Memo to the Historic Preservation Commission

HEARING DATE: March 21, 2012

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San Francisco,
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Project Name:	**Showplace Square Historic Resource Survey Findings** **612 Alabama, Pelton Water Wheel Factory**
Case Number:	**2010.0485U**
Staff Contact	**Moses Corrette, Preservation Planner** Moses.Corrette@sfgov.org (415) 558-6295
Reviewed By:	**Tim Frye, Preservation Coordinator**

On August 17, 2011, the Historic Preservation Commission (HPC) adopted the Showplace Square Historic Resource Survey (Survey); without assigning a status code for 612 Alabama Street[1]. The Survey found that 612 Alabama is individually eligible for the California Register under Criteria 1 for its association with the Pelton Water Wheel Company (Status code 3CS); however, the owner questioned the property's historic significance and requested additional time to provide information regarding the property's status. The HPC instructed the Department to work with property owner to assemble more information and return to the Commission for consideration at a later date.

Applying National Register Criterion A and California Register Criterion 1

In conducting surveys, the Department gathers information and develops findings using the California Register and National Register Criteria, and State and Federal Standards and Guidelines for identifying and evaluating historic properties. A close parallel to the National Register, the California Register defers to the National Park Service publications for guidance. As with National Register Criterion A, California Register Criterion 1 recognizes that properties can be associated with single events, or with a pattern of events, repeated activities, or historic trends. The event or trends, however, must be associated with a context that gives perspective and meaning, and clearly shows the event to be important. Moreover, the property must have an important association with the event or historic trends, and it must retain historic integrity.[2] According to National Register bulletin 15: "a property that is significant for its historic association is eligible if it retains the essential physical features that made up its character or appearance during the period of its association with the important event, historical pattern, or person(s)." Assessments are based on information available at the time of assessment, and may be changed and/or updated if new or additional information regarding properties becomes available.

612 Alabama – Property Description

The subject building at 612 Alabama is a wood and steel-frame industrial building clad with corrugated metal siding with steel sash windows, and a corrugated steel-clad double-gable roof. The building consists of three major segments (see aerial photograph on the following page). The first consists of original 1914 construction for the Pelton Water Wheel Co. is located on the southwestern portion of the

[1] The Case Report can be downloaded from: http://commissions.sfplanning.org/hpcpackets/2010.0485U.pdf
[2] U.S. Department of the Interior, National Park Service, National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation, 12.

lot along Harrison Street, and extending half the width of the lot on 19th Street as a machine shop, together with an "L" on Alabama Street for pattern storage.

The second part, approximately 80 feet on the northern portion of the lot, was built before 1920 as an independent building for the "Blue and Gold" bottling warehouse. The western side of the second part has the appearance of the 1914 building with a gable-roof form and steel siding was altered to this state between 1920 and 1950, as evidenced by the Sanborn maps. This second part does not have a significant association with the Pelton Water Wheel Co., and does not contribute to the resource.

The third part is a 4-story structure with 4th floor mezzanine space located on the southeastern portion of the lot along Alabama and 19th Streets. The original structure of this third part, which included the Pelton Water Wheel Company's offices and drafting room, was altered in 2003 by internally adding 3 additional stories and mezzanine[3]. The alterations to this third part are compatible with the resource, sharing the same scale, massing and metal cladding materials.

New / Updated Information to Evaluate 612 Alabama under California Register Criterion 1

While the David Allen Trust (owner) has provided background research on the technology and the Pelton Water Wheel Co., the evidence continues to support historic significance of the company, and its technology. It should be noted that while the property is associated with the name "Pelton" by way of the Pelton Water Wheel Co. it has no association with the man Lester Pelton, and is not eligible for consideration under Criterion B/2 (Significant Persons). The building is not associated with a significant person, but the events that led to the birth of a new, and important technology. Several supporting documents submitted by owner justify the contributions of the Pelton Water Wheel Co., such as that over 11,000 were in use before the turn of the 20th century.

The Pelton Water Wheel Co. was a hydraulic engineering firm that formed in 1888 at 121/123 Main Street San Francisco (no longer extant) when the original inventor, Lester Pelton[4], sold his patent and name to a

[3] 2000.302E - Three-Story Addition of Production Space into a Portion of an Existing Business Service and Industrial Structure and the Addition of 27 Parking Spaces. The proposed area of renovation is rectangular in shape with about 62 feet of frontage on 19th Street and 200 feet of frontage along Alabama Street, within a larger structure that includes 612 Alabama to 680 Alabama Street.

group of San Francisco capitalists[5]. Between 1888 and 1955, hired engineers, such as William A. Doble and Ely C. Hutchinson continuously patented improvements, and designed custom installations of the hydroelectric technology. By 1892, the Company was so successful that an east coast branch was added at 143 Liberty Street New York City (no longer extant, present site of "Ground Zero") and, reportedly in Jersey City, NJ[6]. The Company took up temporary San Francisco quarters after the 1906 disaster, and built the subject building in 1914 as its new permanent home. No other locations for the manufacture of the Pelton Water Wheel existed prior to 1956. This was verified by an examination of city directories, advertisements, and extensive web-based research that yielded no other associated locations to 1956 when larger corporate owners dissolved the Pelton Water Wheel Co. Further testament to the significant manufacturing contributions of the Pelton Water Wheel Co. is reflected in that as the Panama-Pacific International Exposition of 1915 was organized, an entire block of the Palace of Machinery was devoted to showcase its hydro electrical equipment (see attached graphic).

According to Rob Jordan, a retired engineer and Pelton expert who runs the website OldPelton.net, in the 1950s, the Pelton Water Wheel Company was still manufacturing everything in their extensive catalog at 612 Alabama, including hydro turbine governors, when the larger firm of Baldwin-Lima-Hamilton acquired the Company for the value of its patents. This marks the end of the period of significance.

Based on the known information, it appears that the building at 612 Alabama is individually eligible for the California Register under Criterion 1, for its association with the Pelton Water Wheel Company (Status Code 3CS).

- The building is significant to California history for the technological innovations and manufacture of hydroelectric power generation.
- The Pelton Water Wheel Co. had its origin in manufacturing the equipment that modernized gold mining (hydraulic and hard-rock) in California, changing both the physical landscape of the State, and its economy[7].
- The mass production and continual innovation for custom installations developed by the Company at 612 Alabama revolutionized hydroelectric power generation that was manufactured here, with a period of significance from 1914 to 1956.
- There are no other extant locations in San Francisco, California, or the nation with an association to the manufacture of hydroelectric equipment by the Pelton Water Wheel Company.
- The equipment that was developed and built at 612 Alabama is still in use in many California hydroelectric dams including the San Gabriel Dam in Los Angeles County[8].
- The building retains integrity overall, as it retains the essential physical features that made up its character or appearance during the period of significance.

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[4] Lester Pelton (1829-1908) was inducted into the Inventor's Hall of Fame in 2006 as one of the fathers of hydroelectric power.
[5] "The Bay of San Francisco," Vol. 2, Pages 469-471, Lewis Publishing Co, 1892.
[6] No specific site has been found for the Jersey City Plant. There are no listings in Jersey City Directories, and there is no listing on the Sanborn Maps of 1896, 1898, 1910, 1911 or 1912 for that City. Since the mid-20th century, most of Jersey City's industrial lands have been redeveloped.
[7] Lester Pelton received his patent in 1880, and manufactured 261 water wheels in Nevada City before selling is interests eight years later. Sierran Vol. XXXVIII, No. 3. http://www.kentuckymine.org/sierran/Sierran%20Summer%202010.pdf accessed 2/24/12.
[8] A video of the Pelton in action can be seen here: http://www.youtube.com/watch?v=V5KaFwaG4Sw

- Using the illustration on the preceding page, building segment 1 is unaltered, segment 2 is not associated with the Pelton Water Wheel Co, and does not contribute to the resource, and segment 3, although altered from its original, appears to retain sufficient integrity from the period of significance.

Attachment I Additional supporting documents from Planning Staff

Attachment II Appeal documents from the David W. Allen Trust

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19th Street / Harrison Street


Harrison Street
2235

EXHIBIT OF

THE PELTON WATER WHEEL CO.

Panama-Pacific International Exposition, 1915

An entire Block in the Palace of Machinery is given over to an exhibit of hydraulic power apparatus and auxiliary equipment. This space is occupied by The Pelton Water Wheel Company of San Francisco and New York, and its co-exhibitors,

New London Ship & Engine Co., Groton, Conn.
The Builders Iron Foundry, Providence, R. I.
The Falk Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa.

This exhibit comprises a heavy oil engine of the Diesel type, Pelton-Doble tangential water wheels, Pelton-Francis turbines, governors for water wheel control, horizontal and vertical turbine pumps, hydraulic mining giants, speed-increasing gears, water measuring and recording meters, electric generators and motors, and electric measuring and recording instruments. Representative types of each of these are shown in operation, and every facility is provided for investigating the action of these units. On the following pages is given a brief description of the individual features of each unit, to which the attention of the visitor is directed.

Engineers interested in the further examination of Pelton hydraulic equipment and Pelton facilities, are cordially invited to visit the shops and general offices of The Pelton Water Wheel Company, at Nineteenth and Harrison Streets, San Francisco, telephone Mission 3101.

The development of power from flowing streams is an engineering practice so ancient that its origin is entirely lost. Many types of water power equipment were devised, some of these of unusual intricacy, and it was not until the close of the nineteenth century that a simple form of water wheel suitable for use under the most rugged conditions was developed. This water wheel was the invention of Lester Pelton, and from his first rather crude design, there has been a constant improvement, until the wonderfully excellent and simple machinery shown in this exhibit has been produced.

By means of a Pelton water wheel, it is possible to develop water power wherever the necessary water under even a low head, is available and there are many thousands of ranch homes that are made happier by installing one or more of these simple, efficient wheels for driving feed mills or supplying electric lights. The Pelton water wheel is in use in virtually every nation on the face of the earth, in the most remote portions of the tropical South America and Africa; at the farthermost mines of Alaska and Siberia, as well as in our home states of America.

If you desire further information with reference to water wheels and the possibility of utilizing a stream of water that may be convenient to your home, we will be pleased to mail you bulletins describing every phase of a water power development.

THE PELTON WATER WHEEL CO.,

San Francisco New York

State of California The Resources Agency
Department of Parks and Recreation
PRIMARY RECORD

Primary # _____
HRI # _____
Trinomial _____
NRHP Status Code _____
Other Listings _____
Review Code _____ Reviewer _____ Date _____

*Resource name(s) or number (assigned by recorder) 612 ALABAMA ST

P1. Other Identifier Pelton Water Wheel Co. Machine Shop (historic)

*P2. Location: ☐ Not for Publication ☒ Unrestricted

*a. County: San Francisco and P2b and P2c or P2d. Attach a Location Map as necessary.

*b. USGS 7.5' Quad: SF North Date: 1994

*c. Address: 612 Alabama St City: San Francisco Zip: 94110

d. UTM: (Give more than one ofr large and/or linear resources) Zone ____; _____mE/ _____ mN

e. Other Locational Data: Assessor's Parcel Number: 4020002

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

612 Alabama Street is a partial four-story, wood-frame, steel industrial building clad in metal corrugated siding and capped with a compound gable and flat roof. The utilitarian building occupies a 43,505 sq ft lot on the west side of Alabama Street between 18th and 19th streets. The building has a secondary facade facing Harrison Street to the west. A large section on the southeast corner of 19th and Alabama Streets appears to be a recent addition to the original 1914 building. The east façade can be divided into seven sections. Five sections on the left side are newer and primarily feature steel sash industrial windows. The middle section is three stories and features two entrances on the first floor, one on the left side and one in the middle. Bands of fixed and hopper aluminum sash windows run between the entrances. The upper stories feature bands of 1/1 aluminum sash windows. The last section on the right is similar to the middle section. The west façade appears to be one large warehouse with a gable roof. The fenestration pattern consists of rows of corrugated plastic windows. The left side of the west façade features a loading bay with metal roll-up door on the ground level and a pedestrian entrance. The middle of the building features an angled loading bay currently used for parking. Two additional entrances are located on the right side. The facades terminate with rain gutters on the older sections of the building and a plain roofline on the newer sections. The building appears to be in good condition.

*P3b. Resource Attributes: (list attributes and codes) HP8. Industrial Building

P4. Resources Present: ◉ Building ○ Structure ○ Object ○ Site ○ District ○ Element of District ○ Other (Isolates, etc.)

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects

*P5b. Photo (view, date, accession #
100_5509.JPG, 11/19/2007, view to SW

*P6. Date Constructed/Age and Sources
☒ Historic ☐ Prehistoric ☐ Both
1914, Assessor's Office

*P7. Owner and Address:
650 Alabama Street Llc
650 Alabama St #101
San Francisco Ca
94110

*P8. Recorded by
Tim Kelley
Tim Kelley Consulting
2912 Diamond St. #330

*P9. Date Recorded:
6/12/08

*P10. Survey Type: (Describe)
Intensive

*P11. Report Citation: (Cite survey report and other sources, or enter "none") San Francisco Office of the Assessor/Recorder

*Attachments
☐ Archaeological Record ☐ BSOR ☐ None ☒ Continuation Sheet
☐ Artifact Record ☐ District Record ☐ Location Map ☐ Other...
☐ Photograph Record ☐ Linear Feature Record

100_5515.JPG, 11/19/2007, view to NW, new portion

100_5516.JPG, 11/19/2007, view to N

100_5517.JPG, 11/19/2007, view to NE

100_5520.JPG, 11/19/2007, west elevation rail car entrance

The following discussion was prepared by Brian F. Terhorst, Architectural Historian and is derived entirely from Roger P. Lescohier's unpublished typescript, "THE MINERS' FOUNDRY: Nevada City's Treasure from the Past" (1992). This summary discussion has been prepared for presentation on the State of California, Form DPR 26, APPLICATION FOR REGISTRATION OF HISTORICAL LANDMARK, page 2.

BRIEF HISTORY AND DESCRIPTION (Corresponding to one or more items under I, II, or III of the Statement of Policy.)

In the years immediately following James Marshall's gold discovery at John Sutter's sawmill in Coloma, miners swarmed to the streams and rivers of California's gold country. In 1850, the discovery of gold-laced quartz deposits away from watercourses, triggered off an era of hard-rock mining. Where river deposits could be worked with relatively rudimentary tools, hard-rock mining required specialized, industrial equipment, the most noteworthy of which was the quartz-crushing stamp machine. This demand for hard-rock mining equipment, and for the machinery and tools required for a growing timber industry, spurred the establishment of several foundry operations in Nevada City in the mid- to late 1850s.

In 1859, under the ownership of Messrs. Thom and Heugh, "The Nevada Iron and Brass Foundry and Machine Shop" commenced operations at the site of the complex now known as the Miners' Foundry Cultural Center. By the time Thom and Heugh began construction of their foundry, five fires had swept Nevada City's business section and, to reduce further threat of fire damage, the new foundry was constructed of stone; this is the present "stone hall" of the Miners' Foundry. In addition to producing stamp mill equipment, the new foundry produced donkey engines, ore cars, pulley wheels, hoists, monitor nozzles and a host of other mining and logging equipment.

As hard rock mining continued and intensified, the forests surrounding the gold country's numerous stamp mills were denuded to provide fuel to generate what were primarily steam-powered operations. Acknowledging the growing fuel shortage, many mine owners converted their stamp operations to water power. By the 1870s, only a few foundries were producing water wheels. Among these were the Knight, Taylor, and Fredenburr.

In the spring of 1878, a millwright from Camptonville named Lester Pelton came to Nevada City to visit with George Allan, who in 1876 had become owner of the foundry, changing its name to, "George Allan's Foundry and Machine Works." With him, Mr. Pelton brought a crude prototype of a water wheel, about two feet in diameter. The exceptional feature of Mr. Pelton's wheel was the "splitter" that divided its numerous buckets. The splitter in the center of the bucket, which divided each bucket into two halves, was the key to the high efficiency of the Pelton wheel. It divided the incoming water jet into two parts. Each part of the jet expended its energy in the half-cup and discharged its portion of the water nearly 180 degrees from the direction of entry. This flow provided high efficiency and, at the same time, discharged clear of the oncoming jet. All previous designs splashed back a portion of the water into the path of the jet, dissipating a significant part of the jet's force.

Mr. Allan agreed to work with Lester Pelton to design and produce an industrial quality wheel incorporating Pelton's unique bucket design. Thus began a partnership that was to have far-reaching consequences in the mining and hydro-electric industries.

After much trial and error in refining Pelton's design, Pelton wheels were soon manufactured for sale at Allan's Foundry. Despite poor sales, Pelton pursued a patent on his design which he received in 1880. In the early 1880s, several local water wheel inventors were claiming superior performance from their wheels. In the spring of 1883, the Idaho Mining Company of Grass Valley held a formal competition to determine which of the designs was the most efficient. Beginning on April 30, 1883, four wheels were tested and the results were published as follows in the Grass Valley Union on May 24, 1883:

> At the trial of the different water wheels at the Idaho Works...to determine the relative power of each...it was found that the wheels obtained the percent of the power of the water as follows: Pelton (Camptonville, Yuba County) 90.2 percent; Knight (Sutter Creek, Amador County) 76.5 percent; Fredenburr (Grass Valley) 69.6 percent; Taylor (Grass Valley) 60.5 percent.
>
> The trial showed the superiority of the Pelton wheel, the result being the most remarkable known to wheel men, and establishes it as the wheel par excellence under high water pressure.

Following this clear demonstration of superiority, the sale of Pelton wheels began to soar as mine owners sought the most efficient water wheels available to drive the machinery in their mills. Among

the most important mines to convert their operations to Pelton wheel power were The Empire Mine, The Idaho-Maryland Mine, and the North Star Mine. Not surprisingly, the works of Allan's Foundry were also converted to Pelton wheel power.

Originally employed to facilitate stamp mill operations, the Pelton wheel was adaptable to many uses and was manufactured in a variety of sizes from 4 inches to 30 feet in diameter. Small wheels could be used to power sewing machines, washing machines, and even dental drills. Perhaps the greatest benefit derived from Pelton's invention was the boon it provided to the advent of hydroelectric power.

Following the efficiency competition at the Idaho Mining Company, the demand for Pelton wheels soared. By 1888, Allan's Foundry could no longer fill the number of orders for the new wheel. In that year, Lester Pelton moved to San Francisco and formed the Pelton Water Wheel Company. By 1895, about 850 companies throughout the world were using Pelton water wheels. Even though Pelton was no longer producing his famous wheel in Nevada City, he granted continuing manufacturing rights to Allan's Foundry where he had developed this important technology. Pelton wheels were produced at Allan's Foundry into the early 1900s, when most of the local mines shifted to electric power.

George Allan retained ownership of the Foundry until 1907 when he sold the facility to William Martin who changed its name to the Miners' Foundry and Supply Company. The Miners' Foundry continued to produce mining and lumber equipment and flourished even during the Great Depression of the late 1920s and early 1930s. In the late 1930s or early 1940s, under the ownership of Richard Goyne, a large addition, now known as the Great Hall, was constructed on the eastern elevation of the Miners' Foundry to accommodate its expanded operations in steel manufacture and welding services. When gold mining was curtailed during World War II, the Foundry remained in operation by producing war-related equipment. The Foundry's prosperous days of metal working were coming to an end. Even after mining resumed in 1945, the facility never regained its early prosperity. The last iron was poured at the Miners' Foundry in 1950. In 1957, Goyne sold the facility to Hugh Williams and George Rua who operated a welding and steel factory there before selling the property to Ray Amick in 1965. Like his predecessors, Amick continued producing machinery equipment and made numerous alterations to the building.

The manufacturing history of the Miners' Foundry ended when the property was sold to David Osborn and Charles Woods in 1974. Under their ownership, the facility was converted to the American Victorian Museum and housed a variety of Victorian-era memorabilia and a dining room in the stone hall. In 1978, Osborn and Woods permitted the establishment of a non-profit community radio station in the former business offices of the Miners' Foundry. The current owners, the Nevada County Cultural Preservation Trust, acquired the property in 1989. The Trust's mission is stated as follows:

> The Nevada County Cultural Preservation Trust is committed to preserving and interpreting Miners' Foundry as an historical structure and providing a flexible space for community cultural, educational and social activities. Our stewardship mandates fiscal and managerial responsibility so that we may foster and hand on to our successors a richer cultural environment.

Now known as the Miners' Foundry Cultural Center, the facility continues to house KVMR FM, the community-based radio station and hosts over 200 events each year which are attended by over 50,000 people.

SENT VIA HAND DELIVERY

October 31, 2011

Director John Rahaim
SF Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

RE: Assessor's Block and Lot 4020/002 and the Northeast Mission & Showplace Square Historic Survey

Director Rahaim,

This correspondence responds to **Item 2. F. 612 Alabama, Pelton Water Wheel Factory** of Historic Preservation Commission (HPC) Motion 0134 (*HPC Motion Attachment, page 3*) whereby the David W. Allen Trust (Trust) was asked to "assemble more information and return to the Commission at a later date." In keeping with the recent communication between the two of us, the Trust will herein provide clear evidence and documentation that our 612-660 Alabama Street property did not have a significant association with Pelton Water Wheel and did not warrant the **Status Code 3CS** that it was assigned in the Northeast Mission & Showplace Square Historic Survey (Survey). The property also does not deserve the **7R** (Identified in Reconnaissance Level Survey: Not Evaluated), as was proposed in the staff report (*HPC Survey Adoption Attachment, page 17*) for your August 17 Survey adoption hearing. The Trust again respectfully requests that the Planning Department revise its recommendation to **Status Code 6Z,** and that this matter be agendized at the HPC at the earliest opportunity.

This document will focus entirely on Lot Section 1 from the Survey adoption staff report (*HPC Survey Adoption Attachment, page 15*). Department staff has already conceded that the Lot Section 2 and Lot Section 3 portions of the Trust property on Alabama Street are not historically significant. (Please advise if this determination has changed in any way.)

Department staff maintains that Lot Section 1 has "associations with events" related to Pelton Water Wheel that may be significant. The Trust contends that there is ample evidence to prove that this final portion of Assessor's Block and Lot 4020/002 has no significant association with Pelton Water Wheel that merits preservation. I shared much of the foregoing information with staff and the HPC in advance of the August adoption hearing. This document serves to memorialize and document that same information as well as additional research I now have at my disposal in order to secure **Status Code 6Z.**

In the interest of clarity and brevity for Department staff and the HPC, I will present in chronological order the facts and events that refute the Department's assertions and then cite the relevant supporting document and/or documents.

Original Pelton Wheel Manufacturing Site -- 1879
As evidenced by California Registered Historical Landmark (*Pelton Landmark Attachment.*) the Pelton Water Wheel was invented and first manufactured in Nevada City, California in 1879. According to the landmark plaque, Pelton wheels were manufactured at this foundry "into the early 1900s, when most local mines shifted to electric power." This fact certainly calls into question the significance of any forms of the wheel or other Pelton products that may have been reproduced at 612-660 Alabama Street in San Francisco three decades later.

Original Pelton United Sates Patent No. 233,692 – 1880
The Pelton Water Wheel was patented (*Pelton Patent Attachment.*) when Lester Pelton's operations were still located in Nevada City. Please note that the patent pre-dates by a full 34 years construction of the 612-660 Alabama property that Department staff alleges has a significant association with Pelton.

Pelton Water Wheel Company Organized in San Francisco – 1888
Lester Pelton located "the main works and offices of the company" at 121-123 Main Street in San Francisco. Pelton had other offices in New York and Jersey City. (*SF County Bios Attachment.*)

Significant Production and Use of Pelton Water Wheels – 1892 through 1898
By this date "over eleven thousand Pelton Water Wheels were being used by "850 companies throughout the world." (*The Sierran 2010 Attachment, page 3 and Lester Allan Pelton Attachment, page 6 and Pelton 1898 Catalog Attachment.*) The relevant pages of the 1898 Pelton catalog also cite dozens of Pelton products in use in projects around the globe. Again, this demonstrates that Pelton Water Wheels were manufactured and commonly used a full 19 years prior to construction of the Trust's Alabama property.

Lester Pelton Dies – 1908
The father of the Pelton Water Wheel and hydroelectric power innovator dies in Oakland on March 14, 1908. (*Pelton Hall of Fame Attachment.)* Again, Mr. Pelton never worked at 612-660 Alabama, as it was not constructed until six years after his death.

Extensive Use of Pelton Water Wheel Technology Worldwide – 1909
The relevant pages of the 1909 Pelton Water Wheel catalog (*Pelton 1909 Catalog Attachment*) provided by the Trust further proves that the company's technology was no longer novel and was in circulation and use throughout the world. This catalog was published five years prior to the construction of 612-660 Alabama building and explains why there were the remnants of a drafting facility at this location (as the Trust shared with Planning Department staff).

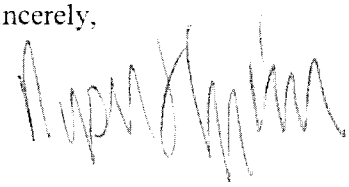
612 Alabama Street is Constructed – 1914
According to several sources, the structure was built in 1914 (*SF Assessor Recorder Attachment and Showplace Survey Doc Attachment.*) As 11,000 Pelton Water Wheels were in use 19 years before the Trust's building in question was constructed, it is a logical assumption that several thousand more were in the marketplace as of 1914. As such, it is difficult to deem this site a "Pelton Water Wheel Factory" of any historical significance.

Pelton Company Liquidation and Transfer of Alabama Street Property – 1956
In December of 1955, Pelton liquidated its assets including the property at 612-660 Alabama Street. The Baldwin-Lima-Hamilton Corporation took possession of the property in 1956 (*Baldwin Lima Purchase Attachment.*). This is germane because subsequent to the assertion of an association between the Trust's property and Pelton, Planning Department staff suggested that potentially noteworthy production of steam cars or engines may have occurred at the same site. Baldwin-Lima-Hamilton produced hundreds of steam engines, locomotives and many other industrial products but stopped producing engines altogether in 1956 (*Baldwin Lima Hamilton Attachment, page 3 of 4*). Thus, no steam engine creation or production of any significance by Baldwin-Hamilton-Lima could have occurred during its brief ownership of the property at Alabama Street.

In light of the substantial and documented evidence provided here, I submit that the Trust's property of 612-660 Alabama Streets should be granted a **6Z Status Code**. I do not believe that any of our structures meet the standard of noteworthy historical significance warranting preservation as outlined publicly by HPC Commissioners during recent Survey hearings. I respectfully request that Planning Department staff recommends to the HPC that the David W. Allen Trust's structures on **Assessor's Block and Lot 4020/002** are found ineligible for National Register, California Register or Local designation and should be given a **6Z Status Code**.

Thank you for your ongoing attention to this matter. I will contact you next week and trust that this item can be placed on an HPC agenda in the near future.

Sincerely,



Fred Snyder

Attachments (14)

CC: Supervisor Jane Kim
Supervisor Scott Weiner
Historic Preservation Commission
Linda Avery
Matthias Mormino
Tim Frye
Moses Corrette
Andrew T. Gregg
Gregg Miller, Esq.

HPC MOTION ATTACHMENT

SAN FRANCISCO
PLANNING DEPARTMENT

Historic Preservation Commission
Motion 0134
HEARING DATE: AUGUST 17, 2011

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Hearing Date:	August 17, 2011
Case Number:	2010.0485U
Staff Contact	Moses Corrette – (415) 558-6295
	moses.corrette@sfgov.org
Reviewed By	Tim Frye - (415) 575-6822
	tim.frye@sfgov.org

ADOPTION OF: **Showplace Square / Northeast Mission Historic Resource Survey**

PREAMBLE

WHEREAS, the Methodology for recording and evaluating historic resources contained in the Office of Historic Preservation publication Instructions for Recording Historical Resources of March 1995 and future editions of that publication is based on the Secretary of the Interior's Standards and National Register of Historic Places Criteria cited therein.

WHEREAS, The *Showplace Square / Northeast Mission Historic Resource Survey* consists of several elements including:

- California Department of Parks and Recreation Primary Records (DPR 523A forms) for 632 individual properties;
- California Department of Parks and Recreation Building, Structure, and Object Records (DPR 523B forms) for 24 individual properties;
- California Department of Parks and Recreation District Records (DPR 523D forms) for two (2) historic districts.
- Survey Inventory for 632 properties, consisting of APN; Address; year built; Status Code; District Name; Integrity, Architecture Rating and Building notes.

WHEREAS, The *Showplace Square / Northeast Mission Historic Resource Survey* was prepared by a qualified historian in accordance with the Secretary of the Interior's Standards and State Office of Historic Preservation Recordation Manual as outlined in Resolution No. 527 of June 7, 2000, adopted by the previous San Francisco Landmarks Preservation Advisory Board; and in accordance with the National Park Service's National Register Bulletin, *How to Complete the National Register Multiple Property Documentation Form* (1999).

WHEREAS, The *Showplace Square / Northeast Mission Historic Resource Survey* was reviewed by the San Francisco Historic Preservation Commission for accuracy and adequacy and is adopted by the San Francisco Historic Preservation Commission at a public meeting agendized for this purpose.

WHEREAS, A copy of the duly adopted the *Showplace Square / Northeast Mission Historic Resource Survey* will be maintained in the Planning Department Preservation Library and on the Planning Department's website.

WHEREAS, Future Landmark and Historic District Designation Reports and Nominations and Structures of Merit Nominations may demonstrate historic significance by reference to the *Showplace Square / Northeast Mission Historic Resource Survey.*

WHEREAS, In the future, in evaluating surveyed properties, historic significance may be demonstrated by reference to the *Showplace Square / Northeast Mission Historic Resource Survey.*

WHEREAS, The Historic Preservation Commission reviewed the all submitted materials and research regarding 1150 16th Street at its June 15, 2011 hearing and adopted a revised status code of 6Z (found ineligible through survey evaluation) by Motion 0128.

WHEREAS, The Historic Preservation Commission reviewed the Case Report, and Additional Information Memorandum, Planning Department presentations, and public comment.

MOVED, that the Historic Preservation Commission hereby adopts the *Showplace Square / Northeast Mission Historic Resource Survey*, including the following materials, and based on the following findings, and directs its Commission Secretary to transmit a copy of the adopted survey materials and this Motion No. 0134, to the State Office of Historic Preservation and to the Northwest Information Center at Sonoma State University for reference:

- **California Department of Parks and Recreation Primary Records (DPR 523A forms) for 632 individual properties;**
- **California Department of Parks and Recreation Building, Structure, and Object Records (DPR 523B forms) for 24 individual properties;**
- **California Department of Parks and Recreation District Records (DPR 523D forms) for two (2) historic districts.**
- **Survey Inventory for 632 properties, consisting of APN; Address; year built; Status Code; District Name; Integrity, Architecture Rating and Building notes, subject to the ammendedments and dirctions to staff below.**
-

FINDINGS

Having reviewed all the materials identified and the recitals above, and having heard oral testimony and arguments, this Commission finds, concludes, and determines as follows:

1. The above recitals are accurate and also constitute findings of the Commission.

2. The Historic Preservation Commission makes the following amendments to the Summary Database of the Showplace Square / Northeast Mission Survey:

A-1 3030 17th Street – Atlas Frame Co.: adopts a revised status code of 6L (determined ineligible for local listing or designation through local government review process; may warrant special consideration in local planning); and to amend the Summary Database of the Showplace Square / Northeast Mission Survey to reflect this change.

A-2 2750 19th Street – Oregon Worsted / Pioneer woolen Mill: adopts a revised status code of 6L (determined ineligible for local listing or designation through local government review process; may warrant special consideration in local planning); and to amend the Summary Database of the Showplace Square / Northeast Mission Survey to reflect this change.

B. Assessor's Parcel Number 4023/004, located at 2700 19th street: amend the Summary Database of the Showplace Square / Northeast Mission Survey to read: "This lot contains two buildings. The 2-story 1908 Timothy Hopkins Warehouse in the Commercial / Renaissance Revival Style, designed by Henry A Schulze, on the northwest corner of 19th and York Streets, appears eligible for the California Register (3CS). The circa 1919 single-story brick building occupied by the Crown Shirt factory on the western portion of the lot is found ineligible for NR, CR or Local designation through survey evaluation (6Z)."

C. Verdi Club, 2424 Mariposa Street: directs staff to transfer the new research onto a DPR 523L form, and append to the existing DPR 523A and DPR 523B forms.

D. 450 Irwin Street, former Greyhound Bus Lines garage and maintenance facility / current California College of the Arts: directs staff to contact the building owner to inform them of the Commission's intent to adopt Survey findings that the building is California Register eligible at a future hearing.

E. 1855 Folsom, former Woolworth's building: directs staff to transfer the research on the "Hot Boxcar" incident related to 1855 Folsom street (Woolworth's warehouse) onto a DPR 523B form, and append to the existing DPR 523A.

F. 612 Alabama, Pelton Water Wheel Factory: directs staff to work with property owner to assemble more information and return to the Commission for consideration at a later date.

G. 1200 and 1210 17th Street: adopts a revised status code of 6Z (ineligible for NR, CR or Local designation through survey evaluation); for the two steel-clad industrial buildings, 1200 17th Street and 1210 17th Street. The Commission adopts the status code of 3CS (appears eligible for CR as an individual property through survey evaluation) for the brick office building; and to amend the Summary Database of the Showplace Square / Northeast Mission Survey to reflect the change in the assessments.

I hereby certify that the Historical Preservation Commission ADOPTED the foregoing Motion on August 17, 2011.

Linda D. Avery
Commission Secretary

AYES:	Chase, Damkroger, Hasz, Johns, Martinez, Matsuda, Wolfram
NAYS:	none
ABSENT:	none
ADOPTED	August 17, 2011

HPC SURVEY ADOPTION ATTACHMENT

SAN FRANCISCO
PLANNING DEPARTMENT

MEMO

1650 Mission St.
Suite 400
San Francisco,
CA 94103-2479

Reception:
415.558.6378

Fax:
415.558.6409

Planning
Information:
415.558.6377

DATE: August 10, 2011

TO: Historic Preservation Commission

FROM: Moses Corrette, Preservation Planner

Moses.corrette@sfgov.org (415)558-6295

REVIEWED BY: Tim Frye, Preservation Coordinator

RE: **Additional Information Requested by Historic Preservation Commission, Showplace Square Historic Resource Survey – Case No. 2010.0485U**

This memorandum provides information in response to comments that were received at the Historic Preservation Commission (Commission) hearings of June 1 and June 15, 2011, for the Showplace Square Historic Resource Survey (Survey). The information in this memorandum is provided in addition to the information included in the Planning Department (Department) report of May 25, 2011, which was previously distributed to the Commission.

This memorandum addresses the following issues:

A. Background information on how the Showplace Square Survey assesses properties based on California Register Criterion 1 (associations with events); and an overview of the properties found to be significant under this Criterion.

B. Clarification of Showplace Square Survey findings for the two buildings on the same Assessor's Parcel Number 4023/004, located at 2700 19th street.

C. Report on staff research for information on the origin and composition of the Verdi Club, whose building is located at 2424 Mariposa Street.

D. Report on staff research on the integrity of 450 Irwin Street, former Greyhound Bus Lines garage and maintenance facility, currently occupied by the California College of the Arts.

E. Report on 1855 Folsom, the former Woolworth's building and the specific role that it played in the Hot Box Car incident.

F. Property owner's appeal of Showplace Square Survey findings for 612 Alabama (Pelton Factory) based on California Register Criterion 1, associations with events.

G. Property owner's appeal of Showplace Square Survey findings for 1200 and 1210 17th Street (Pacific Rolling Mills) based on California Register Criterion 1, associations with events.

F. Appeal of Showplace Square Survey findings for 612 Alabama (Pelton Water Wheel Machine Shop[13]) based on California Register Criterion 1, associations with events. (DPR 523A form and letter from Fred Snyder are Attachment F)

The owner of the building is appealing the draft survey findings, stating: "I do not believe that this block of buildings represents or retains the historical significance or integrity that is suggested in the draft Survey. Well over half of the building square footage of the above referenced property was constructed with a new foundation and exterior in 2001. Another 10,000 square feet section of the fully contiguous set of buildings is a corrugated metal addition that was completed in 1956 and was previously storage lot and roofed warehouse with no walls. Further, I have information regarding the historical association these structures have had with Pelton Water Wheel that runs counter the assumptions in the Survey.[14]"

Additionally, the Commission requested additional information about the activities located within each of the two buildings in the survey area that have associations with the Pelton Water Wheel Co.: 612 Alabama and 2929 19th Street. The Survey found the building individually eligible for the California Register under Criterion 1, for its association with the Pelton Water Wheel Co., a hydraulic engineering firm who manufactured equipment for hydraulic mining and hydroelectric power generation (Status Code 3CS) [15]

The subject building consists of three major elements (see aerial photograph below). The first consists of original 1914 construction for the Pelton Water Wheel Co. is located on the southwestern portion of the lot along Harrison Street, and extending half the width of the lot on 19th Street as a machine shop, together with an "L" on Alabama Street for pattern storage.

The second part, approximately 80 feet on the northern portion of the lot, was built before 1920 as an independent building for the "Blue and Gold" bottling warehouse. The western side of the second part has the appearance of the 1914 building with a gable-roof form and steel siding was altered to this state between 1920 and 1950, as evidenced by the Sanborn maps. This second part does not have a significant association with the Pelton Water Wheel Co., and is not architecturally significant, and therefore does not appear to be significant under the National or California Register Criteria.

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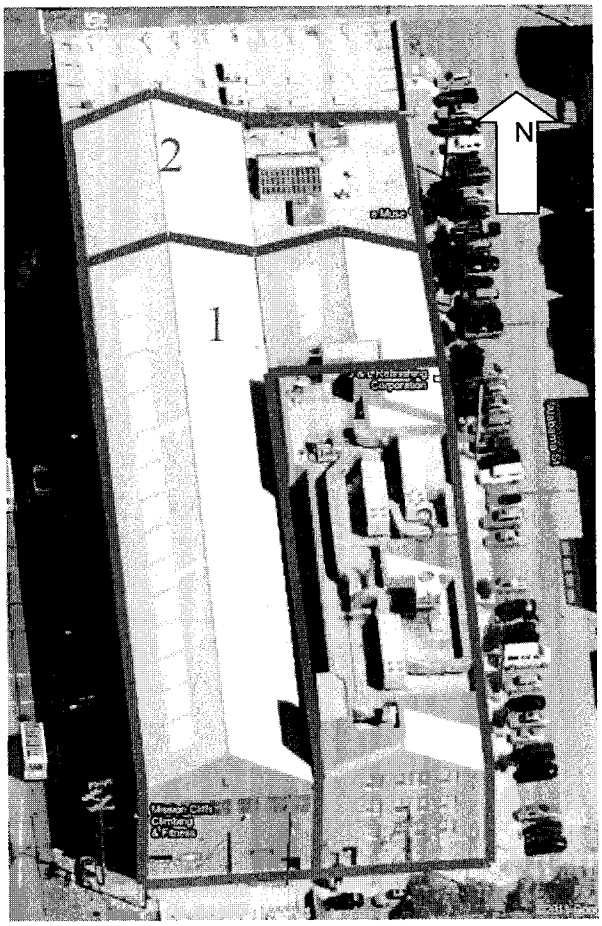
[13] The offices and research laboratories are located on an adjacent block, and are under separate ownership.
[14] Letter to HPC from Fred Snyder of the David W. Allen Trust RE: 600 Block of Alabama Street (Parcel Number 402-002) May 27, 2011.
[15] The Building at 2929 19th Street was erected in 1923, and housed offices, pattern storage, drafting rooms and a small machine shop. These functions were removed from 612 Alabama and transferred to 2929 19th Street.

The third part is a 4-story structure with 4th floor mezzanine space located on the southeastern portion of the lot along Alabama and 19th Streets. The original one-story structure of this third part, used for offices and a drafting room, was altered in 2003, adding 3 additional stories and the mezzanine[16]. The owner contends that this third part is an independent building with a fully independent structural system and foundation; however, the building permit for the construction (BPA 200008016642 and 2000.302E), and a recent office allocation (2009.0847B) all describe this section as part of the 1914 building, and not as an independent structure on the lot. This third part, if considered either as a separate building, or as an alteration to the main building, is compatible with the adjacent structure, sharing the same scale, massing and metal cladding materials as the 1914 building.



The significance of Pelton to California's history is evidenced by official designation of related structures elsewhere in California. Pelton's first manufacturing plant dating to 1879 in Nevada City is California State Landmark #1012 and is significant under California Register Criterion 1, association with events that are significant to California history.

Inducted into the Inventor's Hall of Fame in 2006, Pelton is one of the fathers of hydroelectric power. Lester Pelton (1829-1908) invented the first water wheel to with split buckets take advantage of the kinetic energy of water rather than the weight or pressure of a stream, more than doubling the efficiency of traditional types. In California, and nearby states, traditional water wheels that required high-volume rivers proved inefficient. However, the Pelton wheel could operate with lower flow rivers and streams, thereby being cost effective over expensive

[16] 2000.302E - Three-Story Addition of Production Space into a Portion of an Existing Business Service and Industrial Structure and the Addition of 27 Parking Spaces. The proposed area of renovation is rectangular in shape with about 62 feet of frontage on 19th Street and 200 feet of frontage along Alabama Street, within a larger structure that includes 612 Alabama to 680 Alabama Street.

steam engines in mining operations. The Pelton Water Wheel Company was organized by Lester Pelton and a San Francisco machine shop owner to keep up with demand that could not be met by the small George Allen Foundry in Nevada City. Small hydroelectric power plants in the western United States still generate electricity using Pelton's technology[17].

Further, the significance of the Pelton Water wheel is evidenced by California State Historical Landmark No. 1012, the First Manufacturing Site of the Pelton Water Wheel at 325 Spring St, Nevada City. The Landmark statement reads:

> "The Pelton Water Wheel, first commercially manufactured here at George Allan's Foundry and Machine Works in 1879, was a major advancement in water power utilization and greatly advanced hard-rock mining. Its unique feature was a series of paired buckets, shaped like bowls of spoons and separated by a splitter, that divided the incoming water jets into two parts. By the late 1800s, the Pelton Wheels were providing energy to operate industrial machinery throughout the world. In 1888, Lester Pelton moved his business to San Francisco, but granted continuing manufacturing rights to Allan's Foundry, where the wheels were manufactured into the early 1900s.[18]"

When Pelton setup his first plant at 121-129 Main Street[19] in San Francisco, it was located in the industrial South of Market neighborhood. That site was destroyed in the disaster of 1906. Between 1907 and 1914, City Directories list the Pelton Water Wheel Co. as having an office in the Monadnock Building, with works [manufacturing] at 19th and Harrison. The 1905 Sanborn map shows the site of 612 Alabama as mostly vacant with some small sheds involved in the refining of asphalt. On the opposite side of 19th Street was the Crescent Feather Mattress factory and opposite Harrison was the United Can Co. and the Meese and Gottfried Co. Machine Shop.[20] The 1914 Sanborn map shows the subject building at 612 Alabama labeled "The Pelton Water Wheel Co. Hydraulic Engineers." On both the 1905 and 1914 Sanborn maps, the future site of the Pelton Office building (1923) at 2929 19th Street between Florida and Alabama, is shown as being occupied by several buildings including a paint company, a dwelling, and a saloon. From these sources, it can be concluded that the Pelton Water Wheel Co. operated in temporary

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[17] Inventor's Hall of Fame website: http://www.invent.org/hall_of_fame/293.html accessed 7/28/2011.
[18] State of California Environmental Resources Evaluation System website: http://ceres.ca.gov/geo_area/counties/Nevada/landmarks.html accessed 7/28/2011
[19] Crocker-Langley City Directories for the years 1896 and 1904.
[20] Meese and Gottfried are listed in City Directories as manufacturers of elevating and conveying machinery. It is unlikely that they would have been able to provide the necessary foundry equipment for Water Wheel manufacture.

quarters on the subject site at 612 Alabama between 1907 and 1914 when the present building was erected.

Staff recommendation: Department recommends a change of the Survey status code to 7R (Identified in Reconnaissance Level Survey: Not evaluated) be assigned to the property. Adopt a motion directing staff to transfer the new research onto a DPR 523B form, and append to the existing DPR 523A form.

Basis for recommendation: The importance of this building's role in the development and growth of the hydroelectric generation of energy in the West remains undocumented. Further, it is not known at this time how many places in California were built for, or occupied by the Pelton Water Wheel Co. for manufacturing purposes, or if they are extant; however, Department staff has found no references to places other than Nevada City and San Francisco during its research. San Francisco City Directories from the 1910s list only San Francisco sites and an office in New York City. Within San Francisco, only this building, and the office building and research laboratories at 2929 19th Street are extant. Neither site was built in Lester Pelton's lifetime (1829-1908). The evidence demonstrates that the manufacturing plants of the Pelton Water Wheel Co. have significance on the State level, and that only two sites within San Francisco are extant. Department staff has contacted the State Office of Historic Preservation for guidance on how to evaluate this property, during which, it was concluded that not enough information is presently known to make a determination.

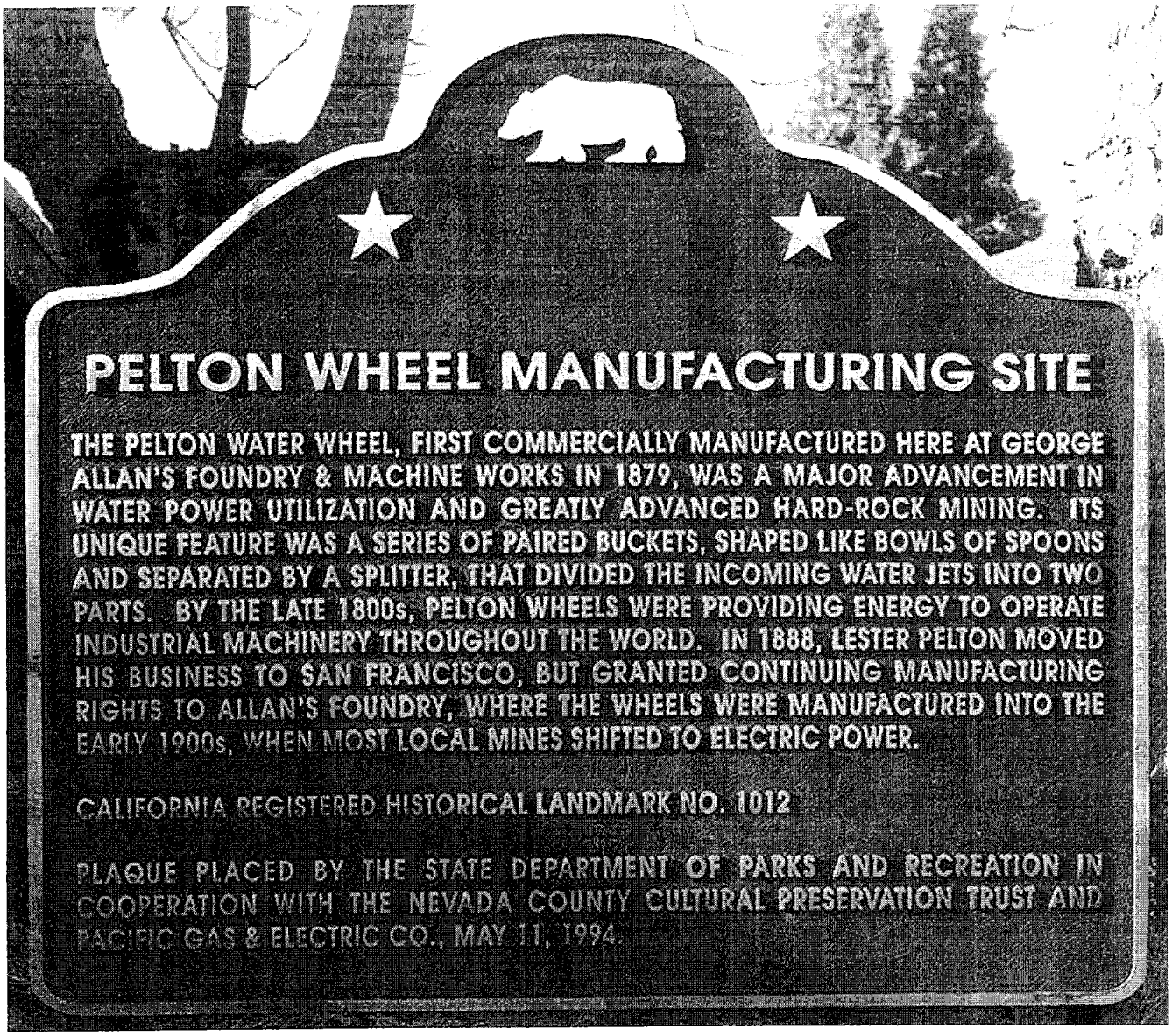
G. Appeal of Showplace Square Survey findings for 1200 and 1210 17th Street (Pacific Rolling Mill[21]) based on California Register Criterion 1, associations with events. (DPR 523A form, and Page & Turnbull's report: 1200-1210 17th street Preliminary Assessment are Attachment G)

The owner of these properties is appealing the Showplace Square Survey findings, on the basis that the property lacks both architectural significance and lacks integrity. In order to analyze of merits of the appeal, the project sponsor retained the firm of Page & Turnbull to conduct further research and provide their independent evaluation of the three buildings. Facts contained in the Page & Turnbull report informed the discussion below.

There are three buildings on two lots that constitute a single plant that was built by and for the Pacific Rolling Mill Co. at 1200 and 1210 17th Street. The first building, 1200 17th Street (APN 3949/002) is a steel-and-wood-frame, multiple-wing, industrial machine shop building clad in corrugated metal siding, built

[21] It should be noted that the subject buildings were built for the Pacific Rolling Mill Co. (without an "s" on Mill), which was a new corporation with many of the same engineers and equipment as the previous Pacific Rolling Mills (with the "s" on Mill) which was liquidated in 1898.

PELTON LANDMARK ATTACHMENT



Pelton Wheel Manufacturing Site in Nevada City, California

Back

PELTON PATENT ATTACHMENT

(No Model.)

L. A. PELTON.
Water Wheel.

No. 233,692. Patented Oct. 26, 1880.

Fig. 1.

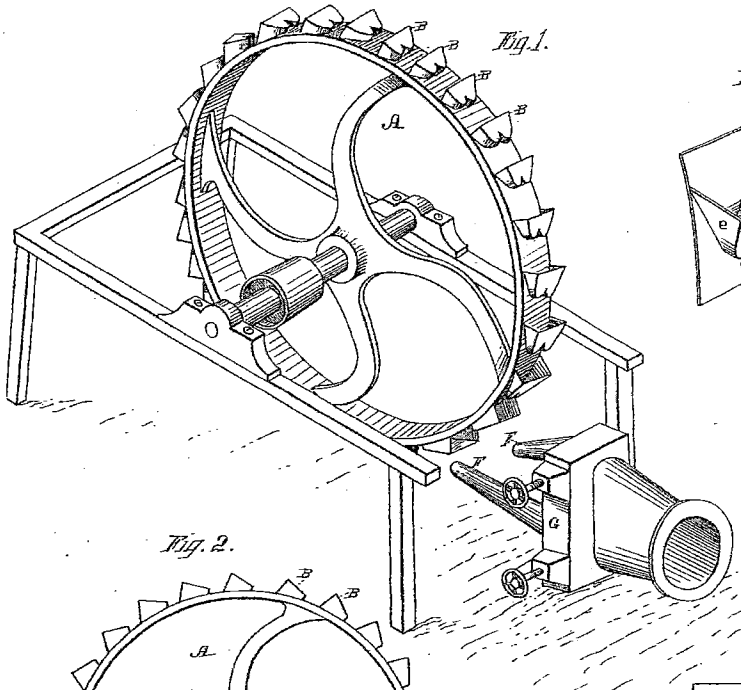


Fig. 3.

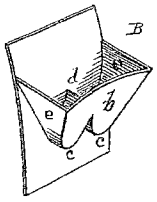


Fig. 2.

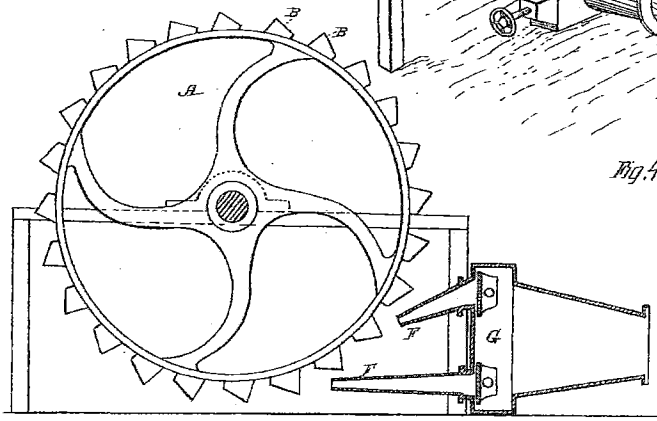
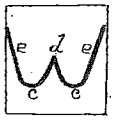


Fig. 4.



Witnesses
Frank A. Brooks
Geo. H. Strong.

Inventor
Lester A. Pelton
By Dewey & Co.
Attys.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

SF COUNTY BIOS ATTACHMENT

San Francisco County Biographies

THE PELTON WATER WHEEL COMPANY

THE PELTON WATER WHEEL COMPANY was organized May 2, 1888, by several of San Francisco's most prominent business men. The present officers of the company are Mr. A. P. Brayton, president; Mr. A. P. Brayton, Jr., vice-president and manager; Mr. J. V. Kunze, secretary and treasurer, Mr. E. L. Brayton and Mr. A. H. Phelps, with the above-named gentlemen, comprise the board of directors.

This remarkable wheel was originally invented and patented by Lester A. Pelton, then of Nevada City, California, in October, 1880. Since then, however, a number of improvements have been made in the original invention, all of them being duly patented.

The enterprise displayed by this company in introducing their wheels and motors, not only in the home market but in nearly all the countries of the world, is most commendable, and the example set by them should be followed by all our manufacturers in other lines. It certainly is no exaggeration to say that had San Francisco a few more such enterprising firms as the company here referred to, there would be no occasion for the large imports of machinery now made here from the East.

A brief reference to some of the most important power installations made by this company will not, we think, be out of place here, and certainly will interest all who are concerned in the prosperity and success of the manufacturers and industries which have done so much to build up the metropolis of the Pacific coast.

One of the earliest and most important installations made by this company, in connection with the electric transmission of power, is that in the shaft of the Chollar mine, in the Comstock lode, where six of these wheels are working under a vertical pressure of 1,680 feet. These wheels are coupled direct with dynamos, and each of them develops 125-horse power, using a nozzle only 5/8 inch in diameter, the efficiency obtained under these extraordinary conditions approximating 88 per cent.

Numerous other installations for the purpose of generating power for electric transmission have been made, notably among them are those at the Roaring Fork Electric Light and Power Company's station at Aspen, Colorado, and the Coeur d'Alese Silver and Lead Mining Company, at Burke, Idaho.

Among the large plants installed recently, where the power developed is used directly, may be mentioned the one at the Columbia River Paper Company's Mills at La Camas, Washington, where ten Pelton wheels are now in operation under a head of 110 feet, developing approximately 1,000-horse power.

The wheels last referred to were put in in place of turbines, which were found by the paper company to be utterly inefficient and unreliable, as they were constantly breaking down and continually requiring repairs.

Another instance of the superiority of this wheel over turbines under moderately low heads is shown in the experience of the Electric Light Company of Santa Ana, Salvador, who after attempting for upwards of a year to run their dynamos with turbines, under a head as low as sixty feet, found that it was impossible to do so with any degree

of economy or reliability, and were obliged to substitute Pelton wheels in their stead. Since the change has been made the company have experienced no further trouble whatever, and the enterprise, which prior to the change in wheels above referred to threatened to prove a failure, has now become an assured success. Hundreds of instances similar to those referred to could be cited did space admit, all going to prove conclusively the genuine merit and superiority of the Pelton wheel,—a superiority which is admitted by the most eminent engineers both in our own country and abroad as well.

The great increase in the Pelton Company's business has necessitated an Eastern branch, with works located in Jersey City, and offices at No. 143 Liberty street, New York.

By this arrangement the company is enabled to handle to better advantage their large Eastern and foreign export business, as well as to save their customers the large sums heretofore paid for overland freights.

The main works and offices of the company in San Francisco are located at Nos. 121 and 123 Main street.

Transcribed by Donna L. Becker.
Source: "The Bay of San Francisco," Vol. 2, Pages 469-471, Lewis Publishing Co, 1892.

THE SIERRAN 2010 ATTACHMENT

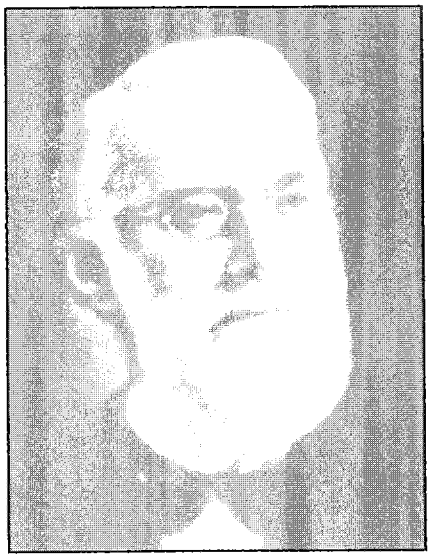
VOLUME XXXVIII, NUMBER 3 SUMMER/FALL 2010

The Sierran

A Publication of the Sierra County Historical Society

The Impact of Lester Pelton's Water Wheel On the Development of California Rivals the 49ers!

While hordes of gold-seeking 49ers swarmed into the Sierras in search of their fortunes, Lester Pelton, a farmer's son living in Ohio, came to California in 1850 with ambitions that didn't include gold mining. He tried making money as a fisherman in Sacramento before coming to Camptonville after hearing of the gold strike on the north fork of the Yuba River. Still not interested in being a miner, Pelton instead spent his time observing the mining operations in the Camptonville area and noted that both kinds of mining, placer and hard rock, required large amounts of power. He realized that hard rock mining was more difficult to provide because power was needed to operate the hoists to lower men into the mine shafts, bring up loaded ore cars, and return the men to the surface at the end of the shift. Power was also needed to operate the rock crushers and the stamp mills, and to pump water out of the mines.



Lester Pelton, whose invention paved the way for low-cost hydro-electric power

At the time, steam engines were being used to provide power to operate the mines but they were expensive to purchase, not easily transported, and consumed enormous amounts of wood resulting in forested hillsides becoming barren in a very short time. Water wheels were being tried by some mine owners making use of the enormous power available from water in the mountain regions but they were patterned after water wheels used to power grain mills in the East and Midwest and were not capable of producing the amount of power needed to operate hoisting equipment or stamp mills.

Having never developed an interest in mining, Pelton spent many years doing carpentry and millwrighting, building many homes, a schoolhouse, and stamp mills driven by water wheels. These water wheels were crudely built and not very efficient. Pelton turned his inventive mind to improve the water wheels

Water Wheel (Continued on Page 3)

THE SIERRA COUNTY HISTORICAL SOCIETY

The Sierra County Historical Society is an organization of people interested in preserving and promoting an appreciation of Sierra County's rich history. The Society operates a museum at the Kentucky Mine in Sierra City, holds an annual meeting, publishes a newsletter and conducts historical research. Members are sent notices of Society activities, receive THE SIERRAN, and are admitted free of charge to the museum and stamp mill tour. If you would like to become involved in these activities or would just like to give your support, please join us!

Officers and Executive Board of The Sierra County Historical Society

President: Bud Buczkowske, Alleghany
Vice President: Joleen Torri, Sattley
Secretary: Vacant
Treasurer: Bill Copren, Sattley

Board members in addition to those previously mentioned are Maren Scholberg, Sierraville; Elda Faye Ball, Loyalton; Suzi Schoensee, Sattley; James Connolly, Sierra City; Mary Nourse, Sierra City; Eli Scholberg, Loyalton.

Museum Curator - Virginia Lutes

Assistant - Judy Lawrence

If you have any suggestions or comments, feel free to contact any board member.

Become a Member!

Membership in the Sierra County Historical Society is open to any interested person, business or organization. Members need not be residents of Sierra County. Dues are due and payable each January for the calendar year.

Membership categories are as follows:

INDIVIDUAL	$20.00
FAMILY & INSTITUTION	$25.00
BUSINESS & SUPPORTING	$35.00
SUSTAINING	$50.00
LIFE (per individual)	$300.00

(The board increased membership fees commencing in June of 2008)

Please send dues to: S.C.H.S. Membership Chairperson, PO Box 54, Sattley, CA 96124

Music at the Mine Completes 2010 Season

Music at the Mine at the Kentucky Amphitheater has already completed the season. This year, Bob Morrales lined up 5 entertaining evenings of music. It takes a lot of energy to put together these events. We would like to thank Bob, Judy, Bill, Virginia, Toni, Cora & Fritz and others who helped. Also those that supported the events by selling tickets: Old Sierra Hotel, Graeagle Mill Works, La Sierra Beauty Boutique, Indian Valley Outpost, Sierra Valley Feed & Ranch and The Mountain Messenger and Sierra Booster for all the publicity.

HAVE YOU CHECKED OUT OUR WEBSITE?

www.kentuckymine.org

Thank you Cindy for doing such a great job!

Mark Your Calendar Now

IT'S ALREADY TIME FOR SCHS ANNUAL MEETING

When: Sunday, September 19th at noon

Where: the Historic Romano Ranch (Peterman Family Ranch)

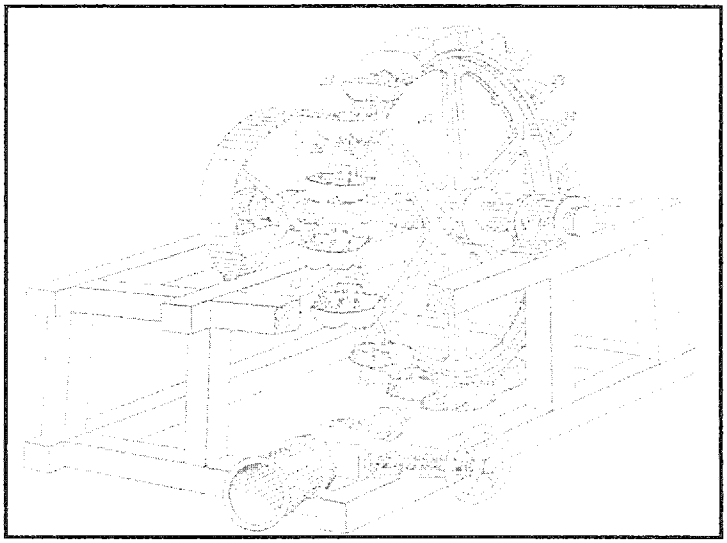
Follow Highway 49 until you see the sign for the turnoff to the ranch.

This year lunch will be provided, so **bring a lawn chair** and come for an afternoon of sharing history. We will have a guest speaker.

Water Wheel (Continued from Page 1)

that he observed were wasting water through excessive splashing. He believed he could devise a better way to use water to generate power.

At the time, Pelton was boarding at the home of Mrs. Margaret Groves in Camptonville. When Pelton told her of his plan to invent a better water wheel, She offered to let him build a workshop at the back of her house and asked him to create a better water wheel to operate her sewing machine. Working through the winters of 1877 and 1878, Pelton built a small water wheel for Mrs. Groves but wasn't satisfied with its design feeling that he needed to solve the problem of water splashing back onto the wheel before he could claim success. He immediately set about creating a prototype water wheel that was made of iron that had paired buckets featuring a splitter in each bucket to discharge the water away from the wheel.



The Pelton water wheel featured "undershot" design and "splitter" cups.

There are varying accounts of what circumstances led to Pelton's development of the splitter design for his water wheel but one story has it that one day Pelton's neighbor as trying to drive a cow out of a clover patch with a garden hose and Pelton observed that when the stream of water hit the cow squarely on the sharp bone of its nose, the water was divided and no water came straight back. Whether this story actually took place or not, Pelton used the concept of splitting water to reduce splashback on the wheel and he invented a water wheel superior to all others.

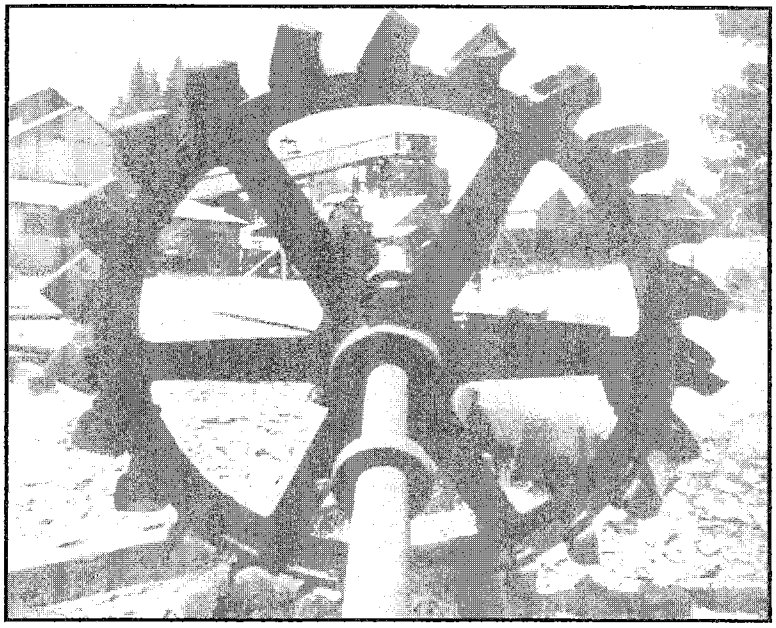
The first Pelton water wheels were manufactured at the Nevada Foundry in Nevada City and Lester patented his design in 1880. They were offered for sale but there were no takers because they no one had confidence in the strange looking wheels until the Pelton water wheel was proclaimed the overwhelming winner in a competition between different water wheels held in 1883 to determine the most efficient water wheel. Pelton's water wheel was over 90% efficient in converting the power of the water to energy beating out its closest competitor by over 25%! Sales of the Pelton wheels soared and the Empire Mine installed Pelton wheels the next year, followed by conversion of the Idaho-Maryland and North Star mines to waterpower. The first two wheels included a six-foot diameter wheel turning 220 rpm, producing 80 horsepower to drive the rock breakers and the stamp mill.

By 1887, 261 Pelton wheels had been

Water Wheel (Continued on Page 1)

Water Wheel (Continued from Page 3)

purchased with nearly 80% being used in California. Demand for the wheels outgrew the Nevada Foundry's production capabilities and in 1888 Pelton moved to San Francisco and formed the Pelton Water wheel Company with the machine works of Rankin, Brayton & Co. By 1895, about 850 companies throughout the world were using Pelton water wheels. The wheels ranged in size from the smallest at 4 inches to 30 feet in diameter which is the largest in the world.



The Pelton water wheel.

Pelton wheels are still being used around the world today to power hydroelectric plants where large quantities of water are available. They are still driving generators in many PG&E stations. However, their use in California mines became limited because a completely dependable source of water could not always be assured due to droughts and winter ice jams that reduced the flow of water. With the advances in electrical technology, Pelton wheels became obsolete in the mines, and by the 1950s nearly all of the gold mines were closed.

Lester Pelton eventually sold the manufacturing rights to his wheel and lived out the rest of his life in Oakland, California, where he died in 1908. He was honored by the American Society of Civil Engineers by the placement of a National Historic Civil Engineering Landmark plaque in Camptonville in 1929, and was inducted into the California Inventors Hall of Fame in 1983.

We are fortunate to have two Pelton wheels at the Kentucky Mine and Museum in Sierra City. Tours of the county park include the opportunity to observe an operational Pelton wheel as it converts the velocity of water dropping from a spring 1,000 feet above, to energy that once powered an air compressor supplying air-powered drills in the mine. And yes, Lester's splitters send sprays of water in all directions away from the wheel, sometimes dousing unsuspecting onlookers, as it quickly picks up speed. After all, it is the most efficient water wheel in the world!

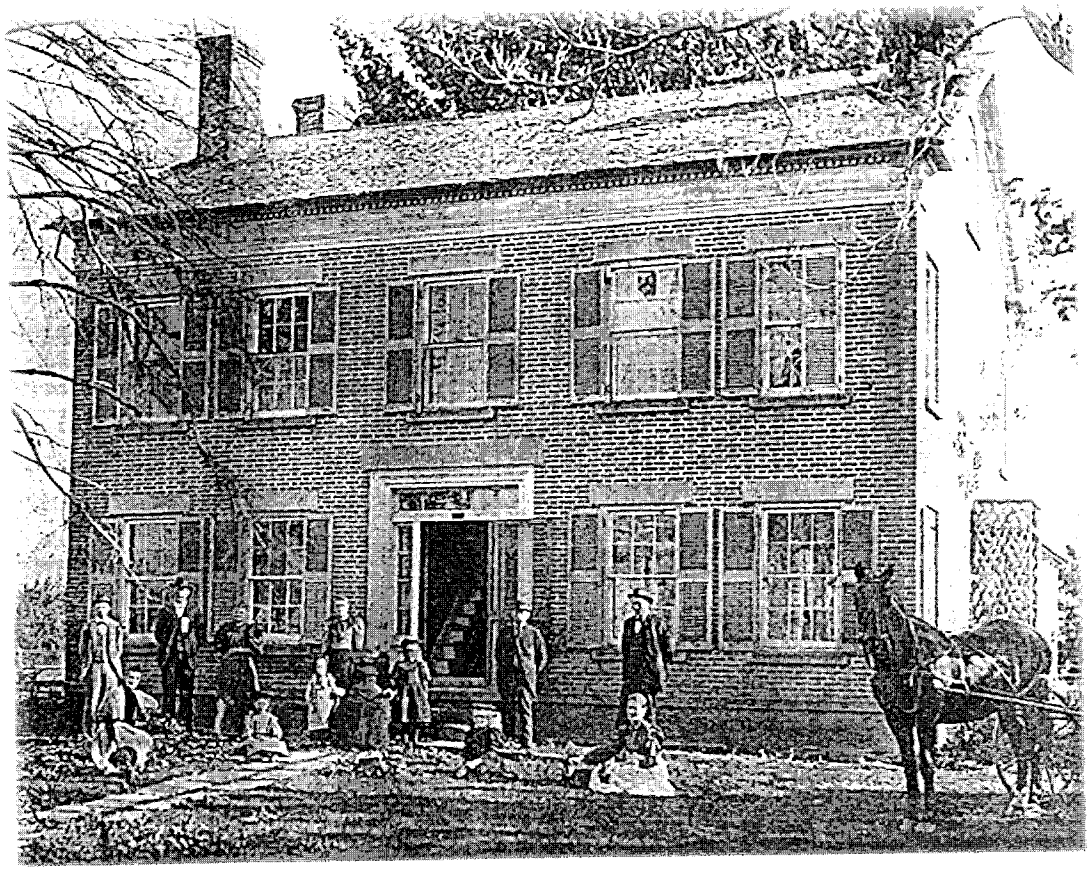
Source material for this article - "Lester Pelton and the Pelton Water Wheel" by Roger P. Lescohier.

LESTER ALLAN PELTON ATTACHMENT

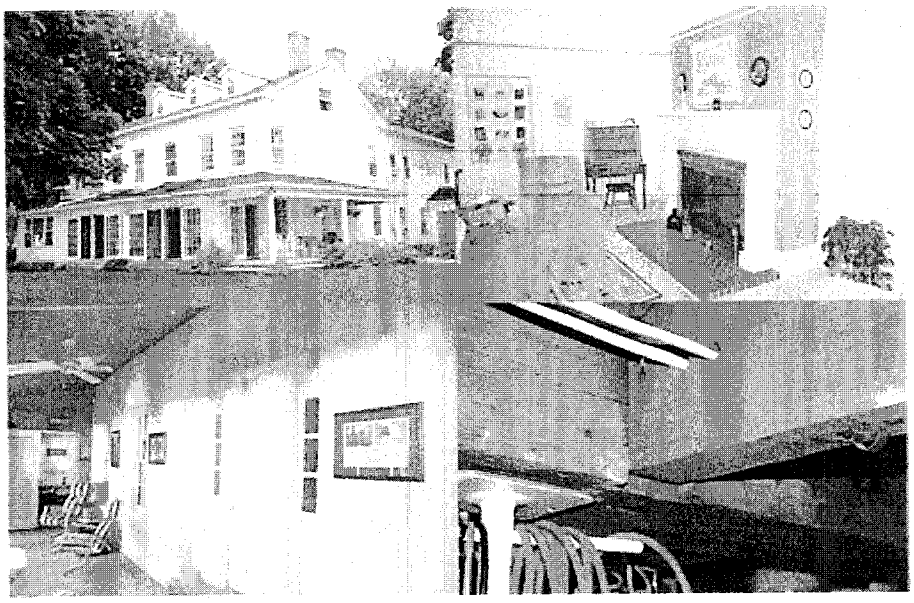
Lester Allan Pelton: father of hydroelectric power

Lester Allan Pelton, considered to be the father of modern day hydroelectric power, was born in Vermilion Township, Erie County, in Ohio on September 5, 1829.

His grandfather, Captain Josiah S. Pelton located in Vermilion in 1818. Originally from the area of Hartford, Connecticut he lived for a time in Euclid, Cuyahoga County, Ohio and when his wife died moved the family to Vermilion. Although well read and very talented he had spent a great deal of his life in the West Indies as captain of a trading vessel and was in ill health by the time he reached Vermilion. Thus, he was not prepared to begin life anew. His oldest son, also named Josiah, then assumed the role of main patriarch for the family. With his guidance and support the family prospered and became comparatively wealthy.



Lester Allan Pelton's Birthplace c.1896-97
Vermilion Township, Ohio

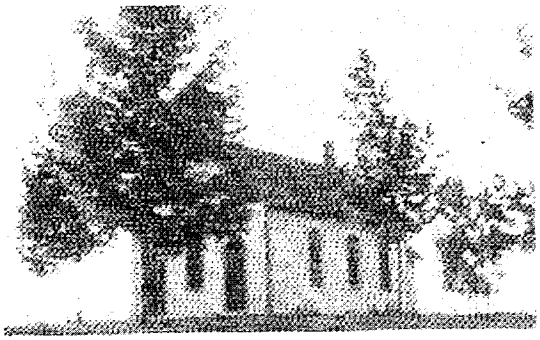


Several views of Pelton's birthplace today (2006).
Now fully restored it is the home of Tom and Jean Beach

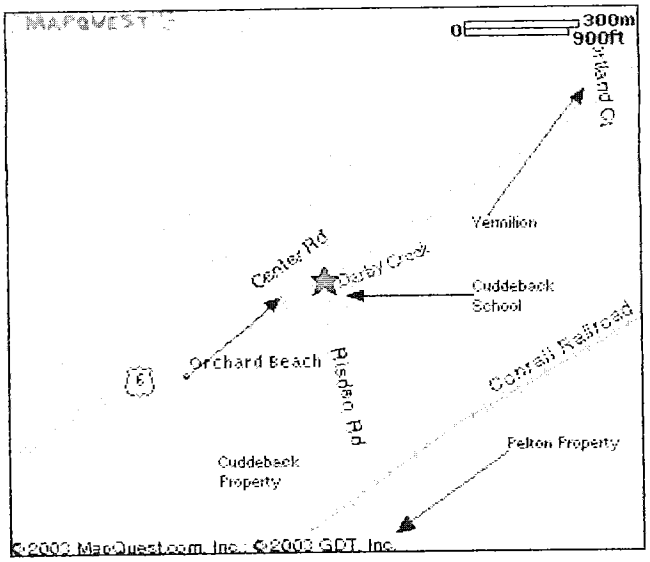
There were seven other children in the family: Sylvester A., Austin, Franklin, Phoebe, Charlotte, Lucy, and Allen, who eventually married Fanny Cuddeback. Allen and Fanny were Lester's parents. All the children figured prominently in the development of the Village of Vermilion (incorporated in 1837) in various capacities both in business and government.

Although family members would eventually own various parcels of land throughout the township and village proper all, including Lester, started life on the Pelton farm in Vermilion Township.

Lester attended the Cuddeback School, a one room schoolhouse, on the southwest corner of Risden and West Shore Roads about a mile west of the village. Little more than this is known about his life in Vermilion.



The Cuddeback school, District #2 located on the Lake Road at Risden. A typical country school building, now a residence.

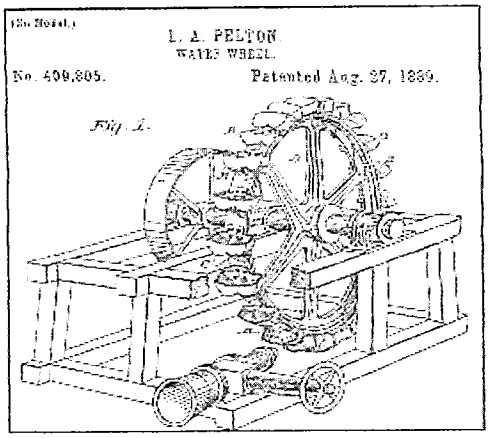


In the spring of 1850, when Lester was about 20 years old he, and and perhaps 10 local boys including William and David Johnson, and Charles Parker headed for gold country in California. Some say that along the way they worked as sheep herders to help them pay their way. Others say they went by wagon train. More to the truth of the matter they most likely did both and a whole lot more.

Arriving in California Pelton left his friends and went to Sacramento where he peddled fish to miners. After hearing that diggingh gold in the Sierra Nevada Mountains was more profitable he moved some ninety miles north toCamptonville in Yuba County along the Yuba River.This was in 1860. All types of mining were going on there; **placer, hard rock, and hydrologic.** Although Lester was not terribly interested in mining he was an avid reader and he enjoyed watching the mining efforts. A very introspective person, he was also a skilled tinsmith, carpenter, and millwright. At the time steam engines powered most of the mining works.

One day he was chasing a stray cow from his landlady's yard in Camptonville. He hit the cow on the nose with water and the water split, circled the cow's nostrils and came out at the outer edge. It gave him an idea. He went home and began to draw a water-wheel with split metal cups.

These are the drawings Pelton made for the U.S. Patent Office of his wheel and its parts. Included is an explanation of the wheel in his own words.



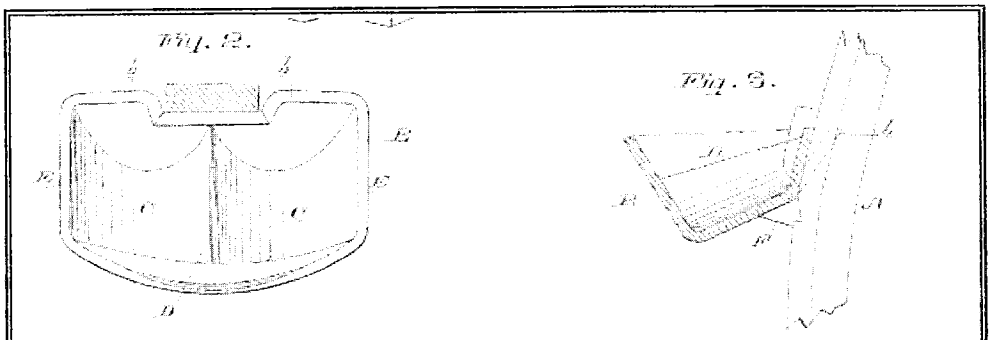


FIG. 2. ENLARGED PLAN VIEW OF ONE OF THE BUCKETS. FIG.3. A LONGITUDINAL SECTION OF THE SAME.

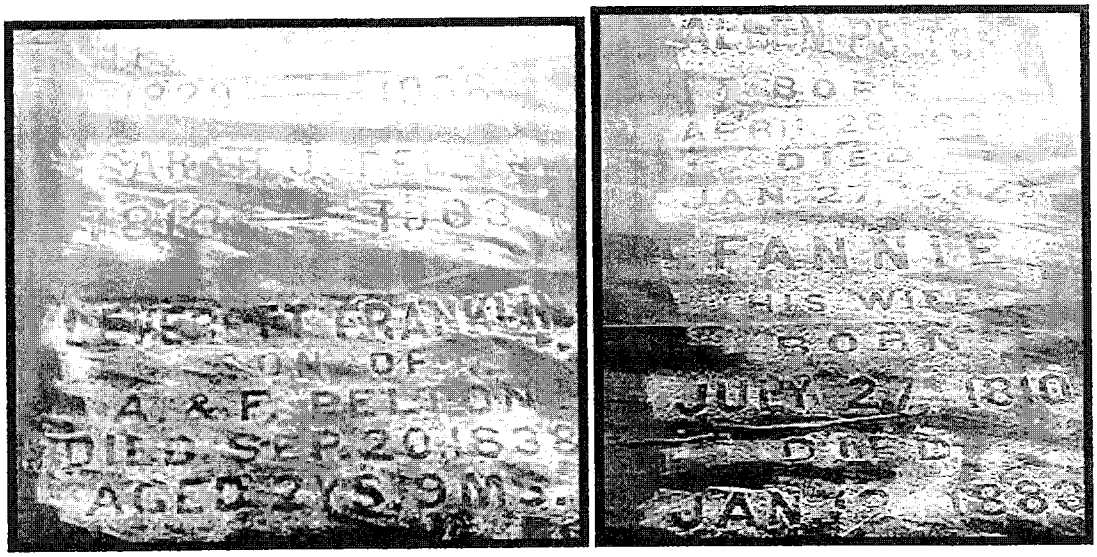
"My invention relates to certain improvements in water-wheels of that class which are driven by the momentum of a stream of water delivered into buckets on the periphery of a wheel through a suitable discharge-nozzle and under a high pressure. My invention consists, essentially, in a novel construction of thebuckets into which the water is discharged, so that the stream of water is divided into two parts by a central ridge or apex which directs the current of water into the curved bottoms of the two halves of the bucket, from which it passes out over the flaring or divergent sides of the bucket, so as to escape smoothly and utilize the full reactionary force of the escaping stream in addition to the direct force of the impinging jet. It also provides an improved means for adjusting and securing the buckets to the wheel rim."

This is, most simplistically, the way the *Pelton Runner* (water turbine) was conceived of and then invented. The runner was first used at the Mayflower Mine in Nevada City, California in 1878. In 1887 a miner attached Pelton's sheel to a dynamo and produced the first hydroelectric power in the Sierra Nevada Mountains. On August 27, 1889 the invention was officially patented. And by 1893 the Age of Hydroelectric power was in full swing. It has proven to be one of the, if not **THE**, most efficient inventions in mining and the production of hydroelectric power in our world.

Pelton's Wheel in Comptonville CA.

On March 14, 1908 into his 79th year of life Lester Allan Pelton passed into the hands of God. He was cremated and his remains were transported back to the town where he was born and lived as a boy. There he was placed to rest with his family in Maple Grove Cemetery on Mason Road south of Vermilion.

Monuments celebrating Pelton's life were erected in Camptonville, California and Washington D.C. One of his original wheels is preserved in Camptonville. Another is on display in the Smithsonian Institute in our nation's capitol.



Inverted chalk rubbings of cemetery markers of the Pelton Family.
Note that the date of Sarah's birth is wrong. She was born in 1831.
(The stone-cutter must have been dyslexic.)

A LETTER FROM CA.

The following communication is, by and large, self explanatory. I rediscovered it whist rambling through the enormous amount of material I have stored on my computer(s). [As I have previously indicated there is a reason folks employ the services of assistants, etc.] In any case, I find the information contained in the letter to be of some historical import. To my knowledge it has not before been published outside a 1908 edition of The Vermilion News. Methinks you'll understand its import as ye read.

Editor Vermilion NEWS:

Thinking you might be glad to pay a last tribute of respect to a former resident of your town, I take the liberty of subjoining a brief sketch of Lester A. Pelton who passed away at his home 827 Grove street Saturday March 14th, 1908.

He was the only son of the late Allen Pelton, long a well known and highly respected citizen of Vermilion township.

In the spring of 1850 when the gold fever of 1849 was at its height, Lester A, Pelton, Henry Roeder, Levi A. Pelton. Henry Hewitt And eight other young men of Vermilion caught the fever and made the preparations to go together as A party the great distance, to California. The journey was overland, long; and full of the hardships incident to that early period, much of it being made on foot The writer recalls listening to many recitals of the perils along the way, the scarcity of food when very small rations were dealt out every morning with the hope of eking out their scanty store until more could by obtained: when the finding of a dead buffalo was an important event; the meat that had dried upon the bones was sliced off and helped much to sustain the men during the latter part of the journey. The party, though spent and and worn was eager to push on to the gold fields, around which so many high hopes had been built. Here the party became more or less scattered. Lester Pelton, engaged in mining in Yuba and Serra counties, afterwards following the vocation of millright, superintending the building of many mills in the section. During his experience he saw the need of great water power, and to, this end he turned his attention, and in 1878 he commenced his experiments which resulted in the famous Pelton Water-Wheel, so out distancing every other invention of its class, as to make a world-wide name for itself. In 1895 the Elliott Cresson, Gold Medal was awarded to Mr. Pelton for his valuable invention, by the Franklin Institute of Philadelphia.

Some idea of the extensive use of these wheels may be gained from the fact that in 1892, over eleven thousand were in use in various parts of the world, in mines, manufactories and other industries; at the present time there are thousands more in use. Mr. Pelton's health became impaired and a number of years ago sold his invention to a San Francisco firm which manufactures the wheels on a large scale.

Being a man of reserved and studious habits he devoted his leisure to such pursuits as pleased him like, reading, or working in his perfectly equipped workshop which he lad fitted up in the basement of his home. Here he was often found working happily over some labor-saving device for the pure

pleasure ot being occupied. The friends who knew him best valued his steadfast friendship and his perfect integrity. He was a man of dignified manner and appearance and was always glad to visit with his friends, especially any old "forty-niner"; He remarked to the writer only a few days before his death that he was the "last one of the twelve who came to California together, fifty eight years ago"; he did not seem to realize that he was so soon to join the band "over there".

The funeral services were held at his late home Monday, March I6th, the Rev. Charles Brown of Oakland, officiating. In closing he gave Tennyson's beautiful poem,

Sunset and evening star
And one clear call for me!
And may there be no moaning of the
bar
When I put out to sea

Twilight and evening bell,
And after that the dark
And may there be no sadness of
farewell
When I embark.

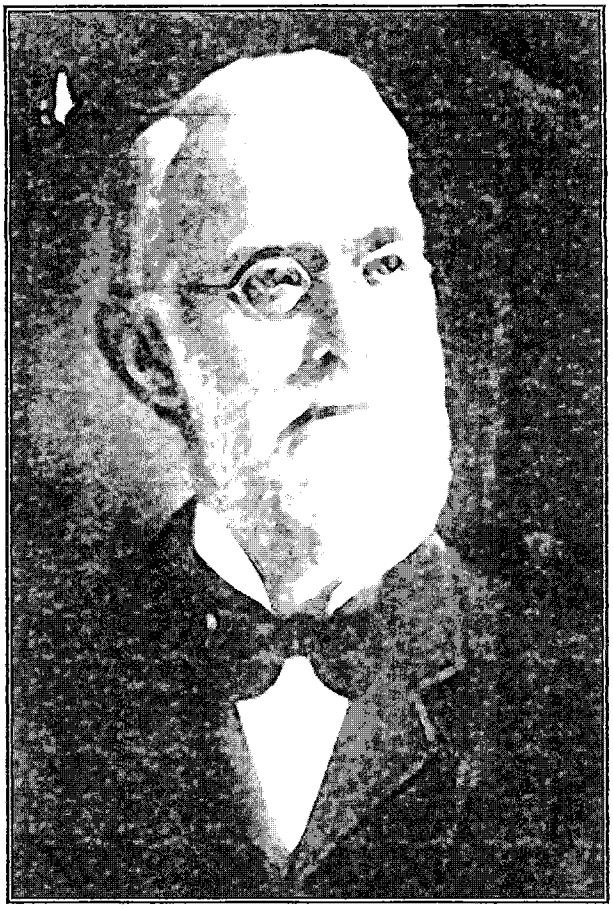
For though from out our bourne of
Time and Place
The flood may bear me far.
I hope to see my Pilot face to face
When I have crossed the bar.

A large number of friends followed him to the beautiful Columbarium; where, as he requested, his body was incinerated. Later the urn containing his ashes will be sent to Vermilion for interment with the other members of his family who rest in the cemetery there.

Mr. Pelton's only surviving sister, Mrs. Henry Wagner, resides in Cleveland, Ohio, Mrs. Fanny A. Stowe, his eldest niece is a resident of Oakland, Cal., Mrs. Ruth Simon and Nelson D. Wagner, niece and nephew of Mr. Pelton also live in Cleveland, Ohio.

Thanking you for giving this notice room In your paper, I am.

Very truly,
Francis M. Pelton
Oakland, Cal., March 18th, 1908



Lester Allan Pelton

As the years turn and more details of Lester's boyhood in Vermilion are discovered they will appear on these pages.

Special Thanks to Tom and Jean Beach

Return to "Views" page

Richard Neale "Rich" Tarrant

PELTON 1898 CATALOG ATTACHMENT

David Allen Trust ~~107~~
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THE PELTON WATER WHEEL

[TRADEMARK]

EMBRACING IN ITS VARIATIONS OF CONSTRUCTION AND APPLICATION

THE PELTON SYSTEM OF POWER.

PATENTED IN THE UNITED STATES AND FOREIGN COUNTRIES.

MANUFACTURED ONLY BY

THE PELTON WATER WHEEL COMPANY

[INCORPORATED].

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ATLANTIC DEPARTMENT:

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A. B. C.,—LIEBER—PELTON.

SEVENTH EDITION, 1898.

ELECTRIC POWER TRANSMISSION

A great industrial revolution is taking place in the development and various applications of electric power, the full significance and far-reaching effect of which are as yet neither understood nor appreciated. All the mystery, doubt and incredulity of the past have given way to the logic of fact and actual demonstration.

Electrical energy in its present stage of development is recognized as the MOST POTENT OF ALL FORCES and a most important factor in material progress and civilization. This subtle and universally prevalent element, about which so little was known but a short time ago, is now gathered, controlled and distributed with a CERTAINTY, PRECISION AND ECONOMY ALMOST INCREDIBLE.

But a decade has passed since it was not possible to transmit power by this means in a commercial way more than a few hundred feet. Now from thirty to forty miles is quite within the limit of ordinary practice with no restrictions as to capacity, save the expenditures in conductor and plant for generating the power.

The greatest progress in the transmission of electrical energy has, however, been in connection with the utilization of water power. With this as a motive force, under all ordinary conditions, electricity is conceded to be the MOST FLEXIBLE, RELIABLE AND ECONOMICAL POWER KNOWN.

With the interest now attaching to this subject, the means of making these vast resources available for power purposes in the most simple and efficient way has come to be of supreme importance, enlisting, as it has, the highest constructive ability and engineering skill known to modern science.

THE PELTON WATER WHEEL COMPANY have demonstrated BEYOND ALL QUESTION their claim to PRE-EMINENCE AND SUPERIORITY in this department of hydraulic engineering, as evidenced by the fact that their wheels are running a majority of the stations of this character in the United States, as well as in most foreign countries.

PELTON WHEELS meet so fully the exacting requirements of this service as regards HIGH EFFICIENCY, CLOSE REGULATION, ABSOLUTE RELIABILITY and small cost of maintenance, that they have come to be regarded as the most essential part of the equipment for an electric power plant, and NO OTHER WILL BE SERIOUSLY CONSIDERED when the advantages above mentioned are understood and appreciated. The system is so flexible that it admits of adaptation to all conditions and every variety of service, and in so simple a way as to provide against the possibility of accident or any interruption to continuous service.

The advantages of this form of power in mining operations are too well known to dwell upon. A few hastily strung wires running to any point instantly transmits the energy of the waterfall into an available force readily adapted to any service. Upwards of five hundred mines in this country are now supplied to a more or less extent with electricity for power and light, by which means all the various operations of mining and milling ores are greatly simplified and cheapened. Many such enterprises may be referred to, now on profitable basis, that owe their very existence to the ECONOMIES WHICH THIS SYSTEM OFFERS, to say nothing of the facilities and conveniences afforded for extended operations.

The question of water wheel regulation, which has so long been a source of perplexity and annoyance in operating electric power plants, has now been definitely solved, and this Company is prepared to GUARANTEE ABSOLUTE AND RELIABLE REGULATION covering the most exacting requirements of any service.

On the following pages will be found a list of electric power installations made by this company, most of them within the past three years, aggregating some 80,000 h. p. Though operating under widely different, and in some instances most extraordinary, conditions, encountering frequently almost insurmountable difficulties, all have been an engineering success, and, so far as known, remunerative in a financial way.

The longest transmissions involved in any of these references are those of the Southern California Electric Power Company—80 miles—and the San Joaquin Electric Power Company—67 miles. Several others range from 15 to 30 miles—the loss in transmission varying from 10 to 25 per cent.

LIST OF ELECTRIC POWER INSTALLATIONS.

San Joaquin Electric Power Co., Fresno, Cal.	2,000 h. p.	running under		1,400 ft. head
Regla Electric Power Transmission Co., Mexico.	3,000 h. p.	"	"	800 ft. head
Big Cottonwood Power Co., Salt Lake City, Utah.	3,000 h. p.	"	"	380 ft. head
Folsom Electric Power Co., Folsom, Cal.	4,000 h. p.	"	"	55 ft. head
Nevada County Electric Power Co., Cal.	1,000 h. p.	"	"	210 ft. head
Santa Ysabel Mine, Tuolumne Co., Cal.	500 h. p.	"	"	300 ft. head
Tuolumne County Electric Co., Columbia, Cal.	500 h. p.	"	"	950 ft. head
Gold Valley Mining Co., Downieville, Cal.	250 h. p.	"	"	200 ft. head
Boza Electric Power Co., Venezuela, S. A.	1,200 h. p.	"	"	400 ft. head
Big Creek Electric Power Co., Santa Cruz, Cal.	800 h. p.	"	"	840 ft. head
Redlands Electric Power Co., Redlands, Cal.	1,000 h. p.	"	"	500 ft. head
Petropolis Electric Power Co., Brazil, S. A.	800 h. p.	"	"	260 ft. head
Quezaltenango Electric Co., Guatemala, C. A.	250 h. p.	"	"	55 ft. head
Ontario Mining Company, Park City, Utah	300 h. p.	"	"	120 ft. head
Alaska Treadwell Mine, Douglas Island, Alaska	600 h. p.	"	"	460 ft. head
Colorado Springs Contract Co., Colorado	440 h. p.	"	"	600 ft. head
Silver Lake Mines, Silverton, Colorado	700 h. p.	"	"	180 ft. head
Roaring Fork Electric Power Co., Aspen, Col.	1,250 h. p.	"	"	330 ft. head
People's Electric Light & Power Co., Aspen, Col.	700 h. p.	"	"	180 ft. head
Telluride Electric Power Co., Telluride, Col.	1,000 h. p.	"	"	500 ft. head
Caroline Mining Co., Ouray, Colorado	400 h. p.	"	"	500 ft. head
Mount Morgan Mining Co., South Africa	600 h. p.	"	"	120 ft. head
Hilo Electric Light Company, Hilo, H. I.	250 h. p.	"	"	260 ft. head
Walla Walla Electric Co., Washington	750 h. p.	"	"	60 ft. head
Amecameca Electric Light & Power Co., Mexico.	700 h. p.	"	"	980 ft. head
Nelson Electric Light & Power Co., Nelson, B. C.	350 h. p.	"	"	160 ft. head
Juneau Elec. Light & Power Co., Juneau, Alaska	200 h. p.	"	"	108 ft. head
Bucaramanga Electric Light Co., Colombia, S. A.	400 h. p.	"	"	53 ft. head
Kycto Electric Power Co., Kyoto, Japan.	1,000 h. p.	"	"	110 ft. head
Chollar Mining Company, Nevada	750 h. p.	"	"	1,680 ft. head
San Antonio Electric Power Co., Cal	800 h. p.	"	"	400 ft. head
Standard Con. Mining Co., Bodie, Cal.	650 h. p.	"	"	340 ft. head
Coeur d'Alene Silver Mining Co., Idaho	760 h. p.	"	"	810 ft. head
Belmont Con. Mining Co., Colorado	250 h. p.	"	"	610 ft. head
Mammoth Mine, Madera County, Cal.	175 h. p.	"	"	60 ft. head
Glenwood Light and Power Co., Colorado	450 h. p.	"	"	380 ft. head
Casapalca Electric Light Co., Casapalca, Peru	400 h. p.	"	"	170 ft. head
Electric Lt. and Power Co., San Jose, Costa Rica	400 h. p.	"	"	200 ft. head
Mt. Lowe Railway Company, Altadena, Cal.	200 h. p.	"	"	1,250 ft. head
Revenue Tunnel Co., Ouray, Colorado	600 h. p.	"	"	650 ft. head
South Yuba Canal Co., Newcastle, Cal.	130 h. p.	"	"	420 ft. head
Central Cal. Electric Co., Newcastle, Cal.	1,200 h. p.	"	"	420 ft. head
Roaring Fork Elec. L. & P. Co., Aspen, Col.	1,400 h. p.	"	"	820 ft. head
Cia. de Luz Electrica, San Salvador, C. A.	300 h. p.	"	"	60 ft. head
Santa Ana Elec. Co., San Salvador, C. A.	400 h. p.	"	"	76 ft. head
Medillin Elec. Lt. Co., Medillin, U. S. C.	700 h. p.	"	"	340 ft. head
Cia. Esplotadora de Lota y Coronel, Chili, S. A.	650 h. p.	"	"	360 ft. head
F. D. Mendiola, Boza, Costa Rica, C. A.	400 h. p.	"	"	200 ft. head
Cartago Electric Light Co., Costa Rica, C. A.	300 h. p.	"	"	250 ft. head
Moodies Mining Co. Limtd., South Africa	800 h. p.	"	"	130 ft. head
Honolulu Elec. Light Co., Honolulu, H. I.	100 h. p.	"	"	200 ft. head
Bozeman Elec. Light Company, Montana	170 h. p.	"	"	124 ft. head
Wallace Elec. Light Co., Wallace, Idaho	125 h. p.	"	"	124 ft. head
Bell Electric Light Company, Auburn, Cal.	100 h. p.	"	"	80 ft. head
Alaska Gold Mining Co., Douglas Island, Alaska	150 h. p.	"	"	460 ft. head
Banner Mining Company, Oroville, Cal.	160 h. p.	"	"	120 ft. head
Co-operative Mining & Milling Co., Arizona	100 h. p.	"	"	150 ft. head
Helena & Livingston Smelting Co., Montana	600 h. p.	"	"	725 ft. head
Burmah Ruby Mines, Mandalay, India	400 h. p.	"	"	120 ft. head
Fairhaven Electric Co., Fairhaven, Wash.	120 h. p.	"	"	300 ft. head
Phoenix Mining Co., New Zealand, Australia	200 h. p.	"	"	180 ft. head
Bear Valley Electric Power Co., Nova Scotia	270 h. p.	"	"	170 ft. head
Tinebi El. Lt. & Power Co., Costa Rica, C. A.	300 h. p.	"	"	260 ft. head
Weaverville El. Light & Power Co., Cal.	700 h. p.	"	"	200 ft. head
Mullan El. Lt. & Power Co., Mullan, Idaho	160 h. p.	"	"	170 ft. head
Calumet Mining Company, Shasta Co., Cal.	300 h. p.	"	"	800 ft. head
Delmatia Mining Co., Eldorado Co., Cal.	230 h. p.	"	"	110 ft. head
Gold King Mining Company, Colorado.	1,200 h. p.	"	"	500 ft. head
Sheridan-Belmont Mining Co., Colorado	360 h. p.	"	"	240 ft. head
Barrio-Nueva Jute Company, Orizaba, Mexico.	700 h. p.	"	"	100 ft. head

LIST OF ELECTRIC POWER INSTALLATIONS.

Southern Cal. Power Co., Santa Ana Cañon, Cal.	5,000 h. p.,	running under	700 ft. head
Cia. de Papal de San Rafael y Anexas, Mexico	1,200 h. p.,	" "	950 ft. head
Cia. de Papal de San Rafael y Anexas, Mexico	550 h. p.,	" "	220 ft. head
Hiroshima Electric Light Co., Hiroshima, Japan	1,200 h. p.,	" "	240 ft. head
Utah Power Company, Salt Lake City, Utah	2,000 h. p.,	" "	440 ft. head
Ned. Ind. Mijnbouw Mtiji., Celebes, East Indies	650 h. p.,	" "	550 ft. head
Petropolis Electric Light Co., Brazil, S. A.	1,000 h. p.,	" "	200 ft. head
Cie. de Boa Vista, Diamantina, Brazil, S. A.	400 h. p.,	" "	350 ft. head
Cripple Creek District Ry., Cripple Creek, Colo.	400 h. p.,	" "	550 ft. head
Burmah Ruby Mines, Mandalay, India	220 h. p.,	" "	60 ft. head
Miller Manual Labor School, Albemarle, Va	70 h. p.,	" "	225 ft. head
Diamond Hill Gold Mining Co., Townsend, Montana	700 h. p.,	" "	170 ft. head
Duplantier Elec. Light Co., San Jose, Costa Rica, C. A.	150 h. p.,	" "	52 ft. head
San Ildefonso Paper Mill, San Ildefonso, Mexico	1,000 h. p.,	" "	185 ft. head
Yuba Electric Power Company, Marysville, Cal.	2,000 h. p.,	" "	290 ft. head
Crested Butte Light & Water Company, Colo.	75 h. p.,	" "	300 ft. head
Development Syndicate, Oroville, California	83 h. p.,	" "	120 ft. head
Kyoto City—Electrical Department—Kyoto, Japan	150 h. p.,	" "	100 ft. head
Alumbrado Elec. de Quezaltenango, Guatemala, C. A.	140 h. p.,	" "	83 ft. head
South Yuba Water Company, Newcastle, Cal.	134 h. p.,	" "	440 ft. head
Concheno Mining Company, Concheno, Mexico	260 h. p.,	" "	190 ft. head
Santa Ysabel Mining Company, Jamestown, Cal.	80 h. p.,	" "	130 ft. head
Nevada County Electric Power Co., Nevada City, Cal.	1,600 h. p.,	" "	200 ft. head
Juneau Electric Light Company, Juneau, Alaska	200 h. p.,	" "	225 ft. head
Hilo Electric Light & Power Company, Hawaii, H. I.	260 h. p.,	" "	250 ft. head
Tuolumne Electric Light & Power Co., Jamestown, Cal.	500 h. p.,	" "	995 ft. head
Oroville Gas & Electric Company, Oroville, Cal.	75 h. p.,	" "	100 ft. head
Cooperative Mining & Milling Co., Bumblebee, A. T.	75 h. p.,	" "	150 ft. head
Empress Electricio de la Antigua, Guatemala, C. A.	200 h. p.,	" "	65 ft. head
Spring Creek Electric Power Company, Shasta Co., Cal.	300 h. p.,	" "	800 ft. head
Telluride Power Transmission Co., Telluride, Colo.	900 h. p.,	" "	901 ft. head
Cañon Creek Electric Company, Gem, Idaho	50 h. p.,	" "	90 ft. head
Columbia & Western Railway Company, Trail, B. C.	550 h. p.,	" "	267 ft. head
Sandon Water Works & Light Company, Sandon, B. C.	200 h. p.,	" "	400 ft. head
Fort Wayne Electric Corporation, Arizona	60 h. p.,	" "	200 ft. head
Waianæ Electric Company, Hawaiian Islands	270 h. p.,	" "	690 ft. head
Boca Ice Company, Prosser, California	40 h. p.,	" "	20 ft. head
Payson Electric Light & Power Co., Payson, Utah	150 h. p.,	" "	125 ft. head
Gold Hill Water Company, Virginia City, Nev.	30 h. p.,	" "	230 ft. head
Big Dipper Mining Company, Iowa Hill, Cal.	20 h. p.,	" "	230 ft. head
Gold Bluff Mining Company, Downieville, Cal.	125 h. p.,	" "	270 ft. head
Pioneer Mining Company, Plymouth, Cal.	25 h. p.,	" "	560 ft. head
Gold Dredging Company, Bannock, Montana	150 h. p.,	" "	350 ft. head
Caroline Mining Company, Ouray, Colo.	520 h. p.,	" "	650 ft. head
Ouray Electric Light Company, Ouray, Colo.	350 h. p.,	" "	250 ft. head
Hidden Treasure Gold Mining Co., Placer Co., Cal.	200 h. p.,	" "	810 ft. head
Jumper Mining Company, Stent, California	400 h. p.,	" "	230 ft. head
Mountain Copper Company, Keswick, Cal.	400 h. p.,	" "	240 ft. head
Ontario Silver Mining Company, Park City, Utah	160 h. p.,	" "	120 ft. head
Antigua Electric Light Company, Guatemala, C. A.	280 h. p.,	" "	65 ft. head
Silver Lake Mines, Silverton, Colorado	300 h. p.,	" "	180 ft. head
Santa Fe Water & Investment Co., Santa Fe, N. M.	120 h. p.,	" "	160 ft. head
Santa Gertrudis Mining Co., Orizaba, Mexico	250 h. p.,	" "	100 ft. head
Empresa Electrica Antigua, Guatemala, C. A.	260 h. h.,	" "	65 ft. head
Los Compania Electrica, Medillin, U. S. Colombia	600 h. p.,	" "	490 ft. head
Cia. Electrica San Cristobal, Venezuela, S. A.	100 h. p.,	" "	150 ft. head
Cia. de Luz Electrica de Heredia, Costa Rica, C. A.	400 h. p.,	" "	200 ft. head
San Jose Electric Light Co., Costa Rica, C. A.	400 h. p.,	" "	200 ft. head
Buttermilk Falls Electric Co., Ft. Montgomery, N. Y.	200 h. p.,	" "	85 ft. head
Ophir Mining Company, Ophir Hill, Utah	100 h. p.,	" "	108 ft. head
Alumbrado Electric Company, San Salvador City, C. A.	750 h. p.,	" "	100 ft. head
Neihart Water Company, Neihart, Montana	75 h. p.,	" "	310 ft. head
Tjimpaka Tea Estate, Island of Java, D. E. I.	70 h. p.,	" "	60 ft. head
Dutch East Indian Electric Light Company	800 h. p.,	" "	560 ft. head
Bear Valley Electric Company, Nova Scotia	110 h. p.,	" "	90 ft. head
Santa Ana Electric Company, San Salvador, C. A.	200 h. p.,	" "	60 ft. head
Talamanco Electric Light Company, Venezuela, S. A.	160 h. p',	" "	200 ft. head
Mendoza Electric Light Company, U. S. Colombia	110 h. p.,	" "	76 ft. head
[illegible]dgetown Electric Light Co., N. S. W., Australia	140 h. p.,	" "	126 ft. head
[illegible]ossland Electric Light Company, Rossland, B. C.	250 h. p.,	" "	240 ft. head
British Columbia Electric Railway, Victoria, B. C.	1,200 h. p.,	" "	570 ft. head

PELTON HALL OF FAME ATTACHMENT

Lester Allen Pelton
Born September 5 1829 • Died March 14 1908

Water-Wheel
Patent No. 233,692

Inducted 2006

One of the fathers of hydroelectric power, Lester Pelton invented the first water wheel to take advantage of the kinetic energy of water rather than the weight or pressure of a stream. The speed and efficiency of Pelton•s wheel made it ideal for generating electricity.

Invention Impact

Pelton designed a wheel with split buckets that harnessed the kinetic energy of a small volume of water flowing at high speed. Properly adjusted, Pelton•s wheel could be over 90 percent efficient; other wheels were at best 40 percent efficient. With Pelton•s wheel, low-cost hydroelectric power could replace expensive steam engines in mining operations in the western states, where streams rarely flowed at high enough volumes to turn traditional water wheels.

To keep up with tremendous demand, Pelton and a San Francisco machine shop owner organized the Pelton Water Wheel Company. Today, Pelton•s wheel still generates electricity in small hydroelectric power plants in the western United States.

Inventor Bio

Pelton was born in Vermillion, Ohio. He migrated to California in 1850, in the midst of the Gold Rush. Failing to strike it rich, he worked as a carpenter and millwright. He began developing his water wheel in the late 1870s, as the power demands of mining operations and related industries grew ever greater.

PELTON 1909 CATALOG ATTACHMENT

PELTON WATER WHEELS

1909

THE
PELTON WATER WHEEL
COMPANY
SAN FRANCISCO NEW YORK

Electric Power Transmission

It is conceded that the electric transmission of energy is now one of the most important factors in the industrial world. The development on these lines has been of phenomenal growth, and the achievements of today can scarcely be credited from the standpoint of a few years ago. The world's first successful experiment in long-distance electric transmission was made in Germany in 1891, where a small amount of power was transmitted from Lauffin to Frankfort, and used in connection with an industrial exhibit held there at that time. In less than a year thereafter a PELTON WHEEL was driving a generator at the plant of the San Antonio Light and Power Company of Pomona, California, and transmitting electricity for power and light a distance of forty-five miles. California and the PELTON WHEEL thus claim the first power transmission plant in the United States, and the second in the world. In fact, the German installation was of an experimental nature, and the Pomona plant may be said to have been the first commercially operative system of electric transmission that was ever installed.

The development was rapid from that time on, until today a transmission of one hundred miles is of common occurrence, and thousands of horse-power are being transmitted for a distance of nearly three hundred miles. It has been demonstrated that the limit of distance to which power can be economically transmitted depends solely on the cost of the line conductors; hence it is difficult to forecast the development which is still to come. It is, after all, the utilization of water power which has made possible this great revolution, as there is no other power agency that will afford sufficient economy of production to make transmission of power commercially practicable. With water as the motive force, under all ordinary conditions electricity is conceded to be the most economical and reliable power known.

PELTON WHEELS meet so fully the existing requirements of this service as regards high efficiency, close regulation and small cost of maintenance, that they have come to be regarded as factors of prime importance in modern water power installations. The system is so flexible that it admits of adaptation to all conditions and every variety of service, and in so simple a way as to provide against liability of accident or interruption to continuous service.

The adaptation of electric power transmission must always be determined by the conditions of each particular case. Every proposition of this character is an engineering problem in itself to be carefully considered and worked out after a full investigation of all the facts and circumstances connected with it.

On the following pages will be found a list embracing 431 electric power installations operated by PELTON WHEELS, aggregating some 454,890 horse-power, which will in itself evidence the fact that this Company has specialized in the electrical field, and has had a wide experience. As will be observed, these plants are running under a great variety of conditions as to head, speed and power, yet in every instance, so far as known, they have proven to be efficient and reliable, affording an economic and satisfactory power.

Electric Power Installations

For Whom Installed	Horse-power	Operating Head Feet
Portezuelo Electric Power Company, Mexico	4000	461
Ned. Ind. Mijnbouw My., Celebes, East Indies	650	550
Petropolis Electric Light Company, Brazil, S. A.	1000	260
Cie de Boa Vista, Diamantina, Brazil, S. A.	400	350
Cripple Creek District Railway, Cripple Creek, Colo.	400	550
Burmah Ruby Mines, Mandalay, India (third station).	200	60
Miller Manual Labor School, Albemarle, Va.	70	225
Diamond Hill Gold Mining Company, Townsend, Mont.	700	170
Duplantier Electric Light Company, Costa Rica, C. A.	150	62
San Ildefonso Paper Mill, San Ildefonso, Mexico	1000	185
Yuba Electric Power Company, Marysville, Cal.	2000	290
Crested Butte Light and Water Company, Colorado	75	300
Development Syndicate, Butte County, Cal.	185	120
Kyoto City—Electrical Department—Kyoto, Japan	150	100
Alumbrado El de Quezaltenango, Guatemala, C. A.	140	83
South Yuba Water Company, Newcastle, Cal.	134	440
Concheno Mining Company, Concheno, Mexico	200	190
Santa Ysabel Mining Company, Jamestown, Cal.	80	130
Nevada County Electric Power Company, Cal.	1600	200
Juneau Electric Light Company, Juneau, Alaska	200	225
Hilo Electric Light and Power Company, Hawaii, H. I.	200	250
Tuolumne Electric Light and Power Company, Cal.	500	905
Oroville Gas and Electric Company, Oroville, Cal.	55	100
Cooperative Mining and Milling Company, Arizona	55	150
Empress Electricio de la Antigua, Guatemala, C. A.	200	65
Spring Creek Electric Power Company, Shasta, Cal.	300	800
Telluride Power Transmission Company, Telluride, Colo.	900	901
Cañon Creek Electric Power Company, Gem, Idaho	180	90
Columbia & Western Railway Company, British Columbia	550	267
Sandon Water Works and Light Company, British Columbia	200	400
Fort Wayne Electric Power Company, Arizona	200	200
Waianae Electric Company, Hawaiian Islands	270	690
Boca Ice Company, Prosser, Placer County, Cal.	140	20
Payson Electric Light and Power Company, Utah	150	125
Gold Hill Water Company, Virginia City, Nevada	130	230
Big Dipper Mining Company, Iowa Hill, Cal.	120	230
Gold Bluff Mining Company, Downieville, Cal.	125	270
Pioneer Mining Company, Plymouth, Cal.	125	500
Gold Dredging Company, Bannock, Mont.	150	350
Caroline Mining Company, Colorado (second station)	520	650
Ouray Electric Light and Power Company, Colorado	350	250
Hidden Treasure Gold Mining Company, Cal.	200	810
Juniper Mining Company, Stent, Cal.	400	230
Mountain Copper Mining Company, California	100	240
Ontario Silver Mining Company, Park City, Utah	160	120
Antigua Electric Light Company, Guatemala, C. A.	280	65
Silver Lake Mining and Milling Company, Colorado	300	180
Santa Fe Water and Investment Company, New Mexico	120	160
Santa Gertrudis Mining Company, Orizaba, Mexico	240	100
Arawaka Mining and Milling Company, Japan	240	100
Empresa Electrica Antigua, Guatemala, C. A.	260	65
Los Compania Electrica, Medillin, U. S. Colombia	600	490
Cia Electrica San Cristobal, Venezuela, S. A.	100	150
Cia de Luz Elec. de Heredia, Costa Rica, C. A.	100	260
San José Electric Light Company, Costa Rica, C. A.	400	200
Buttermilk Falls Electric Company, New York	200	85
Ophir Mining Company, Ophir Hill, Utah	100	108
Alumbrado Electric Company, C. A.	750	100
Neihart Water Company, Neihart, Mont.	175	310
Tjimpaka Tea Estate, Island of Java, D. E. I.	170	60
Dutch East Indian Electric Light Company	800	560
Bear Valley Electric Light Company, Nova Scotia	110	90
Santa Ana Electric Company, San Salvador, C. A.	200	60
Talemanco Electric Light Company, Venezuela, S. A.	160	200
Mendoza Electric Light Company, U. S. Colombia	110	70
Bridgetown Electric Light Company, N. S. W., Australia	110	126
Rossland Electric Light Company, Rossland, B. C.	250	210
British Columbia Electric Railway, Victoria, B. C.	1200	570
Blue Lakes Water Company, Blue Lakes, Cal.	2000	1050
Odawara Electric Railway Company, Odawara, Japan	1000	150
Redlands Electric Power Company (second station)	800	600
Ventura Land and Power Company, California	125	65
Salt Lake & Ogden Railway Company, Utah	175	230
Griffith Con. Mining Company, Eldorado County, Cal.	500	1100
Central California Electric Company, Auburn, Cal.	750	200
Bell Electric Company, Auburn, Cal.	100	150

Electric Power Installations—*Continued*

For Whom Installed	Horse-power	Operating Head Feet
Pike's Peak Power Company, Colorado	3000	1180
Golconda Mining Company, Limited, Oregon	200	380
Buffalo Mill Company, Buffalo, Wyoming	100	454
South Bend Electric Company, Washington	150	400
Redlands Electric Power Company, Cal. (fourth station)	400	550
Gold Note Mining Company, Arizona	300	160
Clipper Mining Company, Pony, Montana	150	130
Rawhide Mining Company, California	1800	1200
Northport Electric Company, Washington	125	175
Ferrocarria Electrica de Jalapa, Mexico	1200	244
La Hormiga Transmission, Contreras, Mexico	800	860
Cia Electrica e Yrrigadora Tetapango, Mexico	3400	195
Oregon Lumber Company, Oregon City, Oregon	165	135
Reno Water, Land and Light Company, Nevada	520	34
San Poil Mining and Water Power Company, Wash.	185	105
Nelson Electric Company, British Columbia	200	185
San Miguel Power Transmission Company, Ames, Colo.	1000	580
Colorado Electric Light and Power Company, Colorado	180	223
Redlands Electric Light and Power Company, Cal. (third station)	350	605
Kanagawa Electric Light Company, Japan	191	200
Four Hills Mining Company, Plumas County, Cal.	300	910
City of Healdsburg Electric Light Company, Cal.	200	963
E. Basadre Forero, La Paz, Bolivia, S. A.	150	230
Lihue Plantation Company, Kauai, Hawaiian Islands	125	45
Elling & Morris Mining Company, Pony, Montana	150	108
Fern Gold Mining Company, British Columbia	100	250
Granite Bimetallic Con. Mining Company, Montana	1800	680
Morning Mining and Milling Company, Mullan, Idaho	240	900
Utica Mining Company, Angels, Cal.	1100	536
Weaver Mining Company, Ballarat, Cal.	100	200
Butte County Electric Power and Light Company, Cal.	1200	600
Sunnyside Mining Company, Eureka, Colo.	200	261
Yellowstone Mining Company, British Columbia	150	430
Moendjoel Estate, Tjibadak, Java, East Indies	275	100
Cia Minera y Beneficiadora de Teziutlan, Mexico	1220	1050
Canas Mining Company, Guernavaca, Mexico	140	70
Fabrica La Experiencia, Guadalajara, Mexico	1400	460
Cia de Boa Vista, Diamantina, Brazil, S. A.	125	170
Cia Luz Electrica de Orizaba, Mexico	1200	320
Fabrica Santa Teresa, Contreras, Mexico	300	270
The Basic Mining and Milling Company, Idaho	800	350
Noriega, Sanchez y Cia, Los Melinos, Mexico	720	110
Burmah Ruby Mines, Limited, Burmah, India	500	200
Hale Electric Light Plant, Dixville Notch, N. H.	150	360
Cia Gas Acetylino, Peru, S. A.	400	125
Telluride Power Transmission Company, Colorado (second station)	1600	550
Central California Electric Company, Cal. (second station)	1200	430
Truckee River General Electric Company, Cal.	2300	84
Sierra Power Company, Southern California	1100	610
Crystal Lake Gold Mining Company, California	450	900
Stanislaus Power Company, Calaveras County, Cal.	1100	140
Montauk Consolidated Gold Mining Company, Cal.	100	115
Seattle Light and Power Company, Washington	200	230
Glenwood Light and Power Company, Colorado	100	460
United Electric, Gas and Power Company, California	100	350
Colorado Electric Light and Power Company, Colorado	100	223
Kanagawa Electric Light Company, Japan	600	200
Cape Colony Electric Power Company, South Africa	1300	560
Trinidad Electric Light and Power Company, W. I.	1050	460
Cia Industrial de Santa Catalina, Mexico	1400	70
Eagles Mere Electric Light Company, Pennsylvania	250	220
Cornucopia Mining and Milling Company, Oregon	400	330
Annie Laurie Mining and Milling Company, Utah	400	550
Mauritius Electric Company, Island of Mauritius	100	160
Frontino & Bolivia Gold Mining Company, S. A.	150	120
La Hormiga Transmission Company, Mexico (second station)	400	860
Teziutlan Copper Mining Company, Mexico	900	1050
Santa Ysabel Mining Company, Tuolumne County, Cal.	260	30
Keswick Electric Power Company, Shasta County, Cal.	4500	1200
Samoa Estates, Limited, Samoa Islands	160	30
Kofu Electric Power Company, Japan	200	90
Bagnall & Hilles, Gomei Kaisha, Japan	250	100
Wanoosnock Electric Power Company, Massachusetts	600	130
British Columbia Electric Railway Company, B. C. (second station)	900	650
Big Creek Power Company, Cal. (second station)	1500	975
Reyla Electric Power Transmission Company, Mexico	3000	800

Electric Power Installations—*Continued*

For Whom Installed	Horse-power	Operating Head Feet
Big Cottonwood Power Company, Salt Lake City, Utah	3000	380
Folsom Electric Power Company, Folsom, Cal.	4000	55
Nevada County Electric Power Company, California	1000	210
Santa Ysabel Mine, Tuolumne County, Cal	500	300
Tuolumne County Electric Company, California	500	950
Gold Valley Mining and Milling Company, California	250	200
Boza Electric Power Company, Venezuela, S. A.	1200	400
Big Creek Electric Power Company, Santa Cruz, Cal.	800	810
Redlands Electric Power Company, Redlands, Cal.	1000	500
Petropolis Electric Power Company, Brazil, S. A.	800	260
Quezaltenango Electric Company, Guatemala, C. A.	250	55
Ontario Mining Company, Park City, Utah	300	120
Alaska Treadwell Mine, Douglas Island, Alaska	600	460
Colorado Springs Contract Company, Colorado	140	600
Silver Lake Mining and Milling Company, Colorado	700	180
Roaring Fork Electric Power Company, Aspen, Colo.	1250	330
People's Electric Light and Power Company, Colo.	700	180
Telluride Electric Power Company, Colorado	1000	500
Caroline Mining and Milling Company, Colorado	100	500
Mount Morgan Mining Company, South Africa	600	120
Hilo Electric Light Company, Hilo, H. I.	250	260
Walla Walla Electric Company, Washington	750	60
Amecameca Electric Light and Power Company, Mexico	700	980
Nelson Electric Light and Power Company, B. C.	350	160
Juneau Electric Light and Power Company, Alaska	200	108
Bucaramanga Electric Light Company, Colombia, S. A.	400	53
Kyoto Electric Power Company, Kyoto, Japan	1000	110
Chollar Mining and Milling Company, Nevada	750	1680
San Antonio Electric Power Company, California	800	400
Standard Consolidated Mining Company, Bodie, Cal.	650	340
Couer d'Alene Silver Mining Company, Idaho	760	810
Belmont Consolidated Mining Company, Colorado	250	610
Mammoth Mine, Madera County, Cal.	175	70
Glenwood Light and Power Company, Colorado	450	390
Casapalca Electric Light Company., Casapalca, Peru	400	170
Electric Light and Power Company, Costa Rica	400	200
Mount Lowe Railway Company, Altadena, Cal.	200	1250
Revenue Tunnel and Mining Company, Colorado	600	630
South Yuba Canal Company, Newcastle, Cal.	130	120
Central California Electric Company, Newcastle, Cal.	1200	420
Roaring Fork Electric Light and Power Company, Colo.	1100	820
Bell Electric Company, Auburn, Cal., (second station)	225	140
Cia de Luz Electrica, San Salvador, C. A.	300	60
Santa Ana Electric Company, San Salvador, C. A.	400	75
Medillin Electric Light Company, U. S. Colombia	700	340
Cia Esplotadora de Loto y Coronel, Chili, S. A.	650	360
F. D. Mendiola, Boza, Costa Rica, C. A.	100	200
Cartago Electric Light Company, Costa Rica, C. A.	300	250
Moodies Mining Company, Limited, South Africa	800	130
Honolulu Electric Light Company, Honolulu, H. I.	100	200
Bozeman Electric Light Company, Montana	170	124
Wallace Electric Light Company, Wallace, Idaho	125	124
Bell Electric Light Company, Auburn, Cal	100	80
Alaska Gold Mining Company, Alaska	150	160
Banner Mining Company, Butte County, Cal.	160	120
Cooperative Mining and Milling Company, Arizona	100	150
Helena and Livingston Smelting Company, Montana	600	725
Burmah Ruby Mines, Mandalay, India (second station)	100	120
Fairhaven Electric Company, Fairhaven, Wash.	150	300
Phoenix Mining Company, New Zealand	500	180
Bear Valley Electric Power Company, Nova Scotia	240	170
Tinebi Electric Light and Power Company, C. A.	300	260
Weaverville Electric Light and Power Company, Cal.	500	200
Mullan Electric Light and Power Company, Idaho	160	170
Calumet Mining Company, Shasta County, Cal.	300	800
Dalmatia Mining Company, Eldorado, Cal.	230	110
Gold King Mining and Milling Company, Colorado	1200	500
Sheridan-Belmont Mining Company, Colorado	300	210
Barrio-Nueva Jute Company, Orizaba, Mexico	700	100
Southern California Power Company, Cal.	4000	700
Cia de Papal de San Rafael y Anexas, Mexico	1200	950
Cia de Papal de San Rafael y Anexas, Mexico	550	220
Hiroshima Electric Company, Hiroshima, Japan	1200	240
Utah Power Company, Salt Lake City, Utah	2000	110
San Gabriel Electric Company, California	3200	400
Tuolumne County Water Company, Cal.	1500	975

Electric Power Installations—*Continued*

For Whom Installed	Horse-power	Operating Head Feet
Big Creek Power Company, California	900	923
Chainman Mining and Electric Company, Nevada	180	177
Montana Electric Light and Power Company, Montana	150	680
Utica Gold Mining Company, California	1000	530
Lucky Girl Mining Company, Nevada	300	660
Winnemucca Water and Light Company, Nevada	150	1100
Mariposa Commercial and Mining Company, Cal.	730	29
Oroville Electric Light and Power Company, Cal.	300	243
Roseburg Water Company, Oregon	150	240
Wenatchee Electric Light and Power Company, Wash.	150	160
Los Gatos Ice and Power Company, California	150	216
Cia de Transmission Elec. de Potencia, S. A.	1800	800
Ardjasarie Electric Power Transmission Company, Java	100	282
Goldpan Engineering and Mine Supply Company, Colorado	540	460
Yosemite Valley Lighting Plant, California	250	144
Eagle-Shawmut Mining Co., California	100	900
Bay Counties Power Company, California	2100	292
Standard Electric Company, California	1800	1000
Hilo Electric Light Company, Hawaiian Islands	240	360
Bishop Light and Power Company, California	100	50
Clark Electric Light and Power Company, Utah	400	700
Ouray Electric Light and Power Company, Colorado	700	400
United Light and Power Company, Colorado	560	720
Lahaina Plantation, Hawaiian Territory	400	565
Bay Counties Power Company, California (second station)	1400	590
Fraser & Chalmers, London, England	200	400
Toccoa Falls Light and Power Company, Georgia	150	245
Pike's Peak Power Company, Colorado (second station)	1150	680
Mexican General Electric Company, Mexico	100	48
San Simonito Power Developing Company, Mexico	700	1050
Angel Sanchez & Brothers, Mexico	250	350
Standard Electric Company, California (second station)	3000	1500
Utica Electric Light and Power Company, New York	125	255
Jalapa Light and Power Company, Mexico	900	250
Bay Counties Power Company, California (third station)	1400	590
Orizaba City Lighting Plant, Mexico	320	600
Yellowstone National Park, Wyoming	600	230
Caucasus Copper Company, Limited, Russia	500	180
Edison Electric Company, California	1000	1900
Ophir Hill Con. Mining Company, Utah	600	836
Hazel Gold Mining Company, California	300	800
Lewiston Electric Power Company, Idaho	500	215
Vancouver Power Company, British Columbia	10000	400
Pike's Peak Hydro-electric Company, Colorado	5000	2150
Nephi City Electric Power Plant, Utah	150	100
Northern California Power Company (second station)	6600	1150
Rock Creek Power and Transmission Company, Oregon	1700	912
American River Electric Company, California	6600	572
Archbishop Gillow, Sinaloa, Mexico	480	115
Societe Industrial de Sta. Catalina, Peru	1500	185
Guanajuato Power and Electric Company, Mexico	6800	320
Allis-Chalmers Company, South Africa	320	360
Mexican Light and Power Company, California	100	310
Cloverdale Light and Power Company, California	350	218
Big Springs Electric Company, Utah	250	270
Siskiyou Electric Power Company, California	1100	680
Brigham City Power Plant, Utah	800	280
Republic Light and Power Company	225	172
Aomori Electric Light Company, Japan	450	320
Fukushima Electric Company, Japan	600	260
Springville Power Plant, Utah	200	140
Gaston Gold Mining Company, California	260	500
Silver Cup Mining Company, British Columbia	520	130
Columbus Consolidated Mining Company, Utah	660	494
Utah County Light and Power Company, Utah	500	285
Seattle Municipal Plant, Seattle, Wash.	5000	550
Cia Aviadora de la Mina Natividad, Mexico	500	254
Empresa Electrica de Santa Rosa, Peru (second station)	1500	155
Marconi Transmission Plant, Mexico	425	592
Edison Electric Company, California (seventh station)	1700	385
Wenatchee Electric Company, Washington	360	760
Utah County Light and Power Company (second station)	500	285
Puget Sound Power Company, Washington	31000	865
Washington & Oregon Power Company, Wash.	3000	356
North Mountain Power Company, California	1100	600
Beaver City Municipality, Utah	200	125

Electric Power Installations—*Continued*

For Whom Installed	Horse-power	Operating Head Feet
Waipori Falls Electric Power Company, New Zealand	4000	655
Britannia Copper Syndicate, Limited, British Columbia	1000	1980
Silver Lake Mines, Colorado	250	365
Treasury Tunnel Mines, Colorado	150	180
Honolulu Municipality, Hawaiian Territory	500	300
Nanaimo Electric Light and Power Company, B. C.	450	159
Los Gatos Ice and Power Company, Cal. (second station)	150	168
Mitsui & Company, Japan	300	350
Casapalca Mining Company, Peru	500	510
Teziutlan Copper Company, Mexico	450	1050
Abangarez Gold Fields, Limited, C. A.	200	260
A. Saenz Barranquilla, South America	150	110
Carbonear Electric Light Company, N. F.	325	210
Animas Canal Reservoir Power Company, Colorado	8000	950
Cia de Luz Electrica, Mexico (second station)	1750	160
Topaz Mining Company, Nicaragua	200	150
J. W. Beckwith, Nova Scotia	175	210
Petropolis Electric Light Company, Brazil (second station)	200	192
Guaratingueta Electric Light Company, Brazil	300	130
Sao Paulo Electric Company, Brazil	1000	75
Bagnall & Hilles, Japan	200	180
British Columbia Electric Railway Co. (second station)	2000	621
Nevada Power, Mining and Milling Company, Cal.	3000	1064
La Grande Water Storage Company, Washington	800	580
Grande Ronde Electric Company, Oregon	600	887
Makee Sugar Company, Honolulu	500	300
Bandoeng Electriciteit, Mattschappy, Java	570	258
Monarch Construction Gold Mining Company, Colo.	150	520
Kauai Electric Company, Hawaii	5000	575
Mount Whitney Power Company, California	2700	1200
Siskiyou Electric Power Company, California	2000	745
D. G. Aguirre, Mexico	1200	175
Cumberland Electric Light Company, B. C.	100	280
Nevada Power, Mining and Milling Company, Cal.	3000	900
Homestake Mining Company, South Dakota	800	470
Shibaura Engineering Works, Japan	500	580
Butler & Company, Alaska	150	150
Ephraim City Municipal Plant, Utah	100	486
Pagilaran Estate, Java	150	212
Mines of Huayna Potosi, South America	200	430
Gaston Gold Mining Company, California	100	569
Takata & Company, Japan	350	200
Oro Water, Light and Power Company, California	3100	165
Lewiston-Clarkson Company, Washington	500	221
Vancouver Power Company, B. C. (fourth station)	3000	360
United Light and Power Company, Colorado	900	692
Columbus Consolidated Mining Company, Utah	660	494
California Gas and Electric Corporation, California	10000	765
Northwest Light and Water Company, Washington	1500	142
Yukon Consolidated Goldfields, British Columbia	2400	650
United Light and Power Company, Colo. (second station)	550	650
Yukaichi Electric Light Company, Japan	700	630
Alaska Electric Light and Power Company, Alaska	600	225
Fremont Power Company, Oregon	2200	1092
Shibaura Engine Works, Japan (second station)	600	580
Wellington Colliery Company, British Columbia	100	167
Trinity Bonanza King Mining Company, California	1100	250
Telluride Power Company, Colorado (fourth station)	4100	1800
Telluride Power Company, Colorado (fifth station)	5000	900
Cumberland Electric Light Company, B. C.	250	975
Haines Electric Power Company, Oregon	110	75
Utah County Light and Power Company, Utah	2800	540
Spring City Electric Light Company, Utah	100	580
E. J. Baldwin, California	300	126
Fairbanks, Morse & Company, Washington	200	240
New York Grass Valley Gold Mining Company, Cal.	100	208
Cia de Luz Electrica, South America	500	456
Ventanas Consolidated Mining Company, Mexico	800	1000
Makaweli Sugar Company, Hawaii	100	276
Oroville Light and Power Company, California	275	240
Amori Electric Company, Japan	450	320
Anstieck & Company, South America	100	170
Takata & Company, Japan	350	370
Stanislaus Electric Power Company, California	37200	1430
Northern California Power Company, Cal. (third station	16750	569
Vancouver Power Company, B. C. (fifth station)	10500	302

Electric Power Installations—*Continued*

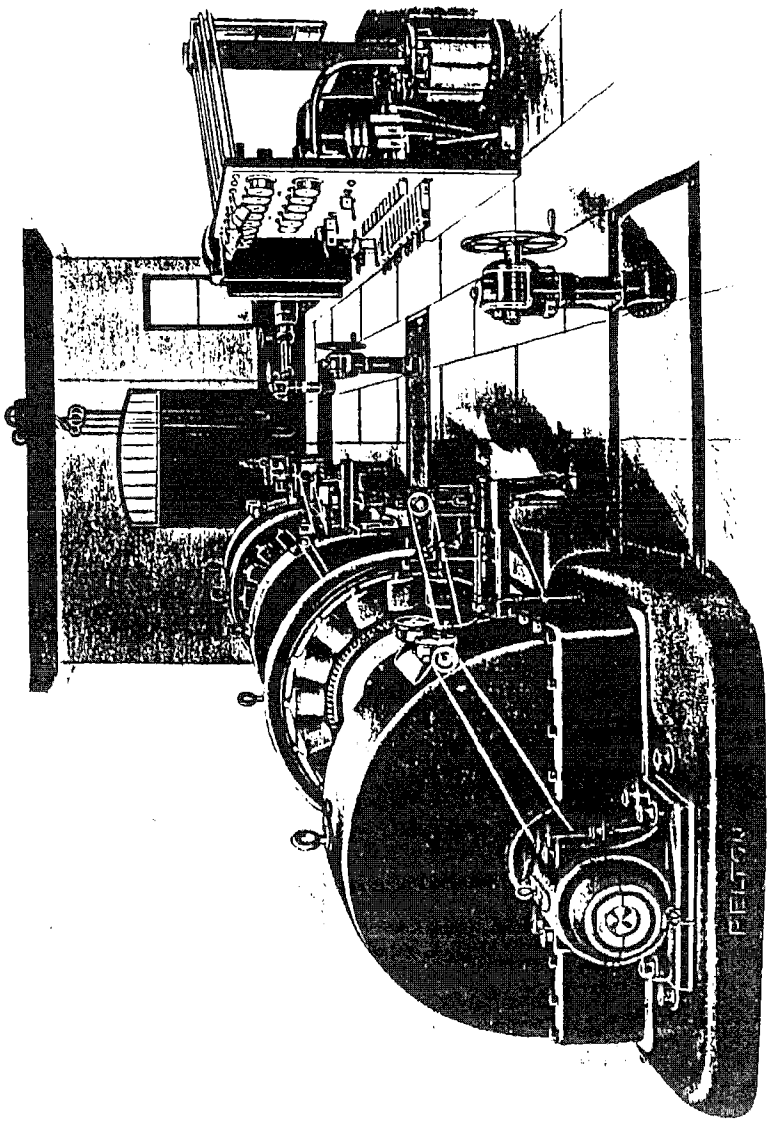
For Whom Installed	Horse-power	Operating Head Feet
Mitsui & Co., Japan	500	345
Dolores Mines Company, Mexico	250	844
Skagit Improvement Company, Washington	250	590
Parowan City Corporation, Utah	100	110
Cedar City Light and Power Company, Utah	150	163
Superior Portland Cement Company, Washington	2400	422
Pacific Power Company, California	250	110
Wallace Light and Water Company, Idaho	800	310
Cia de Luz de Comitan, South America	200	205
Quincy Electric Light and Power Company, California	175	360
Oro Water, Light and Power Company, California	1500	240
City of Los Angeles, California	1500	600
Bungo Traction Company, Japan	600	305
Steptoe Valley Smelting and Mining Company, Nevada	200	465
Kekaha Sugar Company, Territory of Hawaii	300	275
Summit County Electric Power Company, Colorado	1600	450
Nevada-California Power Company, California	7340	928
Northern Light and Power Company, California	3000	721
Societe Anonyme, South America	150	430
Northern California Power Company, Cal. (fourth station)	4000	1100
Steptoe Valley Smelting Co., Nevada (second station)	400	421
Eccles & Browning, Utah	700	1010
Ruby Gulch Gold Mining Company, Montana	165	185
Mexican Light and Power Company, Mexico	130	300
Dalton Power Company, Massachusetts	850	152
Quito Electric Light Company, Ecuador	325	190
New York & Honduras Rosario Mining Company	300	834
Tramway Light and Power Company, Brazil	400	230
D. F. Payne, New York	700	280
Fraser & Chalmers, Limited, England	725	537
Prefectura de Pocos de Caldos, Brazil	310	275
Empresa Electrica de Santa Rosa, S. A.	1200	150
Cia de Papal, Mexico	650	1250
Tanaka Gold Mines, Japan	200	340
La Hormiga Mills, Mexico	400	492
Lake Dunmore Power and Transmission Company, Vermont	210	115
Donnadieu, Veyan & Company, Mexico	750	700
Empresa Electrica de Santa Rosa, Peru	5000	240
Portezuelo Electric Light and Power Company, Mexico	1750	460
Quito Electric Light Company, Ecuador (second station)	325	190
United Towns Electric Company, Northfield (second unit)	325	210
Blue Mountain Electric Company, Pennsylvania	106	350
Peruvian Mining, Smelting and Refining Company, Peru	180	120
Anglo-Mexican Electric Company, Limited, Mexico	120	400
Tezuntlan Copper Company, Mexico	450	1050
Takata & Company, Japan	380	370
Gabriel Mancera, Mexico	265	475
Mining Exploration Company, South America	275	485

Summary of Pelton Wheels Now in Use

Some idea of the extent to which PELTON WHEELS have come into use may be obtained from the following list. There are now running considerably more than 12,000 PELTON WHEELS in various parts of the world in connection with mining, manufacturing and other industries, aggregating in excess of 1,300,000 horse-power.

In the United States and Foreign Countries	Number of Wheels	Aggregating Horse-power
California, Oregon and Nevada	8554	836,053
Washington, Idaho and Alaska	762	76,607
Utah, Colorado and Montana	211	36,166
Hawaii, New Mexico and Arizona	244	18,114
Middle, West and Atlantic States	183	9,812
Mexico and Central America	707	172,279
Various South American States	421	27,300
Australia, New Zealand, Japan and India	549	50,591
East and West Indies Islands	268	34,857
British Columbia and Nova Scotia	123	39,350
England and South Africa	102	13,865
Germany, France, Italy and Spain	406	6,096
Norway, Sweden and Denmark	44	2,096
Total	12604	1,321,167

NOTE.—California is credited with by far the largest number because the PELTON WHEEL was invented and first introduced in that State, and for the further reason that water is abundant there for power purposes and under favorable conditions as to head.



Northern California Power Company—Interior View

SF ASSESSOR RECORDER ATTACHMENT

Office of the Assessor-Recorder

view Block Map
Unofficial Document - Not for Submittal to City Agencies

Record for Block 4020 Lot 002 - Assessor Volume #24

Property Location							
0612 - 0614 ALABAMA ST						Suite/Room:	0000
Mailing Address for Property							
650 ALABAMA ST #101 SAN FRANCISCO CA 94110							
For Fiscal year beginning July 1, 2009 and ending June 30, 2010							
Land:	594,765	Improvement:	5,528,967	Fixtures:	0	Personal Prop:	0
Homeowner Exemption:	0	Miscellaneous Exemption:	0	Exemption Type Code:			
Property Characteristics							
Sales Base Year:		1994	Property Class:		1	Neighborhood:	09C
Kitchen:		Kitchen Built-ins:	0000	Construction Type:	S (Special, see remarks)	Base Lot:	000
Zoning Code:	Zoning from City Planning	Year Built:	1914	Lot Frontage:	0	Lot Depth:	5,000
Lot Area:	43,505	Basement Area:	0	Stories:	2	Units:	3
Rooms:	9	Bedrooms:	0	Bathrooms:	2		

SHOWPLACE SURVEY DOC ATTACHMENT

Showplace Square Historic Resource Survey
Google Map

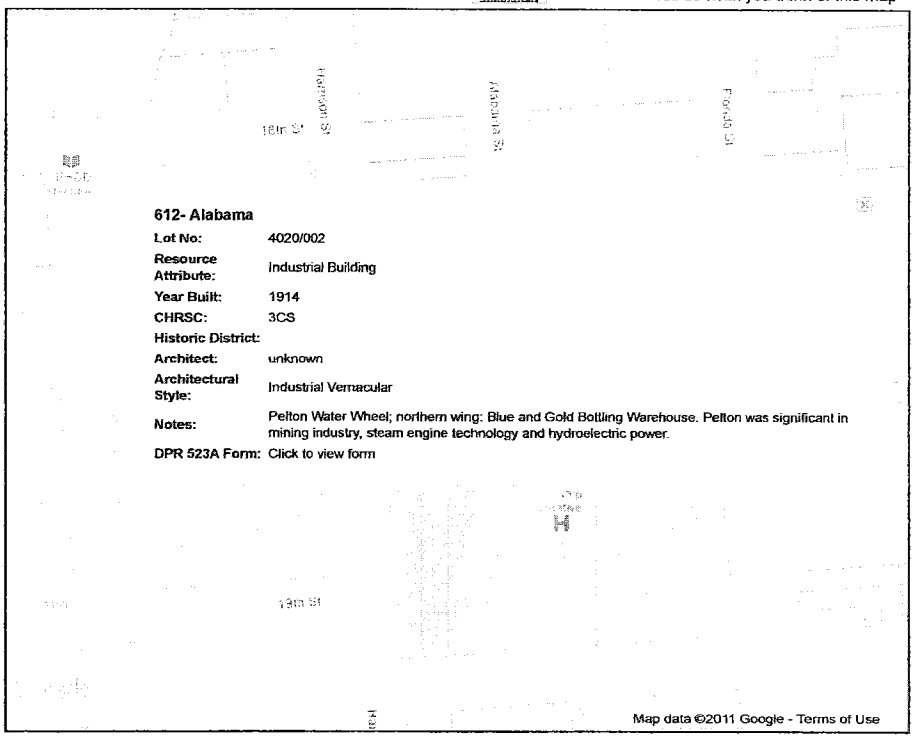
Instructions

Click on any lot to view survey results for that property. For a specific property, type the address, click the 'Search' button and click on the lot to view survey results for that property.

To view information on a historic district, click on the red boundary of a historic district.

612 Alabama Street Search

Your Feedback
Tell us what you think of this map



612- Alabama

Lot No:	4020/002
Resource Attribute:	Industrial Building
Year Built:	1914
CHRSC:	3CS
Historic District:	
Architect:	unknown
Architectural Style:	Industrial Vernacular
Notes:	Pelton Water Wheel; northern wing: Blue and Gold Bottling Warehouse. Pelton was significant in mining industry, steam engine technology and hydroelectric power.
DPR 523A Form:	Click to view form

Map Legend

- Historic Resource
- Potential Historic Resource (requires further research)
- Not a Historic Resource
- Not Evaluated (less than 50 years old)
- Historic District Boundary
- Survey Area

BALDWIN LIMA PURCHASE ATTACHMENT

THE PELTON WATER WHEEL COMPANY

CERTIFICATE

I, CHARLES E. ACKER, Secretary of The Pelton Water Wheel Company (Pelton), a California corporation, do hereby certify that the transfer of real property by Pelton to Baldwin-Lima-Hamilton Corporation (Baldwin), a Pennsylvania corporation, pursuant to Grant Deeds dated December 20, 1955, was incidental to a plan providing for the complete liquidation and eventual dissolution of Pelton, under which plan all assets of Pelton, including such real property, were distributed during the calender year 1955 to Baldwin, sole owner of all outstanding shares of capital stock of Pelton, in consideration of the assumption by Baldwin of all liabilities of Pelton and the surrender by Baldwin for cancellation of all outstanding shares of capital stock of Pelton; that the Board of Directors of Baldwin, sole shareholder of Pelton, approved the said plan at a regular meeting duly held on September 22, 1955; and that the said plan was adopted by the Board of Directors of Pelton at a special meeting duly called and held September 22, 1955, from the minutes of which special meeting the following is a true and exact excerpt:

"RESOLVED, that the Plan of Complete Liquidation and Dissolution of The Pelton Water Wheel Company in the form presented to this meeting be and it is hereby adopted, and that in accordance with its terms all of the property and assets of this Company shall be distributed during the calendar year 1955, subject to all of the Corporation's liabilities, to Baldwin-Lima-Hamilton Corporation, a Pennsylvania corporation, and the owner of all of the capital stock of this Corporation, in complete cancellation and redemption of this Corporation's outstanding stock; and further

"RESOLVED, that the officers of this Corporation be and they hereby are authorized and directed to take all action necessary to transfer and distribute said property and to redeem said stock, and to take such steps as upon the advice of counsel may be deemed necessary or appropriate to give effect to said Plan and the complete liquidation and dissolution of this Company;"

IN WITNESS WHEREOF, I have hereunto set my hand and the seal of The Pelton Water Wheel Company this 19th day of March, 1956.

Charles E. Acker

Charles E. Acker, Secretary
The Pelton Water Wheel Company

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GRANT DEED

IN CONSIDERATION of the sum of Ten Dollars ($10.00), receipt of which is hereby acknowledged, the undersigned, THE PELTON WATER WHEEL COMPANY, a California corporation, does hereby grant to BALDWIN-LIMA-HAMILTON CORPORATION, a corporation, the real property situated in the City and County of San Francisco, State of California, described as follows:

PARCEL ONE:

COMMENCING at a point on the easterly line of Harrison Street distant thereon fifty (50) feet southerly from the southerly line of 18th Street; running thence southerly and along said line of Harrison Street seventy-five (75) feet, thence at a right angle easterly one hundred twenty-four (124) feet three (3) inches, to the westerly line of Alabama Street, thence at a right angle northerly along said line of Alabama Street seventy-five (75) feet, thence at a right angle westerly one hundred twenty-four (124) feet three (3) inches, to the point of commencement.

BEING part of Block No. 11, Potrero Nuevo.

PARCEL TWO:

COMMENCING at the point of intersection of the northerly line of 19th Street, with the easterly line of Harrison Street, running thence Northerly and along said Easterly line of Harrison Street two hundred and seventy-five (275) feet, thence at right angles easterly one hundred and twenty-four (124) feet, three (3) inches to the westerly line of Alabama Street, thence at right angles southerly and along said line of Alabama Street two hundred and seventy-five (275) feet to the Northerly line of 19th Street, and thence at right angles westerly and along said line of 19th Street one hundred and twenty-four (124) feet, three (3) inches to the easterly line of Harrison Street and the point of commencement.

BEING a portion of Potrero Nuevo Block Number Eleven (11).

PARCEL THREE:

COMMENCING at the point of intersection of the southerly line of 19th Street and the easterly line of Alabama Street; running thence southerly and along the said easterly line of Alabama Street 185 feet; thence at a right angle easterly 44 feet 3 inches; thence at a right angle southerly 8 feet 6 inches; thence at a right angle easterly 100 feet to the westerly line of Florida Street; thence at a right angle northerly and along the said westerly line of Florida Street 193 feet 6 inches to the said southerly line of 19th Street; and thence westerly along the said southerly line of 19th Street 144 feet 3 inches to the said point of commencement.

BEING a portion of the Potrero Nuevo Block No. 15.

64470 OR-435

BOOK 6818 PAGE 497

DATED this 20 day of November, 1955.

THE PELTON WATER WHEEL COMPANY

By W. F. Boyle
Vice President

And R. L. Wolter
Assistant Secretary

STATE OF CALIFORNIA
~~City and~~ County of ~~San Francisco~~ ALAMEDA } ss.

On this 21 day of November, 1955, before me, Lena F. Quiring, a Notary Public in and for the City and County of ~~San Francisco~~ ALAMEDA, State of California, residing therein, duly commissioned and sworn, personally appeared W. F. Boyle and R. L. Wolter, known to me to be the Vice President and Asst Secty., respectively, of the corporation described in and that executed the within instrument, and also known to me to be the persons who executed the within instrument on behalf of the corporation therein named, and acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal in the ~~City and~~ County of ALAMEDA the day and year in this certificate first above written.

John F. Allen
NOTARY PUBLIC
In and for the ~~City and~~ County of ~~San Francisco~~ ALAMEDA, State of California
My Commission Expires:

My Commission expires June 30, 1956

RECORDED AT REQUEST OF
CALIFORNIA-PACIFIC TITLE INSURANCE CO.
AT 8:00 A.M.

APR - 4 1956

City and County of San Francisco, California

BOOK 6818 PAGE 495

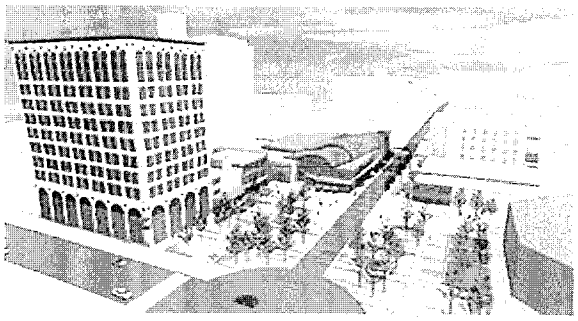
-3-

E64470

$3.60

BALDWIN LIMA HAMILTON ATTACHMENT

Lima Locomotive Works was an American firm that manufactured railroad locomotives from the 1870s through the 1950s. The company took the most distinctive part of its name from its main shops location in Lima, Ohio. The shops were located between the Baltimore & Ohio's Cincinnati-Toledo main line and the Nickel Plate Road main line and shops. The company is best known for producing the Shay geared logging steam locomotive, and for being the home of William E. Woodard's "Super Power" advanced steam locomotive concept - exemplified by the prototype 2-8-4 Berkshire, Lima demonstrator A-1.



Site for Lima Shay Museum Concept, 2005

Contents

History

In 1878 James Alley contracted the Lima Machine Works to build a steam locomotive that Ephraim Shay had designed. In April 1880, Lima rebuilt Ephraim Shay's original design, using vertically side-mounted pistons mounted on the right, connected to a drive line on the outside of the trucks. The Shay was geared down to provide more slow-moving pulling ability for use in the lumber industry. The first Shay locomotive was built in 1880 and was such a success that many people in the lumber industry wanted one. To accommodate the new demand for the locomotive Shay licensed the right to build his locomotive to the Lima Machine Works, which expanded and began to ship Shay locomotives to lumbermen across the frontier. Two years later, locomotives were the main product being produced by the Lima Machine Works, which would produce over 300 locomotives during the next ten years.

After a serious fire, a new shop was opened in 1902 and Shay production continued. However, as railroads began to recognize that speed was as important as efficiency in freight service, the Shay was rendered obsolete. With no option, Lima began constructing conventional steam locomotives, and also began producing other heavy machinery such as steam cranes and railroad rotary snow plows.

Super Power

Success returned to Lima in the 1920s with the new concept of "Super Power" developed by Lima's mechanical engineer William E. Woodard. By making a number of significant changes to maximize a steam locomotive's capacity to generate and utilize steam, Woodard was able to make such locomotives significantly more powerful and faster. He did this by starting in 1922 with the H-10 experimental heavy 2-8-2 design for the New York Central (Michigan Central 8000) and applying both relatively new science (the Cole ratios) every efficiency-enhancing tool available - a larger firebox, increased superheat, a feedwater heater, improved draughting, higher boiler pressure, streamlined steam passages and a trailing-truck booster engine, and by applying limited cutoff (the range of steam valve admission settings) to prevent locomotive engineers from using excessive steam at starting. The 2-8-2 thus produced was demonstrated to be 26% more efficient overall than its immediate predecessor, and the NYC bought 301 copies.

A large increase in firebox area (from 66 square feet (6.1 m^2) on the H-10 to 100 square feet (9.3 m^2) on the A-1) characteristic of his work necessitated adding another axle to the trailing truck, creating the 2-8-4 wheel arrangement. Built in the spring of 1925, the first Berkshire (a demonstrator owned by Lima) was dubbed the A-1. It quickly proved to be a whopping 26-30% more efficient than the H-10! After a highly successful series of tests in the mid-1920s it was sent around the country to make the idea of "Super Power" known. The first forty-five were purchased by New York Central's subsidiary Boston & Albany following initial road testing across the summit of the Berkshire Hills, and the 2-8-4 wheel arrangement came to be known as the "Berkshire" on most railroads. The prototype itself was later sold to the Illinois Central as part of an order for 50 similar locomotives. Woodard summed up "Super Power" by defining it as "horsepower at speed". Previous design principles emphasized tractive effort (pulling ability) rather than speed. By 1949 some 613 Berkshires had been constructed for North American service, of which twenty are preserved - at least two in operating condition (NKP 765 and PM 1225), both Lima products.

There were at least three successive waves of "Super Power". The first began with NYC 8000 and the A-1, and included Missouri Pacific 2-8-4s and Texas & Pacific 2-10-4s. These locomotives had conventional 63" driving wheels. In 1927, the Erie Railroad took delivery of a "second-phase" Berkshire with 70" driving wheels, capable not only of great power but higher speed; in turn, this design evolved into the Chesapeake & Ohio T-1 2-10-4s of 1930, with 69" driving wheels. The "third-phase" of the later 1930s and war years can be identified with locomotives such as the homebuilt N&W 2-6-6-4s, C&O/Virginian 2-6-6-6 and virtually all American 4-8-4s. Boiler pressures rose as high as 310 lbs/sq.in.; thermic syphons added to the firebox and combustion chamber added 8% to the efficiency of the boiler; roller bearings appeared on main axle boxes and sometimes on running gear. And the "Super Power" concept had extended to other builders such as Alco (the Union Pacific Big Boy) and Baldwin (the Santa Fe 5001- and 5011-class 2-10-4s). The four-wheel trailing truck became the standard for large locomotives (ie. 4-8-4, 2-10-4, 4-6-6-4, 2-8-8-4).

Decline

In 1947, the firm merged with General Machinery Corporation of Hamilton, Ohio, to form Lima-Hamilton.

Lima's last steam locomotive was Nickel Plate Road No. 779, a 2-8-4 "Berkshire", which left the

erecting halls in 1949. That same year Lima promoted a new wheel arrangement, the 4-8-6. This would have allowed an even larger firebox than the 4-8-4. No example of the type was built, however.

From 1949 to 1951 Lima-Hamilton produced a total of 174 Diesel Locomotives, in 6 different models.

In 1951, Lima-Hamilton merged with Baldwin Locomotive Works to form Baldwin-Lima-Hamilton (BLH). The Lima-Hamilton line of Diesels was discontinued, in favor of Baldwin's existing line. Though Lima and Baldwin had been known for high-quality steam locomotives, their line of diesel-electric locomotives was unable to compete with EMD, Alco, and GE. BLH left the locomotive business in 1956.

For a time, Clark Equipment Company manufactured Lima-brand construction cranes in the old plant. Most of the company's records and builder's drawings are now housed in the California State Railroad Museum's library in Sacramento, California.

Timeline

- 1877: **Lima Machine Works** is established to produce agricultural and sawmill equipment.
- 1878: Lima Machine Works builds the first Shay type locomotive.
- 1892: Lima Machine Works reorganizes and emerges as **Lima Locomotive & Machine Company**.
- 1911: Lima begins manufacturing locomotives for Class I railroads.
- 1912: Another reorganization and Lima emerges as **Lima Locomotive Corporation**.
- 1916: Joel Coffin purchases Lima; the company is renamed Lima Locomotive Works.
- 1922: Woodard's 2-8-2 NYC 8000, ancestor of "Super Power", is delivered.
- 1925: Woodard's A-1, the prototype "Super Power" Berkshire type, takes to the rails.
- 1947: Lima is merged with General Machinery Corporation of Hamilton, Ohio. The new company is named **Lima-Hamilton.**
- 1949: Lima's last steam locomotive (NKP 779) is built. Lima-Hamilton begins production of Diesel locomotives. Unsuccessful promotion of the 4-8-6. Production of Cranes and other construction equipment continues at the Lima plant.
- 1951: Lima-Hamilton is merged with Baldwin Locomotive Works. The new company is named **Baldwin-Lima-Hamilton.**
- 1956: Baldwin-Lima-Hamilton exits the locomotive market.
- 1980: Production of cranes and construction equipment ends, Lima factory closed and sold.
- 1998: The former Lima erecting shed and heavy Shay shops are torn down and broken up.

See also

- List of Lima-Hamilton diesel locomotives
- *More on Shay Locomotives, including news on a book about them.* (http://www.shaylocomotives.com/)

References

- *Steam Locomotive Builders* (http://www.steamlocomotive.com/builders/)
- *Lima Locomotive Works and Super Power steam* (http://www.trains.com/Content/Dynamic/Articles/000/000/005/301ndbru.asp) , *Trains* Magazine
- *Lima Locomotive Works* (http://www.bluffton.edu/courses/TLC/BushP/LLW-0.html)
- Hirsimaki, Eric (1986, 2004). *Lima: The History*. Mukilteo, WA: Hundman Publishing.
- Neil L. Carlson, "Super-Power: Building a Mighty Mikado", Trains Magazine, May 2000.
- Neil L. Carlson, "Super-Power: From Berkshire to Big Boy", Trains Magazine, June 2000.

External links

- Preserved Lima steam locomotive list (http://www.steamlocomotive.info/locobrowse.cfm?bn=Lima%20Locomotive%20Works)

Categories: Locomotive manufacturers of the United States Lima locomotives Lima, Ohio