AMERICAN ELEVATOR
(Russell-Miller Milling Company Elevator)
(Peavey Co. Elevator)
87 Childs Street
Buffalo
Erie County
New York

HAER No. NY-249

PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

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

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(Peavey Co. Elevator)
HAER No. NY-249

Location: 87 Childs St., Buffalo, Erie County, New York

Date: Mainhouse: plans dated September 11, 1905; submitted to City of Buffalo February 4, 1906; approved April 3, 1906; completed by end of 1906
Annex: building permit application February 2, 1931; issued March 30, 1931; completed Fall, 1931

Designer: Mainhouse: James Stewart & Co.
Annex: H. R. Wait

Builder: Mainhouse: James Stewart & Co.
Annex: Monarch Engineering

Status: Operational

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 American Elevator mainhouse occupies a site alongside the Buffalo River. The elevator was designed and built by the James Stewart Company for the American Malting Company in association with the adjoining malting complex. The plans were drawn between September and November of 1905, and the elevator was complete and operational by the end of the next year. The Elevator was the first in Buffalo built of reinforced concrete, and is thought to be the first in the nation raised by slip forms into which concrete was continuously poured. Previously, concrete had only been poured during daylight shifts, the slip forms being moved once a day before any new concrete was placed.[1]

R. H. Folwell and W. R. Sinks of the Barnett Record Company devised a system of raising slip forms using jacks that acted upon rods incorporated into the bin wall as building progressed. The system was devised for the construction of the King Elevator, Port Arthur, in 1903, but not employed due to the expense of the jacks.

Although both Folwell and Sinks became associated with the James Stewart Company in February of 1905, the American Elevator was not raised by their method. Rather, the forms were raised by locomotive jacks placed on the floor slab within the basement. The substantial basement works were constructed by conventional fixed form concreting methods. The bins were elevated above the floor slab to provide a full basement. The design makes no provision for a bin slab; the bins are supported by octagonal networks of hopper beams elevated above the floor slab by pillars and placed directly below the bin walling. Conical steel hopper bottoms extend across the full width of the bins and rest upon the hopper beams. The bottoms were installed once the bin walls had reached their full height and the jacking frame work had been dismantled. No other design would have allowed the forms to be raised from the floor slab as outlined below.

The jacks and jacking cage were installed within the basement. The jacking frame remained within the basement and acted upon the upper frame which was raised with the forms. As the forms rose, a series of wood posts was added between the jacking and upper frames. The framework and posts passed close to the hopper beams; any other design would have conflicted with the hopper bottom or bin slab. The eight jacks used to lift the forms for each bin were arranged circumferentially so that the verticals of the upper frame were distributed equidistantly around the inside of the bin wall.

A system of timbers known as the "jacking cage" and "upper frame" was inserted between the jacks and the slip forms. The jacking cage, sixteen 4" x 6" vertical timbers tied together by

horizontals, was placed immediately above the eight jacks. The two vertical timbers above each jack were slotted to receive a single vertical 4" x 6" timber; eight such timbers formed the principle components of the "upper frame" which ran immediately inside the bin wall to act on the forms. The upper frame post was pinned to the cage verticals, but could slide within the cage if the pins were removed. After the jacking cage, and hence the forms, had been raised 12", the cage was disconnected from the upper frame posts and the cage and jacks lowered for the next 12" lift. The upper frame was rehooked to the jacking cage 12" above its previous point of attachment or, if extended to its full length, a new section of upper framework was spliced in.

Once these operations were completed, the forms could be raised progressively over the next 12" lift. When the jacks and jacking frame were lowered, the forms and upper frame were held in place by the friction between the concrete and forms. The 4' deep forms were composed of vertical timber staves held by annular timber bands. The inner and outer forms were connected and raised by eight steel yokes, the inside legs of which rested upon the eight vertical posts of the upper frame. A working deck was placed between the forms.

Although the system was both cumbersome and expensive in its use of timber, it produced the world's first truly monolithic concrete grain bins. The system permitted the raising of the forms while the concrete was still in a plastic state. Because concrete was placed in two shifts around the clock, the bin walls were completely monolithic and without "lift breaks." The elevator was built in two lifts of 6 x 4 bin groupings. The form work, cages, staging and jacks were reused on the second set of bins to economize material. The elevator cost $400,000, and provided storage at a cost of 17 cents per bushel.

The forty-eight cylindrical main bins arranged in four parallel non-interlocking rows of twelve had a 2.25-million-bushel capacity. The bins are placed in tangential contact on 25'-8" centers and have an inner diameter of 24'-10". Three rows of eleven interspace bins are located between the main bins. These rise 89'-8" from the top of the basement hopper beams. The tangentially thickened bin walls extend 4'-6" to either side of the bin center lines. The walls are 8" thick, except in the tangential thickening where the minimum thickness is 10". The vertical reinforcement consists of twenty-six 1/2" square lug bars on 34" centers. There are no jacking rods. The horizontal reinforcement is graduated rectangular bars arranged in 12" courses. The graduation of bars within the bin wall, finer than in many subsequent elevators, required the use of eight different bar sizes. Courses rose with height, ranging from twenty at the base to five at the top.

The bin hoppers are at 45° angles. The main bin hoppers are of steel plate fabricated to a conical form. They extend across the full width of the bin and are hung from the basement hopper beams, which have an octagonal geometry below the main bins. The interspace bin hoppers are made of flat steel plate and extend across the width of the bins. The hoppers are supported by a square network of beams formed by the intersection of four adjoining octagonal networks.

The basement is above ground level for its entire height and provides 14' of headroom. The exterior walls appear as three faces of an octagon. The geometry established by the exterior walls finds continued expression within the building in the network of octagonal basement hopper beams below the walls of every bin. These 4' x 3' beams are raised on the 10' high basement pillars below every point of intersection of the sides of the hexagons. The pillars are rectangular and measure 4' x 3'. Details of the reinforcing in the basement structure are unknown. The inner faces of the exterior wall are pierced by upright windows. The foundations are comprised of rectangular concrete sub-piers placed below every basement pillar and capped by a concrete floor slab. The sub-piers extend 12' to rock. The bin floor is a concrete slab supported on longitudinal I-beams. At the eaves, it terminates in an ogee-molded cornice following the bin line. The bin floor is covered by a single-story overall gallery. The gallery is of structural steel with a book tile roof and corrugated iron walls.

As originally constructed, the elevator was equipped with a single workhouse located at the southern end of the building. The workhouse originally measured 98' x 42' and rose to a height of 196'-10". It consisted of the two lower stories in reinforced concrete above a steel frame structure. Below the bin floor, the framework was infilled with book tiles; above the floor it was clad in corrugated iron. Internally, the following levels rose successively from the basement: the main floor, the sacking floor, a lower set of sacking and receiving bins, the cleaning floor, an upper set of cleaner bins, the bin floor, the distribution floor, the scale floor, and the garner floor. Two sets of bins extended across the entire area of the workhouse, each to a depth of 20'-4". These consisted of three rows of seven 14' square steel bins. Double track railroad loading sheds were on either side of the workhouse.

The elevator was equipped with a single fixed marine tower located at the northern end of the building. The tower is of structural steel clad in corrugated iron. As material was not re-elevated within the tower, it only needed to be 125' high. The elevator was built in association with a malt house constructed to the west of it in December of 1906. The steel and

brick malt house was built by the James Stewart Company at a cost of $1 million. The building was in two sections--a main five-story block measuring 175' x 110' featuring three towers on its western elevation and another five-story building south of the main block. A steel-roofed railroad loading shed was located in the gap between the main block of the malt house and the adjoining elevator.

In the spring of 1922, the Russell-Miller Milling Company purchased the complex, which was subsequently extended and converted for flour production. Almost immediately, the unloading capabilities of the elevator were augmented by the addition of a second marine tower with associated quayside. The new tower was movable and ran on tracks between the existing fixed tower and the Perot Elevator. It was of structural steel clad in corrugated iron. Like the original tower, it did not re-elevate the grain so internal functions could be contained in a 125' tower.

Russell Miller commissioned the design of a new mill in 1923 for which a building permit was issued the next year. The new structure was built on the site of the south wing of the original malt house that had been demolished the previous year. The new mill was an eight-story reinforced concrete structure measuring 124' x 50'. The pier and panel structure consisted of 9 x 4 bays, the tops of the piers forming castellations at the parapet. A block of square concrete bins was incorporated into the eastern end of the building and occupied an area of 3 x 2 bays between the basement and top floor. The building was constructed by J. W. Cowper of Boston and completed by May of 1924.

The last major development on the site came in the early 1930s with the addition of an annex to the south of the existing elevator where it abutted the workhouse. The annex was built by Monarch Engineering to the in-house design of H. R. Wait; the work was carried out for the American Elevator and Warehouse Company, a division of the Russell Miller Company. The plans were drawn in November of 1930, and the elevator was operational by the fall of the next year. The bins were built by slip forming above a conventionally constructed basement and bin slab. It is likely that the system of threaded jacking rods favored by the Monarch Company was probably used in bin construction.

The bins provide 1,400,000 bushels of storage. The main bins are 20' in inner diameter and arranged in four parallel, non-interlocking rows of six. The bins are spread on 27' centers connected by 5'-8" long link walls. This development of the classic Wait design provided fifteen 3 x 5 interspace bins of substantial capacity. Sixteen outerspace bins are placed between all exterior main bins. These have convex outer quarter walls, and their capacity is also augmented by the spreading of the

bins. The bins rise to a height of 125' above the bin slab. The bin walls are 8" thick and the link walls 12" thick. The arrangement of reinforcing within the bin walls is not known. Conical hopper bottoms of mortar-faced slag concrete are placed on the bin slab, and feed to conical steel draw-off spouts located within the slab.

The basement, one-third of which lies below ground level, provides 14' of headroom. Six longitudinal rows of mushroom-headed columns, together with two outer rows of rectangular bracketed pillars, support the concrete bin floor. All the columns are spaced equidistantly such that four columns are beneath every internal main bin. The outer wall pillars are located beneath the center line of all exterior, main and quarter bins. The more usual Wait practice of placing pillars below the intersection of quarter and main bin walls was abandoned in this design. The exterior basement walls are straight and smooth-faced, exhibiting none of their structural components. The walls between the wall pillars are pierced by narrow elongated windows.

The elevator is built on concrete caissons that are placed below every basement column, and capped by a 6" floor slab. The bin floor is of reinforced concrete and is protected by a single-story overall gallery. The gallery is of structural steel clad in corrugated iron and has a concrete roof. The workhouse of the original elevator, which now lay between the mainhouse and the annex, was modified and extended during the construction of the annex in 1931. The extended structure, built by the R. S. McManus Steel Construction Company of Buffalo, was clad in corrugated iron. A small 153' high steel and iron workhouse was added at the northern end of the mainhouse in 1933. It was constructed in association with, and elevated grain to, an overhead conveyor gallery connecting the American and Perot elevators. This arrangement allowed grain unloaded by the American marine towers to be placed in the Perot Elevator.

BUSINESS HISTORY

American Elevator & Warehouse was begun as part of the late nineteenth-century merger movement. Its founding company, American Malting, was created in August, 1897, to consolidate a large number of small maltsters under one combine. In direct violation of the Sherman Antitrust legislation, the monopoly flourished for over two decades; its success was due, in part, to relations with major financiers and granary interests including banker J. P. Morgan and maverick Chicago grain merchant Joseph Leiter. Charles Stadler, former New York State senator from New York City, was president of American Malting. The trust was established to sell prepared malt to brewers more cheaply than

they could purchase barley alone. Initially, the trust united operations in Illinois and Wisconsin, but almost from inception it established four general offices in Chicago, Milwaukee, New York City, and Buffalo.[2]

Over the years, the company went through several incarnations to avoid minority stockholders' challenges or to reorganize its capital holdings and debt obligations. Regardless of its corporate identity, however, American Malting continued to exist until 1919, when both its name and purpose were changed as a result of the Eighteenth Amendment establishing prohibition and eliminating the market outlets of malt manufacturers.[3]

In 1903 the company embarked on its first reorganization to offset a minority stockholder challenge led by Joseph Leiter who charged that the board of directors was declaring unearned dividends to facilitate insider stock selling. Leiter stated that where company earnings were never more than 3-1/2 percent, the directors were paying 7-8-1/2 percent, with the balance coming out of principal rather than profit. The majority holders, allies of J. P. Morgan, survived the 3-1/2 year lawsuit challenge and promptly issued $20 million in new stock.[4]

The strategy worked well enough to encourage the company to expand vigorously. In 1903 American Malting already had one malt house and plant at Pratt and William Streets in Buffalo. This was an inland facility insufficient to supply the appetite of the trust's corporate ambitions. Consequently, during the heyday of the grain trust's enterprise, American Malting elected to build a much larger elevator and malt house on the Buffalo River and thereby began operations in a facility that continues to the current day.

By 1905 American Malting Company stock was worth $30 million. In March of that year, the company purchased a tract of land to facilitate its quest for expansion. These "carpetbagger" grain moguls obtained land originally owned by the Sprague, Rumsey, and Richmond estates--all founding families of Buffalo. Elizabeth Sprague was the signatory in the transfer of the property to American Malting. The site adjoined the Electric Elevator on one side and what would become Perot Malting on the other.[5]

The new elevator was to have a 2.5 million bushel capacity while the malt house would produce 9,000 bushels of malt per day and handle 3.5 million bushels of barley every year. The plant would allow the company to close its operations in Cleveland and Hamilton, Ohio, and in Erie, Pennsylvania, and concentrate its entire eastern business in Buffalo. The elevator would cost

approximately $400,000 and the malt house would be close to $600,000. The property alone was sold to American Malting for an additional $250,000. The huge sums were no obstacle; the company declared its only interest was "the best results obtainable under the most perfect sanitary conditions possible."[6]

Between 1905 and 1919, American Malting Corporation successfully ran the elevator despite constant legal challenges made against the parent company and its directors. In 1914, however, American Malting's attempt to instigate further mergers was thwarted by anti-trust court actions, and in 1915 stockholders, concerned about watered stock values, voted to reduce capitalization. In 1917 the company reorganized as American Malting Company to absorb the business of American Malting Corporation. Despite all of these corporate machinations, the Buffalo venture managed to operate successfully until the advent of the Volstead Act, which inaugurated prohibition and immediately eradicated the primary market for malt.[7]

Although the company was still directed largely by men from New York City, for once it had met its match. Nothing could sustain the company's ambitions through the prohibition era unless it instituted a radical change of focus. Furthermore, the directors faced their most serious creditors' suit, which charged that the company's capital stock reduction was a deliberate attempt to reduce the overall value of the company while improving the face value of the remaining stock held by directors themselves. As the liquidators of the malting property, the directors were also charged with allowing said elevators and malting facilities to languish collectively as a "wasting asset" and reducing the property's value through neglect. An order from the Chancery Court of New Jersey mandated that a new company, American Malt & Grain (AM&G), be formed to buy all American Malting property and to establish an escrow account to liquidate funds so as to meet bond payment obligations for the original, now defunct company.[8]

The next four years involved complex transactions that passed ownership of the Buffalo elevator through a series of corporate owners. In December, 1920, the directors and stockholders of American Malt & Grain dissolved it as an operating company, continuing only "as a body corporate for purposes of disposing of property" for three years until December, 1923. Like earlier American Malting directors, the AM&G trustees were challenged in February, 1921 by a dissident stockholder. Luckily for the trustees, his suit failed. In December the American Malt & Grain trustees were able to sell the Buffalo elevator before they ran further afoul of the law. The

new owners were Harry S. Helm and Charles Thayer, two directors of Electric Steel Elevator Company, a subsidiary of Minneapolis-based Russell-Miller Milling. Helm and Thayer bought the Buffalo elevator and malt facilities for a mere $500,000.

American Elevator & Warehouse was incorporated March 18, 1922, as a New York corporation. Its charter granted permission for the company to do business outside New York State even though its sole headquarters and properties were the American Elevator in Buffalo. At this point American Elevator & Warehouse was actually a subsidiary of Russell-Miller Milling, but the fact of that ownership was not declared in the incorporation. In April, 1922, American Malting & Grain sold the remaining properties not turned over to Electric Steel Elevator Company to American Elevator & Warehouse for $512,500. The next year, Russell-Miller openly announced its ownership and plans to begin construction of a new flour mill to replace the defunct malt house. For one dollar, Russell-Miller then purchased the American Elevator & Warehouse buildings and land, thereby making all of the American Elevator property a subsidiary of Russell-Miller. The new flour mill was completed in 1924 and was in full operation a year later.[9]

The new owner, Russell-Miller Milling Company, was a major company in the northwest grain industry. It evolved from several small North Dakota mills and was formed as a corporation in 1897. The company had begun in 1879 with the purchase of one mill by John Russell, a banker, and his son-in-law Arthur Miller, a miller by trade. Four years later, they purchased a second mill, incorporated as Russell & Miller Milling. Under that rubric they expanded into Wisconsin, purchasing the Grand Republic Mill in Superior. The latter move was unsuccessful since Russell & Miller was caught in the Panic of 1893 and lost the Grand Republic.

Direction of the company was taken over by another North Dakota banker, Edward P. Wells, while Harry S. Helm became general manager. They reincorporated as Russell-Miller Milling and successfully expanded the reorganized company. Between 1902 and 1906 they added, increased, or built several mills before relocating corporate headquarters to Minneapolis in 1907. In 1910, still an incorporated North Dakota company, Russell-Miller received a certificate to do business in New York State. It continued to expand its business as Electric Steel Elevator Company, through which it entered the Buffalo grain market when the subsidiary purchased the American Elevator. By the late 1920s, the company owned 135 country elevators and three terminal elevators including the American.[10]

In the 1920s, Russell-Miller's leading retail brand, Occident Flour, was sold primarily to merchant markets such as the baking industry. Buffalo's advantages as a milling center stemmed from its superior access to lake and canal transport routes to eastern markets. By 1931 the company had thirteen flour mills but still only the American serving eastern markets. In 1932 American Elevator & Warehouse changed its name to American Elevator & Grain Co., Inc., before dissolving entirely as a discrete subsidiary in 1937. Russell-Miller changed its name to Russell Flour Mills in 1935, originally introducing the name change in New York State, and later in North Dakota. At that time, the parent company proceeded to run the Buffalo facility under its own name.[11]

Part of the company's strength and success came from strong family control supplemented by loyal, long-term managers. Although most of the Russells and Millers left after the financial collapse of 1893, the second incarnation proved equally close-knit in terms of family ties. Founder Edward Wells, president from 1897 to 1918, was succeeded by his co-founder, H. S. Helm, who ran the company through 1939. He was followed by Wells' son-in-law, Charles G. Ireys, president from 1939 to 1942. At that point, the Millers returned in the person of Leslie Miller, son of founder Arthur Miller, who ran the company from 1942 to 1953. Following the second Miller's retirement, direction passed to other managers such as Michael F. Mulroy who had begun with the company fifty-one years earlier in 1902. The company also employed several notable figures, including the nation's first great mill chemist Harry Snyder and renowned cereal chemist Dr. Betty J. Sullivan.[12]

Russell-Miller's stability made it a logical target for acquisition. In 1954 the whole company was taken over by Peavey, and in 1960 it became a division within the Peavey corporation. At this point, the leading Russell-Miller consumer brand was King Midas Flour, initially a Peavey house brand, and the division was known as Russell Miller-King Midas Mills. By 1963 the Russell-Miller name was eliminated, and the entire operation became known as Peavey Co. Flour Mills.[13]

Peavey Company is one of the largest grain companies in the United States. It is fourth among U.S. millers and sixth among the leading global merchant traders. It was founded in 1874 but not incorporated until 1906. In its early years, Peavey Company was a grain trader similar to Cargill. Frank Peavey, founder of the company, established a wide network of country elevators that actually surpassed those of Cargill in number. Originally from Maine, Peavey worked briefly as a messenger for one of the grain traders on the Chicago Board of Trade. That experience

purportedly gave him a "phobia" against speculation in grain futures. His own entry into the grain trade began in 1874 where he worked as an independent agent for Minneapolis Millers Association. He quickly moved to divert wheat from Iowa to Minneapolis and secured operating permits from the Chicago-St. Paul-Minneapolis Railroad to establish grain warehouses along their rights-of-way. In Minneapolis he erected what was then one of the largest grain terminals. He extended his grain-handling empire along the Union Pacific, Northern Pacific and Great Northern rail lines. The latter collaboration put him in competition with Cargill whose elevators were also expanding along the Great Northern line.

Peavey abandoned his west coast trade in the 1890s because rail shipments in sacks were too uneconomical, and west coast shipping lacked convenient markets. He returned to the source of his original achievement, Minneapolis, where he was the first merchant ever to adopt the concrete-tank elevator. In 1899 he built an experimental concrete silo known to skeptics as "Peavey's Folly." It proved an extraordinary success.[14] When Peavey died in 1901, he left a grain trade business with nationwide ties to transport, banking, and railroads, as well as grain. His successors were members of the Heffelfinger family who had married into the Peavey family. The decade after Frank Peavey's death, the necessity for family control became apparent when the company president and general manager was found drowned in Lake Michigan. General Manager Pettit had borrowed $750,000 from five Chicago banks to engage in the type of futures speculation Frank Peavey had repudiated. Pettit's total debt was $1.2 million; his effort to corner the spring wheat market had failed. Pettit's negotiations in the Peavey company name forced the grain dealer to discontinue a brokerage business.

Peavey Company was required to issue public financial statements of its holdings and earnings and also to refund all indebtedness issued by Pettit through collateral-secured trust notes. In an ironic historical moment, Peavey began to call in its own debts to stay afloat, beginning with a suit for $300,000 against Joseph Leiter, the American Malting investor whose elevator the company would later acquire.[15]

The Heffelfinger family assumed more direct control and guided Peavey Company back to financial strength. By 1928, having recovered sufficiently to begin diversification, it purchased the VanDusen & Harrington Co., owner of King Midas Mill. Peavey entered milling for the first time by adopting King Midas as its retail flour line. King Midas became a division within Peavey during the 1930s. Its next greatest acquisition was the Russell-Miller Milling Company, merged in 1963 with

Russell Miller-King Midas Company and absorbed as an operating division, Peavey Company Flour Mills. From 1945 through the early 1960s, Peavey grandsons and company presidents Totton and F. Peavey Heffelfinger kept close control of their far-flung but conservative operations.[16]

In 1963, Peavey embarked on a modernization program at the Buffalo flour mill which would then be the company's largest milling facility. Expansion would increase production from 10,000 to 13,000 hundredweight and would move grain by pneumatic tubes rather than with the conventional bucket or belt conveyor system. The mill would become the nation's largest pneumatic mill and Buffalo's fourth largest. No increase in elevator handling capacity was deemed necessary to serve the increased milling production.[17]

Peavey retained control over the American Elevator until 1982 when, in a startling development, ConAgra, a much smaller Omaha-based agribusiness company, conquered the giant Peavey Company. ConAgra began its existence as Nebraska Consolidated Mills, a medium-sized, local grain handler. Its first foray into national success came when it adopted the Duncan Hines line of cake mixes. Duncan Hines was not a single company but a brand licensed to small farm cooperatives to give them an identifiable product for retail trade. Nebraska Consolidated, the most successful purveyor of the line, added its own pancake mix. In 1956 this brand name, created to make small mills more competitive, was eventually bought by Proctor & Gamble, leaving Nebraska Consolidated to find new ventures.[18]

Proctor & Gamble had no interest in any of the Omaha company's products other than cake mixes, so all additional licensing arrangements were abandoned, leaving Nebraska Consolidated to produce its own pancake mix. The Omaha miller was forced to return to basics--flour and feed. The company's ventures into retail production were not terribly successful during the next eighteen years, and it struggled to find a niche in either large commodity products or retail. By 1974 Nebraska Consolidated was nearly defunct.

Mike Harper, a new manager brought to ConAgra from Pillsbury, helped turn the company from a $600-million-per-year moribund operation to a diversified $20-billion-per-year contender in the top ranks of food processors. In 1976 Nebraska Consolidated was reorganized as ConAgra and a scant six years later acquired the grain giant, Peavey, Inc. Simultaneously it increased its investment in flour production and began eying east coast markets, making Buffalo's American Elevator (along with the nearby Lake & Rail Elevator that it also owns), very attractive

to the company. Today, ConAgra is a top global grain trader, a huge flour producer, and the largest purveyor of prepared frozen foods in the United States. Whether its superiority in the latter market area will make flour less attractive as a product line remains to be seen, but ConAgra has maintained a flourishing business at one of the few Buffalo elevators to run continuously since its construction.[19]

MATERIALS HANDLING: HISTORY AND DESCRIPTION

Receiving by Water

At the site of the original American Malting complex the alignment of storage tanks perpendicular to the Buffalo River required some departures from subsequently standardized layouts for unloading lake vessels at local terminal elevators. As in the case of its neighbor, the 1897 steel-tank Electric Elevator (no longer extant), lack of sufficient frontage along the Buffalo River precluded constructing rows of reinforced concrete silos parallel to the dock. Instead, the elevator had to fit onto a deep but narrow plot stretching back from the riverbank toward the nearby rail yards. The resulting functional compromise, as a local newspaper noted, required that the elevator marine leg "be at the opposite end from the working house, a peculiar arrangement necessitated by the shape of the site. The location of the marine leg with reference to the working room will make it necessary to carry all grain on a belt under the elevator."[20]

As of 1906 the single, fixed marine tower, 23' x 29' in plan, occupied a wedge of ground between the river and the north end of the rows of bins. The original leg featured a rope driven power transmission system; anecdotal evidence suggests that elements of that arrangement continue to survive. Grain elevated into the tower by the marine leg was weighed in a 400-bushel scale prior to being transferred to the workhouse. After weighing, instore grain was not reelevated within the marine tower, as later became common practice. Rather, cargoes were spouted to a receiving conveyor running longitudinally beneath the bins to the boot of the single receiving lofter located in the workhouse at the south end of the elevator. The original fixed leg is the oldest extant marine receiving equipment on the Buffalo waterfront.

In 1922 a second marine tower was added during the interval between the American's first career as a malt house elevator and its subsequent adaptation as a flour mill storage annex. The new tower was mobile rather than fixed. It patrolled the dock east of the original fixed leg, but without benefit of the support

usually provided to these unstable structures by some form of anchoring to the main elevator house. As in the case of the fixed tower with which it was paired, the 1922 unit did not contain an internal lofter leg. Instead, grain was discharged into a line of collecting hoppers situated in a gallery above ground level. These hoppers delivered to a transverse conveyor leading toward the fixed tower.

About the time when the second marine tower was added, pictorial evidence suggests that other modifications to American's marine receiving equipment and process flow also occurred.[21] A lofter leg was interposed between the two marine towers and the north headhouse was constructed. The status of current marine receiving apparatus and practice remains undetermined. The nominal unloading rate of the original fixed marine tower was projected at 20,000 bu./hr. By the time American Malting had disposed of its interest and the elevator began changing hands, marine receiving capacity had fallen to 12,000 bu./hr. Construction of the second marine leg and other improvements lifted the handling rate to 36,000 bu./hr., a figure that remained constant through the mid-1950s. In 1956, modifications of an undetermined nature further improved marine unloading capability to 47,000 bu./hr., and the rate continued to exceed 40,000 bu./hr. through the 1960s. Between 1971 and 1990, the overall vessel unloading rate was listed as 25,000 bu./hr. with both marine legs in operation.

Receiving by Rail and Truck

By 1906 a two-car track shed adjacent to the west side of the workhouse accommodated equipment for unloading grain arriving via rail. Workers operating a pair of power shovels emptied the contents of boxcars onto a transverse belt running from the pits across the basement of the workhouse. A tripper discharged into the boot tanks of the central receiving leg. This lofter was also used for grain arriving via vessel, an arrangement that would probably not have been used in a transfer elevator such as Concrete-Central, which was designed for rapid handling of grain arriving by water and rail simultaneously.

The original rail receiving rate was approximately 3,500 bu./hr. Improvements during the 1920s and 1930s raised this nominal figure to the point where four cars could be unloaded per hour, equivalent to a rate of 10,000 bu./hr. During the 1970s and 1980s, incoming grain continued to be handled through the receiving pits at a rate of two to three cars or 8,000 bu./hr. However, the increasing prevalence of hopper cars dispensed with the need for power shovels. No car dumper was ever installed at the American Elevator.

Instore and Outstore Distribution:
Vertical and Horizontal Transfer

Grain handling routes within the elevator are exceptionally difficult to reconstruct due to expansion, changes in function over time, and gaps in available source materials. Specifications for machinery currently in use are not available. In 1906 grain received via water or rail and shunted to the workhouse was elevated on a lofter leg, one of five in the original layout. This central receiving leg was flanked by a pair of shipping legs on either side, two for handling barley and two for malt. The shipping lofters were originally rated at 6,000 bu./hr.

All five house legs were initially driven by three electric motors, one for the receiving leg and one for each pair of shipping legs; these motors, which utilized three-phase 400-volt alternating current, were located on the scale floor. Power was transmitted through rope drive to the head countershafts with speed reduction through pinion gearing to the head pulley shafts. These lofters may now be driven at the head pulley through a combination of silent/roller chains and reduction gears. An overhead conveyor gallery connected the elevator with the adjacent malting plant.

The workhouse originally contained two 500-bushel garners and two 500-bushel Fairbanks hopper scales, one for instore barley and one for outstore malt. A third 500-bushel garner was located on the scale floor at the west and reached via spouting from the west pair of shipping legs. This garner appears to have been used in conjunction with a Richardson automatic scale. In 1931 a transverse extension was added to the south workhouse for two new 1,200-bushel garner and scale sets along with jack legs to compensate for the difference in elevation between the bin floor of the 1906 structure and the higher level of the new annex. Spouting arrangements within the workhouse were conducted on two levels, encompassing a distributing story below the scales as well as the bin floor. Universal-jointed spouts diverted instore grain to cleaners, bins or distribution belts and sent outstore grain to shipping points such as the carloading spout. Instore grain previously weighed in the marine towers could avoid the workhouse garner-scale sets through by-pass spouting.

As of 1906 grain requiring conditioning was distributed via spouting from the scales or the by-pass route directly from the lofters to tanks below the bin floor in the workhouse. These small bins supplied eight Invincible separators driven from a common countershaft by a single electric motor. The machines were used for cleaning barley which was discharged into bins

below the cleaner floor to await further distribution. Provision was also made for sacking malt in this area of the workhouse using five Invincible double needle machines. The shift from malting to milling at American altered the type of grain conditioning equipment required for daily operations. The 1937 inventory of the elevator proper included two cleaners, an oat clipper and a drier. The drier was taken out of service during the 1970s.

Both the original house and the 1931 annex contained upper and lower conveyor belts for handling horizontal grain transfers. As of 1906 three distribution belts covered the bin floor, delivering grain from the workhouse to storage. The three bin floor belts added in the annex measured 42" in width. As noted, these conveyors ran at different levels but were linked through short jack legs. Four shipping conveyors were located beneath the storage bins of the 1906 house. These belts were originally driven from an electric motor and countershaft on the sacking floor of the workhouse. The four basement conveyors in the annex consisted of 36" wide belts.

An unusual feature of the internal distribution system at American was the conveyor gallery built in 1933 to transfer grain over to the neighboring Perot Elevator, which lacked marine receiving capability. This project was carried out by Monarch Engineering of Buffalo as job No. 333.[22] Perot initially agreed to pay American 1/2 cent per bushel for elevation through its marine towers and delivery to the head of the conveyor; if grain could not be transferred immediately, Perot would incur additional storage charges. This procedure may have made use of the lofter and headhouse at the river end of American. The installation included a turnhead from American's east bin floor conveyor to the head of the transfer conveyor located between bins 46 and 47. Though still in place, the gallery connecting American and Perot is not currently in use.

Shipping by Water, Rail and Vehicle

Two spouts for loading barges or Welland Canal vessels were located at the fixed marine tower. Loading rates increased from 10,000 bu./hr. prior to the 1922 modifications to 22,000-25,000 bu./hr. during the 1930s. The nominal level of marine shipments dropped to 17,000 bu/.hr. during the 1970s and had terminated altogether by 1990.
Rail shipments were handled through the two-track carloading bay adjoining the east side of the 1906 workhouse. Originally, spouting was arranged to conduct grain directly from the 500-bushel malt scale to a pair of carloading spouts capable of filling boxcars at a rate of 6,000 bu./hr. By the 1930s rail

loading rates had increased to 22,000-25,000 bu./hr. or approximately 150 cars over ten hours. Slight decreases in carloading capacity to 120-130 cars per day were registered from the mid-1950s to the mid-1960s. The nominal loading rate declined from 25,000 bu./hr. to 5,000-10,000 bu./hr. between 1971 and 1990. In 1971 truck shipping capacity at the level of 10,000 bu./hr. was handled through a single spout. By 1990 the hourly rate of loading out to vehicles had doubled, and a total of four vehicular spouts were in use.

ENDNOTES

1. The following paragraphs are based on several sources including the surviving original plans, building permits and the City Plans Book for 1906 housed in Buffalo City Hall. For contemporary descriptions see American Elevator & Grain Trade, 25 (15 January 1907) and Grain Dealers Journal, Special Plans Book, 3 (1913): 12.

2. New York Times, 8 August 1897, p. 5; 1 September 1897, p. 4; 3 October 1897, p. 4; Natalie Lamoreaux, The Great Merger Movement in American Business, 1895-1904 (Cambridge: Cambridge University Press, 1983), 3, 101, 141; Buffalo Express, 13 September 1897, p. 1.

3. Erie County Clerk (ECC), Corporations, American Malting, Certificate of Incorporation and Amendments, n.d., filed January 4, 1922, Box 507; in chancery in New Jersey, May 27, 1919, Box 507. All Erie County Clerk documents are listed by date of document origin, not by date of filing, unless otherwise noted.

4. Buffalo Sunday Times, 15 November 1903, p. 28.

5. ECC, Deeds, Liber 1012, 1 March 1905, 418; Buffalo Commercial, 17 March 1908, 9; Buffalo and Erie County Public Library (BECPL), Scrapbooks, "Industry," vol. 3, 39.

6. BECPL. Scrapbooks, "Industry," vol. 3, 39-41; Buffalo Commercial 15 December 1905, 9.

7. New York Times, 29 May 1914, p. 15; 17 November 1914, p. 15; 14 December 1915, p. 17; 20 February 1917, p. 12.

8. ECC, Corporations, American Elevator and Warehouse, Certificate of Incorporation and Amendments, May 27, 1919 (filed in Erie Co. January 4, 1922), Box 507.

9. ECC, Deeds, Liber 1587, April 5, 1922, 432-459; Liber 1721, December 19, 1923, 82-84; Corporations, American Elevator & Warehouse Co., Inc. Certificate of Incorporation, March 18, 1922, Box 511; Northwestern Miller, 28 December 1921, p. 1427; 5 December 1923, p. 997; 30 April 1924, p. 437; 9 September 1923, p. 1101; "New Flour Mill for Buffalo," Buffalo Live Wire XIV (December 1923): 14.

10. Herman Steen, Flour Milling in America (Minneapolis: T. S. Denison & Company, Inc., 1963), 288-89; Moody's Industrials, 1928; ECC, Corporations, American Elevator & Warehouse: Russell-Miller, Certificate of Authority to do Business in New York State, November 28, 1910, Box 511.

11. Moody's Industrials, 1928, 1931; Steen, Flour Milling in America, 289; ECC, Corporations, American Elevator & Warehouse, Certificate of Change of Name, September 15, 1932; Certificate of Dissolution, April 5, 1937; Change of Name (Russell-Miller), December 16, 1935, Box 511.

12. Steen, Flour Milling in America, 289-290.

13. Steen, Flour Milling in America, 289-290.

14. Jim Hightower, Eat Your Heart Out (New York: Crown Publishing, 1975), 153; "The Grain Traders," Fortune (August 1949), 81-83; Dan Morgan, Merchants of Grain (New York: Penguin Books, 1980), 75, 89, 90-93, 110.

15. Steen, Flour Milling in America, 283; New York Times, 9 July 1911, p. 2; 11 July 1911, p. 1; 12 July 1911, p. 5; 13 July 1911, p. 1; 1 August 1911, p. 16; 17 August 1911, p. 9; 26 September 1911, p. 6.

16. Steen, Flour Milling in America, 283; Morgan, Merchants of Grain, 124, 157-8, 248.

17. BECPL, Scrapbooks, "Industry," Vol. 10, 49-50.

18. Milton Moskowita et al., eds., Everybody's Business (New York: Harper & Row, 1980), 35-359, 389; Moody's Industrials, 1990.

19. Buffalo News, 8 June 1990, p. B-1; Business Week, 25 June 1990, 24-25.

20. Buffalo Commercial, 15 December 1905, p. 9.

21. Reyner Banham, A Concrete Atlantis (Cambridge, MA: MIT Press, 1986), 162-63; Buffalo & Erie County Historical Society, Goldome/Nagle Collection (76-16), photo by Press Studios in Box "Buffalo River"; Henry H. Baxter, "Grain Elevators," Adventures in Western New York History, XXVI (Buffalo: Buffalo and Erie County Historical Society, 1980), frontispiece photo.

22. Deeds, Erie County Hall, Liber 2257, 487-96 (25 May 1933).

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APPENDIX

Mainhouse

Cost:	$400,000
Foundations:	Rectangular concrete sub-piers capped by concrete floor slab
Basement:	Full height 14' above grade; rectangular basement pillars support octagonal network of basement beams Exterior walls appear as half hexagons and are pierced by upright windows
Hoppers:	Conical steel to full width of main bins, supported by basement beams; flat plate steel to full width of interspaces, supported on square network of beams formed by the intersection of the octagonal network below main bins
Bins:	Capacity 2,250,000 bushels Main bins 12 x 4 in parallel rows, cylindrical 24'-10" in diameter, 89'-8" high (from top of basement beams) Interspace bins 11 x 3 No outerspace bins Tangential contacts between all bins, 9' long Bin walls 8" thick, 10" thick at intersections Vertical reinforcement: 26 1/2" square lug bars at 34" intervals Horizontal reinforcement, graduated rectangular bars arranged in 12" courses
Bin Floor:	Concrete, supported on longitudinal I-beams Ogee-molded cornice following line of bins at eaves
Gallery:	Structural steel clad in corrugated iron; book tile roof
Workhouse:	Structural steel, clad in corrugated iron
Marine Tower:	Movable, structural steel clad in corrugated iron

REFERENCES: The surviving original plans filed at Buffalo City Hall show only the workhouse. City building permits, City Plans Book for 1906 and American Elevator & Grain Trade, 25 (15 January 1907) report on the completed structure. Grain Dealers Journal, Special Plans Book, 3 (1913), 12, provides the best source of contemporary plans and photographs.

Annex

Foundation:	Caissons with 6" floor slab above
Basement:	Full height 14', 2/3 above ground; six longitudinal rows of mushroom-headed columns together with two outer rows of rectangular bracketed pillars support concrete bin floor All columns spaced equidistantly; four columns beneath every internal main bin; outer wall pillars located beneath center line of all exterior main & quarter bins; the more usual practice of placing them below the intersection of quarter and main bin walls has been abandoned; smooth concrete exterior wall with narrow elongated windows between pillar uprights
Bins:	Capacity 1,400,000 bushels Main bins 6 x 4 in parallel rows, cylindrical 20' in diameter, 125' tall (from bin slab) Interspace bins 5 x 3 16 outerspace bins; convex 1/4 circle walls between all exterior main bins Non-tangential bin contacts; bins connected by link walls, 5'-8" long; wall thickness 8" Reinforcement unknown
Gallery:	Structural steel clad in corrugated iron Concrete roof

REFERENCES: The original plans are housed in Buffalo City Hall. City Building Permits provide the dates.