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NPS Form 10-900
(Rev. 10-90)

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NAT. REGISTER OF HISTORIC PLACES
NATIONAL PARK SERVICE

OMB No. 1024-0018

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 any 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 French Worsted Company Mill Historic District

other names/site number

2. Location

street & number 153 Hamlet Avenue ☐ not for publication

city or town Woonsocket ☐ vicinity

state Rhode Island code RI county Providence code 007 zip code 02895

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.)

Edward F. Sanderson 3/27/2008
Signature of certifying official/Title Date

Rhode Island Historical Preservation & Heritage Commission
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

I 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
☐ See continuation sheet.
☐ removed from the National Register.
☐ See continuation sheet.
☐ other (explain)

for Edson H. Beall 5.21.08
Signature of the Keeper Date of Action

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.)

- ☐ buildings
- ☒ district
- ☐ site
- ☐ structure
- ☐ object

Number of Resources within Property
(Do not include any previously listed resources in the count.)

Contributing	Noncontributing	
15	1	buildings
		sites
3		structures
		objects
18	1	total

Name of related multiple property listings
(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 manufacturing facility

Current Functions
(Enter categories from instructions.)

INDUSTRY manufacturing facility
COMMERCE/TRADE business
VACANT/NOT IN USE

7. Description

Architectural Classification
(Enter categories from instructions.)

OTHER
20th -century industrial

Materials
(Enter categories from instructions.)

foundation concrete
walls brick, concrete, wood
roof wood, asphalt, stone (slate), synthetics
other

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

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

Areas of Significance
(Enter categories from instructions.)

INDUSTRY
ARCHITECTURE

Period of Significance

1906-c1930

Significant Dates

1906, 1909, 1920s

Significant Person

N/A

Cultural Affiliation

N/A

Architect/Builder

Fontaine, Walter, architect
J.W. Bishop Company, builder

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 36) 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 #

Primary location of additional data:

☐ State Historic Preservation Office
☐ Other State Agency
☐ Federal agency
☐ Local government
☐ University
☐ Other

Name of repository

10. Geographical Data

Acreage of Property 6.7 acres

UTM References
(Place additional references on a continuation sheet.)

	Zone	Easting	Northing
1	19	292920	4652720
2			
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 Edward Connors

organization Edward Connors and Associates date January 2007

street & number 39 Dyer Avenue telephone 401 595-0699

city or town Riverside state RI zip code 02915

Additional Documentation

Submit the following items with the completed 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 _____

street & number _____ telephone _____

city or town _____ state _____ zip code _____

DESCRIPTION

General

Located in the Hamlet section of Woonsocket, Rhode Island, the French Worsted Company Mill is a group of sixteen early 20th-century, one- to five-story, brick industrial buildings, and significant concrete remains of an abandoned rail siding. The complex is sited on a roughly triangular, six-acre site bounded by Hamlet Avenue on the north, the rail line of the former New York, New Haven, and Hartford Railroad (NYNH&H, now Providence and Worcester) on the west, and Davison Street (formerly Mill Avenue) and a land depression marking the location of the historic Hamlet Trench on the east and south.

Designed by Woonsocket architect Walter Fontaine and built by the Tiberghien textile interests of Turcoing, France, for spinning and finishing of worsted yarn for fine women's and men's wear, the earliest construction in 1906 consisted of Mill No. 1, with an attached boiler house, engine room, dynamo room, a carpenter/machine shop, and a detached, mansard-roofed office building. An elevated spur line from the neighboring NYNH&H tracks extended from a point south of the complex to a coal pile west of the first boiler house and Mill No. 1. This first phase of construction was followed in 1909 by the construction of Mill No. 2 (Building 7) a Sorting Building (Building 8) and, in 1911, a Wool Store House (Building 9).

French Worsted carried out a major expansion in the 1920s. This included a Dye House (Building 10), a Combing Building (Building 11), an expanded Engine Room (Building 4) to accommodate three more boilers, and an overhead walkway to connect the two principal mill buildings. Additional construction in the 1920s included a Second Carpenter/Machine Shop with attached stockroom (Building 12) and infill (Building 13) in the alley that originally separated Mill No. 2 from the Sorting and Wool Storage Buildings.

Inventory

Contributing buildings

The following buildings are inventoried chronologically and numbered according to chronological occurrence. This numbering scheme is a departure from a convention established by French Worsted in the early 20th century that assigned numbers to some buildings and names to others.

Building 1, First Mill (1906): A five-story, 174x109', pier and spandrel brick building designed by Walter Fontaine and likely built by the Providence firm of J. W. Bishop. Framing is plank on timber construction supported by square-section wooden columns. A combined stair and toilet tower is located at the northeast

corner of the building. A formal entrance at the base of the tower originally provided communication between this building and the adjacent office (Bldg. 2, q.v.). This tripartite entrance, defined by two paneled cast iron pilasters, is covered in plywood and no longer in use. The brick piers of the main block are echoed in the surface of the tower as a design element defining two vertical pilasters between round arch windows grouped in threes. These pilasters are terminated at a belt course of quarry-faced granite above the historic entrance. Tower windows are wood-frame 3/3 sash, surmounted by a four-pane, half-round fanlight.[1] The tower is capped by a copper-sheathed parapet.

Typical windows in the main block of the mill are 7/7 with a fixed 7-light transom set in a segmental arch opening. The transom is not milled to fit the arch. Fourth floor windows are fiberglass inserts dating to the late 1960s.

The roof is flat and covered in synthetic membrane. Rounded rafter ends are exposed, a pattern that is repeated in a number of buildings throughout the complex. Interior framing consists of square-section, chamfered timber columns supporting a plank-on-timber floor system.

The ground floor of Building 1 served for storage of yarn and baled wool; machinery for preparation[2] of wool on the second floor; twisting, spooling, and working on the third floor; and mule spinning and paper tubes for winding yarn on the fifth floor. A 5-story, roughly 7x 60' south extension of this building housed a ropeway[3] for the transmission of mechanical power from the Engine Room (Building 3) to the five floors of this building. At present, this building houses one light industrial operation on the first floor; the remaining floors are vacant.

Building 2, French Worsted Office Building/Giancarlo's Restaurant (1906): A 45x60' brick, single-story building fronting on Hamlet Avenue. Sited a short distance from the stair tower of Building 1 and originally built as an office for the French Worsted Company, this building now houses Giancarlo's, an Italian restaurant. Built in the Second Empire style, the former office sits on a raised basement defined by a concrete beltcourse

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[1] Many of these windows are filled with plywood. Fiberglass panel windows on the fourth floor were installed by French Worsted to replace those blown out in a powerful bombing in October 1966. Minutes later, another bomb exploded across the walkway on the fourth floor of Building 7. Fourth floor fiberglass windows in that building are of the same origin.
[2] *Callaway's Textile Dictionary* (1947 edition) describes "preparation," as used in worsted yarn manufacture, as "a method of getting long wools...in a suitable condition for combing."
[3] Ropeways, a system of pulleys and shafting utilizing rope, represented a late phase of mechanical power transmission installed at French Worsted, even as some Rhode Island factories of the period were making the transition to electrical drive. Although there are no surviving artifacts of this system in Building 1, a large pulley and truncated shaft are found in the comparable ropeway space of Building 7.

above the basement windows. The overhanging, low-pitched mansard roof is supported by curved wooden brackets and covered in slate. The foundation is concrete.

Despite significant alteration on the east elevation that includes two modern entrances, a concrete handicapped ramp, and a greenhouse addition, the building retains much of its original fabric. Significant among these is the (now unused) formal entrance on Hamlet Avenue, an ornamented brick pavilion with a shallow gabled roof. A single door is set in a recess defined by an arched pediment and cast stone ornament echoing those along the overhanging cornice.

Dormered windows along the mansard slope are vaulted. Three of these are found on the east and west elevations with a single dormer at the rear of the building. Although most are now filled or adapted for ventilation, a few of these dormer windows have an original four-light round arched fixed sash. First floor windows, set in segmental arch openings, are double-hung, 12/12 with a concrete sill. Three shallow keystones project from the brick segmental arch.

Building 3, Engine and Storage House (1906): A five-story, 42x58' brick pier and spandrel building attached to Building 1. The foundation is concrete. Evidence on both the interior and exterior suggests that this building may have originally comprised a deep, clear-span ground story, the three upper floors used for storage. In 1911 it was described in Sanborn maps as having "3-4 stories plus basement."[4] The roof is flat, sheathed with synthetic membrane. Interior framing on floors 3, 4, and 5 is plank on timber supported by chamfered, square section timber columns. Evidence suggests that the ground floor originally comprised one clear-span chamber. At present, a ground floor single row of round-section steel columns of relatively recent installation extends the length of the building south of the center axis. On the clear-span second floor three large, built-up steel girders support the column structure of the upper floors. These upper floors have two rows of chamfered, square-section timber columns supporting a plank-on-timber floor system. The roof is flat and sheathed in synthetic membrane.

Ground floor windows are 4/4 wood frame and set in rectangular openings, the lower sash hinged to open inward. Second-story windows are 4/4 wood frame set in segmental arch openings. The upper sash is not milled to conform to the segmental arch. Upper story windows (3rd, 4th, and 5th floors), set in segmental arch openings,

[4] The evidence suggesting a subdivision of a former high-ceilinged engine room includes a course of corbelling above the present-day second story, a change in fenestration, and filled segmental arch openings on the ground floor that do not correspond with current floor heights. It appears that an original first floor may have been subdivided at some point to two stories. The substantial *I*-beams visible in what is now the clear-span second floor also suggest this alteration.

are 4/4 wood frame with a four light transom. The transom is not milled to fit the segmental arch. All sills are concrete.

This building originally housed steam engines for Building 1. The neighboring Boiler House (Building 4) furnished steam and the adjacent ropeway (see Building 1) transmitted mechanical power to the building's five floors.

At present, this building is mostly vacant; a light industrial operation in Building 1 uses the ground floor for storage.

Building 4, Boiler House (1906, ca 1924): Originally a brick, 50x47', pier and spandrel, single-story building housing five boilers and furnishing steam for mechanical power and heating. The ceiling height in the original section is about 15'. This building adjoined a coal pile at the north terminus of a NYNH&H spur line along the west boundary of the complex. In the mid-1920s French Worsted Company doubled the size of the Boiler House with a roughly 50x60' western addition occupying the location of the former coal pile. This addition, with a ceiling height of about 20', allowed the installation of three more boilers (a total of eight). The original chimney, located in the alley south of the original wing of the Boiler House, was demolished between 1939 and 1950. An operational chimney dating to the mid-1920s survives to the north of the building. Two Kewanee boilers of relatively recent construction provide steam for the plant's heating system. Two non-operational fire tube boilers appear to date to the ca 1924 expansion of the original boiler room.[5] Segmental arch window openings are now plywood filled. Sills are concrete. Four altered entrances provide communication to the alley between Buldings 1 and 7.

This building continues to house the plant's heating system.

Building 5, Dynamo House (1906): A 16x47', single-story interior chamber sited between the Engine House (Building 3) and the Boiler House (Building 4). The French Worsted Company installed an electrical generating plant as part of its original construction in 1906. It is likely that this facility originally furnished direct current for the plant's lighting system and was adapted and expanded over time for use in the generation of electricity for other purposes. An "Industrial Notes" item in the December 1910 *Board of Trade Journal* describes the

[5] These boilers may have been manufactured in Quincy, MA (source: interview with Glenn Rouest, at plant on 12/27/06). Two mid-20th-century Ingesoll-Rand compressors, one of which is still attached by belting to a GE 3-phase motor, are also located in the original (1906) wing of the boiler house.

installation of a new turbine and generator and an increase of 1000 HP for the Woonsocket plant.[6] There are no surviving artifacts of electrical generation. Access to this building has been limited by the current tenant, owner of a light industrial operation.

Building 6, First Carpenter/Machine Shop (1906): A brick, 125x35', single-story building fronting on the alley between Buildings 1 and 7. An off-center row of steel columns suggests that this building was originally clear-span. The foundation is concrete. The roof is flat and sheathed with synthetic membrane; the west half of the roof has six sawtooth monitor windows. Windows set in segmental arch openings are woodframe, double hung with 4 vertical lights on each sash. A 4-light transom is mounted over the sashes; the transom is not milled to fit the segmental arch. Two woodframe double doors appear to be of original construction.

Access to this building has been limited by the current tenant, owner of a light industrial operation.

Building 7, Second Mill (1909): Built by J.W. Bishop,[7] a five-story, brick, 200x115', pier and spandrel building with an attached stair/toilet tower at the northeast corner. The roof is flat and sheathed in synthetic membrane. The building rests on a concrete foundation. The basement floor and first floor are concrete. Interior framing consists of square-section timber columns supporting a slow burning, plank-on-timber floor system. The overhanging roof is flat with exposed, rounded rafter ends.

The brick tower parapet is defined by a raised segmental arch device at each elevation and a copper coping. Tower windows are wood-frame, 3/3 double-hung, grouped in threes surmounted by a half-round, four-pane fanlight. Wood frame windows in the main block are set in segmental arch openings, 7/7 with a fixed 7-light transom. The transom is not milled to fit the arch. Fourth-floor windows are filled with translucent fiberglass panels dating from the late 1960s.

When the French Worsted Company constructed this building in 1909, several preparatory operations for worsted wool manufacture were relocated form Building 1. The building housed wool scouring and washing in the basement, carding and combing on the first floor, drawing-in on the second, and spinning on the three upper floors.

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[6] *Board of Trade Journal* (Dec. 1910, p. 545). Although the item doesn't specify, it is likely that this was a steam turbine driving a dynamo. Earlier dynamos installed in 1906 may have drawn power from the plant's rope drive (adjacent to the Dynamo Room) or directly from the plant's steam engines.

[7] Bishop also built Buildings 8 and 9.

A shallow, projecting pavilion along the north elevation is likely served as an original ropeway (see Description, Building 1). A steel pulley with truncated shaft is found mounted near the ceiling of the fourth floor.

At present this building houses a few light industrial operations, but is mostly vacant.

Building 8, Sorting Building (1909 et seq): A two-story brick, L-plan, 165x115' overall building built by J.W. Bishop. Twelve sawtooth windows are set at a roughly 45-degree angle to the plan of the building in order to direct northern sunlight into the upper floor. The glazed, north-facing surfaces of these structures are now covered. A five-story brick stairtower in the northeast corner provides communication from two sheet metal-clad elevated walkways with the 2nd, 3rd, and 4th floors of neighboring Building 7. Interior framing consists of a combination of built-up *I*-section and square-section wooden columns supporting a floor system of slow-burning plank on *I*-beams.

As originally built in 1909, this L-plan building comprised a two-story rear block and a single-story wing extending northerly. The rear, or main, block had five sawtooth roof structures aligned perpendicular to its east-west axis. In the mid-1920s French Worsted raised the north wing to match the 2-story height of the rear wing, built an elevator tower to provide communication with Building 7, added sawtooth structures to the new second floor, and reconfigured those on the rear block to their present-day north-facing alignment.

Window openings are rectangular with concrete lintel and sill; most are plywood filled. This building is currently vacant.

Building 9, Wool Storage Building (1911 et seq): Four years after the construction of Building 7 in 1909, French Worsted built an irregular *L*-plan, 175x125' overall, single-story, brick building for storage of raw wool. Between 1939 and 1950, the rear section of the building was raised to two stories. The roof is predominantly flat with a narrow shallow gabled section and is sheathed in synthetic membrane. Interior framing consists of a combination of built-up, *I*-section steel and square section timber columns supporting a floor system of *I*-beams, heavy timber and plank. The site of this building took advantage of its proximity to the NYNH&H railroad siding. The west wall runs adjacent to the siding and is punctured at regular intervals by rail shipping doors; these doors are no longer operational. The railroad siding appears to have been operational until the 1970s.

The original north (alley-facing) elevation of this building became an interior wall when French Worsted built the Dye House (Building 10) in 1920. Original segmental arch exterior windows on this wall are now filled.

The current tenant uses this building for machinery repair and storage.

Building 10, Dye House (1920): Built as a Dye House by French Worsted, a brick, 140x50', single-story building sited on the south side of the alley and east of the rail siding. There are two component parts to this building: a flat-roofed eastern section with two monitors running on an east-west alignment and a western section comprising two north-south aligned gambrel roofs with monitors perpendicular to those on the eastern section. A lean-to addition serving as a loading dock runs the length of the building. This addition partially encloses a series of original 3-light, rectangular wood frame windows on the north elevation of the eastern section. Two brick-trimmed oculus windows located at the north-facing gambrel ends are now filled. The roof is covered in asphalt and gravel. The building is a clear span; the gambrel roofs of the western section are framed in heavy timber.

This building served as a dye house from 1920 to 1954. Most of this building is now occupied by Leathertone, a light manufacturer. The vacant, west gambrel section contained remains of a concrete floor and cellar structure likely related to textile dyeing, recently demolished. The east gambrel section has a plain concrete floor and no evidence of any dyeing structures.

Building 11, Combing Building (ca 1923): A two-story, brick, 125x80' overall, irregular plan, pier and spandrel building constructed for the wool combing operations of French Worsted. This building occupies a triangular plot defined by Davison Street and the east wall of Building 7 (which it shares). The foundation is concrete. Segmental arch window openings are filled with T-1-11 panels. The sawtooth roof is sheathed in synthetic membrane. At the rear of the building portion of the ground floor wall of original wall has been replaced with modern concrete block. A Grease House (Building 15) extends from the south wall. This building houses an auxiliary boiler room for Northern Industries, an industrial tenant also leasing space in Building 7.

Building 12, Second Carpenter/Machine Shop and Storage Building (1923 et seq): Originally a single story, brick, 150x75', pier and spandrel building, French Worsted added a roughly 25' wing along the east wall between 1939 and 1950 to house a stockroom. The original section was built to house an expanded carpenter and machine shop to replace or supplement the shops in Building 6. The roof is flat with two sawtooth windows on the original section; glazed surfaces are now covered. The roof of the later storage addition has five vented steel skylights. Entrances are altered and of relatively modern construction. Although there are significant variations in the number of lights, typical woodframe paired windows set in rectangular openings are 9 or 12-light sashes with a pair of four-light transoms.

Both sections of this building are vacant.

Building 13, Infill and Soap House (between 1923 and 1939): The 180'-long alley separating Building 7 from Buildings 9 and 11 remained open until the early- to mid 20th century. At that time, most of the 20'-wide alley became an enclosed, high ceilinged chamber by creating beam seats in the facing brick walls of Buildings 7 and 9 and running *I*-beams across the span to support a planked roof structure. The south wall of the alley was bricked-in; a shipping door on the north wall provided access to the chamber. A departure from this common practice of industrial infill, however, was the creation of an elevated Soap House at the south end of the chamber. This brick, roughly 50x20' elevated room perched over the south end of the alley allowed passage of materials handling equipment or trucks to pass underneath. Strong, caustic soaps are used in the boiling and scouring of raw wool. It is possible that this chamber's suspension over the alley was intended for the draining and disposal of spent textile soap through the floor.

Ca 1950 at roughly the mid-point of the alley a ramp was dug out from the floor to allow trucks to back down the ramp to a concrete loading dock.

Building 14, Second Wool Store House (between 1924 and 1939): A simple, irregular plan, 100x110' overall, single-story brick building projecting from the rear wall of Building 8. The roof is flat and sheathed in synthetic membrane; the foundation is concrete. Three modern freight doors open onto an elevated ramp

Building 15, Grease House (between 1924 and 1930[8]): Attached to and extending from the south wall of the Combing Building (Building 10), French Worsted built a 45x16', single-story structure for the recovery of grease[9] derived from wool scouring. This is a simple, brick, flat-roofed structure with a raised, frame monitor.

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[8] Although a 1956 *Woonsocket Call* feature noting the fiftieth anniversary of French Worsted describes the installation in 1942 of a grease recovery plant, an octagonal tower or tank likely associated with some earlier form of grease recovery or disposal appears in a 1930 photograph. It should also be noted that the brick, segmental arch design of this building suggests an earlier construction around the time of the adjoining ca 1923 Combing Building (Building 11). An infill building in the rook of Building 11 also appears to have been associated with the disposal or recovery of grease. This building, attached to both Building 11 and the Grease House, was demolished along with the octagonal structure.

[9] Raw, unprocessed wool contains yolk (an oily fat secreted at the root of the wool fiber) and suint (dried perspiration). It is likely that the "grease" referenced in the name of this building was a lanolin-based emulsified waste product of the scouring that took place in the basement of neighboring Building 7. The prevailing technology at the time of French Worsted's grease recovery operation utilized centrifugal separators. A public auction notice for French Worsted published in the *Woonsocket Call* (15 November 1972) lists equipment that includes a "Sharples grease separator with two centrifuges." In the 1890s the Atlantic-Degras Company erected a building next to Providence Dyeing Bleaching and Calendering in the Olneyville section of Providence for the extraction of oils from wool scourings. These oils, valuable in the treatment of hides, were then sold to tanners and curriers. A 1982 resource recovery study describes the process as follows:

Segmental arch window and door openings have been altered. To the immediate east of this building is an octagonal concrete foundation for a tank or centrifuge associated with the grease recovery process. This structure and another nearby infill building were demolished after 1975. The building is now vacant.

Contributing Structures

Railroad siding elements (1906 et seq): Near the southwest corner of Building 14, the main line of the Providence and Worcester Railroad branches off at grade as a spur and runs along the west wall of Buildings 14, 9, 10, and 4. Several Building 9 freight doors at the level of the tracks and below grade were used for rail shipping. There are significant reinforced concrete remains of roughly 300' of the elevated section of this spur line. As originally built, the spur line terminated at the open coal pile that was replaced in the 1920s by the expansion of the original Boiler House. With the expansion of the Boiler House, a now bricked-in segmental arch opening permitted the discharge of coal from rail cars directly into the Boiler House. Original railroad ties and inclined passages to the freight doors of Building 9 remain but are deteriorated.

Overhead Walkway (between 1924 and 1930): Between 1924 and 1930 the French Worsted Co. erected a steel beam, enclosed elevated walkway to provide communication between the fourth floors of Buildings 3 and 7. This roughly 130' steel frame structure is sheathed in corrugated steel panels.

Boiler House Chimney (ca 1924): French Worsted expanded the original 1906 Boiler House (Building 4) in the mid-1920s with the installation of three additional boilers and a new roughly 200'-high brick chimney north of the addition. The 1906 chimney located in the alley to the immediate south of the original wing was demolished between 1939 and 1950.

Wool grease is removed from raw wool during initial wet scouring along with dirt, suint, and other natural impurities. Recovery of wool grease has been practiced for years because of its value in lanolin production.... The traditional method of wool grease recovery has been that of centrifugation. Source: *Industrial Resource Recovery Practice: Textile Mill Products Industries*, prepared for US EPA by Franklin Associates, Ltd. (June 1982). www.p2pays.org/ref/26/25037.pdf

Non-Contributing Building

Building 16, Warehouse (1966): A single-story extension from the south wall of Building 8. This 80'x 100' cement block structure has a concrete floor and steel frame roof structure supported by steel columns. A shipping dock and freight door open from the south elevation. This building is currently vacant.

Photographs

Photographer: Edward Connors
Negative stored at: RI Historical Preservation & Heritage Commission
150 Benefit Street, Providence, RI 02903
Date: August 2007

Photo #1: Building 2, Office (left) and Building 1, First Mill (right), looking north.

Photo #2: Building 2, Carpenter/Machine Shop (center, foreground), Building 3, Engine & Storehouse (right), and Overhead Walkway (top), looking west.

Photo #3: Building 11, Combing Mill (center) and Building 7, Second Mill (right), looking south.

Photo #4: Central Alley, looking east from the former rail siding. On the right, Building 10, Dye House (foreground), and Building 7, Second Mill (background). Overhead walkway (center). On the left, Building 4, Boiler House, and Building 6, Carpenter/Machine Shop (foreground) and Building 1, First Mill, and Building 3, Engine House (background).

Photo #5: Building 15, Grease House (center), Building 7, Second Mill (left), and Building 11, Combing Mill (right), looking west.

Photo #6: Building 10, Dye House, looking south.

Photo #7: Southern end of complex; Building 14, Second Wool Storehouse (left), Building 16, NC (center), and Building 7,Second Mill (right), looking north.

Photo #8: Building 1, First Mill, looking east.

SIGNIFICANCE

The French Worsted Company complex is the physical expression of sixty-five years of worsted spinning and finishing in Woonsocket, Rhode Island. Located in the Hamlet section of the city along the west bank of the Blackstone River, this company began operations in 1906, expanded through the 1920s, innovated to compete with Southern competition through the introduction of synthetic yarn manufacture in the 1950s, and failed in 1969. Rhode Island, home to early experimentation in worsted yarn manufacture, emerged as a national leader in woolen and worsted production in the last half of the 19th century. The "French system" mills of Woonsocket represented a huge early 20th-century investment of European capital in worsted spinning. Similar to the fortunes of the state's cotton spinning and weaving trade, the rise of southern competition and unionism in the 1920s contributed to the decline of the local woolen and worsted industry. Thus, the French Worsted Company Complex exemplifies the rise and decline of Rhode Island's woolen and worsted industry in general and that of the heady years of European investment in Woonsocket worsted spinning in particular.

The Hamlet Mill

The French Worsted Company site on the Blackstone River has seen industrial activity since the early 19th century. The layout of the Blackstone Canal from Worcester to Providence in the 1820s not only served the needs of interior transportation; the system of canals and the natural run of the river provided entrepreneurs with numerous mill privileges typically exploited during the canal period (1826–1848) for textile manufacture. Among the investors who took advantage of the canal infrastructure to establish a mill privilege in 1825–1826 for textile manufacture was Edward Carrington, one of the principals of the canal company. Carrington and his agent, Stephen Smith, operated a cotton mill at this location until 1842. Power for the Hamlet Mill required a dam[10] on the Blackstone and a long headrace from a point about a half-mile upstream of the French Worsted site.[11] As it evolved through several owners in the 19th century, the mill complex came to include two main buildings and two long masonry rowhouses of worker housing to the northwest of the Hamlet Mill in the area now associated with French Worsted.[12]

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[10] This valuable privilege provided 9.5' of head and a potential of 400 HP.

[11] This headrace ran parallel to the Blackstone by way of the Hamlet Trench, which the City of Woonsocket drained after 1965. A land depression across Davison (formerly Mill) Street east of French Worsted marks the site of the former trench. One building of the Hamlet Mill complex survived until about 1965.

[12] A halftone of the early worker housing at the Hamlet Mill was printed along with the article, "A New Era Dawning for Hamlet," *Providence Sunday Journal* (18 March 1906): S3, p. 7. One unit of the Hamlet worker housing was located in the vicinity of the present-day parking lot east of the former French Worsted office building (Building 2), extending into the area now occupied by the Second Carpenter and Machine Shop (Building 12). The other unit extended southerly from

The French mills of Woonsocket

In 1906 Charles Tiberghien, president of Charles Tiberghien and Sons, Turcoing, France, purchased a six-acre parcel from the then-owners of the Hamlet Mill property for the construction of a substantial worsted yarn spinning and finishing mill. The establishment of an American branch of this European company in Woonsocket at the turn of the century was due in no small measure to the efforts of future Rhode Island Governor Aram Pothier.

Aram Pothier, who emigrated from Quebec in 1870 as a teen, learned English and found employment at the Woonsocket Institution for Savings by 1875. By the mid 1880s he had begun a long career in politics that took him from Woonsocket Education Commissioner (1885), to Mayor (1894), Lieutenant Governor (1897), and Governor (1908–1915 and 1925–1928). His combination of financial acumen, political savvy, and fluency in French had a profound influence on the Rhode Island textile trade in the early 20th century.

Representing the State of Rhode Island at the Paris Exhibition in 1889, Pothier journeyed to the cities of Turcoing and Roubaix in the northwest of France, the center of French woolen and worsted production, and to Verviers[13], Belgium, to market the benefits of setting up shop in Woonsocket. Pothier's message was simple: establishing manufacturing plants in the United States bypassed the recently introduced McKinley Tariff[14]; Woonsocket had an educated French-speaking workforce with little history of trade unionism; and the Woonsocket city government was willing to offer substantial tax incentives for textile investors.

Pothier's plan was successful. By 1900 massive French textile investment had begun to flow in Woonsocket, municipal incentives assuring the integration of French-speaking management, French worsted yarn spinning technology, and a Francophone workforce. Pothier noted in 1900 that "...these capitalists decided to locate in

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the rear wall of the Sorting House (Building 8). Both buildings were intact in 1911 and demolished by 1939, some of the foundations clearly visible in a September 1939 aerial photo (RI Statewide Planning). The worker housing site in the asphalted area south of Building 8 appears relatively undisturbed and has the potential to yield archaeological information about the lifeways of the Hamlet workers.

[13] Although technically unrelated to French investment in Woonsocket, Pothier's first notable success in attracting European interest to Woonsocket, was the emigration of Joseph and Theophile Guerin, trained in the woolen and worsted plants of Verviers, Belgium. Although they brought little or no capital with them in the early 1890s, the Guerin Spinning Company interests eventually flourished over the next four decades, comprising numerous spinning, weaving, and finishing operations in the Woonsocket area.

[14] This tariff introduced by then-Senator William McKinley and enacted in 1890 exceeded 48% on some imports. This was the most onerous protective tariff in American history.

our State because of our liberal laws, of the conservatism of our population, and of the many other advantages offered."[15]

From the 1890s to the early 1920s, Woonsocket welcomed the Guerin Spinning Mills (1895), Lafayette Worsted (1899), French Worsted (1906), Jules Desurmont Worsted Company (1907), and the Verdun Mill (1922), an aggregate investment of $6 million.[16]

The French Worsted Company

Charles Tiberghien and Sons operated a massive 26-acre plant in Turcoing, France, providing employment to 3,000 operatives in their spinning, combing, weaving[17], dyeing, bleaching, and finishing plants for woolen, worsted, and other textiles. The Tiberghiens' interest in setting up an overseas operation was not out of character; the company had textile operations in Austria and Czechoslovakia as well as investments in maritime shipping.[18] Before the establishment of French Worsted, the Tiberghiens exported about $500,000 in finished goods to the United States.

In late 1904 Tiberghien and his son Charles Jr. visited the United States to investigate possible sites for setting up a spinning, finishing, and weaving plant. These sites included Paterson, New Jersey; Fall River, Massachusetts; and other cities, including Woonsocket. The Tiberghiens considered two sites in Woonsocket, withdrawing from consideration a 2nd ward location because of "grasping" land and water privilege owners.[19] Through the efforts of Pothier, the Woonsocket Common Council in 1905 offered the Tiberghiens a ten-year exemption from taxes. Although an undeveloped site in the east end of town owned by the Hamlet Textile Company was of interest to the company, the company initially declined because of the relatively high price of the land ($50,000). Once again, through Pothier's intervention, the tax exemption was increased to fifteen years and the Tiberghiens selected the Hamlet site for a two-phase, $400,000 investment that would eventually comprise New England's largest worsted spinning, finishing, and weaving plant. An April newspaper article trumpeted Woonsocket's good fortune and ambitions:

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[15] *Paris Exhibition: Report of the Rhode Island Commissioner* (1900), pp. 39-40.
[16] Pothier served as treasurer and/or secretary for Alsace Worsted, Guerin Spinning, Montrose Weaving (all related to the Guerin interests), Jules Desurmont Company, and the French Worsted Company.
[17] Although the Tiberghiens originally planned a weaving plant in the second phase of their American investment, none materialized.
[18] These maritime investments included several ships plying the waters from France to Argentina, Australia, and the United States. Source: *Board of Trade Journal* 18 (April 06): 158.
[19] "A New Era Dawning for Hamlet," *Providence Sunday Journal* (18 March 1906): S3, p. 7.

> Already with the decision of the Tiberghiens to locate in Woonsocket, other manufacturers are considering the advisability of locating there, and the dream of a greater Woonsocket that will include even more diversified industries than at present, and that will be noted throughout the world for its worsted yarns, bids fair to be realized. The Tiberghien plant promises to be the biggest plant in New England, and it will add to the reputation Woonsocket has for this product.[20]

Shortly after the Tiberghiens made their decision, they contracted with local Woonsocket architect Walter Fontaine for plans. In 1905 the investors sent Fontaine to Turcoing to work out the design for the first phase of construction with his French counterparts. Work commenced on the Hamlet site in April 1906. Excavation and foundation concrete work on Buildings 1-6 was completed by August of that year. The first phase of construction centered on a five-story brick mill (Building 1). Initially, this mill would house the wool preparation and spinning operations. Raw wool and finished yarn were stored on the ground floor. An adjoining Boiler House (Building 4) with five boilers provided steam to the neighboring Engine House (Building 3) which provided mechanical power to Building 1 through a ropeway on the south wall of the building. This ropeway represented the last phase of mechanical power transmission even as Rhode Island factories were beginning to install direct electrical drive.[21] A small Dynamo Room (Building 5) generated electricity for the plant's illumination. This first phase of construction was completed with an ornate, mansard Office Building (Building 2) and a combined Carpenter/Machine Shop (Building 6).

With a staff of 200 operatives, Mill No. 1 spun its first bobbin of worsted yarn in mid-1907. Originally intended for fine women's wear, this high-quality "French system" worsted yarn eventually came to be commonly used in men's wear as well. Although this system of yarn spinning had been introduced in Woonsocket a decade earlier by the Guerin interests, French Worsted commenced the production of this product on a massive scale. The French system differs from the English or "Bradford" system in a number of ways, the most significant of which involves the sorting of raw wool fibers by fineness, as opposed to length. The end product is an exceptionally smooth and high-grade worsted fabric. By the fall of 1908 French Worsted was having difficulty finding enough operatives for its workload.

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[20] "Woonsocket's Industrial Boom." *Board of Trade Journal* 18 (April 1906): 158.

[21] Although there are no surviving artifacts of this early system in Building 1, the pavilion on the north wall of Building 7 appears to have been the location of another ropeway serving that building. Some ceiling-mounted pulleys with now-truncated shafts survive in that building. It should be noted that the earliest forms of electrical drive represented transitional technologies. In some cases, large DC motors drove existing portions of line shafting. An example of this transitional technology survives at the main erection room of the Providence Steel and Iron plant (1904), Kinsley Avenue, Providence.

In 1909 French Worsted contracted with the J.W. Bishop Company for the construction of three more buildings: a 5-story mill building for scouring, combing, drawing and merino spinning (Building 7); a single-story Sorting Building (Building 8); and a Store House for raw wool (Building 9). This second phase was completed by 1911; by this time the workforce numbered 400.

In a company retrospective written in 1998, former French Worsted President Luc Tiberghien pointed out that despite the early volume of work, the company did not begin to show a profit until the time of the First World War. A significant increase in capitalization and physical expansion of the plant took place in the 1920s[22], beginning with the construction of single-story brick Dye House (Building 10) in 1920. This was soon followed by a separate two-story Combing[23] Building (Building 11) set off from Building 7, and an expanded Second Carpenter/Machine Shop (Building 12). By mid-decade, French Worsted also raised all of Building 8 and a portion of Building 9 to two stories and doubled the size and capacity of the original Boiler House.

With profitability came the first signs of labor strife. Responding to a strike in the early 1920s, the parent company sent Alphonse Tiberghien from France to reopen the factory with strikebreakers, refusing entry to the premises for any leaders of the strike. French Worsted avoided unionization until the early years of the Depression, a difficult period for the Woonsocket textile industry. By the early 1930s fourteen major mills had closed. In the general climate of New Deal-era encouragement of collective bargaining, the Industrial Trades Union (ITU) was formed in 1931. Although southern competition was affecting all of Woonsocket's textile mills, French Worsted remained in operation through the years of the Great Depression, signing a contract in 1938 with the ITU.

Once the United States entered WWII, war production kept the nation's factories busy. French Worsted operated three shifts, employing 900 workers. During wartime, the company installed a new scouring and grease recovery plant. In the immediate post-war years, the company entered a ten-year, $7 million modernization program that included revamping of the drawing and combing departments and replacement of the older French spinning mules with Whitin spinning frames, an investment that allowed the company to manufacture yarn spun on the French or English system.

A general downturn in the wool market in the late 1940s exacerbated by the outbreak of the Korean War in 1950 ushered in a period of economic difficulty for French Worsted. Other market forces included increased

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[22] The original $400,000 capitalization of the company was augmented to $1 million in 1918 and $2 million in 1922. Source: Luc Tiberghien, *The French Worsted Company* (1998).

[23] This process was originally carried out in Building 7. The combing functions of Building 11 appear to have been supplemental to those of Building 7. The 1950 Sanborn Map continues to show a combing operation on the first floor of the 1909 mill.

competition from Southern woolen and worsted manufacturers, greater volume of imports, and the significant inroads of synthetic yarns into the knitting field. These factors contributed to a general decline in sales, culminating in what Luc Tiberghien called a "very poor year" in 1954.

Despite Tiberghien's introduction of synthetic yarn manufacture in 1954, the company continued to struggle. A public celebration of French Worsted's 50th anniversary in Woonsocket was highlighted in a special 16-page section of the *Woonsocket Call* in October 1956. Hailing the modernization plan, labor and management expressed hope that Woonsocket's second largest employer would survive in a very different economic climate than that of 1906.

A little more than two years later, French Worsted merged with Dauray Textiles, another Rhode Island-based firm. The Tiberghien family remained active in the new administrative structure. Labor difficulties and weak market conditions persisted in the merger years, culminating in two October 1966 dynamite blasts that idled the plant for a month, causing severe damage to the structure and machinery on the fourth floors of Buildings 1 and 7.[24] The company filed for bankruptcy in December 1969 and although a business called French Worsted continued to use a small portion of the complex for "novelty twisting," the company that had played such a dominant role in the economic life of Woonsocket in the 20th century closed its doors in the early 1970s.

Recent History

As is common in the re-use of massive, multi-story textile plants, beginning in the 1970s, the French Worsted facility was leased out to numerous light manufacturing, warehousing and commercial interests. The plant, partially occupied at the time of this writing, is currently under consideration for large-scale rehabilitation and conversion to mixed uses that include residential.

Architecture

The French Worsted Mill provides useful examples of several important 20th-century industrial building types. Buildings 1 and 7 are typical textile mills of their period: plain, wide, brick buildings, of pier and spandrel construction, with slow-burn frames, stair towers, flat roofs, and segmental arch windows. Buildings 3 and 4 are useful examples of powerhouses, with their clear span, high ceiling ground floors.

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[24] "Violent blasts close French Worsted plant." *Woonsocket Call* (17 October 1966): 13. Despite rewards offered and the administration of lie detector tests, the origin of these blasts was never determined. Additional labor actions included a wildcat strike in August 1967 and a walkout of 75 spinners in March 1968.

Overall, the French Worsted Mill illustrates a pattern of growth and expansion typical of textile mills of the period. The primary building is constructed at the streetline and is the public face of the complex, its small office building providing the managerial center. As expansion occurred, additional buildings were added behind and around the major buildings, here (as at other mills) leaving an open "yard" in the middle of the complex. Eventually the mill yard itself was built upon, the space between buildings roofed over, a pattern seen often on constricted urban sites. At French Worsted, the yard is reduced to a narrow alley between the two sections of the complex.

Period of Significance

The period of significance (1909-c1930) is defined as the span of time during which the various elements of the district were constructed. It is possible that two minor but contributing structures (Buildings 13 and 14) were built as late as 1939; these are identified in the inventory as "between 1923 and 1939," reflecting that their specific dates are not known but that there is certainty about the range. If their precise dates are later found and are discovered to be later than 1930, the period of significance should be extended to encompass the construction dates of these buildings.

The c1930 end date for the period of significance reflects the general understanding of the significance of the textile and worsted industries in Woonsocket. While French Worsted did not close during the 1930s, its production was much reduced during this period of general debility for the industry. The increase in production during World War II was only a temporary change in the common pattern of reduced production, merger, bankruptcy, and closing.

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Plat of Land in Woonsocket, Rhode Island, conveyed by Hamlet Textile Company to the French Worsted Company. Surveyed and platted by W.H.G. Temple (March 1906).
On file, Woonsocket City Clerk's office.

Drainage Plan for French Worsted Company. Fontaine and Kinnicut, architects (12 October 1906).
On file, Woonsocket City Engineer's office.

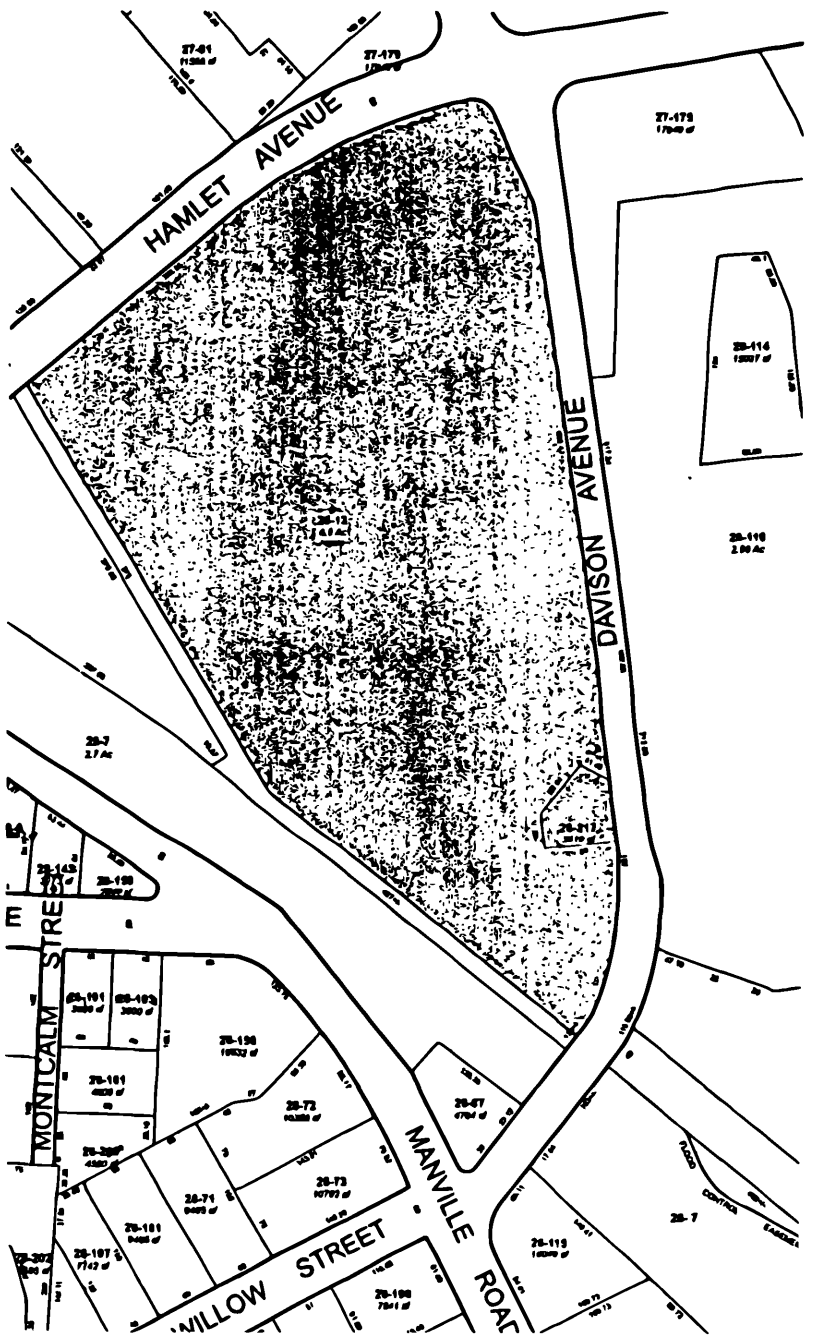
GEOGRAPHICAL DATA

Boundary Description

The boundaries of the French Worsted Company Mill Historic District are contiguous with those of Woonsocket Tax Assessor's Plat 28, Lots 12 and 217.

Boundary Justification

These boundaries, comprising about 6.7 acres, define the land historically associated with the operation of the French Worsted Company from 1906 to 1969.



Additional Information

Rope transmission was a significant feature of the French Worsted Company's development in Woonsocket. Unfortunately, there is little surviving physical evidence of the rope power transmission system built at the French Worsted plant. Nevertheless, the embrace of this technology by the French parent company and by architect Walter Fontaine is significant, and later investigation may suggest additional areas of significance for the mill.

Around the year 1900 industrial engineers were developing new technologies for the transmission of power in American industrial buildings. The predominant form of power transmission in the 19th century was belting and shafting driven by waterpower or steam engines. Although much innovation centered on the introduction of electrical power, the American Manufacturing Company of Brooklyn, NY, a manufacturer of rope and cordage since about 1890, began promoting the use of rope as a means of power transmission instead of leather belting. AMC actively promoted this new power technology through a book entitled *A Little Blue Book on Rope Transmission*. Over time the title was simplified to *The Blue Book of Rope Transmission* and reprinted several times until at least 1918.

Rope transmission represents the last phase of improvement of mechanical power generated at a single point and transmitted throughout a manufacturing plant by purely mechanical means. Even as French Worsted installed this complex system in 1906, transitional electrical power systems were being installed in Rhode Island industrial buildings. Notable among these were the plants of Beaman and Smith (1899), Providence Steel and Iron (1904), and electrification of the mid-19th-century plant of the Rhode Island Malleable Iron Works. Many of these early electrical systems were transitional in the sense that they combined direct-drive motors attached to machinery with some residual use of local belting and shafting driven by electrical motors.

Walter James and M.C. Mackenzie's *Principles of Mechanism* (New York: John Wiley and Sons, 1918) based much of their chapter on rope power transmission on AMC's *Blue Book.* The following excerpt from James and Mackenzie describes the benefits of rope drive and an explanation of two types. At the time of this writing, it is not known whether French Worsted installed a drive system of the English (multiple ropes) type or the American (single rope) type.

Rope Driving

The transmission of power by means of ropes did not come into general use until a comparatively few years ago. At the present time, however, ropes have, in many instances, taken the place of belts and gears for heavy drives in grain elevators, steel mills, and textile mills.

The following discussion consists largely of condensed extracts from *The Blue Book of Rope Transmission,* published by the American Manufacturing Company, of Brooklyn, N. Y., and the illustrations are reproduced from that publication.

Some of the advantages claimed for rope drives are as follows:

The Distance and Direction in which Power may be Transmitted is Practically Unlimited. Satisfactory driving may be done where the distance between shafts is as great as 175 ft., without the aid of carrying pulleys, while, with such carriers, the distance may be prolonged almost indefinitely. On the other hand, successful driving can be done with ropes where the shafts are close together. There are in operation many drives whose sheaves are but 10 ft., or even less, center to center. Where shafts are neither in the same line nor plane, by properly placed guide sheaves power may be transmitted around corners from one building to another, and, in short, between any two shafts in whatever relative position they may be placed.

2. *The Amount of Power which may be Transmitted is also Practically Unlimited.* There are many drives in this country which are transmitting from 3000 to 4000 H.P. with perfect satisfaction.

3. *Economy in First Cost and Maintenance.* In drives of 200 H.P. and up, and where the shafts are more than 30 ft. center to center, the cost as compared with belts will vary from 15 to 50 per cent in favor of ropes, according to the distance and size of drive. This advantage increases rapidly as the distance apart of shafts and amount of power transmitted increase.

The, small cost of maintenance of a rope drive is a strong point in its favor. The average life of rope on a properly designed drive is from eight to ten years.

4. *Economy of Space.* The width of rim surface required in rope drives is only from one-half to two-thirds that required for belting, varying with the size of rope used. It follows, therefore, that the supporting bearings may be placed nearer together for a rope than for a belt drive.

5. *Positive and Steady Running.* The elasticity of the rope, its light weight, and slackness between pulleys take up inequalities in power and load.

6. *Rope Drives are Noiseless.* This fact is due to the flexibility and lubrication of the rope, and the air passage in the groove, between it and the sheaves.

7. *No Electrical Disturbance is Produced.* This is an advantage particularly noted in textile mills, where such disturbances, caused by belts, are the greatest source of annoyance.

8. *Precise Alignment of Shafting not Necessary.* When shafts are at an angle with each other, in the same or a different plane, by properly placed guide pulleys power may be transmitted by ropes to great advantage. And where shafting supposed to be parallel has, for one reason or another, been placed at an angle, unless the imperfection is too pronounced,

the rope will follow the grooves of the sheave, even without the use of an idler.

9. *No Loss by Slipping.* In properly designed rope drives, where diameters of the pulleys are sufficiently large and the angle of groove correctly turned, loss of power by slipping becomes so infinitesimal that no allowance should be made when calculating the speed for the driven shaft.

10. *Transmitting Power to Different Floors.* Where power is to be carried to several floor of a mill, rope-driving again stands forth prominently. The full number of ropes start from the driving pulley, while the number required for each different shaft are easily dropped off at the several floors.

11. *Future Additions to Power.* It has become in this country almost a universal custom, in the erection of new mills, to provide for increase of plant. In rope-driving this provision is readily made by installing sheaves with extra grooves, and adding new ropes when additional power is required.

Systems of Rope Driving

There are two distinct systems of rope-driving, the *multiple,* or, as it is popularly known, *English* system, and the *continuous,* or *American* system. Each of these has its advantages, depending upon the conditions under which it is used.

The Multiple System (Fig. 81) is the simpler, consisting of one or more independent ropes running side by side in the grooves of the pulleys. This system is especially adapted to the transmission of large powers, and gives the very best results for drives protected from the weather, where the shafts are parallel or very nearly so. With this system, the drive has the utmost security against breakdowns, because of the extreme unlikelihood of more than one rope giving way at the same time. When a failure does occur, the individual rope may be removed and repaired at some convenient opportunity, the delay from such failure being slight, if any. Further, power may be more easily carried to the different floors of a mill; the amount of power transmitted may be more readily increased by the addition of new ropes; the rope always bending in the same direction has a longer lease of life than the Continuous System; and finally, it is cheaper to install.

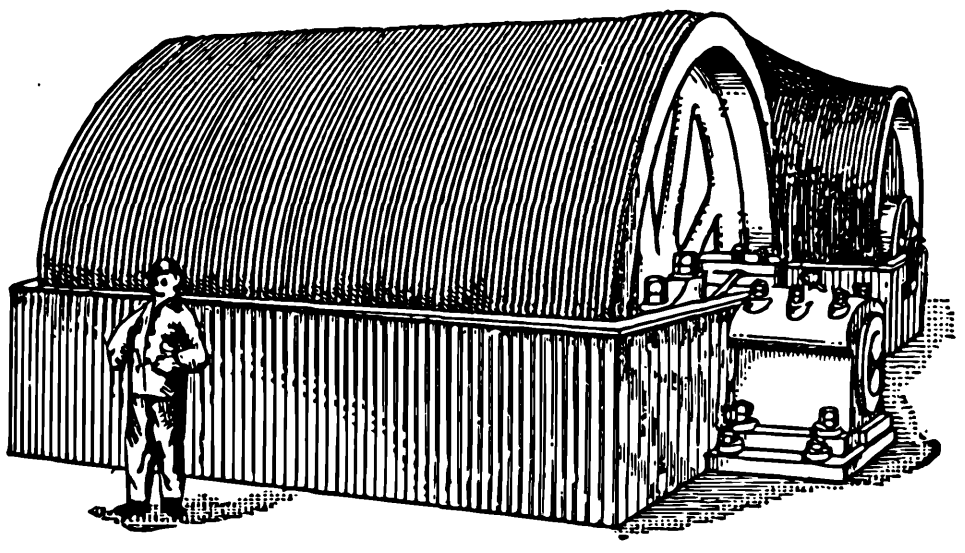


FIG. 81.

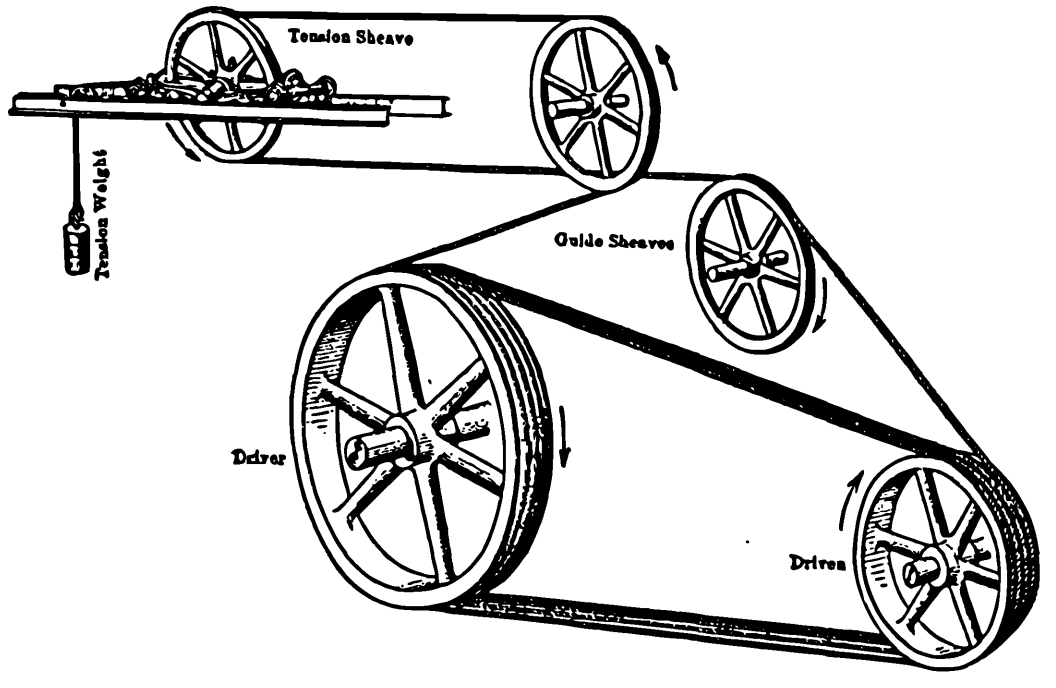


FIG. 82.

In the *Continuous System* (Fig. 82) one rope is wound around the driving and driven sheaves several times. With this system it is necessary by some device to conduct the rope from an outside groove of the delivering, to the opposite outside groove of the receiving pulley, this transfer being accomplished by means of a traveling tension carriage whose office is to produce a uniform tension throughout the rope, and is so arranged as to travel back and forth, automatically regulating the slack which may occur from stretch in rope, inequalities of load, etc.

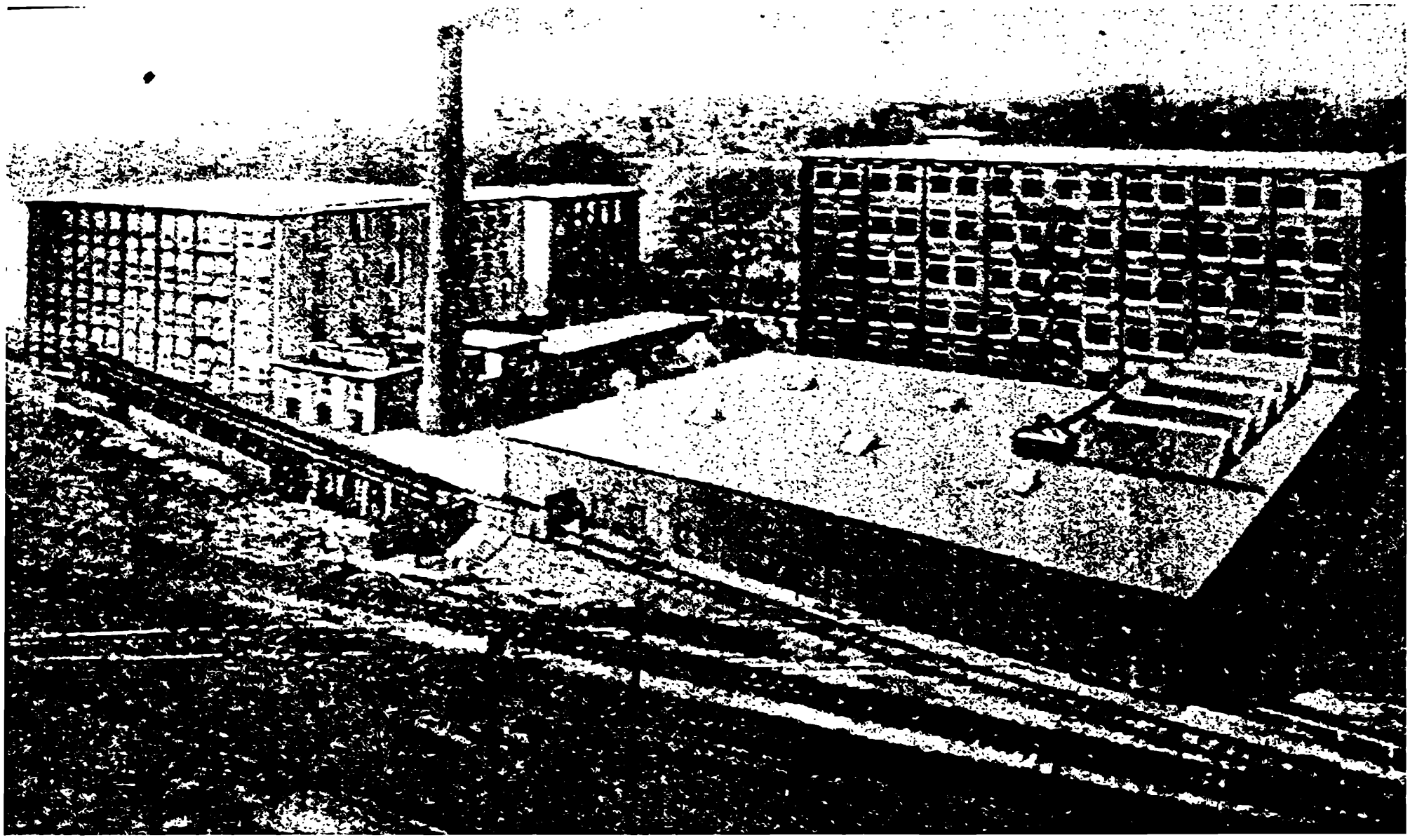


Figure 1
ca 1924 halftone reproduced from *Davison's Textile Blue Book* (1928 edition)

This view from the early 1920s in the *Blue Book* shows the plant as it appeared before the mid-1920s expansion.

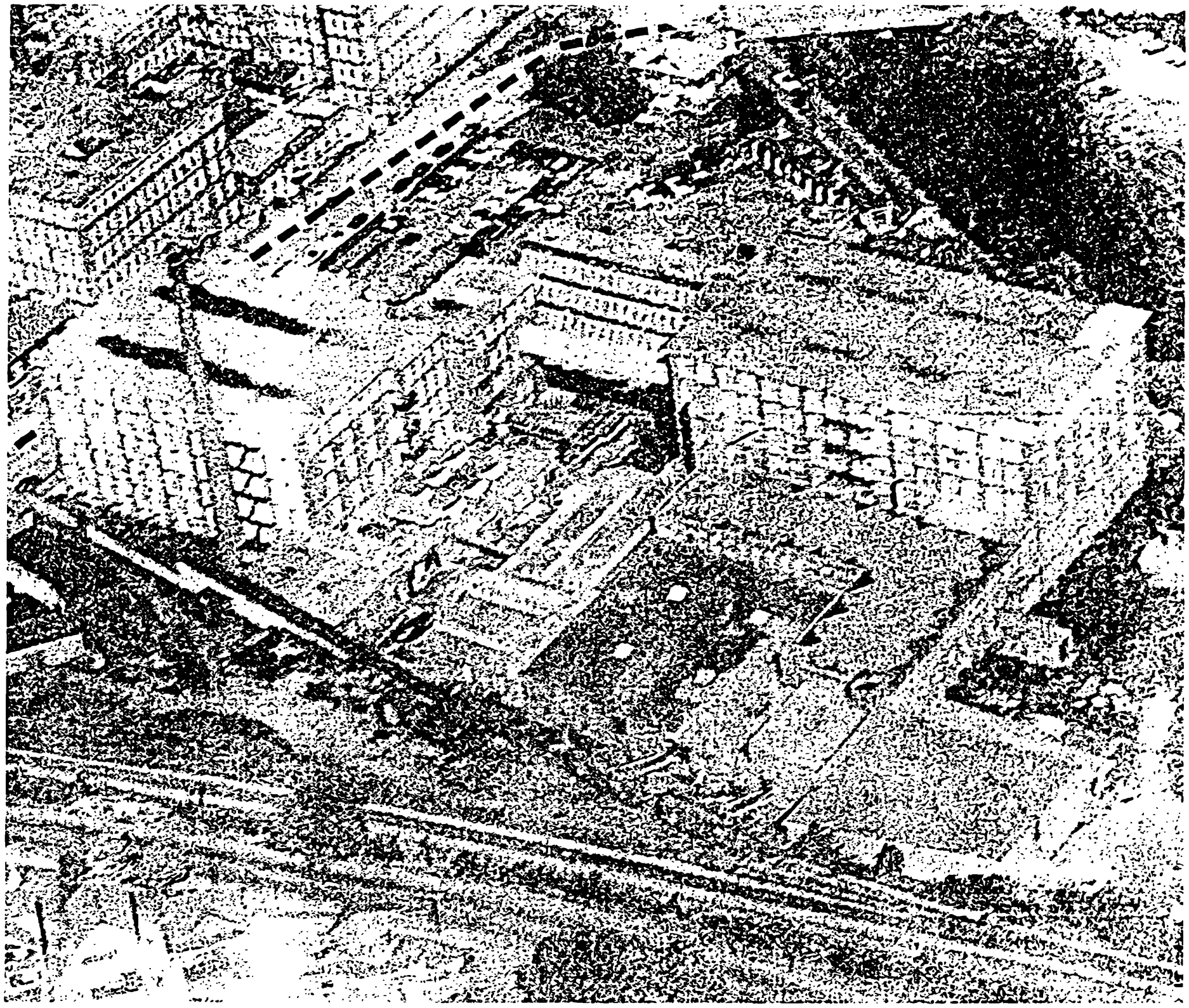
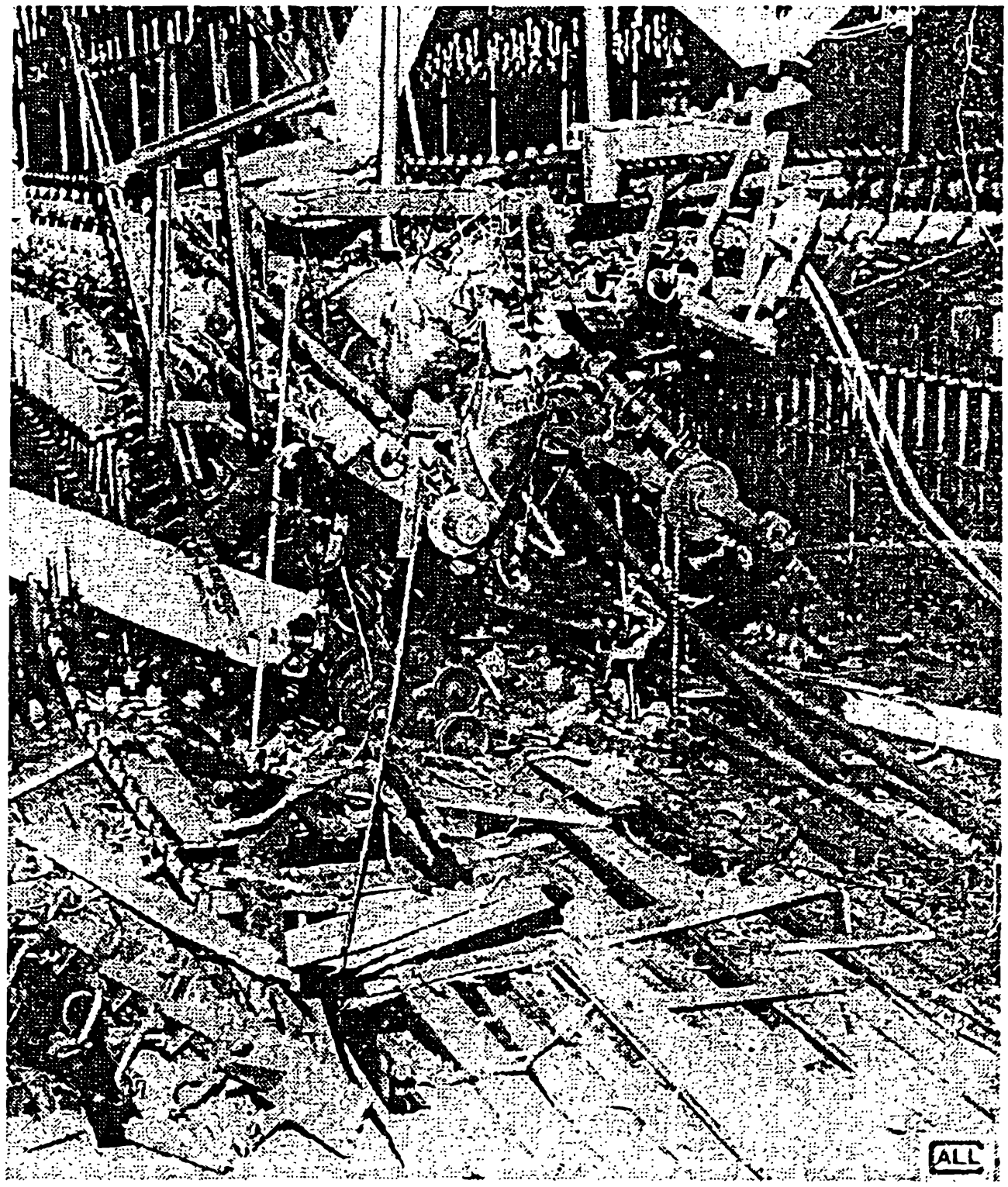


Figure 2
ca 1950 halftone showing plant at its fullest expansion



WRECKED SPINNING FRAME

. . . This machine, located in the rear section of the French Worsted plant, was one of several wrecked by explosion.

Figure 3
Halftone from *Woonsocket Call*
after the October 16, 1966 bombing of Buildings 1 and 7

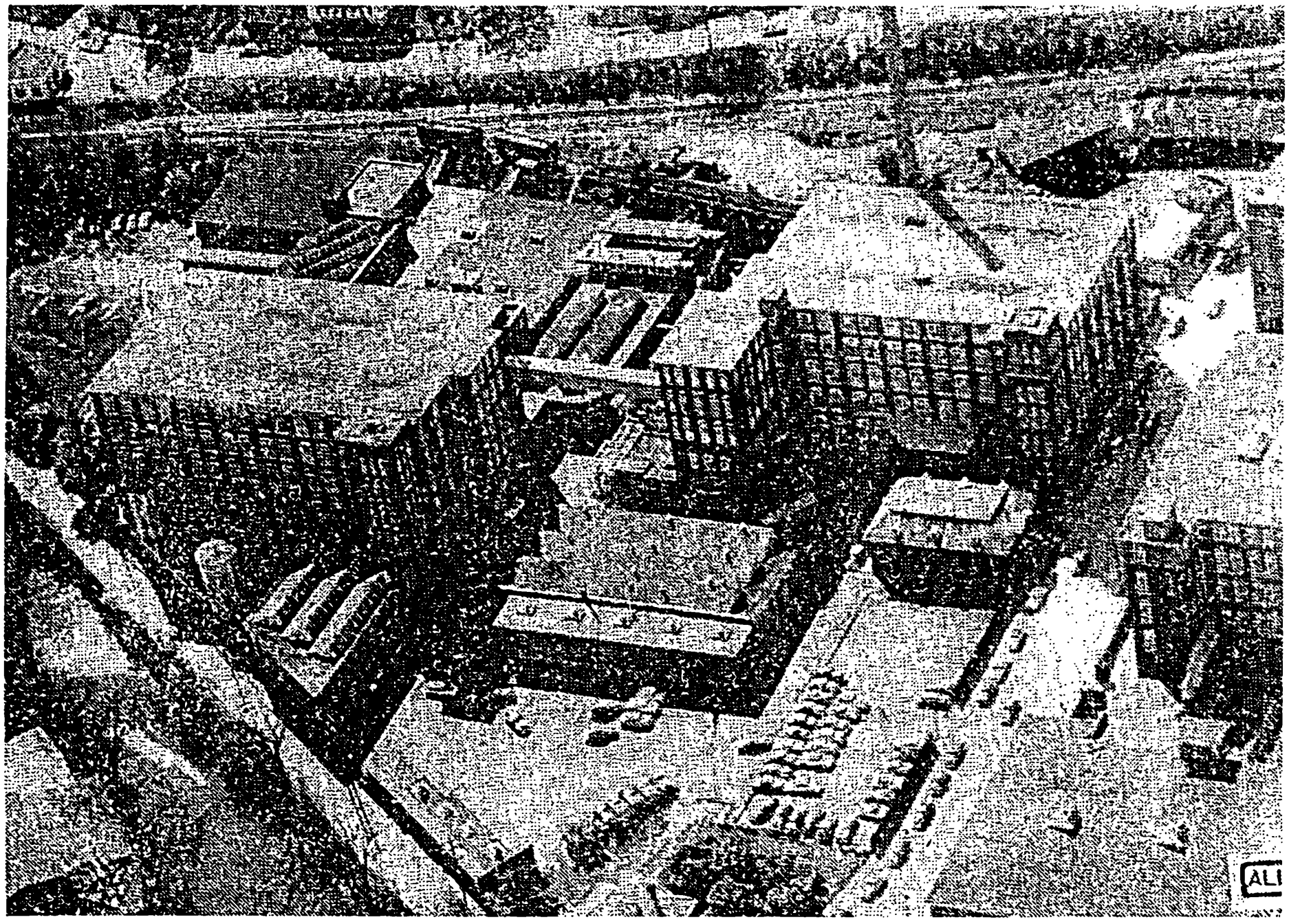


Figure 4
ca 1975 halftone showing the complex as viewed from the east
Note octagonal grease recovery tank in lower left along Davison Street.

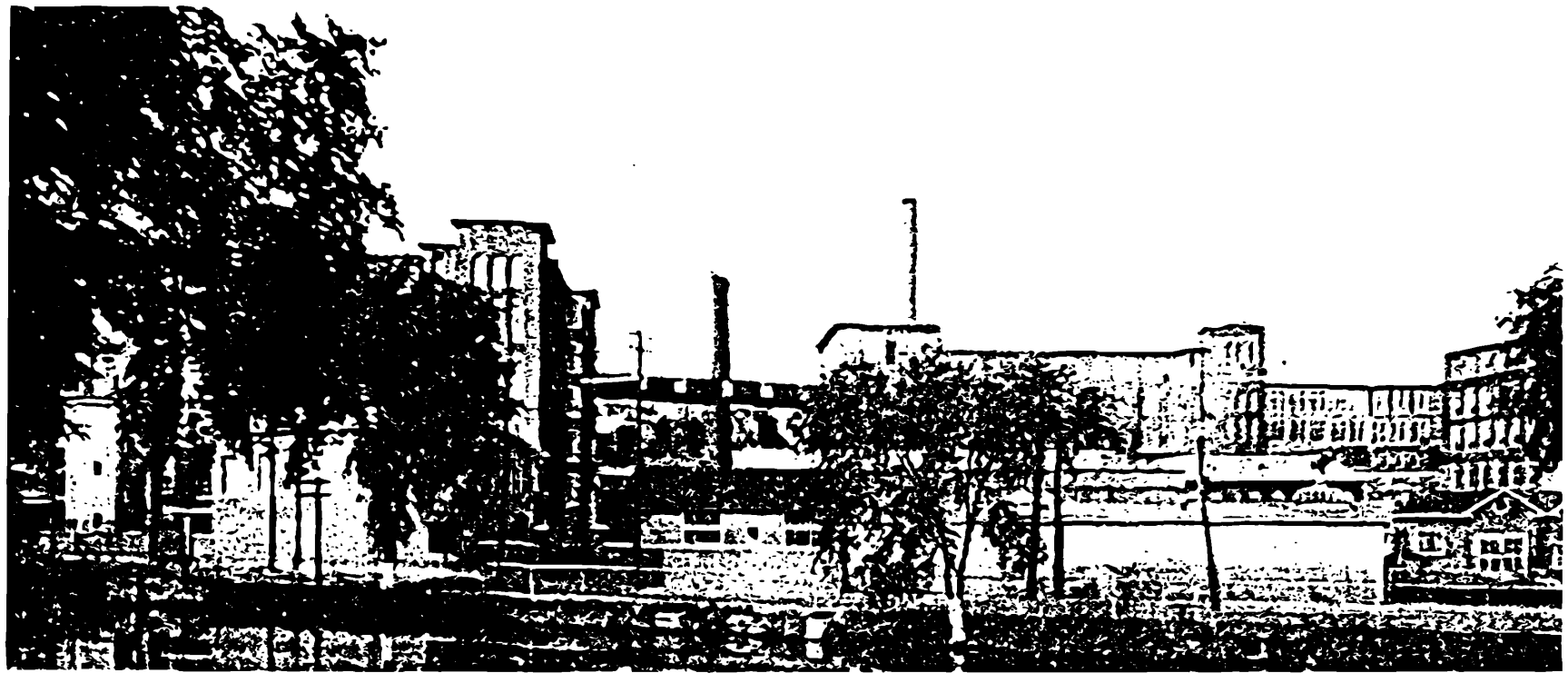
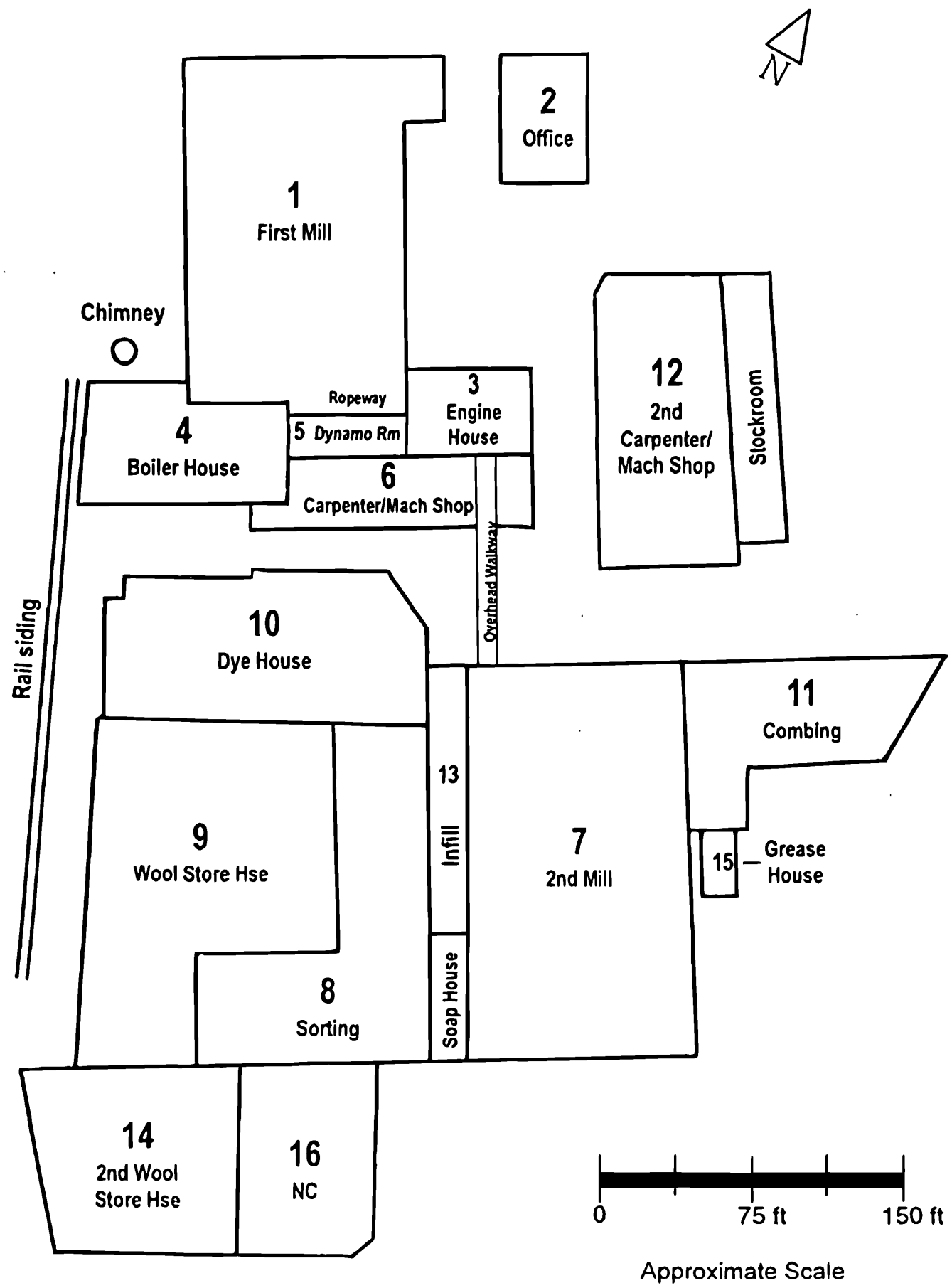


Figure 5
1930 view to the west from the Blackstone River

Building Key
French Worsted Company



Site Plan
French Worsted Company