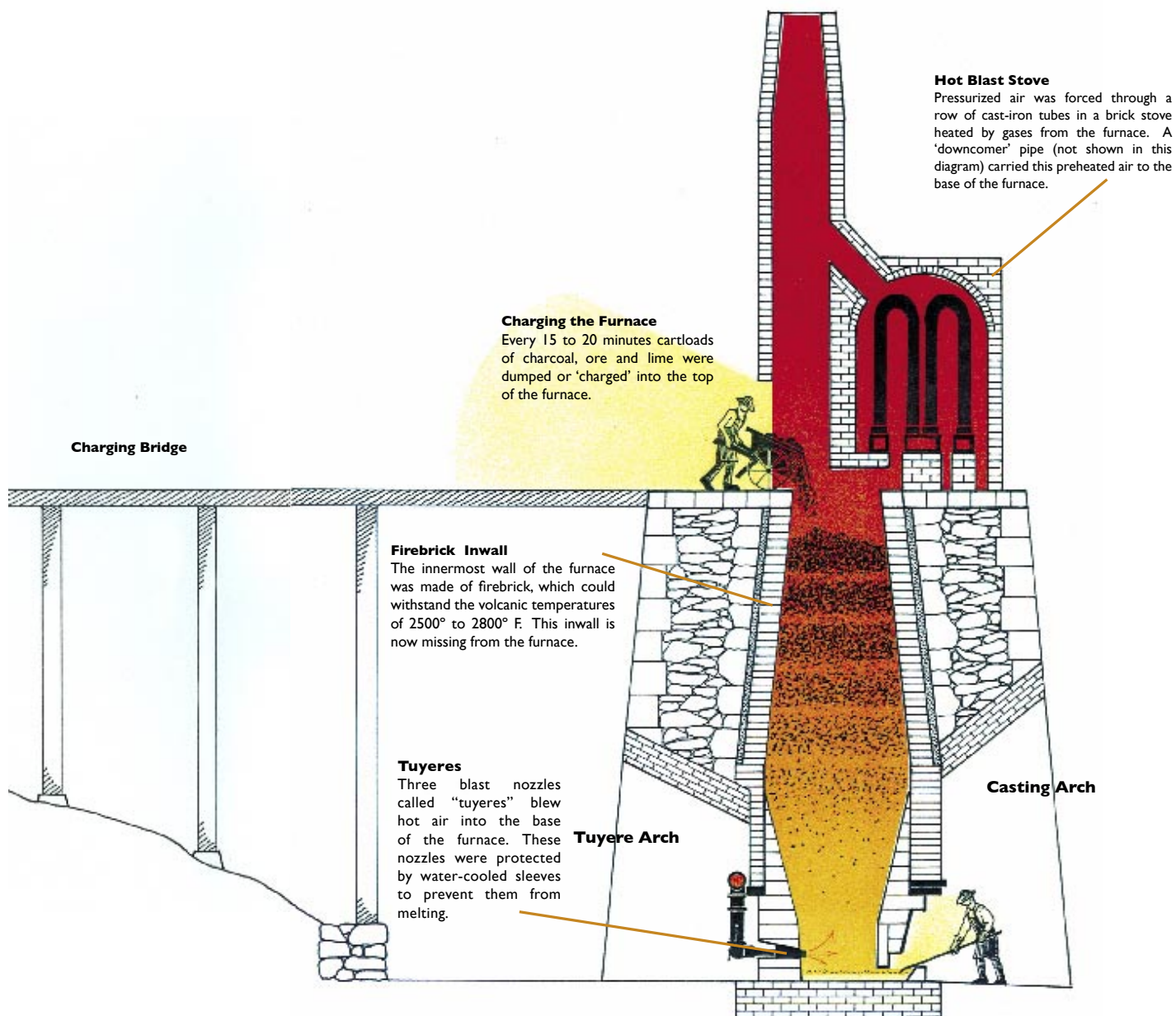


MAKING IRON

Susanna Campbell Kuo © 2008

Smelting Iron Ore

Extracting iron from ore is the first step in making any iron or steel product. The smelting process works as follows: charcoal, ore and limestone are fed into the top of the furnace and air is blown into the bottom. During combustion, a chemical reaction takes place. Charcoal acts as a reducing agent to remove oxygen from the ore (iron oxide), leaving metallic iron. The oxygen combines with carbon to form carbon dioxide and carbon monoxide, which escape up the chimney. With the aid of a flux (limestone), impurities in the ore separate into a glassy material called slag. Once the furnace is "in blast," it operates night and day without stopping for as long as a year and a half. It is only shut down when repairs are necessary or business is slow.



This cross-section does not show the buildings that enclosed the furnace.

Susanna Kuo © 2006

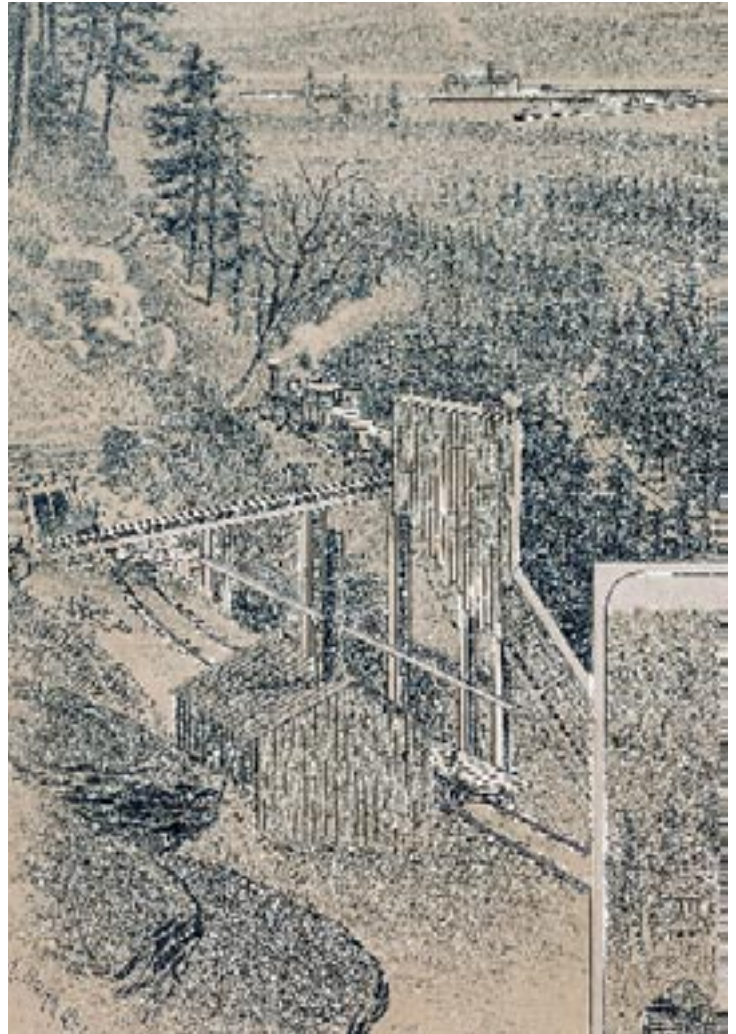
Raw Materials

Iron Ore

Ore for the Oswego Furnace was obtained from two mines: the Patton Mine in South Oswego and the Prosser Mine on Iron Mountain. The ore was a hydrated form of hematite variously known as brown hematite, limonite or bog ore. An 1888 account in a supplement to the *West Shore* magazine described the Prosser Mine: "It is a fissure vein of brown hematite, averaging ten feet in thickness, the ore yielding forty percent metallic iron. The old mine penetrated the hill in which the ore is found for a distance of about a thousand feet. The ore is first shoveled into cars in the mine, hauled out and dumped into bunkers, from which cars of the Oregon Iron & Steel Company's narrow gauge railway are loaded and drawn to the furnace stock house."

Charcoal

Fuel for the furnace was charcoal, which was superior to mineral coal because it did not contaminate the iron with sulfur. Chinese woodcutters felled Douglas fir trees and cut them into billets, which were then burned by colliers in charcoal "pits" in the forest. The billets were actually stacked on level ground in two tiers. The finished stack was



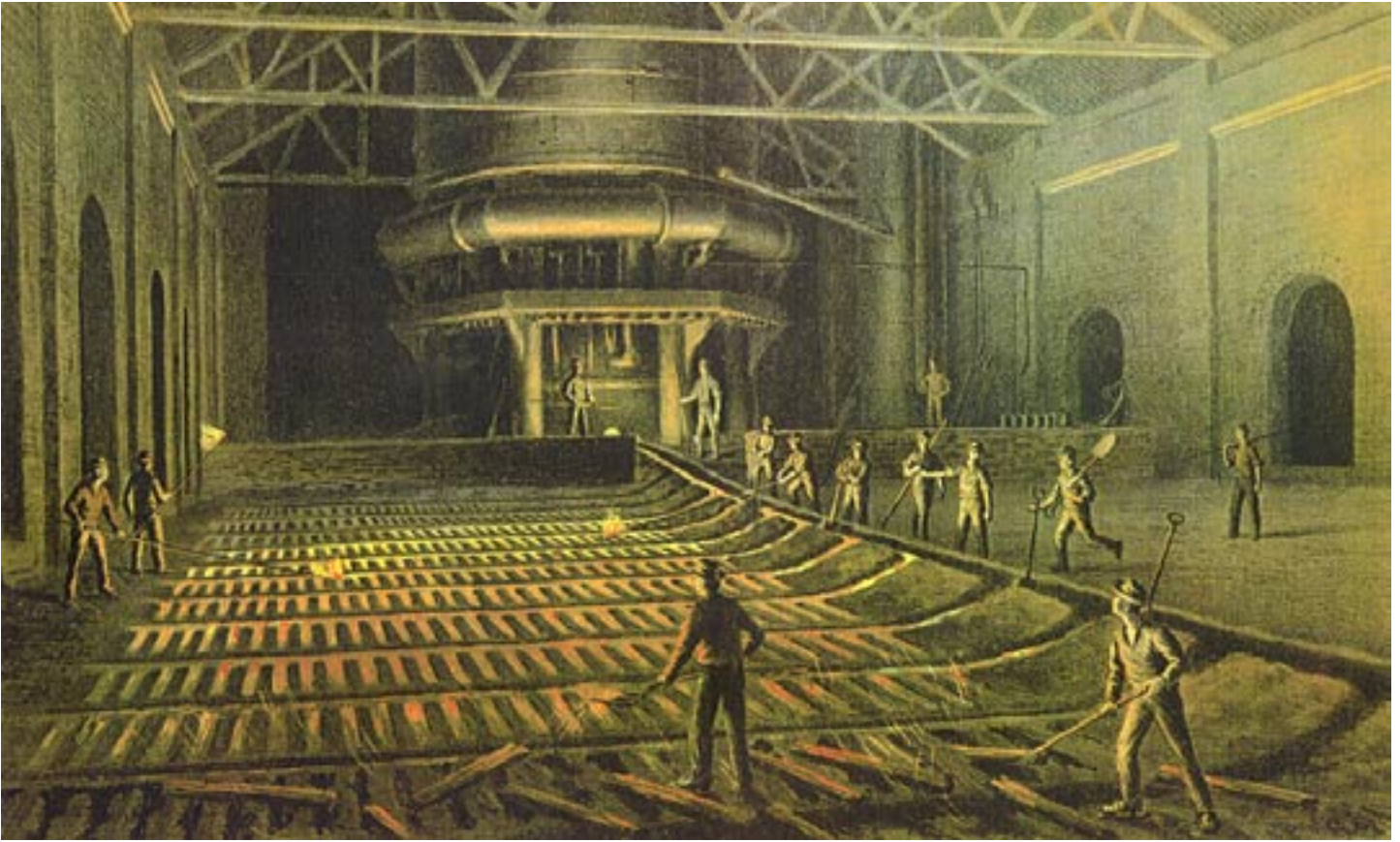
Engravings from a Supplement to the *West Shore*, 1888. A narrow gauge railroad carried ore from the mine on Iron Mountain down to the furnace.

Collection of the Oswego Heritage Council

about thirty feet in diameter and twelve feet high. It was covered with leaves and soil to cut off oxygen. The slow process of smoldering took about two weeks. During this time the charcoal burner or "collier" tended the mound night and day to ensure it didn't catch fire. Charcoal was made by this method until 1885. Thereafter, it was made in brick kilns near the new furnace.

Limestone

Limestone for the Oswego Furnace came from Puget Sound since there was no source nearby. Limestone serves as a flux during the smelting process, reacting with impurities in the ore and causing them to separate from the metal. These impurities collect in a glassy waste material called slag that floats on top of the molten iron.



Color engraving from the *West Shore*, November 2, 1889 Courtesy of the Lake Oswego Public Library

Casting Pig Iron

This night scene shows ironworkers tapping Oswego's second iron furnace in 1889. The method of casting pig iron in a sand floor was identical at both furnaces. Every twelve hours the furnace keeper broke a clay plug in the dam stone and the molten iron ran down a channel in the casting house floor. The stream of white-hot iron was diverted into branching channels called 'sows.' Each sow fed a row of molds called 'pigs' because of their resemblance to nursing piglets. Before the pigs cooled, they were broken off the sows with sledgehammers. Oregon iron was sold to foundries and forges in Portland and San Francisco where it was re-melted and made into a variety of cast iron, steel and wrought iron products. The two Oswego furnaces produced 93,404 net tons of pig iron between 1867 and 1894.



A bar of pig iron discovered near Oswego's second iron furnace. *Photo/Susanna Kuo*

Some Notable Uses of Oregon Iron



Cast Iron Architecture

The cast iron facades of Portland's Ladd & Tilton Bank and Salem's Ladd & Bush Bank were identical. William S. Ladd, the founder of both banks, was also president of the Oregon Iron Company. The majority of cast iron building fronts in Portland were made of Oregon iron.

Photo/Susanna Kuo



Pipe for Portland's Bull Run Water System

The Oswego Pipe Foundry was the only pipe foundry west of Saint Louis. It manufactured water pipe for Portland and other towns in the Pacific Northwest.

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1879 San Francisco City Hall

Iron from Oswego was used in San Francisco's first City Hall, which was destroyed in the earthquake of 1906.

Photo courtesy of Alex Blendl, phone: 503-657-0970.