Mammoth Machines

An overview of **The President** Pumping Engine and **The Chapin Mine Cornish Pump**

Presentation by…..

Mark W. Connar

Presentation to the Mining History Association

- Marquette, Michigan
- June 2019

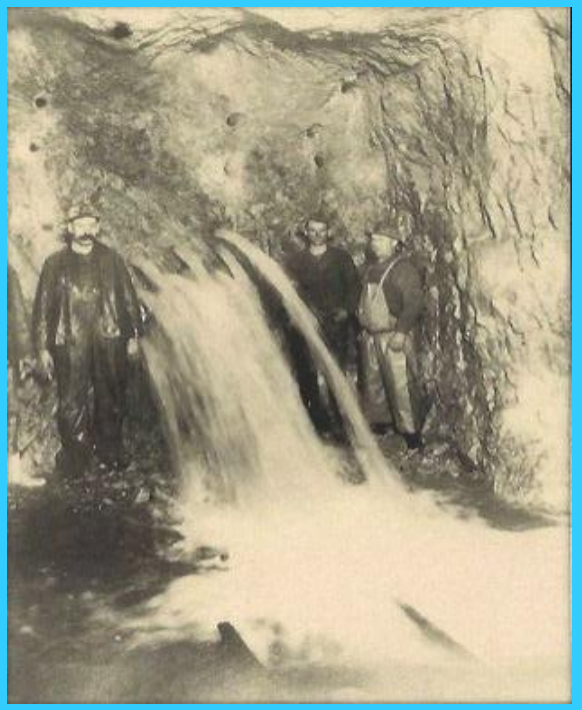
Special Thanks to L. Michael Kaas and R. Damian Nance

The Common Thread - Wettest Mines in America

"….the water had to be fought by the pumps throughout every foot sunk and for every minute in the life of the mine." F.L.Clerc, 1899 (courtesy Lehigh University Special Collections)

Mayo Lanning, New Jersey Zinc Mining Engineer at the 400 Level – ca 1954 (courtesy Robert Lanning)

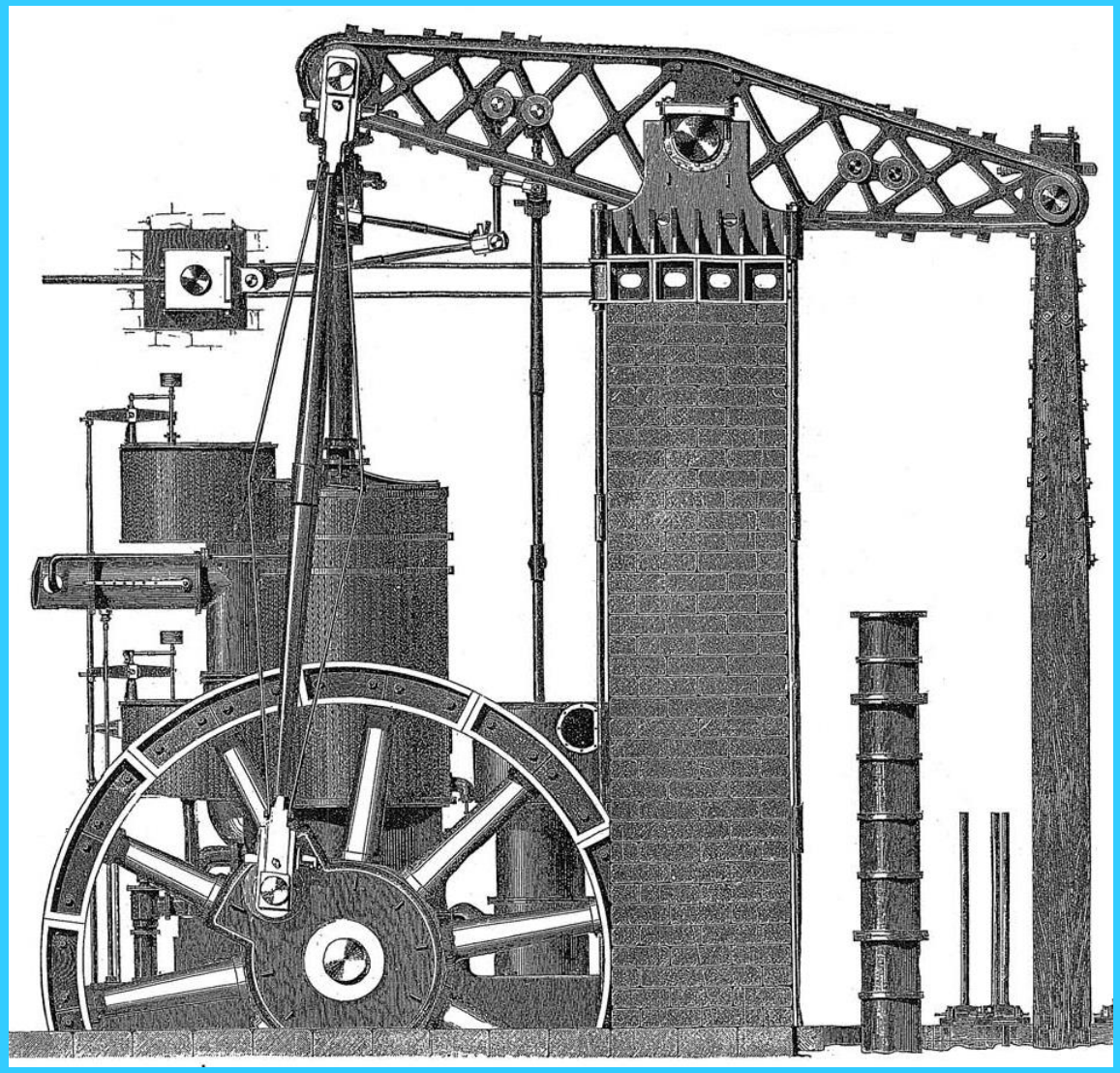
"The Chapin Mine is one of the wettest mines in the entire lake region, making steadily about 3,000 gallons of water per minute." The Iron Trade Review, Vol. 39, Issue 2, Sept. 27, 1905



Early 1900's Chapin Mine (courtesy of Menominee Range Historical Museum)

The President

- Named for Ulysses S. Grant
- Weighed 675 tons
- 2 Latticework beams
- 110 inch diameter cylinder
- 2 30’ diameter flywheels
- Built over 3 years by Merrick & Sons, Phila.
- Pumps and boilers (22) by I.P. Morris, Phila.
- John West - designer
- Ran continuously from 1872 to late 1876 (shaft 240 feet deep)
- Ran intermittently from 1881 to 1892
- Capable of drawing 17,000 gallons of water per minute/24.5 million gallons per day



Ueberroth Mine, ca1870s

- Zinc mining commenced, 1853
- Wetherill Patents, Expire 1876
- Lehigh Zinc Closes Its Mines, 1876
- Bergen Point Zinc Owns All Mines, Forms Friedensville Zinc Co., 1881
- All Mines Close (5 in district), 1893
- Engine Scrapped, 1900 (one boiler survives)
- New Jersey Zinc buys property, 1899

(Miller, 1924, Plate II A)

The President - Made in America
“Largest Stationary Engine in the World”

The New-York Times.

NEW-YORK, SATURDAY, APRIL 26, 1873.—TRIPLE SHEET.

ZINC MINING.

The Lehigh Company's Mines at Friedensville, Penn.—The Largest Stationary Engine in the World.

The South Australian Advertiser.

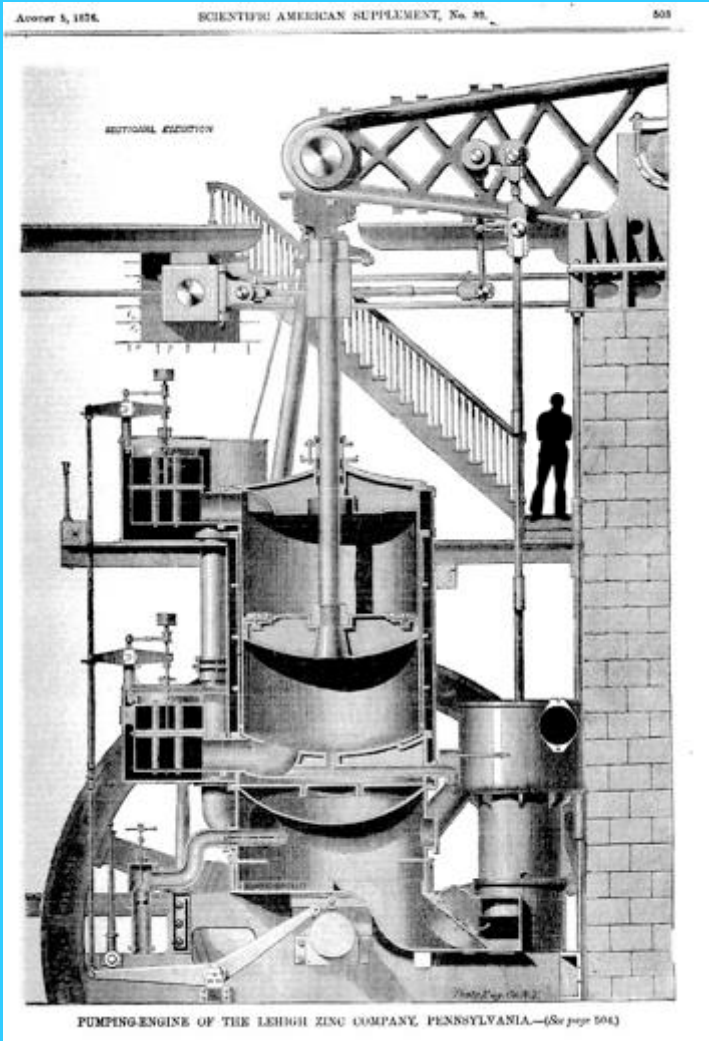
ADELAIDE, MONDAY, MAY 12, 1873. PUBLISHED DAILY—PRICE

THE LARGEST STATIONARY ENGINE IN THE WORLD.

A recent number of the *Mining Journal* gives an interesting account of the starting of the Lehigh Zinc Company's mammoth engine,

Photos– newspapers.com/SMU Central University Library digital collection (top right)/philadelphiaencycolopedia.org (bottom left)

The President

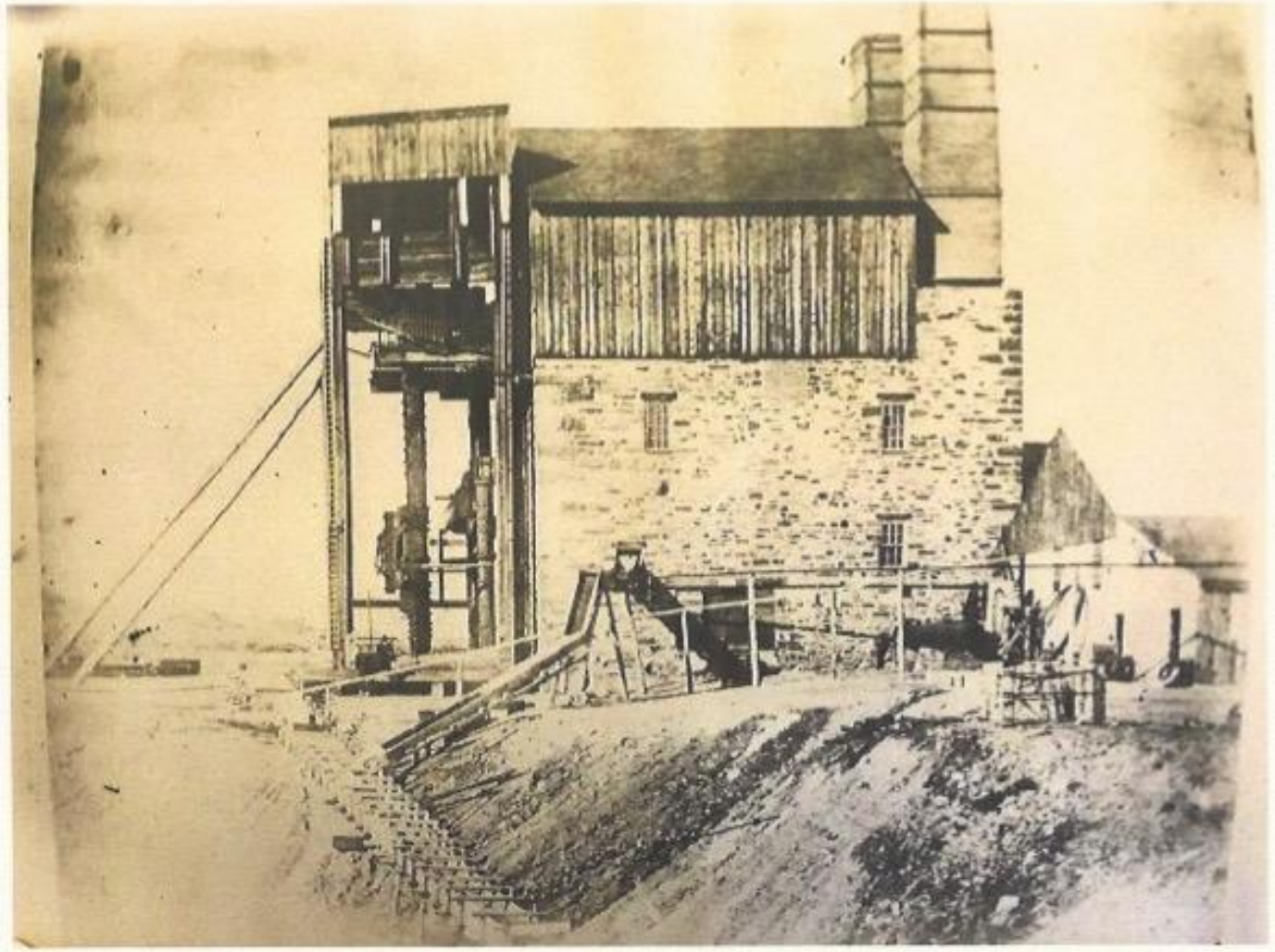


"It is the triumph of the rotative system as applied to a mine pump. I would not believe it would run so smoothly, if I had not seen it. It is worth coming across the Atlantic to see."

John Kraft
Chief Engineer – SA John Cockerill
Seraing, Belgium
1876

Diagram – Scientific American Supplement 1 – August 5, 1876 (modified with figure added); quote from letter to Charles Pratt & Co. from F.L.Clerc, 1899 (Lehigh University Special Collections

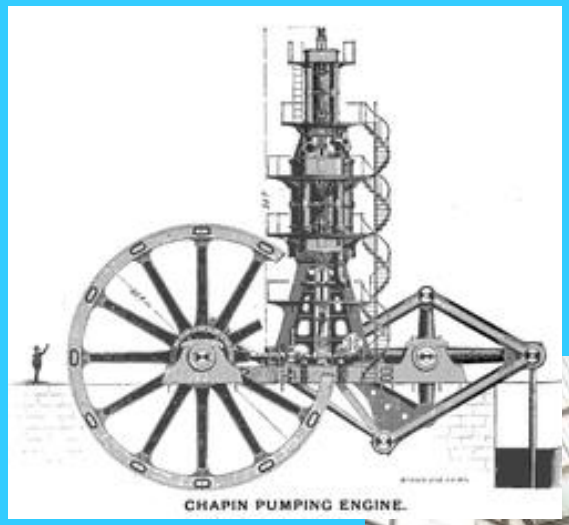
House of The President



Stabler Land Company Records – Lehigh University Special Collections

The Chapin Mine “Cornish” Pump

- Named for Mine
- Weighs 725 tons
- Inverted beam
- Tandem compound cylinder, 100 inch diameter low pressure, 50 inch diameter high pressure
- 40’ diameter flywheel
- Built over 3 years by E.P. Allis, Milwaukee, Wi
- Edwin Reynolds – designer
- Ran at Ludington “D” shaft from 1893 to 1898 (shaft 600 feet)
- Reassembled at Ludington “C” shaft in 1908 (shaft 1500 feet)
- After 1914, in stand-by mode with electrically driven centrifugal pumps primary service
- Capable of drawing 3,400 gallons of water per minute/4.9 million gallons per day

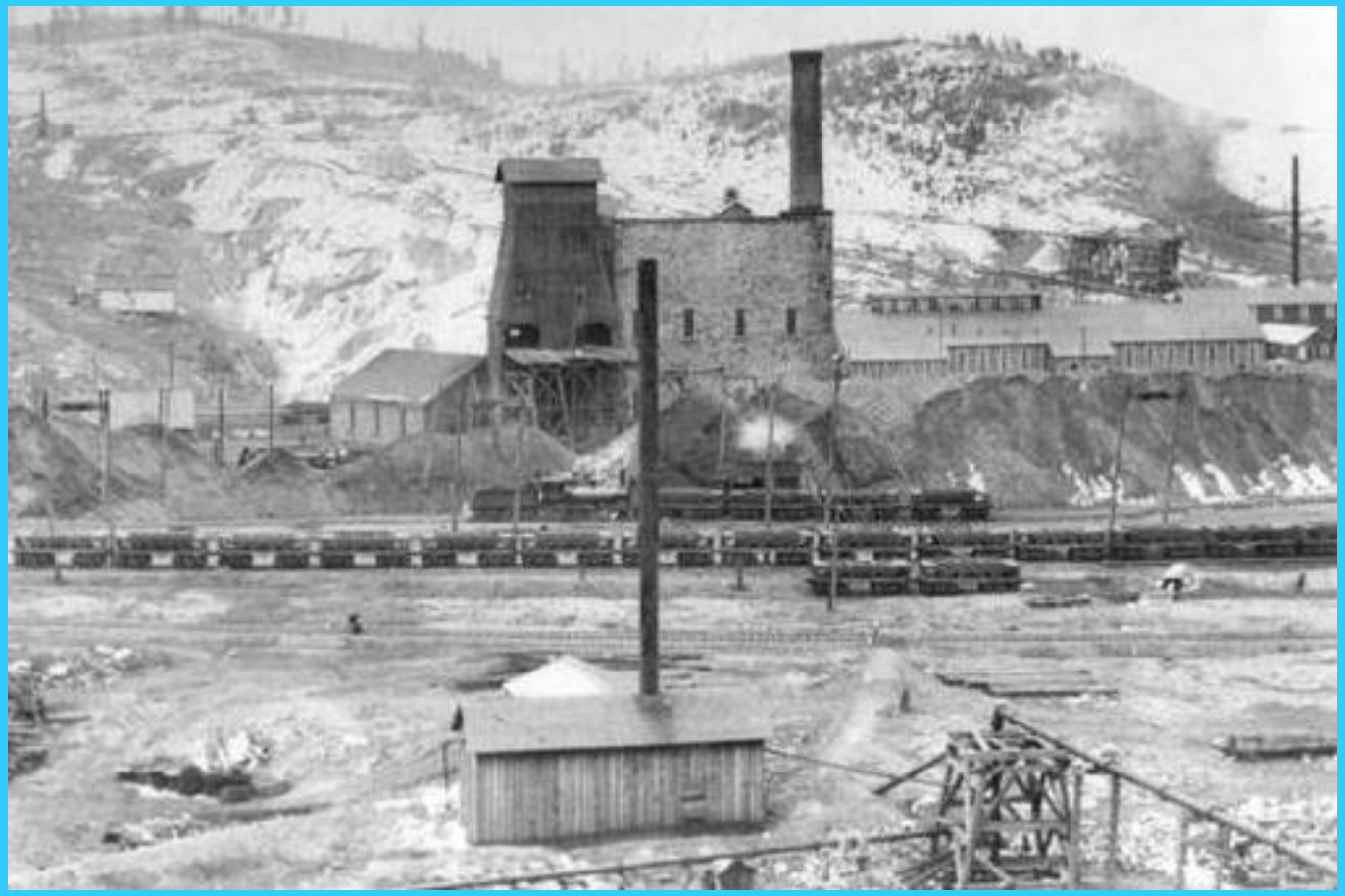

CHAPIN PUMPING ENGINE.

Chapin Mine

- One of the greatest iron ore strikes in the Lake Superior region, 27 million tons of ore over operational history
- Henry Austin Chapin landowner
- First year of shipping, 1880
- Chapin Mine Company buys out nearby Hamilton and Ludington Mines after flooding, 1894
- Mines consolidated under Chapin Mining Company sold to National Steel, 1899 and became part of US Steel in 1901
- Mines closed, 1932
- Cornish Pump donated as an “industrial relic”, 1934

(Chapin Mine, Iron Mountain, Mi, October 1890 Burdick, Armitage & Allen)

House of The Chapin Mine Pumping Engine



Which Engine was Larger ?

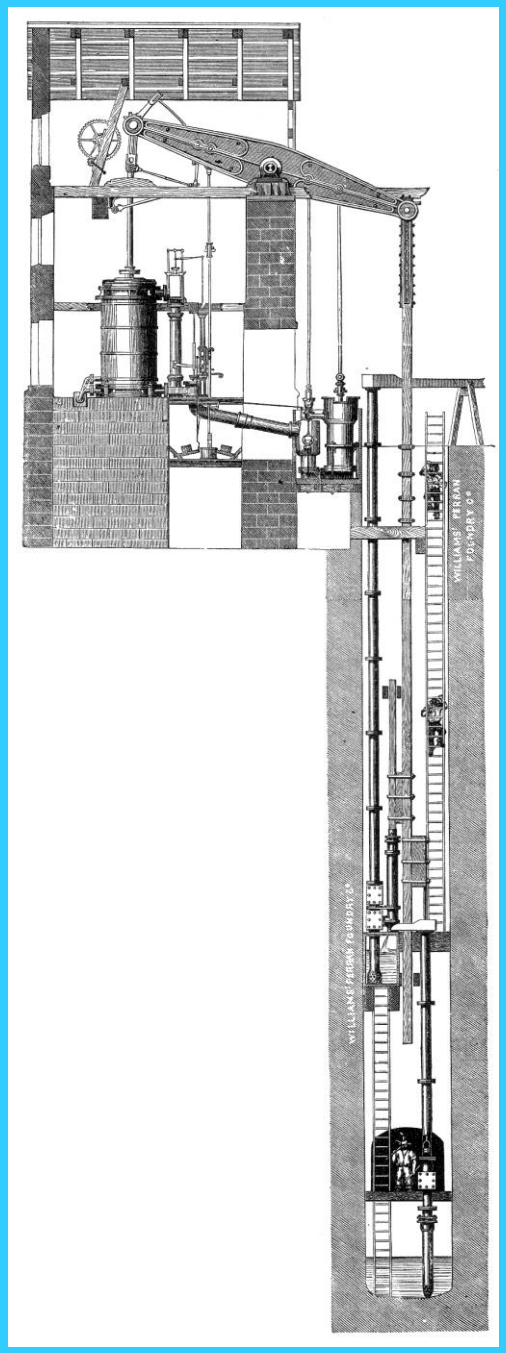
"The plant now in course of construction at the works of E.P. Allis & Co., is a pumping plant which is estimated to weigh 750 tons, and which will be the largest in the country excepting the one at Bethlehem, PA."

Edmond Kent

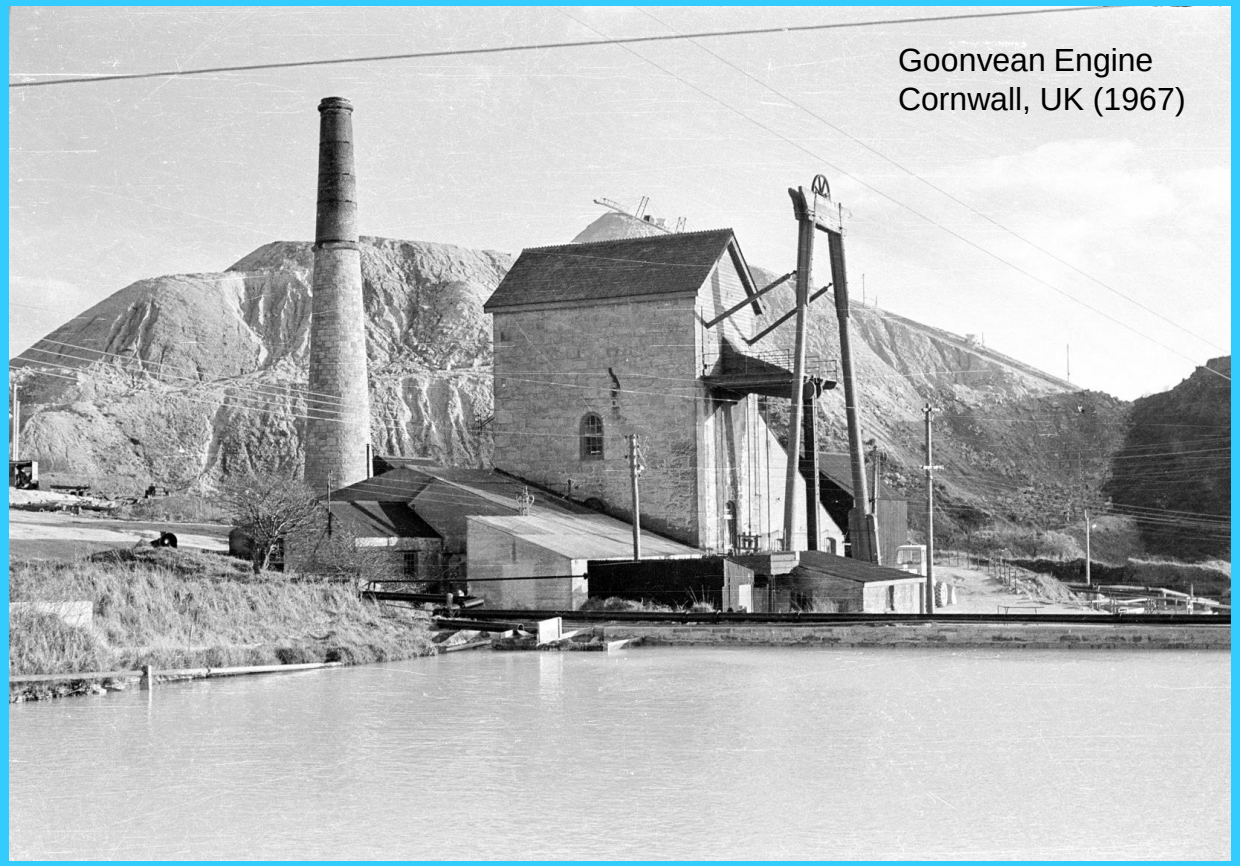
Master Mechanic, Chapin Mine

Iron Mountain's Second Mayor

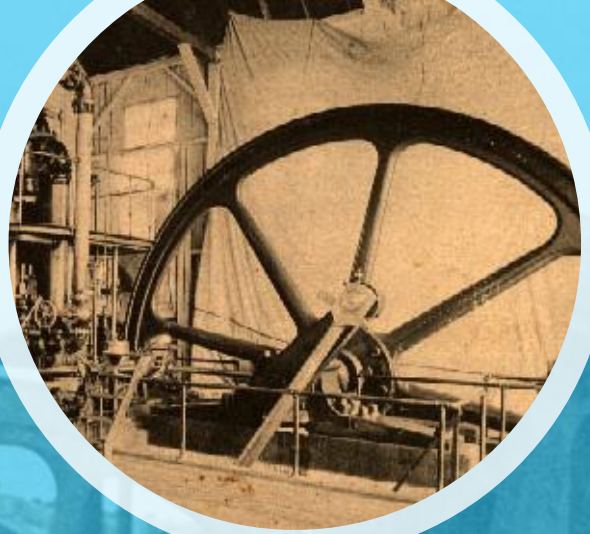
(Courtesy of William John Cummings Historian, Menominee Range Historical Foundation)

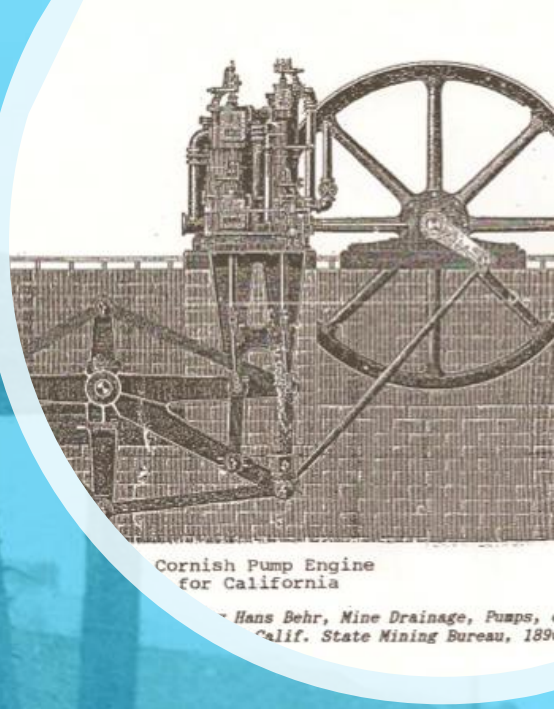


“Classic “ Cornish Pumping Engine



Goonvean Engine
Cornwall, UK (1967)





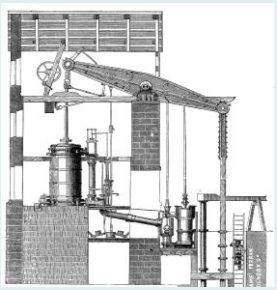
Cornish Pumps in America

"…..development of the deep hard-rock gold mines in California might have been delayed for nearly half a century – until the high pressure electric motor-driven pumps became practical about the year 1900."

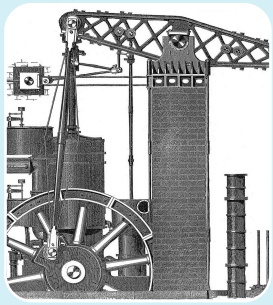
Roger P. Lescohier

The Cornish Pump in the California Gold Mines

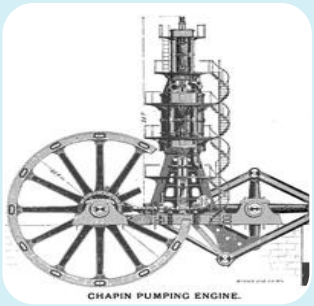
President and Chapin – Cornish Pumps ?



Classic Cornish



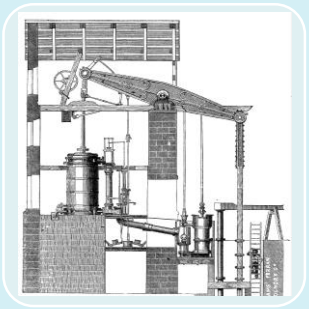
The President



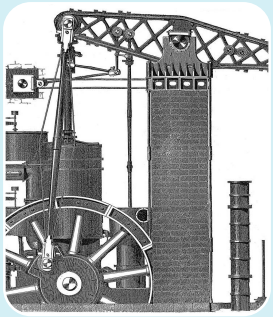
Chapin Mine Pump

Classic Cornish	The President	Chapin Mine Pump
House Built	House Built	Self Supporting
Vertical Cylinder	Vertical Cylinder	Vertical Cylinder
Single Cylinder	Single Cylinder	Compound Cylinder
Walking Beam	Walking Beam	Inverted Beam
Single-Acting	Double-Acting	Double-Acting
Non-Rotative	Rotative	Rotative
Pit-work System	Pit-work System	Pit-work System

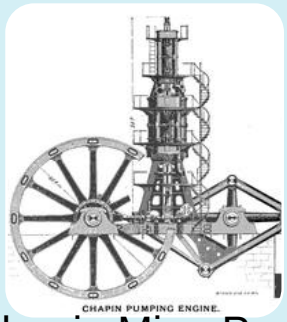
President and Chapin – Cornish Pumping Engines ?



Classic Cornish



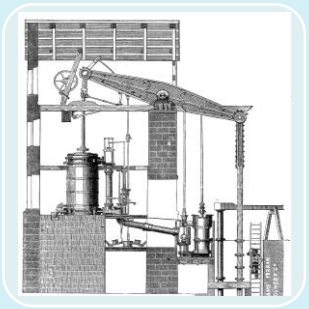
The President



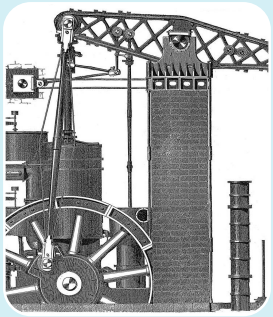
Chapin Mine Pump

Classic Cornish	The President	Chapin Mine Pump
House Built	✓ House Built	Self Supporting
Vertical Cylinder	✓ Vertical Cylinder	✓ Vertical Cylinder
Single Cylinder	✓ Single Cylinder	Compound Cylinder
Walking Beam	✓ Walking Beam	Inverted Beam
Single-Acting	Double-Acting	Double-Acting
Non-Rotative	Rotative	Rotative
Pit-work System	✓ Pit-work System	✓ Pit-work System

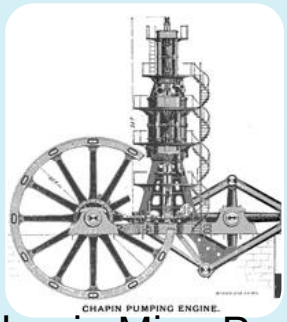
President and Chapin – Similar?



Classic Cornish



The President



Chapin Mine Pump

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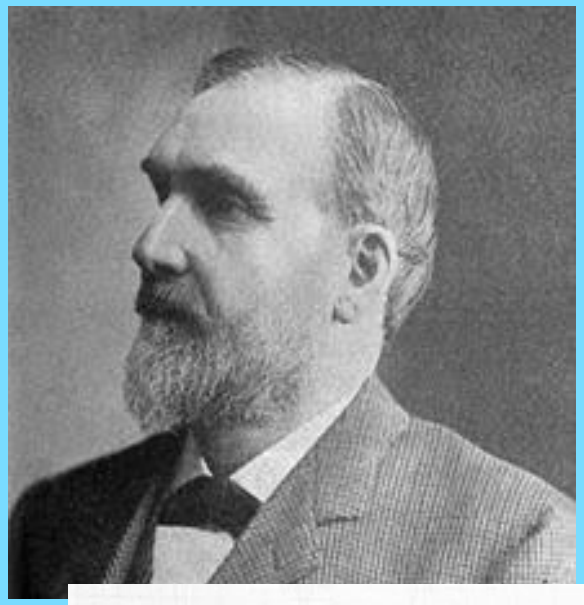
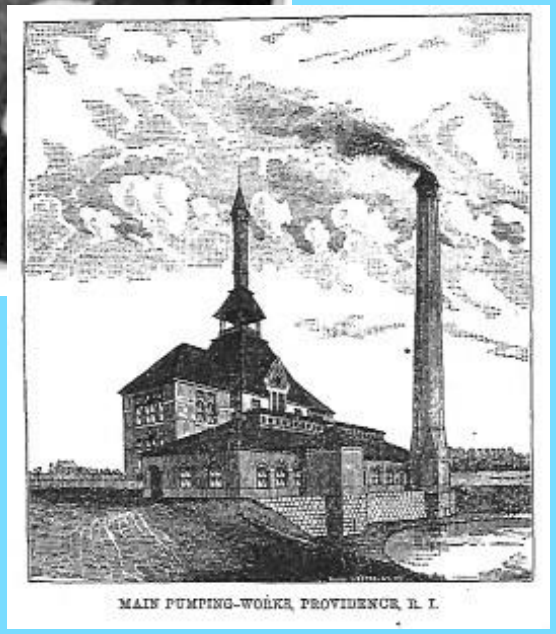
Non-Rotative	✓ Rotative	✓ Rotative
Pit-work System	✓ Pit-work System	✓ Pit-work System

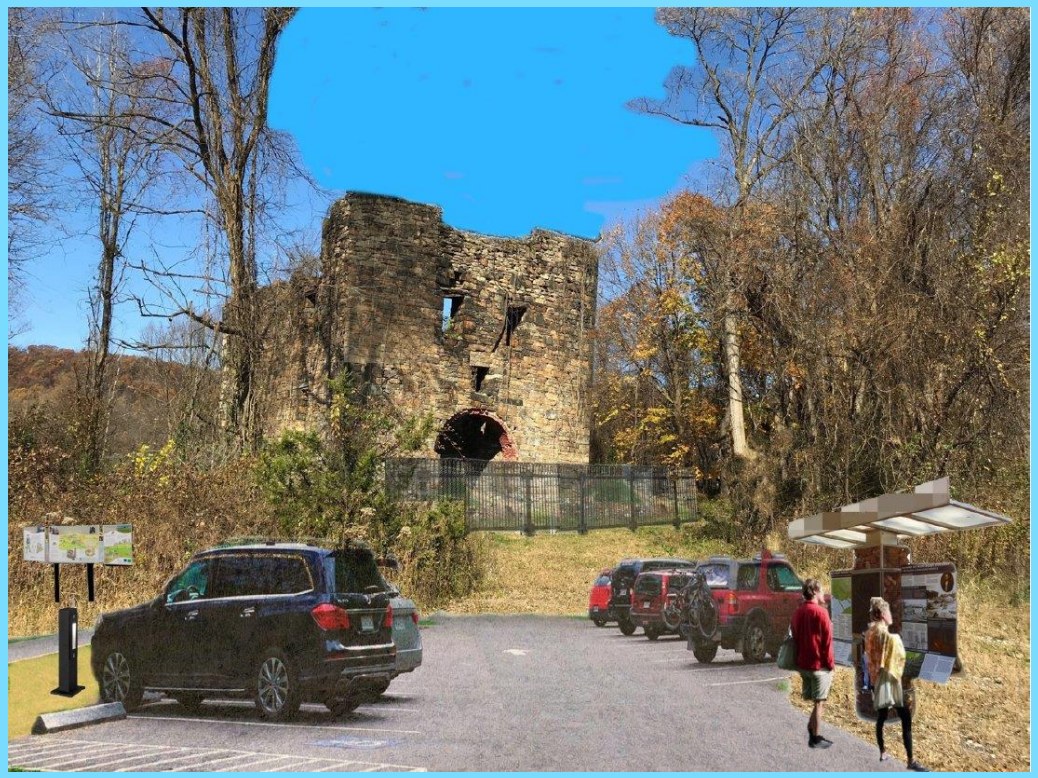
West and Reynolds - A Providence Connection ?

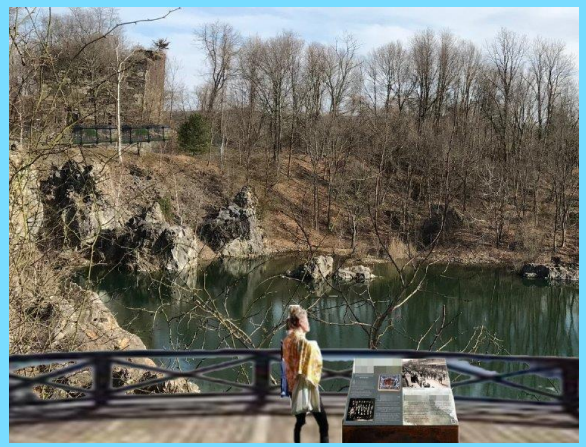




The Ueberroth and Hartman Mine Property Today

Friedensville Mining Heritage Park Opportunity





(Connar, 2019)

Conceptual Park Plan

https://www.dropbox.com/s/e18sq25wqpv0l5y/Lehigh%20Park%20Pitch%20Video.mov?dl=0

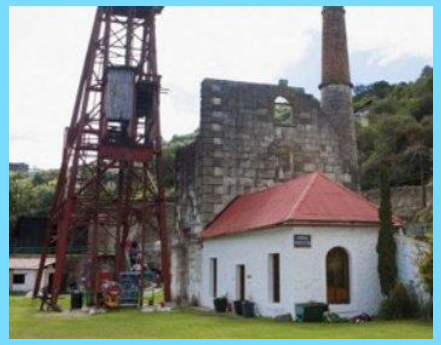
WHAT'S NEXT AT FRIEDENSVILLE?

WILL IT JOIN THE GLOBAL LANDMARKS OF MINING HISTORY?

"The President" Engine House
Uberroth Mine, Friedensville, PA

UK Cornish Mining World Heritage Site (UNESCO)

Australia



Mexico

(Photos courtesy Connar, Kaas, UNESCO)

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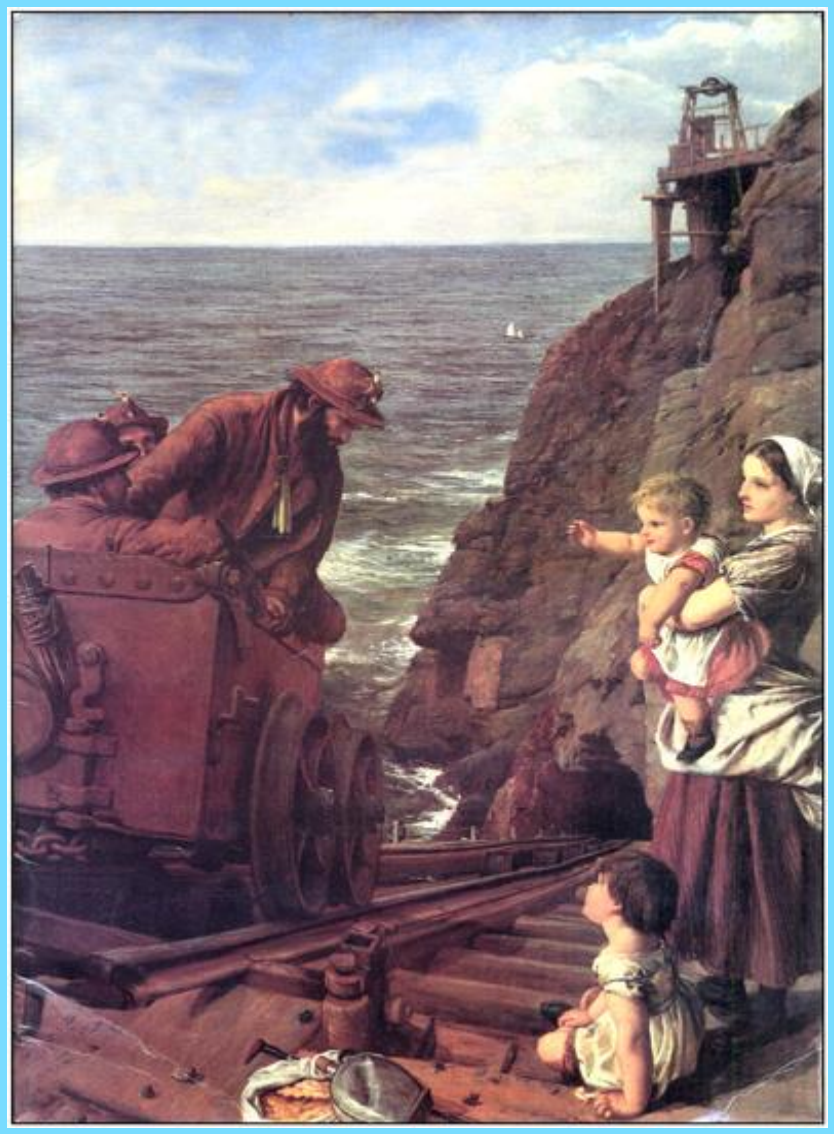
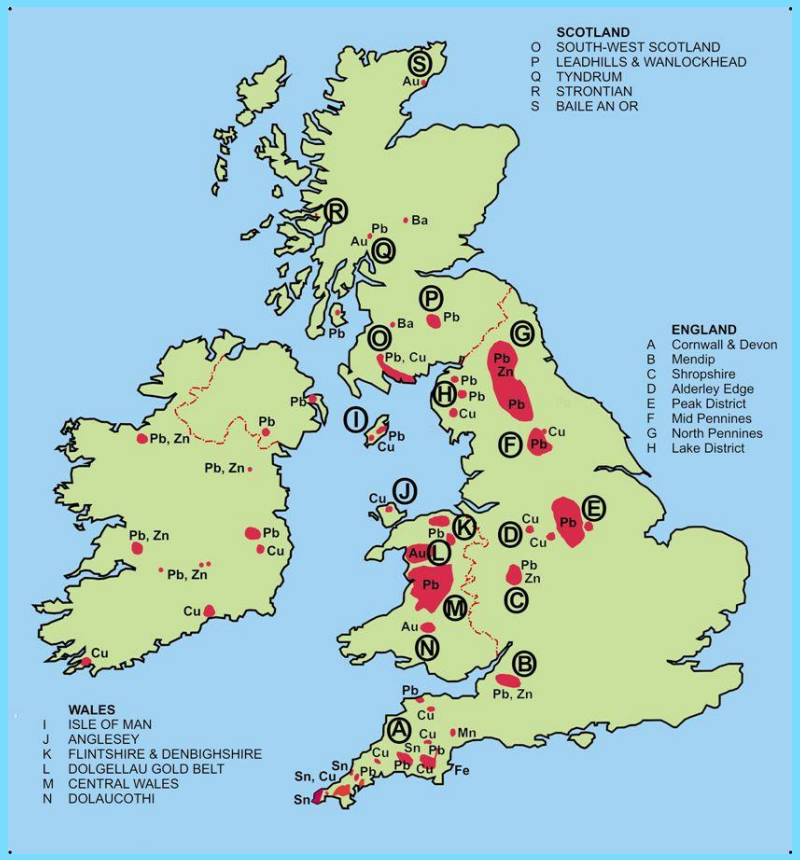
Bethlehem, PA Public Library
Borton-Lawson, Bethlehem, PA
National Canal Museum, Easton, PA
Berks County Historical Society, Reading, PA
National Museum of Industrial History, Bethlehem, PA
Lehigh County Historical Society, Allentown, PA
Lehigh University, Special Collections, Bethlehem, PA
Lafayette College, Special Collections, Easton, PA
Montgomery County Historical Society, Norristown, PA
Moravian Church Archives, Bethlehem, PA
Landis Valley Village and Farm Museum, Lancaster, PA
Robert Lanning, Saint Louis, Mo
Lehigh University Student TE “Lehigh Park” Project Team

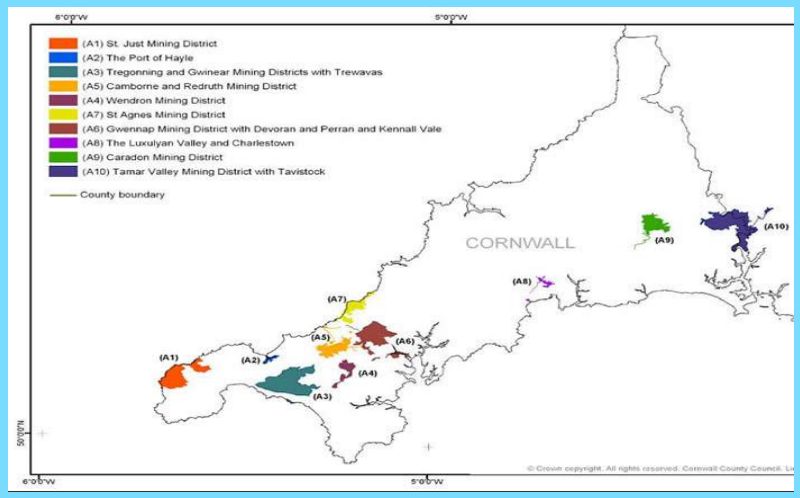
“Tell Me More” Contacts

Mark W. Connar
1480 Saucon Meadow Court
Bethlehem, PA 18015
610-248-6653
mwconnar@aol.com

Cornwall and its' Mines and Miners

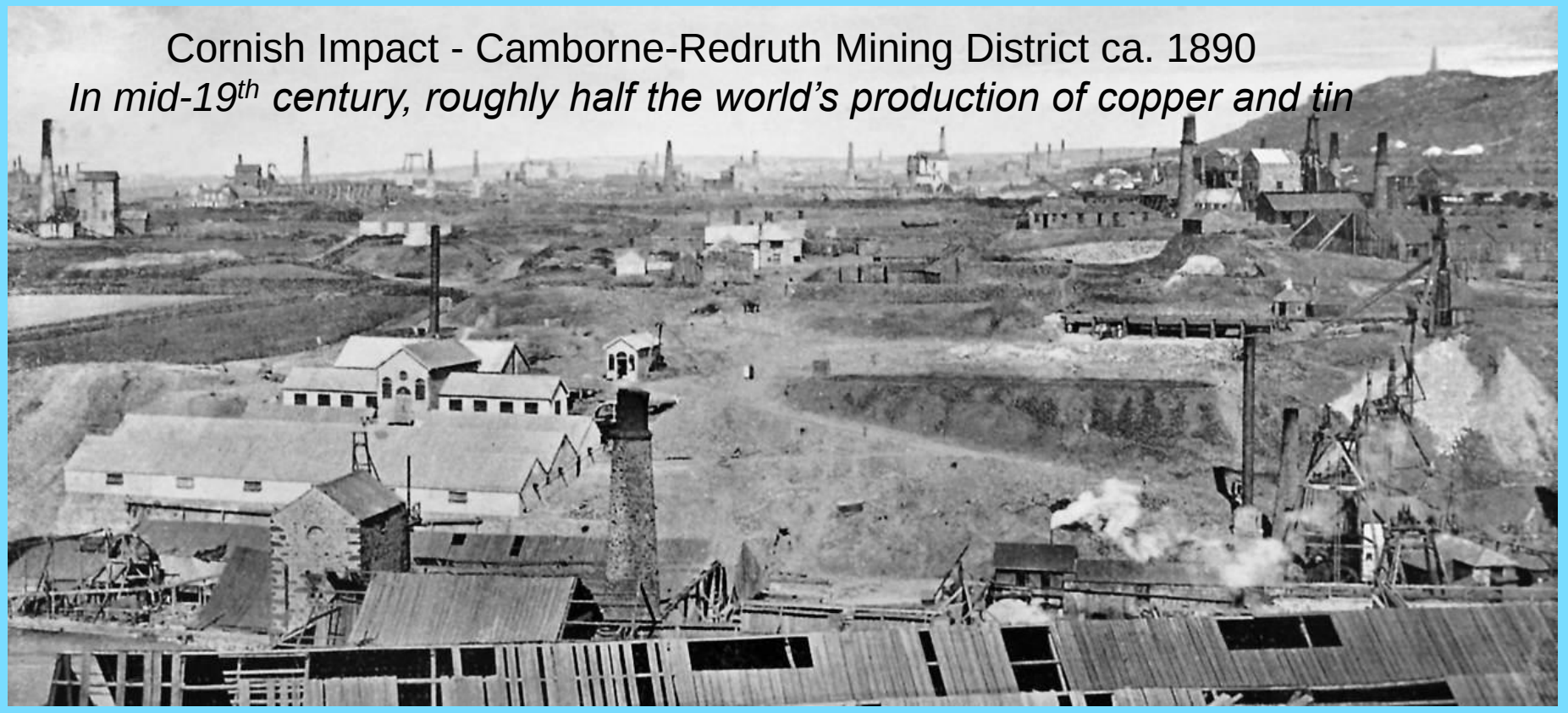






Cornish Impact - Camborne-Redruth Mining District ca. 1890

In mid-19th century, roughly half the world's production of copper and tin

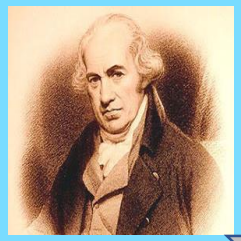


Between 1845 and 1913, 1530 mining ventures produced:

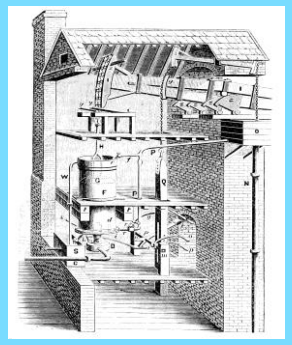
Copper	4,000,000 tons (peak 1856)	**Tin**	700,000 tons (peak 1871)
Iron	590,000 tons (peak 1872)	**Silver**	5,500,000 oz (peak 1869)
Lead	250,000 tons (peak 1847)	**Arsenic**	100,000 tons (peak 1885)
Zinc	80,000 tons (peak 1881)		

Plus: Tungsten, Manganese, Uranium, Nickel, Cobalt, Bismuth

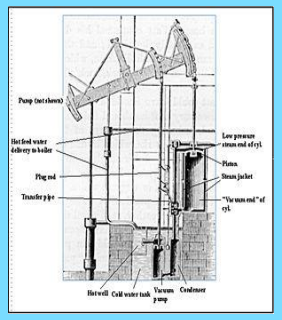
Evolution of Steam Technology in Cornish Mines



Thomas Newcomen (1683 - 1729)



Boulton & Watt (1775 - 1800)



Richard Trevithick (1771-1833)