

CONNECTING TERMINAL ELEVATOR  
100 Furhmann Blvd.  
Buffalo  
Erie County  
New York

HAER No NY-245

HAER  
NY  
15-BUF  
29-

PHOTOGRAPHS  
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
National Park Service  
U.S. Department of The Interior  
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HISTORIC AMERICAN ENGINEERING RECORD

CONNECTING TERMINAL ELEVATOR  
HAER No. NY-245

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NY  
15-BUF  
29-

Location: 100 Fuhrmann Blvd., Buffalo, Erie County, New York

Date: Mainhouse: application for building permit filed  
May 25, 1914; approved June 2, 1914; completed  
Spring, 1915  
Annex: building permit application April 13, 1954;  
approved August 4, 1954

Designer: Mainhouse: H. R. Wait, Monarch Engineering  
Annex: George B. Field or Theodore Green, Jr.

Builder: Mainhouse: Monarch Engineering, Buffalo  
Annex: Hydro Construction Company, Buffalo

Status: Derelict

Significance: The grain elevators of Buffalo comprise the most  
outstanding collection of extant grain elevators  
in the United States, and collectively represent  
the variety of construction materials, building  
forms, and technological innovations that  
revolutionized the handling of grain in this  
country.

Project  
Information: The documentation of Buffalo's grain elevators was  
prepared by the Historic American Engineering  
Record (HAER), National Park Service, in 1990 and  
1991. The project was co-sponsored by the  
Industrial Heritage Committee, Inc., of Buffalo,  
Lorraine Pierro, President, with the cooperation  
of The Pillsbury Company, Mark Norton, Plant  
Manager, Walter Dutka, Senior Mechanical Engineer,  
and with the valuable assistance of Henry Baxter,  
Henry Wollenberg, and Jerry Malloy. The HAER  
documentation was prepared under the supervision  
of Robert Kapsch, Chief, HABS/HAER, and Eric  
DeLony, Chief and Principal Architect, HAER. The  
project was managed by Robbyn Jackson, Architect,  
HAER, and the team consisted of: Craig Strong,  
Supervising Architect; Todd Croteau, Christopher  
Payne, Patricia Reese, architects; Thomas Leary,  
Supervising Historian; John Healey, and Elizabeth  
Sholes, historians. Large-format photography was  
done by Jet Lowe, HAER photographer.

Historians: Thomas E. Leary, John R. Healey, Elizabeth C.  
Sholes, 1990-1991

This is one in a series of HAER reports for the Buffalo Grain Elevator Project. HAER No. NY-239, "Buffalo Grain Elevators," contains an overview history of the elevators. The following elevators have separate reports:

NY-240 Great Northern Elevator  
NY-241 Standard Elevator  
NY-242 Wollenberg Grain & Seed Elevator  
NY-243 Concrete-Central Elevator  
NY-244 Washburn Crosby Elevator  
NY-245 Connecting Terminal Elevator  
NY-246 Spencer Kellogg Elevator  
NY-247 Cooperative Grange League Federation  
NY-248 Electric Elevator  
NY-249 American Elevator  
NY-250 Perot Elevator  
NY-251 Lake & Rail Elevator  
NY-252 Marine "A" Elevator  
NY-253 Superior Elevator  
NY-254 Saskatchewan Cooperative Elevator  
NY-256 Urban Elevator  
NY-257 H-O Oats Elevator  
NY-258 Kreiner Malting Elevator  
NY-259 Meyer Malting Elevator  
NY-260 Eastern States Elevator

In addition, the Appendix of HAER No. NY-239 contains brief notations on the following elevators:

Buffalo Cereal Elevator  
Cloverleaf Milling Co. Elevator  
Dakota Elevator  
Dellwood Elevator  
Great Eastern Elevator  
Iron Elevator  
John Kam Malting Elevator  
Monarch Elevator  
Pratt Foods Elevator  
Ralston Purina Elevator  
Riverside Malting Elevator

The Connecting Terminal Elevator occupies a waterfront site on the west side of the Buffalo Ship Canal immediately upstream of its confluence with the Buffalo River. The previous wood Connecting Terminal Elevator was completely destroyed by fire on March 9, 1914. The owner, the Pennsylvania Railroad Company, immediately commissioned a new concrete elevator to replace the structure, and within the year a new facility at the port was receiving grain. The contract was awarded to the Buffalo-based Monarch Engineering Company, and was built to the design of its chief engineer, H. R. Wait.

The elevator was the precursor of a series of standard Wait-designed structures, including the entire Concrete-Central complex and the first two phases of the Superior Elevator, with later derivative forms including the annexes to the American and Perot elevators. The Connecting Terminal Elevator building is 223' x 66' and is of the full basement type with the bins supported on a full bin slab. The building permit was filed in 1914, and the structure was completed by late winter of the next year, receiving its first boat in February of 1915. The construction cost was \$227,000, or 21 cents per bushel of storage. The basement works were constructed by conventional fixed form techniques, and the bins were built by slip form methods, presumably by the threaded jacking rod system used by the Monarch Company. Structural steel work and plaster walls were used above the bin floor.<sup>1</sup>

The elevator had a capacity of 1,048,000 bushels stored in three parallel rows of ten cylindrical bins. The main bins were approximately 20' in inner diameter and rose 90' above the bin slab. They enclosed two rows of nine interspace bins. Additionally, the elevator featured thirty outerspace "pocket bins" placed between the external walls of the main bins. The outer wall of these bins was convex and one-third the circumference of the main bins. The main bins had a capacity of 25,000 bushels, the interspace bins 11,000-12,000 bushels and the outerspace bins 4,000 bushels. The main bin at the northeast corner of the complex was horizontally sub-divided for shipping by boat, the first known instance of such horizontal subdivision of a concrete bin in Buffalo. The main bins were connected both longitudinally and laterally by link walls. Connecting Terminal was the first concrete elevator in Buffalo to use such an arrangement in an attempt to expand the storage volume of both outer- and interspace bins. The precise dimensioning and reinforcing arrangements of the bins are unknown, though they are assumed to have been very similar to those of Superior "A" Elevator.

Hoppering was provided by an inclined mortar slab placed on

slag concrete poured on top of the bin slab. Draw-off was provided by small conical steel hoppers resting within the bin slab. The bins were supported on a full bin slab which in turn was supported by square basement pillars, providing a full basement height of 15'. The pillar heads broadened in an inverted pyramid form. The outer rows of pillars were rectangular and had bracketed heads. Four pillars were spaced equidistantly below every main bin. The outer pillars were below the intersection of the main and outerspace bin walls. The exterior basement wall was formed of panels of rusticated concrete block infilling between the outer row of pillars. Connecting Terminal was the last Buffalo elevator to show such elaboration in the detailing of the basement walling. An elongated window extended the full width of the top half of each panel. The pillars rose from a foundation slab supported on wooden piling.

Unlike other representatives of Wait's early work, the bin floor was apparently of concrete rather than book tile. The concrete was supported in the usual manner by transverse I-beams which were raised with the forms and supported the working floor during construction. A single-story gallery of structural steel with a reinforced concrete roof extended across the full width of the structure. A workhouse of structural steel with plaster walls and concrete roof was placed above the bins toward the northern end of the structure. It rose to 182' above grade. As originally built, the workhouse had three bays and accommodated three elevator legs and sets of weighing equipment. An additional bay was added on the southern end of the structure to accommodate another lofting leg. The date of this addition is not known, though it may date from the addition of the second marine tower.

The original elevator was only equipped with one marine tower built by the Monarch Company. It was moveable along tracks that extended the length of the elevator. The structure was 159' high and was of structural steel clad in corrugated iron. A second marine tower of the same pattern as the first was added at a later date. A double-track railroad shed of structural steel and corrugated iron abutted the northwest side of the elevator, below the workhouse. A personnel lift tower of steel and corrugated iron was placed on the south elevation and rose slightly above gallery level. Little development took place at the site until after World War II. In 1950 a 60' drier tower of structural steel clad in corrugated iron was added to the north of the elevator.

The most significant addition to the complex occurred in 1954 with the construction of an annex south of the existing elevator. The annex measured 159'-4" x 66'-4" and was slightly separated from the mainhouse, but the gallery bridged the two structures. The annex is of interest not only as the last

elevator to be built in Buffalo, but also as the city's only representative of the tunnel type elevator. The design, although retrograde by having more in common with small "country" elevators than large "terminal elevators," represented a continuum of design practice dating back to Haglin's pioneering structures. The building was constructed by the Hydro Construction Company of Buffalo possibly to the design of George B. Field. The building permit was approved in 1954. The estimated cost of construction was \$400,000 or 60 cents per bushel of capacity. Such a figure indicated a substantial post-war increase in construction costs, especially considering the simplicity and economy of the design and the absence of headworks.

The elevator had a capacity of 600,000 bushels stored in two parallel rows of five cylindrical bins of an interior diameter of 30', and a single row of four interspace bins. There were no outerspace bins. Although the original plans show bin walls rose to a height of 100' above the foundation slab, as constructed the walls rose to 109' to provide a bin floor that was level with that of the original elevator.

The bins were in tangential contact in both directions, the tangential thickening extending for 4' either side of the bin center lines. The bin wall thickness was only 6", with a minimum thickness of 8" at the tangential contact. The vertical bin wall reinforcing was comprised of jacking rods of intermediate grade new billet and 1-1/16" in diameter. Sixteen jacking rods were arranged equidistantly about the circumference of the bin, on 6' centers such that a jacking rod was placed at every tangential contact. They were supplemented by ordinary verticals of unknown dimension. Two ordinary verticals were placed between the jacking rods in the external wall in all contact thickenings, while only one such vertical was required in the internal walling. The verticals were located in the middle of the bin wall.

The horizontal reinforcement was comprised of graduated round rods at a regular coursing interval of 8". The courses of rod diminished from fifty-nine at the foundation slab to twenty at the top of the wall. The horizontals were tied to the inside of the verticals, an arrangement found at no other Buffalo elevator.

The bin walls rose directly from a 20" reinforced concrete foundation slab. No basement was provided, the bin bottom hopping being placed directly on the foundation slab. The hopping was comprised of 4" slabs of inclined reinforced concrete resting on foundry sand, the hopping extending across the width of the bin. The bins discharged via centrally placed steel spouts in the foundation slab to the sub-surface longitudinal conveyor tunnels that laid beneath the foundation

slab and extended along the full length of the elevator.

There were two such tunnels below the center line of each row of bins. The tunnels were 7' x 9' and rose from a 14" tunnel slab. The structure of the tunnel was integral to that of the foundation slab. The foundation slab and tunnel were supported by 500 wooden piles 10" in diameter. The piles were arranged in the ring configuration typical of this style of elevator construction. In addition to the ring of piles below the bin walls, piles were also placed along the line of the vertical wall of the conveyor tunnels. These piles extended for 3' within the tunnel walls.

The bin floor was of monolithic concrete and followed the line of the bins. A single-story structural steel gallery with corrugated iron walls and a concrete roof covered most of the bin floor. The marine tower tracks did not extend along the waterside length of the structure as no spouting arrangements were provided in the gallery. The final addition to the complex occurred in 1957, when a railroad car dumper was installed to the southwest of the new annex. The dumper was accommodated in a structural steel and corrugated iron shed. To facilitate the lofting of the grain from the dumper a workhouse of structural steel was built above the gallery in the southwest corner of the annex. The workhouse rose to 175' above grade.

#### BUSINESS HISTORY

The Connecting Terminal Grain Elevator located in Buffalo at the mouth of the Buffalo River has had a long, complex history as a business enterprise. The extant facility is actually the second elevator built on the site by the Connecting Terminal Railroad, the first, wooden elevator "A", having burned March 9, 1914.<sup>2</sup>

The elevator fire excited notice in local newspapers, in part because the absentee owners did not immediately appear to assess the damage and make plans for rebuilding. With Connecting Terminal "A" gone, there were not enough elevators on the city's waterfront to handle the massive grain load bound for the Buffalo port.<sup>3</sup> At the time of the fire, the elevator's parent company, CTRR, was based in Philadelphia with offices at the North Street Station. The company had originally been incorporated in New York City on June 7, 1881, in order to control .31 mile of terminal railway and 2.60 miles of siding in Buffalo.

Although its earliest corporate history is not entirely clear, records indicate that CTRR was relatively autonomous and

locally directed in Buffalo. By 1892, however, much of the control had been shifted to owners and directors from both New York state (New York City and Buffalo) and Pennsylvania (primarily Philadelphia). CTRR was closely interlocked with a myriad of other rail lines, but whether it was owned by any other line in its earliest days cannot be ascertained from public documents.<sup>4</sup>

In 1895 directors from New York, Buffalo, and other cities interlocked CTRR with many other competing lines. In the years before the Sherman Antitrust laws became enforced and before the 1914 Clayton Act outlawed interlocking directorates, intimate relations between and among theoretically competing businesses were common. Such collusive arrangements made joint ownership unnecessary because companies quite openly fixed prices, delegated market shares, and controlled services with complete disregard for competition and public well-being.

The two lines most closely affiliated with CTRR were the Western New York & Pennsylvania Railroad (WNY&PRR), which acquired CTRR, and the Pennsylvania Railroad (PRR), which acquired WNY&PRR and thereby assumed control over the Buffalo line as well. In the mid to late 1890s, some of the top railroad men in America served as CTRR directors, making it of considerable importance to large business interests.

Between 1895 and 1900 the lines with the strongest ties to CTRR included WNY&PRR, Erie & Western Transportation (E&WT), and the Pennsylvania and Delaware railroads. Directors included WNY&PRR President William H. Barnes, (Mr.) Joan K. Barclay, Albert J. County, later PRR vice president, and George E. Bartol, also a director of Girard National Bank, a primary capital source for Connecting Terminal and the Pennsylvania Railroad. John Pugh Green, a director in 1895 of both CTRR and the Delaware Railroad, was later president of the WNY&PRR. Lewis Neilson was then Secretary of WNY&PRR and later director of 112 corporations controlled by the Pennsylvania Railroad. Isaac Seligman, a prosperous Wall Street financier, was on the Connecting Terminal board of directors as well as the board of WNY&PRR. E&WT director Frank Firth was also on the CTRR board, with only one local director left in the 1890s, Pascal Paoli Pratt, founder of Buffalo's Pratt & Letchworth Saddlery Hardware Company and a director of Buffalo's Manufacturers & Traders Bank.<sup>5</sup>

The transformations in direct ownership are not recorded in public records, but it appears that after a decade or so of independence, CTRR had established strong ownership links with Erie & Western Transportation. E&WT owned 378 shares of Connecting Terminal as of May 17, 1892, and was a signatory to CTRR mortgages as well as an underwriter of the requisite

collateral secured with E&WT bonds.<sup>6</sup> By 1907 Connecting Terminal was clearly a WNY&PRR subsidiary that had been absorbed by the powerful Pennsylvania Railroad. Full surrender of CTRR capital stock to PRR did not occur until 1931, when a formal transaction changed a legal lease arrangement between WNY&PRR and Connecting Terminal. The legal fiction of WNY&PRR as leasing the right of way from Connecting Terminal was abandoned since the latter was a wholly-owned subsidiary of WNY&PRR and both were under the thumb of the Pennsylvania Railroad.<sup>7</sup>

By 1914, when the elevator fire occurred and CTRR finally sought to rebuild the waterfront facility, it did so on behalf of the Pennsylvania Railroad. The deed of conveyance of the property upon which the new concrete, fireproof elevator would be constructed notes that Connecting Terminal, WNY&PRR, and the PRR were all equal in ownership of the property; in actual fact the elevator and the connecting rail lines were to be run fully on behalf of the giant railroad concern from that date forward.<sup>8</sup> The railroad ran the elevator until 1925, when it relinquished daily management and operations to a new company, the Lake Elevator Corporation. This company was a partnership between Armour Grain Company, a subsidiary of the giant Chicago meatpacking concern, and the local Buffalo grain trading firm, Eastern Grain Mill & Elevator Company. Lake Elevator thereby briefly established local control, if not ownership, over Connecting Terminal Elevator.<sup>9</sup>

By 1931 the Armour and Eastern Grain interests had lost interest in the facility and relinquished management control to the Connecting Terminal Railroad. Connecting Terminal Elevator was then leased to Atlas Grain Elevator Corporation, while the rail line and warehouse rights were once again "leased" to CTRR's parent, the Pennsylvania Railroad. Atlas Grain was itself a subsidiary of Van Dusen, Harrington Inc., a Minneapolis grain house. Van Dusen had acquired King Midas and several other grain and milling concerns, the former of which was a leader in durum milling which served the baking trade and domestic markets. In 1928 both partners died, and the company was taken over by the giant grain conglomerate, F.H. Peavey & Company.<sup>10</sup>

The Pennsylvania Railroad never relinquished its formal ownership over the property, even as direct, day-to-day operations changed hands. During World War II, the elevator was taken over by the Superior Grain Corporation, another large Buffalo grain trading and elevator company. Superior took full advantage of the Connecting Terminal's substantial capacity. In 1941 the pressure to move grain eastward for export to allied powers embroiled in the war led the government to convey ten million bushels to Buffalo elevators until it could be shipped to

eastern ports. Superior Grain was well-placed to handle substantial portions of that consignment. After the war, Superior was equally ready for the bounteous post-war crop yields of 1946 and 1948, the two largest shipments received in Buffalo since the 1920s. Superior Grain received these and successive Commodity Credit Corporation storage receipts until it relinquished control over Connecting Terminal Elevator in the early 1950s.<sup>11</sup>

Superior Grain was succeeded briefly by Connecting Grain Terminal Corporation, a local incarnation headed by Everett Flinchbaugh, a Buffalo grain trader and president of the Buffalo Corn Exchange. Unlike other companies, Connecting Grain Terminal Corporation had briefly acquired a partial ownership interest, not just a lease, in the elevator itself in 1951. The joint venture with the Pennsylvania Railroad did not survive, however. By 1959 Connecting Terminal Elevator was again the sole property of the railroad and was leased to General Grain Corporation, an Indianapolis firm. Its management subsidiary handling daily operations was known as Buffalo Terminal Elevator, Inc. General Grain promised to bring grain supplies to Buffalo that previously had been shipped elsewhere, but its enthusiasm was not matched by grain receipts, and it vacated the lease in the early 1960s.<sup>12</sup>

In 1963 Continental Grain Corporation, one of the five largest international grain marketing companies, acquired the lease from Pennsylvania Railroad. General Grain's failure had caused Connecting Terminal Elevator to close for a period of time, but Continental revived the facility. As Superior Grain had attempted to do just after World War II, Continental proposed to use Connecting Terminal Elevator to warehouse massive grain holdings destined for export by the government. Continental's plans were short-lived, however, as all terminal elevators closed in quick succession when Buffalo lost its preferential rail rates connecting the city to eastern ports. In 1965 Continental canceled its lease on Connecting Terminal.<sup>13</sup>

In 1954 the Pennsylvania and its subsidiary, WNY&PRR, agreed to form a non-operating real estate holding company known as PennDel ("Pennsylvania Development") Company. The property ownership was thus submerged in a more complicated set of relationships that increasingly distanced the railroad from actual operations and rendered the elevator a mere "cash cow" for the company rather than an active productive property.<sup>14</sup>

By the 1960s, the Pennsylvania Railroad was in bankruptcy with its passenger operations absorbed by the newly-formed government rail company, Amtrak, and its rail equipment maintained by another government agency, Conrail. Pennsylvania's

property development arm survived, however. Penndel continued to own the Buffalo elevator and adjoining tracks and their rights of way. The elevator, which remained idle after Continental Grain withdrew, became something of a white elephant for Penndel; it was not until 1979 that the railroad development company finally sold the now-derelict elevator to Jeffrey Davis and John Edwards of the Buffalo River Marina for \$50,000. Penndel reserved the trackage and "appurtenances thereto" and the right to enter the premises to remove rails for scrap.<sup>15</sup>

The property was renovated as a shoreline docking facility, but efforts to rehabilitate the elevator came to nothing. The owners developed substantial mortgage costs but not much else, and in 1991 came within three days of losing the entire property to their primary backer, M & T Bank of Buffalo, the successor to Manufacturers and Traders which had business links to the elevator at the turn of the century. In April, 1991, Buffalo engineer Harold Gantzer purchased the entire property for a reported \$1.2 million. He moved immediately to secure the grain elevator and to upgrade the riverbank docking facilities. His goal is to convert the draughty grain elevator into housing, and he has contracted to begin some preliminary renovations.<sup>16</sup> Because the elevator is one of the most visible on Buffalo's waterfront and one with a remarkable history tied to the fortunes of some of the world's most important transport and grain merchant operations, local preservationists hope that such renovation can preserve the structure as a reminder of the glory that once was Buffalo.

## MATERIALS HANDLING: HISTORY AND DESCRIPTION

In March of 1914 an overnight fire consumed the Connecting Terminal Elevator "A", one of the largest wooden granaries on the waterfront with a storage capacity of 950,000-1,000,000 bushels.<sup>17</sup> Built in 1882, its machinery had been designed by the eminent elevator engineer, Robert Dunbar. Among the elevator's features was an early version of a steam-powered movable marine tower; according to Dunbar's own account, this leg could travel an overall distance of 18' along the dock to facilitate the unloading of larger vessels.<sup>18</sup>

After the debris from the conflagration had been cleared away, the task of rebuilding Elevator "A" with fireproof materials commenced on April 28, 1914.<sup>19</sup> The advantages of the site included the nearby tracks of the Pennsylvania railroad with accommodations for 200 cars and a convenient dock location at the juncture of the City Ship Canal and Buffalo River near the harbor entrance that was more accessible than locations further upstream. Monarch Engineering Company of Buffalo designed a reinforced concrete storage facility with a raised basement; the workhouse framework was structural steel with reinforced concrete floors and roof as well as non-combustible plaster walls.

Storage capacity aggregated 1,048,000 bushels, and equipment was provided for receiving grain by water or rail and for deliveries to boats and cars. Original operations were powered throughout by a dozen individual General Electric motors. The first grain shipment was received on February 4, 1915. However, an imbalance in the respective capacities of the receiving and shipping machinery rendered it impossible to take grain into the elevator as rapidly as it could be loaded out. In 1954 storage capacity was expanded by 600,000 bushels in an annex south of the 1915 structure. Hydro Construction Company of Buffalo designed and built the addition.

Connecting Terminal was disemboweled during the early 1980s in the course of an abortive adaptive reuse project.<sup>20</sup> The marine towers, headhouse and track sheds are no longer extant, and other machinery has also been scrapped. A few V-spouts still stand amid the ruins of the conveyor gallery over the storage bins. Among Buffalo's principal surviving steel or concrete waterfront transfer elevators (as distinguished from houses serving adjacent processing facilities) are Concrete-Central, Superior, Marine "A", Standard, Great Northern and Saskatchewan (Pool). This site and the Pool have suffered most from disuse and demolition.

### Receiving by Water

As of 1915 grain was unloaded from lake vessels through a single marine tower, self-propelled and mounted on the ordinary sets of car wheels used for this purpose. A second tower, projected to possess equivalent capacity, had been placed in service by 1917. The original tower contained a marine leg rated at 24,000 bu./hr., upper and lower garner (presumably of 1,000-bushel capacity each), a 400-bushel receiving scale and a 24,000 bu./hr. marine lofter leg that re-elevated instore grain to the exterior V-spouts for further distribution within the elevator proper.

It may be assumed that machinery arrangements within the marine towers were comparable to those at the Monarch-designed Superior and Concrete-Central elevators dating from the same period.<sup>21</sup> In those instances the marine leg was driven from a motor mounted at the crosshead while other functions, including the leg pusher, hoist winch and ship shovels, received power from a motor located on the first floor of the tower through a series of rope drives and geared connections. The motor for the marine lofter was situated at the bin floor level of each tower with power transmission to the head pulley via rope drive and pinion reduction gearing. The marine towers at Connecting Terminal may also have featured the same kind of dump tank provided at Superior for diverting elevated grain back to the bottom of the marine lofter.

Though activation of a second marine leg should theoretically have doubled receiving rates to a maximum of 48,000 bu./hr., in fact this anticipated level of performance never materialized, perhaps due to constraints associated with the number of instore conveyors or their carrying capacity. Actual vessel unloading rates appear to have averaged 25,000-35,000 bu./hr. from the 1920s through the mid-1930s. The dock itself was reinforced with sheet piling in 1939.<sup>22</sup> During the late 1950s, some upgrading of the machinery in the marine receiving sequence may have occurred along with the expansion of storage capacity.

### Receiving by Rail

Originally, cars could be unloaded in a two-track shed located on the west (lake) side of the elevator adjacent to the workhouse. Arriving boxcars were spotted by a car puller (also used in the shipping process) over a single receiving pit, equipped with the requisite power shovels that were used by their operators to scoop out the contents. Grain from the car pit was subsequently elevated by a short jack leg and then spouted to the

boot of one of the main house lofters for elevation to the apex of the headhouse, where weighing and instore distribution followed. The initial rail receiving rate was 8,000 bu./hr., equivalent to emptying an average of two boxcars every hour.

As part of an expansion program that preceded the opening of the St. Lawrence Seaway, the Connecting Terminal Elevator Corp. Division of Harper Feed & Grain installed a car dumper of undetermined type and capacity in 1957.<sup>23</sup> The dumper operated in conjunction with an additional lofter leg of undetermined capacity and a secondary workhouse located at the south end of the 1954 storage annex. The dumper permitted cars to be unloaded more rapidly than could be accomplished through the car pit. This equipment is no longer extant.

#### Instore Distribution: Vertical and Horizontal Handling

Grain unloaded from vessels and elevated through the marine towers could be spouted directly from the V-hoppers atop the building to certain storage bins without halting the machinery in order to shift the towers along the dock. Alternatively, marine receipts could be transferred via turnheads and portable belt loaders to a pair of conveyors running longitudinally through a gallery or cupola over the bin floor; these belts carried instore grain to bins beyond the reach of direct spouting from the marine towers. The bin floor belts, of undetermined width, each had a rated carrying capacity of 20,000 bu./hr. As of 1915, all the conveying machinery in Connecting Terminal had been supplied by the Webster Mfg. Co. of Tiffin, Ohio.

Grain arriving via rail was elevated by the house lofters, each rated at 15,000 bu./hr. There were originally two such legs in the working-house; a third apparently was added during the same period as the second marine tower. Instore grain was discharged at the head pulley into 2,000-bushel upper garners and then into 2,000-bushel hopper scales for weighing. The Fairbanks scales were of the trussed lever variety. As in the case of the contemporary Superior and Concrete-Central headhouses, grain exiting the scales was presumably channeled via turnhead to a series of distributing hoppers--each scale had a set of four such boxes situated below--for subsequent spouting to bins or belts.

Since the upper belt galleries of the 1915 and 1954 sections were connected by bridges at the bin floor level, we may presume that grain unloaded from vessels could be conveyed to the annex for storage while receipts via the car dumper could similarly reach the bins of the original elevator. Whether the bin floor belts ran continuously through both sections is undetermined, through there was no observable change in level that would have

required the use of jack legs comparable to the situation at Lake & Rail or American. The capacity of the house lofters may also have been improved during the 1950s.

#### Grain Conditioning and Dust Control

As of 1915 Connecting Terminal was equipped with a pair of cone-type Monitor aspirating separators for cleaning grain; each machine had an nominal hourly capacity of 5,000 bushels. A 1,500 bu./hr. Randolph gas-fired drier was subsequently installed in a structure adjoining the north end of the elevator. Improvements or repairs to the drier may have been undertaken in 1950. The original dust collecting system was furnished by the H. A. Day Company of Minneapolis; floor sweepers delivered dust and dirt from all portions of the structure to a collector for spouting to the ground floor and subsequent bagging. The nature of any improvements or extensions to the dust control system remain undetermined.

#### Shipping by Water and Rail

Original plans contemplated deliveries of grain from Connecting Terminal to canal barges, boats working the Montreal route, local wagons and rail cars. To aid in extracting shipments from storage, two conveyors ran beneath the bins at a maximum rate of 15,000 bu./hr. These belts carried grain to the boots of the house legs for re-elevation and outstore weighing. Approximately half the storage bins could also spout grain directly to the lofters without using the lower belts.

After passing through the garner-scale sets in the headhouse, shipments were presumably directed to the proper route for loading out by the distributing boxes previously mentioned. There were also two shipping belts in the 1954 annex. However, due to a structural change in the design of the storage facility, these belts ran through tunnels rather than a raised basement; the exact nature of the linkage between the outstore horizontal materials-handling equipment in the two sections remains undetermined.

Grain was delivered to vessels from a horizontally-subdivided bin via a single dock spout at the north end of the elevator; the nominal marine loading rate was 30,000 bu./hr., but the average in actual practice was nearer 15,000-25,000 bu./hr. Rail cars were loaded at a maximum rate of twenty per hour through two spouts descending to the tracks in the car shed. The addition of a third house lofting leg made it possible to temporarily claim a (theoretical) 50 percent increase in rail

shipping rates from 200 cars every ten hours to 300. Throughout the 1920s and early 1930s, rail loading was conducted at rates of 24,000-30,000 bu./hr., but, by 1938, carloading had fallen back to the original level of twenty per hour; rates declined to twelve per hour immediately after World War II. After construction of the annex, cars continued to be loaded in the original track shed with the addition of a spout from the bin floor of the 1954 structure for outstore shipments through the auxiliary (south) workhouse. Upgrades during the last decade of Connecting Terminal's operation, from the mid-1950s to the mid-1960s, apparently restored the twenty cars per hour rate.

ENDNOTES

1. The following paragraphs are based on information from several sources including city building permits and plans filed in Buffalo City Hall; Northwestern Miller 103 (21 July 1915): 155; The American Elevator and Grain Trade 34 (15 August 1915): 92.
2. Northwestern Miller 103 (21 July 1915): 155; Buffalo Commercial (10 March 1914): 18; Buffalo Courier 10 March 1914, p. 1.
3. Buffalo Express (10 March 1914), 1, 7; 11 March 1914, 7; Moody's Industrials, 1919.
4. Erie County Clerk (ECC), Corporations, Connecting Terminal Railroad, Box 4100, Consent to Mortgage, May 17, 1892; ECC, Mortgages, Liber 383, May 1, 1883, 406-75; Moody's Transportation, 1912. Early records indicate that CTRR was a relatively autonomous railroad company locally controlled in Buffalo. All Erie County Clerk documents are listed by date of document origin, not by date of filing, unless otherwise noted.
5. Who Was Who, Vol. 1, parts 1, 2- Vol. 5; Buffalo City Directory, 1892-1900; Who Was Who in New York, 1907, 1909, 1929.
6. ECC, Corporations, Connecting Terminal Railroad, Box 4100, Consent to Mortgage, May 17, 1892; ECC, Mortgages, Liber 326, July 1, 1892, 15-58.
7. Who Was Who, Vol. 1, parts 1,2- Vol. 5; Who Was Who in New York, 1907; ECC, Corporations, Box 15349, Certificate of Surrender of Capital Stock, May 26, 1931. The 1907 WWWWNY reference for board director Seligman notes his tie to WNY&PRR, "now a part of the Pennsylvania Railroad System."
8. ECC, Deeds, Liber 1239, December 24, 1910, 1.
9. Buffalo Express, 21 October 1925, p. 4.
10. Moody's Industrials, 1931; Herman Steen, Flour Milling in America (Minneapolis, MN: T. S. Denison & Company, Inc., 1963), 279-80.
11. Buffalo Courier-Express, 19 October 1948, p. 13 and 25 May 1941, p. 2; Buffalo & Erie County Public Library (BECPL), Scrapbook, "Buffalo Industry," Vol. 13, 234.
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14. ECC, Corporations, Western New York & Pennsylvania Railway, Box 15349, Merger, October 15, 1954.
15. ECC, Deeds, Liber 8781, February 26, 1979, 162-67.
16. Buffalo News, 24 July 1991, p. C-7.
17. For accounts of the fire see Buffalo Commercial, 10 March 1914, p. 18; Buffalo Courier, 10 March 1914, p. 1; Buffalo Express, 10 March 1914, p. 1; Buffalo Times, 10 March 1914, p. 1; Buffalo Evening News, 10 March 1914, p. 15; Buffalo Express, 11 March 1914, p. 7.
18. H. Perry Smith, ed., History of the City of Buffalo and Erie County, vol. II (Syracuse: D. Mason & Co., 1884), 216.
19. Insofar as can be determined, the structure known as Connecting Terminal Warehouse "B" was a single-story frame building, located south of the grain elevator and used for housing package freight.
20. Permit #160992 (10 March 1980).
21. See Buffalo Structural Steel Co. plans for erection of Husted (Superior) marine tower which includes a reference to Terminal tower, Sheet #1 (11 March 1914), 301/428 Buffalo City Hall.
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23. For illustrations of the dumper and south workhouse in relation to the 1954 annex see BECPL Scrapbooks, "Industry," Vol. 9: 61 (Buffalo Courier-Express, 20 September 1959) and Vol. 10: 11 (Buffalo Courier-Express, 10 November 1963).

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APPENDIX

Mainhouse

Cost: \$227,000

Foundation: Wooden piles capped by concrete foundation slab

Basement: Full height 15' at grade; four longitudinal rows of square, pyramid-headed pillars, together with outer longitudinal rows of rectangular bracketed pillars support bin slab; pillars are spaced equidistantly, four pillars below each main bin; the outer pillars are placed below the intersection of the main and 1/4 walls; exterior wall straights and formed by panel infill of rusticated concrete blocks between outer row of pillars; an elongated window extends the full width of each panel above 1/2 height

Bins: Capacity 1,048,000 bushels  
Main bins, 10 x 3, in parallel rows, cylindrical approx. 20' in diameter, 90' high (above bin slab); NE corner bin horizontally sub-divided for shipping by boat  
Interspace bins, 9 x 2  
30 outerspace bins, convex 1/4 circle outer walls  
Non-tangential link wall contacts between all main bins

Bin Slab: Concrete slab, on I-beams

Gallery & Marine Tower: Steel-frame with ferro-enclave plaster walls  
Movable, structural steel clad in corrugated iron

REFERENCES: The original Buffalo City Hall plans have been lost. City Building Permits provide dates, and The City Plans Book for 1914 costs of construction. The building is featured in Northwestern Miller, 103 (21 July 1915): 155 and American Elevator & Grain Trade, 34 (15 August 1915): 92.

Annex

Cost: \$400,000

Foundation: Wooden piles to 2' foundation slab and 14" tunnel slab

Basement: Conveyor tunnel only, 7' high, 9' wide, below grade

Hoppers: Concrete slab on gravel, directly above foundation slab.

Bins: Capacity 600,000 bushels  
Main bins 5 x 2, in parallel rows, cylindrical 30' in diameter, 109' high (from foundation slab)  
Interspace bins 4 x 1  
No outerspace bins  
Tangential contacts between all bins, 8' wide  
Wall thickness 6", 8" at contacts  
Vertical reinforcing, intermediate grade new billet of 11/16" diameter; 16 jacking rods arranged equidistantly, supplemented by 2 ordinary verticals between jacking rods in external and contact walls and 1 between the jacking rods of internal walls; the verticals are located in the middle of the bin wall  
Horizontal reinforcement, graduated round rods at regular coursing interval; the horizontals are tied to the inside of the verticals

Bin floor: Monolithic concrete

Gallery & Headhouse: Structural Steel, clad in corrugated iron

REFERENCES: Army Engineers microfilm of original drawings and contract are housed in Buffalo City Hall. City Building Permits provide dates and City Plans Book for 1954 costs.