

UNITED STATES DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICE

**FOR NPS USE ONLY**  
RECEIVED APR 30 1976  
DATE ENTERED NOV 7 1976

## NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*  
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

### 1 NAME

HISTORIC

The Shot Tower

AND/OR COMMON

### LOCATION

STREET & NUMBER

Commercial Street and River Front

NOT FOR PUBLICATION

CITY, TOWN

Dubuque

CONGRESSIONAL DISTRICT

Second

STATE

Iowa

VICINITY OF  
CODE

COUNTY  
Dubuque

CODE

061

### CLASSIFICATION

#### CATEGORY

DISTRICT

BUILDING(S)

STRUCTURE

SITE

OBJECT

#### OWNERSHIP

PUBLIC

PRIVATE

BOTH

#### PUBLIC ACQUISITION

IN PROCESS

BEING CONSIDERED

#### STATUS

OCCUPIED

UNOCCUPIED

WORK IN PROGRESS

#### ACCESSIBLE

YES: RESTRICTED

YES: UNRESTRICTED

NO

#### PRESENT USE

AGRICULTURE

COMMERCIAL

EDUCATIONAL

ENTERTAINMENT

GOVERNMENT

INDUSTRIAL

MILITARY

MUSEUM

PARK

PRIVATE RESIDENCE

RELIGIOUS

SCIENTIFIC

TRANSPORTATION

OTHER:

### OWNER OF PROPERTY

NAME

City of Dubuque, under aegis of Dock Commission

STREET & NUMBER

River Terminal at E. 4th St., Mrs. Shirley Lange, Manager

CITY, TOWN

Dubuque

VICINITY OF

Iowa

STATE

### LOCATION OF LEGAL DESCRIPTION

COURTHOUSE,

REGISTRY OF DEEDS, ETC. Dubuque County Courthouse

STREET & NUMBER

720 Central Ave.

CITY, TOWN

Dubuque

STATE

Iowa

### 6 REPRESENTATION IN EXISTING SURVEYS

TITLE

DATE

FEDERAL STATE COUNTY LOCAL

DEPOSITORY FOR  
SURVEY RECORDS

CITY, TOWN

STATE

# 7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
<input type="checkbox"/> EXCELLENT	<input type="checkbox"/> DETERIORATED	<input type="checkbox"/> UNALTERED	<input checked="" type="checkbox"/> ORIGINAL SITE
<input checked="" type="checkbox"/> GOOD	<input type="checkbox"/> RUINS	<input checked="" type="checkbox"/> ALTERED	<input type="checkbox"/> MOVED DATE _____
<input type="checkbox"/> FAIR	<input type="checkbox"/> UNEXPOSED		

## DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

Original: 110' of limestone topped by 40' of brick. The four-sided structure measures 18'10" on each side. Walls 3' thick taper to 20" thick at the top of the stone work. The top of the brickwork is 12" thick. The structure is nine stories high, with 3 windows and a door on the first story, and 4 windows in each of the other eight.

A ladder structure inside enabled workmen to reach the 9th story. Lead was heated in a small building at the foot of the tower, transported to the top by a windlass system, then poured through a series of screens at each floor level. The screens were pieces of sheet iron with small holes punctured at 1/2" intervals. The lead dropped into cold water at the base of the tower to harden. It was then rotated in a cask to polish it, placed on an incline to roll through sieves to sort it as to size, then bagged for market.

The Tower was surrounded by lumber yards. In 1911 a fire destroyed these buildings, and gutted the inner wooden structure of the tower. Lacking attention in succeeding years, the Tower fell into disrepair.

Present: In 1959 a citizens' group raised money to repair the Tower. Old mortar was cut out and repointed; sills of windows were replaced with poured concrete. Tie rods were run through the structure to plates on the exterior. A 6" reinforced slab of concrete was poured over the top, providing a manhole. After pointing the brick, a clear silicon waterproofing solution was applied. A lightning rod system was installed, and screening in the windows to exclude birds.

Every effort was made to retain the original old appearance. However, the interior ladder structure was not restored. The Tower is currently a locked, empty shaft, enclosed in a locked iron fence. A grain shipping warehouse encroaches nearby.

# 8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW			
<input type="checkbox"/> PREHISTORIC	<input type="checkbox"/> ARCHEOLOGY-PREHISTORIC	<input type="checkbox"/> COMMUNITY PLANNING	<input type="checkbox"/> LANDSCAPE ARCHITECTURE	<input type="checkbox"/> RELIGION
<input type="checkbox"/> 1400-1499	<input type="checkbox"/> ARCHEOLOGY-HISTORIC	<input type="checkbox"/> CONSERVATION	<input type="checkbox"/> LAW	<input type="checkbox"/> SCIENCE
<input type="checkbox"/> 1500-1599	<input type="checkbox"/> AGRICULTURE	<input type="checkbox"/> ECONOMICS	<input type="checkbox"/> LITERATURE	<input type="checkbox"/> SCULPTURE
<input type="checkbox"/> 1600-1699	<input type="checkbox"/> ARCHITECTURE	<input type="checkbox"/> EDUCATION	<input type="checkbox"/> MILITARY	<input type="checkbox"/> SOCIAL/HUMANITARIAN
<input type="checkbox"/> 1700-1799	<input type="checkbox"/> ART	<input type="checkbox"/> ENGINEERING	<input type="checkbox"/> MUSIC	<input type="checkbox"/> THEATER
<input checked="" type="checkbox"/> 1800-1899	<input type="checkbox"/> COMMERCE	<input type="checkbox"/> EXPLORATION/SETTLEMENT	<input type="checkbox"/> PHILOSOPHY	<input type="checkbox"/> TRANSPORTATION
<input type="checkbox"/> 1900-	<input type="checkbox"/> COMMUNICATIONS	<input checked="" type="checkbox"/> INDUSTRY	<input type="checkbox"/> POLITICS/GOVERNMENT	<input type="checkbox"/> OTHER (SPECIFY)
		<input type="checkbox"/> INVENTION		

SPECIFIC DATES 1854

BUILDER/~~ARCHITECT~~ C.H. Rogers and Co.

## STATEMENT OF SIGNIFICANCE

The development of Dubuque was from the beginning predicated on the existence of large deposits of lead in the region of northeast Iowa. For many decades, however, Dubuque lead was processed in St. Louis, which, until 1854, boasted the only shot tower in the midwest. In that year, C.H. Rogers and Co. was engaged to build and operate a shot tower in Dubuque. Competition from St. Louis undermined the Dubuque operation almost from the start, resulting in several changes in ownership before 1859. The Civil War initially seemed a market for Dubuque-made shot, but the St. Louis producers, Chadbourne and Foster, countered with an offer to buy the shot tower. Once in possession, Chadbourne and Foster abandoned the structure. Its subsequent use was as a firewatch until 1911.

Even in 1875, Dubuque believed it had lead "enough to supply the world...for ages". But the lead is gone now, and mining in the region has turned to zinc. The Shot Tower remains as an artifact from the early prosperity of the lead business, a prosperity which founded and sustained Dubuque and northeast Iowa for many years.

# 9 MAJOR BIBLIOGRAPHICAL REFERENCES

Andreas, A.T. Historical Atlas of Iowa. 1875.  
 Dubuque Weekly Express and Herald, Nov. 25, Dec. 24, 1856.  
 Dubuque Herald and Times Journal, Ap. 22, 1910; Aug. 24, 1930; Oct. 11, 1931;  
 Dec. 25, 1949.  
 Dubuque Telegraph Herald, Aug. 31, 1959; Oct. 25, 1959  
 Estimate submitted by Geo. B. Jackson, Steeple-Jack and Tuckpointing Co., Dubuque,  
 Sept. 3, 1959.

# 10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY less than one acre

UTM REFERENCES

A	[ 1   5 ]	[ 6   9   2   7   0   0 ]	[ 4   7   0   7   7   8   0 ]	B	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]				
	ZONE	EASTING	NORTHING		ZONE	EASTING	NORTHING		ZONE	EASTING	NORTHING
C	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]	D	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]				

VERBAL BOUNDARY DESCRIPTION

located in an industrial area. Site is the middle of Commercial Street.  
 Bordered on north by grain terminal, east by levee and Dock Commission  
 office, south by railroad, west by open land.

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

# 11 FORM PREPARED BY

NAME / TITLE

Mrs. Kenneth Mercer

ORGANIZATION

Dubuque County Historical Society

DATE

26 Jan. 1975

STREET & NUMBER

2241 Lincoln Ave. (P.O. Box 305)

TELEPHONE

CITY OR TOWN

Dubuque

STATE

Iowa

# 12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL

STATE

LOCAL

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

STATE HISTORIC PRESERVATION OFFICER SIGNATURE

*Arlin D. Johnson*

TITLE

Director, Div. of Historic Preservation

DATE

4-22-76

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

DATE

*Ray P. [Signature]*  
 DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

DATE

11/9/76

ATTEST:

*W. [Signature]*  
 KEEPER OF THE NATIONAL REGISTER

DATE

11/1/76

**United States Department of the Interior  
National Park Service**

**National Register of Historic Places  
Continuation Sheet**

Section number \_\_\_\_\_ Page \_\_\_\_\_

**SUPPLEMENTARY LISTING RECORD**

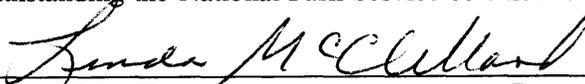
NRIS Reference Number: 76000767

Property Name: Rogers, George W. Company Shot Tower (Additional Documentation)

County: Dubuque State: Iowa

Multiple Name

-----  
This property is listed in the National Register of Historic Places in accordance with the attached nomination documentation subject to the following exceptions, exclusions, or amendments, notwithstanding the National Park Service certification included in the nomination documentation.

 \_\_\_\_\_  
Signature of the Keeper Date of Action May 22, 2003

=====  
Amended Items in Nomination:

Section 3/ State Certification

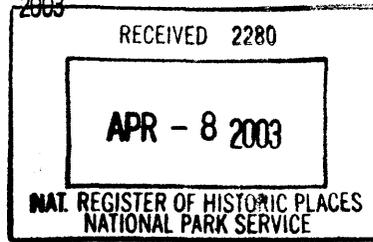
The Level of Significance at which property is considered significant is hereby changed to "State." Upon correction and clarification as noted in the concurrent NHL review (see attachment), the level of importance may be raised to "National."

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The Iowa State Historic Preservation Office was notified of this amendment.

**DISTRIBUTION:**

- National Register property file
- Nominating Authority (without nomination attachment)

MAR - 6 2003



AD

**United States Department of the Interior  
National Park Service**

**National Register of Historic Places  
Registration Form**

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

**1. Name of Property**

historic name George W. Rogers Company Shot Tower (Revised, expanded and updated)

other names/site number Dubuque Shot Tower

**2. Location**

street & number Commercial Street and River Front [N/A] not for publication

city or town Dubuque [N/A] vicinity

state Iowa code IA county Dubuque code 061 zip code 52002

**3. State/Federal Agency Certification**

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this  nomination  request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property  meets  does not meet the National Register criteria. I recommend that this property be considered significant  nationally  statewide  locally. ([ ] see continuation sheet for additional comments).

Ronell J. Soite March 26, 2003  
Signature of certifying official/Title Date  
**STATE HISTORICAL SOCIETY OF IOWA**

State or Federal agency and bureau

In my opinion, the property  meets  does not meet the National Register criteria. ([ ] See continuation sheet for additional comments.)

\_\_\_\_\_  
Signature of certifying official/Title Date  
\_\_\_\_\_  
State or Federal agency and bureau

**4. National Park Service Certification**

hereby certify that the property is:

- entered in the National Register.
- See continuation sheet.
- determined eligible for the National Register.
- See continuation sheet.
- determined not eligible for the National Register.
- removed from the National Register.
- other, (explain:)

Signature of the Keeper

Date of Action

Sandra McCallard

May 22, 2003

George W. Rogers Company Shot Tower  
Name of Property

Dubuque County, Iowa  
County and State

**5. Classification**

**Ownership of Property**

(Check as many boxes as apply)

- private
- public-local
- public-State
- public-Federal

**Category of Property**

(Check only one box)

- building(s)
- district
- site
- structure
- object

**Number of Resources within Property**

(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
_____	_____	buildings
_____	_____	sites
<u>1</u>	_____	structures
_____	_____	objects
<u>1</u>	<u>0</u>	Total

**Name of related multiple property listing**

(Enter "N/A" if property is not part of a multiple property listing.)

N/A

**Number of contributing resources previously listed in the National Register**

0

**6. Function or Use**

**Historic Functions**

(Enter categories from instructions)

Industry/Processing/Extraction/manufacturing facility

Recreation and Culture/monument/marker

Industry/Processing/Extraction;communications facility

**Current Functions**

(Enter categories from instructions)

Recreation and Culture/monument/marker

**7. Description**

**Architectural Classification**

(Enter categories from instructions)

Mid-19<sup>th</sup> Century/Exotic Revival

**Materials**

(Enter categories from instructions)

foundation stone

walls stone

brick

roof N/A

other

**Narrative Description**

(Describe the historic and current condition of the property on one or more continuation sheets.)

George W. Rogers Company Shot Tower  
Name of Property

Dubuque County, Iowa  
County and State

## 8. Statement of Significance

### Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- A** Property is associated with events that have made a significant contribution to the broad patterns of our history.
- B** Property is associated with the lives of persons significant in our past.
- C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- D** Property has yielded, or is likely to yield, information important in prehistory or history.

### Criteria Considerations

(Mark "x" in all the boxes that apply.)

Property is:

- A** owned by a religious institution or used for religious purposes.
- B** removed from its original location.
- C** a birthplace or grave.
- D** a cemetery.
- E** a reconstructed building, object, or structure.
- F** a commemorative property.
- G** less than 50 years of age or achieved significance within the past 50 years.

### Narrative Statement of Significance

(Explain the significance of the property on one or more continuation sheets.)

## 9. Major Bibliographical References

### Bibliography

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

#### Previous documentation on file (NPS):

- preliminary determination of individual listing (36 CFR 67) has been requested
- previously listed in the National Register
- previously determined eligible by the National Register
- designated a National Historic Landmark
- recorded by Historic American Buildings Survey  
# \_\_\_\_\_
- recorded by Historic American Engineering Record # \_\_\_\_\_

### Areas of Significance

(Enter categories from instructions)

Industry  
Architecture

### Period of Significance

1856-1953

### Significant Dates

1856 (see Continuation Sheet)

### Significant Person

(Complete if Criterion B is marked above)

N/A

### Cultural Affiliation

N/A

### Architect/Builder

Unknown

### Primary location of additional data:

- State Historic Preservation Office
- Other State agency
- Federal agency
- Local government
- University
- Other
- Name of repository: \_\_\_\_\_

George W. Rogers Company Shot Tower  
Name of Property

Dubuque County, Iowa  
County and State

**10. Geographical Data**

**Acreege of Property** less than one acre

**UTM References**

(Place additional UTM references on a continuation sheet.)

1 [1][5] [6][9][2][7][0][0] [4][7][0][7][7][8][0]  
Zone Easting Northing

2 [ ]  
Zone Easting Northing

3 [ ]

4 [ ]

See continuation sheet

**Verbal Boundary Description**

(Describe the boundaries of the property on a continuation sheet.)

**Boundary Justification**

(Explain why the boundaries were selected on a continuation sheet.)

**11. Form Prepared By**

name/title James E. Jacobsen

organization History Pays Historic Preservation Consulting Firm date March 5, 2002

street & number 4411 Ingersoll Avenue telephone 515-274-3625

city or town Des Moines state IA zip code 50312

**Additional Documentation**

Submit the following items with the complete form:

**Continuation Sheets**

**Maps**

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

**Photographs**

Representative **black and white photographs** of the property.

**Additional items**

(Check with the SHPO or FPO for any additional items)

**Property Owner**

(Complete this item at the request of SHPO or FPO.)

name City of Dubuque

street & number City Hall, 13<sup>th</sup> & Central telephone \_\_\_\_\_

city or town Dubuque state IA zip code 52002

**Paperwork Reduction Act Statement:** This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 et seq.).

**Estimated Burden Statement:** Public reporting burden for this form is estimated to average 18.1 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Projects (1024-0018), Washington, DC 20503.

**United States Department of the Interior  
National Park Service**

**National Register of Historic Places  
Continuation Sheet**

**Section number** 7 **Page** 1

George W. Rogers Company Shot Tower\_(revised, expanded and updated)

Dubuque County, Iowa

**1. Additional Significant Dates:**

1872, 1877, 1881, 1911

**7. Narrative Description:**

Descriptive Summary:

The Dubuque Shot Tower<sup>1</sup> consists of a tapered square-cut masonry hollow column form. The whole structure stands 120 feet five inches above the current ground level. Seven stories (82'11") are of Galena Dolemite stone construction, and the uppermost three stories (37'6") are built of soft red brick. There is strong evidence that some of the originally exposed column base is now buried, as is an estimated 15-20 feet of stone foundation.

The load-bearing masonry walls are progressively reduced from a base width of three feet to just one foot at the top of the tower. The base measures 19'2" square, while the cap measures 12'4" square. The square interior shaft is a consistently square 13'2" x 13'2".

The structure's exterior walls are of a somewhat varied construction. While each floor level is provided with four identical rectangular window openings, the majority of which have plain stone lintels. The three lowermost levels of the stonework utilized stone voussoirs, save for the entrance. The lintels are set flush while stone sills project beyond the wall plane. A number of the stone lintels have untrimmed ends, an indication that stone refuse was being used to reduce construction costs. The stonewalls comprise small-scale white limestone and is laid in a random ashlar manner. Heavier quoin stones strengthen the corners of the stonework. The brickwork is of varied colors and is laid in alternating running and rowlock brick courses.

The tower is located on Dubuque's former riverfront, on the northwest corner of Fourth and Commercial streets. Its monumental scale and its prominent location made the tower a community icon. After 1887 the city's vehicular traffic passed by the tower to the south when the first Mississippi River bridge was opened. This is the only Iowa example of a shot tower and it survives today as the only Midwestern pre-Civil War example of its type.

Significant dates which mark the history of the structure are 1856, original construction; 1872, the addition of the rooftop statue (removed 1881); 1877-major renovation (apparently the construction of a permanent interior spiral stairway); 1881, the conversion of the shot tower into to fire watch tower (construction of a frame glassed observation tower as a tenth floor); and 1911, the gutting of the tower by fire.

Detailed Description:

Like many early icons, the Shot Tower has been the continuous recipient of historical interest, but until very recently, few researchers bothered to dig beyond the readily available and oft-rehashed body of tower information. Primary sources were ignored and the structure itself was never thoroughly investigated. Conflicting physical statistics and a dearth of solid historical data typify available tower accounts.

This nomination amendment effort provides the opportunity to clarify confusing points and to isolate the key "unknowns" which deserve further exploration. This effort builds upon and continues excellent work recently completed by

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<sup>1</sup> For convenience, the traditional name, "Dubuque Shot Tower" will be used in the text of this amended nomination, in lieu of the longer historical name, "George W. Rogers Company Shot Tower."

**United States Department of the Interior  
National Park Service**

**National Register of Historic Places  
Continuation Sheet**

**Section number** 7 **Page** 2

George W. Rogers Company Shot Tower\_(revised, expanded and updated)

Dubuque County, Iowa

Ronald Balmer, IIW Engineers & Surveyors, P.C., of Dubuque. This firm performed an intensive level structural and historical study of the shot tower during 2002 (refer to bibliography).

The most significant “unknown” involves the foundation supports and the base of the tower. The HABS-HAER drawings depict seven stone floor levels and further depict a rounded well opening at the base. The same source depicts and measures a four-stage stone spread footings with a six-foot width. The drawing however notes “exact condition of footing undetermined.” If the HABS team did indeed have access to the base of the tower and were able to directly describe the reported “well” then their drawings are accurate. Hypothesis on their part is more probable. Ronald Balmer proposes that some considerable portion of the base is now buried, given that the original floodplain level as of c.1856 was much lower than is the present-day ground level. Balmer’s hypothesis is driven by varied elevations which are given for the structure. A detailed description penned in late 1856 gave the elevation as 150 feet, 30 more feet than are to be presently accounted for. It is highly doubtful that the buildings were able to reach bedrock at this site located in the middle of the Mississippi River valley. Lacking that support, wood pilings capped with a stone foundation would have been probable. Obviously hopes for productive historical archeology are pinned on the presence of these buried floor levels. The present base is filled with flood sediments and there is no indication of the well described during the 1930s.

Lesser mysteries involve the reason for the switch from stone to brick construction at the seventh floor level, and the question of whether the stone walls are solid or consist of a filled interior and exterior wall building system.

Overall Plan and Massing:

The Shot Tower plan consists of a plain, tapered column that is square in section. Figure I depicts the most accurate rendition of the structure’s overall form and scale. The lower seven stories were laid up in rubble stone, while the upper three floors were of brick construction.

Exterior Walls:

The structure represented an expensive construction project for its day but a number of physical characteristics hint at an effort to limit those costs. A number of the stone lintels were untrimmed at least in part, an indication that the stone was reused or was flawed surplus from other building sites. The stonework is of small-scale rubble construction with random ashlar coursing. One might expect a use of larger stones in the lower portion of the stone wall, and certainly larger corner stone quoins are mandated in stone construction. The non-use of standard, large squared building stone is a surprise, given the record vertical scale of the building plan. The white limestone is atypical of Dubuque stone construction, the quarry source being from the Illinois side of the Mississippi River (Galena Dolemite).

The stone wall is probably of solid stone construction given that small-scale stone is used in the outer shell. A hollow wall or rubble filled construction method would mandate the use of a more substantial and regularly coursed exterior stone shell. The wall tapers progressively back towards a hollow interior shaft (13’2” square). At the column base the walls are three feet thick. At the cap of the stonework, the walls measure 20 inches in thickness. At the uppermost level, the brick walls are just seven inches thick, or the width of two layers of brick.

Figure 2 illustrates a number of stonewall characteristics. Most notable is the nature of the stone itself and the coursing. The crude stone voussoir arch is used on the lowermost three stories of the tower. The plain stone lintels are used above that point. This switch, during construction, represents either the belated availability of the surplus and imperfect lintels, or the realization that the lintels promised a stronger tower. The cast concrete sill and wood louver infill both date from the repair work of the 1960s.

United States Department of the Interior  
National Park Service

National Register of Historic Places  
Continuation Sheet

Section number 7 Page 3

George W. Rogers Company Shot Tower\_(revised, expanded and updated)

Dubuque County, Iowa

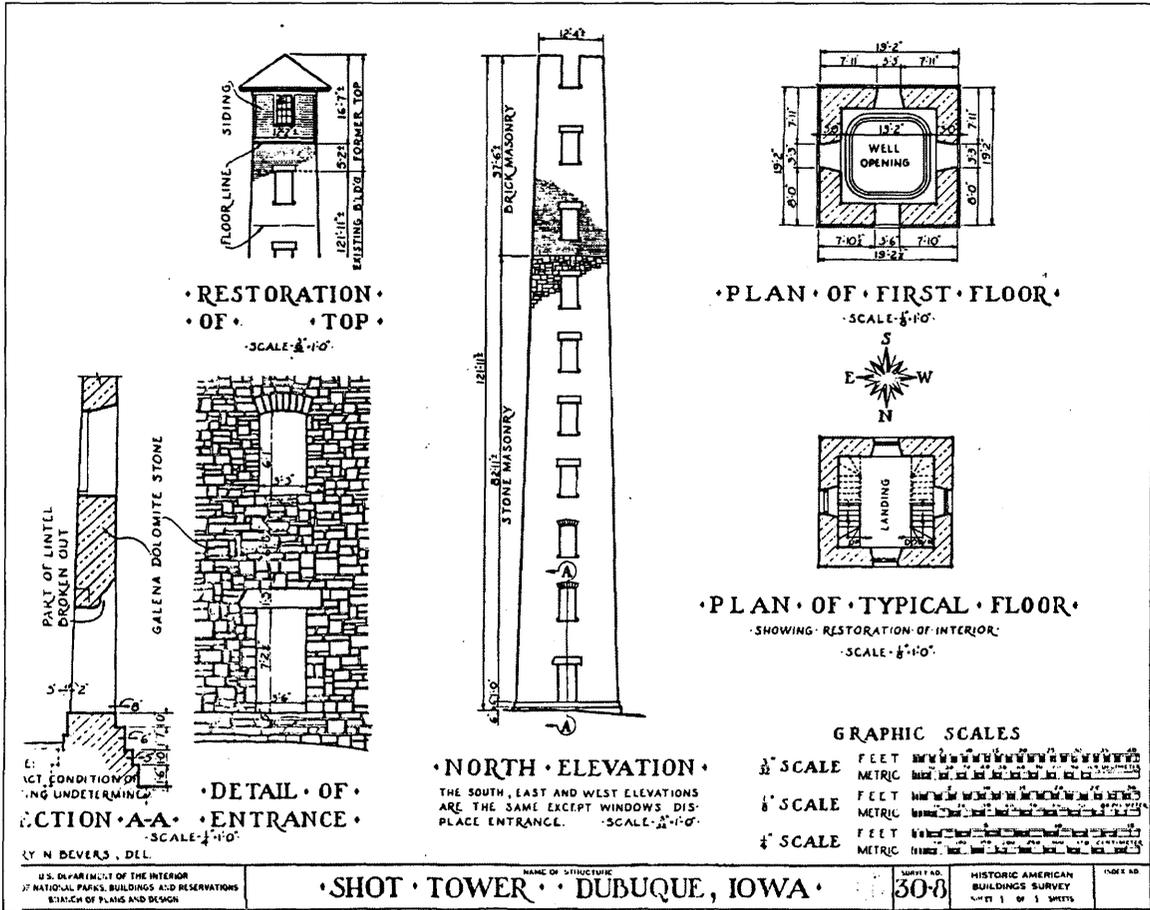


Figure I: Historic American Buildings Survey scaled drawing, 1934  
(Library of Congress, HABS-HAER Collection)

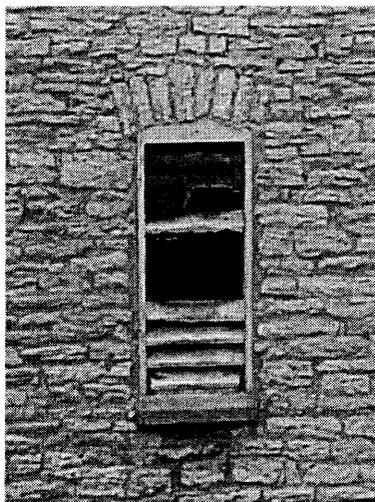


Figure 2: Exterior stonework, window and voussoir arch example, third floor, north face  
(photo by IIW, 2001)

**United States Department of the Interior  
National Park Service**

**National Register of Historic Places  
Continuation Sheet**

**Section number** 7 **Page** 4

George W. Rogers Company Shot Tower\_(revised, expanded and updated)

Dubuque County, Iowa

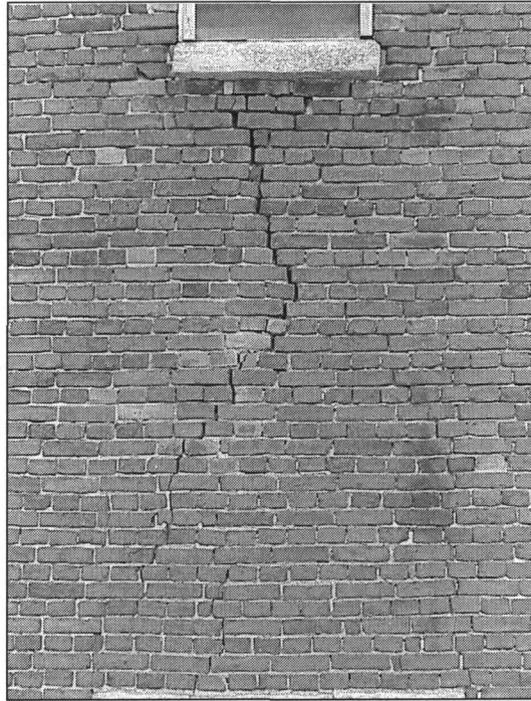


Figure 3: Exterior brickwork example, eighth floor, north face  
(photo by IIW, 2001)

Figure 3 illustrates the exterior brickwork coursing. The brick coursing consists of patterns of alternating rowlock and stretcher rows, and of double stretcher rows between rowlock courses. In this image, the former is used in the lower two-thirds of the view, the latter above that level. The double stretcher course brick coursing pattern is used on the upper half of the brickwork. As Figure 3 indicates, this is a good coursing method to tie the exterior wall plane into the back wall, but it is more vulnerable to vertical cracks due to the extensive use of rowlock brick courses. Another cause of structural failure is the inclusion of cut brick in the middle of the courses. The cut brick enabled the obelisk form to be built, but placement in the center of the course produced a weaker vertical joint.

Stone voussiors were used on the lowermost three floors, while stone lintels were uniformly employed above that point, apparently as a means of strengthening the structure. Figure 2 indicates that these arches were narrow and rudimentary, lacking spring or keystones. The stone lintels are longer, and consist of plain stones which were set flush with the exterior wall plain. The original window lintels are not identified, and might have been of wooden construction. It is known that the original lintels were set flush as were the lintels and the 1960s work replaced these with projecting concrete sills which were then thought to be protective of the walls and openings. The original window infill, if any was employed, is also undetermined.

Four sets of tie rods and cast iron star bolt anchors, were added to the tower in 1960. Three paired sets tie together the north and south walls at the fifth, seventh and ninth floor levels. The fourth set ties together the east and west walls at the base of the ninth floor (see Figure 5 below).

A broad concrete collar was cast around the base of the structure in 1960. It stands about three feet high and is a foot thick. The base around the tower is recessed. A stone retaining wall encircles the base in an elongated off center rectangle. The commemorative plaque is above the east door (see Figure 4 below).

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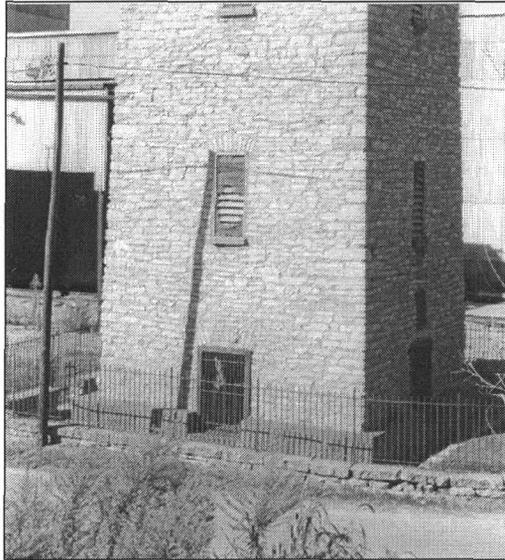


Figure 4: Shot Tower base detail, view to the northwest (August 2002, photo by James Jacobsen)

A concrete cap roof with a hatchway was added to the tower in 1960 and replacement brick was used to reconstruct the lost upper portion of the ninth floor. The change in brick color at this level indicates that the surviving wall was demolished down to or even below the sill level. Five short lightning rods were spaced across top of the structure at this same time.

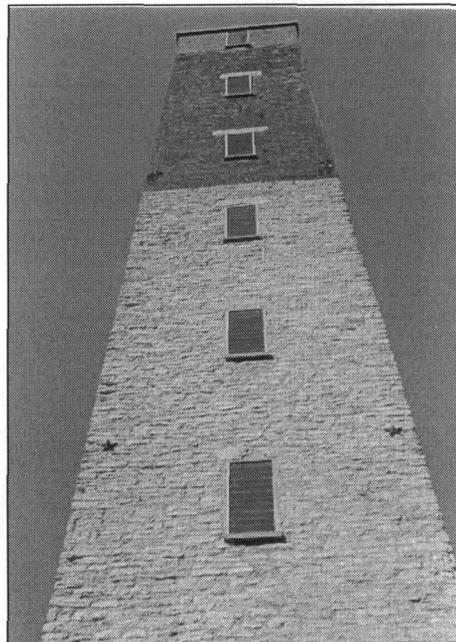


Figure 5: upper detail, south tower face (August 2002, photo by James Jacobsen)

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Interior Notes:

The structure interior has been largely ignored until very recently. The interior shaft has yet to be closely examined to locate any joist holes for the stairway and floor systems. It would appear that the interior walls were largely “tuck-pointed” with a generous coating of concrete, and that all voids were filled and obliterated. All of the interior arches were also reinforced with cast in place large concrete lintels. The window and door sidewalls are angled inwards so that the openings are wider on the plane of the interior wall than they are at the exterior wall plane. The base of the structure is filled with guano and flood sediments above the ground level. No sub-surface investigation has been made of these materials. The “well” measured and identified in 1934 is not apparent. No investigation has been made of the foundation system and there is a good chance that there is at least one additional floor level buried in the sediments.

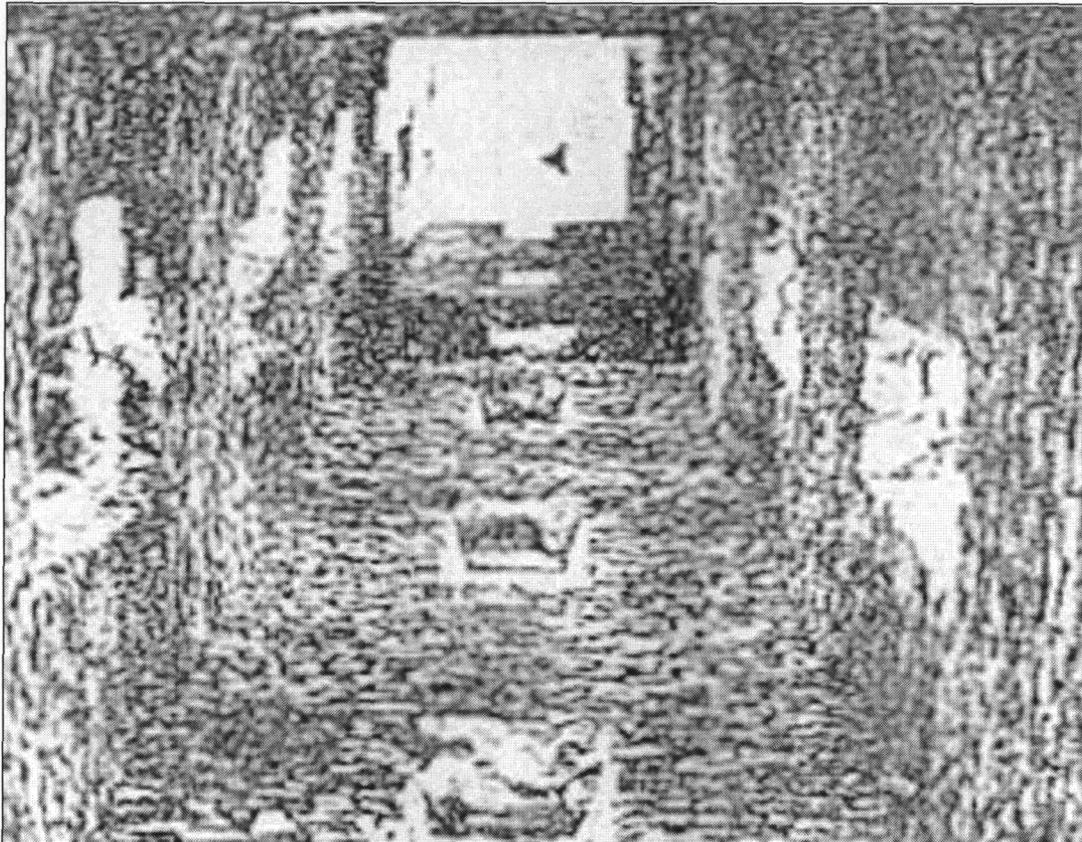


Figure 6: Interior view, 1959  
(*Telegraph-Herald*, October 25, 1959)

Figure 6 presents an interior view of the tower. Note that the interior walls are fairly vertical. There are no obvious joist voids from floors or ladder or stair mounts although there is a vague pattern of two principal joint holes at each floor level. These voids were all filled in when the tower interior was renovated in 1960, so there is no evidence of them at present. Note that the stone lintels are decorative touches only for the exterior front of each opening. The bulk of each opening comprises stone voussoir arch work behind each lintel. These arches were damaged on the interior wall plane by the 1911 fire. This photo cannot be made today due to the concrete cap atop the tower. As of 1959 the roofless tower and open windows allowed for plenty of interior light.

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Physical History:

The following timeline and physical changes relate to the present-day Shot Tower structure.

1856: original construction.

It is assumed that the present structure was built at one point in time, and that the brick and stone sections were originally envisioned as built. The original tower cap was likely a frame hip roof form. The uppermost lintels and brickwork were lost in the 1911 fire.

1858: The birds eye view depicts the tower at its present height, or at least with its stone and brick sections in place. An attached frame structure is also shown.

The historical accounts (refer to Section 8, below) indicate that a frame building was added in the spring of 1857. A lithograph shows this building standing on stilts. The 1856 tour of the facility shows that the steam engine was in a separate adjacent building (there wasn't room for a steam engine within the tower). If this is the case, then initial the ten-foot ascent was into this building, rather than the tower itself. All evidence indicates that this facility was designed for a small-scale, seasonal operation with a small workforce. The original tower ascent was made by a series of ladders. The January 1862 collapse of the floor of the frame building appears to indicate that a raised building on stilts was still in use. The 1861 lithograph (see below), which shows a two-story frame building is so inaccurate as to the tower, there is no reason to think that the building is accurately portrayed either.

1874-81: A statue of Andrew Jackson was placed atop the tower. The wood and iron reinforced statue was removed due to deterioration, when the lumber company acquired the tower in 1881. No images showing the statue in place have been found. Photos from this period are inconclusive as to whether the adjacent frame building was extant.

The statue was a private venture and a surprise to the community. A steeplejack put the statue in place, so the statue was apparently lifted up on the outside of the tower. It otherwise had to pass up within the structure, being raised in either way by block and tackle. A substantial statue of any size would have required a large workforce. The implication is that the tower had an intact roof that could support the statue. No image of the statue in place has been found. Articles from 1873 and 1879 indicate that the original wooden stairway, probably a squared off spiral arrangement, remained in place but was deteriorating. This stair system likely replaced the original ladders c.1857-59.

1881: The Standard Lumber yard acquired the structure and began to use it as a fire-watchtower.

1887: The "observatory" atop the tower was replaced. The adjacent vehicular bridge to Illinois was completed and the tower was suddenly a prominent icon (*Herald*, November 24, 1887).

The addition of the observatory appears to be directly related to the new public visibility of the tower. The newspaper account stated "the watchman will begin his solitary vigil" implying that the fire sentry box was a new use for the tower. It is known that the lumber company owned the structure from 1881 onwards and used it for this purpose. The same account also adds "It is a grand spot for a view," an implication that there was some opportunity for public visitation. Photos show both a hip roof cap (1889) and a flat roof addition on the structure.

1911: The tower was gutted in the famous Standard Lumber fire. The uppermost brickwork and window lintels were lost and the interior gutted.

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The structure had wooden covers on its windows at the time of the fire. The fire burned from the top down and gutted the structure.

1915: The tower site was purchased for use as a park.

Nothing appears to have been done beyond acquisition of the property.

c.1937: HABS-HAER documentation of the tower.

The structure was effectively abandoned and its state was that of the post-fire ruin. The windows and rooftop were open. The site was not overgrown, which indicates that some groundcover control was in place.

1960: The tower exterior was tuck-pointed and in some places stuccoed with concrete. The tower base was excavated and fenced as a park. The stair system was replaced and public tours were briefly held. Wooden louvers were placed inside the windows and concrete sills replaced lost stone sills.

The municipal Dock Board Office was responsible for the tower. By this time the structure was located in the center of the unpaved and undeveloped Commercial Street extension. The Dock Board determined to repair the tower in mid-April and contracted with George B. Jackson & Sons to complete a work plan that was developed by Bartels & McMahan Engineering Company. The work included spot tuck-pointing, the emplacement of cast concrete lintels and sills, casting a concrete roof cap with a 30"x60" trap door opening, the installation of security iron grills (2.5" openings) on the lowermost openings, casting a 12"x1'6" concrete base around the structure foundation, waterproofing the exterior with a silicon coating, adding eight tie rods, a "five point two ground" lightning rod system, and replacing (and staining) failed or lost brickwork. Inside the tower, concrete bulkheads reinforced each stone window and door arch and filled voids at the tops of these openings. The entire interior wall surface was coated with a concrete mixture.

1960: The Dock Board approved leaving the area around the tower open for use as a small park. Subsequent to this the tower gained a cast iron fence, commemorative plaque, and a concrete foundation circle around its base.

1963: The tower gained a historical marker at the behest of the Dubuque Chapter of the Daughters of the American Revolution.

1969: The city floodwall was built, providing protection for the tower. The floodwall encourages and makes possible the construction of warehousing immediately adjacent to the tower. Railroad spurs are also laid close to the tower.

1986-87: Active consideration was made of a proposal to move the tower into the downtown based on a market/development study conducted by a team from the University of Wisconsin on behalf of the Greater Dubuque Downtown Committee. Municipal funding for planned 1991 tuck pointing work was reduced.

1991 [November 17]: A railroad car damaged the foundation with damages valued at \$5-10,000. The railroad paid the repair bill and the city did the work.

2002: Structural evaluation by IIW.

2002-03: Amendment made to National Register Listing, elevating the tower's significance level to national.

2003: National Historic Landmark nomination prepared and submitted.

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Location:

When originally constructed, the Shot Tower occupied the northern end of a riverfront levee, a site that was well east from the city proper. The site was actually in the river when it is platted on the original town plat map. It appears that the filling process that made the Shot Tower construction possible, took place in the mid-1850s. It is also possible that the tower builders were able to utilize a semi-dry caisson construction method to construct the foundation. The reason for this tower location is undetermined. The site was well away from lead and fuel sources and construction was certainly impeded by the need to ship stone and brick to this point.

From 1856 until the 1870s, the tower was part of a warehousing and shipping context. The levee was reached from the north via an extension of Seventh Street. By the early 1860s the Dubuque and Sioux City Railroad had elevated trackage that ran behind the tower. The addition of the railroad bridge, completed December 15, 1868, caused the trestling of the railroad line running immediately south of the tower. Over time this trestle was buried or replaced with a built up levee. By the early 1880s the area between the tower and the city was raised and platted and lumberyards occupied a vast area around and to the west of it. A large brewery was in operation immediately south of the tower and tracks. The Dubuque Star Brewery building (1898) remains there today (see Figure 71). The 1887 completion of the first Mississippi River vehicular bridge coincided with the eastward extension of Fourth Street. That street was thereafter a prominent entrepote into the city. The 1911 Standard Lumber fire marked the end of a generation of massive lumber yards in the city and the tower has stood in quiet undisturbed isolation, apart from rail and road traffic, until fairly recently (Oldt, pp. 637-39).

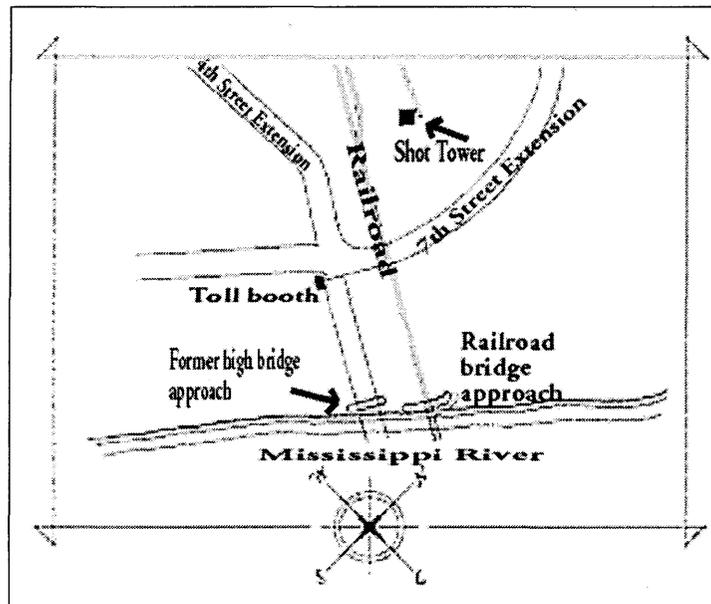


Figure 7: HABS locational map  
(Library of Congress, HABS-HAER Collection)

Figure 7 depicts the relationship of the tower site to the river, railroad and Fourth Street. It also shows that like most Dubuque buildings, the tower was sited without regard to the compass. The Peavey Company Warehouse which stands quite close to the tower, dates to c.1969.

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Figure 8: present day appearance of the Shot Tower, view to the southeast  
(photo by IIW, 2001)

Figure 8 shows the present-day setting of the tower with the Peavey Warehouse in the background. The corner of the brewery building is visible at lower left, as is the railroad track which runs immediately south of the tower. Also visible is the 1960 concrete cap.



Figure 9: Aerial view of the tower, view to the north (photo by IIW, 2001)

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Designer and Contractor:

Neither the architect/designer or the contractor are mentioned in the numerous contemporary Shot Tower accounts. It is probable that the structure was architect designed, given the need for a solid foundation on a difficult building site, and particularly given the unusual form that was given the tower, the obelisk or tetragonal form. It is more than likely that an architect, who was unfamiliar with shot towers and their technology, produced an exotic revival style obelisk, one that was too short to accomplish its purpose. The 1856 state census reported just two architects in Dubuque but there were at least four in the city. Two were in a new partnership, these being John Francis Rague (1799-1877) and John N. Moody. They first advertised their new firm on October 17, 1856. Architect John D. Abbey first advertised his services on April 30, 1856. Architect F. G. Brandt was announced as a "newcomer" on November 7, 1856. He favored the Italianate style but was apparently not in the city when the Shot Tower was designed. Rague is a strong candidate, given his design the very next year of an Egyptian style County Jail at Dubuque and his French heritage. He came to Dubuque in 1854 (Hoffman, *Express & Herald*, April 30, October 17, 1856; *Daily Republican*, November 7, 1856; August 26, 1857).

As for the contractor, the 1856 state census recorded six builders, a dozen stone masons and 43 bricklayers as residing in Dubuque. What is certain is that the Shot Tower stonework is an example of impressive craftsmanship. The stonework is not typical of Dubuque stonework of the period, which is more rigorously coursed and it required considerable skill to attain the obelisk form using stone rubble. The changes from stone voussiors to lintels, and the change from stone to brick, hint at a stringent economy of construction. The structure was also built very quickly, but the contractor is unidentified.

Foundation and Footings:

Nothing is known about the underpinnings of the shot tower but they are surely quite substantial. The depth of bedrock in this setting is also undetermined, but a good estimate would be 40 to 60 feet. Historical records document a very rapid construction of the tower and no mention is made to its foundation system. It is possible that construction began only after the support system was complete.

The probable support system consists of timber pilings which were driven to bedrock. These would have been leveled and capped. A series of heavy limestone block layers would have stepped up and back to the surface, ending in footings which would match the tower footprint. It is probable that very large carefully cut yellow limestone blocks would have been used for the foundation.

In 1858 English civil engineer Robert Rawlinson penned a series of recommendations for providing adequate support for a tall structures. He warned that "the foundations of a chimney may require extraordinary precautions...solidity alone from a considerable depth can alone be relied upon [to support a tower]...and simple enlargement [of the foundations] is not enough." Uneven or compressible ground could not be tolerated. An adequate foundation could only be achieved through "piling, deep sinking, heavy ramming, or heavy weighing." Rawlinson recommended that the foundation be one-fourth as high as the structure that it supported. Failing that, the "foundation should [at least] be made secure to [the necessary] depth." Anticipating a criticism that his tall and square designs would be vulnerable to wind pressures because of the large areas that were exposed to the wind, he countered "a wind will not injure a sound structure standing on a good foundation (Rawlinson, pp. 1-5)."

The very structural success of the shot tower reflects the very best engineering and design available for its time and likely represents a substantial portion of the original construction cost. At some future date the details of the tower's foundation will be determined and it is probable that a good case for significance under Criterion D (the potential of a building/structure to yield information about innovative construction techniques) can be made.

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Archaeology:

No archeological work was carried out in conjunction with this nomination amendment effort. This document proposes that there is a strong potential to yield information (Criterion D, structures and buildings) relative to the underground support system of the Shot Tower.

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**8. Significance Statement:**

Significance Summary:

This nomination amendment changes the level of significance for the Dubuque Shot Tower to national significance (no level of significance was established in the original 1976 listing). The Dubuque Shot Tower is nationally significant under Criterion C because it is a rare and unique surviving example of the shot tower property type. It is the only tapered square obelisk shot tower example. It is the only surviving mid-19<sup>th</sup> Century example of its type and the only surviving shot tower that represents lead shot production technology of its time.

The Shot Tower is the only surviving pre-Civil War Dubuque industrial structure and it is directly associated with the later phase of Dubuque's important lead mining industry. It was lead that first determined the city's location and which made possible its explosive growth as the state's first city. Lead-derived wealth was the basis of a city heritage of financial self-sufficiency that enabled it to weather bad financial times even as growth on the part of its competitors was slowed or briefly halted. As a key Mississippi River industrial power, the city dominated an up-river market and settlement process. It naturally competed with rival downriver cities, notably Galena, Illinois, and St. Louis. The Shot Tower represents the direct competition between the two cities in the marketing of processed lead.

The Shot Tower is a rare survivor for its type and period, and its survival is quite wondrous. It was very nearly purposely demolished in 1862 when it's St. Louis rivals obtained ownership of it. The tower survived the threats of fire, collision and abandonment. By the early 1870s it was celebrated for its prominent location and its already-achieved landmark status. Infilling between the levee and the city proper drew the tower closer to public association and the completion of the 1887 vehicular bridge across the Mississippi River linked the city's principal vehicular gateway, Fourth Street, with the tower. There is some indication that the tower served as a viewing point for residents along with its role as a fire lookout tower for the lumber mill interests. Local interest in developing the tower as a park and historical resource date to c.1915. It was to have been used to honor the late U.S. Senator Allison. The tower was a photographic icon throughout the next several generations and it was documented by HABS-HAER in 1934, a clear indication that the tower was then deemed to have some national significance. The tower was stabilized and restored in 1960 and marked in 1963. Its chances for a much-belated development as an available and properly maintained and interpreted historical property are only now certain as Dubuque takes action to develop a riverfront walkway area.

Dubuque emerged early on as Iowa's premier city by all key measures, population, industry and wealth. Its early dominance was the direct result of its lead-mining wealth. Dubuque and particularly the Catholic Church which was the seat of the Archbishop in Dubuque, dominated and largely directed the early settlement of much of northern and western Iowa and the Upper Mississippi River region generally. While the Shot Tower enjoyed dubious and fitful success during 1856-58 as a producer of lead shot, it was briefly refurbished for use during the first year of the Civil War. The Shot Tower is consequently directly associated with the settlement of the state, the development of the state's lead-mining industry, and its efforts to mobilize its military resources in response to the Civil War.

The National Shot Tower Design Context:

The best historical source on American shot towers was penned by Dr. Carey P. McCord for the *Industrial Medicine and Surgery Journal* in 1958. This unusual publication was an appropriate one for the topic given the direct association between the toxic lead shot industry and human health. Dr. McCord's thesis was that no other industrial process had survived so long with so little fundamental change in its process. The actual technology of shot making will be treated later on but suffice it to say that for 200-plus years, the process of producing lead shot could be accomplished using the same structures and

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pretty much the same equipment. Necessarily, a nearly static lead producing technology was paralleled by an equally standardized and fairly simple industrial architecture.

The shot tower was a commonplace urban landmark in American urban centers by the early 1800s. Shot towers vied with church steeples and public buildings as visual landmarks and it was said that nobody had to inquire where the local shot tower was. At its height, the American shot tower industry counted 25 towers in operation. They acquired symbolic importance early on and commonly were the locations of important local celebrations. The Beck tower in Philadelphia was the venue for a massive torchlight celebration of the signing of the Treaty of Ghent, on February 15, 1815, the conclusion of the War of 1812. Edgar Allen Poe was so intrigued by the Phoenix/Merchants' Philadelphia shot tower that he placed an advertisement promising that a man would attempt to fly from the top of the tower to the Lazarette Lighthouse on the bay. A huge crowd gathered and finally realized that the promised feat was scheduled for All Fools Day (1839). Many of the early shot towers which survived into the 20th Century were acquired for the use as monuments by local governments (McCord, pp. 622-24).

Based upon visually documented American shot towers, this study proposes that extant and non-extant, American shot towers can be divided into three general architectural groupings, defined by form and chronology. The first period dates from 1808 through c.1850 (this equates with the closing years of what is termed the second epoch and the first 24 years of the third epoch, of the domestic lead industrial history, see below). Shot towers of this first period are free-standing towers which lack any architectural adornments. They are simple functional towers. Many of the earliest American shot towers were built in direct response to the Embargo Acts of 1807-09 which halted the importation of English produced lead shot, or to meet munitions needs created by the subsequent War of 1812. The second era dates from the middle-19<sup>th</sup> Century, and represents shot towers which were built between Chicago and San Francisco (the conclusion of the third historical epoch and the beginning of the fourth one, 1869-1900). This second era is defined architecturally by the elaboration of the basic shot tower form. The tower is still structurally separate from a factory base and is distinctly visible as a structure, but it is more highly ornamented. The final or third phase of tower design and construction dates from 1900 onwards. This final phase incorporated the shot tower structure into larger industrial complex, usually adding a factory base to the tower. In this final period, the tower is only partly visible in the form of a roof top feature, or it is more rarely completely contained within a larger factory building. Phase III dates from c.1900 (the final years of the fourth and final epoch of the lead industry history).

Many American shot towers combined shaft drops and shorter head buildings. The latter lengthened the drop and housed related equipment and furnaces. These are not true shot towers if one accepts the premise that a shot tower must be mostly or fully visible and above-ground in an architectural sense. The tower is the production process. Some towers were augmented with fairly deep wells, but the towers still comprised the vast majority of the overall dropping distance. While all shot towers are included in this contextual overview, only true shot towers are considered in comparison with the Dubuque Shot Tower. There is only one surviving example of the combination shaft and head building arrangement, that being the New River, Virginia example. One other tower has been reconstructed (Spring Green, Wisconsin).

**Phase I Shot Towers (1808-1850):**

Phase I shot towers are notable for their absolutely functional designs. Most assume the form of exaggerated smokestacks and there was never any public recognition of them akin to that awarded lighthouses. All known early American shot towers had designs which produced strong and tall buildings, both requisite for the towers' purpose. The round form was the easiest and strongest to achieve these ends.

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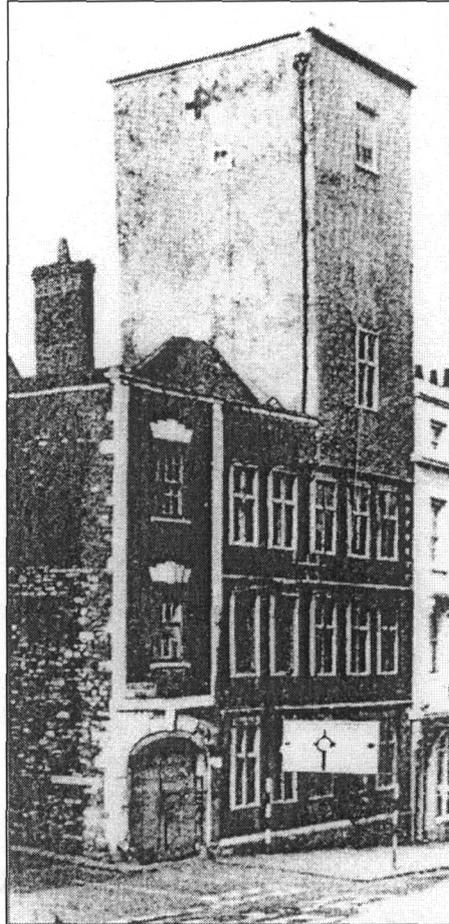


Figure 10: Watt's first shot tower, Bristol, England.  
Built c.1782, demolished 1968 (Minchinton, p. 52)

English plumber William Watt developed and patented the modern shot-making process and built the first shot tower (Figure 10) in 1782. His contributions to the shot-making industry are discussed in the technology section.

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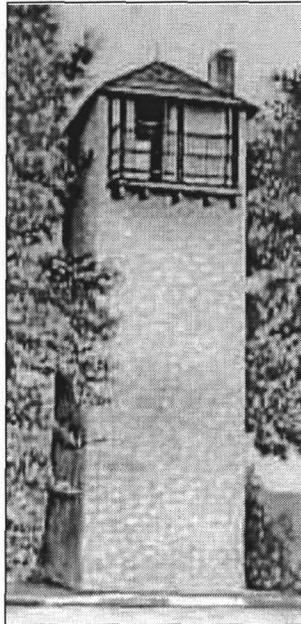


Figure 11: Jackson or New River Shot Tower (1807)

The next tower was the Virginia example shown above (Figure 11). Only three American shot towers employed a square or obelisk form, the Virginia example being square, the Dubuque and Beck towers, were obelisks. This form was not only difficult to build, but it was also a weaker one for achieving the desired high elevation needed. The tower is so short, it appears to be a true square in plan, rather than a tapered obelisk form. The 75' high tower (it is higher than the photo indicates) was matched with an equally deep shaft.

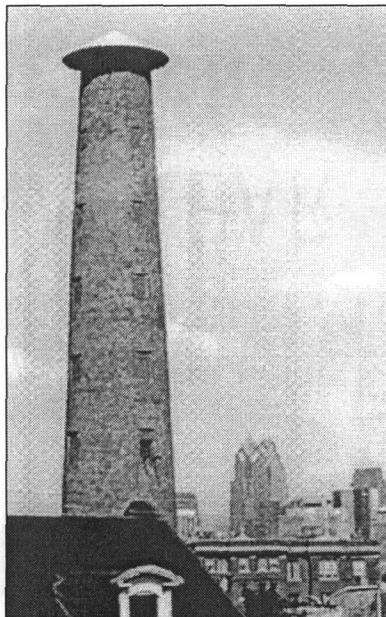


Figure 12 Sparks-Bishop Shot Tower, Philadelphia (1808)

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The next two shot towers were finished in 1808, within a week of each other, these being the Sparks' and Beck's shot towers, both built in Philadelphia. The Sparks Shot Tower (Figure 12) is claimed to be the earliest surviving American shot tower and it boasts of a having the longest actual production history of any American shot tower. That history is also directly associated with all of America's 19<sup>th</sup> Century wars. Its form is that of a tapered brick cylinder, and it is the only other American shot tower that has four window openings at each floor level, other than the Dubuque example. The tower is reduced by 50 percent (30 feet to 15 feet diameter) from its base to its cap. The turret with broad overhang is unique to American shot towers. Its association with the original design and construction is undetermined.

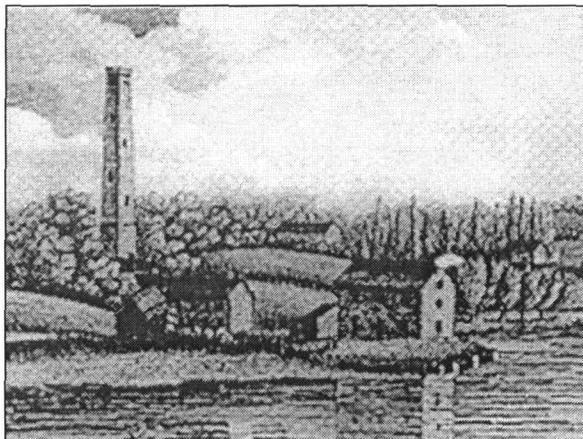


Figure 13: Paul Beck's Philadelphia Shot Tower, image drawn c.1812  
(Thomas Birch, artist, American Philosophical Society)

Beck's shot tower (Figure 13) is the only other true obelisk American example. Architecturally, it had a base, column and cap demarcation. Its windows were placed at stair landings so the openings on each face were offset vertically with adjacent ones. Built in 1808, the form could well have had a conscious link with the emerging Egyptian Style, but this would have been very early, the American onset of that style being generally dated to c.1835.

The zenith of American shot towers appears to date to the first quarter of the 19<sup>th</sup> Century. Every urban center had a tower and collectively the number of towers far exceeded market needs. Dr. McCord suggests that just two towers could have met domestic shot needs, at full production. Needless to say, many towers survived only because they could command local markets. Many failed in the face of foreign competition, reopened in 1811 and resumed after 1815 at the end of the War of 1812 and in the face of the financial panic of 1819. Shot prices were particularly depressed from 1810 through 1820. When cheap British-made shot once again flooded the American market in early 1811 for example, Missouri shot makers learned that even the Philadelphia shot towers had halted production in the face of plummeting shot prices. Western shot towers were numerous with five towers in operation in Jefferson County, Missouri, immediately south of St. Louis. All of these were frame towers set atop a high bluff line, and they date to c.1809-1814. These served the western American military needs during the war. Other western shot towers were established in New Orleans and St. Louis (*Missouri Gazette*, January 24, 1811).

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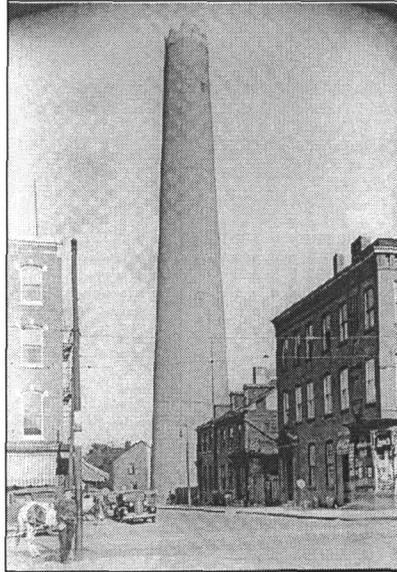


Figure 14: Phoenix/Merchants' Shot Tower, Baltimore (1828) (HABS photo, 1936, Library of Congress)

Moses Austin is generally credited with producing the first lead shot in America. At any rate the Austin's had a long-term association with lead mining and shot-making, in an odyssey that linked Pennsylvania, Virginia and Missouri, between 1791 and 1809. Moses and Stephen Austin, brothers, successively developed lead mining interests in the Wytheville Virginia area during the early 1790s, and then in Missouri, in a five-county area that was immediately south of St. Louis. The first actual shot tower in that region dated to 1809 and was built near Herculaneum, a Mississippi River lead shipping point, by John N. Maclot. The Austin's established a second tower in that same area. Two additional towers were established in 1814 by Christian Wilt and John Honey. These last-two named were still in operations as late as 1818. All of these, save for Maclot's, simply used high bluffs, in lieu of actual towers, so they were not true "shot towers." Maclot added a supplemental tower in 1810 so that he could produce the larger caliber of shot. Thomas Jefferson owned the Natural Bridge, Rockbridge County, Virginia, and leased it for use as a shot tower c.1809 (215' drop) (Conner, pp. 1-5; Swartzlow, part four, p. 201; *Missouri Historical Review*, October 1937, p. 83).<sup>2</sup>

Dr. McCord rated the Phoenix Shot Tower (Figure 14) as the most imposing American shot tower and the tallest shot tower structure. The tower's construction was deemed important enough to have the last surviving signer of the Declaration of Independence, Charles Carroll, dedicate its cornerstone on June 2, 1828. The tower is another tapered brick/iron cylinder shot tower example, one that is devoid of any regular fenestration pattern. The Phoenix also represents the upward physical limitation of shot towers with its height of 217 feet (many accounts claim 234 feet but this includes an underground shaft). In its day it was the tallest structure in the country prior to the completion of the Washington Monument. Note the general lack of fenestration on the tower, with the few windows being apparently aligned on just one side (these are 9/9 double hung sash). The tower was built without the use of scaffolding. The wall thickness is reduced from 4.5 feet at the base to 20 inches at the top. The crenellated cap and uppermost brickwork on the tower is not documented and is laid up in a different brick and mortar than is the rest of the structure. It might date to a post-1878 fire reconstruction or to the 1928 rehabilitation of the tower. The tower was gutted by fire in 1878, but was repaired and was used for another ten years to produce shot. Reflective of changing shot tower technology, the refurbished tower contained a narrow round central metal chute within which the shot descended.

<sup>2</sup> The five Missouri Counties were Jefferson, Washington, Saint Genevieve and St. Francois and Madison. After the Civil War, lead mining and processing operations shifted to southwestern Missouri, and the nearby corners of Arkansas and what would become Oklahoma (Shot Making In Missouri, p. 269; Swartzlow, part I, p. 187; Gibson, pp. 315-18).

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HABS determined that the two uppermost floors were of iron construction, while the roof was of concrete (National Register Nomination, 1971; HABS documentation).

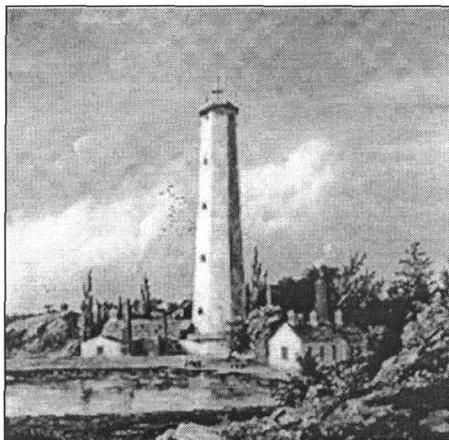


Figure 15: Youle's Shot Tower, New York City (non-extant) (1823)  
(Painting by Jasper F. Cropsey, 1845)

Youle's New York City shot tower (Figure 15) was one of three towers in that city. It had a tapered octagonal brick form, a projecting octagonal turret cap, and fenestration apparently on its southern exposure.

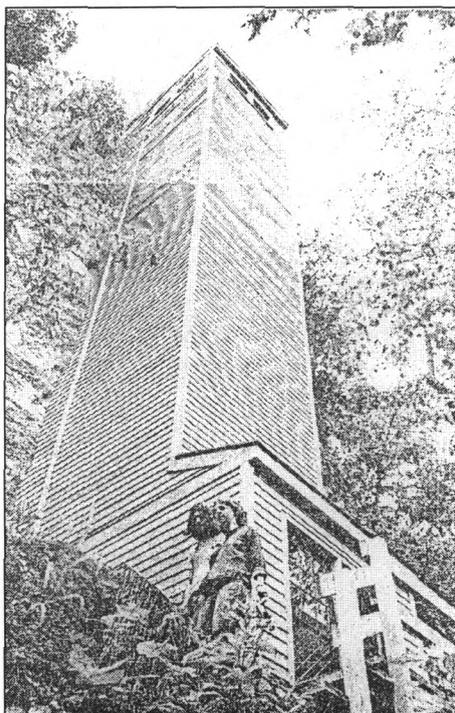


Figure 16: Reconstructed tower of the Helena, Wisconsin, Shot Tower (1833-1860)

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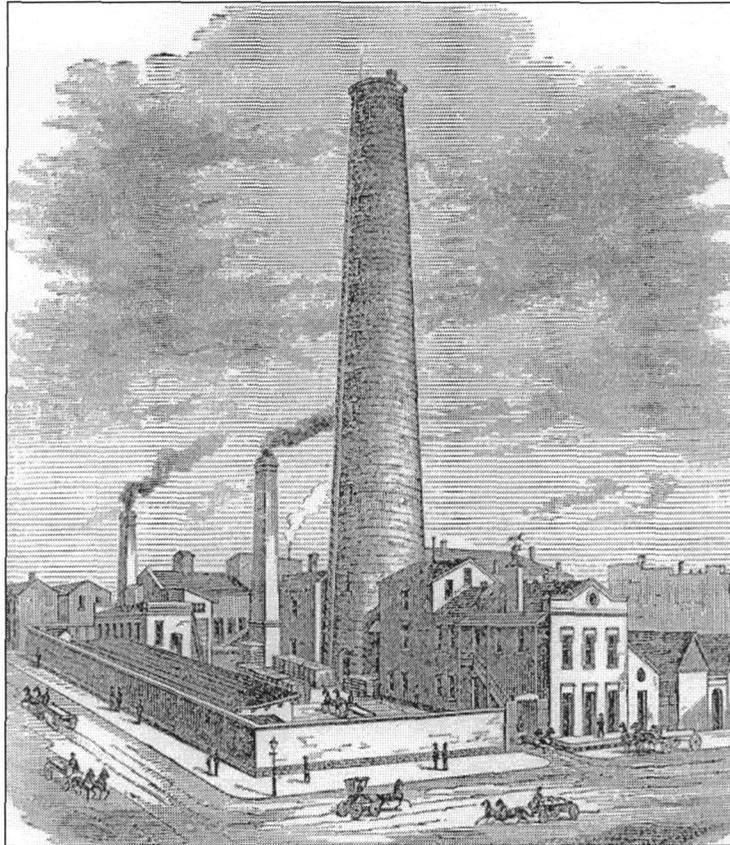


Figure 17: St. Louis Shot Tower (1845-47) (non-extant)

The first St. Louis Shot Tower was built in early 1840 and stood 150 feet tall. No image of that tower has been found. The second St. Louis Shot Tower (Figure 17) was started in 1844 and achieved an elevation of 175 of a planned 195 feet when it collapsed. A replacement tower was built closer to the river, the owner, Ferdinand Kennett, being satisfied with a 175-foot height. Kennett retired in 1854 and the St. Louis Shot Tower Company was formed in 1858. The tower was a tapered brick cylinder with a slightly projecting turret cap. Fenestration consisted of a single vertical row of elongated narrow windows. The St. Louis towers closely resembled those of the first phase, although an 1852 photograph of the second tower (Figure 49) depicts a crenellated cap, which implies an architectural affectation. This would qualify it as a Phase II shot tower. (Figure 48) clearly shows a broad pot-lid like rounded cap (Dacus, pp. 336-338; Shot-Making In Missouri, p. 269).

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Figure 18: One of the New York City shot towers, adjacent to the Brooklyn Bridge then under construction (Minchonton, p. 55; New York Historical Society)

**Phase II Shot Towers (1850-c.1900):**

Phase II shot towers attempted to combine some stylistic influence with a functional design. To this end, the Dubuque Shot Tower was executed in the Egyptian obelisk form embrace the last of the simply designed functional examples as well as much more ornate examples. The defining characteristic for most of these towers is still the free-standing tower, usually loosely attached to related buildings. Six or eight-sided towers were also favored, perhaps reflecting an effort to look more like romanticized light houses. Commonly, these structures were recognized community landmarks and sported large American flags as did the Selby tower in San Francisco.

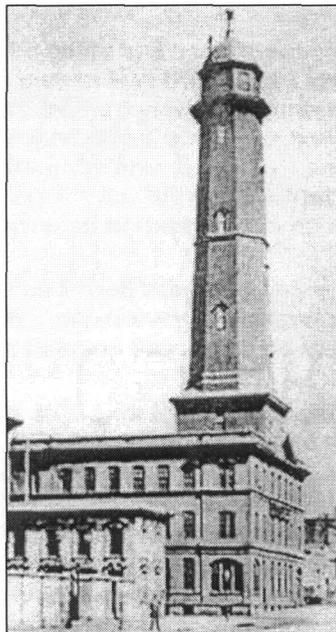


Figure 19: Selby Shot Tower, San Francisco (non-extant) (1864)

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The Selby Shot Tower is the earliest known example of the incorporation of the shot tower form into a larger industrial plant (assuming that this is what Figure 19 depicts). The tapered six-sided brick tower was similar to a lighthouse design, with vertical divisions and a square tower base (like a church steeple). Windows sported ornate lintels and spiraled around the tower, perhaps matching an interior spiral stair system. Thomas Selby was a San Francisco hardware dealer who needed a supply of birdshot. His lead was apparently locally produced and his cheaper lead source, in lieu of imported bulk lead shipped by sea, enabled him to dominate the area lead market. ([www.owensvalleyhistory.com](http://www.owensvalleyhistory.com)).

The Phase II towers were all located in the western portion of the country, a west that by this time included the California coast, and the Upper Mississippi River Valley. Their development was in direct response to the new found lead deposits in the western states. The earlier eastern towers felt the impact of this development as their lead source was eliminated.

Up to 1848, the receipts of lead from the west were sufficient for the wants of the manufacturers of this country. Then the news of the gold of California made a draft upon the labor of the states, and the miners of the West soon left, and the quantity of lead from there began decreasing, and importing from foreign countries commenced, and has gradually increased.

One reason for the dropping off of lead supplies was regional consumption by these more westerly tower operations. They likely enjoyed considerably cheaper lead supplies than did their eastern counterparts. With the exception of the St. Louis and Wisconsin towers, there were no other western shot towers known to have been in operation as of 1853. Wythe County, Virginia, Philadelphia and Baltimore each had a single tower while New York had two towers in operation. Total national lead consumption was put at 150,000 to 200,000 pigs of lead (75 pound units) with a lead shot production of 5,000 tons annually (Baltimore, *Illustrated News*, April 16, 1853).

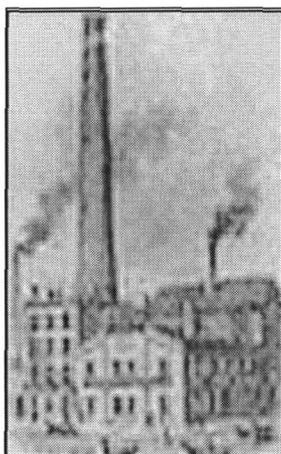


Figure 20: Chicago Shot Tower

This image of the Chicago shot tower is (Figure 20) poor because it comes from a shot bag image. Still, the round tapered tower is a massive one and it is associated with a larger factory site very similar to the St. Louis shot tower. The company was established in 1867 after the closing of the Dubuque Shot Tower. It survived the great Chicago fire but its final year of operation is undetermined.

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Phase III Shot Towers (c.1900-present):

Phase III shot towers were the products of larger industrial ammunition companies and the tower form was combined with a broader factory base. The towers are stylistically distinguished with belt courses, stone trim and elaborate caps. As appears to be true of most shot towers, these towers have broadly projecting caps. By this time, the shot tower process involved the use of forced air that blew against the dropping shot. This presumably lengthened the fall of the balls and improved their final form. Increasingly the towers produced only the smallest grade of buck or shotgun shot.



Figure 21: Gulf Lead and Shot Manufacturing Company shot tower,  
(The City of New Orleans..., 1885).

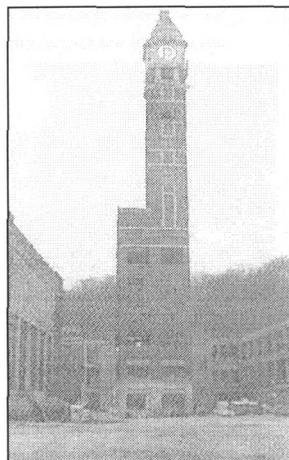


Figure 22: Peters Cartridge Company Shot Tower (1915)

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The Peters Shot Tower (Figure 22) is square in form but is not tapered and it is incorporated into what is basically a flourmill-like factory base. While the photo is unclear, it appears that concrete or stone was used to ornament the window openings or a series of vertical panels of differing sizes. The roof is possibly a rounded turret, and has a high profile. A “P” is emblazoned on the upper front of the tower ([www.ourworld.compuserve.com/homepages/kadima/about.htm](http://www.ourworld.compuserve.com/homepages/kadima/about.htm)).

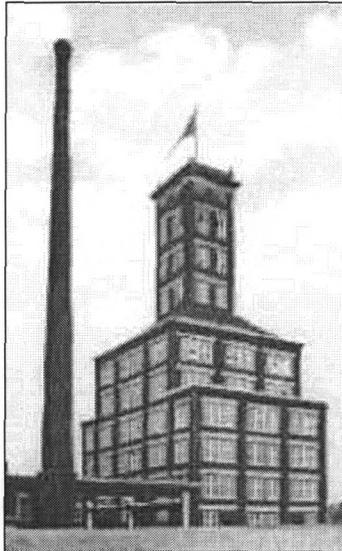


Figure 23: Remington Shot Tower, Bridgeport, CT

The Remington (Figure 23) and Winchester (Figure 24) shot towers are additional c.World War I industrial plant examples of later shot towers. These towers quite likely employed the new technique of dropping hot lead into a strong updraft of forced air. This process improved the product quality by effectively increasing the “drop.” It is possible that these towers were largely ornamental, and promoted the larger ammunition-producing role played by these major national arms and ammunition companies.

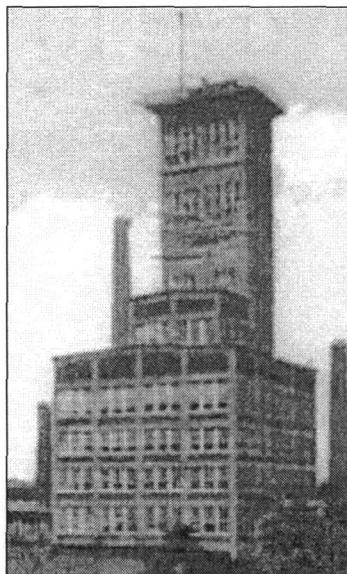


Figure 24: Winchester Shot Tower, New Haven, CT

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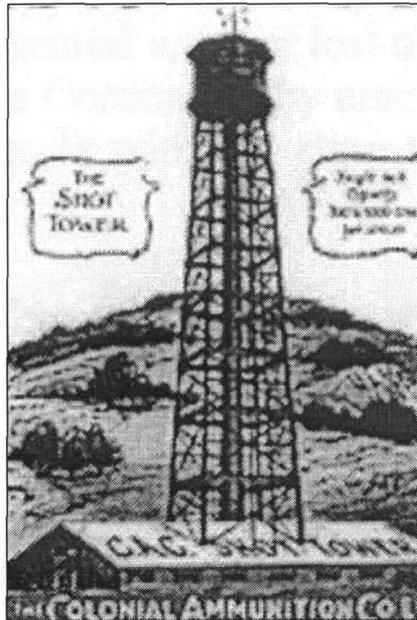


Figure 25: Colonial Ammunition Shot Tower, Auckland, New Zealand (1914)

Figure 25 is included because it nicely illustrates the absolute minimal structure necessary to create a shot tower function, a tower, an upper platform, and a centered circular drop shaft. The central reduced cylindrical shaft feature was typical of later American shot towers and the Selby Shot Tower (San Francisco) was rebuilt in 1907 along similar lines to this example. The Auckland example represents a return to function over form as far as shot towers went.



Figure 26: Remington Arms shot tower, Lanoke, Arkansas (1970)  
(Minchinton, p. 54)

Shot towers are used today to produce shotgun shot. The term “shot tower” was also used in conjunction with early above-ground nuclear testing in the American West. The form was sufficiently recognizable that many tall buildings are called shot towers but never performed that function. The best examples of this is found at Fort Hayes, Columbus, Ohio, where the

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main administrative building, with a centered front tower, bore this title. A house in Austin Texas, now demolished, was also so called. An appendix listing all known true American shot towers is to be found at the end of this section.

Excluding the Virginia shot/shaft tower, 11 shot towers survive across the country. Three represent Phase I, one (Dubuque) is a Phase II tower, and seven are Phase III examples. The Dubuque Shot Tower is the sole surviving Phase II structure and is one of a kind of all surviving shot towers in the nation. The Dubuque example was built in the form of an Egyptian obelisk and is the only known surviving example of two towers that employed that form. The Phase III shot tower examples are not comparable architecturally, because they represent shorter tower segments in combination with factory bases. Of all surviving Phase I shot towers, only the Phoenix shot tower retains an original associated building.

Nationally then, the Dubuque Shot Tower is the only surviving example of its type (full height shot tower), phase (architecturally elaborated, in this case employing the Egyptian obelisk form), and period (mid-19<sup>th</sup> Century). Its claim for national significance is based on its being a well preserved surviving example of a relatively rare industrial structural type, its unique qualities and time period related to its type, its association with a specific era and method of private sector lead shot production, and its being the sole surviving representative of shot towers which were associated with the Mississippi River Valley and its lead-mining history.

**Master List of 38 Identified (or potential) American Shot Towers, Extant and Non-extant**  
(**Bolded** text indicates that the tower is extant)

<b>Name</b>	<b>Location</b>	<b>Date</b>	<b>Form</b>	<b>Status</b>	<b>History</b>
<b>New River /Jackson (Phase I)</b>	Austinville, VA	1807	shaft, square tower, 150' total drop	extant, HABS documented NRHP	Built by English-born immigrant Thomas Jackson, lead from Austinville mines. Still in business by 1853.
<b>Thomas Sparks/ John Bishop (Phase I)</b>	Carpenter St., Philadelphia, PA	1808	142', round, tapered, turret cap	extant, ASME landmark	Functioned 1812-1903, associated with War of 1812 as well as subsequent wars. Four generations of the Sparks family operated the tower for nearly 100 years. The initial market was for hunters and co-owner Bishop, a Quaker, sold out his interest when war-related production began.
Thomas Beck Shot Tower (Phase I)	21 <sup>st</sup> & Cherry Streets, near Schuylkill River, Philadelphia, PA	1808	Obelisk with base, flared cap	non-extant	Out of business and demolished by 1823 (McCord)
John Maclot (Phase I)	Herculaneum, MO	1809	Wooden tower on bluff	non-extant	First of a series of towers replace bluff dropping process. Out of business by 1853.
Moses Austin/ J. H. Alford Co. (Phase I)	Herculaneum, MO	1810 or 1814	same as above	non-extant	Lead from Mine a Breton, 1787-1817.Purchased by St. Louis Shot Company 1836. There were as many as four towers. Austin family bankrupt by 1920. Out of business by 1853.
Witt Honey	South of	c.1814	same as	non-extant	(Steward)

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Shot Tower	Riverside, Jefferson Co. MO		above		
Smith T. Shot Tower	below Selma, Jefferson Co., MO	c.1814	same as above	non-extant	(Steward)
Rush's Shot Tower	Harlow Island, Jefferson Co., MO	c.1814	real tower?	non-extant	(Steward)
Globe Shot Tower Company (Phase II?)	Philadelphia, PA	Unknown	Unknown?	non-extant	Surviving 25-pounds shot bag. Not operating as of 1853.
George Youle's (Phase I)	East River & 53 <sup>rd</sup> , New York, NY	1821-23	octagonal, 25' well	base only survives	First built 1821, rebuilt 1823, last surviving of three New York City shot towers. Operating as of 1853, along with one other New York City tower.
Wolfe Shot Tower (Phase I)	North Bay Street, Baltimore, MD	1823	Unknown	non-extant	demolished 1845 (McCord)
<b>Phoenix Shot Tower/ Merchant's Shot Tower Company (Phase II)</b>	Fayette St., Baltimore, MD	1828	round over shaft, 215', 234' total, crenelated	extant, HABS, National Historic Landmark	Jacob Wolfe was the builder/owner. Functioned 1828-94. The Merchant's Company operated the tower as second owner, until it closed. The tower was saved from demolition in 1921 and is associated with an original building.
Unknown tower (Phase I)	Eutaw Street, Baltimore, MD	Unknown	Unknown	non-extant	demolished 1851 after damage by fire (McCord)
Fatham's Shot (Phase II?)	New York, NY	Unknown?	Unknown	non-extant	Surviving 25-pounds shot bag
Leroy Shot & Lead Company (Phase II?)	New York, NY	Unknown	Unknown	non-extant	Surviving 25-pounds shot bag
Shot Tower	Lexington, KY	1830's?	Unknown	Unknown	No data and no local confirmation (McCord)
Spring Green (Phase I)	Helena, WI	1834	frame tower over 185' shaft	reconstruction as state park 1970s, NRHP	Built by A. B. Sampson for Daniel Whitney. closed in 1861 and buildings destroyed. Not listed in 1853 list of operating shot towers.
Unknown	Decatur, AL	Unknown	Unknown	non-extant	present as of 1852
St. Louis (Phase I)	St. Louis, MO	1840	150 feet, brick	non-extant	In operation through 1846-47.
St. Louis (Phase I)	St. Louis, MO	1849	round	non-extant	First built 1844, rebuilt 1849, functioned as late as 1883. Became F. Kennett & Co.

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					1840. By 1849 Kennett, Simonds & Co., Kennett retired 1854, later known as Collier's Shot Tower Works, Superfund site.
<b>Dubuque (Phase II)</b>	Dubuque, IA	1856	square, 120'	NRHP	Functioned 1856-59, 1861-62.
Tatham & Bros.	New York	c.1858	Unknown	non-extant	Firm operated lead pipe, sheet works in New York and Philadelphia, "we have lately erected a shot tower in this city [New York]"
Unknown (Phase II)	North Clay St. Clifton Mills, OH	c.1861	house?	Unknown	"odd, tall house" said to have been used to make shot for rifles during Civil War, doesn't appear to be a tower.
? (Phase II)	Booneville, MO	Unknown	Unknown	Unknown	tower destroyed, equipments seized by 5 <sup>th</sup> Iowa Infantry, August 25, 1861, Civil War.
Chicago (Phase II)	70 N. Clinton, Kinzie Street, Chicago, IL	1867	round	non-extant	Founded by E. W. Blatchford. Sole proprietor of lead trade in city as of 1873, sheltered refugees during 1871 fire.
Unknown	Milwaukee, WI	Unknown	Unknown	Unknown	reported extant 45 years ago, no confirmation by Milwaukee County Historical Society.
[Thomas] Selby Shot Tower (Phase II)	1 <sup>st</sup> and Howard streets, San Francisco, CA	1864	Unknown	non-extant	Selby obtained lead from east of the Sierra Mountains, started as hardware merchant 1850, couldn't get birdshot so built small tower.
[Thomas] Selby Shot Tower (Phase II)	Foot of Hyde Street, San Francisco, CA	1869	Tapered octagonal with dome cap, tall square base.	non-extant	The beginning of the Central Pacific Railroad tapped into lead sources to the east, this larger tower was built. The tower sported a large flag at the time of the 1906 earthquake, survived that disaster. Was long a waterfront symbol. Minchonton says post-earthquake fire destroyed the tower and that it was rebuilt as a simple metal lattice work tower (see Figure 25).
Unknown tower (Phase III?)	Howard & Montgomery Streets, Baltimore. MD	post-1874	Unknown	non-extant	(McCord)
Omaha Shot Company (Phase II)	Omaha, NE	1880	100' shaft, 65' tower	Non-extant	Established in 1880, five-ton daily shot production capacity, seven employees.
Gulf Lead and Shot Mfg. Co. (Phase II)	St. Joseph and Constance streets, New Orleans, LA	1883	214' tapered octagonal tower with conical cap,	non-extant	Put out of operation by fire January 27, 1887, inspected by Underwriters Inspection Bureau of New Orleans in 1897 ("Gulf Shot Tower Company"), conflicting reports state tower was demolished in 1887, and in 1906 when it was replaced by a meat

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					packing plant. Tallest structure in the city as of 1885, featured twin electric lanterns on its top. Included elevator for sightseers in conjunction with World's Industrial and Cotton Centennial Exposition, 1884-85 (The Williams Research Center, New Orleans).
<b>Chadwick Lead Works (Phase III)</b>	176-84 High St. Boston, MA	1887	Six-story plant, 184' tower inside	Extant	Boston Lead Works took over operations 1902, full range of lead products, converted to other uses by 1922.
<b>Peters Cartridge Co. (Phase III)</b>	Kings Mills, OH	1915	square tower atop factory	extant, used as an office complex	Peters was a notable national ammunition producer. The Kings Mills Powder Company was nearby from 1877 on. The plants were acquired by Remington in 1934, and were closed in 1944, later operated by Seagram's Distillery and Columbia Records. McCord lists as one of five modern towers operating as of late 1958.
<b>Remington (Phase III)</b>	Bridgeport, CT	c.1920	Unknown	Unknown	McCord lists as one of five modern towers operating as of late 1958. Still in use.
<b>Unknown. (Phase III)</b>	East Alton, IL	?	Unknown	Unknown	McCord lists as one of five modern towers operating as of late 1958.
<b>Remington (Phase III)</b>	Lanoke, AR	c.1920	170'	Unknown	McCord lists as one of five modern towers operating as of late 1958. Still in use.
<b>Winchester (Phase III)</b>	New Haven, CT	c.1915-16	Factory with tower	Extant	McCord lists as one of five modern towers operating as of late 1958. Closed 1980, now a part of the Winchester Repeating Arms Company Historic District
<b>Unknown. (Phase III)</b>	San Francisco, CA	?	Unknown	Unknown	McCord lists as one of five modern towers operating as of late 1958, California Historical Society cannot confirm.

Contextual Summary:

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production, and its being the sole surviving representative of shot towers which were associated with the Mississippi River Valley and its lead-mining history.

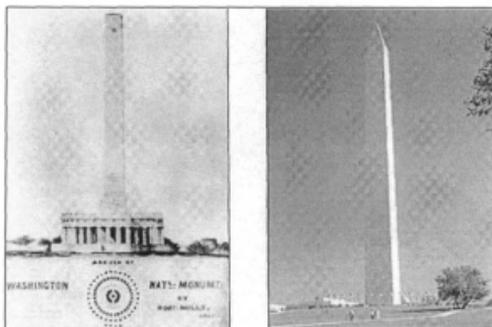
National Architectural Context:

Figure 27: Washington Monument, Original Design and As Built  
([www.cr.nps.gov/nr/twhp/www/ps/lessons/62wash/62visual1.htm](http://www.cr.nps.gov/nr/twhp/www/ps/lessons/62wash/62visual1.htm))

The Egyptian style was popularized by Napoleon's 1798 Egyptian campaign. The Rosetta Stone, along with a fleetload of pillaged ancient sculptures and artifacts introduced the style to Europe. Ancient Egyptian architecture was only then being appreciated as an important antecedent influence on Greek and Roman architecture. The style was the most popular of the three exotic revival styles (as defined by McAlester, the three being the Egyptian, Swiss Chalet, and the Oriental) but it was poorly adapted to residential design. It found expression in public buildings and in the unique Egyptian monumental form, the obelisk. The style was used to evoke or symbolize linkages between nationalism and ancient Egypt. Napoleon raised up an actual Egyptian obelisk in Paris. Bunker Hill, in Charlestown, MA, was marked with an obelisk tower in 1825. The Washington Monument was designed in the early 1830s as a flat-topped obelisk, and it was modified into a true obelisk when construction began in 1848. The form continued to be popular into late 19<sup>th</sup> Century when London gained "Cleopatra's Needle," located along the Thames River, in 1877. It wasn't until 1884 that the most famous obelisk, the Washington Monument, was finally completed (Gelernter, pp. 116, 162-63).

Dubuque has the Nationally significant (National Register of Historic Places) Egyptian style County Jail building (1856-57) which was designed by local architect John T. Rague. The adoption of this style and the provision of a design by a local architect indicates that Dubuque was favorably disposed to using the Egyptian style as of the mid-1850s. The County even executed a matching south-end addition to the jail in 1874 and the building was faithfully restored in 1943. While not yet proven, it would appear that the Dubuque Shot Tower was purposely located on the city riverfront to commemorate the growth and expectations of the city in general and the Harbor Improvement Company's real estate project in particular. The loaning of funds for the structure by the company appears to indicate that the tower would promote its interests. The builders also envisioned placing a navigational light atop the new tower. The Egyptian (and Roman) style was directly associated with the principles of the Enlightenment, as was the Masonic Movement. It is tempting to see Masonic symbolism in the proposed

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combination of a light (the eye in the pyramid) and the tower (ibid., McAlester, pp. 230-33; "Dubuque Has Architectural Rarity; County Jail, Erected in 1856, Modeled After Egyptian, *Telegraph-Herald*, November 7, 1943).<sup>3</sup>

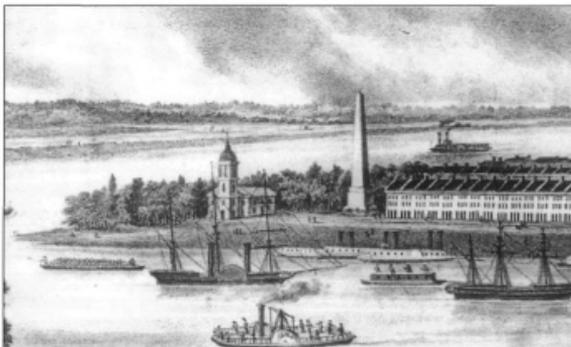


Figure 28: Proposed Cairo, Illinois obelisk, 1838, the Mississippi River as America's Nile River (Strickland, reproduced in Reps, p. 163)

It is fitting that the Shot Tower was built at a time when new Dubuque building designs were finally being more reflective of national styles, as the following notice indicates:

Improving – The buildings that are going up in the various parts of our city are of a superior character, much surpassing those constructed in previous years; and should the balance of the great number already under contract prove to be of the same description, they will greatly enhance the beauty of our city, and will challenge a comparison with the architecture of any city of the West.

*Express & Herald*, June 22, 1856

The following entry documents the joint involvement of both G. W. Rogers and the Dubuque Harbor Improvement Company in the design and construction of the Dubuque Shot Tower:

G. W. Rogers of this city, has purchased a lot in the center of the island, on which he intends to erect immediately a shot tower, on the top of which the [Dubuque Harbor Improvement] Company design to place a brilliant light, during the season of navigation, for the benefit of steamboats landing in the night, and to light up the levee.

The Shot Tower was planned to be a monumental centerpiece for the company's land development effort and more particularly, the "heavy commercial" district that was predicted for the riverfront. At the end of 1855, G. R. West, who had just completed his warehouse near the Shot Tower site, predicted that "in ten years the levee will extend for three miles up and down the river, on a line with these improvements, and nearly all the Railroad and other principal business

<sup>3</sup> Betsy Woodman notes that the Mississippi River was termed the "American Nile." Perhaps there is a relationship between the Shot Tower Design and the nearby river? (Woodman, p. 163).

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of the city will be done there.” Accordingly, the development company designated the riverfront portion of the extended Seventh Street to be “Commercial Street” (*Express & Herald*, January 1, February 15, 1856).

Shot-Making Technology Context:

Recalling Dr. McCord’s thesis that for over 200 years, shot production itself was virtually unchanged, this section looks at the association of the Dubuque Shot Tower with the technology of shot production.

When Dubuquer Joe Pickett Sr. attempted an amateur effort in the 1970s to produce shot in the Shot Tower, he quickly became aware that an apparently simple process of dropping lead shot, wasn’t simple at all. His first efforts, dropped from an elevation of 50 feet, resulted in “half moon with tentacles” when the still hot lead exploded in the water. Adding 20 more feet of descent produced lead globs ranging “from tiny gourds to miniature pancakes.” From the lower level mentioned, the lead was still too soft to prevent cross winds from splattering the brick walls with melted lead. His experiments determined that proper elevation, lead temperature, the lead type and quality, and proper sieves, were all critical in achieving any success. He finally had to go to the top of the tower to produce anything resembling lead spheres. The lead couldn’t be too hot. If it was, it exploded upon impact with the water and made pancakes. A drilled skillet finally worked as a sieve. Pickett experimented with local lead as well as a dozen other varieties, but finally was able to have success with lead produced at Leeds, Alabama. Pickett’s secret pure lead formula, never revealed, did not include any of the poisonous additives which were historically used (*Telegraph-Herald*, October 17, 1976; *Des Moines Register*, May 25, 1976).

While the popular imagination fixates on musket balls, shot towers historically were mostly interested in producing buckshot, distinguished as squirrel and bird shot. Dr. McCord credits the shot tower with making possible the development of the shotgun. Early metal slingers were termed “slug guns.” Regular dropped buckshot made the refined shotgun form possible and with it, the “rapture” (McCord’s choice of words) which developed between that weapon and its aficionados. Prior to the development of dropped shot, bullets in all sizes were cast in multiocular molds with 50 to 70 voids. After casting, one had to remove the stems or sprues which the casting method produced. Larger shot were crudely produced by tumbling cut out lead cubes in a “rumbler” with an abrasive to produce rounded pellets (McCord, p. 623).

The process of dropping shot from a high point was not a novel concept and McCord credits the “inventor” of the process, William (or Josiah in some accounts) Watts, not with adding anything new to shot making, but rather with being clever enough to receive a 14-year patent (1782-1796) on it. The use of a short (just a one foot) dropping of melted lead through a brass colander to produce birdshot was popularized by Prince Rupert in 1665. This informal production required no tower, simply the sieve, melted lead and a container of water to catch and cool the shot, but the end product tended to be pear-shaped, rather than round. This didn’t matter for slug guns of course. English plumber Watts claims to have had a dream in which a rain of molten lead enveloped him, the droplets striking the ground in perfect spheres. In 1769 he adjourned to the upper levels of St. Mary Redcliffe Church, in Bristol, England and conducted his first experiments in dropping melted lead. He added three stories to his house, located across from the church, and entered into what was the first industrial-scale production of lead shot. He was the first to drop lead from a great height, was as a result the first to successfully drop large caliber shot, and as noted, the first to claim a patent. His patent restricted American shot production. American shot makers (Moses Austin papers) were aware of the patent restrictions by 1789 and the Philadelphia shot makers used the term “patent” in their shot advertisements well after the Watt patent had expired, an apparent effort to claim quality control on their product. It is interesting to note that both the church where the first lead was dropped, and the Watt “shot tower” survive today, the latter being in production until very recently (assuming it isn’t still) (Queen Anne’s Revenge Archaeological Project, [www.ah.dcr.state.nc.us](http://www.ah.dcr.state.nc.us); John Lienhard, University of Houston, [www.traphof.org/shot\\_towers](http://www.traphof.org/shot_towers); McCord, pp. 623-24).

The mass-production of dropped lead balls paralleled the mass production of firearms, as well as an exponential growth in the demand for lead shot in mass quantities. Until the early 19<sup>th</sup> Century, guns were individually crafted and had

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individualized hand molds to cast musket balls for the weapon. Improved shot, as was noted in regard to the shotgun, enabled guns to develop greater precision and fineness. The lead trade largely consisted of lead pigs which weighed 65-75 pounds each, and in the more remote areas, very small lead bars (six to seven ounces in weight) were cast for easy transportation ([www.monticello.org/resources](http://www.monticello.org/resources); Conner, pp. 1-5; Swartzlow, part four, p. 201).

Backing up for a minute, it is important to first define the fundamental lead shot production method. That process melts lead, pours that lead through a screening device at great elevation, and the laws of physics determine the formation of the lead droplets and their assumption of a spherical form. The lead spheres strike a cushioning vat of water where cooling is completed. Dr. McCord notes that the only refinements to this simple process involved adding mechanical power and handling and refining the heat source. The industry literature describes numerous process details. These relate to the sequencing of the production stages, the additives which were combined with the lead, the desired elevations from which different calibers had to be dropped, the character of the sieve used, and the nature of the final phases of processing the lead shot after it was dropped.

An array of technical descriptions of the shot-making process follow, and each will be critiqued relative to the commonalities and exceptions which apply to it. The accounts are arranged chronologically so as to trace any apparent evolution in the production process.

This first 1840 St. Louis description of the shot-making process is the earliest detailed one found. It is a very detailed, although brief account:

The Shot Tower is 150 feet high, the lead is drawn up from the [Mississippi] river bank by horse power, to the top, and then melted. It is taken out in ladles and run through a single row of small holes in a horizontal line, which forms it into drops, and cools, before it strikes the water contained in a large cistern below. It is then ladled out, put in a large sheet iron pan, and dried over a hot fire; when thoroughly dried, it is put in what is called a polishing keg; a small quantity of black lead is added, which by turning some two or three hundred times gives it a bright, glossy appearance. It is then screened on tables and sized. The factory has been in successful operation since the middle of April last, during which time there has been manufactured upwards of 400,000 lbs. of shot, a majority for the merchants of this place.

This operation employed eight hands when in full production. The process while a primitive one (horse power, primitive horizontal mold), produced a very large amount of shot. The same account also noted that the quantity of shot equaled that of the expended bulk lead, this being an indication of a high-quality of pig lead. The use of a pierced trough in lieu of a sieve is unique to this account (St. Louis *Argus*, August 19, 1840).

The above account is the only known description of the use of an alternative sieve form at the top of the shot tower, in this case, an elongated row of holes. Henry Schoolcraft, writing in 1819, described what appears to be a similar innovation, that was developed by Elias Bates at that time. Bates invention "supersedes the necessity of using a sieve [sic]"

...He has a ladle of cast iron, in the shape of a parallelogram, but smaller at the bottom than the top. The two longest, being opposite sides of this ladle, are perforated with holes near, and at an equal distance from, the top, so that by canting the ladle a little either way, the shot drop through, and as the ladle is smallest at the bottom, are not at all impeded in their way to the cistern below...(Schoolcraft, p. 139).

The following lead shot production description was used at the Phoenix Shot Tower in Baltimore as of 1853, it is unusually detailed and is included as a comparison to the Dubuque operation:

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The operation of manufacture commences with hoisting up the lead on an endless chain (or windlass) driven by steam, and melted in the kettles at the dropping stations, where it is alloyed with the chemical mixture [arsenic and antimony] to prepare for dropping; an iron handle or holder is then hung out over the hatchway which is open from bottom to top, and in this handle is placed a pan, with the bottom perforated – the perforation being of the size corresponding with the shot required. The descending streams are parted by their continually accelerating velocity into the quantity of metal required to form each shot, which immediately assumes the spherical form, and maintains it, until cooled by its rapid passage through the atmosphere, it becomes permanent before reaching the base of the tower, where it is received in a cistern of water, which suddenly destroys the velocity, without altering its form; it is then raised from these cisterns by a ladle or machinery and passes thence to the dryer, where it is thoroughly dried, and from thence passes to the polishing cask or cylinder, to which is added a small quantity of black lead. A quick revolving motion soon produces a bright polish, by the attrition of the shot against each other. It is then passed to the receiving box, through an apertable [sic] in the tower, thence to the finish-room; from thence to the inclined tubes, for separating the perfect from the imperfect – the perfect or spherical ones running freely down the inclination, while the faulty ones remain at the head, or straggle to the sides, and are swept back into a box and remelted. The good shot are received in a box at the end of the inclined table, and from thence pass to the sifting case, which contains a series of sieves of various sizes, the larger ones being at the top, and, as the shot descend through them, each sifter receives such as suit its size; from the sifter they are put in boxes or tubes, on a convenient bench, ready to be weighed, in bags of 25 lbs., and are then ready for distribution to the trade...

The shot manufactured here have a high reputation. The metal is melted at various distances from the ground, and consist of lead, combined with arsenic and other metals, which give it the quality of forming readily into globules after it is poured into copper pans, in the bottom of which holes of requisite sizes have been drilled. The largest shot are dropped from the highest platforms.

Baltimore *Illustrated News*, April 16, 1853, pp. 244-45

The above account closely corroborates the technology employed in Dubuque, save for the multiple dropping and furnace stations which were arranged within the Baltimore tower. The account clearly indicates that lead was poured at the top of the tower, and not melted and then raised up to them. Such a system would have economized labor in elevating lead and fuel. Only one pouring station could have been used at any one time, so the same labor and fuel costs would be incurred as each caliber of shot was produced. The economy was found in elevating raw materials to each post. Only the largest caliber of shot necessitated the use of the full height of the tower. There appears to be no downside to casting all calibers from the top of the tower, as was done in Dubuque, but it necessitated maximal lifting up of lead, chemicals, tools and fuel. The Baltimore account references a polishing additive of black lead (other accounts mention graphite) which was likely used by all shot towers as a polishing grit. It also mentions a shifting case, which will be discussed below. Arsenic is said to have made the molten lead more fluid and was also a hardener after it was cooled. One local account claims, without citation, that one pound of arsenic was mixed with 100 pounds of shot. An important note on production sequence in this account was the fact that the shot were dried and polished prior to being sorted. These preliminary steps were necessary if the sorting process was to work and the same sequence was used in Dubuque (Shot Towers Thrived, p. 163; Old Shot Tower, p. 1).

This is the first (late 1856) description of the shot making process employed at the Dubuque Shot Tower, just constructed (this and subsequent Dubuque accounts are fully presented in the historical summary section below):

...After taking a momentary glance we walked up the first flight of stairs, which makes an elevation of 10 feet, and entered the first story. In this room or story, will be found directly in front of the entrance, the steam engine which is used to hoist, by means of a windlass, the lead to the extreme height, preparatory to casting, and to rotate the cask used in finishing the shot -- Besides this, there is the tub, partially filled with water, in the

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center of the chamber, in which is caught the falling shot; the right of the room on entering is occupied by the windlass and the left the inclined plane which detects the perfect from the imperfect shot. After satisfying our curiosity in this portion of the tower, we commenced the ascent, the means used, temporary ladders, and these we climbed from story to story, until we stood in the ninth, where we found one of the gentlemanly proprietors, Mr. Geo. W. Rogers, busily engaged in improving his furnace.

This ninth story, which is just one hundred and forty feet from the ground [the height on the ninth floor], is where the great mystery is solved how they manufacture shot. The apparatus used, and of which consists the whole of this room's furnishing, is summoned up in a furnace capable of smelting three hundred pounds of prepared lead, and a ladle or two, together with the various sieves used in making the several grades of shot. -- After having explained to us how, that by taking a ladle full of the combination of arsenic and lead, heated to a certain temperature, and pouring the same into the sieve (which is simply a sheet iron disk with small holes punctured at intervals of a half-inch, which hangs over the aperture, through the floor—and by the by, we should have mentioned that in the several floors to the very bottom there are apertures [presumably openings in each floor level] in each, thus forming a channel for the falling globules to pass--and from thence the molten lead passes to a tub below. How that from this tub the shot is taken and placed in the cask, which revolves around until it receives that finish which is observed on all shot, and how it is taken from this cask and placed upon the inclined plane where the perfect shot roll down and the imperfect, oval and flat, slide down and drop into a groove which the brisk, round perfect shot leap over and are caught into a receiver, and how from thence they are passed through as many sieves as there are sizes of shot, which are placed in a case one above the other, the coarser on top, and are thus graded preparatory to bagging and how they are bagged, ready for market...

The 1856 Dubuque Shot Tower tour observed the list of a steam powered windlass system, the dropping process at the top of the tower, the use of a central aperture through all of the floors, a furnace of 300 pounds capacity which was located at the top of the tower, a series of graduated sieves (in this case simple perforated iron dishes, the perforations spaced half an inch apart), ladles with which to pour the lead, a tub of water at the base, a polishing cask, an inclined preliminary sorting plane with a cross-groove that caught imperfect shot, and a sifter which employed a series of graded sieves set one above the other to perform the final sorting. It is unclear whether the steam engine was in the adjacent building but is likely. The visitor noted a "room or story, will be found directly in front of the entrance," an implication that the powerhouse was outside of the tower proper. Smokestacks are apparent in the early images of the building (a similar smokestack would have been needed at the top of the tower, unless cross ventilation carried away the furnace fumes). The same account then states "besides this" (the steam engine") were the water tub, cask, sorting plane and windlass, so the exact location is unclear. Certainly the windlass would have best worked from the tower base, as is shown in the images above. In Dubuque, drying and polishing preceded sorting and packaging (*Express & Herald*, November 19, 1856).

All of these accounts describe a sorting process that raises the question of whether the sieves were perforated uniformly or not. The sorting descriptions hint that a full range of calibers was being separated in sifting drawers, and the smallest being discarded entirely. Did a production sequence employ graded sieves or were all calibers simultaneously cast? More recent shot production employed single caliber sieves and it is probable that this was the case in these earlier accounts. If a single caliber was being dropped, why was sorting necessary?

This second Dubuque shot production description dates to 1857. This account allows for the passage of a year during which the shot production process might have been improved:

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...we commenced our enquiries of the presiding genius of the furnace, ladle and lead kettle. He appeared somewhat amused at our questions, all of which, however, he very politely answered. For the information of those who do not know how shot are made, we will give an explanation of the process. At the top of the tower, in a room about twelve by fourteen feet, a small brick and iron furnace is built, upon which is an iron kettle capable of holding about ten or twenty gallons of melted lead, which is there poured into a copper strainer, and being suspended over the opening in the flooring of the tower, the liquid drops through, and down a distance of *one hundred and fifty* feet, into a large tank of water prepared to receive it. By the time the hot lead reaches the tank, it assumes a globular or shot form and on coming in contact with the water, it is instantly cooled and hardened. The shot are then placed in a barrel shaped tank, which, by an appliance of machinery, is made to revolve, thus cleaning or polishing them. They are then rolled over an inclined plane in an oscillating chest with strainer pans for separating and assorting the different sizes. They are then weighed and bagged. We are informed by Mr. Langworthy, that with the present force of eight hands, and other facilities, they manufacture about five thousand pound weight daily... (*Daily Northwest*, September 22, 1857).

The furnace remains at the top of the tower and it heats a single kettle. The strainer is of copper construction and probably was "store bought." The account specified a "small" brick and iron furnace with a kettle capable of holding 10-20 gallons of lead.

Neither Dubuque account speaks of drying the new shot, but instead move the process directly from the water tank to the polishing cask. The St. Louis Shot Tower used a heated spiral process that used hot air to dry the shot. The cask was "barrel shaped." This account offers no details about the inclined plane but it specifies an oscillating sorting chest. The St. Louis operation used the same process. The shot were poured into the top and passed through successively smaller strainer pans (*Daily Northwest*, September 22, 1857; *Missouri Republican*, January 5, 1847).

This third Dubuque account dates to 1859 and described the Dubuque Shot Tower production under the operation of Messrs. Tallman and Clark;

The tower is 130 feet high. In the lower rooms are the Furnaces, Engines, sorting and polishing machinery, and the "putting up." The lead is melted and one pound of arsenic is added to every hundred pounds of lead. It is drawn up to the top of the tower and poured into a sieve, from which it falls to the first floor in a reservoir of water. From the reservoir it goes on the dryer and thence to a revolving cylinder in which it is polished. It is then taken out and poured on an inclined plain. At the bottom of this is another inclined plain which is separated from the first by a distance of a couple of inches. The pellets that are perfectly spherical will gain momentum enough in passing down the flat inclined plain to carry them over the space which separates it from the one below. If a pellet is a little lame however, it comes down very slowly, aided mayhap by a boy and a brush, and falls between the two inclined plains into a box and is again to be re-melted. Those that go over both plains are of all sizes. They are then taken out and put into a sort of sifting machine. This looks like a chest of drawers—the top drawer is perforated a certain size, the next below it a size smaller, and so on down. The show is poured into the top and the whole machine driven backward and forward by machinery. Of course all the pellets below a certain size corresponding with the holes in the top drawer fall through and so on down—each drawer retaining a certain sized pellet, say "B.B.," "No. 1," etc. (*Daily Herald*, April 14, 1859).

Obviously the process has been considerably altered since 1857. The lead melting is done at ground level as are all mechanized operations apart from the windlass. A boy aids the operation of the sorting plane, the only reference to child labor in shot-making. One change in packaging at the tower involved six- pound units in lieu of the standard 25-pound bags. In January 1862, the floor of the attached frame building collapsed under the weight of bulk lead and stored shot. Included in the list of items cast down were "two cauldrons of molten lead weighing about fourteen hundred pounds...[and]...one large stove, full of fire, and a large furnace, under full blast. The cauldrons were presumably set into the top of the furnace, and the stove provided

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another heat source for the workers. This account corroborates the relocation of the lead melting process to the ground level. The several Dubuque shaft towers necessarily reversed the location of the furnaces, placing them at the top of the drops. This change, dating to post-1862 was determined by the economy of delivering fuel and lead at the top of the shaft rather to the base of the hole (*Daily Times*, January 9, 1862).

These various accounts, occurring over a period of 22 years, evidence very little change in method. Presumably the sieves were increasingly industrially produced, as is evidenced by the reference to a copper sieve in use in Dubuque. The major change for the Dubuque operation was relocating the furnace to the ground level. At least in Dubuque, the accounts clearly indicate that the majority of the processing equipment was made on site by skilled craftsmen. The demand for this specialized equipment apparently failed to justify mass production. McCord mentions the use of a loose lead oxide in the sieves, an additive that cleaned the sieve and made the melted lead seep rather than flow. He also states that wood and charcoal were the fuels of choice in shot towers. No account mentions either the lead oxide or type of fuel used (McCord, p. 674).<sup>4</sup>

Modern shot dropping evolved into a near continuous and labor-free process. Lead shot was polished and lubricated and in some instances copper plated because lead otherwise quickly tarnishes. The modern process was virtually failure-free and nationally as of 1958, five operating towers were consuming 40,000 tons of lead annually (Ibid., p. 626).

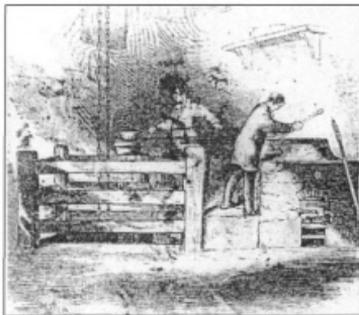


Figure 29: Furnace/pouring room, Phoenix/Merchant's Shot Tower, Baltimore  
(*Desmores's Illustrated News*, 1853)

Figure 29 shows a brick furnace with metal vat used to melt the lead. The furnace is large in scale (the Dubuque Shot Tower vat could hold 20-30 gallons of lead), and was raised above the floor. The drop is surrounded by a protective wall. Note the heavy chain windlass which is suspended alongside the drop. This windlass would have delivered fuel and lead. Note that the ladle work was done by hand, with the sieve being suspended over the drop chute (McCord).

<sup>4</sup> McCord also states that shot towers could only produce shot ranging from .23 to .04 inches in diameter, and that eight sizes of buckshot were recognized. The statement is worth noting but it appears to understate the upper caliber capabilities of shot towers (McCord, p. 674).

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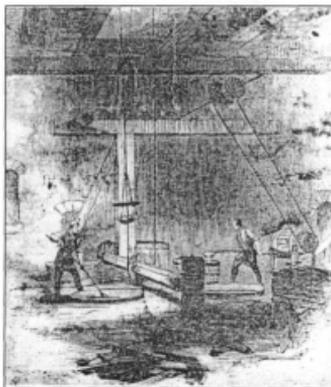


Figure 30: Melting tubs, Phoenix/Merchant's Shot Tower Baltimore (*Desmorest's Illustrated News*, 1853)

Figure 30 appears to show a preliminary lead melting series of tubs on the ground floor of the tower. Apparently faulty shot were immediately re-melted and then elevated in solid form for a re-casting. It is also probable that additives were mixed into the lead at this point. A final melting took place at the top of the tower. The windlass is visible but the chain windlass, shown in Figure 29, is absent. Of particular interest are the polishing cask, and sorting chest, both visible to the right. Not visible, is the base of the shot drop and the cooling vat.

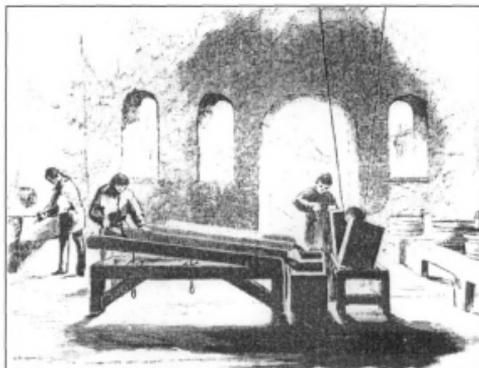


Figure 31: Sorting the cast shot (*Desmorest's Illustrated News*, 1853)

The above figure depicts both the sorting chests (to the right, agitated by a belt system) and the sorting tables.

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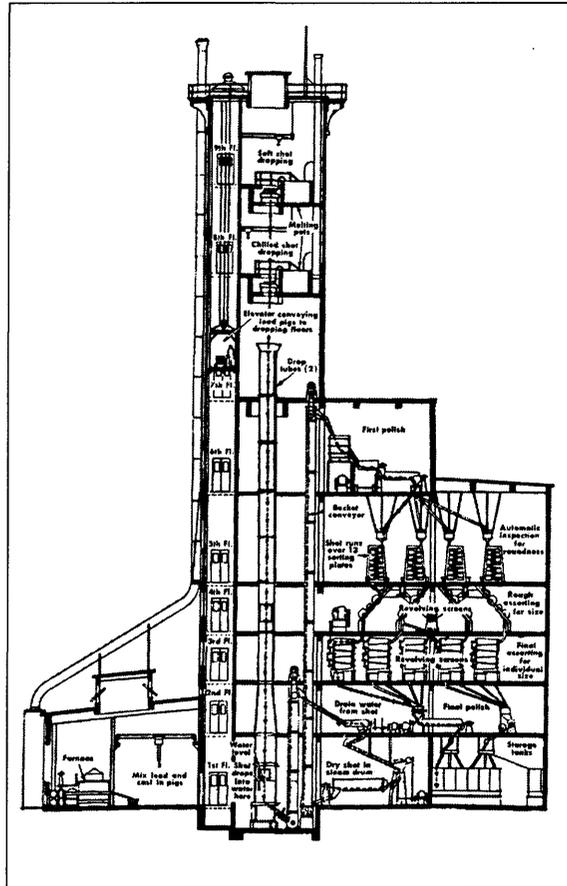


Figure 32: New Haven Winchester Shot Tower Schematic (Lead In Modern Industry)

Tower height was vital if the largest calibers of shot were to be successfully produced. The Phoenix Shot Tower in Baltimore appears to have been the tallest American example, standing 217 feet above its shaft. The world’s tallest shot tower (as of 1853) measured 249 feet, and was located at Villach, Carthina, in Europe (Austria). The Dubuque Shot Tower is likely the shortest one in America, standing at just 120 feet high (Baltimore *Illustrated News*, April 16, 1853).

The modern shot tower schematic (Figure 32) depicts the factory processing of lead shot. The lead was initially melted and mixed with additives on the ground floor (left of view), cooled in the form of pigs, was raised to one of two furnaces at the top of the tower (the highest produced soft lead sheets, the lower one was a “chilled lead dropping,” implying the use of forced air against the dropping formed shot), and then re-heated and dropped. The shot dropped within a cylindrical well, falling into a deep pit of water. The shot was elevated to the second floor, the water was drained off and the shot was dried in a revolving drum. The shot was then raised again to the sixth floor. There it went through an initial polishing process, was rough sorted, fine sorted and given a finish polish. This process typified a Phase III shot tower process (McCord).

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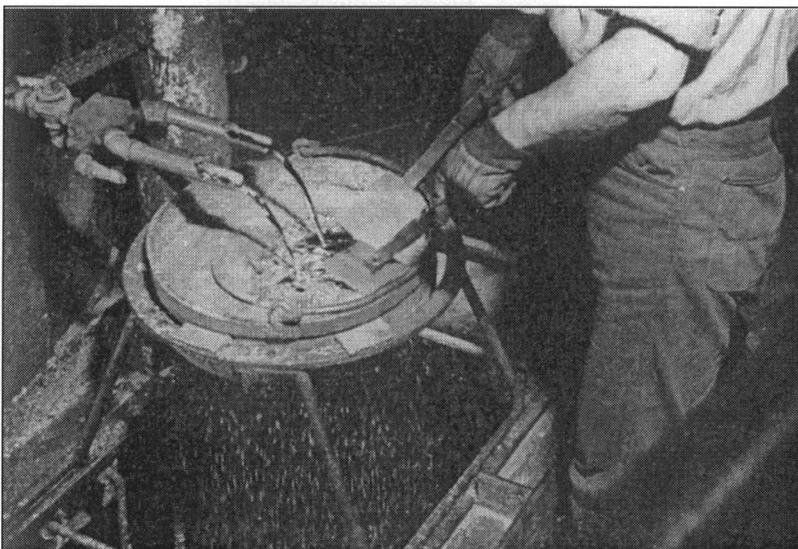


Figure 33: Casting shot, 1952 (Lead In Modern Industry)

In the above image, molten lead with additives cascade into a perforated pan that is filled with a sludge of oxidized lead that slows the flow of the lead. The addition of two to six percent of antimony to the molten mix hardens the shot, while the addition of one percent of arsenic increases its fluidity. Note the spray of fine lead globules from beneath the pan (*ibid.*, p. 124).

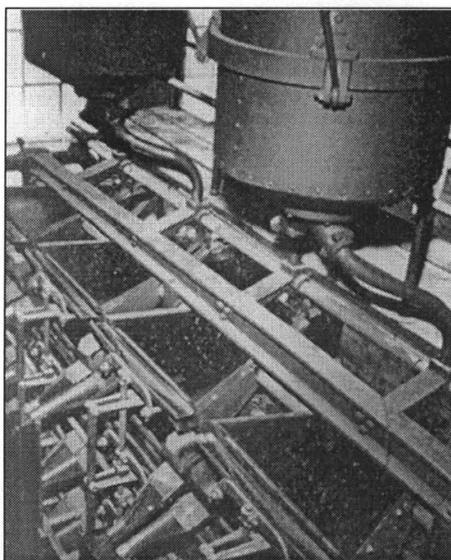


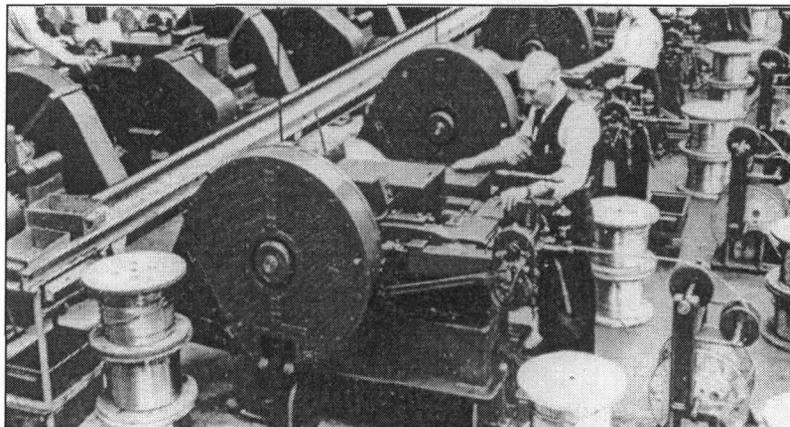
Figure 34: Sorting the cast shot, 1952 (Lead In Modern Industry)

Figure 34 depicts the modern sorting equipment that used glass plates and troughs as a sorting mechanism (*ibid.*, p. 124).

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Figure 35: (Lead In Modern Industry)

By 1952 the largest caliber of shot was .23 inches in diameter and the maximum fall was just 125 feet. The use of an up-blast of compressed air lengthened the fall. Figure 35 depicts the alternative method of producing shot, combining a lead wire core with a copper-zinc jacket. Another casting method used revolving split ring molds. These processes turned out larger calibers, up to .44 inch in diameter (ibid., p. 124).

National and Regional Lead Mining/Shot Making Context:The National Context:

Lead mining and the refining and processing of lead ore have played a key commercial role throughout human history. The importance of lead as a vital metal increased with the advent of the industrial age. The history of shot towers necessarily comprises a vital component of this larger national economic sector. The history of lead production in the United States can be divided into four "epochs." The first epoch, pre-dating 1799 was typified by "fitful and inconsequential" surface scratchings in Virginia and Missouri that were sufficient to meet a nominal domestic market. That market, was largely supplied by foreign imports, and in the case of lead shot, completely satisfied. The earliest recorded Euro-European American effort to mine lead (excluding southwestern Spanish silver mines which primarily produced silver, with lead as a by-product) dated to 1621, in Virginia. The first lead mining in what late became southeast Missouri, began in 1719. The Wytheville, Virginia, mines, the most substantial of what would become inconsequential eastern lead sources, were first worked in 1750 (Ingalls, pp. 28, 214).



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George W. Rogers Company Shot Tower\_(revised, expanded and updated)

Dubuque County, Iowa

All domestic shot towers date to the final three epochs and those that are of particular interest to this study, to the second and third epochs. There were no American shot towers prior to the Embargo Act and it was that brief closing off of imported lead shot which marked the development of a substantial domestic lead shot industry. In another important sense, lead shot production represented yet another emergent value-added American industry that was an important component of urbanization and the development of national and regional economic and transportation patterns. It was said more out of nostalgia than historical fact that “in the early days of this country every section had its shot tower.” In fact, the earliest shot towers were located far distant from lead sources, in major East coast cities. The common location factor was direct proximity to water transportation. The lead had to be transported overland to the towers. The mines in Southeast Missouri gained their own counterpart ad hoc shot towers but even there, upwards of 50 miles of overland shipments separated mine and smelter from the shot tower. The towers were on the Mississippi River. It wasn’t long before these towers were supplanted by the St. Louis shot tower, which would dominate the entire region until after the Civil War (Lead In Modern Industry; Ingalls, p. 79).

The lead miners of the second and third epochs succeeded generally increasing total production over time despite many obstacles. The list included changing national tariff policies, lead land leasing restrictions, and constant foreign competition. Generally speaking, lead production tended to increase despite falling market prices or changing tariff rates. The tariff rates were more important as restrictors of imports than as facilitators of lead exports. As previously noted, there was only one period of international American domination of the lead market (1841-48, peaking in 1844). Most pre-Civil War lead mining employed a low-tech exploitation of near surface sources. The continuous discovery of new lodes (particularly the Joplin district, first mined in 1848, substantial in output by 1854), the importation of more efficient Cornish miners who could produce from digs Americans had abandoned, and improved smelting processes, and other factors, produced increasing lead ore yields even as the prospects of the industry rose and fell.<sup>5</sup> The eclipse of Mississippi Valley lead production was due to the exhaustion of easily reached lead veins, the high cost of deep rock mining, the impossibility of removing groundwater from the mines, and the departure of thousands of lead miners to the silver and gold mines of the West. The relative ease of mining surface lead was the major retarding factor in capitalizing and modernizing the industry (Ingalls, pp. 104, 136-37).

The Lower Mississippi River Valley (Southeast Missouri) dominated domestic lead production from 1720 until 1830, at which time it was supplanted by the Wisconsin district. A significant sub-context in the history of lead mining was the first federal effort to retain ownership of mineral lands (the model for this came from European monarchies!). The importance of the known Missouri lead reserves as a factor in the 1803 Louisiana Purchase is reflected in the reservation of five leagues of these lands from public sale in the St. Louis Treaty of 1816. A federal leasing program remained in place until it was abandoned in 1846, collapsing in the face of Jacksonian democracy and a weakened national government. Still, this was an unusual federal experiment, attempted well before its time (ibid., pp. 124-26).

By the mid-19<sup>th</sup> Century lead production was centered in Southwest Wisconsin, Northeast Iowa, East Tennessee, Southwest Virginia, Arkansas and Missouri. During the Civil War, the lead mines at Wytheville, Virginia, supplied one-third of Confederate lead needs (3.2 million of 10 million pounds). The United States relied on lead produced in Missouri, the upper Mississippi Valley, and imports. By the early 20<sup>th</sup> Century the lead-producing centers had uniformly been replaced by western sites, save for Missouri, which continued to rank number one. After Missouri, in order of production, were Utah, Idaho, Oklahoma, Kansas, Montana and Nevada (Robertson, p. 913).

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<sup>5</sup> One of these factors was a natural dropping of water tables of 10-15 feet, which occurred in the 1890s and exposed formerly inaccessible lead and zinc veins. This was in the Wisconsin district (Ingalls, p. 138).

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The Wisconsin Lead District Context:

Lead drove the settlement of the upper Mississippi River Valley and it caused the early settlement of the key cities of Dubuque and Galena. Lead brought southern culture north, in the forms of settlement, technical example, and cultural affinity that was driven by the dominance of southern markets (St. Louis and New Orleans). Lead played a leading role in the developing struggle between Mississippi River (read southern) and overland (read eastern) shipping routes. The Dubuque shot tower is associated with all of these nationally significant trends. The Wisconsin lead district included parts of Illinois (345,000 acres of lead lands) and Iowa (184,320 acres of lead lands), although the district's namesake state contained the lion's share of the lead deposits (1,428,480 acres of lead lands). The district dominated American lead production between 1827 and 1871. Dubuque historian Randolph Lyons claims that as of 1850, the lead mines of the district accounted for 87 percent of the national production, and ten percent of world production. This was a rapidly achieved ascendancy, given that serious lead mining began only in the early 1820s. Explosive growth occurred east of the Mississippi between 1825 and 1827 and Galena's founding dates to the latter year. The Black Hawk War of 1832, which opened the Iowa side to settlement, was caused as much by lead as any other cause. Its decisive conclusion opened Iowa to legal settlement a year later (*ibid.*, 119-30; Lyons, *Faith & Fortune*, p. 245).

As early as 1822, the first Mississippi lead was shipped east to Detroit, using a combination of rivers, a portage, and the Great Lakes. The Mississippi River, while convenient, was distant from most of the smelters and was only seasonally available. Rapids at the mouth of the Des Moines River, in Iowa, and at Rock Island, Illinois, made the river route risky and problematic, depending on water levels. Steamboats augmented flat boats and keel boats beginning in 1823. Pig lead was more likely to be shipped south, to St. Louis for reprocessing into shot, lead pipe, lead sheet, etc., or to New Orleans for shipment to the East coast or to foreign destinations. The river, in fact, made the lead producing dominance of the upper river possible, just as railroads would later enable the Rocky Mountain mines to enter the national market. The same river exacted a toll on both exports and imports and increased the cost of living in the Wisconsin lead district (*Ingalls*, pp. 131-33).

Shot was more likely to take the eastward shipping route. The shot tower at Helena, Wisconsin, established in 1831, shipped all of its product to the east, via Green Bay. This reflected the predilection of that area to favor shipping routes that favored the urban centers in eastern Wisconsin. By 1836 more direct overland shipping routes to Milwaukee had superceded the much longer and more expensive Fox-Wisconsin rivers route. By 1841 lake shipping to the East Coast was cheaper and four times quicker than shipment via New Orleans and around the coast was. Serious Mississippi River shipping difficulties occurred in 1839-40 and several Eastern lead processing plants were established, further encouraging eastward shipments. By 1842 a continuous railroad line linked Milwaukee and the East Coast, and just 160 miles separated the rails from the Mississippi River. Mines which were not close to the Mississippi River were all the more likely to ship directly east. It is probable that the Iowa mines were less likely to do so, prior to 1855 when the railroad shipping option was a reality. Already by 1846-47, St. Louis was losing its long-standing dominance over the region. Chicago was by this time a competing industrial and transportation hub. The Wisconsin Herald predicted in 1847 that as soon as the final railroad gap was closed, that all lead would go east on wheels." By 1852 virtually all of the lead from the Wisconsin mines was being shipped eastward through Milwaukee. Steamboats with lead shipments, were leaving the Mississippi River and venturing up the Illinois River to Peru, which was then the western rail terminus. The numbers of lead pigs received in New Orleans told the story. In 1852 256,000 pigs were received for export. That number declined to 74,000 pigs by 1854, and just 18,000 by 1857. Unlike all other lead lands, the Wisconsin district was agriculturally productive and as settlement proceeded, farming was found to be more profitable than lead mining (*ibid.*, pp. 133-136).

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...From the records kept at Galena by Captain Beebe and others it appears that the amount of lead annually produced by the Upper Mines gradually increased from five thousand to ten thousand tons...during the years from 1829 and 1839: after that it rose more rapidly, and attained its maximum from 1845 to 1847, nearly reaching twenty-five thousand tons [annually] in those years. Since that time the decline has been marked, the amount raised in 1853 being only thirteen thousand three hundred tons: since that year no exact record of shipments has been kept, so far as we have been able to ascertain, the railroads beginning about that time diverted a part of the trade from the river. A large portion of the lead manufactured now goes across the country to Chicago, which formerly all found its way to the Mississippi. Of the remainder, a part is consumed in the country and the rest goes down the river to St. Louis.  
Hull and Whitney, Report on the Geological Survey of the Iowa, 1858, p. 467.

Between 1840 and 1850 the Wisconsin lead region reached its zenith in terms of annual production. The total in 1840 was 13,425 tons. The years 1845-47 yielded 26-27,000 tons annually. Beginning in 1848, the total began to decline, although the region was still the nation's principal lead producer for another 22 years. Lead prices increased between 1846 and 1850. The years 1851-1891 were described by historian Walter R. Ingalls as "a rapid decline followed by a long stagnation." The development of the Dubuque shot tower apparently was an effort to take advantage from the waning dominance of St. Louis and Mississippi River shipping. Clearly, railroad access was the vital factor that made shot making in Dubuque feasible. The new industry was also prompted by the opportunity to add value to locally produced raw materials and to serve upriver shot markets which St. Louis shot makers could no longer profitably serve (*ibid.*, pp. 136-38).

The Illinois share of lead production diminished beginning in 1847, to the detriment of Galena, and the benefit of Dubuque and Iowa. The 1847 count of lead pigs was 778,469, was 681,969 by 1848, and just 452,608 pigs by 1851, a 60 percent decline (*Western Journal*, Volume VII, No. 6, March 1852, p. 399).

The Dubuque Area and Lead Mining:

The lead trade first built Dubuque, and the same business has greatly added to its wealth every year since and is still one of the principal sources of profit...

*Express & Herald*, October 27, 1861

It is well known that this vicinity is rich in mines of lead, it being, in fact, the largest depository of that mineral in the Union. There are many mines within a short distance of Dubuque, and some within the corporate limits. The lead trade is what has made this city from the commencement, and though it is not now the principal business of the place, its importance can hardly be over estimated, for even now the working of the mines is but superficial, leaving immense deposits of wealth to be developed when more scientific methods of mining shall be adopted, and sufficient capital turned in that direction, which will no doubt be done before many years have passed. The principal part of the lead mined has heretofore been exported, but measures have recently been taken to establish manufactories in this city...[a shot tower and white lead, lead pipe and lead sheet factory]

*Weekly Express & Herald*, February 10, 1858

The lead industry was significant because it brought about Dubuque's site selection and establishment and it laid the groundwork for the financial independence that Dubuque capitalists enjoyed in subsequent years. Funds from lead mining built up the city and capitalized future industrial development. The industry determined that the initial local population was almost exclusively male in its composition. The lead fixation diverted attention from other endeavors such as town foundation. Wilkie

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suggests that the initial mining fervor resulted from a false assumption that agriculture wasn't feasible in so northerly a location. Mining faded as farming succeeded and supplanted it (ibid.).

The Mississippi River was the super-highway equivalent in a time when extensive cross-country trekking and shipping was difficult to impossible to accomplish. The initial Euro-American penetration into and control of the Upper Mississippi Valley necessarily was predicated on using the river as a transportation and communication corridor. The first regional tourists, the Frenchmen Father Jacques Marquette and Louis Joliet, included the future site of Dubuque in their 1673 down river itinerary. Regional flags changed from France to Spain in 1763, and back to France in 1800. American cash on the Napoleonic barrelhead in the form of the Louisiana Purchase switched theoretical flags to the United States in 1803 although only infrequent military parties could legally raise the colors there until 1833 (Sommer, pp. 4-5).

Beginning in 1783 Quebec-born Frenchman Julien Dubuque (1762-1810) negotiated with the Fox Indians to gain access to the Catfish Creek area ("Mines of Spain") lead deposits. He died in 1810 and his Indian compatriots rubbed out every physical trace of his mining and smelting operations, and took up the mining themselves. In 1796 Spain granted Dubuque an impressive 164,000 acres of land that roughly centered on the Dubuque location. In 1804 Dubuque paid off his St. Louis supplier, Auguste Chouteau with a land transfer of 63,815 acres. Included in that land deal was what became the City of Dubuque. This lingering issue of land ownership would long-retard Dubuque's early growth (Horton, pp. 4-6).

The Indian lead smelting operation was particularly inefficient, with a high percentage of the ore being burned off in open fire smelting. By 1819 they had turned over smelting operations to traders who operated island smelters. James L. Langworthy negotiated rights to survey the mining area and arranged to smelt the ore on the Illinois side, with Indian miners supplying the raw ore. By June 1830 Langworthy and brother Lucius H. Langworthy, were squatting on the Iowa side of the river. Federal soldiers entered the area in response to a Sioux-Fox tribal conflict and evicted the miners. Future president Col. Zachary Taylor commanded this force and future Confederate president Lt. Jefferson Davis sent soldiers from Fort Crawford. On June 17, 1830 the miners at "Dubuque Mines" penned an extra-legal codicil that provided for allocating mining rights to 200-yard square claims. The eviction postdated this document. The miners returned in mid-1832 and were quickly evicted. The Black Hawk Treaty of September 21, 1832 terminated Indian land claims to the easternmost 50 miles of Iowa Territory and the miners, to the number of 200 men, again returned to the Iowa side. In January 1833 the military again evicted them. The new area was legally opened for resettlement on June 1, 1833 and the evictees and others poured back across the river. The U.S. Congress even legitimized the 1830 miner's articles and the mineral lots as the standard for the first land survey. Within just three years the growing town of Dubuque was platted in 35 blocks, boasted 250 mostly frame buildings and a population of 1,000 inhabitants (ibid., pp. 7-8; *Dubuque Visitor*, May 11, 1836; Ingalls, p. 122).

More optimistic historical sources credit the lead industry with aiding Dubuque in weathering the Financial Panic of 1837 and this point deserves further investigation. The following claim is offered by Dubuque Its Manufacturing And Commercial Facilities (1886, p. 13):

The financial revulsion of 1837 did not materially affect Dubuque. Its main resources were lead, produced steadily by the industry of hundreds of miners and the working of half a dozen smelting furnaces. This product commanded a ready cash sale in the markets of St. Louis and New Orleans. In all American mining districts paper money was received slowly and cautiously as a circulating medium, and accordingly the depreciated bank note currency of the Eastern States was despised, and gold and silver were the principal forms of money, and continued so for twenty years afterward...

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Hype and boosterism obscure actual Dubuque area lead production figures, particularly for the period 1856-1862, the period of operation for the Dubuque Shot Tower. The problem in separating out Dubuque/Iowa lead production is the use of Dubuque/Dunleith as a regional shipping point, particularly for Wisconsin-produced lead. Export figures are available for some years but there is no way to measure local lead consumption of course. Dubuque lead exports for 1852 were 348,000 pounds, for 1853, 481,800 pounds, for 1855 481,440 pounds, for 1856, just 74,891 pounds, and for 1857, 587,000 pounds. The *Herald's* export figures for 1854 (4,385 pigs) and 1855 (5,202 pigs) do not correlate with these figures however. No explanation is offered for the poor showing in 1856, the year the Shot Tower was built but both tallies otherwise record increasing lead production around Dubuque. The *Times* reported a resurgence in lead mining during the winter of 1856-57, a "new impetus" that took place even as the Shot Tower was being built. Lead exports from Dubuque during 1858 (through October) were estimated at 40,000 pigs, or 1,500 tons valued at \$150,000. A significant change in mining, the continuation of mining throughout the winter, resulted in a year round mine production. Annual production at 13 mines as of early June 1860 totaled 40,000 pounds of ore. The four operating smelters had a 400 pig per day capacity as of mid-July 1860, or 28,000 pounds. The mines could easily outstrip the smelters' processing capacity. An 1860 shipping report, published in 1865, provided river shipping totals for the months between March and November, and accounted for a total of 55,327 pigs exported, with 10,298 pigs going east by rail. Adding 1,600 pigs on the levee as of January 1861, the year total production was put at 67,225 pigs, or 2,454 tons (4,908,000 pounds), the whole valued at \$262,000. Curiously the 1862 lead production, reported by the City Assessor, totaled just 1,000,000 pounds, valued at a mere \$50,000. If accurate, these figures reflect a sharp decline in the lead mining and processing industry (*Morning Sun*, October 20, 1858; *Herald*, June 6, July 18, September 19, 1860; 1865 City Directory, p. 20; *Daily Tribune*, January 17, 1858; *Daily Republican*, September 17, 1857; *Express & Herald*, January 1, 1856; June 3, 1863; *Times*, January 5, 1857).

Jealousy between the several states also interfered with compiling regional lead production figures. The Dubuque *Daily Republican* took the Grant County *Herald* to task in August 1856 for its claim that five-sixths of all lead production was coming out of Grant, Iowa and Lafayette counties, all of which were located in Wisconsin. The same source rejoined "this leaves a very small proportion as the product of Iowa and Illinois." The Dubuque newspaper claimed that a million dollars annually represented this "small proportion" most of which was shipped to St. Louis. Dubuque also celebrated the diminishing lead production in Illinois. The *Express & Herald*, noting that lead had made Galena just as it had Dubuque, but that Galena's lead exports for 1854 had declined by 74,000 pigs (*Daily Republican*, August 14, 1856; *Express & Herald*, February 8, 1855).

The 1860 Dubuque County industrial census found four lead smelters in operation in Julien Township, which included the city of Dubuque. These consumed 1,000,000 to 1,500,000 pounds of lead each and produced between 680,000 and 1,030,000 pounds of pig lead. Three smelters had a profit of \$35-38,000 annually. The largest firm, Brunskill and Waters, made \$52,000 in 1859. Ten years later there were eleven mines and two smelters operating in Julien and Jefferson townships. The shafts were uniformly 75-100 feet in depth. Ten years later, as was recorded in the 1870 industrial census, there were 16 mines and just two smelters (Brunskill's, Fern & Simpson) (*Morning Sun*, December 22, 1858).

The construction of the Dubuque Shot Tower coincided with a technological change in area lead mining operations. This transformation began with a February 1856 meeting where L. H. Langworthy brought in representatives of the Jamestown Mining Company representatives who argued for the use of deep mining technology, previously not employed in Dubuque. Langworthy also called for the creation of a new stock company to properly finance the new mining methods. Basically the change marked the transition from "gopher style" surface mining to a more sophisticated and more highly capitalized deeper shaft and gallery mining process, one made possible by new technology. Most important were high-volume steam driven pumps which allowed for the re-opening of abandoned and flooded old works. Powerful steam engines were used to lift lead ore from shafts. The large number of small-scale

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mining operations were increasingly replaced by large automated mines with larger workforces (*Express & Herald*, February 28, 1856; February 2, 1859; Wilkie, pp. 143-144).<sup>6</sup>

Dubuque Shot Tower History:

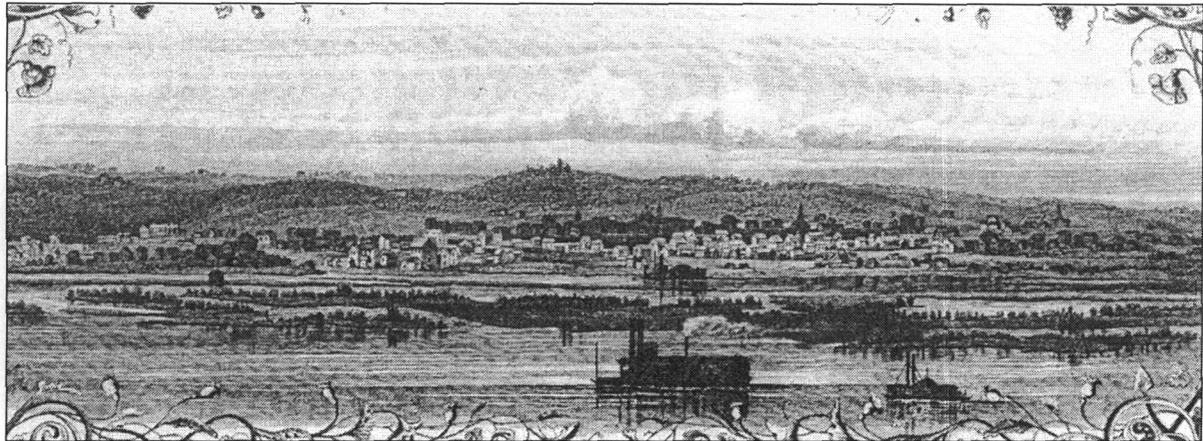


Figure 37: Dubuque Im Staate Iowa, c.early 1850s, view to the west from Dunlieth (Wilkie, p. 215, author's personal collection)

The future shot tower site was transferred to the City of Dubuque on October 19, 1855 by President Franklin Pierce (Book Townlots #66, p. 66). Presidents Polk (February 1, 1848, Book Townlots76, p. 512) and Fillmore (May 4, 1852, Book L15, p. 15) had previously transferred the islands and intervening lands between the city and riverfront to the city. President Pierce gave the city the riverfront acreage. There was relatively little acreage above water to transfer (Figure 38) but what would develop as the principal city levee was extant by this time. Figure 38 depicts the existing riverfront at the time of the first Army Corps survey.

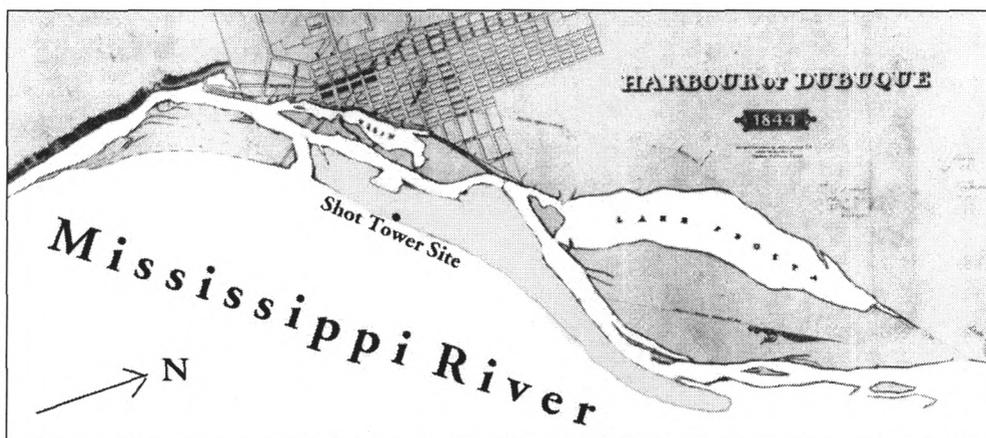


Figure 38: 1844 Map of Dubuque

<sup>6</sup> See also "Draining The Lead Mines" in the *Daily Republican*, August 8, 1857. Despite these substantial changes, lead mining was still largely a seasonal activity, with miners retiring from their trade during the hot summer months. What was termed the "fall and winter" mining season, began in September (*Herald*, August 28, 30, 1861).

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of Engineers river survey. The approximate future site of the Shot Tower is noted (roughly due east of an extension of Third Street). The difficulty is estimating the riverward distance, there being no existing reference points which are comparable to contemporary ones. Ron Balmer has platted the location relative to the original 1838 city plat map and it was his determination that the future site was then underwater. The challenge to Dubuque was to gain both reliable and convenient steamboat wharfage, a good winter harbor, and a sandbar-free river channel or deepwater access to the river. As Figure 37 clearly shows, the main river channel was located well to the east of the downtown proper and the changing river channel and extensive wetlands located between the river and the city would hinder achieving any of the principal river transportation goals for any length of time. The Army Corps of Engineers would partner actively with the city to open up the city to river transportation. Between 1853 and 1856, the Corps completed a series of harbor improvements that made possible broader riverfront development. All this is to say that the most reliable river access as of the early 1850s was the actual riverfront where the Shot Tower would later be built. It was distant from the city and accessed only by a curving road from the northwest. A number of substantial warehouses were built along the levee front and the earliest filling efforts likely raised up the "levee" (Balmer, presentation; Horton, pp. 28-29).

Other developments which occurred between 1853-55 set the stage for the riverfront development that included the building of the Shot Tower. Most important, the city extended municipal boundaries east to the middle of the river in 1853. Two causeways, one south of the Waples Cut, and the other above Barney's Cut, were extended towards the river in 1853-54. Seventh Street was extended to the river in 1855. The first Illinois Central Railroad train reached Dunleith, Illinois, on the east bank of the river, on June 26, 1855, a key factor that intensified Dubuque's interest in obtaining better river shipping access. Dunleith, a grouping of a few frame shacks as of 1854, quickly developed as an important town (now East Dubuque). Its convenient levee competed with those in Dubuque. Three riverfront development companies were established at this time and two major competing blocks emerged in Dubuque, representing competing developmental proposals for the upper or lower parts of the city. The Dubuque Harbor Company was in charge of improvements opposite the lower part of the City. The Central Improvement Company controlled a number of intervening islands and the Dubuque Harbor Improvement Company had the north end of the riverfront, with a northern boundary of 8<sup>th</sup> Street (Extended) (Oldt, pp. 97, 103, 105-06, 109, 113, 114, 125, 129; *Daily Tribune*, May 26, 1856).

The Levee at the foot of Seventh and First street are [sic] nearly ready for use and will probably be completed by the time navigation is fully resumed. Already two stone buildings are in process of construction, on Seventh street, which are to be used for business purposes. Many more are in contemplation, and ere long expect to see the most of the wholesale business of the city done upon or near the main channel of the river.

*Express & Herald*, April 3, 1856

There is now a bridge across the slough and connecting the main island with the business part of the city. Boats are now landing on the outer island and hacks and carts are running to and from Main street to the deep waters of the Mississippi. This is an important fact for Dubuque. Seventh street also will soon be completed to the deep water of the main river

*Express & Herald*, June 13, 1855

The city turned to these three private entities to develop the harbor and riverfront and James J. Langworthy was made the owner of the riverfront property on March 3, 1855 and April 15, 1856. The Dubuque Harbor Improvement Company was incorporated on March 7, 1855. The company principals were James Langworthy, his brothers Solon M., James L. and Lucius H. Langworthy, Lincoln Clark, Thomas S. Wilson, C. J. Cummings, Joseph Ogilby, Alexander Anderson, Timothy Fanning, Alfred McDaniel (president), James M. Marsh and Benjamin F. Woods. The company received land from the city on March 7, 1855 and again on April 25, 1856 (Balmer Presentation; Deed Book S, p. 373; Deed Book S, p. 92; Town Lots Book 3, p. 230; Incorporations Book #1, p. 33).

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The Dubuque Harbor Improvement Company Addition, which was approved by the Dubuque City Council on May 4, 1857 and filed for record on January 27, 1858, envisioned the establishment of an entire new “downtown” on the company land adjacent to the river. The plat provided for a market square and a public square. Its lots, apparently intended for residential development only, measured 25x100 feet. All streets were 64 feet wide. It is proposed that the Dubuque Shot Tower was envisioned as a promotional landmark structure, prominently placed on the riverfront in front of the development (Deed Book T, p. 9).

The first riverfront construction followed in 1856. The Lull, Merritt & Company erected two large brick warehouses on the levee “at the foot of Seventh Street,” the connecting street to the city. These buildings had “the most substantial” foundations and were three stories high. Adjacent to these, Thomas & Cook also built a brick warehouse, the three buildings costing a total of \$8,000 to construct. It would appear that brick was readily available at this time and that much of the new construction could now be done in brick. A new horse powered brick machine was delivered to the city in mid-March and it had the capability of substantially increasing brick production and Keys & Jackson used the new equipment to establish a pressed brick yard which opened in late July. The yard of Mahoney, Crangle & Company offered 500,000 new brick in late September. In front of the future Shot Tower site, the Upper or Outer levee was being paved by late August. A severe drought facilitated the work. When finished, the levee ramp would “be ranked among the first on the Western Waters” (*Daily Republican*, October 10, 1856; *Daily Tribune*, March 5, 14, 1856; *Express & Herald*, July 22, 24, August 28, September 5, 9, 23, 1856).

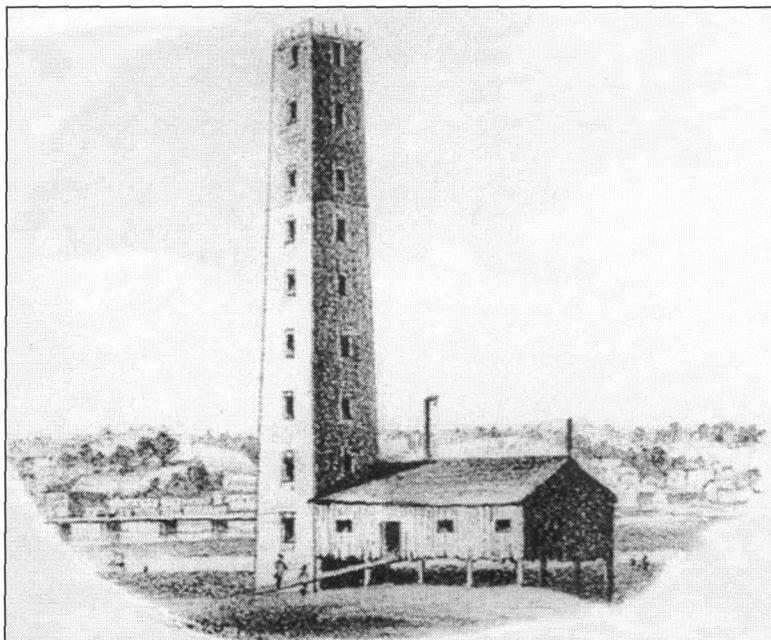


Figure 39: Detail, “Birdseye View of Dubuque,” W. J. Gilbert, 1858 (State Historical Society of Iowa)  
Note the flat roof and railing around the top.

These buildings were raised on leased or purchased land, the Harbor Improvement Company having completed the requisite site preparations before construction began. The key component was the Seventh Street extension which made the riverfront development feasible. That work was done by the time of the final land transfer in April 1856. Rogers arrived in Dubuque in late 1854 and established a gun shop at 5<sup>th</sup> and Main Streets:

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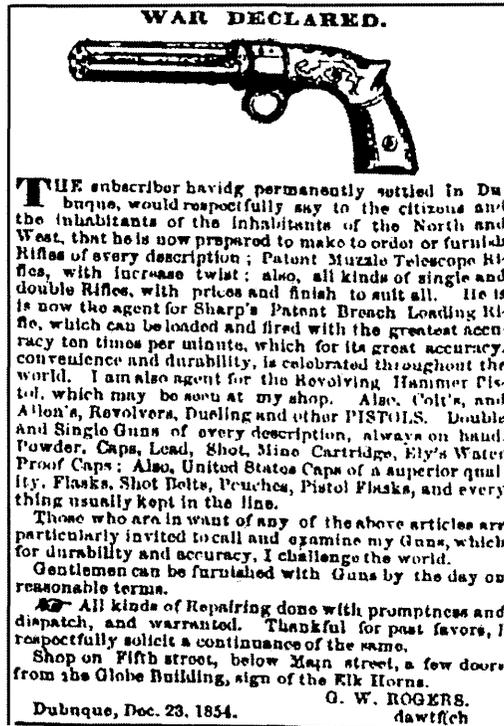


Figure 40: Rogers “declares war” on other local gun dealers, 1854  
(*Express & Herald*, December 23, 1854)

The first mention of the proposed Shot Tower was made in two local newspapers on December 3, 1855:

A Shot Tower In Dubuque – Mr. G. W. Rogers has been in contemplation for some time to erect a shot tower in this city, and we learn that he has now purchased the ground and is making preparations to build. He has made an improvement in the method by which he greatly reduces expense.

It is unclear whether the expense reduction meant a way to build a cheaper tower or a cheaper way to cast the lead shot. Rogers had presumably investigated various building sites and had selected the riverfront lot, located in the center of the Dubuque Harbor Improvement development. Nothing had transpired at the tower site as of mid-February 1856 when the following announcement was made:

G. W. Rogers of this city, has purchased a lot in the center of the island, on which he intends to erect immediately a shot tower, on the top of which the [Dubuque Harbor Improvement] Company design to place a brilliant light, during the season of navigation, for the benefit of steamboats landing in the night, and to light up the levee (*Express & Herald*).

SHOT TOWER—We have been informed by a friend that one of our fellow townsmen contemplates erecting a shot tower in the neighborhood of Eagle Point, during the coming season (*Daily Republican*).

These two simultaneous accounts are clearly contradictory. The first, is more detailed and places the tower in its present location, on a purchased lot. The second, without direct attribution of the builder, places the tower at the end of Eagle Point, clearly a logical place if ready access to lead was desired. The development company provided the

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mortgage, secured by the purchased lot, which paid for the tower construction. This entry documents the close partnership between the company and Rogers' project. The tower would serve two purposes, that of shot production, as well as symbolic promotion for what the company hoped would be a new riverfront city center (*Express & Herald*, December 3, 1855; February 15, 1856; *Daily Republican*, December 3, 1855).

The shot tower was finally under construction as of mid-October 1856. The *Daily Republican* twice described the planned tower, the second account noting that construction was finally underway. The first account appeared on August 20:

GRAND PROJECT – We learn that Messrs. G. W. Rogers & Co., Manufacturers of Guns, Pistols, and general dealers in hunting apparatus, cutlery, &c. of this city, will soon erect a Shot Tower on the Island, at the foot of Seventh Street, near the new Levee. It will be built of stone, 25 feet at the base, and ten feet at the top. The Tower will be 150 feet in height from the base, and will be capable of manufacturing from three to five tons of shot of all sizes, and bar lead, per day. It will be worked by a 5 horse power steam engine.

The amount of capital invested is from 10 to \$12000. It is intended that the Tower shall be completed and in successful operation about the 1<sup>st</sup> of October next. Merchants of Chicago and the great West, will find Dubuque the best market for shot and lead. This city has a decided superiority over St. Louis.

Being so favorably situated, surrounded by hills and bluffs abounding with an inexhaustible supply of mineral, and such immense shipping resources must at once determine this to be the great lead mart of the Union. This enterprising firm intend to carry on the manufacture of every description of guns, also keep a general assortment of revolvers, of the most approved patents, fine cutlery, and materials for dealers. Their establishment is on 5<sup>th</sup> street, between Iowa and Main .

The above account indicates that the entire tower was originally to have been of stone construction, with the goal of reaching 150 feet in height. Recall that the St. Louis Shot Tower had failed at 175 feet a number of years previously in attempting to reach 195 feet. An elevation of 150 feet was considered conservative. Note further that the intended products included bar lead, presumably smaller sized bars made from the standard rough lead pigs. Finally note the emphasis on eastern and western markets, with the oblique reference to St. Louis being an inferior production and shipping point relative to those markets.

The Shot Tower of Messrs. Rogers & Co., now in process of erection, on the Levee near the foot of 7<sup>th</sup> Street, is rapidly approaching completion. It has now reached the height of 95 feet. It is being built of stone, and the extreme height of the tower will be 150 feet when completed.  
*Daily Republican*, September 27, 1856<sup>7</sup>

Shot Tower.--Messrs. G. W. Rogers & Co. are building a large Shot Tower near the foot of 7<sup>th</sup> street on the outer levee. It will, when completed, reach to the height of 150 feet, being 25 feet square at the base and 10 feet at the top, 105 feet high will be built of stone, and the remaining 45 feet of brick. This when completed will present quite an imposing appearance. This enterprising firm have some intention of placing a large light at the top for the convenience of those navigating the river, if the city should deem it expedient. It certainly would meet with the approbation of steamboat men. No city in the Union possesses better facilities for the manufacturing of shot of all sizes and bar lead than Dubuque, being surrounded, as it is, by high bluffs, containing an inexhaustible supply of mineral. The mines in this vicinity are very extensive, and the amount of lead ore annually shipped from them immense. Dealers will find far better inducements to purchase here than elsewhere. This extensive establishment will be driven by a five horse power steam engine. The entire cost will amount to \$12,000 (*Daily Republican*, October 10, 1856).

<sup>7</sup> The same source announced that Fitch & Bower, of Madison, Indiana, planned to establish a white lead manufactory in Dubuque. The two men "are possessed of an abundance of capital" offered the *Daily Republican*.

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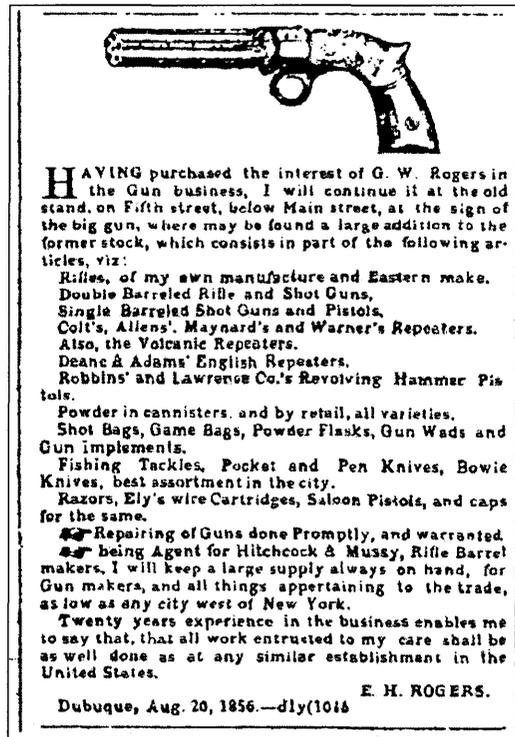


Figure 41: Rogers Gun Shop, Announcement of change of ownership  
(*Express & Herald*, August 20, 1856)

Rogers' gun shop offered made-to-order rifles and shotguns of "superior workmanship." Clearly Rogers' background was that of gunsmithing, gun sales and sports hunting. On July 22, 1856, it was announced that G. W. Rogers had transferred his gun shop interests to his brother E. H. Rogers, "a gentleman lately from the East." It was also noted that G. W. Rogers "is erecting a shot tower on the island belonging to the Seventh Street Harbor Company. It is the intention of this [new] firm, on the completion of their works, which will be on or about the 1<sup>st</sup> of October, to manufacture all the various grades of shot now in use." This account clearly implies that the shot tower project unfolded during the second half of the year and its initiation centered on the arrival in Dubuque of brother E. H. Rogers. No building announcement prior to the one cited above, mentions the shot tower project (*Express & Herald*, July 22, 1856).<sup>8</sup>

The Dubuque Harbor Improvement Company (first called the Seventh Street Improvement Company, as noted above) acquired the riverfront land from James Langworthy on March 7, 1857 (Balmer Presentation).

We learn that the Shot Tower of Messrs. G. W. Rogers & Co., at the foot of 7<sup>th</sup> street on the outer Levee, will be ready for business in a few days. It is now nearly completed, and the machinery is being placed in the establishment, and ere long we shall hear of the Dubuque Shot Tower being in successful operation. We have no doubt the worthy proprietors will receive a highly profitable trade. Success to them.

*Daily Republican*, November 12, 1856

<sup>8</sup> There was at least one other gun shop in Dubuque at this time, Williams & Brother, and T. H. Clark established a gun manufactory at the end of December 1856 (*Express & Herald*, March 23, December 28, 1856).

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Rogers was enough of a promoter that he had the sense to present examples of his first lead shot-making efforts to at least one newspaper office. It was a good move because a week later that editor would make a special visit to the tower and promote Rogers' efforts.

The First Shot: -- We had the extreme gratification last evening to witness the first practical results of the working of Messrs. Geo. W. Rogers & Co.'s shot tower.

The shot placed upon our table by Mr. Rogers were unfinished and in the precise condition in which they were made -- numerous sizes mingles together, yet the great majority very perfect, indeed, this first result must be very flattering to the proprietors, and unless we are much mistaken, this, which marks a new era in Dubuque manufactures, will eventually, possessing the advantages of raw material at hand, open a very extensive trade, and one which cannot but prove a realization of a fortune to the parties interested.

It is our intention in the course of a few days to give a full description of the "tower," and all of its workings, which we believe will prove interesting to our readers.

*Express & Herald*, November 18, 1856

True to his promise, the very next morning, the editor of the *Express and Herald* made the trek to the island to inspect the new tower:

At the early part of the day yesterday, we concluded to mount the "tower" of Messrs. Geo. W. Rogers & Co., and see what was to be seen.

After walking out the Seventh street continuation for a few minutes in the bracing air of the morning, the sun shining with an intensity just fervid enough to make the morning pleasant, we arrived at the foot of the tower and looked upon its height.

And here let us say, immediately at its base is the only true position for one to occupy in order to fully realize its magnitude. After taking a momentary glance we walked up the first flight of stairs, which makes an elevation of 10 feet, and entered the first story. In this room or story, will be found directly in front of the entrance, the steam engine which is used to hoist, by means of a windlass, the lead to the extreme height, preparatory to casting, and to rotate the cask used in finishing the shot -- Besides this, there is the tub, partially filled with water, in the center of the chamber, in which is caught the falling shot; the right of the room on entering is occupied by the windlass and the left the inclined plane which detects the perfect from the imperfect shot. After satisfying our curiosity in this portion of the tower, we commenced the ascent, the means used, temporary ladders, and these we climbed from story to story, until we stood in the ninth, where we found one of the gentlemanly proprietors, Mr. Geo. W. Rogers, busily engaged in improving his furnace.

This ninth story, which is just one hundred and forty feet from the ground [the height on the ninth floor], is where the great mystery is solved how they manufacture shot. The apparatus used, and of which consists the whole of this room's furnishing, is summoned up in a furnace capable of smelting three hundred pounds of prepared lead, and a ladle or two, together with the various sieves used in making the several grades of shot. -- After having explained to us how, that by taking a ladle full of the combination of arsenic and lead, heated to a certain temperature, and pouring the same into the sieve (which is simply a sheet iron disk with small holes punctured at intervals of a half-inch, which hangs over the aperture, through the floor—and by the by, we should have mentioned that in the several floors to the very bottom there are apertures in each, thus

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forming a channel for the falling globules to pass--and from thence the molten lead passes to a tub below. How that from this tub the shot is taken and placed in the cask, which revolves around until it receives that finish which is observed on all shot, and how it is taken from this cask and placed upon the inclined plane where the perfect shot roll down and the imperfect, oval and flat, slide down and drop into a groove which the brisk, round perfect shot leap over and are caught into a receiver, and how from thence they are passed through as many sieves as there are sizes of shot, which are placed in a case one above the other, the coarser on top, and are thus graded preparatory to bagging and how they are bagged, ready for market; we say, after explaining all this to us, we placed our feet on the rounds of the ladder and emerged once more into the open air through the scuttle of the roof – and hat a glorious site was presented to our eyes – the whole city lit up with joyous sunshine looking like fairy picture. Down the river, a view of eight miles with a boat in the distance steaming the river, and above, the glad waters shut out by the bluffs of the Wisconsin side, joining in appearance with that of Eagle Point on this, all presented, with the moving forms of life pursuing their avocations, and the hum of business which came from the work shops, a scene exhilarating in the extreme and worth the toil of climbing the height of one hundred and fifty [the height atop the roof] feet to enjoy it.

The tower, as our citizens well know, is square in form, its height we have given as one hundred fifty feet, one hundred and ten of which is stone, and forty of brick. At the base the measurement is twenty-six feet; the walls at this point are nine feet in thickness, gradually tapering up to the top of the stone work where it measures 20 inches. The brickwork finishes at twelve inches in thickness, thus showing a very firm structure. The number of stories in the tower is nine, each with the exception of the lower which has but three, having four windows, making a total of 35 in all.<sup>9</sup>

The cost of the tower as it now stands, we are informed, amounts to nearly \$7000 and will, when the additional building is added in the spring, reach \$10,000.

When the whole affair is complete its capabilities will enable the manufacturers to furnish daily, if necessary, from six to eight tons of shot ready for market but for the present winter the amount will be limited from one to two tons.

With the hasty and imperfect sketch of the tower we leave it, and advise our citizens who would wish to gratify their curiosity, to wait upon Mr. Rogers, as we have no doubt but he will be pleased to give them an exhibition of its whole working after the present week when he will be in full blast (*Dubuque Express & Herald*, November 26, 1856).

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<sup>9</sup> This statement is incorrect, there are four openings on each of the nine floors.

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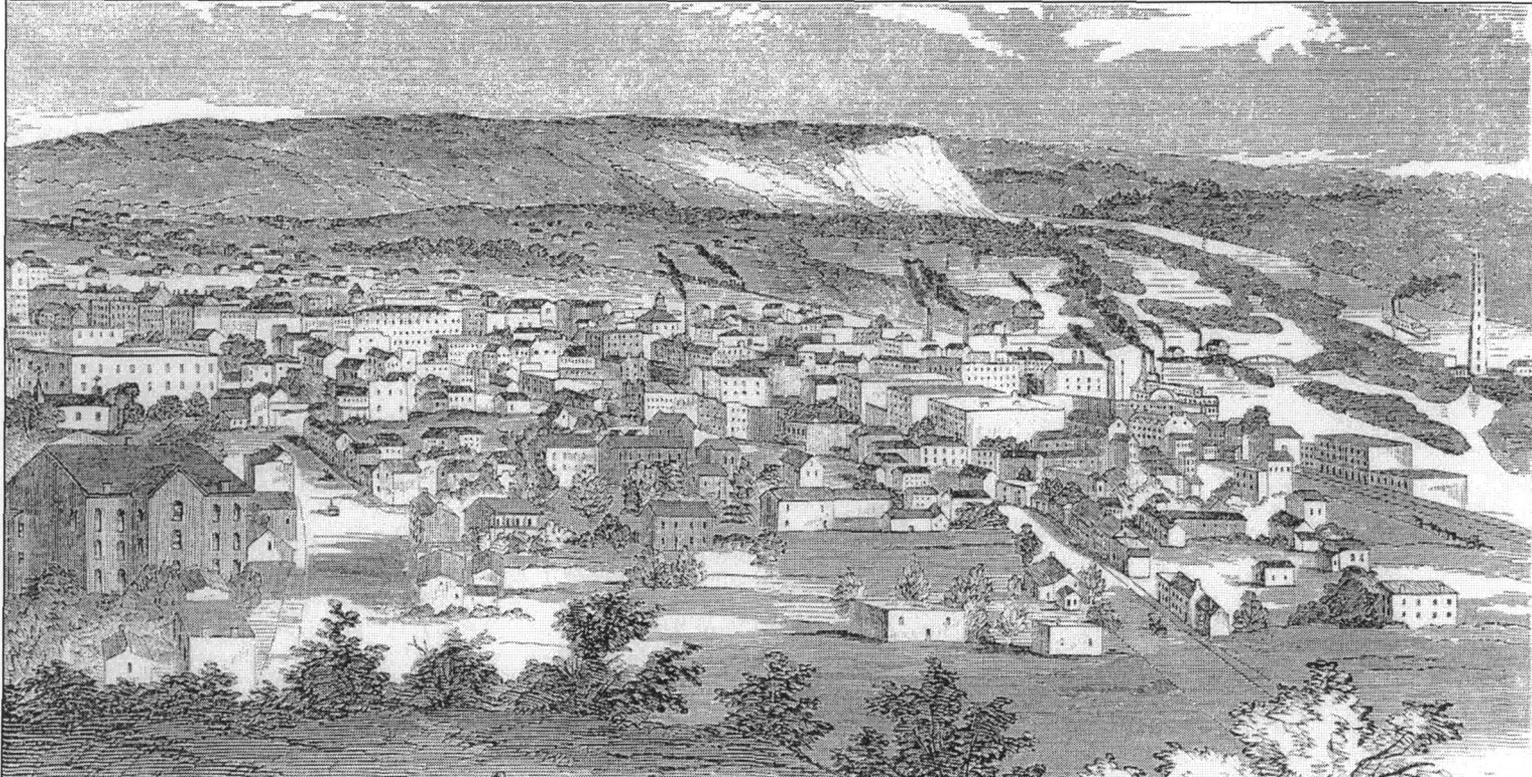


Figure 42: Ballou's view of Dubuque, view to the north, 1856  
(*Ballou's Pictorial Drawing Room Companion*, October 31, 1857, p. 281)  
The Shot Tower appears at far right

Figure 47 depicts the newly completed Shot Tower and its single-story frame building, the latter being elevated on stilts. This image is informative on a number of key points. First, if the shadow line on the building's roof is correct, then the attached building was either north or east of the tower. Given the background elevations, the view most likely is toward the northwest, thereby placing the building north or northeast from the tower. The account and the presence of smokestacks on the building, indicate that the ten-foot initial ascent taken by the visiting editor, was up the ramp, shown in the view, into the side building, and that the steam engine, winch, and the sorting mechanisms were all located outside of the tower. Finally, the elevation of the building indicates that the working base of the tower was indeed its first (of nine) levels. The building was elevated to match that level and to avoid floods as well. This argues against there being very much tower base buried underground. When the two-story replacement building was constructed (see Figure 47 below), its second story likely aligned with the ground floor of the tower.

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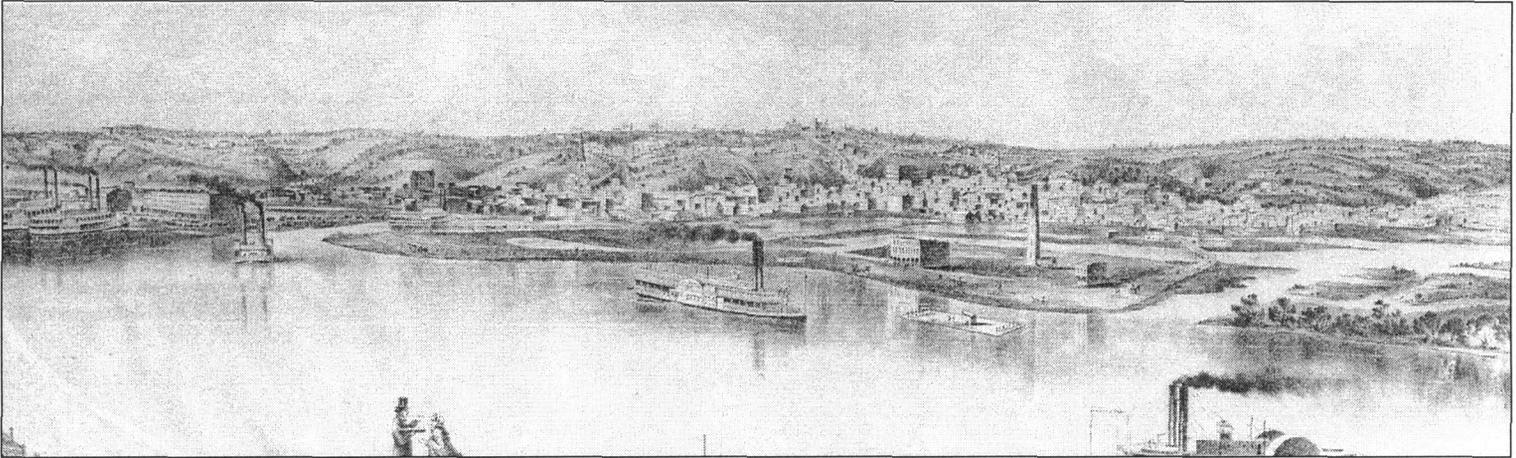


Figure 43: 1858 lithograph of the Dubuque riverfront (Dubuque: Frontier River City, p. 156).

One additional reason for the Shot Tower's proximity to the river might have been for convenience of fuel delivery. Dubuque imported its coal and its wood supply was both diminishing and expensive. *The Daily Republican* reported "...the high price of wood and the facilities for obtaining coal by way of the river and railroads will eventually make coal the principal article of fuel used in Dubuque." It is probable that Rogers used coal for his operation (*Daily Republican*, September 11, 1857).

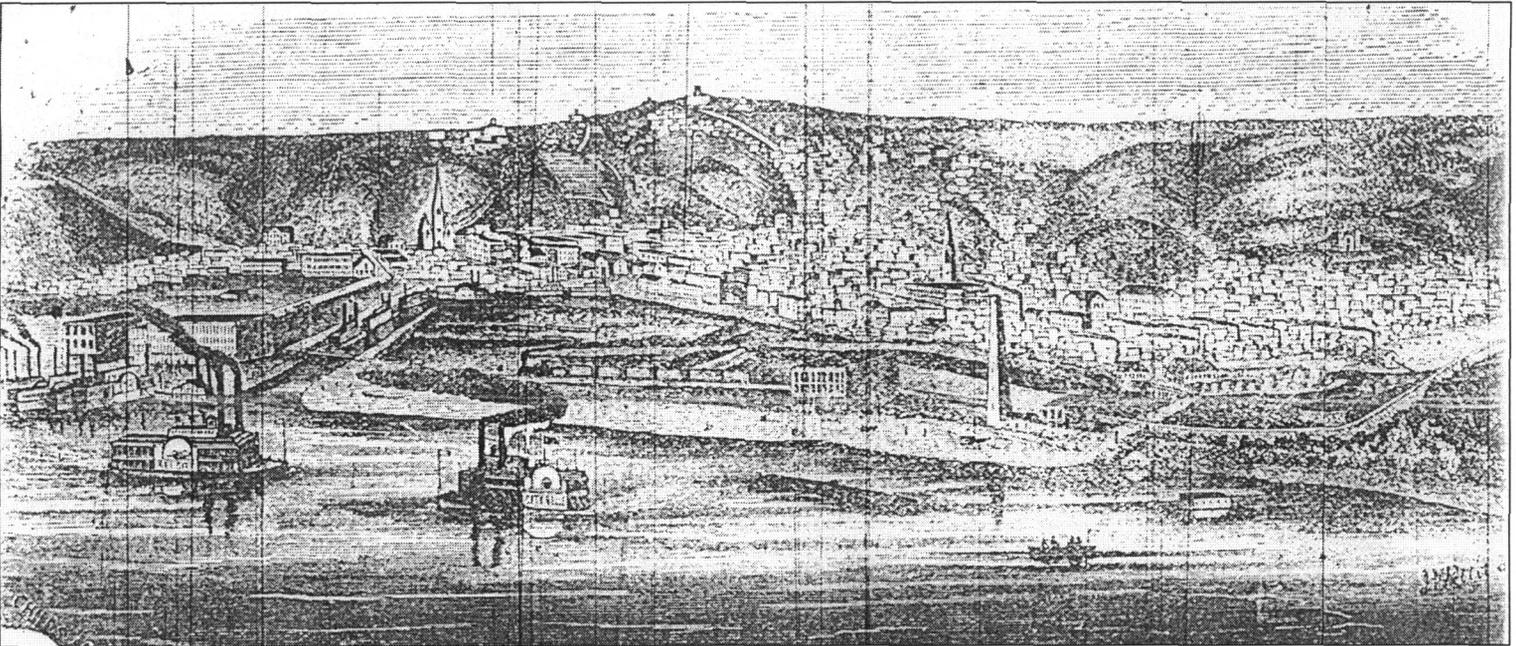


Figure 44: 1864 view of the Dubuque riverfront.

By December 24, 1856, Rogers was finally ready to begin regular operations. The following advertisement, targeted to the local market rather than the river export market, appeared in the *Weekly Express & Herald*, and continued to run through the spring of 1857:

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**SHOT TOWER:**

The subscribers are now prepared to fill all orders for SHOT, combining all the different sizes from Buck Shot to No. 20, at nearly St. Louis prices. All orders will be promptly filled, and shot delivered without any extra expense. Orders from the country must be addressed to G. W. Rogers & Co., accompanied by the Cash, to receive attention. As our business will be strictly a Cash business, we shall be enabled to serve those who may favor us with their orders at rates that will make it in their interest to deal with us in preference to other markets. Orders left at the Gun Shop of E. H. Rogers, on Fifth below Main Street, will receive immediate attention.

Rogers curiously could claim retail prices “at nearly St. Louis prices” an apparent claim that his cost was cheaper. The advertisement also identifies E. H. Rogers as a probably partner with George Rogers, and hints that their involvement with shop production grew out of the selling of guns (*Weekly Express & Herald*, December 24, 1856; April 1, 1857).

The planned additional building, to have gone up in 1857, didn’t transpire. There was however continued large-scale commercial construction along the outer levee. Bronson & Stewart built a six-storefront four-story brick block with cast iron front, at a cost of \$35,000. The massive building measured 125’ square and was the city’s largest warehouse, with 22 cast iron columns set along its façade. It is this building that dominates woodcuts of the period, standing south of the Shot Tower. L. D. Anderson built a single storefront, costing \$10,500. Cogswell & Barnes built a double storefront, of stone, three stories high, at a cost of \$12,000. No mention of a Shot Tower addition was listed in the annual progress report. A probable reason for the lack of improvement was the financial panic that struck the city and nation, beginning in mid-September. Area banks began to close and the city was devastated with the closure of Herron Brothers Bank on September 19. Money was in such short supply that a public meeting of merchants was held in mid-October to resolve the matter and the several harbor improvement companies were authorized to issue their own script as a result (*Dubuque Daily Tribune*, December 31, 1857; *Weekly Republican*, July 26, 1857; *Daily Republican*, October 18, 1857).

Figure 44 depicts the post-1857 building up of the outer levee, viewed from the bluffs west of the city proper. Present are the range of warehouses and store buildings that line the levee, as well as a number of frame storefronts which appear to front onto Fourth Street. A watercourse separates the outer levee and the city in the foreground. The Shot Tower stands without an attached building. East Dubuque or Dunlieth, Illinois, is visible across the Mississippi River. The absence of the two-story Shot Tower building, present by 1861, hints that that building was constructed in 1861 when lead shot production resumed (see Figure 47 below).

The market area of the Shot Tower company has never been documented. The initial 1856 advertisement cited above, was clearly directed to the local sportsmen trade, and not the river export trade. A most helpful reference to the Dubuque lead shot trade came with the establishment of a white lead factory in the city in mid-1857. White lead was a principal component of paint at the time. Messrs. Finley, Burton & Company offered white lead (dry or ground in oil), Red Lead Lithardage, Zinc Paint pipe and sheet lead and the factory, when in full operation, would consume ten tons of lead weekly, or just a little less than was used at the Shot Tower (see account below). The local newspapers had advocated such a business for years, to better take advantage of the local lead production. Local processing of that lead was even more profitable than was mining and smelting lead for export. At any rate, the *Weekly Republican* noted “Recently, a shot tower has been built, and is now doing a large business. Instead of buying shot, we sell the article to our neighbors; and Chicago, Galena, and the up-river country, are more or less supplied from this point.” Thus two important points were made. The lead shot operation was operating on a grand scale, and secondly, the export market was east, via the Railroad, and principally upstream. Apparently a finished lead shot

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product could be shipped competitively up river, at rates below those of downriver shot companies. Chicago had its own shot producers, yet Dubuque had found a market niche there as well (*Weekly Republican*, July 1, 1857).<sup>10</sup>

A second newspaper account corroborates the success of the Shot Tower. The *Weekly Express & Herald* reported in early 1858 as follows:

...A shot tower was built last fall [sic], near the levee, of stone and brick, 150 feet high, and the manufacture of shot commences on the 17<sup>th</sup> of November last, since which time an immense quantity has been made, full equal to that made in other places; thus supplying Dubuque an important article for which she was previously dependent on St. Louis.

The newspaper kindly dates the onset of initial production, a date, November 17, 1856, that corroborates the earlier accounts noted above. Clearly the local shot production had eliminated one market niche of the St. Louis shot producers. The two above accounts attest to the loss of much of the up-river market previously enjoyed by St. Louis lead interests (*Weekly Express & Herald*, February 10, 1858).

The latest newspaper reference linking G. Rogers with the tower appeared in the *Daily Republican* in late July 1857. Mr. Macloon showed the editors "with a pencil sketch view of the northern portion of the city taken from the top of Rogers' shot-tower." The drawing was intended to appear with others in Ballou's Pictorial Magazine. The view covered the city from Eagle Point to the Female College. The artist was H. W. Pettit. In the end ambrotypes were taken by local photographer Frank Pickerell and these were the basis of the images used in Ballou's. A picture of the college was included, but Pettit's sketch was not (*Daily Republican*, July 24, 1857).

The editor of the *Daily Northwest* inspected the Shot Tower in late September 1857, and thereby added to the historical record of its continuing operation:

A Visit To The Shot Tower. --- In our peregrinations yesterday morning, we chanced to pass near the shot tower, owned by Messrs. Cook and Langworthy. And as usual, our local curiosity being excited, we determined to know and see how shot were made, so in we went, putting, as a matter of course, our best foot foremost. By enquiry of Mr. Langworthy, one of the proprietors, we ascertained that any one ambitious of going to the top of the tower could do so without charge, and free-gratis-for-nothing. So up we went, *puffing* [sic] and blowing, (that's our forte) until about midway, when we came to a halt, pretty well winded, and a strong inclination to turn back. But no -- that wouldn't exactly prove our pluck and satisfy our *rising* ambition, so, to the ladder we again turned. At an expense of much breath, and considerable straining of our -- just now relaxed muscles -- we reached the top, which is one hundred and fifty feet high. After resting a spell, and feeling somewhat recovered, and greasing our tongue with the "oil of civility," we commenced our enquiries of the presiding genius of the furnace, ladle and lead kettle. He appeared somewhat amused at our questions, all of which, however, he very politely answered. For the information of those who do not know how shot are made, we will give an explanation of the process. At the top of the tower, in a room about twelve by fourteen feet, a small brick and iron furnace is built, upon which is an iron kettle capable of holding about ten or twenty gallons of melted lead, which is there poured into a copper strainer, and being suspended over the opening in

<sup>10</sup> Finley and Burton were using a newly patented process just developed by a Dr. Hannon. The new process produced the necessary carbonate in three weeks instead the normal six months. The factory, not located, occupied a frame structure (45x125) and the process employed a 20 horse power steam engine. The owners also added their own smelter works. The works had been under construction "for some time" as of late June, and was to be in operation by mid-July. The business was in full operation as of late October (*Daily Tribune*, June 29, October 26, 1857).

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the flooring of the tower, the liquid drops through, and down a distance of *one hundred and fifty* feet, into a large tank of water prepared to receive it. By the time the hot lead reaches the tank, it assumes a globular or shot form and on coming in contact with the water, it is instantly cooled and hardened. The shot are then placed in a barrel shaped tank, which, by an appliance of machinery, is made to revolve, thus cleaning or polishing them. They are then rolled over an inclined plane in an oscillating chest with strainer pans for separating and assorting the different sizes. They are then weighed and bagged. We are informed by Mr. Langworthy, that with the present force of eight hands, and other facilities, they manufacture about five thousand pound weight daily.

We were much struck with, and really delighted at the beautiful prospect from the top of the tower. The view of the city is certainly one of the best to be had. If there is an artist in our midst desirous of taking a correct, extended, and beautiful view of Dubuque, we would advise him to select the top of the shot tower as his point from which to do so (*Daily Northwest*, September 22, 1857).

Obviously George W. Rogers was already out of lead shot production, given that Mr. Langworthy is in charge.

The Shot Tower almost completely escaped newspaper editorial notice during 1858. The one oblique exception, was made at years' end:

**Lead and Shot Works:**

We learn that a company of enterprising capitalists are about to take hold of the Dubuque Shot Works, and add to that manufacture the branch of sheet lead, and perhaps that of manufacturing pipe.

There is no reason in the world why the lead gathered from our mines should not be worked here into all of the merchantable forms that commerce demands, and it is only wonderful that such a source of profit has escape[d] the notice of the man of means seeking for places of investment for their capital, as long as it has.

Success to this party organizing and may rich returns flow into their coffers for their daring and enterprise.

Presumably Messrs. Finlay and Burton first looked at acquiring and enlarging the Shot Tower operation. They instead chose to establish their own white lead works. Early in the year, the parcel that included the tower was individually platted out and recorded (January 27, 1858). The parcel included Lots 22-24 of Block 7, the tower actually stood on Lot 24 (Balmer; *Morning Sun*, December 25, 1858).

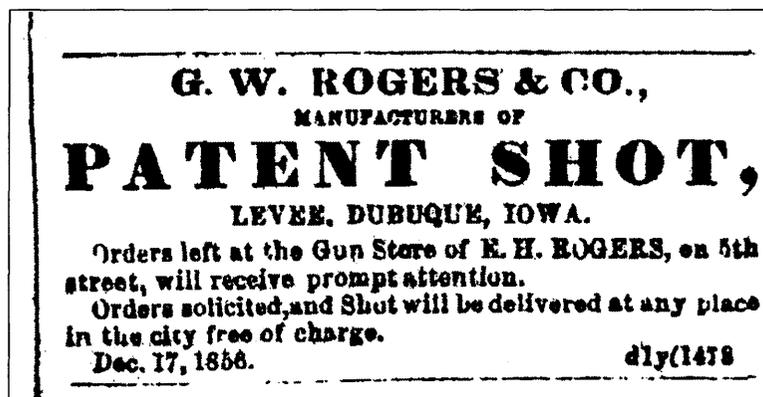


Figure 45: Rogers Advertisement, Spring 1857  
(*Express & Herald*, March 17, 1857)

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There was plenty of lead departing Dubuque throughout the year 1858.<sup>11</sup> West & Hopkins had shipped 7,000 pigs of lead from their Jones Street warehouse as of March 24, 1858 and the *Times* credited them with having 14,000-15,000 pigs accumulated a week previous, awaiting the opening of navigation. The lead accumulated over the winter and was shipped as soon as the river opened. The *Times* reported four new lead strikes between the city and Peru, with 10 to 15 mining “gangs” at work along the Peru Road, as of August 1858. The local unemployed were assured that the mines guaranteed employment and an “inexhaustible source of wealth.” In mid-September, new and excellent lead veins were opened in the Obeshon Range in southwest Wisconsin, just seven miles from Dubuque. One major impediment to local mining was the draining off of experienced miners in the several gold and silver rushes in the West. The *Express & Herald* tried to convince miners that more wealth was to be found in lead mining than any other promised mineral. By October 1858 there were 300 lead miners working within seven miles of the city. Many of these were new to the work, being unemployed due to the poor economy. They replaced the departed gold seekers. Total lead exports from Dubuque and Dunleith in 1858 was estimated at 40,000 pigs, weighing a total of 2,920,000 pounds or 1,500 tons. The total value, based on a market rate of \$5.25 per 100 pounds, was \$150,000. The supply of lead wasn’t a factor in closing the Shot Tower (*Morning Sun*, October 13, 17, 20, 1858; *Weekly Express Herald*, March 24, April 28, September 1; *Times*, March 11, August 23, 1858).<sup>12</sup>

It is particularly problematic to tie down lead shot production at the tower during 1859 and 1860. The long-term role of George W. Rogers is also difficult to document.

The impressive fact is that the Shot Tower operation weathered at least the first year and a half of the financial panic of 1857, at least into late 1859, a time when many businesses failed both in Dubuque and across the state. Among these casualties was the Harbor Improvement Company. Its dreams for relocating the downtown to the riverfront collapsed and its vast acreage would remain largely undeveloped until the 1870s-80s when the land was used for lumber drying and storage. The *Northwest* found a silver lining in the aftermath of the panic. It observed in late April 1859 that “the false bottom of Dubuque has at last fallen out, and we are now transacting business upon a safe and firm foundation.” There was real opportunity. Stores which ad rented for \$1,000-2,000 annually in pre-panic days could now be secured for \$500-700. Lots could be purchased at low figures and “shin plasters no longer circulate in our midst.” Finley & Burton’s white lead factory, a parallel reflection of local value added lead processing also survived into early 1859, and was apparently quite successful. It did finally succumb to the panic. The *Times* reported a 20-ton shipment to St. Louis in late March 1859 (*Times*, March 24, 1859):

The white lead manufactured at the Dubuque White Lead Works is taking precedence in the markets for its excellence, being chemically pure and less liable to discolor. The company besides shipping to other points, are now filling an order for St. Louis of twenty tons. This shows what may be done in the manufacturing line in Dubuque, and there are many other sources for as profitable investment (*Morning Sun*, March 25, 1859).

In the face of bad times, construction proceeded throughout the city, with an estimated 300 new houses going up, along with numerous business blocks (30 buildings as of August 3, 1859). Work resumed in late July after a year’s hiatus on a block at Main and 11<sup>th</sup>. The *Morning Sun* echoed the confidence expressed by the *Northwest*, when it announced that “These hard times, inconvenient as they are, will not prove unprofitable to this community.” One substantial benefit to the lead trade was the turning of the unemployed to that new line of work.” Still, the city accounted for over half of all business failures, both in number and total liabilities, during 1858 (94 failures, worth \$2,196,122 in 1858, as opposed to 56 failures valued at \$825,000 the previous year). The aftermath of the panic continued into the early war years. The *Herald* observed in mid-1861 “How the

<sup>11</sup> 1861 lead exports from Dunleith, as of September totaled 7,390 pigs of lead and 76 kegs of shot. These shipments were going by rail (Daily Union, get date).

<sup>12</sup> West & Hopkins were the principal lead exporters at Dubuque as of early 1858 (*Times*, March 11, 1858).

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glory of 1857 has departed..." and noted "the contrast between the flush times of 1856-7 and the dullness of 1861-2" (*Morning Sun*, November 5, 17, 1858; January 21, July 22, August 3, 1859; *Herald*, August 10, 1861).<sup>13</sup>

SHOT TOWER.—While on a visit to the Shot Tower this morning, we were informed that it was expected the work of manufacturing Shot would commence about the first of next week.  
*Daily Times*, March 22, 1859

Peleg Tallman and William Hyde Clark took over the lead shot production, leasing the tower beginning in the spring of 1859. Their efforts lasted just three months, despite an apparently substantial reinvestment in new machinery at the tower:

Messrs. Tallman & Clark tested the newly arranged machinery in the shot tower, yesterday afternoon, by putting it in motion and dropping shot. It works to perfect satisfaction and the establishment will commence to manufacture for the market on Monday next. Success attend the enterprise, which we have no doubt will follow with such men at the wheel, and in the native home of the material (*Morning Sun*, March 26, 1859).<sup>14</sup>

This is the only account that associates Tallman and Clark as partners in the shot making business. Tallman is duly listed as the Shot Tower agent in the 1859 Dubuque city directory. As of 1858 he was working as a realtor and money broker, his office in both years being located on Seventh, between Main and Iowa streets. Beginning in early 1862, Tallman became a war correspondent for the *New York Times*. He died at Columbus, Kentucky in April 1863, while serving in that capacity. The *Times* noted that Tallman had been "during the flush times of '55 and '56, was a very extensive dealer in lands. After the crisis he managed the shot tower for awhile, and for a year was Assistant Superintendent of the Custom House construction." The *Herald* described Tallman as "a worthy young man...[who]...came into this city years ago with \$13,000, which was nearly all lost in land speculation" (*Times*, April 18, 1863; *Herald*, April 18, 1863).

William Hyde Clark (1836-72) came to Dubuque from Buffalo, New York, in 1856 and entered into banking. He next served as secretary of the Dubuque Harbor Improvement Company, c.1857-58, prior to returning to banking, serving as Teller of the new Dubuque Branch of the Iowa State Bank, where he was associated with Julius K. Graves. His Civil War service exposed him to the disease that ended his young life. Despite his youthfulness at the point of death, the *Herald* termed him one of the city's "oldest citizens...having lived here above fifteen years." The same source added, "[Clark] was his own worst enemy in being too generous and self-sacrificing in behalf of those he deemed near and dear to him as friends" (*Herald*, October 11, 12, 1872; *Times*, October 12, 16, 1872).

**Shot Making**

The *Herald* at various times has urged the necessity and economy of building up lead manufacturies in this city—upon the plea that is folly to send our lead to St. Louis, then to New York, and which place it was bought by our dealers. This enormous addition of freight was just exactly so much money wasted.

Messrs. Peleg Tallman & Co. have put the idea to a practical working, they have leased the Shot Tower at the foot of Seventh street, and are now manufacturing a better article of shot

<sup>13</sup> The white lead works was gone as of late 1861, when the *Herald* called for a replacement firm, adding "the failure in the white lead business, through mismanagement or other causes by some parties, should not deter other capitalists from engaging in it" It celebrated the fact that "at last shot is successfully made here" (*Herald*, September 25, 1861).

<sup>14</sup> The source "Old Shot Tower" states that Tallman leased the tower beginning in March 1859.

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than can be bought in St. Louis or New York. As our readers may not be familiar with the process of manufacturing shot, we will give them a brief description.

The tower is 130 feet high. In the lower rooms are the Furnaces, Engines, sorting and polishing machinery, and the "putting up." The lead is melted and one pound of arsenic is added to every hundred pounds of lead. It is drawn up to the top of the tower and poured into a sieve, from which it falls to the first floor in a reservoir of water. From the reservoir it goes on the dryer and thence to a revolving cylinder in which it is polished. It is then taken out and poured on an inclined plain. At the bottom of this is another inclined plain which is separated from the first by a distance of a couple of inches. The pellets that are perfectly spherical will gain momentum enough in passing down the flat inclined plain to carry them over the space which separates it from the one below. If a pellet is a little lame however, it comes down very slowly, aided mayhap by a boy and a brush, and falls between the two inclined plains into a box and is again to be re-melted. Those that go over both plains are of all sizes. They are then taken out and put into a sort of sifting machine. This looks like a chest of drawers—the top drawer is perforated a certain size, the next below it a size smaller, and so on down. The show is poured into the top and the whole machine driven backward and forward by machinery. Of course all the pellets below a certain size corresponding with the holes in the top drawer fall through and so on down—each drawer retaining a certain sized pellet, say "B.B.," "No. 1," etc.

Our old friend C. H. Remington has had charge of and the construction of all the machinery, and the various conveniences are owing largely to his skill and inventive genius.

The machinery for the establishment is driven by a three horse power engine. The tower has been in operation a little over two weeks, and they have manufactured over 9,000 lbs. of shot.

They are also making arrangements to manufacture sheet lead and tubing.

We are glad to be assured that they are receiving liberal orders.

W. H. Daniels is Foreman of the establishment.

*Daily Herald, April 14, 1859*

The above account is the only one to identify specific Shot Tower employees and it is the only contemporary account to accurately report the height of the tower (missing the correct figure by just ten feet). Remington is not listed in the 1858 city directory, but appears as a machinist in the 1859 directory. He drowned in 1872, attempting to save a drowning boy in the Mississippi River. Daniels (1826-1898) was listed as a laborer in directories of this time. He died in 1898 and was described "as well and favorably known." His son Charles was an engineer with the 11<sup>th</sup> Street Elevator, and his son Will was a noted California newspaperman (*Herald*, March 15, 1898; *Times*, June 18, 20, 22, 1873).

These two early 1859 Shot Tower accounts document the refitting or at least the rearrangement of the production process, and an opening of operations a month after river navigation began. Mr. Remington was the designer and builder of the Tallman-Clark operation and Daniels was their foreman (*Daily Herald*, April 14, 1859).

The tower was recognized for its value as a vantage point. This account describing its use by a local artist, appeared in late 1859:

View of Dubuque:

A Mr. Fleish is engaged at the present times in sketching a view of the city from the shot tower. An airy seat for an artist just at the present time. Speaking of the tower we may add the proprietors will get to running again in a few days.

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It would have been cool and blustery atop the tower in early October. The entry nicely adds that the tower remained in operation, having been shut down for an unexplained reason, for an undetermined period of time (*Morning Sun*, October 6, 1859).

The Shot Tower was likely flooded out twice in 1859. The first 1859 flooding came in mid-May. The *Herald* reported “from any point in the city, 7<sup>th</sup> street, the outer levee, Jones street, &c, look like slender threads thrown across the surface of the water.” By May 14, the water reached the top of the 7<sup>th</sup> street improvement and teams hauling fill ceased working. Attention shifted to saving lumber stocks from the yards located at the foot of 7<sup>th</sup> Street. Again in early June, it was reported “the several Improvement Companies are entirely overflowed, except Third street extension, leading to the ferry landing.” (*Weekly Times*, June 16, 1859; *Morning Sun*, June 11, 1859; *Herald*, May 13, 14, 1859).

Peter Cook and William Langworthy, both Harbor Improvement Company directors, were the last known entrepreneurs to attempt a continued shot production. They are said to have operated the tower through the end of 1859. Rogers is no longer listed in Dubuque city directories after 1858, but his name appears in the sheriff’s tax sale notice in March 1860 (see below). Roger’s company is said to have become Cook, Rogers & Company and then Cook & Langworthy, both of these changes likely occurring in 1858 or even 1859. The 1858 Dubuque city directory lists Cook & Langworthy as the Shot Tower operators (Commercial Avenue on the inner levee), which appears to support the 1858 date.<sup>15</sup>

Cook & Langworthy were the probable new owners and operators when the artist, cited above in October 1859, was at work on the top of the tower. Their operation was certainly short lived given that the Shot Tower was sold to yet another unidentified party and the Dubuque Harbor Improvement Company was forced to foreclose on the new owner in January 1860.

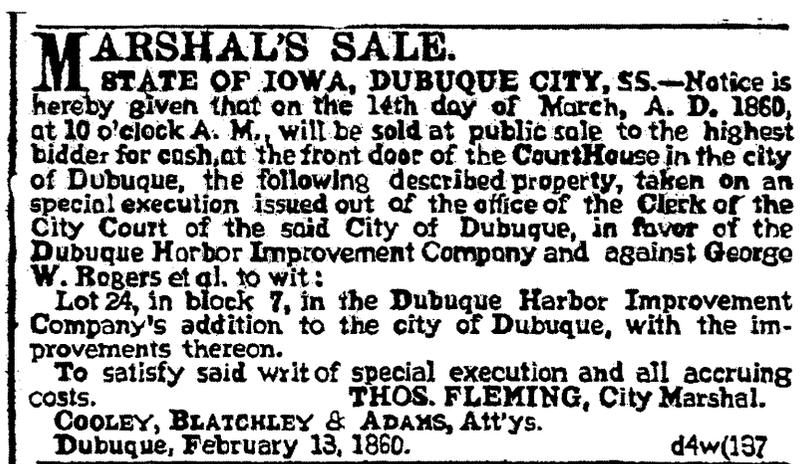


Figure 46: Sheriff’s Sale, *Herald*, February 23, 1860

The successive sales were related to financial problems with the Dubuque Harbor Improvement Company and not to a failure to pay property taxes. The property was seized by the City Marshal a month later and Gilbert Woodruff, of Rockford, Illinois, purchased it (Lot 24) for \$1,653 at public auction on March 14, 1860. Note that George W. Rogers is still named as a principal in the matter. A day later Woodruff sold the parcel to Julius K. Graves for just \$1,200. The price reduction hints at some form of partnership between Woodruff and Graves. Graves later picked up the other two adjoining lots (lots 22-23) at the end of 1860, paying \$5,450 for them. Note that the undeveloped lots were worth considerably more than was the single lot with the

<sup>15</sup> The Dubuque newspaper index cites both of these changes to a Express & Herald article dated August 25, 1857. That article is not to be found and it might well be that the year is in error.

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Shot Tower. He was the sole owner of the Shot Tower company, having bought out one willing seller after another at rock bottom prices. Graves was not an original member of the Rogers firm (Oldt, p. 128; *Telegraph-Herald*, September 26, 1933) property abstract).<sup>16</sup>

There is no evidence of shot production in Dubuque during 1860(nor is there evidence that it wasn't in production, the newspapers are simply silent on the matter) and the available record indicates that the Shot Tower enjoyed regular production from its construction through 1859. If out of production, it wasn't due to the lack of local lead production. The total lead exports for 1860 totaled 67,225 pigs of lead, including 1,600 pigs still on the levee as of January 1861. Fifteen percent of this total were shipped out by rail, the rest by river. A Herald account of late 1860 reported that about seven percent of the downriver lead was headed for Pittsburg, on the Ohio River (3,000 of 2,487 pigs). The 1860 figures well above those of the previous year. The price of lead might explain the Shot Tower's problem. Higher lead prices would have enabled St. Louis competitors to broaden their shipping range, while low prices would have favored local producers like those in Dubuque. The reality however, at least by 1861, was falling lead prices (*Herald*, September 19, 1860; *Times*, January 26, 1861).

The apparent final failure of the Shot Tower is commonly blamed on price undercutting on the part of the St. Louis competition. It is said that this effort began as soon as word of the new Dubuque tower reached that city. The probable source for these legends is a published recollection by Senator William Allison, first published in 1914. The senator recounted that a group of Dubuque businessmen had invested "at large expense" in the tower venture, thinking it would "pay like a California gold mine." There was no other tower nearer than St. Louis the senator recalled. The initial business was "quite satisfactory" but demand then slackened. Allison recalled how Julius Graves quietly purchased the company shares, with no explanation for his acquisitions. Graves "saw his opportunity" with the coming of the Civil War. Allison claimed that Graves simply had to announce his intentions to produce shot and within two weeks, he was first approached by the St. Louis shot tower interests. This was clearly not the case, Graves took no action with the Shot Tower until well after the war was underway. Once in operation, Grave's effort was very profitable at least through March 1862, and plans were in the works to substantially broaden and expand production. Allison also stated that a price war was initiated by the St. Louis interests and that Graves encouraged all to buy from them at their below production cost rates. The price war was quickly concluded, according to Senator Allison (*Telegraph-Herald*, April 15, 1914, reprinted from the *Chicago Record-Herald*, no date).

In reality the St. Louis interests were struggling against more than area shot tower, given that there at least two towers in operation on the Upper Mississippi River, at Dubuque and in Wisconsin. The western shot towers had the advantage of being close to their lead suppliers, and had a price edge over the East Coast shot towers. It is claimed that St. Louis dominated the regional lead shot market, but artificially low shot prices would have hurt it the most, given that its shot was shipped the greatest distances. Short-haul competitors would have paid considerably lower shipping costs within their smaller market areas. Other factors in the lack of overt success for the Dubuque tower were likely high bulk lead prices, the lack of economic of scale in a small and fairly inefficient operation, a too-short tower that produced shot with a high rate of failures, and the very difficult economic times of 1857-59. The June 1861 *Daily Times* treatment of the Shot Tower (see below) confirms the advantage of low lead prices and local production opportunity. That source noted "the present low price of lead has made it an inducement once more to embark in this undertaking" (*Telegraph-Herald*, September 26, 1943; *Daily Times*, June 15, 1861).

The booming lead mining industry withered in the face of low market prices. The *Herald* reported "the present condition of the country has affected the lead trade as well [as] every other branch of business. The price of mineral is low in consequence of their being a low or uncertain market for lead. Hence those miners who are raising mineral feel that if they are obliged to sell at the present prices they will sustain an unexpected loss." The smelters stopped buying and the miners even considered starting their own smelter. The going rate was just \$25-27 per 1,000 pounds of ore, and lead pigs sold at \$4.75 each.

<sup>16</sup> Neither surviving newspaper, the Herald or Times, discussed the January 1860 sale and the March 1860 sheriff's sale is also not discussed. No associated district court case was found to explain the facts behind the seizure and sale.

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Lead Trade—The unsettled state of the lead market and the equally unsettled state of the currency, has induced most of the smelters throughout the lead region to discontinue buying miners' minerals for the present. Mining is, however, prosecuted as vigorously as ever (*Herald*, April 25, 1861).

The other course was paper script. The Dubuque Miners' Association voted a resolution opposing accepting "stumptail" currency for their lead. Friends of Julius Graves took action to exempt the State Bank (Grave's bank) from the action, noting "the notes of this bank are equivalent to coins." The *Herald*, for one, disagreed and was pleased to report the many instances where the bank refused to cash out its own script. The failure of another Dubuque banking house, Theo Gelpecke & Company, on May 6, was another measure of very unsettled financial times in the city. The lead market situation improved between May and September, during which mineral prices increased \$12 per half ton, from \$20 to \$32. Mining was still a seasonal industry, with many miners ceasing work during the heat of the summer. By late August, many were returning to work, buoyed by the higher lead prices (*Herald*, April 19, May 8, 19, June 15, August 30, October 27, 1861).<sup>17</sup>

As war fever increasingly gripped the city and region, lead miners were among those who joined the early military companies. The miners at Mineral Point, Wisconsin, raised their own unit, the "Miners Guards." The *Herald* suggested that lead miners were perfect for sapper and miner engineering service. The Dubuque Miners' Association complained that they could scarcely obtain a quorum for meetings because the "war news" dominated and all things were now military. Southern shipping interests pledged to maintain an open Mississippi River trade and Confederate shipping duties were exempted from lead shipments. Less patriotically inclined Dubuque lead miners still had the option to head west to dig gold, the gold fever raging on (*Herald*, March 29, April 28, 30, May 21, 1861).

The first 1861 reference to the tower notes that high water had hindered shot production. The same high water impeded the departure of the city's first Federal volunteers on April 24. There was barely sufficient dry levee area to accommodate the large crowd that saw them off downriver. The account is unclear as to whether lead shot production was underway previous to the flooding (*Daily Times*, April 24, 1861).

Shot Tower. – We are informed by one of the proprietors of this fine building that as soon as the high water subsides in the river, they will commence the manufacture of shot once more. It is our sincere hope that as long as shot are made anywhere, this institution will continue to run to its full capacity. It is entirely wrong to pay half a dozen freights and profits on the products of our lead mines before it gets to our hands ready for consumption, when it might be made up here at our doors just as well.

J. K. Graves, Esq., a gentleman who is largely interested in this enterprise, purchased a large flag the other day which cost him \$40, which he intends to raise upon a tall pole from the top of the shot tower on the receipt of the news of the first battle and victory for the Union. Good for him.

*Daily Times*, May 24, 1861

Graves finally couldn't wait for a battle, let alone a victory, and he displayed his large Star Spangled Banner at the end of May. There were several minor naval actions in Virginia during mid-May but it is more likely that his patriotic display was made in response to the killing of Federal Colonel Elmer Ellsworth, who was shot while removing a Confederate flag from a hotel in Alexandria, Virginia, a town that Federal forces occupied on May 24, 1861.

<sup>17</sup> While the smelters were the primary market for lead ore, there is at least one report where a local merchant was a direct buyer. The Shot Tower operators would have purchased bar lead either from the smelters or perhaps a purer lead product from the white lead factory (*Morning Sun*, July 16, 1859). For an excellent example of the *Herald* berating the State Bank notes, see *Dubuque Herald*, November 7, 1861.

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THE HIGHEST FLAG IN IOWA. — The patriotic proprietors of the Shot Tower raised yesterday a fine S.B. B., on a staff above the top of the tower, 160 feet from the ground. We doubt whether there is a pole of that height in the State. At least, Dubuque will claim the honor of the highest flag until further news.

*Herald, May 31, 1861.*

Graves (1837-1898) and his brother, R. E. Graves, were principally bankers. Julius Graves started his working life as a bank clerk in his native New Hampshire. He came to Dubuque in 1855 and was made cashier for the private banking house of M. Mobley & Company. The bank reorganized as J. K. Graves & Co. in 1858, and then merged with the State Bank of Iowa as its Dubuque branch, with Graves as vice president and general manager. Graves also served on the State Bank's Board of Control as a director. In later years Graves was a principal organizer of both the National State Bank and Commercial National Bank. His major business interest was the Key City Gas Works, with which he became affiliated in 1859. He became its president and chief stockholder. He also served as the president of the Dubuque Street Railway (1868) and is credited with establishing the Fourth Street Elevator. He was elected Mayor in 1866 despite his Republican politics, in 1876 he was elected to serve in the State House of Representatives, and in 1881 he was elected to serve four years as a state senator. He became involved with railroad construction in 1870, serving as president of the Chicago, Clinton & Dubuque Railway Company, the Chicago, Dubuque & Minnesota Railroad, and the Iowa Pacific Railroad (Portrait and Biographical Record, pp. 138-39; 1880 History, pp. 795-96; Oldt, pp. 621-22; Lyon, Faith & Fortune, p. 169).

With the coming of the Civil War, the Graves brothers loaned the State of Iowa considerable sums necessary to raise and equip military volunteers from the Dubuque area. Julius Graves took the lead locally in volunteering to raise, equip and finance the military organization, and the establishment of what was first termed "Camp Union," and later expanded and renamed "Camp Franklin," a major state military rendezvous point. In early September 1862, Graves was appointed Post Quartermaster by Governor Kirkwood. Letters of support for his selection were submitted by William B. Allison, George S. Peirce, Brigadier General F. J. Herron, and his fellow bankers, R. Bunson, T. Davis and brother R. E. Graves (Record Group 101, Adjutant General, General Correspondence, 1861-62, Boxes 3, 13, State Archives).

In late May 1861, Julius Graves penned the following offer to Governor Samuel J. Kirkwood, concerning the Dubuque Shot Tower:

As the sole owner of the "Dubuque Shot Tower" I take this occasion to tender the use of said property to Government for the manufacture of such supplies of Bullets and other Leaden missiles of war as may be required during the continuance of the present troubles – without money and without price. – The Tower is in good running condition and is at your immediate service.

Or if preferred I shall be most happy to furnish such War materials delivered at such points as you may deem expedient and at actual cost. As you are well aware this section of Iowa is the seat or "Fountain head" of the Lead region – the supply is inexhaustible, which fact coupled with the facilities of the Tower for the manufacture of Bullets, Shot, &c, etc. I commend to your consideration.

In the present struggle of Liberty with barbarism it behooves all who love their Country to sink the partisan in the Patriot – to yield personally emolument and gain to the glorious cause of our National Flag.

This is the motive which activates me and I am ready to add my mite in advancement of the "common cause" – and will gladly furnish that which shall deal death and destruction to Traitorous Southern Rebels "until the last armed foe expires."

Your Obt. Svt.  
J. K. Graves

There is no evidence of a response from Governor Kirkwood. One of the Governor's staff noted at the bottom of Grave's letter:

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Mr. Graves has just suggested the idea to me of offering the use of his "Shot Tower" &c. to you for the patriotic purpose of giving them "a little more grape." He is one of our best business men & has every facility to serve the people in this emergency – whatever he promises will be done.

A search of State ordinance records during the Civil War years identified just one bulk lead contract, with John C. Washburn, of Davenport. The State appears to have obtained its ammunition supply from Federal arsenals and buyers, although in truth, its initial request for 500,000 rounds of buck and ball cartridges, requested on July 23, 1861 (immediately following the Federal defeat at the battle of First Bull Run in Virginia), could not be filled "owing to a number of very urgent requisitions now on hand." There is little evidence that the State Arsenal ever held any quantity of musket balls. Many of the State weapons were large caliber foreign imports, Garibaldi Rifles, and Prussian Muskets, of caliber .71 and .72 respectively. These weapons as well as other specialized weapons such as Colt Pistols, came with their own bullet molds. There are many references to "elongated musket balls" an apparent reference to the *Minie* type cartridge ball, which was a cast produce. This evidence indicates that the Shot Tower produced no shot for State purposes, but it doesn't mean that this was the case in other states (Record Group 101, Adjutant General, Invoices of Ordnance and Ordnance Stores, 1861-1865, Box 1).

What is clear is that the Shot Tower was in full operation. Seventy-six kegs of shot were shipped by rail from Dunleith as of September 1861. The Shot Tower also contributed an extensive display at the annual County Agricultural Fair (plowshares into swords?) that same month, for which it received a "Diploma" (*Express & Herald*, September 12, 1861):

The Dubuque Shot Manufacturing company had several pigs of lead worked up into spherical masses, in sizes varying from mustard seed to large marrow fat peas. These are commonly called shot, bullets and slugs. At one end of the same table was lead in the ore, rough, unsightly; at the other, lead finished in the highest state of the art, bottled and bagged, ready to be hurled at the first unlucky bird or secessionist that may fall in the *pro tem* owner's way.

*Daily Union*, September 5, 1861

A local source, without citation, credits Graves with a daily production of 100-150 25-pound sacks of shot, adding "Even at capacity not all the orders could be filled and additions were planned" (Old Shot Tower, p. 1).

Graves early purchase of the Shot Tower in November 1860, previously noted, dispels any likelihood that his entry into the lead shot making trade was related to the coming of the Civil War. The purchase date was previous to the earliest state secession date and well before the onset of the war itself. However, Graves letter to the Governor implies strongly that the banker's interest in the Shot Tower was purely patriotic. Nothing had been done for half a year to place the tower into operation, so perhaps the war offered an easy way to secure lucrative war contracts and to place it in operation. Failing that, Graves fell back to attempting regular lead shot production for a civilian market. One major factor in his favor was the burning in 1861 of a competing shot tower near Helena, Wisconsin. Dunleith, Illinois, the railhead across the river from Dubuque, was the major export point for lead from Wisconsin (the Potosi region) by early July 1861. As of July 3 there were 100,000 pounds of lead bars awaiting shipment eastward, the lead being "mostly from Potosi." The demise of the Helena tower might have increased this lead exportation. The accumulation was also largely caused by the virtual disappearance of railroad cars in the early months of the war. This gave him back the upper river market. A month after writing his letter to the Governor, Graves announced plans to reopen the lead works, and the following info-mercial appeared in the *Daily Times*:

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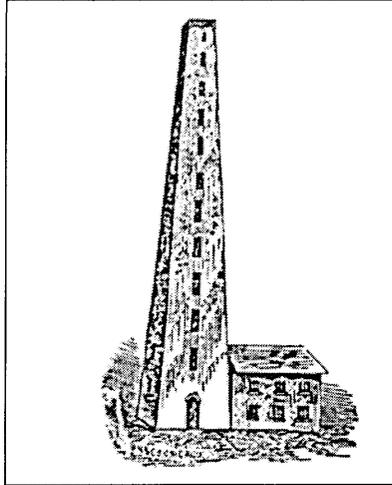


Figure 47: 1861 Shot Tower wood cut (*Daily Times*, July 15, 1861)

Shot Tower – Above will be found a cut, which at a large expense has been prepared especially for the *Daily Times*, or any other man. It is a correct representation of that fine structure, the Dubuque Shot Tower. It is well built of stone and brick, 150 feet in height, and erected in the flush times of 1856, at an expense of more than \$15,000. The original owners became involved and were unable to run it after it was completed. It has been sold and re-sold upon different decrees of the court and on mortgages until at last it is in the hands of our enterprising young townsman J. K. Graves, Esq.. He has associated with him other men of experience and these uniting with him will start again in the business of making shot of all sizes, on Monday next.

The present low price of lead had made it an inducement once more to embark in this undertaking. The tower will make, when run to its full capacity, from 5,000 to 8,000 lbs of shot daily, and would, if run constantly, use up one half of the entire lead crop of the Dubuque mines.

P. Tallman, Esq., the former superintendent, will have charge of the manufacture. For the convenience of sportsmen he will make a great improvement in the manner of sacking the shot. Heretofore it has always been put up in twenty-five pound sacks, but he will put up half sacks, containing twelve pounds and quarter sacks with 6 pounds. These small packages will be very popular with sportsmen, as many gentlemen who go out for a day's shooting, do not wish to purchase a full sack.

It is very gratifying to see an enterprise of this character reviving at a season of such general prostration: - We hope our jobbing merchants will extend every encouragement they possibly can to this manufactory and give them the preference when they can consistently with their own interests. We sincerely hope this company may soon carry out their intentions of making sheet lead and lead pipe, and eventually make white lead for the whole upper Mississippi Valley.

Absent from this account is any reference to the national emergency or a market that was offered by it. Presumably, failing to obtain a State contract, the owners had devised a conventional plan of operation, one that focused on the needs of sportsmen and local merchants and offered a smaller six-pound bag of shot in lieu of the usual 25-pound bag. A part of this plan was to expand production into other lead materials such as pike and sheet lead. A key reference to lower bulk lead prices is an important indication that it was the high cost of bulk lead that had forced the closure of the tower in the past. . The local newspaper was thrilled to see the revival of a notable pre-panic industry and its return to production was one more indicator that the effects of the panic were finally abating. Notable as well is the newspapers' special effort to present a woodcut of the facility, a rare step at this time in newspaper illustration technology (*Daily Times*, June 15, 1861; *Herald*, July 3, 1861).

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George W. Rogers Company Shot Tower\_(revised, expanded and updated)

Dubuque County, Iowa

Earlier accounts indicate a seasonal Shot Tower operation but as of January 1861, Graves' shot production was very busy, an apparent indirect indication that the war was driving the lead shot market. The following fortuitous accident account, nicely documents the Shot Tower operation:

Hair Breadth Escape. \_\_ A serious accident occurred at the Shot Tower Tuesday afternoon, about three o'clock, occasioned by the giving way of the floor of the finishing room attached to, but not a part of the tower.

Owing to the impossibility of shipping across the river for the past few days the quantity of shot has accumulated and together with the large quantities of lead stored on the premises, caused the floor to give way, precipitating three of the workmen together with about a thousand bags of shot, eighteen tons of lead in pigs and cakes, two cauldrons of molten lead, weighing about fourteen hundred pounds, as also miscellaneous articles used in the room, including one large stove, full of fire, and a large furnace, under full blast.

Strange to say, amidst the ruins thus created, but one of the workmen—Mr. Richard Dillon—was injured. He was found with his leg broken and his head somewhat bruised, surrounded by huge piles of lead and a large beam across his neck, so that his escape from instant death was truly miraculous.

He was promptly cared for Drs. Lay and Lewis, and is doing well.

The blame rests of course in storing such quantities of lead in the building, the workmen, were, however governed by their own ideas, as to whether it should be stored there or left piled up outside the building, so that no fault can be attributed to any one. The loss will be small—aside from the delay—as the lead and shot can be re-melted. The damage to the building will be remedied at once so that business will proceed as usual after the present week.

*Daily Times*, January 9, 1862

This account provides the only measure of the Shot Tower workforce, with three workmen in the attached building, and some number atop the tower. It implies strongly that the building was still a raised structure, as originally depicted. The 1861 drawing (see above) contradicts this and it quite possible that the collapse was that of a second floor, with the "precipitation" dropping to the ground floor. The account is very detailed about the scale of the production, with two cauldrons likely being heated by a single furnace, and the fact that the melting was done on or near the ground, rather than at the top of the tower. The amount of accumulated bar lead and the amount being melted at the time of the operation are measures of a large-scale lead shot production. There is also a heat stove which provided auxiliary heat to the building. All of the winter production was being shipped by rail and thus the need to transport the shot across the river to the railhead at Dunleith. The ice must have been too thin or had broken up, preventing the use of sleighs to ship the lead over the river. Here again, one of the work force is named. Richard Dillon is simply listed as a laborer in period city directories of 1858 through 1866.<sup>18</sup>

Graves' shot production was going very well as late as mid-March, 1862, when the following account appeared in the *Daily Times*:

Dubuque Shot Manufacturing Company. – This company's works are in full blast at the tower, and they are turning out from 100 to 150 sacks per day. Mr. Graves is introducing improved machinery and otherwise adding to the advantage of this factory, hoping thus to be able to keep up to his orders. One firm in Chicago, agree to take one thousand sacks per week during the whole of 1862. Burbank & Co. of Saint Paul, as soon as the river navigation opens, wish to be supplied with several hundred sacks weekly for the trade of the Red River of the North. These are only two of the great customers of our shot tower. No small amount is sold by the local agents, Smith & Cannon[,] and other orders from a distance are pouring in more rapidly than they can possibly be filled.

<sup>18</sup> City directories never specifically identify the Shot Tower workers although the 1858 directory does identify the White Lead factory employees. This omission implies that the workers were unskilled laborers, and like all laborers, no specific place of employment is offered.

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George W. Rogers Company Shot Tower\_(revised, expanded and updated)

Dubuque County, Iowa

The Company designs erecting this summer a smelting furnace in conjunction with the tower, and be enabled to save a great amount of expense in melting, etc. The original intention of the company was to eventually build machinery and shops for the manufacture of bar lead, lead pipe, sheet lead, and other articles made from lead, but they are so overrun with business at present that they find it expedient to devote their whole energies to the manufacture of shot and bar lead alone. It is to be hoped, however, that the time may come when every pound of the products of our mines may be manufactured here at home.

*Daily Times*, March 19, 1862

This account appears to nicely document Mr. Graves' original plan, that of establishing a lead products factory in Dubuque, despite Senator Allison's recollections to the contrary. Note the complete absence of any reference to war-related production. There is no way to know that the various vendors were not military contractors of course, but clearly much of the production was intended for domestic use, and the market area was east by rail and north and northwest by river. No mention is made of the St. Louis shot makers. Again, lead shot production is going ahead year-round, regardless the availability of river shipping, although the northern trade is dependent upon that shipping mode. Clearly the company is also producing a considerable amount of bar lead, in small weights. It is probable that these bars were marked by the company name (referenced for the first time in this account). These bars would survive in archeological settings, particularly at sunken steamboat sites.

The final local reference to the Shot Tower dates to mid-July 1862, and might indirectly document an abandoned facility that was vulnerable to the visitation of local youths:

THOU SHALT NOT STEAL.—A boy stole a chunk of arsenic from the shot tower a day or two ago and took it home. There he threw it on the ground in the garden and went to dinner. Soon after he had finished his meal he went out doors and was dismayed to see sixteen of his father's Shanghai's dead upon the ground, and as many more on the point of giving up the ghost. Served him right.

*Daily Times*, July 13, 1862

The Shot Tower sale was concluded on July 14, just a day after this account. News of the sale leaked out prior to the filing of the sale public record ten days later (property abstract).<sup>19</sup>

Within a week, the same source announced the startling news that the Shot Tower had been sold.

THE SHOT TOWER IS SOLD.—J. K. Graves, Esq., informs us that the shot tower in this city has been sold to Mr. Chadbourne of the Saint Louis Shot Manufacturing Company. It has been purchased by them because it interfered so much with their trade, and we learn with much regret it is their intention to take out the machinery, board up the doors, and close the establishment merely because it had become too powerful a rival. This directly affects our prosperity to a certain degree, and it rests only with our capitalists to say whether the manufactory of shot shall be abandoned entirely by the citizens of Dubuque.

*Daily Times*, July 18, 1862

The actual Shot Tower sale was concluded on July 14 and the purchase filed for record ten days later. The local press were aware of the sale by July 18, 1862 (property abstract).

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<sup>19</sup> The advertisement for the "Dubuque Shot Manufacturing Company" continued to run in the *Daily Times* as late as July 27, 1862. The advertisement, offering to fill "orders for the various sizes of shot, fitted with dispatch." Was this an oversight or was the company already planning to produce shot in another way? (*Daily Times*, July 27, 1862)

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Dubuque County, Iowa

The Express & Herald was then being considerably distracted by such things as the arrest of its editor, Dennis Mahoney, on charges of disloyalty. That distraction, along with the threat of a military draft, likely excused its contradictory report on the sale of the tower, a report that wasn't retracted:

THE SHOT TOWER.—The report that the shot tower of the city was sold to a St. Louis firm, is incorrect. Laflin, Smith & Co., the great powder and shot firm, a branch of which house is established here are the purchasers. The price paid was \$3,000, we learn, and the building is now boarded up and deserted, thus destroying the competition which it kept up while operation.

*Express & Herald, July 24, 1862*

Both of these accounts document the claimed shot production competition between Dubuque and St. Louis and the acquisition of the Shot Tower was in fact accomplished to shut down the Dubuque operation.

THE SHOT TOWER.—The shot tower passed into the possession of Messrs. Chadbourne & Forster of St. Louis yesterday, and not to Messrs. Laflin, Smith & Co., as the Herald stated. The price paid was \$3,000. The original cost of the building was \$15,000. It is promised by the present owners that they will expend 6,000 on the tower, and get it running immediately.

*Daily Times, July 26, 1862*

Something had caused Mr. Graves to decide to close down his shot tower. It is known that his manager, Pellig Tallman, had decamped for service as a war correspondent, the previous January. Still, the plant was in full operation as of the following March. The St. Louis purchase price was hardly an offer that couldn't be refused. Graves certainly had much more money tied up in the Shot Tower both in its acquisition as well as its several improvements. Just a week after the sale was publicized, Graves wrote Governor Kirkwood seeking "a Staff appointment – or position as Quartermaster under Brig. Gen. Herron who is now recruiting here." Col. William Allison had served as the Governor's staff representative in Dubuque, but had resigned in January 1862. The Daily Times called for his replacement in mid-August, noting "The military interests here already suffer for lack of some proper head to direct affairs." It was Grave's apparent intention to see actual field service, given his pledge to the Governor that "I am ready to quit Banking, drop my Pen and devote my time and energies to the welfare of the Brigade and the extinction of Traitors." Graves didn't get assigned to the brigade but did secure the post of Dubuque Quartermaster, a mostly honorary yet important position that paid \$3.00 a day. Dubuque was alive with excitement about the threatened military draft and a major effort was underway to form additional regiments. Hysteria about loyalty reached its high point as local Democrats were arrested and hauled off to Old Capitol Prison in Washington. Governor Kirkwood let it be known that no field staff applicant would be considered absent evidence that the candidate had actively recruited volunteers. Graves secured his desired appointment, was ranked a captain, and took on the significant challenge of rebuilding and enlarging the existing rendezvous camp on Eagle Point. Graves oversaw the rapid construction of 60 new barracks and the camp, large enough to house 6,000 volunteers, was renamed "Camp Franklin" in honor of Benjamin Franklin (Record Group 101, Adjutant General, General Correspondence, 1862, Box, 13, State Archives; 1880 History, pp. 462-63; *Daily Times*, August 10, 13, 16, 19, 28, 29, September 14, 19, 1862).

The legend states that Graves simply dumped the Shot Tower and found a clever new, cheaper and perhaps more effective way to produce shot. His lead shot company continued operating under its old name and Graves was an active partner, although his name rarely surfaces in contemporary newspaper accounts (see below). The story goes on to recount how Graves was taken to court based on his undocumented promise to not build another shot tower in Dubuque. The problem with the legend is the lack of any documentation that the court case was ever tried.

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George W. Rogers Company Shot Tower\_(revised, expanded and updated)

Dubuque County, Iowa

What nobody could have known, in mid-1862, was that the market value of lead would escalate to record levels before the war ended. By 1865 a thousand pounds of lead was worth \$109, in sharp contrast to a preceding 30-year running average of \$30 (source?).

The St. Louis Shot Tower Company, Downstream Competition:

This major regional producer of lead shot had its origins in early 1844 when Ferdinand Kennett began to raise up a 195' tower. That effort failed at 175 feet and its bricks were removed to a Mississippi River site, just north of where the famous Eads Bridge would be built following the Civil War. This impressive plant is pictured in Figure 48. The new tower reached 175 feet and its foundation rested on a massive stone that was discovered during the excavation of the foundation. The firm was titled Kennett, Simonds & Company in 1849, and was re-titled the St. Louis Shot Tower Company in 1858. The newly incorporated firm was capitalized at \$200,000 and annually consumed between five and six million pounds of bulk lead. The company officers were President G. W. Chadbourne, Secretary Theodore Foster, and Superintendent O. G. Rule. Chadbourne had started out in the lead shot trade as a mere clerk in 1847 but had risen to the top management of the operation. The company obtained its lead both from upriver sources as well as a number of Missouri lead mining areas, principally Jefferson County and Southwest Missouri (Dacus, pp. 336-38).

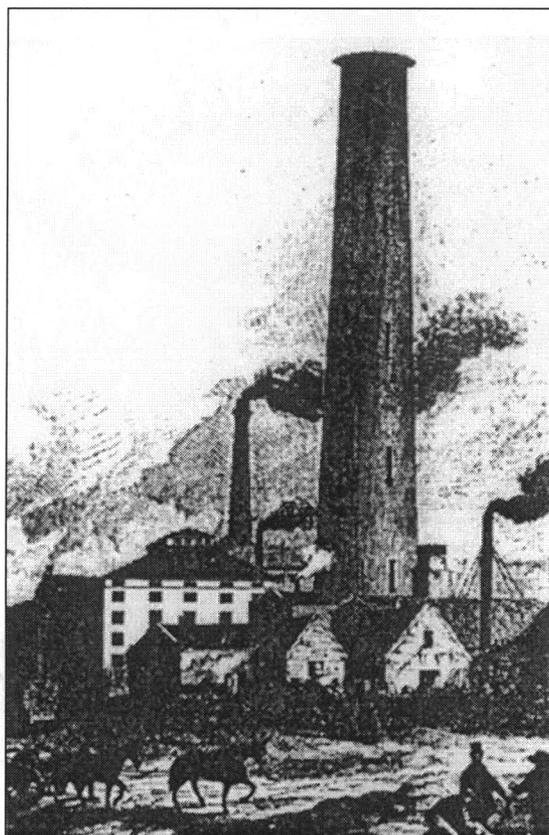


Figure 48: The St. Louis Shot Tower  
(*Missouri Historical Review*, January 1954, p. 162)

The *Missouri Republican* (St. Louis) described the new shot tower in an early February 1847 article. It repeated the 175-foot elevation, but gave the drop distance as just 150 feet. The tower diameter was 31 feet at the base and 17 feet at the top.

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The newspaper acknowledged that the Baltimore shot tower was taller than this one, but it claimed second place nationally. The tower had an estimated daily capacity of 10,000 pounds of lead. Its initial power source was horsepower, but steam power was planned to replace the horses (*Missouri Republican*, February 8, 1847).<sup>20</sup>

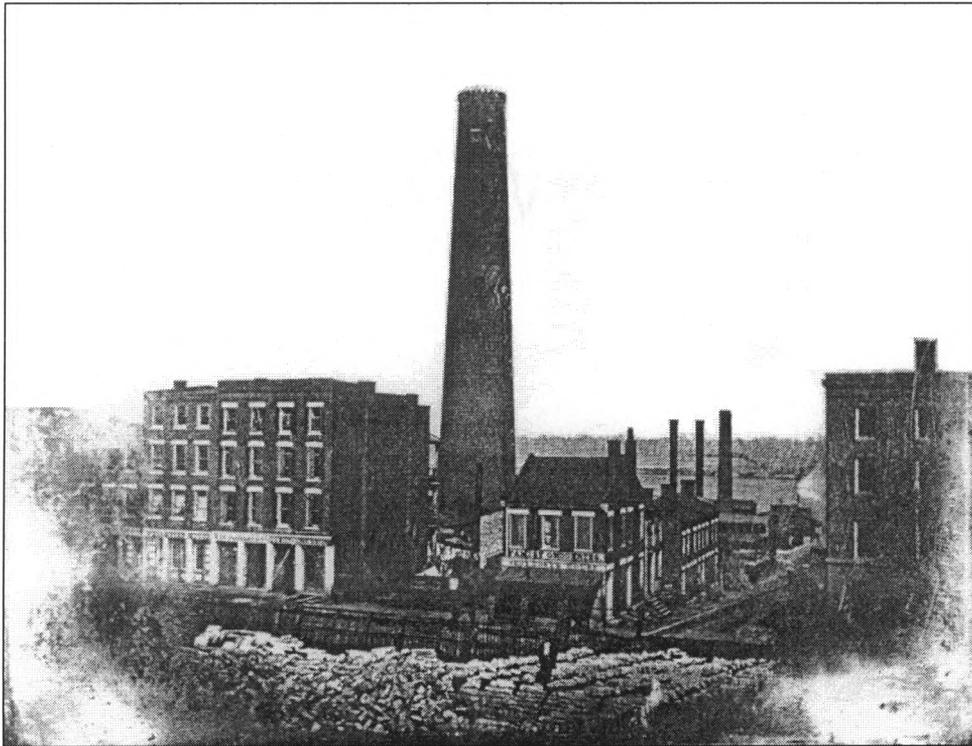


Figure 49: Thomas M. Easterly (1809-82) photograph of the St. Louis Shot Tower, c.1850  
(*Gateway Heritage*, Spring 1994, p. 63)

The war interrupted the availability of lead from most of Missouri. While most of the state continued to be occupied by Federal forces, the state's mines and shot towers had been largely destroyed or disabled. The war also eliminated any downstream market for the St. Louis company. The only other known lower Mississippi Valley shot tower operation was in New Orleans and its period of operation is undetermined. Increasingly, Chadbourne's firm would have sought out new market areas and replacement lead sources. Both could be found at Dubuque.

The St. Louis firm prospered well into the 20<sup>th</sup> Century. In 1878, the Tour of St. Louis observed:

The products of the St. Louis Shot Tower find a sale in every part of the country, and by the employment of skillful hands and the latest and most valuable patents, the company has established an immense business and gained a reputation for the excellence of their shot almost unparalleled (Dacus, p. 228).

While the St. Louis company is not known to have ever used the Dubuque Shot Tower, they used the 1861 tower woodcut in conjunction with the advertisements of their local agents, Laflin & Smith, later Laflin & Rand Powder Company.

<sup>20</sup> The same source gave lead shot exports from St. Louis for the years 1844-1846. There was a previous shot tower in operation given the shipments of 28 kegs and 462 kegs of shot for the years 1845 and 1846 respectively (*Missouri Republican*, January 5, 1847).

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Laflin & Smith were agents for the company as early as September 1861, well before the Dubuque Shot Tower was purchased by the St. Louis interests (*Express & Herald*, September 12, 1861).

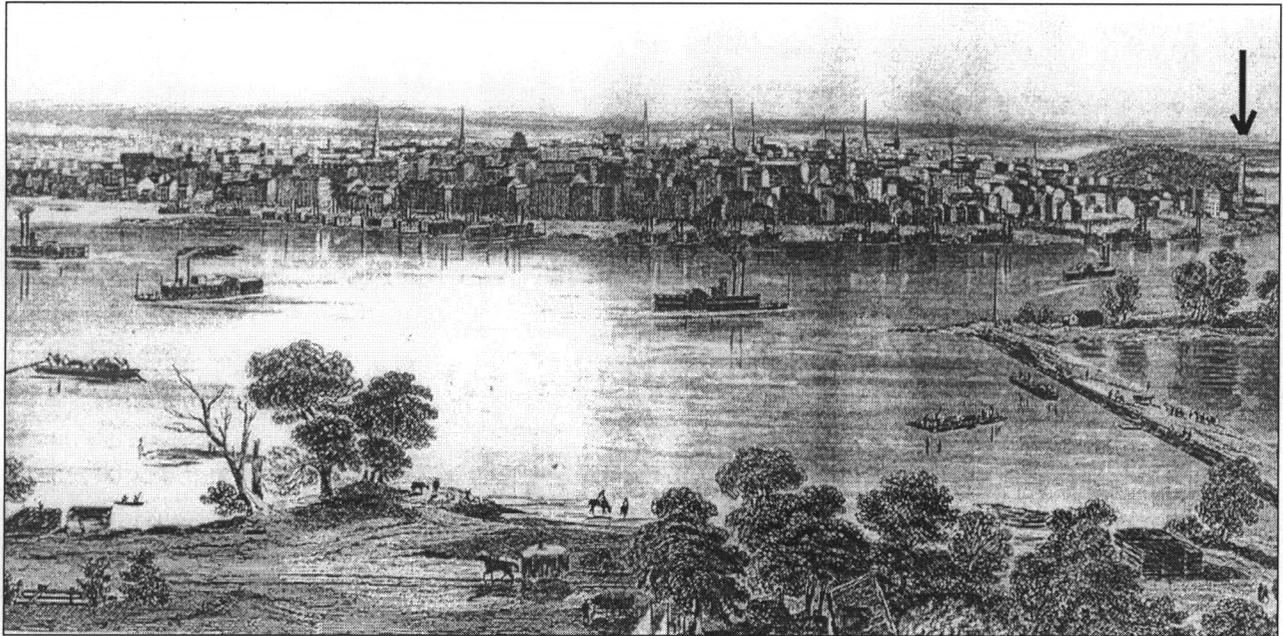


Figure 50: St. Louis riverfront, view west (arrow locates St. Louis Shot Tower)

(Colored lithograph by J. W. Hill, 1852, Missouri Historical Society Print Collection, Gateway Heritage, Fall 1997, p. 4)

The St. Louis Shot Tower Company's Dubuque Agent:

Laflin & Smith Powder Company, dealers in powder, shot and safety fuse, were located at 56 Main Street as of 1865. One account states that this firm was actually a branch of the St. Louis firm and the shot that they sold in Dubuque came from that source. It was surely handy for the St. Louis shot makers to have “eyes and ears” in Dubuque itself. It is also logical to assume that any “price war” between the two shot-makers largely played itself out on the very streets of Dubuque (1865 City Directory, p. 124; Dubuque County Historical Society).

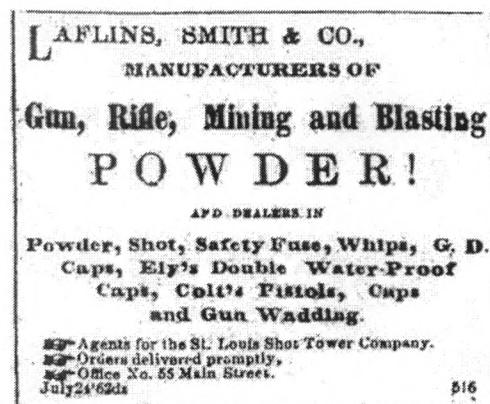


Figure 51: Laflin, Smith & Company Advertisement (*Herald*, July 26, 1862)

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The firm became Laflin & Rand by the 1870s and it continued to use the Shot Tower woodcut on their order forms at that time. They continued to represent St. Louis firm and felt justified in associating with the Shot Tower image into the 1870s, despite the fact that the St. Louis firm lost the tower to unpaid taxes in early 1871.

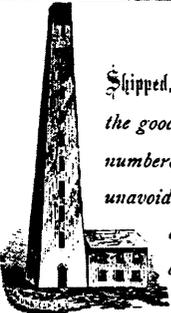
<b>LAFLIN &amp; RAND POWDER CO.,</b>		
<i>Gun Powder Manufacturers, and Dealers in Shot and Gun Caps,</i>		
NO. 56 MAIN STREET, DUBUQUE, IOWA.		
	Dubuque,..... 187 .....	
	Shipped, In good order and condition, by LAFLIN & RAND POWDER CO., on board the good Steamboat..... the following articles, marked or numbered as below, which I promise to deliver without delay, in like good order and condition, unavoidable dangers of navigation and fire only excepted, to .....	
	at..... paying freight for the same	
	at the rate of .....	
	Powder..... per Keg.	
MARKS.	ARTICLES.	WEIGHT.

Figure 52: Laflin & Rand order form (Dubuque County Historical Society)

Dubuque “Shot Tower” or “Shot Hole” operator Jim Hughes also used the same image in his 1863 advertisement (see below) and clearly stated that his shot was “manufactured...at the Dubuque Shot Tower.” Hughes was not the heir of the Dubuque Shot Manufacturing Company, the former owner of the actual tower, but he was more than willing to “borrow” the image of the Shot Tower. No body was using it and it was just another way to irritate the St. Louis interests (*Herald*, April 16, 1863).

Making Shot Towers Out of Mine Holes:

What is the use of shot-towers, when just as good shot can be made in mineral shafts. We were shown some samples of shot yesterday that was made by pouring molten lead down a deep shaft, the shot being equal to any made in a tower. Won't somebody buy up all the mineral holes to prevent shot being made here[?] Who bids for the lot[?]

*Daily Herald*, July 27, 1862

The Democratic *Herald* could be counted on to come out swinging at the corporate interest, and in this instant the corporate giant was hitting close to home. This account documents the near-immediate local experimentation (following the sale of the Shot Tower) with the use of shot holes in lieu of shot towers. It also confirms the legend that the St. Louis interests had indeed purchased the Shot Tower to shut it down. The *Herald* saw a true financial windfall if the same entity would buy up all of the abandoned mine shafts (*Herald*, July 27, 1862)!

Graves had to promise to refrain from building another shot tower within 100 miles of the city for a ten-year period. Graves however quickly acted to re-enter his lead shot trade and within two weeks the *Daily Times* would report both the sale and the establishment of a new and innovative lead shot “tower”:

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George W. Rogers Company Shot Tower\_(revised, expanded and updated)

Dubuque County, Iowa

A Hundred Shot Towers [In Dubuque].—The day before yesterday,<sup>21</sup> Messrs. Chadbo[u]rne & Forster, of St. Louis, paid \$3,000 for the Dubuque Shot Tower, for the purpose of having a troublesome rival out of the way. Although they promised to expend \$5,000 on it and set it at work, in order to pacify many dissatisfied businessmen in the city, they of course do not intend to do any such thing. No, they privately inform their agents that they intend to board up the windows, take out the machinery, lock the door and throw the key in the river. Rather than have another sack of shot made in Dubuque, said they, we will put a keg of powder under the tower and blow it higher than Gilderoy's kite. The next day after the purchase was completed and the property transferred, the wholesale price of shot, throughout the entire Northwest, advanced 25 cents per sack.—Chadbourne & Forster manufacture a thousand sacks per day. The recent advance in price put \$250 per day in their pockets, and in twelve days they made enough to pay for the Dubuque Shot Tower. So they can afford to blow it up and not feel the loss.

Now, we have no feeling against C.&F. They have, of course, a perfect right to buy up their rivals in business, and make as much money as they can. Doubtless they have families to support and they have to look to the main chances to keep the mouths all fed. But this much we object to; we don't like to see a manufacturing establishment that was at work using up the rough products of our mines, blotted out of existence – it materially affects our business prosperity – consequently the following incident is peculiarly gratifying to us and interesting, because the experiment was made upon a suggestion thrown out by ourselves nearly one year ago.

No sooner was the shot tower sold than a party of gentlemen took a wagon load of all necessary implements and started out to make a trial of an idea that had been whispered about on the sly in the city for some months past. They had melting pots, lead, ladles, ropes, tubs, firewood, etc. etc. Going out in the vicinity of General Booth's residence, they built a fire within a short distance of an old mining shaft, and proceeded to melt a quantity of tempered lead. The shaft was some 140 feet in depth. Attaching ropes to a washtub partly filled with water, they let it down to the bottom of the pit. This was for the purpose of catching the pellets of lead they dropped down. A sieve was adjusted as nearly over the tub as possible, and when the lead was perfectly melted, the experiment was completed by pouring it through in the same manner that is pursued at the shot tower.

The tub was slowly and laboriously drawn to the surface, and its contents were subjected to scrutiny of the excited party. "Hurrah! It's a success!" broke forth from lips of one. "By Jingo, ain[']t they bully?" said another. Yes, dear reader, the experiment was a success, and at the present writing a pound or more of the identical shot, contained in a glass bottle, is on the table before us. The shot averages considerably better than that made at the tower. For a few hundred dollars any of these abandoned shafts can be transformed into the best of shot towers or shot holes, which ever you would call them.

By erecting a cheap wooden tower over some of the deepest shafts, shot of the largest size could be made. That the business is profitable is proved by the notion of Chadborne & Forster. A very small outlay of capital will fit up a tower in every respect superior to the one just sold. If there were lead enough, or demand enough, we could have a hundred shot manufacturies at work here within two months. Who will be the first man to move in the enterprise?

The experimenting party were very much elated by the result of their trial, and consider their discovery very valuable. They expect it will lead to important results, and look forward to the creation of shot manufacturing works here within a few weeks which shall compete with the world.

If C. & F. want to buy up all our mineral holes, now is their time to do it.

This more extensive *Daily Times* account ran the same day as did the *Herald* notice (see above). An important omission from this article is any reference to Mr. Graves' promise to not compete with St. Louis by building another

<sup>21</sup> The date the dead was filed.

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shot tower. Instead the focus of the account is on the locals collectively out-witting the St. Louis corporation by getting them to buy out the Shot Tower on the assumption that its non-availability would prevent shot making in Dubuque (*Daily Times*, July 27, 1862).

The “keystone” of the Shot Tower legend or story is that the St. Louis folks immediately challenged Graves in court, claiming that Graves had promised to not build another shot tower. Graves prevailed by convincing the court that his agreement had prevented him from raising up a tower, not from using a hole in the ground. The Dubuquer bested his St. Louis rivals, got rid of his problematic tower and still made money making shot. The legend is recounted in much later accounts, and is presumably based upon the recollections of Senator William Allison, previously addressed.

News of the “contract violation” soon reached the ears of the Missourians, and an attorney came to Dubuque, armed to the teeth with injunctions, writs, and court orders, but to no avail. Mr. Graves proved in a court action that he had not constructed a shot tower, for he had dug a shot tunnel instead”

*Telegraph-Herald*, September 26, 1943

Suffice it to say is that there is no district court case pitting Graves against the St. Louis Shot Tower Company. Nor is there any contemporary newspaper account of the court case, a subject that would not have escaped public interest and notice.<sup>22</sup>

A party of men were out to West Dubuque yesterday, inspecting a mineral shaft 130 feet deep, near the residence of P. O. Hare, with a view of making shot. The shaft is near the main road and easy of access, making it an excellent location for a shot manufactory.

*Herald*, July 21, 1862

MORE EXPERIMENTS.—Experiments are daily being tried in the way of making shot by dropping it down mineral shafts, and with still more satisfactory results than at first. It is rumored that one of our citizens (Mr. Hull) intends to embark in the enterprise immediately. It turns out that this method of making shot has been pursued with success for many years in Germany, and to some extent in Missouri, so the problem may be considered solved, that there is no necessity o building \$15,000 towers when a hole in the ground with an expenditure of \$500 will do as well.

*Daily Times*, August 1, 1862

The *Telegraph-Herald* in 1943 offered a detailed account of the shaft alternative:

The purchasing agent had hardly got aboard a South-bound boat, when Mr. Graves bought another complete set of shot producing machinery. While waiting for the equipment to arrive he did a bit of surveying in hills and bluffs surrounding the city, and discovered an abandoned 157[-]foot mine shaft, near Asbury Road.

He made a lateral incision into the side of the bluff, striking the shaft 100 feet below the surface, where he blasted out a room. He moved the machinery in and within three months was producing more shot than ever was produced by the old shot tower.

<sup>22</sup> The Shot Tower buyers were minimalists in that they purchased only Lot 24, Block 7, the property containing the tower itself. The deed actually reads “Lots 24.” Graves had added the two adjoining lots and he must have retained ownership of these (property abstract).

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There is no explanation as to why the room would have been placed both well below ground and well above the base of the shaft. All similar operations used a horizontal exit gallery which was flush with the base of the shaft. The melting and dropping would have been done from the top of the shaft, and the processing would have taken place near the base. The dropped shot fell perhaps into a flooded base, but would have then been hoisted up to the processing room. Figure 53 below, illustrates the advantages of combining a shaft drop with ground level shot processing. No lifting of fuel or lead was necessary in such an operation. The Wisconsin example had a river bluff advantage however, and neither Dubuque drop-shaft operation did. The dropped shot had to be hauled back to the surface for finishing (*Telegraph-Herald*, September 26, 1943).

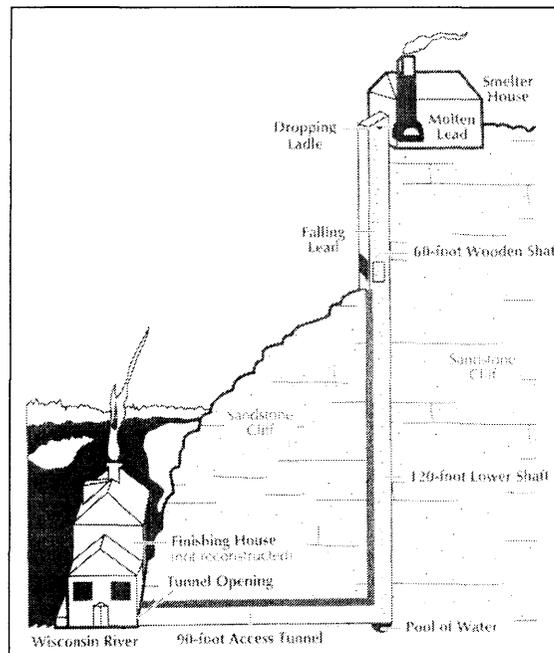


Figure 53: Elevation diagram, Helena, Wisconsin shot tower/shaft  
(Wisconsin Department of Natural Resources, Tower Hill State Park brochure)

Dubuque Shot Manufacturing Company, 1862-1886:

Two successful Dubuque “shaft tower” companies emerged from the numerous experimenters. The first involved Julius Graves, William Carter, and “General” Caleb H. Booth (1814-?). Booth and Carter likely conceived of using shafts as shot towers, given their engineering and mining backgrounds. Booth was an early Dubuque resident, having arrived in 1836. He was a lawyer by profession, but had a railroad engineering background as well. Booth was perhaps the most important leader in the mechanization of the local lead mining industry. He developed a double action steam pump with a 900-gallon per minute capacity for draining mines and he used heavy steam lifting equipment to automate the removal of lead ore from shafts. Booth brought the first steam engine to the city, and mined from 1839 on in partnership with William Carter. Booth served in the first state legislature session and was the first mayor of Dubuque. He was a major investor in the Dubuque and Pacific Railroad, was a founder of the State Bank of Iowa. Noting the reference to the Booth residence in the newspaper account given above, Booth likely owned the prospective shaft site. The 1880 county history credited Booth being “one of the originators of the method of shot making by the substitution of a mining shaft for the ordinary shot tower.” Mining partner William Carter (1806-?) got to Dubuque three years before Booth and was principally involved in lead mining. By 1862, Carter “with two others, built their works for manufacturing shot, and since then Mr. Carter has had the active management of the business as

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Superintendent.” Carter was also associated with the Dubuque City Mills, at which point lead shot for the local trade was kept on hand (*Morning Sun*, November 15, 1858; *Express & Herald*, March 4, 1859; *Herald*, August 20, 1863).<sup>23</sup>

THE NEW SHOT TOWER.—Messrs. Booth, Carter, Chaney and J. K. Graves, commence the erection to-morrow of a new two story brick building over the shaft just west of Gen. Booth’s residence, to be devoted to the manufacture of shot. This company is a strong one, and composed of gentlemen who will not allow any small sum to by them off from the track. this project has been rapidly conceived, and will be just as rapidly carried forward to completion, and once more will Dubuque supply the great Northwest with shot.

*Daily Times*, August 3, 1862

The above account more than hints that the price paid for the Shot Tower was but a “small sum.” It also documents the Dubuque shot market as being principally upstream, the area northwest of Dubuque.

The Booth-Carter shot tower was located in West Dubuque, “beyond the residence of Gen. Booth” on the Hales Hill Road. It was one mile northwest of the city limits as of 1865. It was described as follows in early April 1863:

...Over an old mineral shaft beside the road a two story frame building has been erected. A neat little engine saws the wood, hoists the shot from the bottom of the shaft, and drives the machinery. Before the molten metal can be used to any purpose arsenic has to be mixed with it, which is an unhealthy operation. The lead in the pig is hoisted to the top of the tower where it is melted, mixed and poured with a ladle into a vessel perforated with holes of various sizes and falls to the bottom of the shaft a distance of 155 feet into a tub filled with water, which prevents the shot from flattening. When a sufficient amount has been dropped the tub is hoisted up, the shot poured into a heater where it is dried by steam and emptied down into an inclined plane where it is separated the perfect from the imperfect, then down another story where it is sized, sorted and put into bags of 25 lbs. each. The works have been in operation nearly four months [since c.January 1863]. – Seven thousand lbs. of lead are used daily, and last Thursday 288 bags were weighed and put up. There being no tax on the raw material the manufactured article has to bear the whole burden, amounting to a levy of 15 to 20 dollars per day. Last week three car loads were shipped to Chicago, and orders are coming in from all directions.

This account mirrors the shot-making process used at the Shot Tower proper. Here too, a two-story frame building housed the sorting and finishing work, as did the second building at the tower. This is the only contemporary account that admitted the health risk associated with mixing arsenic and lead. Clearly, pure lead produced a poor product absent these additives. The export market was thriving and appears to have been rail and Chicago-dominated, although the market was a general one. Finally, this account demolishes the myth that shaft-shot making immediately followed the sale of the Shot Tower. In fact, half a year elapsed before this facility was ready for any substantial shot production (*Herald*, April 1, 1863; 1865 City Directory, p. 76).

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<sup>23</sup> Mrs. Jerome E. McGuire was the principal speaker at the rededication of the Shot Tower on June 14, 1963. She recalled that Gen. Booth’s granddaughter, Hollie Lusch, recalled watching the Shot Tower burn from a vantage point on Fenelon Place in 1911. A memento of her grandfather’s shaft tower was a glass encased shot display case that has been incorrectly associated with the Shot Tower (Dubuque County Historical Society).

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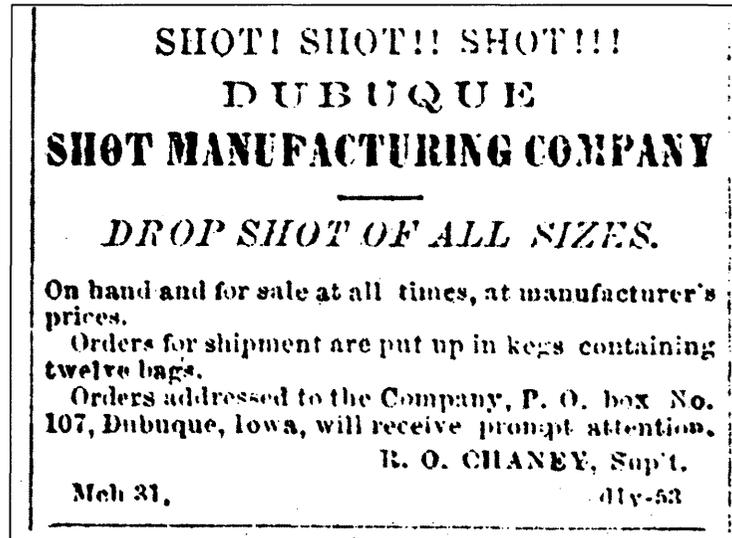


Figure 54: Dubuque Shot Manufacturing Company advertisement, 1863  
(*Herald*, July 15, 1863)

The 1870 industrial census lists William Carter & Company, producer of shot and bar lead. Capitalized at \$20,000, the operation was steam powered, had four employees, and was operating ten months out of the year. There were two furnaces, the business consumed 100,000 pounds of pig lead, 200 cords of wood, 125 tons of coal, seven kegs of arsenic, wooden kegs and canvass for shot bags, all valued at \$85,000. Products were 800,000 pounds of shot, valued at \$95,000, and 200,000 pounds of bar lead, valued at \$18,000. The 1867 city directory confirmed that the firm had increased its product range to include bar lead. Perhaps they had simply added a smelter to process lead ore (1867 City Directory, p. 77)?

Fire completely destroyed the plant in November 1877. The factory was described as being three miles west of the city, directly opposite Patrick Ahern's farm residence. The "tower" contained large quantities of lead and shot and the total loss was estimated at \$11,000. A key of powder endangered the shot work's neighbors but a snow covering saved their buildings. Gen. Booth had just renewed an insurance policy a day before the disaster, but total coverage was just \$5,000. The works were immediately, with \$3,000 being expended on them by years end. The *Herald* noted "It is of larger dimensions and its facilities for the manufacture of shot is doubly increased. The building is far more imposing than formerly..." (*Herald*, November 10, December 14, 1877; January 22, 1878).

William Carter was Superintendent of the Dubuque Shot Manufactory until his death in 1883. It is interesting to note that the shaft mine had a drop of 150 feet and that the newspaper account, presented above, admitted that "The shot [produced at the shaft site] averages considerably better than that made at the tower." an clear indication that a greater elevation produced a better product. The works, rebuilt as noted in 1878, consisted "of a four-story brick with wings, storehouses, etc., and a 'drop' of 170 feet, supplied with every facility for manufacturing all grade of shot, with a capacity of turning out 60,000 bags of twenty-five pounds each, annually" (1880 History, pp. 768, 778; *Telegraph-Herald*, October 19, 1933; September 15, 1946;).

The beginning of the end of this most successful alternative to the Shot Tower came in early 1886 when the Western Shot Company, with shot towers in Minneapolis and Omaha, acquired the shot works and was reorganized as the Western Shot Company. Two years later the *Herald* reported "The Booth & Carter shot tower, west of the city, is being torn down and the

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machinery will be shipped to Omaha. It was built in 1862.” Once again, a shot-making conglomerate had bought out and shut down a Dubuque shot making firm (*Times*, February 10, 1886; *Herald*, May 10, 1888).<sup>24</sup>

William Carter (1816-1883) was a notable early Dubuque settler (1833) and was a major promoter of the city, and superintended the Booth-Carter-Graves shot works from 1862 until his death. He was also involved with George W. Rogers in flour milling as Carter, Rogers & Company. R. O. Chaney (1845-1880+) came to Dubuque in 1845, and was a lead miner beginning in 1854. A practical surveyor, Chaney actually built and operated the Booth-Carter-Graves shot works. He served as Town trustee and was a school board director (1880 Dubuque County History, pp. 175, 773-74, *Daily Herald*, November 8, 1883; *Daily Times*, November 7, 1883).

The Dubuque Shot Tower, 1862-1869, James Hughes, Dubuque Grocer and Shot-maker:

MORE SHOT TOWERS.—James Hughes, the enterprising grocer on Julien Avenue, not to be out-done by others, will commence this week the manufacture of shot in the old “Stout Shaft” on the road to West Dubuque, near Dr. Finley’s. This is an excellent location, near the city, and on the highway, making it a desirable place. When all the shot towers get under full blast that article ought to be cheap.

*Daily Herald*, August 5, 1862

James Hughes commenced the erection yesterday of a frame building 40 by 25 feet, over the shaft spoken of the other day. Lumber, ropes and building material are already on the ground, and in a few days Jim will have shot for sale a little lower than St. Louis prices.

*Daily Herald*, August 7, 1862

The second shaft operation was established under the management of James Hughes (1834-1877). Hughes appears to have fancied himself as the rightful heir of the Shot Tower, using its image in his advertisement (see Figure 55 below). The *Herald*, a year later, curiously credited Hughes with establishing “the first one of the kind ever started in this vicinity.” The two accounts underscore the importance of good transportation to a shot making operation and reiterate the local hopes that local shot production would lower prices. Hughes was still not under production by late August despite optimistic hopes. The shaft for his “new fashioned Shot Tower in the ground at West Dubuque” was 150 feet deep. For whatever reason, the *Herald* expressed confidence that the popular grocer “knows what he is about” (*Daily Herald*, August 21, 1862).

It is possible that he didn’t know what he was about, and that his actual production was delayed until early 1863, as the following notice hints:

SHOT.—Jim Hughes means to have shot this time, and no mistake. He has purchased the machinery used at the 7<sup>th</sup> street Shot Tower; has a number of men employed fixing up things, and will soon show the public what a hole in the ground can do, in the way of making shot.

It is more than curious that the Shot Tower equipment was made available to him, apparently by the St. Louis Shot Company? Perhaps that firm had given up on its efforts to squelch Dubuque shot making and was willing to sell the equipment. At any rate, the equipment was still in the Shot Tower as of early 1863, so its purchasers had simply sealed its doors when they bought it (*Daily Herald*, March 7, 1863).

<sup>24</sup> The Dubuque newspaper card index cites February 10, 1886 as the source for the article about the Western Shot Company. That issue does not exist in the filmed newspapers and by this time, the *Times* was reduced to a weekly issue.

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Hughes was in full production starting April 1, 1863. Hughes had a daily output equal to the Booth-Carter-Graves operation as of that time. His works were within the city limits, being located just west of the junction of West Fifth and Delhi streets. The *Herald* noted

...over this shaft a building has been erected with all the necessary machinery. Instead of a tower the molten metal is dropped down the shaft a distance of nearly 200 feet, and shot is turned out equal to any made above ground. The idea was conceived some time ago, but Mr. Hughes was the first to carry the project into execution.



Figure 55: James Hughes shot tower advertisement  
(*Herald*, April 16, 1863)

Within just a month, Hughes had vastly automated his production process, reducing both his operating expenses and the size of his workforce. The same source reported:

...Several other important changes are yet to follow. One is a small elevator, which is to carry the shot over head, where it descends on an inclined plane and runs into a hopper for assortment. Mr. Simpson has been engaged as prime manager. Hughes will soon have the machinery so arranged that all a person will need to do is to put wood under the boiler. Why not make a tube and run the shot into town?

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Both of these alternative shot making operations developed more in response to increased lead market prices than for any other reason. The *Herald* noted in early June 1863 that:

Miners inform us that \$49 @ [sic] \$50 per 1,000 lbs. was the price paid for mineral last Saturday. There has been, and is, considerable [lead] used at home in the manufacture of shot, besides which consumption there is a good foreign [export] demand.

The year 1863 was a good year for local new construction in Dubuque, this being a reflection of the beginnings of a return to normalcy even as the war continued. It was also a good year for locating new rich lead sources, particularly what was termed the "Pikes Peak" veins (1865 City Directory, p. 71; 1867 City Directory, p. 77; Wilkie, p. 144; *Herald*, April 2, 9, 11, May 7, June 4, 19, 1863; *Telegraph-Herald*, April 15, 1914).<sup>25</sup>

DUBUQUE VS. ST. LOUIS.—The *Chicago Journal* of Tuesday last, quotes shot [prices] easier, owing to a competition between the St. Louis and Dubuque shot companies. So it seems that Jim Hughes' shot hole is "beginning to be felt." Bully for Jim.

*Daily Times*, April 16, 1863

The above account crows about the early success of the Dubuque shot hole operators. The difference in shot prices was being felt as far away as Chicago. It is curious that it was Hughes' operation that is credited with having the market impact.

It is a wonder that the Shot Tower survived damage or destruction to fire, given the proclivity of these shot holes to burn down. Hughes' shot works burned three times within a span of just five years. The first fire was in 1864 and the plant was rebuilt the next year. The second conflagration struck during the second week of August 1866, as the following account describes:

NEW SHOT WORKS.—The shot works of James Hughes, destroyed some time ago, have been re-built with a large building and new engine—a great improvement on the other structure. By means of a cupola, the fall of shot is as great as at the St. Louis tower, and with other facilities, the establishment will be able to turn out shot equal to any made. The proprietor has put his past experience with all the known improvements, and will commence making shot the latter part of this week.

Hughes' loss was estimated at \$2,500 on the lost lead stock alone, and his insurance was just for \$1,000. The third fiery destruction hit in late March 1869. In its final iteration the building atop the shaft was of brick construction. The works were then valued at \$8,000 and insurance was just \$3,000. Nothing was saved but plans to once again rebuild were announced (*Herald*, August 15, 16, 1866; March 23, 1869).

Hughes died at the young age of 43 years in 1877. The Times recalled that Hughes "made many friends—among them Mr. J. K. Graves, who, when appointed on an Indian Commission took Mr. Hughes with him. On his return he took the management of the business of making shot at the Dubuque shot-tower." This presumably refers to the actual Shot Tower and might explain where Hughes got his shot making training. Hughes was a merchant, managed the street railway (and lowered fares to a nickel), owned the *Telegraph* newspaper, owned and operated three Mississippi River steamers, ran the Eagle Point ferry and was finally a baker. The *Herald* noted that Hughes "had noble traits of character, but of late years he seemed to have lost that stability which was a marked feature of his former life, and which, if persisted in, would have made him one of the most wealthy and prominent business men of Dubuque."

<sup>25</sup> The source "Old Shot Tower" states, without citation, that the St. Louis company sold the Shot Tower "machinery" to Jim Hughes in 1863. If true, then the company was no longer concerned about competition from local shot production.

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The Times was equally candid, stated “There was in his character and conduct much to emulate, and some things to be ashamed. There were many bright features, blurred in some respects, the natural result of a life left in youth to its own unguided ways, growing to manhood amid many unfortunate influences. Yet he was in the main a good citizen, and always an affectionate husband and father.” Hughes was buried in Clinton, Iowa, the home city of his wife (*Daily Herald*, April 27, 1877; *Daily Times*, April 27, 1877).

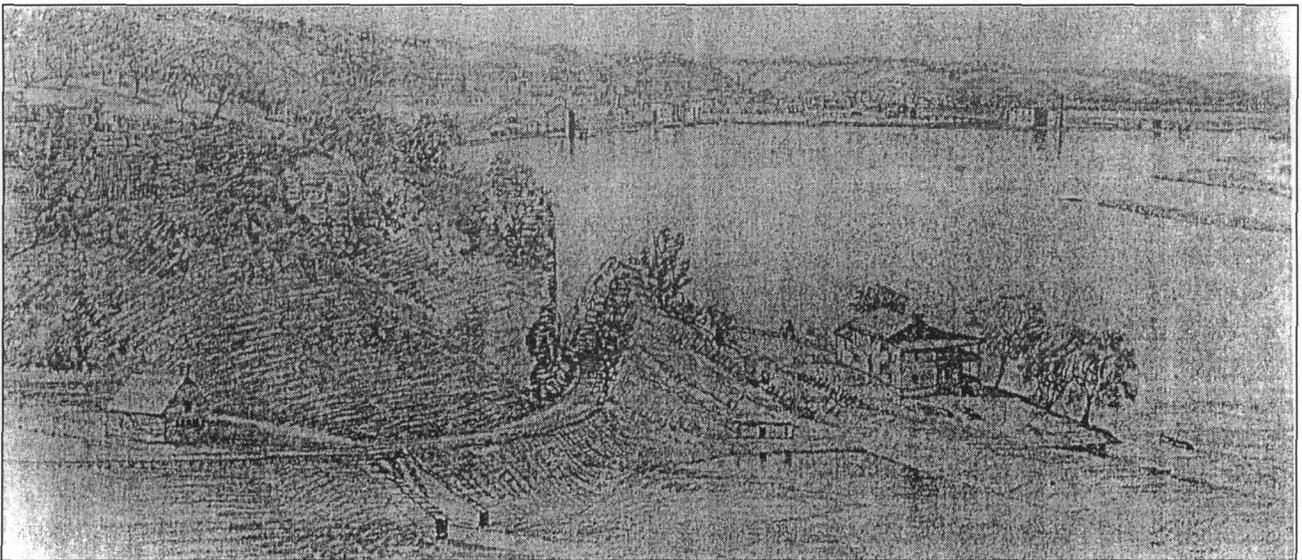


Figure 56: 1863 drawing of Dubuque, by A. O. Marble (view to the north)  
Note that the Shot Tower appears right on the river's edge. The artist has even given it a reflection  
(Minnesota Historical Society)

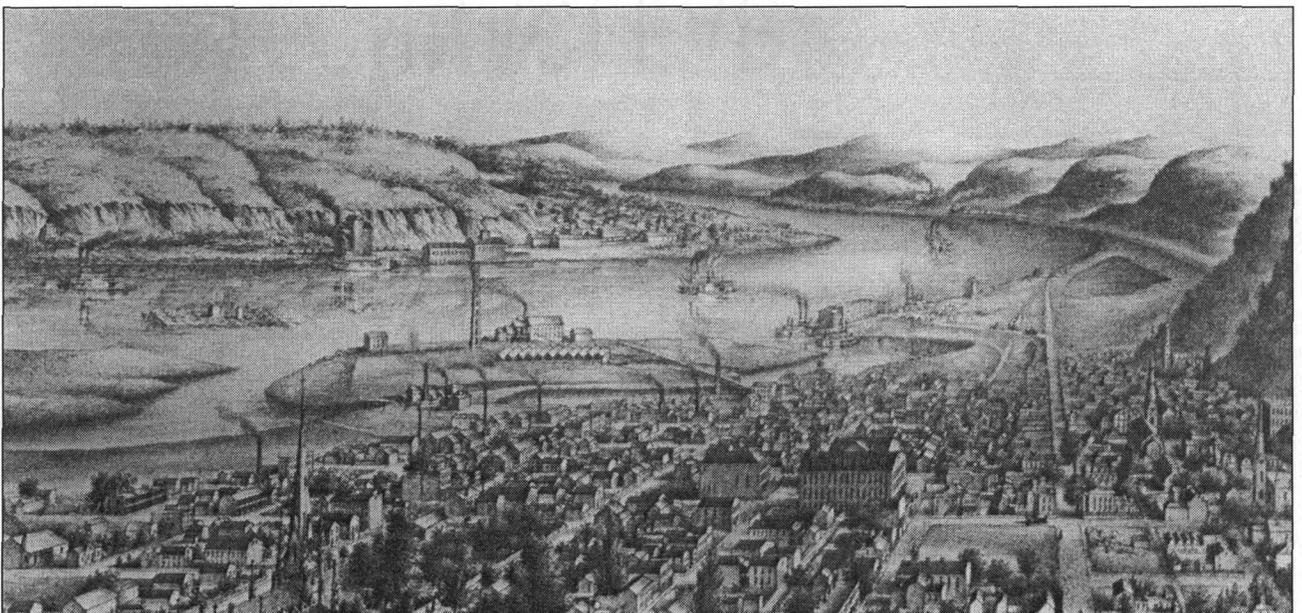


Figure 57: Charles H. Vogt Dubuque Lithograph, view to the southeast, 1866  
(Center For Dubuque History, Loras College)

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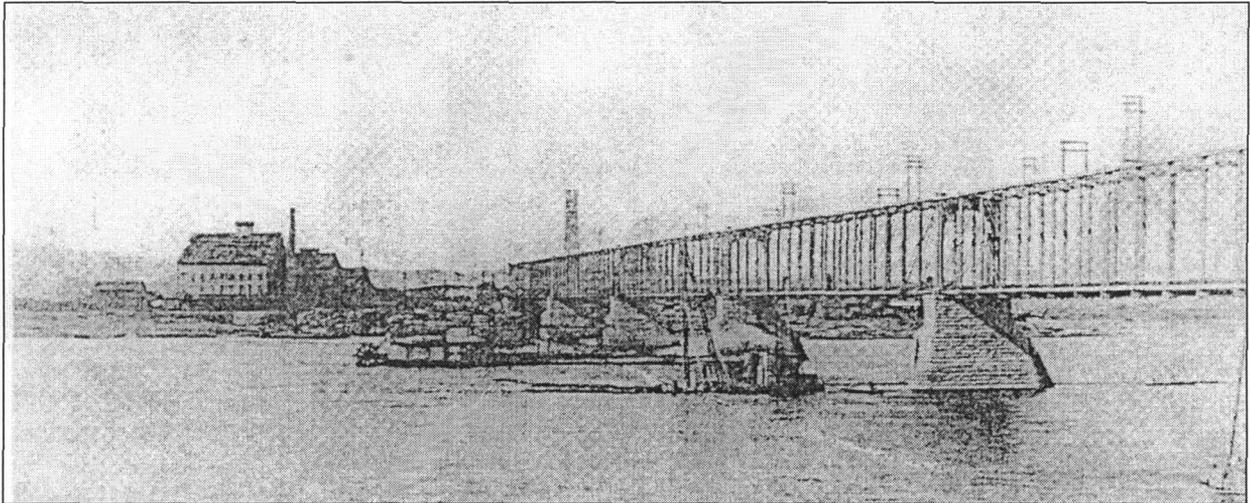


Figure 58: New Rock Island Railroad Mississippi River bridge (Dubuque-Dunlieth Bridge), 1868, view northwest.

A Railroad Bridge Turns the Shot Tower Property into a Rail Yard, 1868:

Dubuque had rail service to the Illinois shore by 1858, and had its own Dubuque & Sioux City line under construction to the west by the early 1860s, but it had no Mississippi Railroad bridge until late 1868. This was necessarily a great hindrance to the city but a boon to river ferries. Figure 59 illustrates the proximity of the Shot Tower to the new railroad line. The railroad was to be the first installment of rail and vehicular river crossings at this point. Figure 59 also depicts the land elevation relative to the normal river channel flow and appears to indicate that relatively little additional riverfront development had transpired since 1857. Several warehouses, dating to 1856-57, remain to the south of the Shot Tower.

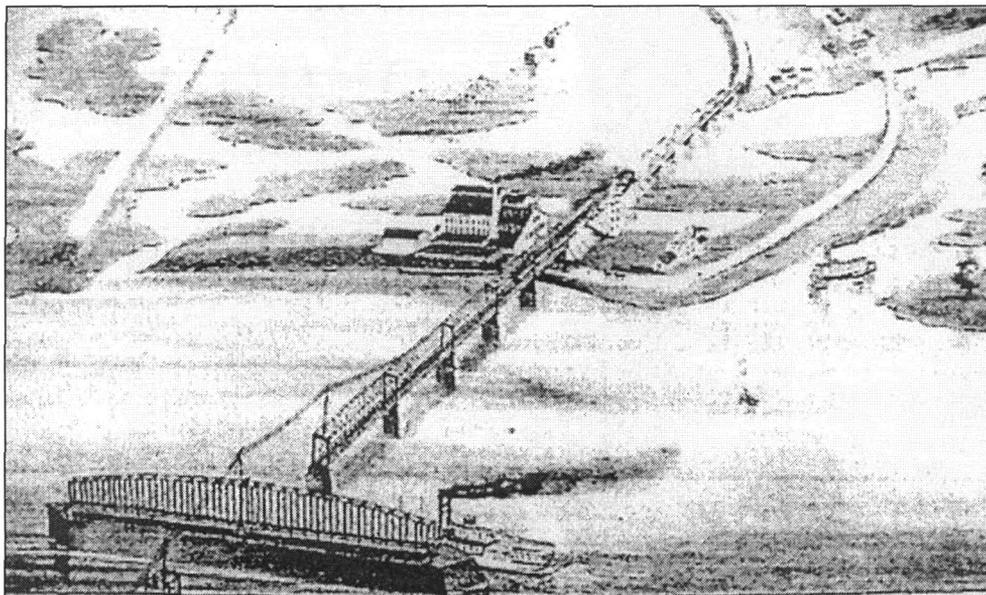


Figure 59: 1872 Birdseye View Of Dubuque, view west

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Figures 59-60 indicates that there was no immediate development in and around the Shot Tower even four years after the railroad bridge was completed. It is possible that floods or fire had eliminated some buildings. Most notably, the Fourth Street extension, barely visible as a diagonal white line, is completely undeveloped, in contrast to the 1858 image (see above). There is no building attached to the Shot Tower. The railroad right-of-way was still trestled across open waters just west of the tower.



Figure 60: c.1867 winter S. Root photo, view east (Dubuque County Historical Society)

This image explains why the Dubuque Harbor Improvement Company plan for a new downtown failed and the majority of its acreage remained open water or wetlands. Fourth Street runs across the center of the image. The Shot Tower appears to have no associated building. The company terminated its activities March 7, 1882 (*Herald*, May 24, 1881).

**SOLD FOR DELINQUENT TAXES.**—The old and conspicuous land mark, the Dubuque shot tower, which stands near the western terminus of the railroad bridge, was sold yesterday for delinquent taxes. The tower was purchased some years ago by a St. Louis shot company merely to prevent competition, and has been permitted to stand idle ever since. The company it seems have neglected to pay the taxes accruing upon the same, and hence the sale.

*Daily Times*, August 26, 1871

The 1871 purchaser is not identified. Note that the Shot Tower is first identified as a “land mark” just 21 years after its construction. Two years after the sale, J. A. Rhomberg, owner of the distillery to the south of the Shot Tower, transformed his property into a flour mill with a 300-barrel daily capacity (*Daily Herald*, April 25, 1873).

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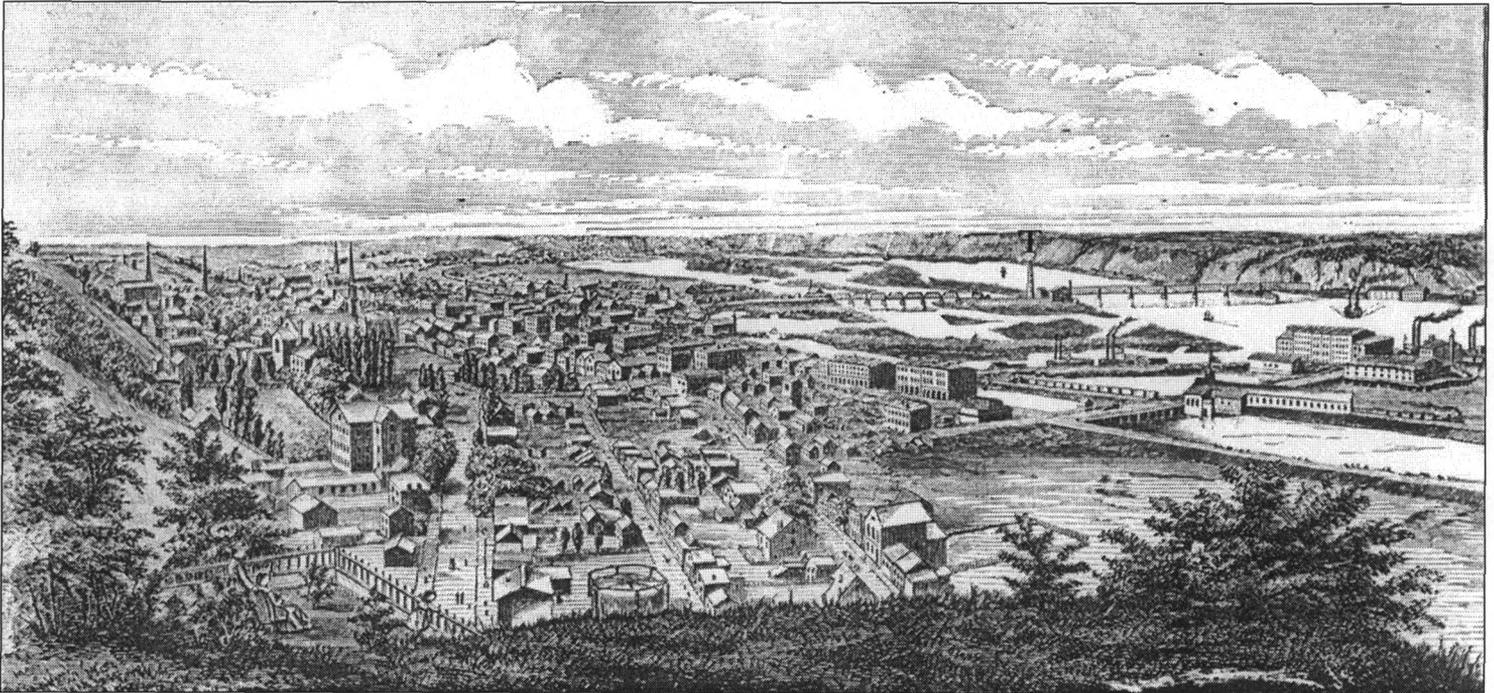


Figure 61: 1872 panorama of Dubuque, view to the northeast  
(a "T" marks the Shot Tower location)

Venturesome boys are in the habit of playing in the shot tower and climb up the inside nearly to its top on old and decayed stairs and wood work liable to give way at any moment. The practice is a dangerous one and unless discontinued will result in an accident if not death. The windows of the shaft should be boarded up to prevent egress.

*Daily Herald, April 17, 1873*

It is said that Dubuquers awakened in early 1874 to discover an equestrian statue of Andrew Jackson placed atop the tower. Local attorney John Deery was responsible for the fete. Deery, purchased the statue and hired a steeplejack, John Dreyhouse, to raise it to the tower roof. The statue was necessarily too large to pass up through the tower. The tower was still owned by the St. Louis Shot Tower Company and Deery obtained their permission for the improvement. The placement of the statue is the first indication that the Shot Tower was developing a local landmark role in Dubuque. It was by this time nearing 20 years of age, and while still young, counterpart buildings were rapidly being replaced by the early 1870s. The use of the tower roof to support the statue indicates that a flat roof of some sort was in place. No images of the tower with the statue in place have been located

No little surprise was evidenced in the city yesterday by those who happened to look toward the Shot Tower, and saw mounted on its summit, a statue. Closer inspection of it revealed the fact that it was an equestrian statue of the old hero of New Orleans, General Andrew Jackson, which had been quietly placed there by persons unknown. The statue is the one that has been standing in Thomas Kavanaugh's yard for a year or more past. It is made of wood and is a very creditable specimen of the artistic skill of Mr. Kavanaugh.

*Daily Times, February 1, 1874*

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The *Herald*, in its same-day coverage, took the winds out of the surprise legend, stating:

John Deery is a public spirited citizen, and has adopted a singular way of displaying his enterprise. By means of subscriptions he secured enough money to rejuvenate Tom Cavanaugh's statue [sic] of Gen. Jackson, and his horse, which for years has stood sentinel at Mr. Cavanaugh's residence and mounted the wooden device on top of the shot tower, where it was placed yesterday with impressive ceremonies.

The statue remained in place until 1881, at which time it was said to be in a deteriorated state (*Daily Herald*, February 1, 1874; Sommer, p. 44; Balmer Presentation, p. 17; Henny; *Telegraph-Herald*, August 30, 1930).

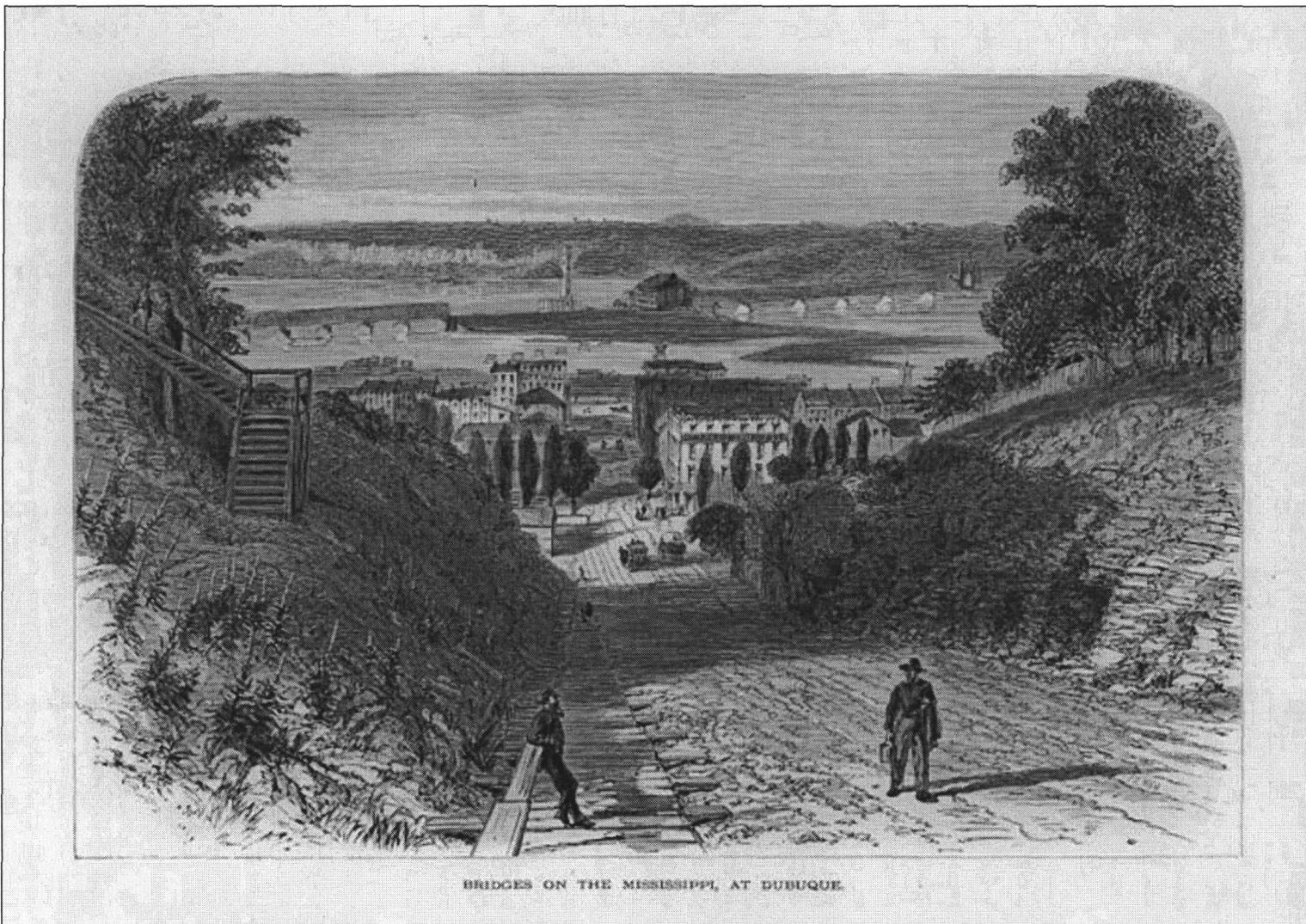


Figure 62: Alfred R. Waud drawing, Dubuque, view east, 1873 (American Perspectives)

Sculptor Kavanaugh was born in Ireland and gained his reputation for creating a statue of Queen Victoria's Prince Albert. In Dubuque, he completed two equestrian statues of wood, reinforced with iron. The first, of George Washington, burned when the artist's house on Sumner Hill was destroyed. The second, of General Jackson, was intended for perhaps a

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temporary placement on the southeast corner of Jackson Park, opposite St. Patrick Church. Kavanaugh was then Alderman for the First District. John Deery penned a history of Dubuque's noted artists in 1915, and he recalled that "Just after the O'Connell celebration in 1875 [sic] he [Kavanaugh] presented the statue of Jackson to the writer [Deery]. It was hoisted by the old steeplejack, John Drehouse, to the top of the shot tower where it stood for years' (*Telegraph-Herald*, October 10, 1915).<sup>26</sup>



Figure 63: John Deery (?-1916)<sup>27</sup>

**THE OLD SHOT TOWER**

The old shot tower situated at the entrance of the bridge, is one of the old notable structures on the river. It was a twin brother or sister to the old elevator that went up in smoke a few weeks ago. It was built in 1856, cost \$15,000, and stands 150 feet high. Almost every boy in the city knee-high-to-a-grasshopper has climbed to the top and cut his name on the wood work with an old jack-knife or scratched it on one of the bricks. After being used for some years a St. Louis firm bought it from the Dubuque owners and it was agreed in the contract that no other shot tower should be built in this city by them. They lived up to the agreement, and built a shot-hole at West Dubuque. Since that time it has stood vacant, and been the roosting-place for the inhabitants of the atmosphere and the look-out for those who dared scale its weak and rotten stairway. Yesterday a visit was paid to the old romantic weather-beaten, pile of stone and brick. Some acrobatic variations, such as hanging by your heels, skinning the cat, etc.,

<sup>26</sup> Kavanaugh's son, John J. Kavanaugh, was a skilled landscape artist. The son painted a series of portraits of the city's mayors which were then on display in City Hall (ibid).

<sup>27</sup> Deery was Irish-born and came to the city in 1854. He was assistant editor of the Northwest, was postmaster during the Buchanan administration, and was then a lawyer who specialized in real estate. He lost a wife and his only son to untimely deaths in the 1870s. He never held public office. A lover of literature and art, he was the natural candidate to favor ornamenting the Shot Tower with an equestrian statue (*Herald*, May 23, 1916).

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finally took us to the first story, after which it was fair sailing over broker doorsteps, etc. A single misstep, or a stair giving way, would send us flying through the air, and in all probabilities would wake up dead and find Coroner Coakley sitting over their remains. But away with idle thoughts and to the top to shake hands with that old brick, General Jackson, who keeps an eye on the city of Dubuque and East Dubuque. To look from the top of the tower to the ground below makes one's head feel as if he had been pulling "lots of it" through a straw and was about to fly away. That is what the *Herald* man said, who happened to peep over. The scene from the top is one that would be food for the pencil of the sentimental for weeks as it is just the place to write snow and spring poetry. But our object was not to gush off the beauties of Nature, it was simply to take down a few of the names penciled and cut there years ago by boys, who are now young men. On the window sill can be read, "Charles Otley, Dave Robison, Frank Stout, Jim Welsh, Geo. Henion, Joe Morgan, Ed. Shankland, W. Vandever, George Blossom, George Gray, Dr. J. Peterson, James Wallis, Jo Linehan, Will Andrew, M. Tschirgi and others.["] A younger crowd have had the pleasure of cutting Gen. Jackson and his horse. On the horse's neck can be read ["] C. Russell, Wadsworth, Davenport; C. D. Ham, G. Graves, L. Graves, A. O'Malley and others.["] In the brick ["] Ed. Peasley, A. Flick. H. Schunk, T. Rogers, W. Morrill, Stanley Robison and C. Bissell have left their marks. It is a pleasure to visit this old autograph album and read over the names, for it calls back the good old schooldays that have gone never to return.

*Daily Times*, November 11, 1879

In 1951 the *Telegraph-Herald* printed a childhood memory of C. Walt Brandon, then a resident of Wyoming. Brandon was then a working newspaper editor, so his recollection couldn't have pre-dated 1900, but did pre-date the 1911 fire. Brandon recalled:

To me the old shot tower stands out s nothing else in my memory....It was headquarters for the Irish and Dutch [German?] youngsters as well as others. It was the rendevouz [sic] of my boyhood days. In the days I refer to it was a shambles in many ways. The windows were gone and there was nothing to stop youths from climbing the stairs and then by wall ladder to climb through the hole in the ceiling into the old metal heating room at the top. That room and the stairs were burned out later and now nothing but a bleak hollow shell remains.

Brandon makes no reference to the presence of the lumberyard watch house or watchman (*Telegraph-Herald*, September 9, 1951).

Chadbourne & Forster must have redeemed their ownership of the tower following the sheriff's sale of 1871, because they sold the property on May 11, 1881 to C. J. Lesure for just \$425. Mr. Lesure removed the deteriorated Jackson statue. Lesure, along with W. H. Day and the Empire Lumber Company of Eau Claire, Wisconsin, incorporated the Standard Lumber Company, with a capitalization of \$300,000. The new company then acquired the Shot Tower property on June 24, 1881, paying just \$600 to Lesure. This sales price covered the purchase of a total of six lots (Balmer Presentation; property abstract; Book of Incorporations, #2, p. 210).<sup>28</sup>

<sup>28</sup> Standard Lumber Company re-incorporated for 10 years on January 8, 1887, and for 20 years with capitalization at \$500,000 on September 16, 1907, Book of Incorporations, #5, p. 511).

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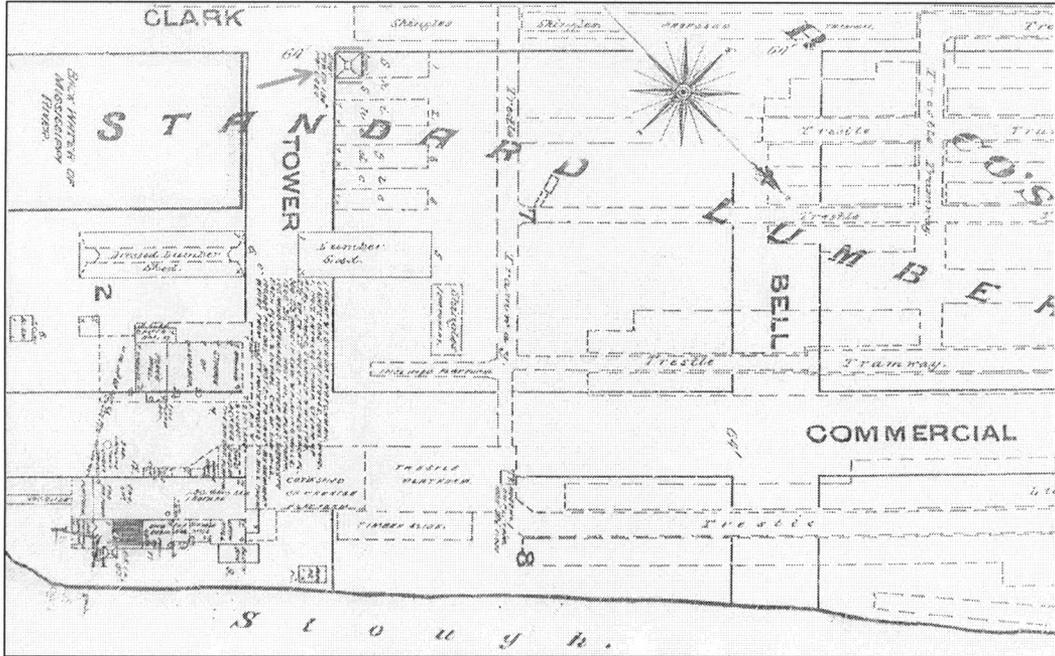


Figure 64: 1884 Sanborn Fire Insurance Map

The Shot Tower is outlined with gray and a gray arrow points to it (note that this perspective differs from the subsequent Sanborn maps, Tower Street parallels the river, note also that an open river channel extends west to near the tower base)

Figure 64 depicts the Shot Tower, buried amongst a row of five single story frame lumber sheds. The map defines Block 7. The map increased the height of the tower to an impressive 190 feet (1884 Sanborn Fire Insurance Map).

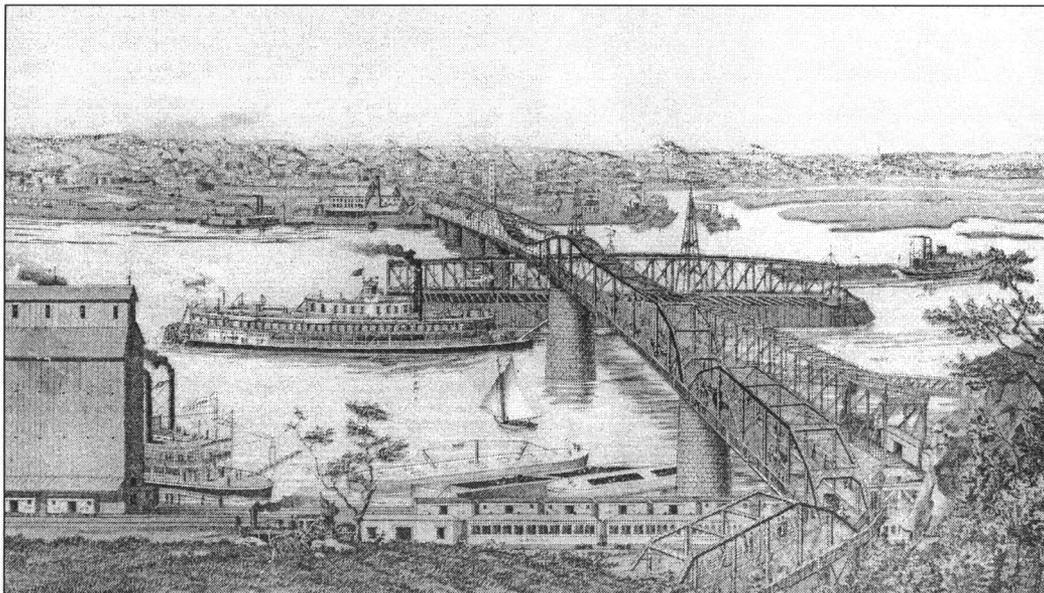


Figure 65: 1887 Alexander Simplot drawing of the new high wagon bridge and the railroad bridge, view northwest (Daily Herald, November 24, 1887)

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The new high wagon bridge (re-titled the “lower high bridge” when the Eagle Point bridge was finished in 1904) brought the tower a public prominence that it had not previously enjoyed. Previously, it was an important city symbol to river and railroad men, but it was now a key part of the vehicular Fourth Street gateway into the city. For the first time, a substantial vehicular traffic entered the city from the Illinois side and travelers had an elevated view of the tower from the bridge. The Standard Lumber Company acknowledged this new prominence with a new watchman’s quarters atop the tower. The *Herald* reported “The new fire box has been placed in the observatory on the top of the shot tower, and the watchman will begin his solitary vigils. It is a grand spot for a view.” This entry implies that this was a replacement “fire box” but that the watchman was for the first time using the tower as a watchtower. It also strongly implies that the public could visit the tower and that there was now an interior stair system in place to make it possible (*Herald*, November 24, 1887).<sup>29</sup>

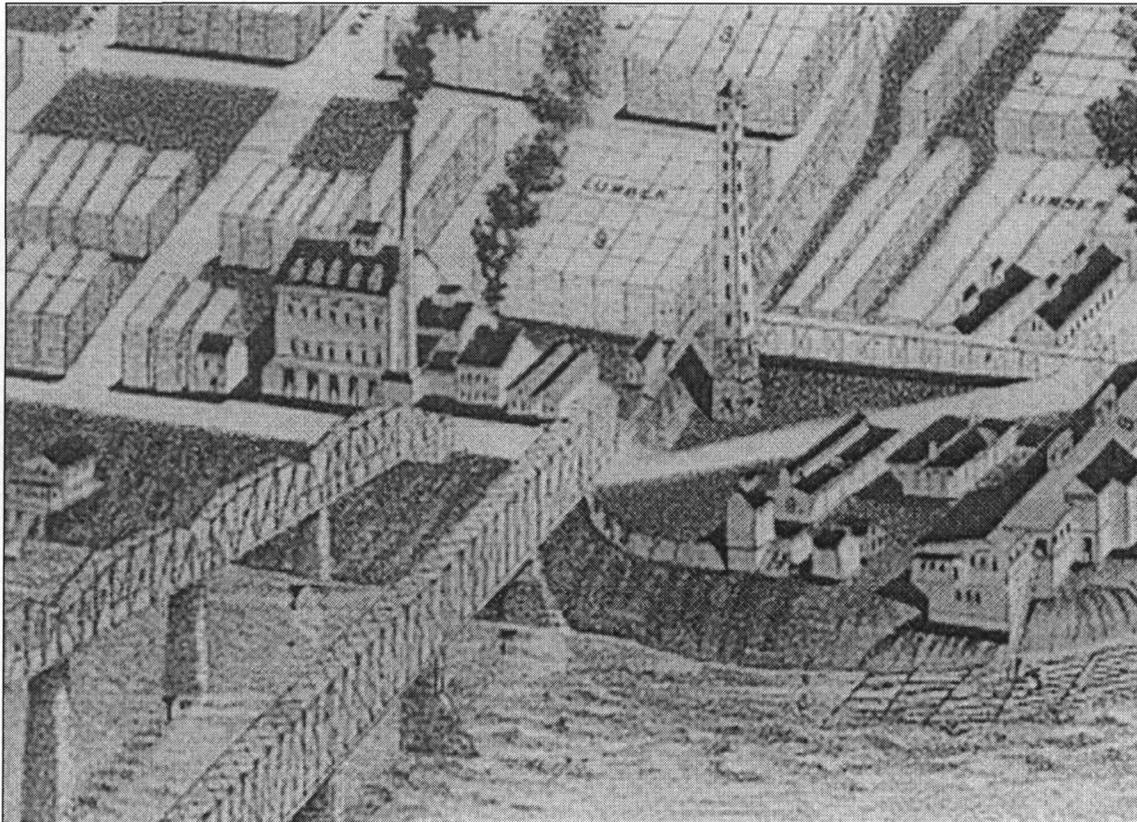


Figure 66: 1889 overview of Shot Tower site, view west  
(Perspective Map of the City of Dubuque, 1889)

Figure 66 gives the tower an impressive eleven stories and shows the tower apart from the lumberyard complex.

<sup>29</sup> The city celebrated the bridge’s 50<sup>th</sup> anniversary in 1937, not knowing that World War II would bring the Julien Dubuque bridge to the city. The older bridge was removed c.1944 when the new bridge was done and Fourth Street ceased to be important as a municipal gateway (*Telegraph-Herald*, November 28, 1937).

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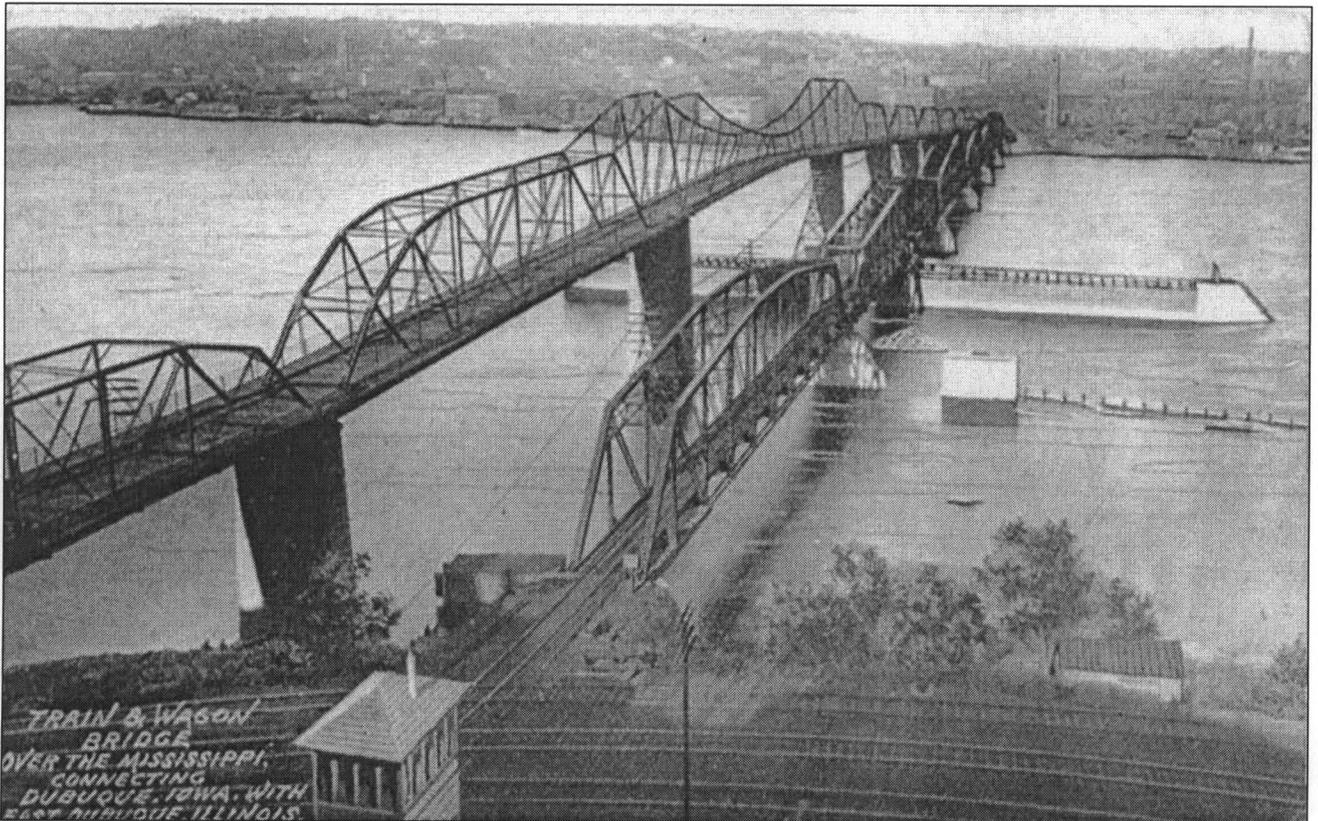


Figure 67: Railroad and wagon bridges, view west toward the Shot Tower, c.1910

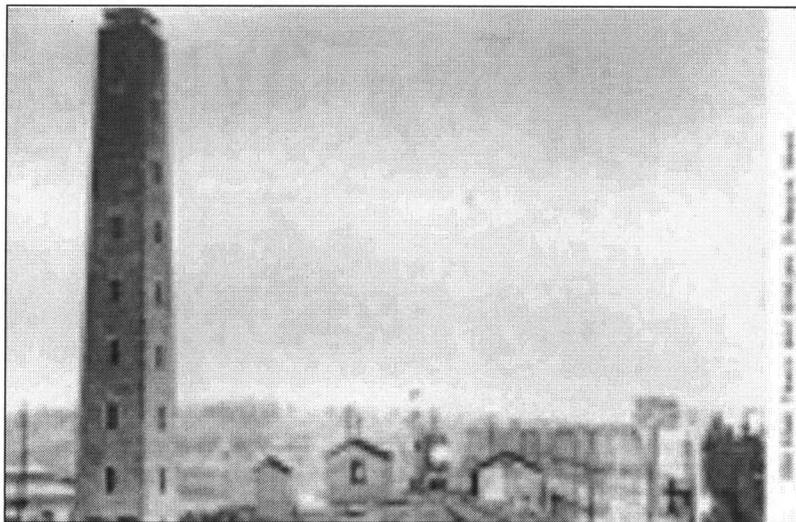


Figure 68: View east toward railroad and wagon bridges, pre-1911

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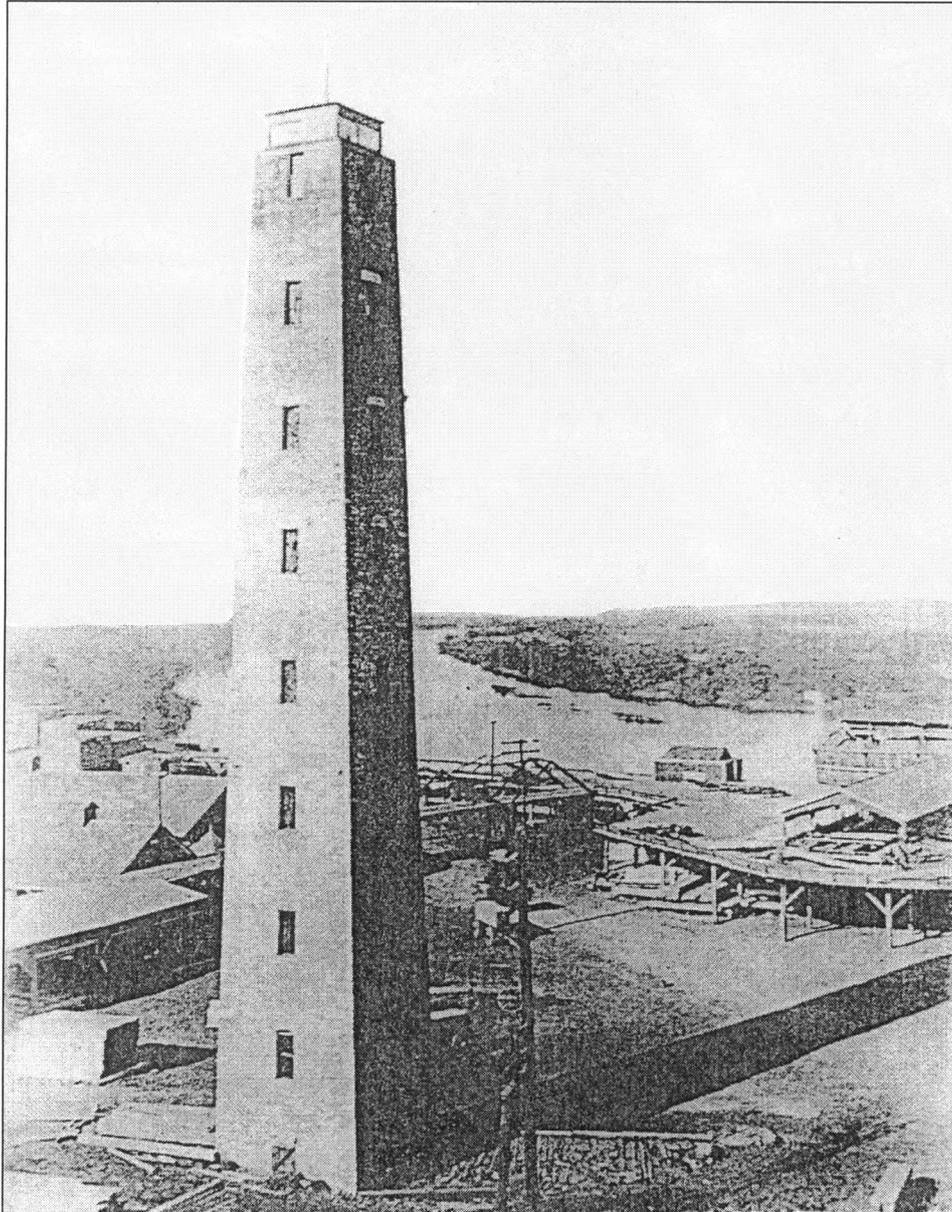


Figure 69: c.1889 photograph, view north  
Other versions of this photo show a tall flagpole on the roof.

Figure 69 once again confirms the isolated appearance of the tower and also indicates that the lowermost floor was half buried. This image is the only photograph of the tower prior to the 1911 fire and shows the cap of the ninth floor in place.

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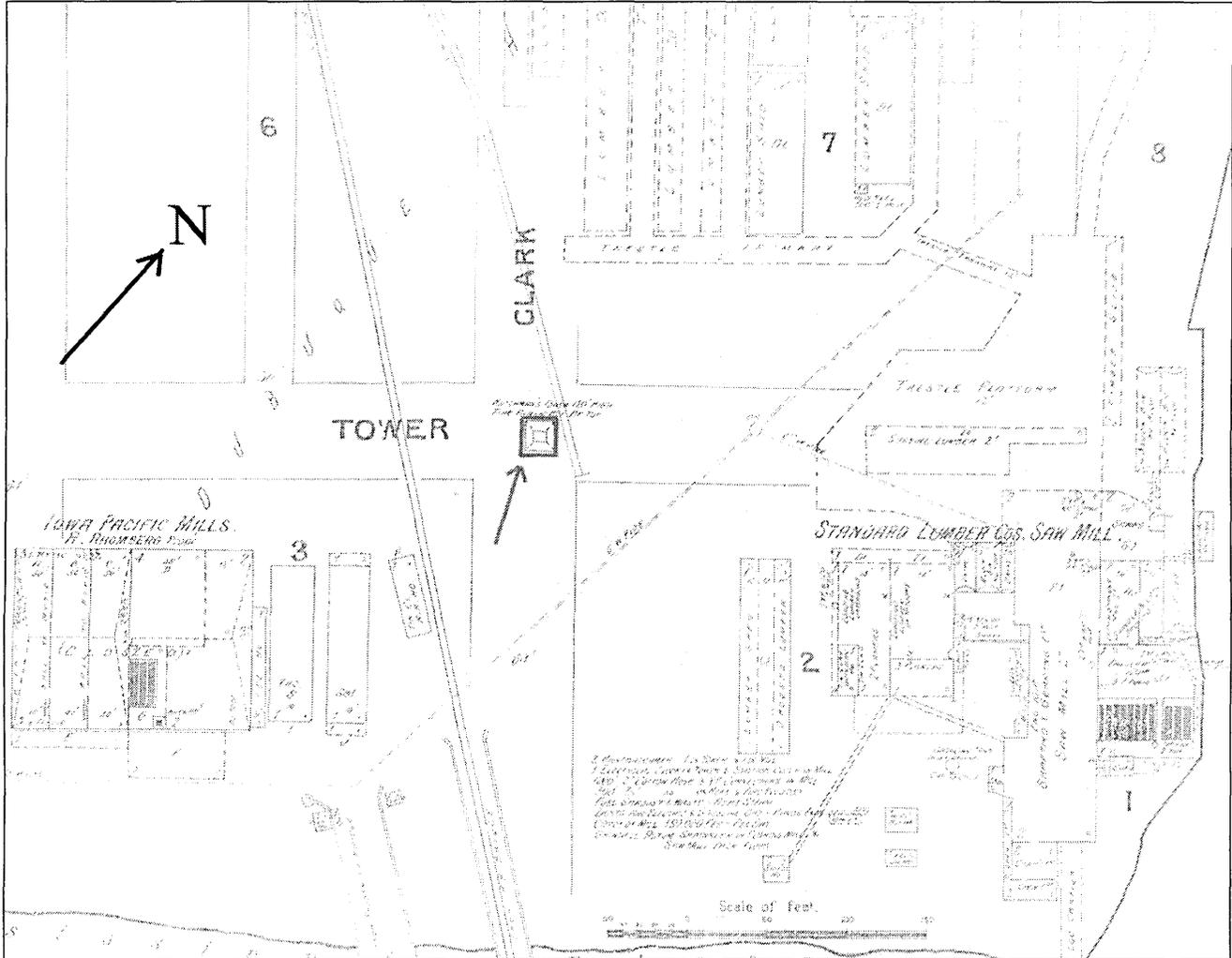


Figure 70: 1891 Sanborn Fire Insurance Map  
(The tower is outlined in gray and located by an arrow)

By 1891, the Sanborn mappers had determined the correct height of the tower, 120 feet. They also made a map correction, moving either the streets or the tower so as to place the tower in the intersection of two streets. Note that these maps show the tower with a hip roof form. Figure 70 clearly indicates a shallow pitched hip roof, and a “fire box” that was recessed within the walls of the tower. Tower Street was progressively vacated from the plat in 1876 and 1888 (Book of Affidavits, #2, p. 434).

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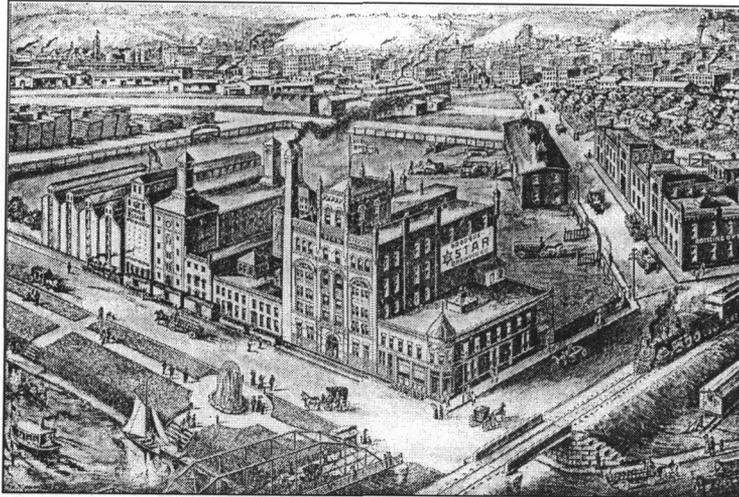


Figure 71: Dubuque Star Brewery, established in 1898, view west (the tower is out of view to the immediate right)  
(Center for Dubuque History, Loras College)

Figure 71 is included because it depicts the fast-developing waterfront immediately south of the tower. The Fourth Street Extension is substantially built up (these are the bottling works for the brewery) and the new brewery complex is in place. There is a decorative fountain along the riverfront.

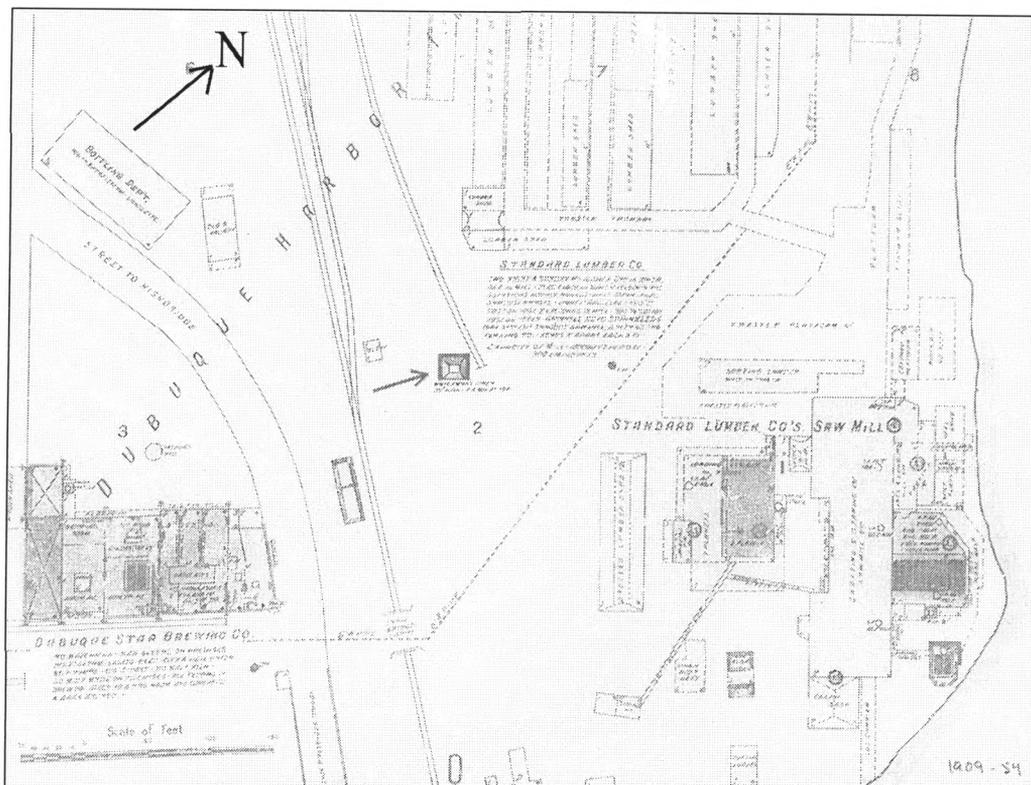


Figure 72: 1909 Sanborn Fire Insurance Map  
(the tower is outlined in gray and is located with a gray arrow)

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Figure 72 shows that the streets previously evident in Sanborn Maps have been eliminated. The tower remains physically isolated at the end of a railroad spur. This should have offered some considerable protection from the 1911 fire, and it did protect it from fires in 1894 and 1910, but it didn't do so in 1911, a testimony to the furious nature of a fire that consumed 10 million board feet of lumber. The 1909 Sanborn Map notes two watchmen at the lumber company, one in the tower, the other in the sawmill. There was an electronic clock in the tower.

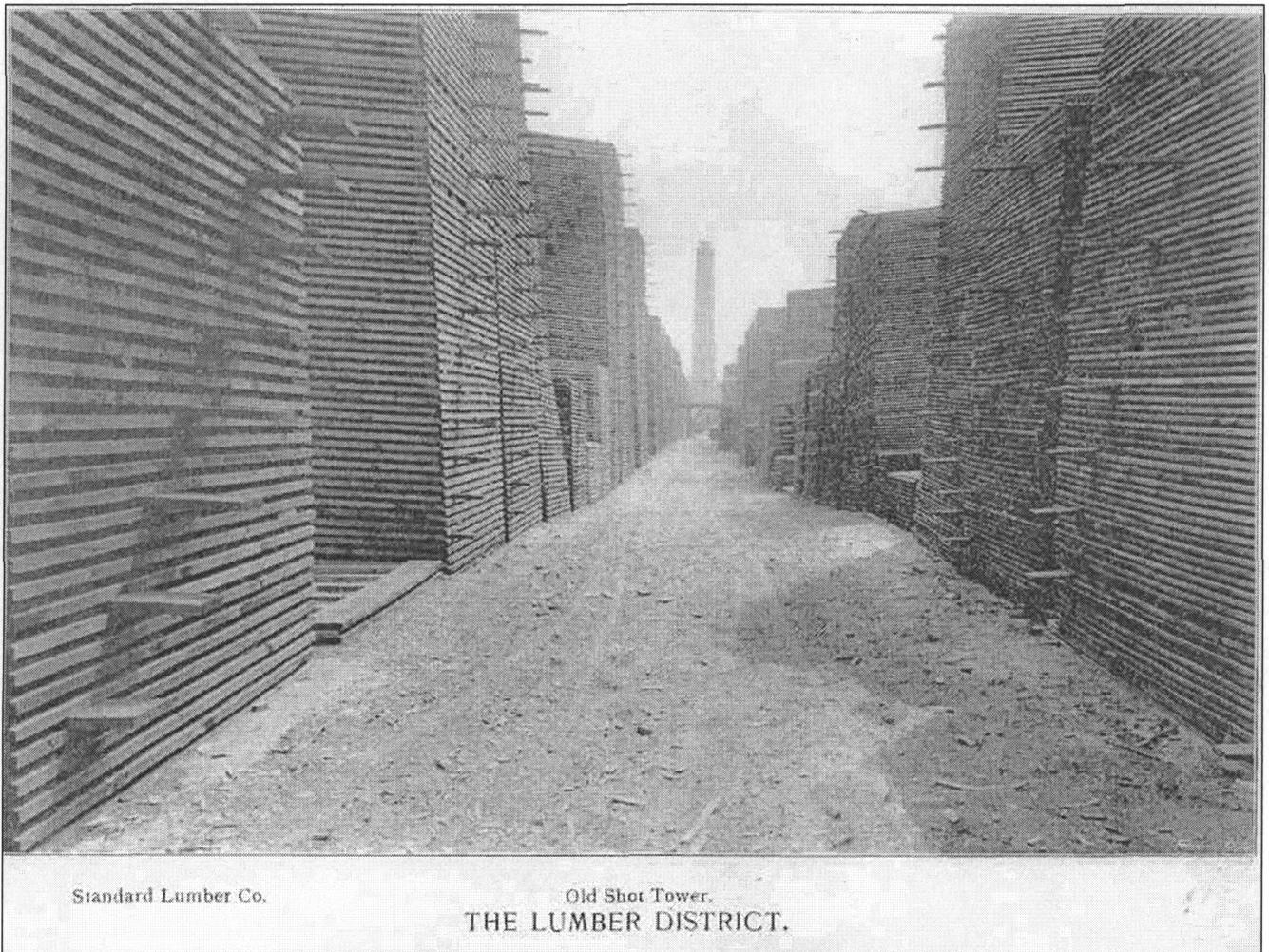


Figure 73: The shot tower surrounded by lumber  
(Dubuque County Historical Society)

The four successive 1911 lumber yard fires were notable events in Dubuque history. The sheer scale was unmatched even in a river city where such fires were fairly commonplace and these blazes marked the end of a doomed Upper Mississippi Valley white pine lumber industry. Watchman John Brahm was in the tower in the late afternoon of April 22 when he spotted the first blaze. His discovery was almost simultaneous with a spotting by Illinois Central Railroad men in the nearby Block Station. The city had been on edge for two weeks given the outbreak of four major fires and a combined loss of \$300,000. The Bijou Theater was completely destroyed in a April 7 fire and the Julien Hotel suffered \$40,000 in damages in a April 11 fire. The first major lumberyard fire also occurred on the 11<sup>th</sup>. All of these were set fires. The April 22 fire consumed twice the

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acreage as did the first blaze. The Flick Box Factory was also heavily damaged. The fire consumed \$300,000 worth of piled white pine lumber. The Shot Tower did its job and escaped damage (*Telegraph-Herald*, April 22, 1910).

The third fire broke out at midnight on May 27, 1911. Six city blocks of stored lumber, white pine stock that “could not be replaced” (probably because the upriver timber source was completely used up). The blaze could be seen for a distance of 10 miles, and was said to have been the most brilliant since the blaze of 1894. The Shot Tower was to the south of the point of origin and was for some time protected by a northerly breeze. It was finally consumed along with two of three box cars which were on sidings at its base. Curiously the wooden driveway to the lower High Bridge wasn’t even charred, while streets to the north of the tower were baked a bright red by the intense heat (*Telegraph-Herald*, May 27, 1911).

The *Telegraph-Herald* printed this description of tower’s succumbing to the flames:

Perhaps the most spectacular feature of the fire was the burning of the old shot tower, a relic dating back almost beyond the memory of the oldest inhabitant. Built solidly of stone and nearly two hundred feet high this structure stood through the great lumber fire of 1894.

Saturday morning’s fire leaves it still standing but nothing but a shell. Whether a spark or from the intense heat the flames burst first from the roof, high above the highest flames. Then the windows of the floor below caught and so down to the bottom. Finally the entire woodwork caught and dense black smoke poured in a ribbon of smoke from the top to bottom of the tower. When this cleared away the burning timbers of the floors could be seen falling inside, shooting past the windows and sending up showers of sparks.

The burning of the old shot tower, which for years has been one of the best known landmarks of the Key City, was watched with a fascination on every hand.

The structure is hollow, and as the windows fell out, the shaft of fire could be seen raging from top to bottom, belching forth from the top on a shower of flame wind rendered to it the aspect of a mammoth sky-rocket. From the sides, a solid wall of smoke waved in the breeze, reminding one of an immense flat afloat on the night and tinged with the conflagration which roared and hissed beneath it.

The stone shaft caught fire from the top and burned down. The tower stands to the south of the origin of the blaze. The wind was from the south. Yet the intense heat from the burning pine when it reached the altitude of the top of the tower was such that it caught and the path of the flames was through the center of the structure and to the ground. The windows and spiral staircase were consumed. Just how seriously the walls were injured and whether it will be necessary to level the structure, which has stood for fifty years, has not been determined.

This account is the source of the presence of a spiral staircase within the tower. It is hard to understand why a spiral staircase would occupy a square tower. Spiral staircases, if metal, required a central support column so the stairs naturally postdated the use of the tower for shot production. The stairs were presumably installed in 1877, given the expenditure of \$3,000 on the tower that year. The account also documents that the fire did not begin at the base of the tower as is claimed by some sources. Rather the penthouse cap caught fire from the intense heat from burning materials upwind from it (*Telegraph-Herald*, May 27, 1911; November 4, 1956).

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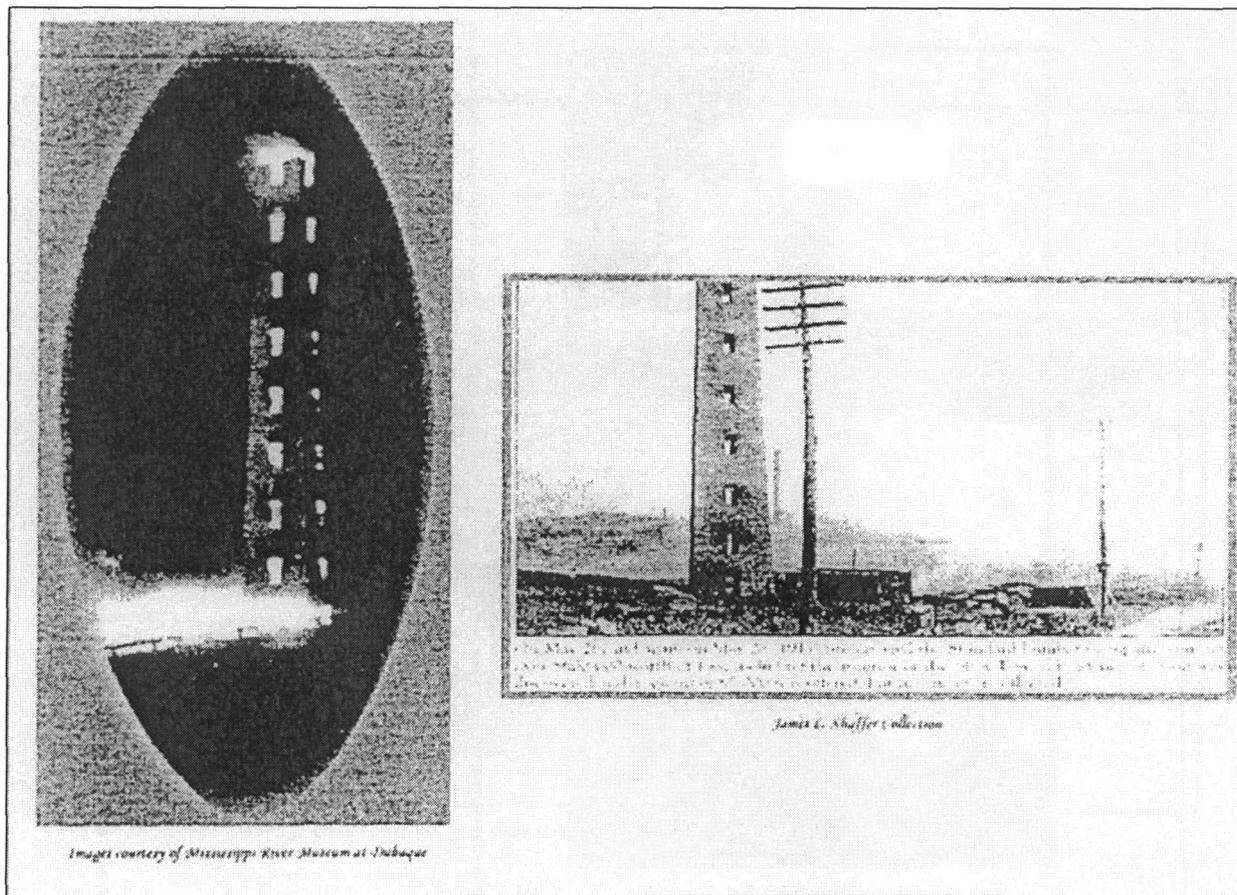


Figure 74: Burning of Shot Tower, 1911 and aftermath of fire  
(photos courtesy of Dubuque County Historical Society)

The fourth lumberyard fire followed two days later and consumed the south yard of the Standard Lumber Company, with a loss of \$400,000. Also consumed were the Conlin & Kearns Ice House and four shanty boat houses. The Star Brewery suffered damages of \$7-8,000. Six blocks of stored lumber were consumed. The total loss of lumber was an estimated 10,000,000 board feet. The company had insurance covering two-thirds of the loss but it was wiped out as a business anyway (*Telegraph-Herald*, May 29, 1911).

Standard Lumber was finished with its burned out yards and disposed of them to M. H. McCarthy on July 25, 1911, for just \$1.00. McCarthy is said to have been linked with the company, as is hinted by the purchase price. The M. H. McCarthy Company was incorporated on March 15, 1912 to deal in real estate. For most of two generations the area around the Shot Tower would remain open, weed filled and undeveloped. Landfilling took place north of the tower site and shanties clustered in that area as the Great Depression turned normal life upside down for many Dubuque residents (Balmer Presentation; Town Lot Deeds Book 73, p. 546; Incorporations Book 6, p. 137).

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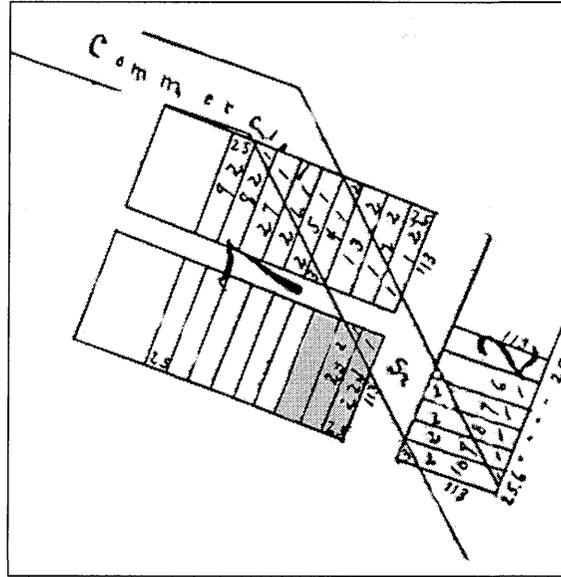


Figure 75: 1911 re-plat of Commercial Street  
(Shaded lots are those associated with the Shot Tower, the latter stands on Lot 24)

Diagonal Street, later re-named Commercial Street, was extended across Blocks 7 and 2 in mid-1911. Standard Lumber Company secured the re-platting. This action placed the Shot Tower in the middle of Commercial Street (Property abstract).

The Shot Tower as Memorial and Icon:

The Andrew Jackson statue era, 1874-81, marked the first use of the tower as a monument and perhaps a viewing vista for the public. After the 1911 fire, the tower was increasingly viewed as a local landmark that was worthy of a park-like setting and proper commemoration. The 1915 passing of Senator William B. Allison resulted in the founding of the Allison-Henderson Memorial Association. David Henderson had long served as Speaker of the House and collectively, the two Congressional giants had represented the irony of Republicans governing an ardently Democratic city. On October 23, 1915 the Association, represented by John R. Waller, purchased the tower and its surrounding area for dedication as a park. The price was good for the seller, the property sold for an impressive \$12,000. In August 1916 the Association transferred the property to the City of Dubuque. The city was empowered to sell some of the land as long as 80 percent of any proceeds would pay for a memorial park somewhere in the city. The tower had no association with the two Congressional leaders (Allison was a close friend of Julius Graves however) and the group simply wanted to use the property as financial leverage to achieve their goal for a commemorative park. The City of Dubuque accepted a mortgage that was part of the purchase price and was the clear titleholder as of March 1921. The Allison-Henderson Memorial Park was designated, and did include the Shot Tower, but no development occurred apart from the construction in the 1930s of the riverfront Council Ring, a circular raised stone overlook that is located several hundred yards northeast of the Tower (Balmer Presentation; Town Lot Deed Book 79, pp. 418, 478).<sup>30</sup>

<sup>30</sup> Association trustees were John R., James H., and John Rider Wallis, and Frederick E. Bissell. A 1929 affidavit corrected and quieted private claims to the outer levee, the vacated former Tower Street, and land which was loaned for a 25-year period to Standard Lumber Company. M. H. McCarthy had falsely claimed title in a 1916 quit claims deed (Affidavit Book 2, p. 434, January 7, 1929).

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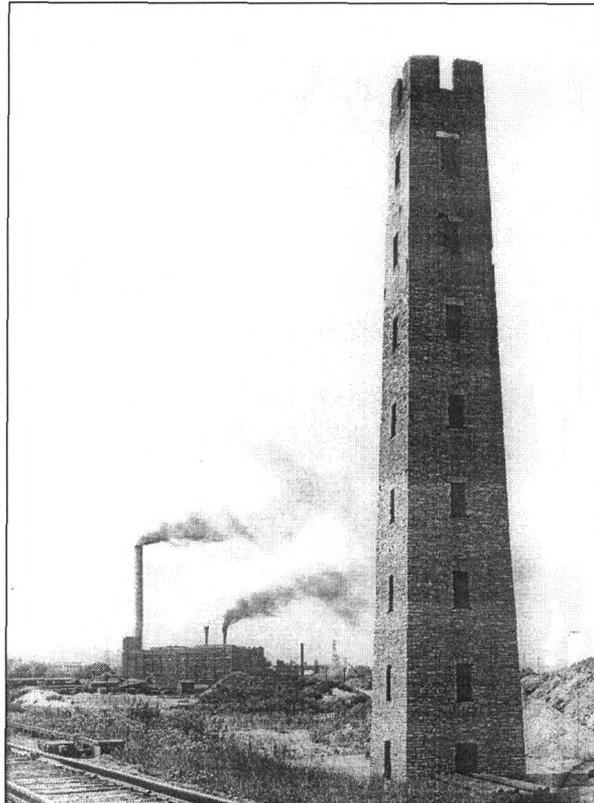


Figure 76: c.1915 photograph of the Shot Tower, view to the west.  
The municipal power plant (still extant but altered) is visible behind the tower.

Newspaper coverage of the tower was non-existent through the 1920s and was minimal during the early 1930s. A 1933 article celebrated the tower's 75<sup>th</sup> birthday (it was then 77 years old). The same source noted that the tower had been gutted by fire in the 1890s. In 1934 the tower was selected for documentation by the Historic American Buildings Survey program of the Department of the Interior. This was a make-work federal project that employed architects, draughtsmen and engineers during the Great Depression. The tower was drawn to scale and photographed in accordance with Historic American Engineering Record standards. The work also entailed the development of a brief history of the tower (see Figure 1; *Telegraph-Herald*, August 6, 1933).

A 1934 *Des Moines Register* photo of the tower was captioned "Let Red Men Beware! Dubuque's shot tower, built in 1840's. They dropped melted lead from the top...took cannon balls out of water tank at bottom[!]" Thus the shot tower was thoroughly separated from its historical function and reality (*Des Moines Register*, February 25, 1934)."

The Dubuque Women's Club petitioned the city to take steps to preserve the deteriorating tower in late 1931. Plans were in the works to develop the area for industrial uses and the women sought the establishment of a protective island as a small park. Warning that "each year sees further deterioration of its masonry," the city was called upon to tuck-point the tower and at least to temporarily roof it. The club also recommended the installation of a beacon light on the tower:

If the old Tower could be made into a beacon so that its beams could be seen for miles up and down the river and across the country into the three states, it would again have a real purpose in addition to its historic growth. In the event of an airport being established permanently here, the light would be of inestimable value.

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Nothing was done. In late 1949 the Girl Scouts proposed to plant shrubbery around the Tower base if the city would clean up the area, but again, nothing transpired (*Telegraph-Herald*, October 11, 1931; December 25, 1949).

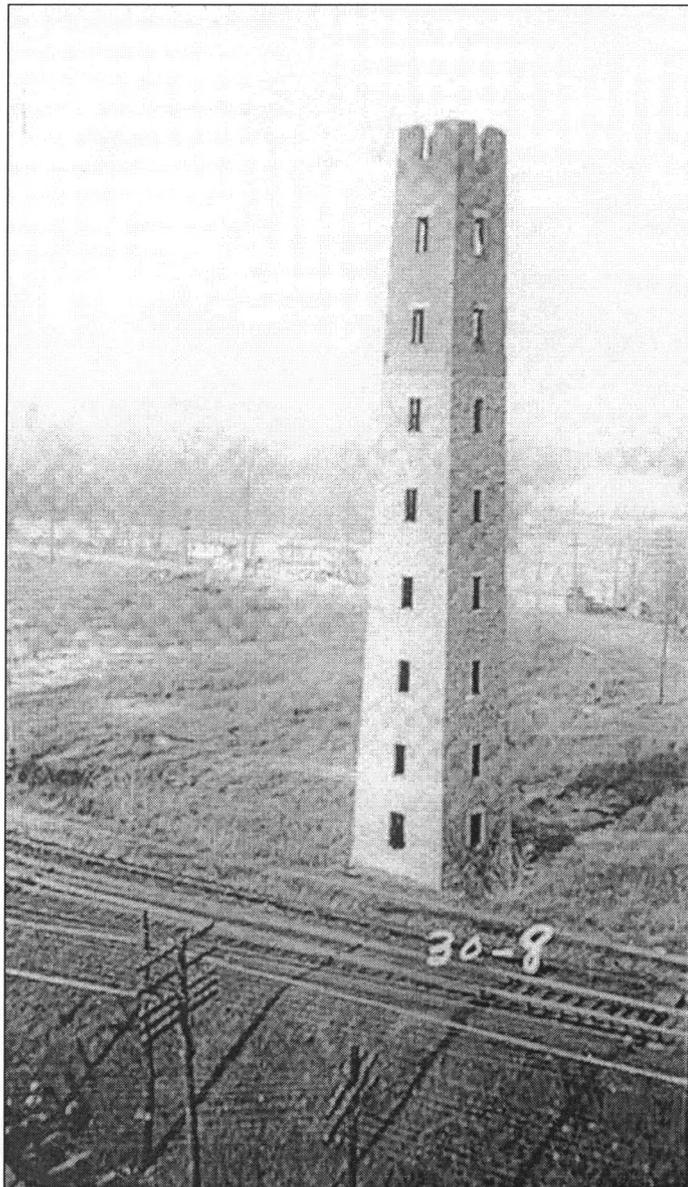


Figure 77: 1934 HABS-HAER photo, view to the north  
(Library of Congress, HABS-HAER Photograph Collection)

The HABS documentation formalized the landmarking process for the Shot Tower. By 1943, the *Telegraph-Herald* termed it a “Famed local landmark” noting that it had “played a very important role in the prosecution of the Civil War” and then curiously added “it has stood as a silent tribute to Iowa Union veterans in three wars, the Spanish American conflict in

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1898-99, and the two world wars.” By this time the structure was nearing its century mark, which was also helpful in terms of being publicly accepted as a landmark (*Telegraph-Herald*, September 26, 1943).

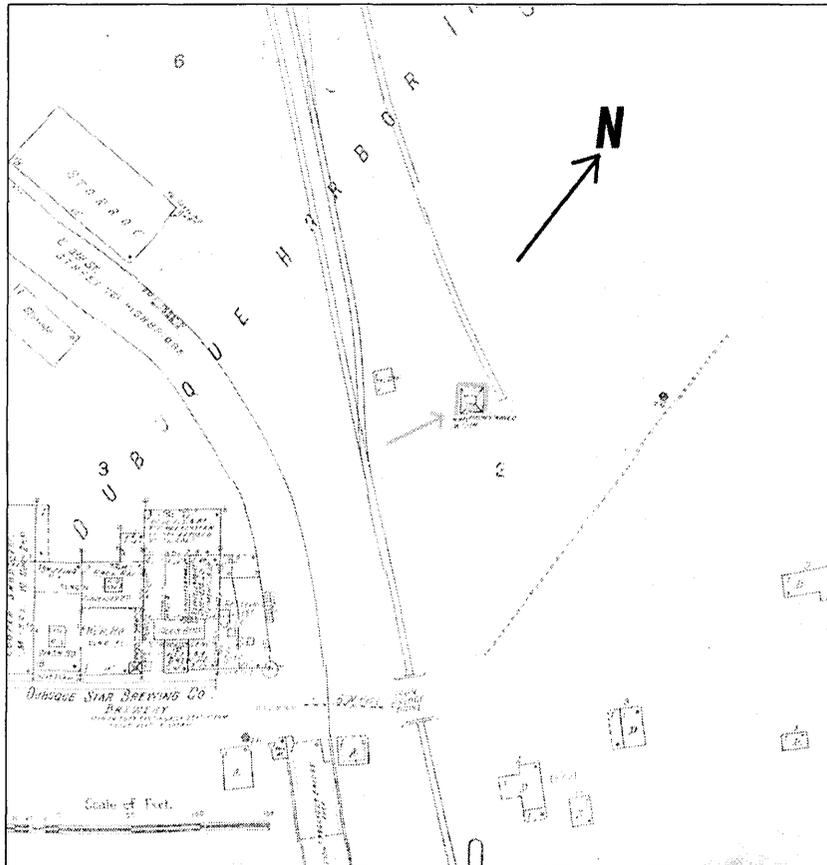


Figure 78: 1936 Sanborn Fire Insurance Map  
(the tower is outlined in gray and is located with a gray arrow)

Figure 78 again depicts the lonely setting of the tower as of the mid-1930s. The small shacks visible to the northeast were part of the several “Hoovervilles” which had sprouted up between the city and the river. A promotional Chamber of Commerce photo from this period shows ice skating on the lagoon to the north of the tower. Nothing had come of the park idea of 1915, but the matter was revisited in 1941, even as World War II was just underway, but nothing was finally done. The area was again re-platted so as to define leasable riverfront parcels. Commercial Street was reconfigured along the north side of the railroad tracks and the tower was actually in the street right-of-way. In 1950 the city negotiated 75-year leases for the industrial site immediately north of the tower (Balmer Presentation).

Following World War II the Shot Tower was elevated to an Iowa icon by means of a series of promotional articles which appeared in the Palimpsest. “Steamboat” Bill Peterson, a Dubuquer, was a leading booster of the tower. His article stressed the role of the tower as a surviving witness to the entire history of the city. The height of exaggerated claims for the tower came in 1951 when *Railroader* Magazine captioned a cover photo of the tower with the note that it had “furnished much of the shot used by the Union army” during the Civil War. The *Des Moines Register* called the tower a “long-neglected historical monument” in 1949 (*Railroader* Magazine; *Des Moines Register*, January 2, 1949).

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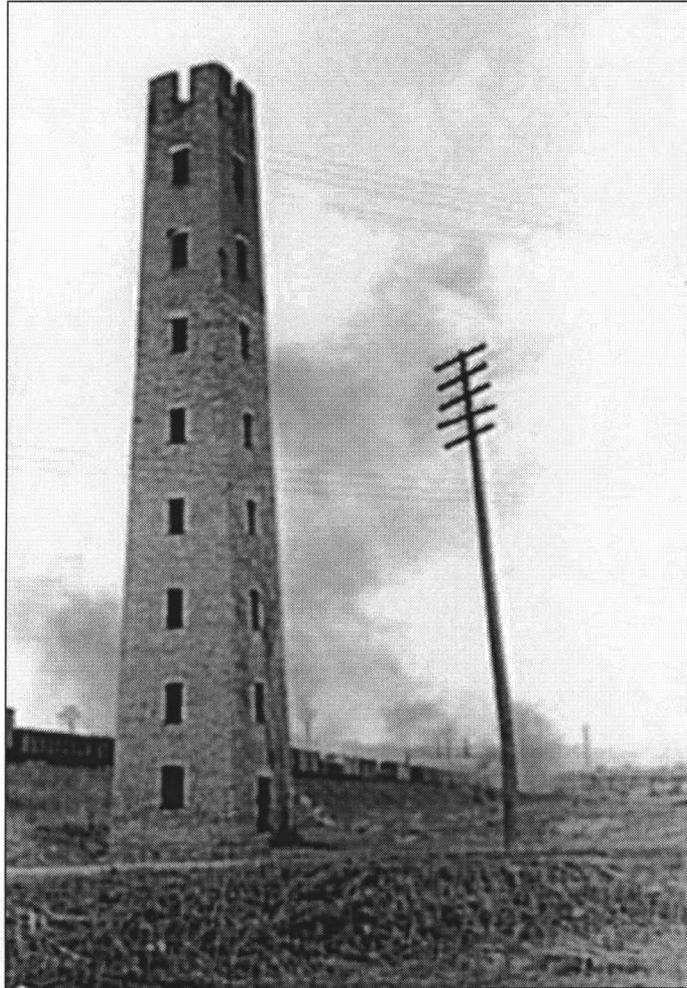


Figure 79: May 1940 photo, view west, photograph by John Valcon  
(Library of Congress, HABS-HAER Photograph Collection)

In 1951, industrial buildings were being constructed just north of the tower and an engineer who was making soundings for the foundations, offered the opinion that the Shot Tower would last another 100 years, that its mortar was “as hard as flint” and “the stone is made of the hardest found in this vicinity.” A few rocks had fallen from the first floor window frames “which is now level with the surrounding terrain because of filling.” A few stones had also fallen from the upper stone arches. The Chamber of Commerce declared its support for saving the tower in 1952 “because of its great historical interest” and its “trademark” role for the city. The beautification committee of the Chamber studied the matter and warned that action had to be taken “before its too late.” The City Engineer studied the tower and developed a \$7,000 project cost, including \$2,000 for scaffolding. A particular concern was the loose brick on the top of the tower walls. The bricks endangered children who played around the tower and passing trucks using Commercial Street. Fears were expressed that a truck could strike the tower and bring it down “like a house of cards.” The Beautification Committee issued its report in early 1953 and recommended the sealing of the lower openings, the installation of a roof, and the completion of a building survey by a competent engineer. Fund raising, for a total of \$5,000 to \$15,000, would center on a school-based fund drive. The first tower restoration work was

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discussed in 1956 and estimates of needed work, tuck-pointing, replacement concrete sills, and a concrete roof cap, totaled \$7,500 (*Telegraph-Herald*, September 9, 1951; November 21, 1952; February 11, 1953).<sup>31</sup>

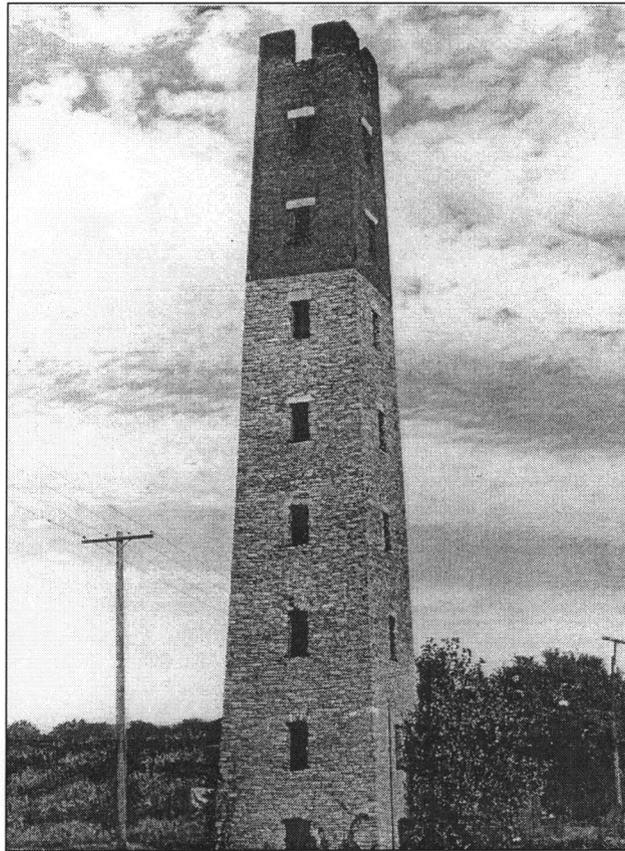


Figure 80: 1951 photo of the Shot Tower, view to the west  
(*Railroader Magazine*, August 1951, cover)

Figure 81 nicely illustrates the impact of the municipal leasing out of the area immediately north of the tower in 1951. Virginia Carolina Chemical Company is now the Peavey Company. This is the first Sanborn Map to not show the vehicular bridge to the south of the railroad bridge.

By 1959 the Dubuque County Historical Society was taking the lead in saving the tower and suddenly the tower that could stand another 100 years was ready to fall like the walls of Jericho. A local contractor warned that the stonework was merely a “vener” and there were “plenty of holes” in the tower. The Historical Society had partnered with the Dubuque Vacation Committee and a “number of interested Dubuque organizations and individuals have rallied behind the idea of restoration.” The City Council allocated \$5,000 for the tower repair work, to be expended in 1950. The Historical Society stated that a total of \$12,000 would be needed. By this time the tower was called “the oldest landmark in this part of the country.” While the Shot Tower had been cited as one of two surviving shot towers back in 1953, it now was admitted to be one of five such towers. The tower was “the only real symbol of Dubuque” (*Telegraph-Herald*, October 25, 1959).

<sup>31</sup> The industrial plant successively housed the Pillsbury Company Grain Terminal, the Harvest State Cooperative (c.1996) and the Peavey Company (until 2002). The complex is now vacant.

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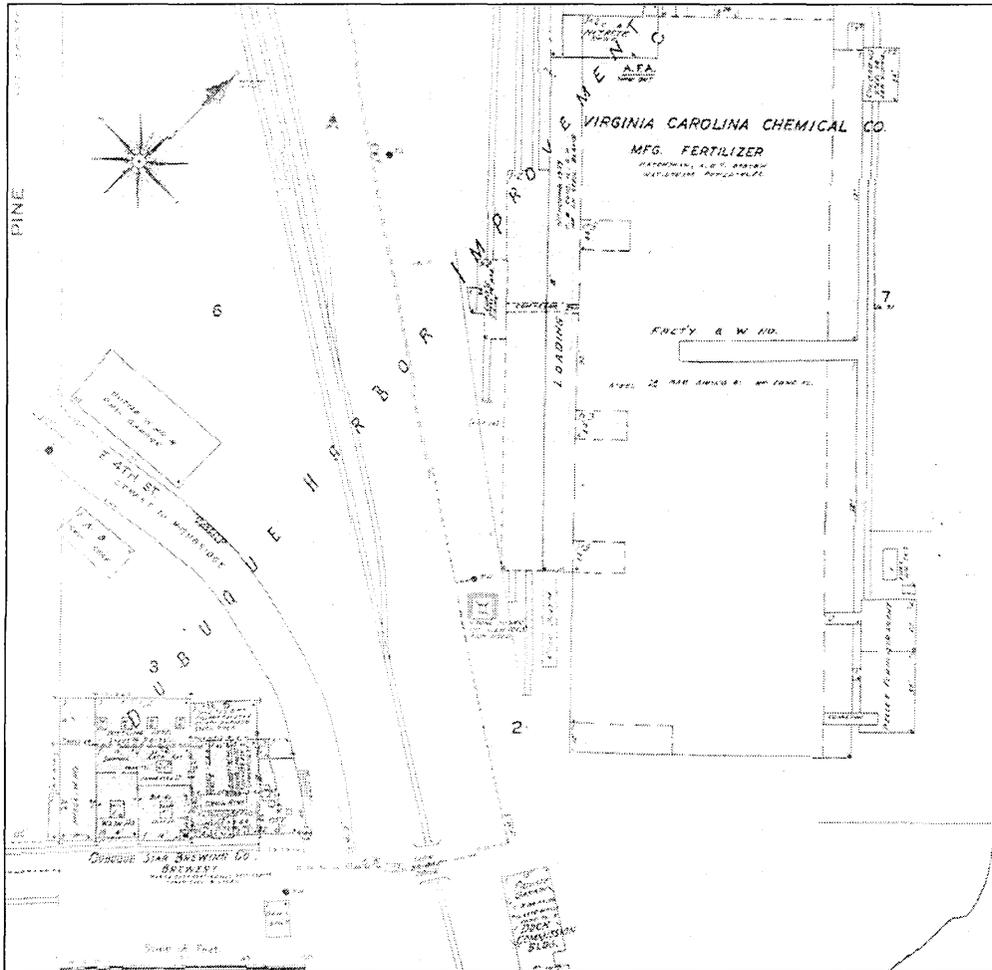


Figure 81: Sanborn Fire Insurance Map, 1965  
(the vaulted garage structure, visible to the east of the tower, post-dates 1936 and is still present)

It wasn't until November 1959 that a special "Save Our Shot Tower" committee, chaired by Henry Miller, was organized. The committee set an initial goal of \$7,000, and finally raised \$6,848 of a \$6,700 revised goal by late March 1960. The restoration plan by this time was more expansive. While the tower would be tuck-pointed, the surrounding area was to be lighted, cleaned up, and the tower would be put in a condition to once again produce lead shot. Tours would also be offered (Balmer Presentation).

The tuck-pointing, re-roofing, and the replacement of window sills with concrete ones, the covering of the windows with wooden louvers, and the pouring of a concrete base around the tower base, were all completed in 1960. The interior walls were tuck-pointed and cast concrete interior lintels were put in place. The roof was festooned with five lightning rods. While none of the tourism improvements were done, the Dubuque Historical Society re-opened the tower for the public in November 1961, claiming an investment of \$14,000 in the work, matched by the city's \$5,000 expenditure. In 1967 the site was permanently protected from flooding by the construction of a city-wide floodwall. The Dubuque Garden Club landscaped the base of the tower. At some time during the 1960s, a protective iron fence placed on an oval stone base was added, funded by

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private service groups. In 1969 the present plaque was placed on the east base of the structure by the Dubuque Chapter of the Daughters of the American Revolution (Balmer Presentation; *Telegraph Herald*, September 15, 1959, November 13, 1961).



Figure 82: c.1940 view of the Shot Tower, view towards the river, brewery to the right.

In 1976 Joe Pickett Sr., who had reopened the former Star Brewery just south of the tower, re-staged lead shot production as part of the bicentennial effort. Pickett spent 18 months trying to produce acceptable shot. He appropriately first used his own brewery as a production site, and a beer barrel as the cooling tank for the dropped shot. When he dropped lead from the fourth floor wind blew through the windows and plastered his brick walls with lead. He next tried the top of an elevator shaft in the brewery. He finally determined to use the Shot Tower, but there was no way to do so, given the absence of stairs. Unwilling to risk entanglement in the tower's lightning rods, a planned National Guard lift by helicopter was declined. Pickett finally resorted to the use of scaffold inside the tower. Jackson Tuck Pointing Company provided the necessary scaffolding for free. Over time Pickett's shot making efforts (aided by a young and interested Dr. Richard Vermeer) transformed from "meteorites" into spheres. He produced 1,000 bottles of shot for the Dubuque County Historical Society for use as fund raising items. In 1976 the Shot Tower was listed on the National Register of Historic Places by local historian Helen Mercer and it was designated as a municipal historic landmark in 1993 (*Telegraph-Herald*, October 17, 1976; January 16, 1993; *Des Moines Register*, May 24, 1976).

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Figure 83: c.1935, view to northeast, note small house in background. Wisconsin stone bluffs visible.

In 1987 serious consideration was given to disassembling the tower and rebuilding it at the head of the Ice Harbor, where it would be more publicly accessible and would serve as an “architectural focal point.” The relocation option was first proposed in 1987 and wasn’t abandoned until 1997. The University of Wisconsin conducted the study for the Greater Dubuque Development Committee. There was precedent. The Town Clock tower had been moved to Town Clock Plaza on Main Street in the early 1970s, although it was relocated as a single unit. The moving idea was re-visited in 1995 when BRW conducted a feasibility study. Relocation was finally dependent on a corporate partnering with the Peavey Company and it determined that it was too busy with its business to remedy a problem that it didn’t perceive to be a problem. Further tuck-pointing work planned for 1991 was eliminated from the city budget due to the failure of a local sales tax referendum. In 1991 a runaway railroad car smashed through the metal fence and seriously damaged the west base wall of the tower just north of the door. Damage was estimated at \$5-10,000 and the railroad company paid for the necessary repairs. All of this attention produced a strong level of community support in favor of preserving the tower. An April 1992 poll found 76 percent of residents favored the tower’s preservation (Balmer Presentation; *Telegraph-Herald*, April 12, 1992; September 28, 1987).

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In 2002 IIW Engineers & Surveyors, P.C. were contracted to perform a structural evaluation of the tower and to prepare recommendations for including the tower in the river walk project. Historic Preservation Consultant James Jacobsen was subsequently contracted to amend the National Register of Historic Preservation listing to designate the Dubuque Shot Tower to be nationally significant. He is also charged with preparing a National Historical Landmark nomination for the Shot Tower.

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This draft nomination amendment would have been impossible to prepare absent the impressive corpus of research which Ron Balmer and his Dubuque firm, IIW, accomplished as part of their structural and interpretive reuse study of the Dubuque Shot Tower. Mr. Balmer was more than generous in sharing his findings and his information enabled this author to research more effectively, supplementing his findings.

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10. Geographical Data:

Boundary Description:

Lot 24, Block 7, Dubuque Harbor Improvement Addition

Boundary Justification:

This is the parcel that has historically been associated with the shot tower and it includes any probable archeological features. The buildings which are adjacent to the tower are all on publicly owned land.

Photo List:

Photographer: James E. Jacobsen

Date: August 8, 2002

Film Type:

	View:	Description:
1.	west	east front of tower, full height of tower, setting
2.	east	west front of tower, full height
3.	northeast	south and west fronts of tower, full height view
4.	west	general setting, west face of tower
5.	southwest	north and east fronts of the tower, full height