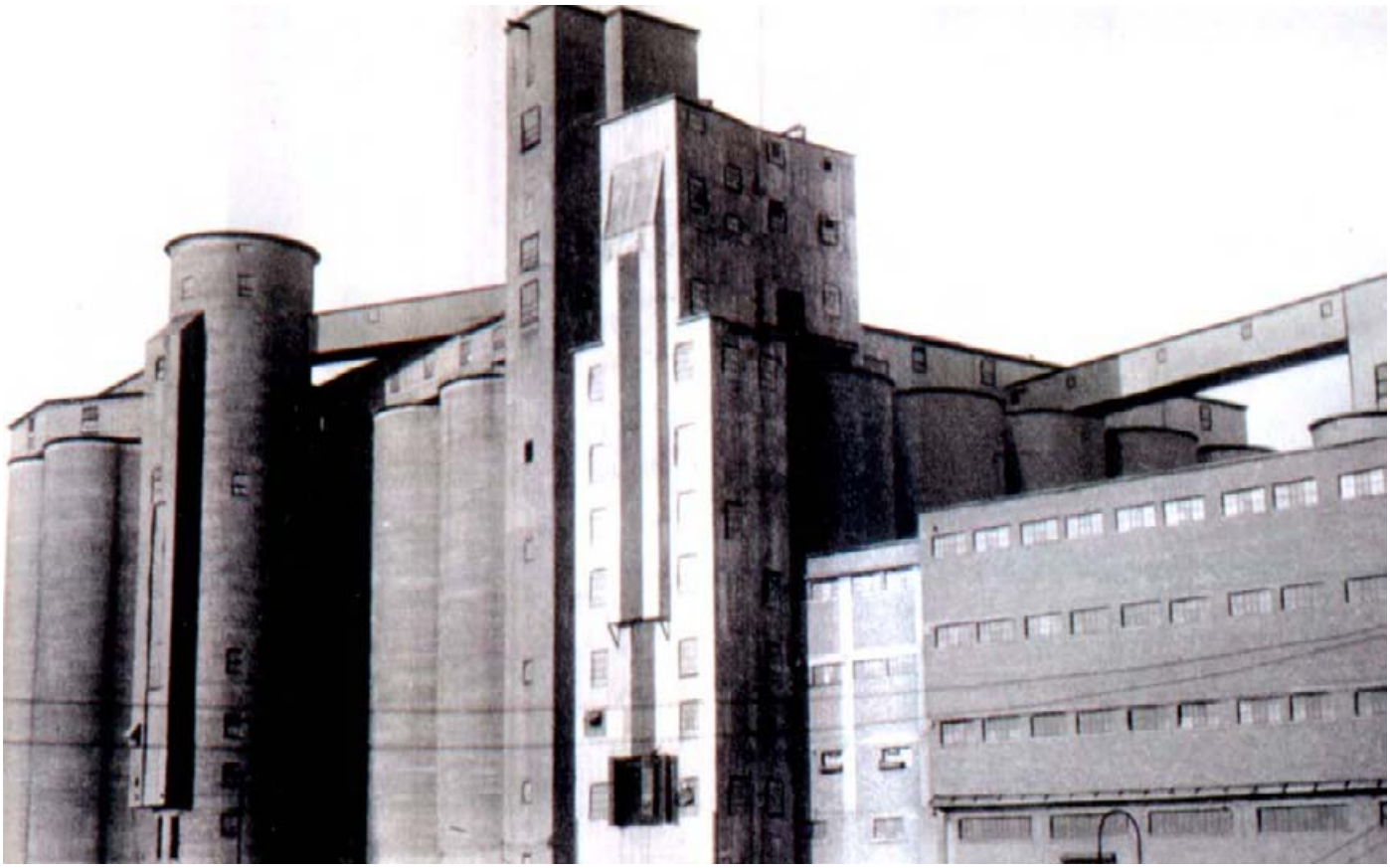


For the Electric, I have adapted the strategy of “imposing.” The large theater has a box form with double balcony. The small theater has a wide tube form and an arena style seating.

The theater consists of three structural systems: concrete bin, theaters, and interstitial floors. They are structurally independent and the connections are made by bridges. The bridge is of steel grating so that people can recognize that they are walking through one system to another. Between the existing walls and the new structures there is a gap to differentiate the new forms from the original building.

This work is adapted from Takushi Yoshida’s Masters Thesis in Historic Preservation at Columbia University. Professor Bentel served as his Thesis Advisor.

# Silo Dreams:
## The Grain Elevator and Modern Architecture



Washburn-Crosby Silo in Buffalo, NY.
(Courtesy of Buffalo and Erie County Public Library)

*Hadas Steiner*
*School of Architecture and Planning*
*University at Buffalo, SUNY*

# Silo Dreams

The ability to hoard was at the heart of the Neolithic economy that gave birth to the earliest known cities, and that capacity continued to fuel urban development until the threshold of the twentieth century.[1] Agricultural abundance, however, relied on the efficiency and capacity of a system devised to preserve surplus, and much effort was invested over time in the improvement of storage. By the era of the imposing cylinders that would transform the destiny of Buffalo, New York, the technology introduced by the ceramic jar had increased manifold in scale. A peculiarly American socioeconomic process, from the vast dimensions of agricultural big business to the individual tales of immigrant laborers, crystallized in the form of a vertical architectural machine designed to draw bulk grain from arriving lake vessels and spout it to departing canal barges, as well as store and protect it from rodents, damp, and combustion.[2] Now more or less devoid of their function as part of such a network, the colossal, often empty bins retain the symbolic essence of an urbanism built on commodity exchange.

The grain elevators clustered along the inner and outer harbors of the Buffalo River and Lake Erie are the culmination of more than a century of experimentation which began with the first elevator built in Buffalo in 1842.[3] With more and more vessels arriving in the newly dredged Buffalo harbor after the opening of the Erie Canal, invention was applied to the process of loading and unloading grain by local entrepreneur Joseph Dart, and his engineer, Robert Dunbar. The distinctive feature of the large shed by Dart and Dunbar was not its wooden container which had the contours of a large barn, but a vertical system that combined the extant mechanisms of the bucket conveyor, steam engine, and rope-and-pulley power train to replace the time-consuming job of stevedores. The system was so expedient, reducing what had been a week of labor to a matter of hours, that subsequent storage facilities followed the Dart model. Ultimately, though, fires in the bins, whether started by the self-combustion that occurs when grain is stocked in confined conditions or the airborne cinders from nearby locomotives, made experiments in the 1890s with steel, ceramic tile, and, later, concrete, more economical than the continuous cycle of rebuilding. During this period of experimentation, the physical properties of stored grain were studied, and tall cylinders were adopted as the standard form for the bins. In the end, the advantages of concrete meant that by the second decade of the twentieth century, the material came to be used for most large

American Elevator as seen in Mendelsohn's 1926 *Amerika*.

elevators, as is the case with most which remain on the Buffalo waterfront.

Another story, this time one beyond the confines of the grain business, begins where the generation of form by social and economic forces ends. In the 1910s and 1920s, photographs of grain elevators circulated in European architectural publications dedicated to modern architecture, prominent Buffalo examples included. That the functional dictates of grain storage could produce the uncontrived beauty of the platonic cylinder was taken as proof of modernist values. Such industrial buildings, it followed, were at least as modern as any contemporary architecture with masterly authors, such as Louis Sullivan or Frank Lloyd Wright. On the authority of these images, avant-garde European architects began to design non-industrial buildings that resembled an American industrial type that they had never physically experienced. Thus images of grain elevators influenced the way that Europeans thought about the general state of American architecture, as well as the developing aesthetic of modernism and the discussion over the future course of the discipline.

As Reyner Banham observed in his book *A Concrete Atlantis: U.S. Industrial Building and European Modern Architecture* (1986), despite the avid interest of the modernists in functional structures, the influence of grain elevators on the development of a non-industrial architectural aesthetic had not been critically considered. Banham, an influential British architectural critic, was struck by this gap in the historical narrative when he came to teach in Buffalo at the State University of New York from 1976 to 1980.[4] Banham had trained with one of the eminent historians of classic modernism, Nikolaus Pevsner, and had already built an iconoclastic reputation through the controversial study of the forgotten roots of modernist technological ideology.[5] The experience of Buffalo's industrial legacy was a notable one for Banham, and he forcibly argued a case for the crucial aesthetic role that these utilitarian structures had played beyond their regional function.

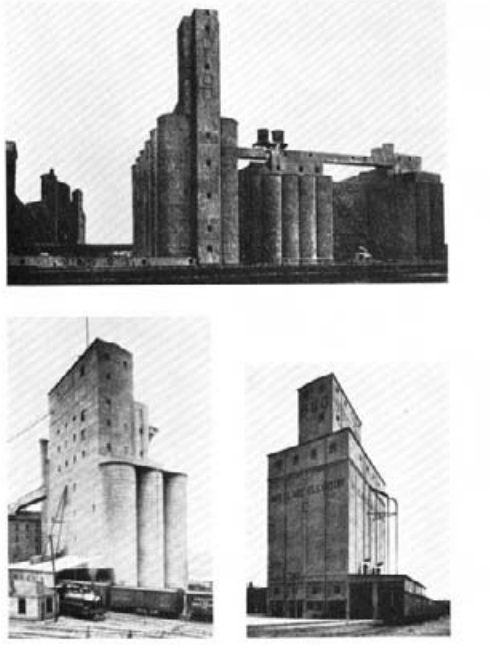
*A Concrete Atlantis* made the claim that the quintessence of European modernism was rooted in two types of American industrial buildings, the daylight factory and the grain elevator, and that the "dialectical confrontation between sculptural forms and gridded space," which defined the influential style of Le Corbusier, derived from "the closed forms of American industrial storage containers and of the openly gridded loft space of regular American factories."[6] Usually the work of Auguste Perret is cited as the earliest architectural application of reinforced concrete and, in fact, many of the techniques and patents used in the American structures that the modernist would admire came from Europe. But the early European examples are miles from the aesthetic of the silo: only after WWII does such weighty rawness make an impact on European architecture in any measurable way.[7] Banham's conviction was that the use of reinforced concrete was more hardheaded when applied to economic conditions in the United States, rather than to formal considerations within the effete world of design. Thus Banham's discussion of the massive elevators as fundamental to the modernist imagination at the same time as the theory and practice of lightweight architecture was heading towards the transparency of steel and glass was, indeed, an ideological innovation.[8]

It has been said that Banham's text is not thorough or extensive enough to do the subject of the American industrial legacy justice.[9] Indeed, *A Concrete Atlantis* is not a history of industrial building in the United States, or even in Buffalo, nor its relationship to European modern architecture. The strength of the argument lies in revealing the richness of what others had disregarded as "tons of deserted, decaying concrete."[10] By the time the European modernists took note of the elevators and proclaimed them to be pioneering technology, they were, from an industrial point of view, on their way out. By the time Banham recalled international attention to the legacy of Buffalo's elevators, a number of the featured structures had already disappeared. Indeed, the text includes a lengthy plea for the protection of industrial buildings from the fate of Wright's nearby Larkin Building,

which had been demolished in 1950.

The evaluation of the grain elevator by European architects as a beautiful form was itself a transformation that accompanied the shift from wood, via steel and tile, to concrete. The British novelist Anthony Trollope had compared the early elevators with their lifting mechanisms unfavorably to elephants in the 1860s, as would his compatriot, Rudyard Kipling, in 1889. For Trollope, the structures were like dreadful monsters with "great hungering stomachs and huge unsatisfied maws" standing amongst the chaos of the docks.[11] Local people, if the press is any indication, agreed with their guest *literati* that the elevators were "indescribably ugly structures" with "naught all regard for architectural ethics and producing the most horrible extreme to 'a thing of beauty and joy forever'" -- in short, as the byline claimed: "Examples of hideousness in Architecture." There is still public sentiment that the elevators are not only unsightly but, now empty, pose a threat to health and the economic development of the desolate Buffalo waterfront.

The awe generated by firsthand observation in the latter half of the nineteenth century contrasts with the photographic encounter that inspired architects in the early twentieth century. The avant-garde had the romantic



Washburn-Crosby Elevator in three different cities.
(Source: Banham 1986, 209)

notion that America was a place where modernity was already a reality. Unfettered by the historicist considerations of style and other corruptions of Old World civilization, the American engineer produced solutions that derived their aesthetics from the pure application of mathematics to need. Structural inevitability was to modernism what the "State of Nature" had been to the Enlightenment philosopher: the equivalent of a vernacular for industrial times. Such belief in the purity of engineering supposed that twentieth century grain storage facilities did not draw on historical precedent, for industrial architecture, thus modern architecture, was not supposed to have antecedents but to spring fully from the present demands of function, material, and construction. That, in sum, is what the slogan "form follows function" entails.

By now it is common knowledge that Modernism (not to mention the logistics of grain storage) drew inspiration from what came before.[13] If rationalism had been sufficient to generate form, why would it be that, as Banham asks, "a design school could look like a factory, or an apartment block in Paris could resemble an automobile plant in the Detroit suburbs?"[14] Poring over the paradigmatic monuments of the great architects alone will not suffice to explain such contradictions. Without knowing about the development of the daylight factory, for example, one would be at a loss to understand why the Fagus Shoe Factory by Walter Gropius would be touted as the first truly modern work of architecture. Resemblance to industrial buildings, to silos or factories, was an available iconography for the promise of functional honesty, structural economy, and, above all, up-to-the-minute structural engineering. Utopian, in the old-fashioned sense of remote in place but not in time from the European experience, America was, literally and figuratively, "a concrete Atlantis."

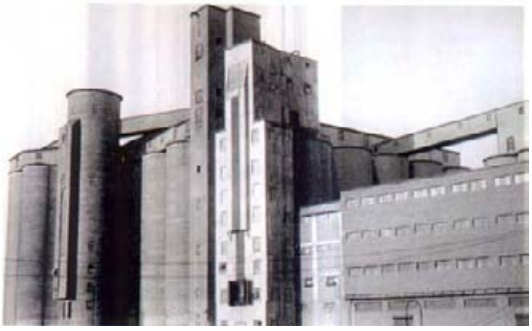
Banham's interest in American industrial buildings may have come into focus during his time in Buffalo, but he, like the modernists before him, had first seen the grain elevators as hazy images. Reproduced alongside seminal texts of architectural modernism, the photographic

subjects were intended as an iconography of pure geometry and clear construction. The association of elevators with pure form appears to have entered modernist consciousness via Wilhelm Worringer's comparison of contemporary silos to the monuments of ancient Egyptians in his celebrated text, *Abstraction and Empathy* (1908). In addition to the fact that the concrete silos bore an uncanny likeness to the massive columns of New Kingdom temples, ancient Egypt was associated with the history of grain storage through the biblical story of Joseph stockpiling grain for the seven years of famine, as well as the myth that the pyramids functioned as silos.

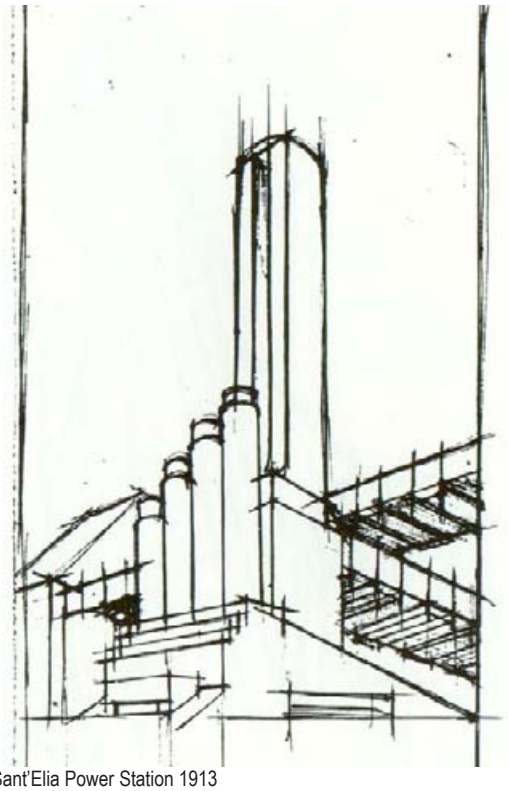
Struck by the resemblance, Walter Gropius likened American industrial buildings to architecture where symbol and structure are unified as they are in the pyramids in his classic *Jahrbuch des Deutschen Werkbundes* essay, "*Die Entwicklung moderner Industriebaukunst*" (1913). The layout of the article intensified the force of visual example by inserting seven pages of illustrations before the text. As such, images of grain elevators and factories, including the tile Washburn-Crosby complex (1903) and the steel Dakota Elevator (1901, demolished in 1966) of Buffalo, were what the reader first encountered. Gropius also included concrete examples, but these were located in Canada and South America. In 1913, Gropius' conclusion that America -- rather than Germany -- was the 'Industrial Motherland' would have come as a surprise the industrialists, artists, and architects to whom the manifesto was most immediately addressed.

Little tangible is known about how Gropius came to possess these relatively esoteric photographs. Nonetheless, because of the primacy placed on the imagery and the subsequent wide-ranging circulation of these uncommon images, the source continues to the subject of scholarly interest. Banham notes that the once current legend that Carl Benscheidt (for whom Gropius designed the Fagus Shoe Factory and offices) came back from America with a package of images from the Atlas Portland Cement Company is unlikely. Sigfried Giedion, according to Banham, reported that Gropius spent more than a year soliciting these pictures from sources in America and Canada.[15] Many of the images do appear to be drawn from the repertoire of the American concrete industry, but some of them had been published in the general media before. The Dakota image, according to William J. Brown, was a reprint of a "garishly colored" postcard published by the Buffalo Evening News in 1903.[16] The photo of the Buenos Aires silo, as Mark Jarzombek has pointed out, was published in 1909 in the popular magazine *Illustrirte Zeitung* as part of a feature on the turbine engine.[17]

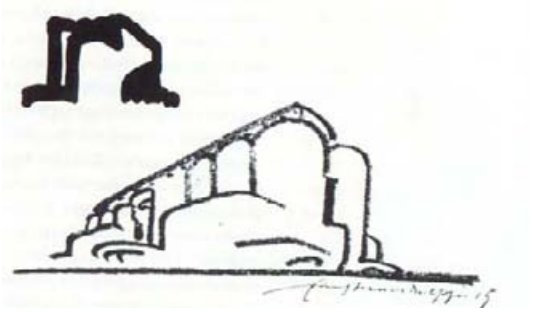
It is also clear that whatever the source, little was known of the structures in the photographs. Neither the Dakota nor the Washburn Crosby elevators illustrated the argument that formal clarity follows function, for example.[18] The particularities of materials were reduced to grey-scale; diverse physical locations, from harbor to prairie, were unaccounted for, as was the fact that many of the sites were the product of agglomeration over time. Regardless of their origin, photographic quality, or technical content, however, Gropius' illustrations became a staple of modernist doctrine. The influence of silo aesthetics was palpable across the ideological field of avant-garde practitioners, from Antonio Sant'Elia and his designs for the futurist *Città Nuova* (1914), to Erich Mendelsohn's energetic, expressionistic sketches of elevators made from these illustrations.
In 1919, Le Corbusier asked Gropius if he could use some of the elevator photographs in the French architectural magazine, *L'Espirit Nouveau*. The influence might have ended here. However, in 1927, some of these images reappeared in LeCorbusier's *Towards a New Architecture*, which rapidly



Washburn-Crosby Elevator as published in Walter Gropius, *Jarbuch des Deutschen Werbundes*, 1913
(Courtesy of the Buffalo and Erie County Public Library)



Sant'Elia Power Station 1913
(Courtesy of Costa Meyer, 1995)



Sketches of Silos by Mendelsohn, 1914-1915
(Source: Bahnham 1986, 10)

achieved the reputation of *the* book of the new era.

Le Corbusier's heavily image dependent strategy in *Towards a New Architecture* (emulated in *A Concrete Atlantis*) relied on the juxtaposition of imagery and bold assertions. He began his polemic with what he called the 'Three Reminders' of the essence of architecture: mass, surface, and plan. The elevators, including the Dakota, sat alongside the elaboration of the very first of the reminders, that on 'Mass.' Le Corbusier stated unequivocally:

*Our eyes are made to see forms in light; light and shade reveal these forms; cubes, cones, spheres, cylinders or pyramids are the great primary forms which light reveals to advantage; the image of these is distinct and tangible within us and without ambiguity. It is for this reason that these are beautiful forms, the most beautiful forms. Everybody is agreed to that, the child, the savage and the metaphysician.*[19]

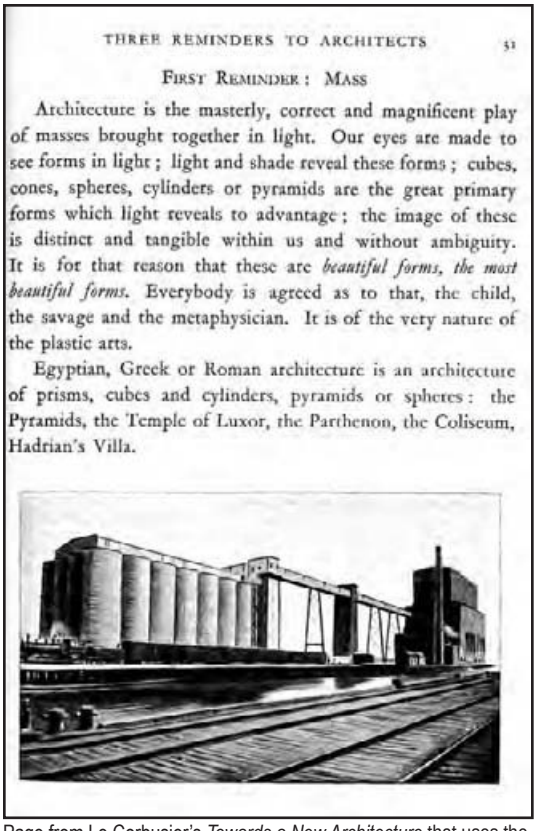
Le Corbusier then listed what cultures had architecture -- Egyptian, Greek and Roman -- because they built pure volumes, and which did not -- the Gothic is dismissed as a sentimental fight against the forces of gravity. Le Corbusier declared in summation: "Thus we have the American grain elevator and factories, the magnificent FIRST FRUITS of the new age. THE AMERICAN ENGINEERS OVERWHELM WITH THEIR CALCULATIONS OUR EXPIRING ARCHITECTURE."[20] The structural rationale of cylindrical storage, together with the solution of packing the circular bins to eliminate wasted space in the floor plan, was celebrated by Le Corbusier as "Forms assembled in light."

Of all the photographs Le Corbusier borrowed from Gropius, that of the Buenos Aires silo is now the most famous, less for what is in the image than for what is not. A comparison of the *Jahrbuch* with *Towards a New Architecture* reveals the transition the image underwent in the journey from one manifesto to the next. The silo, under the misleading caption "Canadian Grain Stores and Elevators," has lost its chain of pediments and a passing train. Touch-ups have been done to a variety of details, including the verticals of the cylinders, in order to strengthen the visual experience of pure form and make the association with the serial uprights of ancient Egyptian and Greek architecture appear more convincing. In sum, Le Corbusier altered this image significantly to better suit his purposes. Others unknowingly reproduced Le Corbusier's composition, including, coming full circle, Wilhelm Worringer, who compared this altered image with a drawing of a royal burial tomb in his text on *Ägyptische Kunst* (1927).[21]

After Le Corbusier, numerous accounts of architecture in both Europe and America included the elevators as modern icons, from Bruno Taut's *Modern Architecture* (1929), which introduced a new elevator from the Buffalo waterfront, Concrete Central (1915-17) to a European audience,

to Vincent Scully's *American Architecture and Urbanism* (1969). In the manifesto for the next aesthetic transition generally known as postmodernism, *Learning From Las Vegas* (1972), Le Corbusier's love of grain elevators became proof of its opposite: the unwavering importance of analogy, symbol, and image over function in architecture, despite all insistence otherwise. And the Italian architect Aldo Rossi flouted Le Corbusier, calling grain elevators "the cathedrals of our time," and admiring them, not for purity of volume, but for their marking "the passage of time, the slow evolution of a collective work."[22]

In addition to the reproductions that make up the modernist record and the images of demolished structures that compose the historic one, the grain elevators have often been the subject of documentation processes, as they were in the photographs that Dorothea Lange famously took for the Farm Security Administration. There are typological projects, like those undertaken by the Bechers, in which all the variables external to the building (weather, sky, scale) are made as uniform as possible in order



THREE REMINDERS TO ARCHITECTS 51

FIRST REMINDER: MASS

Architecture is the masterly, correct and magnificent play of masses brought together in light. Our eyes are made to see forms in light; light and shade reveal these forms; cubes, cones, spheres, cylinders or pyramids are the great primary forms which light reveals to advantage; the image of these is distinct and tangible within us and without ambiguity. It is for that reason that these are *beautiful forms, the most beautiful forms.* Everybody is agreed as to that, the child, the savage and the metaphysician. It is of the very nature of the plastic arts.

Egyptian, Greek or Roman architecture is an architecture of prisms, cubes and cylinders, pyramids or spheres: the Pyramids, the Temple of Luxor, the Parthenon, the Coliseum, Hadrian's Villa.

Page from Le Corbusier's *Towards a New Architecture* that uses the grain elevators for a treatise on mass.
(Source: LeCorbusier 1965, 31)

to emphasize how all the extant elevators in the world relate to each other as an architectural type. The photographs of Lisa Mahar-Kepliger have been compared by Aldo Rossi to black and white etchings for bringing out "the purity of the geometries, the clarity of construction, the relationship with the landscape . . . the fresco of the American countryside constructed of a few essential items: the grain elevator, a few trees and telephone poles give us a scene much like the profiles of the hills in the films of John Ford."[23]

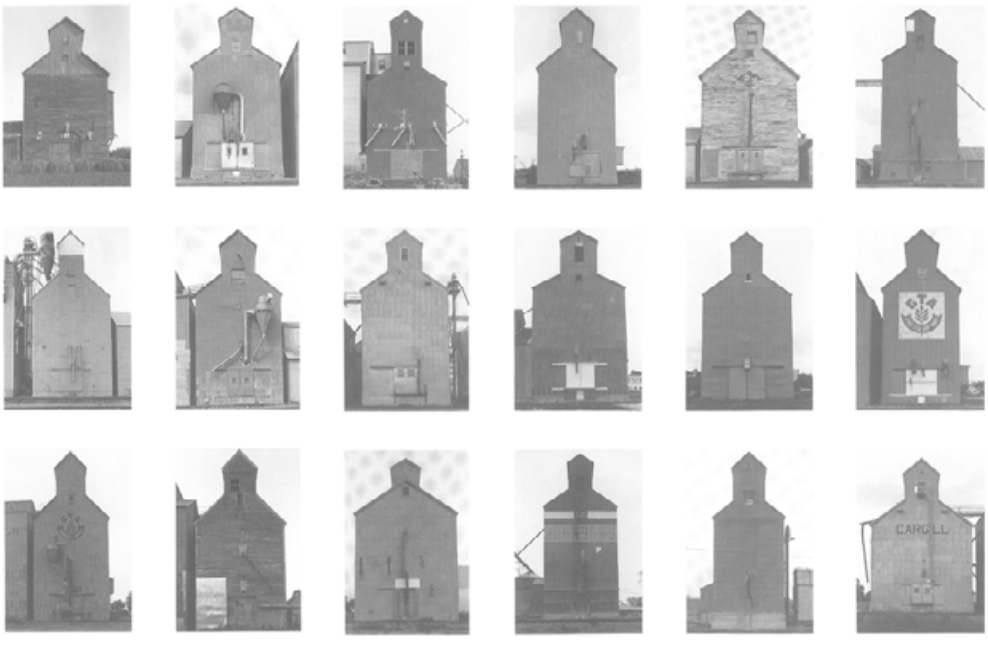
The cooption of U.S. industrial buildings for an international vision of architecture also provoked response from American artists in all media. To the American eye, these facilities looming on the horizon were much more than a functionally determined machine. As Kevin Lippert has observed, they embodied the realities of the American landscape, the passing of the family farm, changes in modes of transport, and the death of urban waterfronts.[24] Karal Ann Marling has evocatively analyzed the painting of the John W. Eshelman and Sons grain elevator in Lancaster, Pennsylvania by Charles Demuth, *My Egypt* (1924), as "bound up with the experiential dimension of American history."[25] Frank Gohlke has explored the scale and verticality of the structures as an integral part of the dynamic and shifting landscape over which they loom.[26] The more recent state of ruin has also been called on, whether to show the awkwardness of a form that has outlived its function, or whether to raise metaphysical questions about the passage of time, as in Charles Sheeler's *Classic Landscape* (1931). In their state of disrepair, the elevators take on a monumental, romantic air, not unlike the effect of a crumbling cathedral.[27]

Plenty of American photographers, Wright Morris, Ansel Adams, and Ralston Crawford included, have emphasized precisely what the modernists loved in their photographs: strong geometry and stoic mass. There are also the ones by Patricia Layman Bazelon, which Banham used to illustrate his own empirical tour. Usually Banham took his own shots, but this time he commissioned photographs from Bazelon taken with the purpose of making a formal impression.

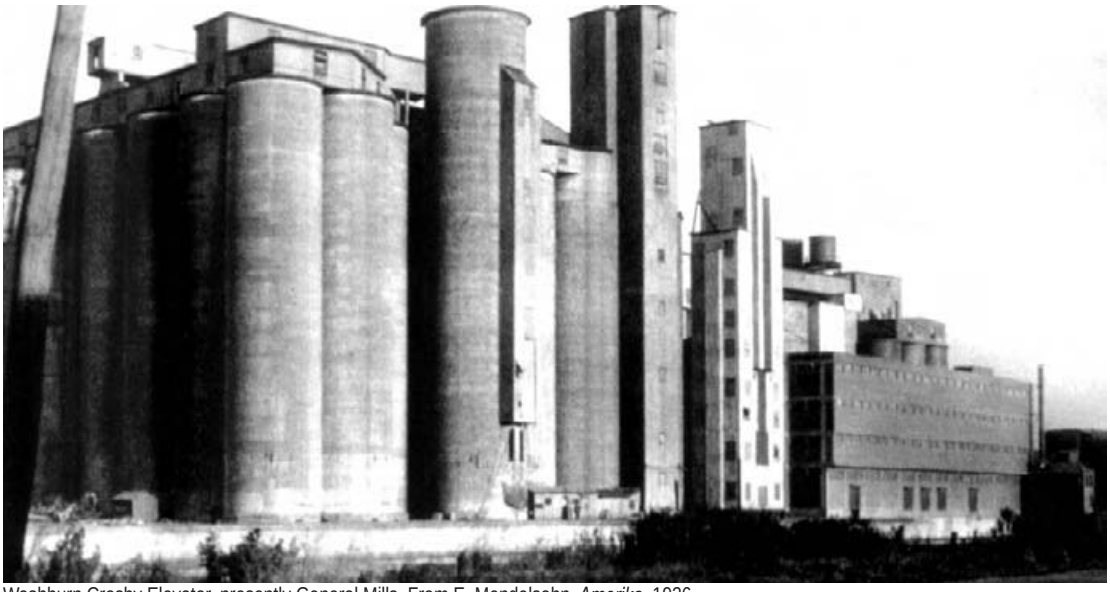
Yet, as beautiful as Bazelon's photographs are, many of the reproductions in *A Concrete Atlantis* are, in keeping with the tradition of how the elevator must appear on the pages of an architectural polemic, small and grainy. Whole pages of the *Yearbook* and *Towards a New Architecture* that feature the elevators have themselves become images in Banham's book, just as the images of elevator were in them.

It is obvious that the importance of the grain elevators to Modernism as an aesthetic movement had little to do with the nitty-gritty of slip-form construction or the workings of the belts, chutes, and pulleys about which, it appears, the modernists knew close to nothing.[28] It is unlikely that they would have inquired about the constant and dusty work involved in grain storage that took place in the galleries above and below the storage bins. They knew little of the history that led to the concrete elevator they so admired, or even that it was a doomed archetype. After all, like most people, architects and non-architects alike, the European modernists experienced the elevators abstractly. Banham made the evocative point that modernism (and here one should keep the sketches Mendelsohn made from Gropius' grain elevator reproductions in mind) must be the first architectural movement "based almost exclusively on photographic evidence rather than on the ancient and previously unavoidable techniques of personal inspection and measured drawing."[29] The modernists studied the elevators from photographs that had been drawn from unattributed sources and then badly reproduced; to fill in the gaps, Banham went on an old-fashioned tour of the objects themselves. Standing before the monuments though, Banham returned to the small grainy reproductions that he knew so well. Photographs in hand, he tried to match them with what stood before him decades later. This act returns to the basic distinction, one that is particularly pertinent to the act of preservation: what is the difference between learning things from firsthand experience and extrapolating from a photograph, or, as in Banham's case, vice versa?

The polarity between the experience of buildings and the experience of buildings in images has been important to the epistemological model of architecture in the twentieth century. The architects who first relied on photography in place of firsthand experience implicitly accepted that to look at photographic reproduction was equivalent to having seen what was depicted in it. Trade images were thought




Typological comparison of wooden elevators.
(Source: Mahar-Keplinger, 1996, 122-3)



Washburn Crosby Elevator, presently General Mills. From E. Mendelsohn, *Amerika,* 1926
(Courtesy of the Buffalo and Erie County Public Library)

devoid of contrivances and free of historical trappings. Documentary photographs were a product of optical science, as Banham writes, and were:

*supposedly free from the elements of personal selection and interpretation that must inevitably infect any artistic rendering, or even the traditional production by architectural draftsmen of finished drawings from field notes. The photographs represented a truth as apparently objective and modern as the structures they portrayed*.[30]

But, in fact, as confirmed by Le Corbusier tampering with the "objective" photos, industrial technology produced a vocabulary of forms whose conventions and proportions were no less explicit than those of the Classical Orders that required field trips.

Mendelsohn did make a Grand Tour: he came to Buffalo in 1924, so impressed had he been by the pictures of the elevators that he had engaged with back home. He was even more overcome when he saw them in person. He then proceeded to produce more visual documentation for the European back home. He wrote to his wife in Berlin: "I took photographs like mad. Everything else so far seemed to have been shaped interim to my silo dreams. Everything else was merely a beginning."[31] Mendelsohn published some of these photographs, including the Washburn-Crosby elevator, in a photographic essay, *Amerika: Bilderbuch eines Architeckten*.[32] It is clear from his captions that he was astonished, first with the size of the elevators, then with their formal elements. He reflected on the scale of production as something rarely seen on the "old continent," just as Trollope had on his American tour some sixty years prior. Mendelsohn, now in the era of concrete, recorded:

*Elevator fortresses in the transshipment port at the northeastern end of Lake Erie where the Niagara flows into it. Unplanned confusion, in the chaos of the loading and unloading grain ships, railroads and bridges. Monster cranes with gestures of living creatures, crowds of silo compartments of concrete, stone and enamel. Suddenly an elevator with management, uniform layered facades against the stupendous verticality of 100 cylinders . . . Childhood forms, clumsy, full of primeval power, dedicated to purely practical needs. Primitive in their functions of ingesting and spewing out again. Surprised by the coinciding needs, to some extent a preliminary stage in a future world that is just beginning to achieve order . . . If the will to organize becomes clear in this way, then the delirium is transformed into boldness and the confusion into harmony.*[33]

He also wrote: "A bare practical form becomes abstract beauty."[34]
At the end of the day, the interest was not

in the calculations of engineers -- Gropius and Le Corbusier used photographs, not technical drawings. Nor is it about the accuracy of the record -- Banham's text is marred by easily verifiable misattributions. The interest is not even in the factual record of personal experience -- Mendelsohn's elevators are labeled generically 1 through 4, and even mistake their geographical location. The interest was, and remains, one of standing, as Banham did, in silence before these powerful monuments of abandoned industry and trying to imagine them as they were when Trollope and Mendelsohn drew their aesthetic conclusions. As they are now, in emulsion and in the field, the elevators carry the philosophical resonances of the everyday, of bigness, of the technological, of the elemental.

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The Kellogg Elevator as photographed by Mendelsohn
From *Amerika,* 1926 (Courtesy of the Buffalo and Erie County Public Library)

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1. Louis Mumford, "Ceramics, Hydraulics, and Geotechnics," *The City in History: Its Origins, Its Transformations, and Its Prospects* (New York: Harcourt, Brace and World, 1961) 15-17.

2. Robert B. Riley discusses how American agriculture in the west was transformed by the shift from subsistence farming to farming for the eastern urban market. This new market dictated the focus on wheat over oats or corn, and required the shipping of that wheat in bulk rather than bagged, which in turn required the development of both a pricing and a grading system. In addition, the process required the development of a time-efficient vertical unloading system to replace the laborious transfer of grain sacks from the boats to the horizontally organized "flathouses." See "Grain Elevators: Symbols of Time, Place and Honest Building," *AIA Journal* 66, no. 12 (November 1977), 50-55.

3. For the complete history of grain elevator construction in Buffalo, see Francis Kowsky, "Monuments of a Vanished Prosperity" in this volume.

4. At SUNY, Banham taught in a structure that began its life as a daylight factory, the now disused Bethune Hall on Main Street.

5. Banham had already built a career in Britain out of studying what others saw as pedestrian. He dwelt on the utilitarian in the same manner that other historians focused on the products of calculated artistic design. For example, he had a written book on the urbanism of Los Angeles that took "non-architecture," such as highways, hamburger stands, and surfboards, into account. By comparison, grain elevators and factories seem like classical objects for historical study. Banham believed that the traditional history of buildings and cities would have to be revised to account for all forms of human structure, including anonymous buildings, not just those which participated in the self-referential realm of "high art."

6. Reyner Banham, *A Concrete Atlantis: U.S. Industrial Building and European Modern Architecture, 1900 – 1925* (Cambridge, MA: MIT Press, 1986), 3.

7. This style, influenced by the later work of Le Corbusier and the early work of Peter and Alison Smithson, came to be known as Brutalism.

8. It is not that none had registered this observation before. Banham himself quotes the remarks of Walter Curt Behrendt from 1927: "To do justice, it is necessary to say, and this will probably surprise the reader, that it was the example of America that gave the impulse to the German architects when they first tried to clarify the problem of structure. To be sure, this impulse did not originate in the skyscraper . . . but the simple structures of industrial building such as grain elevators and big silos." Quoted in Banham, 230-231.

9. Henry Baxter of AE Baxter Engineering has compiled a list of factual errors in Banham's history of the

Buffalo elevators, including significant omissions and a dozen factual errors regarding the elevators and their designers. For lists of other relevant material that Banham did not cover – a sufficient explanation of how this kind of architecture became known and assimilated in Europe; European examples of banks, stores, hotels, newspaper buildings, and offices; early work with reinforced concrete – see the reviews by Andrew Saint, *AA Files* 14 (Spring 1987), 106-8, and Elizabeth C. Cromley, *Journal of the Society of Architectural Historians* 46, no. 3 (September 1987), 301-2.

10. Saint, 107.

11. *North America*, vol. 1 (Philadelphia: Lippincot, 1962), 181.

12. "Ugly but profitable: The grain elevators of Buffalo: Examples of hideousness in architecture – A wonderful branch of the city's commerce – Its inception and development," *The Buffalo Commerical* (2 April 1891). Quoted in William J. Brown, "Walter Gropius and Grain Elevators: Misreading Photographs," *History of Photography* 17, no. 3 (Fall 1993), 305.

13. The nineteenth century roots of modernism were the subject of Banham's dissertation, published as *Theory and Design in the First Machine Age* (London: Architectural Press, 1960).

14. Banham, 7.

15. Banham, 195.

16. Brown, 306.

17. The *IZ* was a conservative magazine published in Berlin. See Mark Jarzombek, "The Discourses of a Bourgeois Utopia, 1904 – 1908, and the Founding of the Werkbund," *Rethinking German Modernism* (Washington, D.C.: National Gallery of Art in conjunction with the J. P. Getty Center for the History of the Humanities and the Arts), 131. Jarzombek has also uncovered archival evidence that some of the images were taken on an espionage mission disguised as a cultural visit by a Germany seeking to overcome its vulnerability to French attacks on the grain supply.

18. As William J. Brown has pointed out, the Dakota's inner mechanics and cylindrical bins could not be seen in a photograph as they were sheathed in steel. The distinction between the early tile cylinders of the Washburn-Crosby and later concrete additions was also not apparent from Gropius' photograph. See Brown, 107.

19. *Towards a New Architecture* (London: Architectural Press, 1965), 31.

20. *Towards a New Architecture*, 33.

21. Munchen: R. Piper, 1927, 56. This transposition is noted by Brown, 307.

22. Lisa Mahar-Keplinger, *Grain Elevators* (New York: Princeton Architectural Press, 1993) 7.

23. Mahar-Keplinger, 7.

24. Mahar-Keplinger, 83.

25. Karal Ann Marling, "My Egypt: The Irony of the American Dream", *Winterthur Portfolio* 15, no. 1, Spring 1980, 25.

26. Frank Gohlke, *Measure of Emptiness: Grain Elevators in the American Landscape* (Baltimore, MD: Johns Hopkins University Press, 1992).

27. A classic example of this sentiment: "The elevators rise up out of the prairie like cities of dreams, towers of gleaming silver or gold, or blinding white in the late day reflection of the sun. Up close you find they stand in ruins. Like an ancient castle in kingdoms that no longer work, they pierce the prairie sky with the solitude of their abandonment. Weathered and peeling, their windows gone, their doors awry, they are roosting places for pigeons, places where time no longer exists." Ruth Rudner, "Grain Elevators," *Parabola* 17, no. 1 (February 1992), 39.

28. See, for example, the critique leveled by George O. Carney in "Grain Elevators in the United States and Canada: Functional or Symbolic," *Material Culture* 27, no. 1 (1995), 1-24.

29. Banham, 18.

30. Banham, 18.

31. Banham, 6.

32. In *Technics and Civilization* (New York: Harcourt Brace and Company, 1934), Louis Mumford reprinted one of Mendelsohn's photographs alongside a reference to Worringer.

33. Erich Mendelsohn, *Amerika: Bilderbuch eines Architekten* (Berlin: R. Mosse, 1926), 36-40. Translations taken from the reprint, Erich Mendelsohn's *Amerika* (New York: Dover Publications, Inc., 1993), 44-7.

34. Aus nackter Zweckform wird abstrakte Schonheit. Mendelsohn, 40.

# Challenging the Imagination:
## Adaptive Reuse of Grain Elevators

(Courtesy of Granary Associates)

*Thomas Yots, Historian*
*City of Niagara Falls, NY*

# Challenging the Imagination

*When we got to that . . . place, that grain elevator, they took me on that . . . belt, and it was scary because I couldn't see anything and I felt that I was swaying and I was going to fall off . . . Finally when we got to the top, they pushed me out of the walkway and told me not to turn or move or else I would fall in . . . it was so small a place to stand . . .*
Lauren Balfour

This segment of Lauren Balfour's *City of Light* (1999) takes place in the massive wooden Coatsworth Elevator on Buffalo's waterfront. The author needed little help in creating the mood on the pages of her novel, since the mere mention of a grain elevator on Buffalo's waterfront brings to the reader images of intrigue, danger, and fascination. Today, soaring concrete elevators are the last manifestation of the giant grain storage/processing machines on Buffalo's waterfront. Most of the elevators have been abandoned or are in minimal use at this time and they beg the question as to what should be done with them. Demolition is financially prohibitive for the monolithic concrete structures and it seems doubtful that they will again see use as grain storing entitites. The answer appears to be simpler: find new uses for these venerable structures, applying the concept of adaptive reuse.

Adaptive reuse has been with us for centuries. In the Neolithic village of Catal Hyuk, residents built their new mud brick dwellings on the foundations of earlier structures. An entire Medieval village was built within the walls of a former Roman amphitheatre, reusing the walls as fortification for the village. Today, whether shopping in the trendy shops of Boston's once wholesale market, Fanuel Hall, or sipping cappuccino in the former chocolate factory in Ghiardelli Square in San Franscisco, one can still feel the history while experiencing the new use. In Buffalo itself, SUNY's School of Architecture and Planning has classrooms, studios, and computer centers in rooms which once housed the inmates and staff of the local insane asylum. In another example, the great Gothic structure which was Buffalo's Main Post Office became the downtown campus of Erie Community College, saving a familiar local landmark while bringing new life to a struggling neighborhood.

Bike riding in the former industrial site at Duisburg Nord Landscape Park. (Photo by Robert Shibley)

The recovery of the Industrial Landscape in the Emscher Landscape Park. (Photo by Robert Shibley)

Industrial complexes offer a vast store of material for adaptive reuse. From daylight factory buildings to redeveloped landfills, former industrial sites have been successfully reconfigured for new uses. One of the most extensive examples of this is the Emscher Landscape Park in Germany, where an entire region of abandoned industrial sites has been redeveloped into a vast park where ecology is the theme and adaptive reuse is the means to the end. Flowing through Germany's Ruhr Valley, the Emscher River became an industrial sewer for the various coal, steel, and chemical industries sited along its banks. In the later 1980s, with a population of over two million people and a high unemployment rate, attention

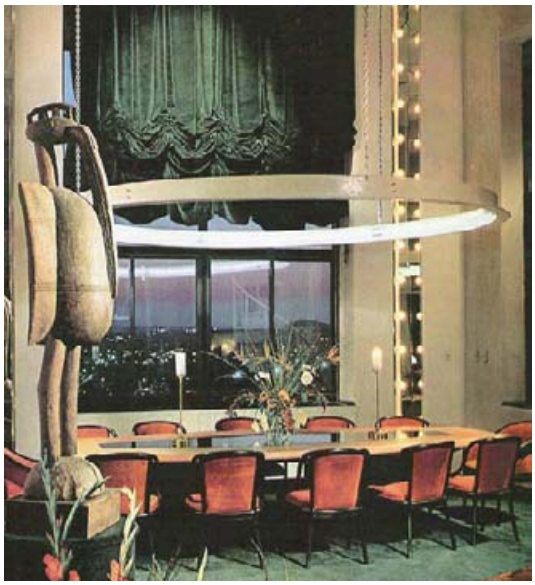
The entrance to the grain elevator, "the Granary," in Philadelphia, that houses the offices of an architectural firm, Granary Associates (Courtesy of Granary Associates)

was focused on improving the outlook for this economically and environmentally threatened district. The challenge of Emscher River region was so great that it was deemed impossible to approach this through traditional redevelopment schemes. Abandoned industrial buildings as many as ten stories high and land devastated by strip mining and chemical landfills required a new and highly aggressive approach. The answer was to create a region of "industrial monuments" through which hiking trails move, connecting a "regional network of leisure areas."[1] Newly created recreational spaces resulted: abandoned steel plants became concert venues, natural gas storage tanks house cultural fairs, and children's exploration centers occupy former machine houses. The traditional role of private funding as the sole source of finance for reuse was not feasible here. Instead, a carefully crafted plan driven by a state-supported entity put together national and local government funds with private and not-for-profit development sources to fund this huge project.

Europe has not been alone in creating successful adaptive reuse schemes. In the *Journal of Property Management*, Jan Campbell writes of successful projects in the United States, stating that adaptive reuse ". . . gives run-down, outmoded buildings a new vitality that makes them attractive again."[2] The journal article goes on to espouse adaptive reuse as a way to avoid high new construction costs and to benefit from tax incentives while capitalizing on the "strong emotional appeal" in the preservation of locally popular landmarks. Markets and factory buildings, hospitals and post offices, each present reuse opportunities to create new uses in structures designed and built for public access from the onset.

How does this happen with grain elevators -- mechanical structures whose primary usage was the storage of grain with minimal involvement by workers? Successful adaptations have occurred in the U.S. and Europe. Some of these projects have kept the grain storage portion of the building inactive, opting to occupy what had been the public access areas of the operation. Others have taken invasive steps, opening up bin walls to provide windows and balconies for use by people who will occupy the former storage spaces. In yet another approach, installations have kept the entire grain elevator intact while generating a new use with something placed within the storage bins.

One example of the "pedestal approach," where the bins remain unused and instead serve as a pedestal or separation between occupied spaces, is the Granary in Philadelphia. This former grain silo today serves as the headquarters for an architecture and design firm called the Granary Associates. It is a building with a history remarkably similar to several Buffalo elevators. Built in 1925 to replace a previous wooden elevator that had been destroyed by a grain explosion, the Granary was constructed using the slip-form method that built virtually all of Buffalo's concrete grain silos. This ingenious construction method allows the circular bins to rise in successive layers to create a continuous monolithic form as succeeding layers bond to the previous layers which are still in the setting stage. The Granary, an inland silo, had a waterfront connection via the Reading Railroad and was active in the grain storage and transfer business until the late 1960s. Trains delivered grain that was deposited into sub-grade vaults and redistributed to the bins via a belt-driven

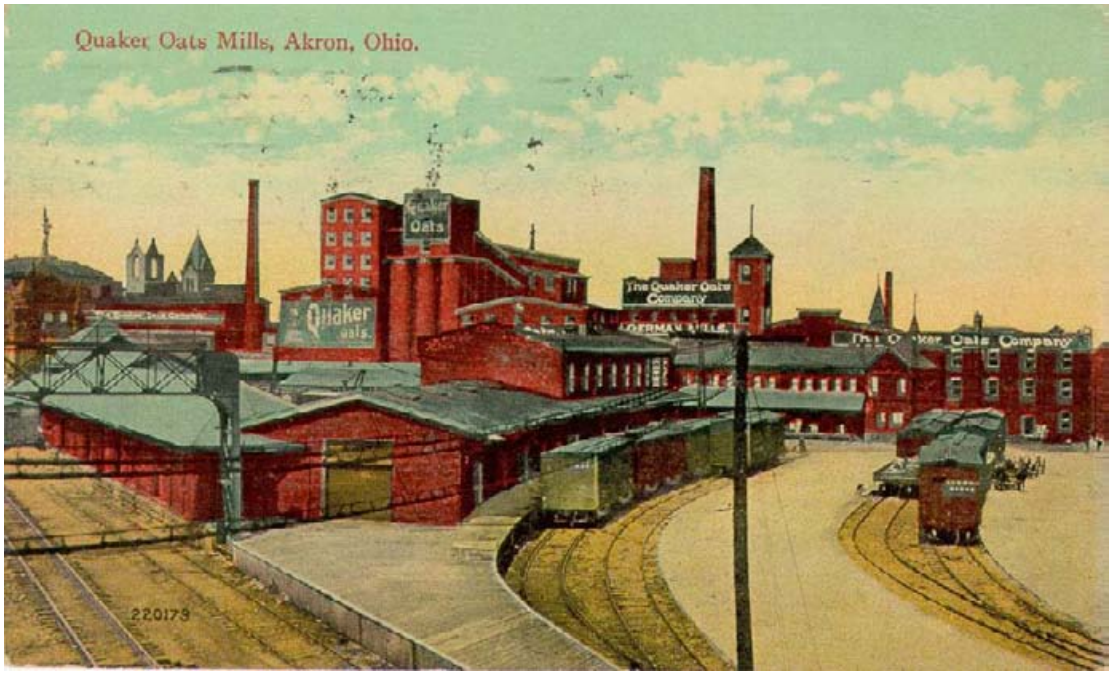


Interior of the Granary.
(Courtesy of the Granary Associates)

scoop elevating system. Grain left the silo via wagons which would be positioned beneath the appropriate storage bins.

By 1970, the Granary was no longer in use as a grain storage facility. After some faltering attempts at reuse, the elevator was rehabilitated by designer Kenneth Parker for the site of his interior design firm and penthouse apartment in 1977. Parker used 30,000 square feet of the complex, including the lower level open spaces and upper level workhouses, for his conversion. Parker's design firm, Kenneth Parker Associates, occupied the three floors comprising the lower level and a unique three-story 12,000 square foot living space was fit in the areas above the bins. The grain bins remained undeveloped, leaving essentially two-thirds of the space vacant. However, in what has to be an uncanny twist on reuse, the eighty foot bins themselves provided a much needed separation of work and living spaces for the designer, who in a 1979 *Architectural Digest* interview stated: "I think it is clear that anyone who works in close proximity to a living environment must arrange a strong psychological division."[3] The Granary Associates bought the building in 1988, adding 15,000 square feet in a project employing federal tax incentives. Although three of the bins have been retrofitted as stairways and an elevator, sixty-nine of the seventy-two former bins remain to this day unoccupied. In accordance with the Granary's placement on the National Register of Historic Places and the use of Historic Preservation Tax Credits in the rehabilitation, the original weighing and processing equipment remains in storage below the ground level.

With the exception of rehabilitated surfaces, the face of the Granary is quite similar to its original configuration. Such is not the case with another grain elevator adaptive reuse, the Quaker Inn in Akron, Ohio. The Quaker Square website invites




A Postcard of the Quaker Oats Mills in Akron, Ohio.

"Sleep in a Silo . . .", an advertisement for the Quaker Inn Hotel in Akron, Ohio.
(Courtesy of Quaker Inn)

you to "Sleep in a Silo . . . Dine in a Mill . . . Shop in a Factory."[4] Here, holes have been punched into the concrete silo walls to allow for hotel room windows and balconies. Ferdinand Schumaker began the Quaker Oats Company in Akron in the 1850s and developed it into the City's largest employer. The company pioneered advertising and marketing schemes that allowed it to flourish and become a major staple of Akron's economy. The Quaker complex grew to occupy multiple grain elevators, processing plants, and production facilities. By the 1970s, the company had abandoned much of this site, leaving little prospect for industrial reuse. The Quaker Square project began in the late 1970s, rehabilitating the former oats factory and silos into commercial retail space as well as restaurants and the Quaker Inn hotel. "Sleep in a silo" is the motto of this hostelry and one does, indeed, sleep in what had been the round bins of the silo built originally in 1932. The approximately twenty-four foot diameter of the bins produces a room size that in fact coincides with the ideal square footage for a hotel room. The adaptation reuses some of the original grain processing equipment and incorporates thirty-six of the bins into the hotel. The windows and balconies on the building's exterior are necessities for accommodating hotel guests.

While such a drastic alteration of a façade is often shunned by preservationists, it appears great latitude was given to this project and the community's aspirations are summed up in the Historic American Engineering Record where it is stated that the complex "has been 'recycled' into a successful regional specialty retailing center by maximizing the quality and character of these handsome industrial structures."[5] Even if one is concerned with the loss of integrity of the slip-form built concrete walls or bothered by the mahogany Colonial decor of the hotel rooms, it should be noted that this adaptive reuse does make use of the actual bin space, "storing" people in the exact places that housed 1.5 million bushels of grain.

A third and compelling example of adaptive reuse, the Silophone, involved a vacant waterfront elevator in Montreal. Architect Thomas McIntosh and musician Emmanuel Madan used Silo #5, a part of an industrial

Silo #5 in Montreal, Canada that was used as the site of the Silophone.
(Photo by Diana Shearwood. Courtesy of Emmanuel Madden)

complex on the St. Lawrence River. The elevator's fate has an eerie familiarity for anyone aware of the history of the grain industry in Buffalo. Built in four stages from 1906 to 1958 to a final size of 115 bins, the giant grain silo was closed in the early 1990s as the movement of grain bypassed the Port of Montreal for other trade routes. The elevator sat abandoned, saved from demolition by the high cost of taking down a steel and concrete structure of its size. McIntosh and Madan entered the picture in the late 1990s with a design using the silo as a musical instrument, fitting the approximately one hundred foot high by twenty-five foot in diameter bins with sound producing equipment allowing music to be created in the unique acoustics of the concrete cylinders.

The instrument was configured to accept sound from telephone transmission or from an Internet website, thus allowing for public interaction. Once transmitted into the silo, the sound was transformed into an unparalleled acoustic experience by the immense spaces that produced a reverberation time of over twenty seconds. In addition to the interactive element, the Silophone drew thousands of visitors to the waterfront to experience live concerts as the instrument was played by noted musicians. The value of the Silophone project was the ability of the architect and composer to find a use for the building based on the very same qualities that allowed it to function effectively in the storage of grain: the size, shape and material of the bins. The Silophone project operated for nearly two years at a budget of over $300,000 Canadian dollars. [7]

As communities look for long term, stable development ideas for grain elevators, it would be wise to consider the number of cities outside the U.S. where abandoned

Looking up into Silo #5, one of the silos used in generating the acoustical experience of the Silophone.
(Photo by Diana Shearwood. Courtesy of Emmanuel Madden)

Playing the SiloPhone.
(Photo by Diana Shearwood. Courtesy of Emmanuel Madden)

silos have become apartments (both rental units and condominiums). In the February 26, 2003, issue of Australia's *Daily Telegraph*, Marrickville Mayor Barry Cotter, referring to a proposed adaptation of the Waratah Mills grain elevator, said "You can't get much more creative use of a building than turning silos into apartments."[6] In Buenos Aires, a former grain mill and its storage bins have been innovatively converted to dwelling units boasting twelve foot ceilings and circular floor spaces. Amsterdam's Silodam project has seen both the conversion of an existing 19th century silo to apartments and the construction of an adjacent modern unit taking full advantage of its link to both the historic silo and the Amsterdam waterfront. Similarly, a project intended for the Northern Roller Mill building in Auckland, New Zealand has been proposed by Manson Developments. The ambitious project saves the mill and silo buildings built in the late 19th and early 20th centuries and, like the Silodam in Amsterdam, incorporates new buildings with the adapted Neoclassical historic structures.

The very nature of the grain elevator as a machine presents both challenges and opportunities for reuse. The more refined and specific a machine becomes (and the concrete grain elevator reached the pinnacle in each of these categories), the more difficult it is to find another acceptable use for it, different from its original design. However, there is a certain sublime attraction to these giant monolithic structures which transcends many of the obstacles presented for reuse. Because the grain elevators have found a niche in popular culture, as the quote that begins this chapter shows, it does seem possible that we will find new uses for them.

However, imagination and daring are needed to nudge the Buffalo grain elevators into a prominent position in the revitalized lake and river landscape. Whether as residential units or commercial entities, works of art or interpreted ruins, Buffalo's grain elevators sit poised today, ready to take that step into a world of reuse. The 19th century's invention which became the 20th century's workhorse is about to become the

Silodam, Amsterdam. Project by MVRDV (2002).
(Courtesy of Brian Rose)

21st century's venue for redevelopment: a fitting new step in a lifetime of service to the community. The silos stand as equals among architectural giants in Buffalo such as the Darwin Martin Complex, Kleinhans Music Hall, and Richardson's Psychiatric Center. The challenge is there for industry, government, and the arts to grasp the concept of adaptive reuse and breathe imagination and spirit into these noble structures.

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# “Where is the Fun in a Grain Elevator?”

Inside the inside of Marine A.
(Photo by Johannes Runge)

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# "Where is the Fun in a Grain Elevator?"

There is every reason to be wary of the Letters to the Editor column of a major metropolitan newspaper. Readers are not necessarily representative of the broader public; those who choose to write to a newspaper are not necessarily representative of all readers; and those letters chosen (and edited) for publication are not necessarily representative of all those letters received. Yet most of us sense that this medium somehow provides an indispensable window. If some people were moved or upset or inspired enough to actually sit down and write a letter, many others probably share those sentiments -- letter writing may be a far more important an indicator than the survey data of some casual telephone or shopping mall poll. And reading the arguments and observations in these letters is what many readers evidently find useful in crystallizing their own opinions about an issue. Survey after survey has shown that readers turn to the editorial page in search of the letters, and that they usually read them before reading the editorials themselves. Similarly, the recently proliferating "my turn" essays or the like -- essentially an open window for essay-length letters to the editor -- are generally more widely read than the syndicated pundit's columns filling the rest of the op-ed pages.

Thus it may be of more than ordinary significance that in the spring of 2003, an important debate about Buffalo's grain elevators raged in the letters to the editor columns of the *Buffalo News*, stimulated by two very different developments.

Hadas Steiner and Michael Frisch, touring the Buffalo Grain Elevators by boat. (Photo by Lynda H. Schneekloth)

The first was the designation of two of the elevators -- the Concrete Central Elevator and the wooden Wollenberg Grain and Seed Elevator -- on the National Register of Historic Places, after a successful application developed by a coalition of preservation and heritage groups, architects and historians, and city officials. The announcement was accompanied by repeated official declarations that the step signaled an opportunity for Buffalo, a city where the grain elevator marine leg was invented in 1842 and where the dramatic landscape of elevators -- unmatched anywhere in the world -- could provide a crucial and distinctive linchpin for a development strategy of heritage tourism and adaptive reuse.

The second was the announcement that Archer Daniels Midland, which operates one of the two remaining active grain elevators on the Buffalo Waterfront, intended to raze an unused elevator it owned -- and not just any elevator, but rather the 1897 Great Northern, once a landmark Pillsbury facility and at one point the world's largest elevator; it is now the sole surviving example anywhere of the important brick-shell, steel-bin type. This announcement, and the still unresolved battle it provoked, followed by only a few weeks a more definitive action: the stunning overnight demolition of the Harbor Inn, a tavern at the heart of what had been the waterfront grain elevator district, and for decades a kind of unofficial vernacular museum of the waterfront grain industry, its workers, and its neighborhood, all lovingly maintained by the saloonkeeper, Eddie Malloy, and his family.

Framed by these happenings, the letters column condensed a debate that spread across many dimensions of community discussion. "The Great Northern and Buffalo's architecture, while not always 'pretty,' are as important to Buffalo as the pyramids are to Egypt," wrote Richard Kegler. "There are no doubt land developers in Rome who see the Forum as a potential 'gray field' that could turn a quick profit if only all of that old stuff could be cleared out of the way. Too many bonehead decisions have been made to obliterate Buffalo's heritage . . . The grain elevators

are one of Buffalo's greatest assets in the rough . . . Developing historical tourism is a win. Demolishing history is a loss."

Nonsense, replied Joseph Baldi. "[Mr. Kegler's] contention that this grain elevator is as important to Buffalo as the pyramids are to Egypt is quite humorous . . . Let's not kid ourselves here. We are not talking about demolishing the Darwin Martin House . . . We're talking about razing an obsolete, hulking eyesore on this city's waterfront. ADM Corp., one of the few Fortune 500 companies left in this city, will pay for the cost of demolition and debris removal. In its place will be a cleaned, graded parcel of land that has the potential to be a valuable piece of reclaimed real estate on Buffalo's waterfront . . . The Preservation Board . . . would have us believe that tourists will flock to see a grain elevator. Sorry, I just don't see that happening."

Gary Serwinowski of Lancaster agreed: "These big, ugly, obtrusive buildings do absolutely nothing for the look of the waterfront except to symbolize a city that can't, or won't, stop clinging to its past in the hopes that it will one day be like that again . . . If people would put half as much energy into improving our city as they do in trying to save old dilapidated buildings like the grain elevators, we might see some positive change . . . I highly doubt that people will flock here on vacation to see an old grain elevator, but they might come here if here was something modern and attractive to see or do. Just because something is old doesn't mean it's beautiful."

"I'm responding to the letter from the Lancaster resident who sees no value in preserving the Great Northern Grain elevator," wrote David Ruperti of Buffalo. "Perhaps he simply isn't aware of how significant these 'big ugly, obtrusive' buildings are . . . The building is no domed theme park, but it does have the ability to attract tourists who are interested in influential architecture, industrial technology, and the history of Buffalo's waterfront. We also need to realize that we cannot only cater to tourists . . . The grain elevator is no chicken wing legacy, but it is still a part of who we are. Some say that if an old building is demolished, it demonstrates that we no longer needed it. Others say that it demonstrates that we are willing to progress and put the past behind us. I say that it demonstrates an unwillingness to be creative and innovative in our decision-making. I urge all Western New Yorkers to make thoughtful, well-rounded decisions about our city's future."

Stephen Miller of Buffalo, for the moment, had the last word in this exchange: "In reply to the May 28 letter regarding the grain elevators in Buffalo, I live in the city and I say 'get over it.' I can't believe that with all the problems this city is having, someone is concerned with saving one of the greatest eyesores on the waterfront. You want creativity and innovation? Tear them down and put something there that's going to help save Buffalo! No one is going to take a vacation and come here to see the Grain Elevators, the Twin Span Bridge, or the Central Terminal Building. We need something other than ruins and a bridge to bring us out of this crisis! If we are going to 'embrace' our past we need to bring it to life. Look at Williamsburg, Virginia. They don't go there just for the history or the architecture. They go there because they can get involved in the past. They can see life as it was! They can see colonial craftsmen at work. They can march with the patriots! They can have fun! *Where is the fun in a grain elevator?"*

This is an argument nobody can win, because in a sense everyone is right. The elevators *are* important, and they *do* have vast potential as generators of interest and activity. At the same time, they *are* dilapidated and vacant; it *is* hard to imagine tourists coming -- in significant enough numbers to matter for development -- just to look at them; it is *not* immediately obvious where and how, beyond abstract appreciation and the dramatic landscape, is to be found the sustained interest and engagement, much less the "fun" Mr. Miller asks for, on which successful heritage tourism depends. The defenders of the elevators are surely correct, but the critics ask fair questions that need to be answered.

These are, in fact, the questions too often

left unaddressed, the questions begged by the very qualities -- their monumental scale, their status as, for the most part, urban "ruins," and their forbidding inapproachability -- that make the elevators so impressive. "It's not preservation for the sake of preservation," said Bernadette Castro, New York's Commissioner of Parks, Recreation, and Historical Preservation, at the ceremony marking the Wollenberg and Concrete Central designations. "It's preservation for the sake of the next step, of bringing that economic impact and benefit to this great region. It's about adaptive reuse. It's about heritage tourism." But what *is* that next step, concretely? How *do* we go from general appreciation to demonstrable economic impact? It may be "*about*" heritage tourism, but how can we actually *do* heritage tourism with the grain elevators? What choices do we have, and what approaches can we take, understanding that critics are right in sensing that asking people to come simply to gaze at the monumental landscape in appreciation will not quite be enough?

At that same designation ceremony, Buffalo's ever-hopeful Mayor, Anthony Masiello, observed that "a test of our will to move forward will be our ability to turn these structures into something more meaningful and more useful." In this essay, I'd like to offer some suggestions in response to this challenge, a challenge I think it is crucial for all those interested in the grain elevators to engage directly.

Let me begin by noting that the challenge of the grain elevators involves something more than the unique qualities of these structures -- their scale, condition, location, and landscape. In an important sense, they embody a broader paradox facing all heritage tourism in the urban environment: it is hard to turn *any* particular site, monument, event, or structure into a magnet that can generate activity beyond the immediate concerns of a particular constituency, or the bounds of its own story.

Too often, it takes so much focused effort to save, restore, build support and interest for, or promote any single dimension of historical interest, much less any particular institution, building, or site, that the energy of heritage tourism risks becoming ever more fragmented and centrifugal. The whole, in terms of overall appeal and legibility, can end up seeming far less than the sum of the parts, and consequently there is a real limit to the overall impact on the "re-branding" of a problematically imaged community such as ours. We understand that in order to generate a self-sustaining critical mass of heritage visitation, whether tourist or home-grown, we need somehow to aggregate and combine the appeal of the Darwin Martin house, the Michigan Avenue Baptist Church, the Central Terminal, and the Pan American Exposition - but this seems almost impossible to approach in practice.

When we move beyond the particular city to the broader region, in our case a binational Buffalo-Niagara region, the challenge of integrating a highly diverse, fragmented spectrum of stories and attractions is only compounded. This contrasts profoundly with the situation faced by a small town or a rural community at a major historic site -- say, for a regionally relevant example, the Portage Railroad site or the Drake Well in western Pennsylvania. In such cases, there's no debate about the focus for heritage development: the choice of story, and what to do with it, is relatively straightforward.

Given our own region's relentless capacity for beating up on itself, it may be helpful to observe that the dilemma of fragmented, competing stories, audiences, and sites is in some ways a natural and healthy one for cities and regions like ours. This is because what makes complex urban regions interesting -- what makes a city a city, in fact -- is the infinite multiplicity of stories, grounded in different dimensions of experience from cultural to economic to spiritual to political, all drawing on, and speaking to, an equally complex web of communities and groups.

That the stories are woven together in the fabric of urban life and change over time is a way of saying that they are, in fact, connected, often in tangible and demonstrable ways -- ways that a more integrative approach to heritage projection

could actually help to make tangible, visitable, and exciting.

In other words, the problem of urban heritage is in some ways the key to the solution: if we can take a story outside itself and show its connection to other stories, places, and aspects of urban life, we broaden the potential base of interest and we help to aggregate the otherwise fragmented appeals of a range of themes or stories.

And in so doing, we can offer a bigger and more exciting story still -- how a particular city and region works, grows, and changes historically -- so that the excitement and interest of every dimension can, in fact, begin to add up to that elusive goal of so much heritage development: conveying a deeper sense of the spirit, character, and uniqueness of a place. In this way we may leverage historic or heritage appreciation so as to impact the broader image of the community and region, something so critical for contemporary growth and change in the very real world that cities like ours confront.

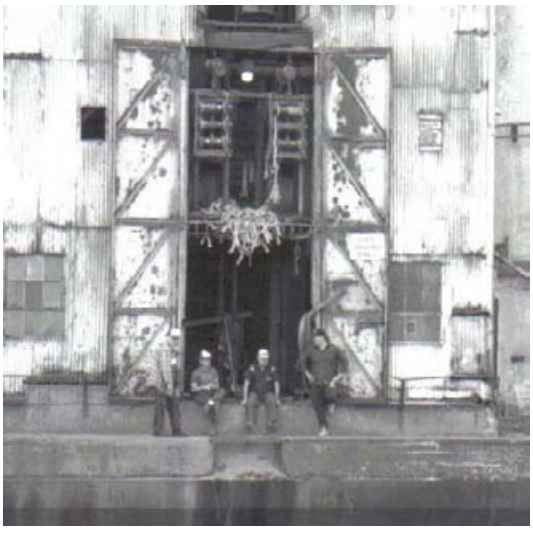
I think the grain elevators may offer a near-perfect example of the challenge and the possibilities for response. However important, they are by themselves too static, monumental, and unapproachable to support the kind of generative heritage development I'm discussing here. By the same token, however, if we engage them creatively as resources for heritage projection and programming, their story has enormous potential as the anchor and generator for visitation and active exploration across our entire region, for an evocation of place that speaks to the present and future as much as to the past, and even for the fun and active involvement in history that letter writer Stephen Miller correctly identified as one of the keys to successful heritage development.

In this spirit, let me offer a few examples of what it would mean to approach the elevators as something other than monuments to be looked at. A heritage strategy could give people something more to do, see, and experience once they have "seen the elephant," thus leveraging the elevators in ways that might have a chance of really "working" as a draw.

I will not deal here with the many forms of adaptive re-use that could make the elevators a living resource, as these possibilities are presented and well-explored elsewhere in this publication. Nor will I speculate on various imaginable ways of having the elevators, even as relics, activated as visitation and interpretive sites themselves -- tours of an elevator restored to working condition, for instance, complete with a decommissioned ship like the Kinsman Independent alongside, its sample grain unloaded, perhaps by its own former "scoopers," on a regular demonstration schedule, as at so many of the increasingly popular factory and industrial tour sites across the nation.

Rather, for demonstration purposes, let us assume that we had to work with the elevators as they are -- for the most part mute, empty monuments of an era past, too decrepit for the most part to support anything but the most minimal active visitation. What might it still be possible to imagine, by way of a heritage tourism strategy?

My approach rests on two ideas. One is the importance of linkages and itineraries, whether printed or web-posted, that connect the elevators to the city and region as a whole and encourage self-guided explorations or even actively promoted group tours and activities. The second is the notion that it is helpful -- with history in



Workers taking a break from their work in the Standard Elevator. (Photo by Lynda H. Schneekloth)

general and with *this* history in particular -- to forge links between past and present, to connect a serious encounter with history to encounters and even entertainments in contemporary culture. This is especially inviting in dealing with the grain elevators because the story of grain necessarily reaches contemporary products, processes, or landscapes very familiar to visitors, whether from home or away, yet about which they in fact know very little. By offering ways to explore the richness of place and community, and by offering glimpses into the story of contemporary icons like breakfast cereals familiar to every visitor, we stand to increase the base of appeal beyond those explicitly drawn to the "past," while also underscoring a profound point about history: its capacity to help us engage the complexity of life and experience in our own context.

Consider three broad categories of "stories" through which the grain elevators could become so much more than just hulking monuments or architectural statements to be either hailed or mocked, as in the letter-column exchanges.

The first is the most obvious, and one already under intense discussion and planning -- the rich history of lake shipping, the waterfront, and the Erie Canal, that is the subject of intense heritage development currently, and to which the story of the grain elevators, industries, workers, and communities could not be more central. Whether in the endlessly debated planning for how the history of the Erie Canal terminus figures in current waterfront development and urban presentation, to the broader planning of the Erie Canal Heritage Corridor, or in initiatives such as the Buffalo and Erie County Historical Society's exciting proposal for an on-site heritage and transportation museum in the waterfront's former DL&W terminal building, it is increasingly clear that there will be, and must be, a broad interpretive and visitation context taking shape within which the elevators are crucial. Simply shaping this momentum to take maximal advantage of the district's site resources will be one way to answer the critics: the elevators can be engaged within a richly developed heritage destination, one that combines a range of human, social, political, and economic stories, and to which they can contribute enormous, irreplaceable specificity and interest.

But that should be only the beginning of an imaginative, integrative approach: with the link of grain growing, transportation, grain processing industries, and regional history and life made clear, cross-locale excursions could carry this theme into explorations capable of extending a short visit into a multi-day stay. This is one of the central pillars of the heritage corridor idea,

Accessing the elevators is difficult but many find it irresistible.
(Photo by Lynda H. Schneekloth)

The Buffalo River Urban Canoe Trail takes you through the canyons of elevators. (Photo by Lynda H. Schneekloth)

but it has more open-ended implications if we see it as something extending beyond history and heritage as such. Imagine, for instance, a visit to the elevators and the Buffalo waterfront that would be connected to excursions to Lockport and other Erie Canal sites, as well as to the Niagara River towpath, Black Rock, and the Tonawandas, and to sites in Ontario including the Welland Canal. One or two day visits, conceivably, could involve viewing (or even riding on) a supertanker going through modern locks, an historical evocation by canal barge ascending Lockport's famous lock ladder, a visit to the restored Buffalo Erie Canal terminus and the remnants of Erie Canal neighborhoods, machine shops, and factories in Black Rock, as well as to the existing, working elevators and mills of the contemporary grain industry.

Add the dimension of railroading -- crucial to the grain elevators and to virtually every other story -- and an even wider range of activities, destinations, and interpretive possibilities open up, including steam engine rides, switch-yard demonstrations, the Central Terminal and the DL&W, what's left of the immense complex of rail in South Buffalo and Lackawanna, the role of Niagara River crossings and rail history in Canada, and so on.

Suddenly, an immense vista opens up -- a vista of regional and international character with links to things we know visitors and locals alike find fascinating about history and contemporary life: a living agenda, rich in possibility, all of which could be anchored by the grain elevators, and could support, in conjunction with other sites and cooperating institutions, a coherent range of possibilities for visitation, interpretation, and entertaining activities. The pyramid-like aspect of the elevators as architectural shrines, in this broader context, is rendered alive and dynamic while still drawing on what is so manifestly dramatic, unique, and irreplaceable in the grain elevator landscape as a heritage destination.

The same points are even more dramatically underscored if we look at the challenge from another angle -- a focus on the story of the grain industry, broadly considered, past and present. Here the monumental scale of the elevators can be connected to something every resident or visitor knows at first hand -- bottles of beer, bags of flour on supermarket shelves, and boxes of cereal like Cheerios, whose names everyone knows, but whose manufacture in Buffalo is unknown to even to many residents who wonder about that strange toasty smell wafting over the city from time to time when conditions are right.

Here there are manifest opportunities for both history and fun. Imagine combining the kind of elevator heritage boat tour currently offered, for instance, with a factory tour of the Cheerios plant, or other such facilities, perhaps including a spectrum of ethnic and regional bakeries. This is the kind of obvious connection, for an exciting visitor experience, that too often is obscured by the historical orientation of heritage promoters, and the business orientation of contemporary developers. And yet there can be enormous power in the simple recognition that people might, indeed, be attracted by gliding waterside among the monolithic elevators *and* by seeing firsthand "where Cheerios come from," and that putting these together might make a visit to Buffalo all the more attractive and intriguing a prospect. The incredibly successful Crayola Factory attraction in an otherwise bleak Easton, Pennsylvania landscape is an instructive example.

The implications go well beyond the waterfront, of course. One major function of the grain elevators was to propel Buffalo's enormous brewing industry. Beer and brewing, in turn, were at the heart of much neighborhood life, especially in Buffalo's huge German-American community. In the very different context of current lifestyles and urban revitalization efforts, brew-pubs

and micro-breweries are both popular and of considerable serious interest. Is it so hard to imagine a set of brewing and beer itineraries that could connect the barley elevators on the waterfront to historic brewery sites, working factories, and neighborhood taverns, and recent micro-brewery experiments throughout our region?

Or take the example of breakfast cereals one step further: Buffalo's Cheerios are part of much bigger story, one quickly reaching from Buffalo to the internationally famous equation of Nabisco Shredded Wheat and Niagara Falls. Indeed, there is broader fascination in all of this: everyone knows breakfast cereals, but how many know when and why Americans began to eat them? How many are aware of the connection that Niagara Falls came to represent, between the rise of breakfast cereals, dietary reform, and turn-of-the-century Utopianism -- for in fact the marketing connection between the cereal and the sublime wonder of the world was neither random nor coincidental.

Nabisco closed its operations in the Falls recently, and the image of Niagara has disappeared from the Shredded Wheat Box, but surely there is a vivid, exciting, marketable story here waiting to be packaged in a way that could address that persistent goal of local planners, which is turning the immense tourist magnet of Niagara Falls into more of an economic generator for the region as a whole. Why not imagine a two-day itinerary that would forge that link between the Falls and Buffalo, between shredded wheat and our grain elevators and Cheerios? Broaden it out one step further - since cereals are only one kind of food - and even more ambitious regional itineraries could include the story of Welch's Grape Juice in Chautauqua, the Jello Museum in Leroy, New York, and Coffee Rich and, of course, the Anchor Bar (birthplace of the chicken wing) in Buffalo itself: an archeology of instantly familiar foods and a wonderfully rich, unfamiliar history that could be encountered in both instructive and, yes, *fun* ways. Suddenly, there is a dramatic, range of possibilities, with profound interpretive possibilities in the most serious historical sense, between the mute elevators and the surprisingly alive, crackling history of visitors' daily lives.

A third and final set of examples flows from a focus on people - as a direct and powerful counterpoint to the overwhelming scale of the elevators, and a crucial dimension of their story. In fact, the link between the elevators, their workers, and the neighborhoods and institutions around them, from homes to unions to taverns, is unusually intimate and close. The colorful story and richly documented world of the Buffalo grain scoopers, and so many of the people who lived and worked in the elevators, is a resource just waiting to be mobilized in a more sustained way. There are existing organizations and festivals, such as the relatively recent but highly promising annual Buffalo River Fest in Father Conway Park, celebrating Buffalo's Old First Ward and Valley neighborhoods, that could both contribute to and be sustained by more comprehensive grain elevator heritage projection. Walking oral history tours organized and led by neighborhood residents and elevator/ waterfront workers could bring the landscape and the human scale of family and neighborhood stories together. It would not take too much more effort to weave such opportunities into more ambitious circuits -- thematically linked encounters with historically linked waterfront neighborhoods or grain working families from Buffalo to Black Rock to Lockport to Niagara Falls, or into Canada and down to Jamestown as well, for that matter, could be an exciting matrix for helping visitors move fluidly throughout the region, sensing its diversity and the historical processes that have tied it together.

As with our other examples, a story-driven approach need not be narrowly or too literally focused on elevator workers, grain scoopers, and neighborhoods. Instead, the complex history of grain in local life could suggest ways to weave a very different fabric for exploration, across the many dimensions of urban life.

Consider, for instance, the dramatic story of the landmark 1899 Grain Shoveller's Strike in Buffalo. At that time, access to the work unloading the grain ships was controlled by


A group of grain elevator fans approacing the Cargill Elevator.
(Photo by Lynda H. Schneekloth)

saloons that functioned, in effect, as hiring halls for the shippers. Because of this, worker struggles on the waterfront took a highly unusual form, with much of the elite establishment lining up behind the unions to challenge the power of the mostly Irish saloonkeepers. All of this played out in epochal form in the protracted 1899 strike -- a story that ended up involving unions, the leaders of the Catholic Church, the Temperance Movement, elite reformers from Delaware Avenue society, and an emerging Irish establishment as well. The waterfront boss then was William J. Connors, a tavern owner, brewer, political figure, and increasingly important newspaperman, as owner of the *Buffalo Courier*, later the *Courier Express*.

This is a remarkable story, in which enormous urban complexity is crystallized -- complexity with considerable resonance in any community from which visitors may come and with considerable tangibility for local residents as well. It is not hard to imagine ways of leveraging such a story in exciting, attractive, and historically meaningful ways.

Imagine a day that began at the foot of a giant elevator (even better would have been the Harbor Inn, once one of those hiring-hall saloons, had it not been shortsightedly demolished). Then visitors set out to follow the story in sites throughout the city, and even more broadly through the various dimensions the story involved, whether literally part of the unfolding 1899 events or not. Not-to-be-missed landmarks such as City Hall, the St. Louis Church, a Delaware Avenue mansion, the former *Courier Express* building, and today's *Buffalo News* could all be included in such an itinerary, as well as less well-known but equally intriguing story-linked destinations including taverns, union halls, lake shipping association offices, and reform organizations. To follow such an itinerary would do more than tell the story, by taking visitors and residents criss-crossing the rich texture that is the life of a city, and coming to an appreciation of Buffalo's rich historical and contemporary character in the process.

There is nothing magical, demanding, or even particularly expensive in the kind of approaches to heritage projection that I have discussed here. Much of the approach could prove valuable even in virtual form, through imaginative websites far more enticing than the kind of bulletin-board listings our promoters have been routinely relying on. Indeed, there is a deeper significance and lesson in this

observation, because in some way the website environment and the vital life of cities have something important in common, a characteristic that speaks to the broader challenge, discussed at the start of my remarks, of effective heritage projection in the urban and regional context.

What makes cities exciting is that so many stories, lives, dimensions of experience, and worlds are all densely compacted, and deeply intertwined. What makes visiting cities exciting is to sense this vitality and density, and to have the capacity to travel across continents of experience, in effect, simply by crossing the street from an historic church to an art gallery or disco, from a gated estate to a throbbing street market. What makes negotiating a well-constructed website exciting is the same quality: there is not one linear path, one necessary route, but rather, we bounce or surf or click from one curiosity to another, driven by individual whim or interest or a chain of logical pursuit.

The kinds of linkages and story connections I have been suggesting can be presented, and explored, in the same way, both online and in well-designed visitor guides and activities. A visitor to the art deco masterpiece of the former *Courier Express* building, on a heritage walking tour, could follow the story of William Connors down to the waterfront docks, saloons, and grain elevators where he got his start. Visitors to Niagara Falls ought to be able to see connections that could draw them on the trail of grain from Shredded Wheat to Cheerios and to the Great Northern and its Pillsbury roots, if Archer Daniels Midland can be persuaded to not demolish the structure. And visitors to the grain elevators themselves -- whether Skyway drive-bys enticed for a closer look, or tourists on the dramatic Miss Buffalo river crawl past the pyramids -- ought to see a whole panoply of regional stories, histories, and adventures open up before them, ready for exploration once they're off the boat.

The monuments are there, the history is there, the stories and their resonance in a living, changing international city and region today are all there. With some effort and imagination, it can all come together. Even in their current dilapidation, the awesome grain elevator district can be one crucial base for such approaches to heritage projection -- alive, human, and open to active exploration. In this sense, Mr. Miller was misplaced in his critique but right in principle: at and through the grain elevators, the past can come alive, if we let it -- and exploring it can even be fun.

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