

Water for the Cities:
New York City and The Croton Aqueduct
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Introduction

Water Supply an International problem

Case study New York City

New York Great City
World City
Great Appetites & Ambitions

Historical Struggles on the Path to Greatness

Water supply-the Central Roadblock

Resolution of the city's first water supply crises

Enabled New York to grow
Shaped its relationship to
the surrounding communities
natural resources and the environment
conditioned patterns of later responses

Result
Largest surface water supply in the U.S.
High quality water
World's best tasting

Public Perceptions
A permanent reality
Invisibility
Habits of consumption
Source of our water
Availability on demand
Ignorance of value and history

How is this history instructive for the present.

Interpretive Frames

1. Tension between Culture & nature
Fundamental battle
Wilderness subdued
Abundance
Resources-god's special-gifts

Cultural Anxiety

Concerns of writers like Thoreau
Hudson River School of painters-
Romantics and nature

2. The geographical and resources base
Limits to growth and physical expansion
Concept of bio-regionalism
Nature's boundaries

The Croton Aqueduct and the question of
limits
Was it precedent setting?

3. Technology, the landscape and politics

Building of the CRAQ and the technical
knowledge of its day

Transforming the City and the Westchester
landscape

Distribution Power:city-suburb

Changing in daily life

4. Chapter in the History of urban development

New York City case study
Different scale
Application to other cities

Planners and city fathers
Impulse to grow
Class and entrepreneurial
interests.

Public health history and dynamic capitalism h

History of 19Century Cities
Movement and circulation.
People, capital, and water
Congestion and Growth

5. Public Health Crises

The unhealthy city
Polluted water supply

Framing the issue
Constructing the public health issues
Remaking the City's Reputation

History and development of the NY water supply

Growth of the City

Population

Unplanned growth

"Gotham"

Post-war Port(War of 1812)

Merchant ascendancy

South Street-economic hub of city

Packets/Black Ball 1818

1825 Erie Canal opened

Commercial supremacy

Banking insurance

Bureaucracy of business

Mapping the Changes

Nature v Culture

Streets v swamps

The Grid 1807

Physical expansion

Regularize real estate

Topography as obstacle

New York as Entrepot
 Commercial/industrial growth
 Immigrants cheap labor
 Rates of immigration
 Unprecedented density
 Social and physical danger
 Backlash

The Overwhelmed City
 Growth outstripped institutional and resource base
 Shoddy building
 "The up and down city"

Fires
 Great fires of 1776-1834-1835
 Destruction
 Insurance Companies and Panic 1837
 Water resources

Disease
 Fire's twin demon
 Yellow fever 1798
 Cholera epidemic of 1832
 1800-1875 Period of the Great Epidemics

Context:
 Warning preparations
 Street world- business garbage-
 dogs and pigs
 Offal, breweries, soap-makers
 Street cleaning/garbage privatized
 Manure and privies
 Burial grounds
 River as sewer

Whose responsibility?

Cholera
 Epidemic comes in June 1832
 Mortality rates/ sudden and unexpected
 Flight of the upper class
 Quarantining the poor and the
 Use of filth theory/anti-contagionist

Weak 19c municipal government/
 NYC Crises What's at Stake?

Model in Philadelphia water works
 The model city
 Benjamin Latrobe's 1801 Schuylkill water supply
 Fairmont works 1822
 Architecture

Why was NYC so late?

History of NYC Water supply
 Early drinking water sources
 The Collect fresh water pond (Foley Square)
 Polluted 1790s "shocking hole"
 Animals(Horses) & household garbage

City caught up with Collect by 1800
 Privies & Pollution
 NYC water's distinctive taste
 Canal to drain the collect

The population out stripped the water base

Other non-potable sources

City needed adequate clean water supply
 City and public water works.
 Aaron Burr and the Manhattan Company
 Private capital and monopoly
 Chambers St. reservoir 130,000 gallons
 1796 and profits

Triggers for Action-Cholera and Fire
 1832 Cholera Impact
 Shock and Fright

NYC Common Council pleads to Albany -
 Water commissioners
 Survey of 1835
 Croton watershed and river
 Municipal ownership/state sponsorship
 Cost

Planning the Aqueduct
 The survey
 Major Douglas and John Jervis 1835
 The Engineer-RR, Bridges, Canals
 Movement

Construction Plan
 Dam the Croton
 Create Reservoir
 Tunnel across the Harlem
 Introduce hydraulic engineering
 Plan a Gravity system

Rural vs. urban-power struggle
 Collapse of the first dam
 Uproot Community /
 Repeated pattern
 second dam 1899
 Ashokan Reservoir

Westchester Responds
 Protest property & power
 Silting of the Croton River
 Destruction of the Sharon Canal Scheme
 Transformation of Westchester

The Tunnel Plan
 40 Mile tunnel
 7.5' to 8.5' range in diameter
 Brick and local stone
 Shape of tunnel

Building the CRA
 Property owners
 Irish workers
 Temperance
 Public works projects

Ventilators and waste weirs
 Stone culverts and the line
 Sing-Sing kill and the bridge

Harlem River Bridge
 Traffic vs. siphon
 The Harlem to Murray Hill
 Embankments and walls in Manhattan

Opening Celebration Oct 1842
 Water arrived July 4, 1842
 Character of celebration
 Water available
 Fountains
 Cost of connection

Impact
 Public baths
 Closet Baths, water closets/indoor plumbing
 Street clean-ups
 Consumption increase
 1856 expand the reservoir
 extend the watershed.
 "Adams Ale" and the dram shops
 Temperance postponed

Sewers and sanitary engineers
 Edwin Chadwick in England
 Dr. John Griscom in NYC
 Private waste and house drains
 "Water carriage" sewers
 1849-1865 NYC built 125 miles of lines
 Sanitation Health & class

City's Reputation
 Analogy with London
 Commercial dominance
 Unfettered growth
 City Suburb
 Reach of the City
 Circulation

RECONCILIATION AND MEANING

Progress and nature
Historical association-a continuum

July 4, 1842 The public celebrates
Popular attraction
Architectural style
Civic event
Technology and historical association

"Croton Ode for celebration"

Charles King, "Memoir of Construction" (1843).
American superiority
Free labor
Conspicuous consumption
God's gift.

Fayette Towers Engineer
Art, science and the appreciation of nature
The 1st fountain at the Harlem River
Public recreation
Bucolic
Historical association with Spoleto
Dam technology-sublime
High Bridge

Insatiable City

I. Croton System
Out grew the supply ten years
Dammed more branches of Croton River
Add 12 reservoirs and three lakes
Found to be insufficient

10% supply

II. Catskill System
Annexation of Bronx, Brooklyn, Queens 1898
Requires More Water
Esopus River 100 miles away in the Catskills
20% Watershed in Catskill preserve
Ashokan Reservoir more all Croton in capacity
Completed 1944

40% supply

III. Delaware System
1928 Delaware River
Reservoirs -Neversink, Pepacton, Cannonsville,
Roundout
Completion in 1965

50% water supply

Surface Supply system

Protection & Safety
Watershed = 30,000 acres
Watershed Function
NYC owns 7%

Size of city a function of size of watershed

Croton

Water treatment
Sewage treatment plants in the watershed
Croton 53 sewage treatment plants
Water quality
Septic overload
Costly filtration

Catskill

water quality
Population low
Natural purification
Subdivisions

Delaware Watershed

Cannonsville problematic
Dairy farms
Algae bloom summer months
Phosphorous run off

Conservation and Filtration

Summary

Great technical achievement
Civic pride
Precedent Setting

The reach of the city and the condition of
dependency

Confronting nature

Dispelling anxieties
Building confidence to live in harmony
with nature.

Beginnings of the modern age