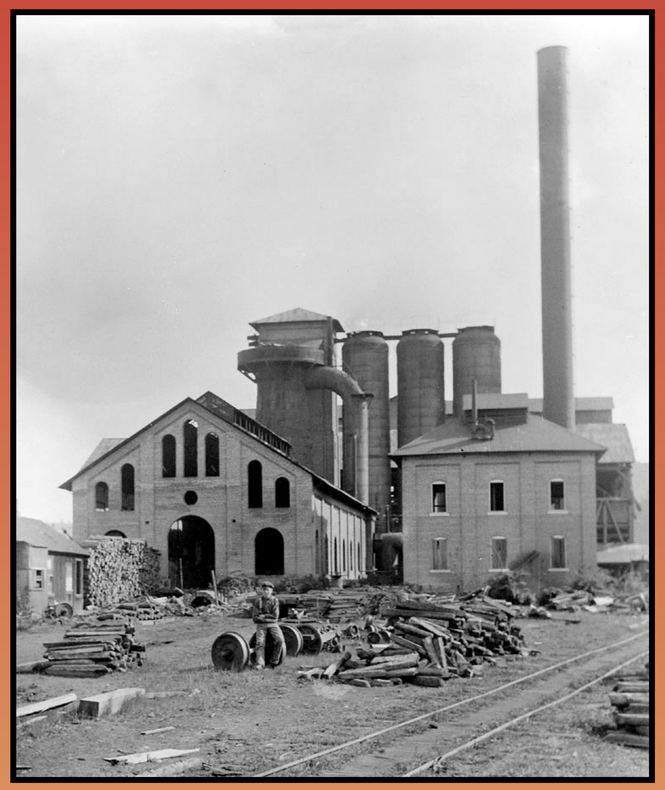
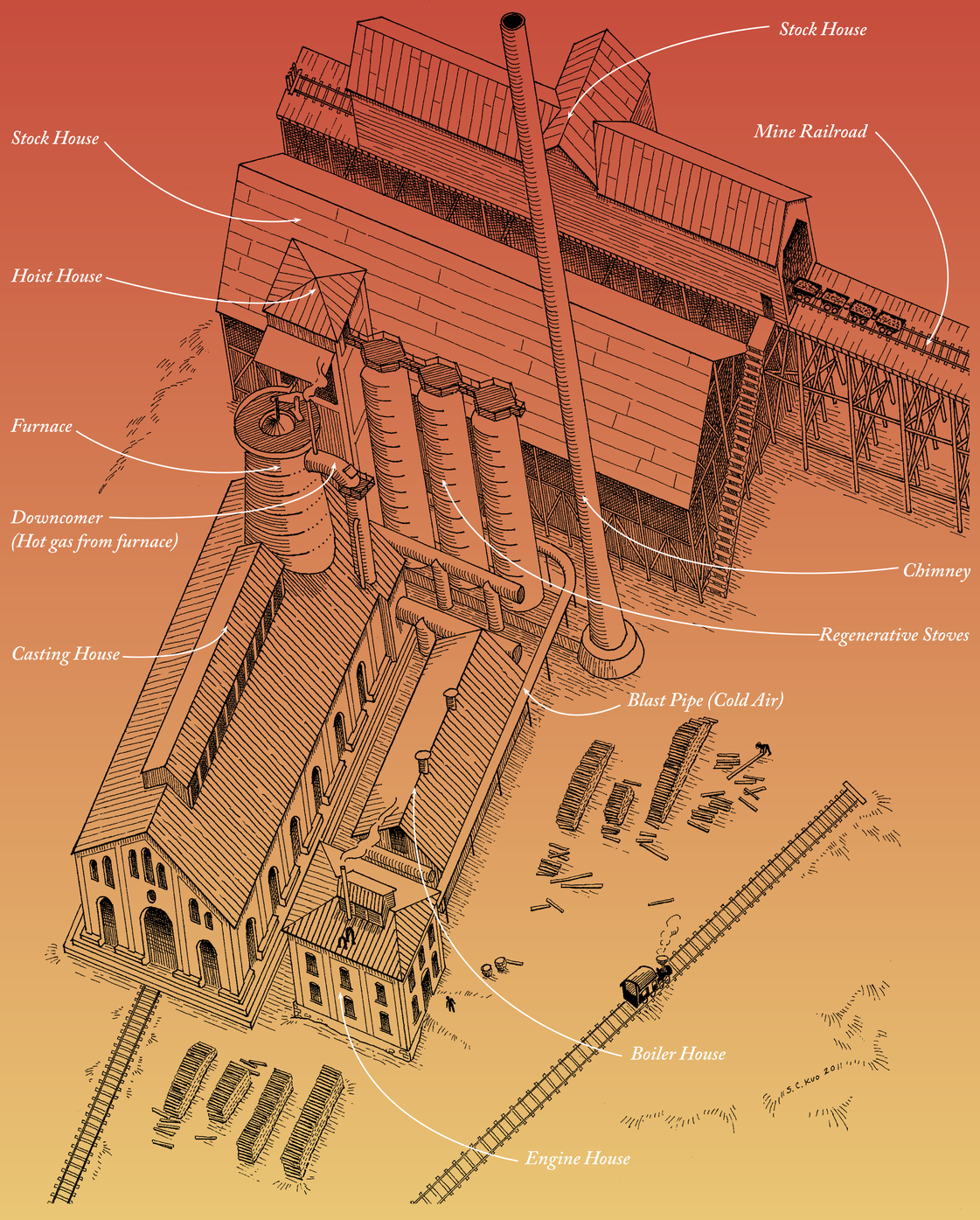
# Oswego's Second Blast Furnace



Stacks of pig iron and car wheels lie in front of the casting house. The blowing engine was housed in the two-story building on the right. *Courtesy of the Lake Oswego Public Library.*

Forty-two brick beehive kilns produced charcoal for the furnace. Each kiln held fifty cords of wood, which yielded about 2,500 bushels of charcoal. *Courtesy of the Lake Oswego Public Library.*

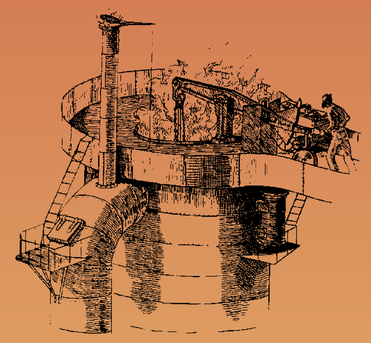



Bird's eye view of the iron works by Susanna Campbell Kuo

## Technology in Transition

Oswego's second iron furnace was built in 1888, a time of transition from the old way of making iron by hand to the new age of giant automated steel mills. At the center of Oswego's new plant was a 60-foot, ironclad furnace that could produce up to 50 tons of iron a day, five times the capacity of the old furnace. The cast iron shell of the furnace and the blast pipes that injected air into its base were cooled by water circulating through a closed system of copper tubing.

The biggest change in technology at the new furnace was the blast system. Instead of a turbine driven by water, the new furnace had an 800-horsepower Weimer blowing engine powered by steam. The engine weighed 100 tons and moved twelve thousand cubic feet of air per minute with ten pounds of pressure to the square inch. This pressurized air was preheated in three regenerative stoves. The key feature of these stoves was a honeycomb of refractory brick filling their interiors. Hot exhaust gas from the furnace was pumped through the passages and ignited until the bricks were red-hot. Then the gas valves were closed and cold air from the blowing engine was pumped into the stove. This continuous cycle of alternately pumping hot gas through the stove, then reversing the flow and pumping cold air through the hot brickwork required a minimum of two stoves. At the time it was built, Oswego's was the only furnace in the country with three regenerative stoves. At the end of the heat exchange process, hot air was pumped into the base of the furnace through six blast pipes or "tuyeres" and waste gas was expelled through the 160-foot tall chimney.



Charging the Furnace. The *West Shore* magazine, "Iron Manufacture at Oswego" (Nov. 2, 1889).

The handling of raw materials was also modernized. Instead of being delivered by wagon, raw materials were delivered by rail and by barge. Ore from the mine arrived by rail cars at the top of the stock house where it was weighed, graded, crushed, and roasted before being stored in bins. Limestone, used as a flux during the smelting process, was shipped on barges and lifted to the top of the stock house on an inclined conveyor. Charcoal was no longer manufactured in earth-covered mounds in the woods. Instead, it was made in brick kilns near the furnace. Each kiln held fifty cords of Douglas fir and yielded about 5,000 bushels of charcoal in two fillings a month. The proportions of charcoal, ore, and limestone were carefully measured before they were fed into the furnace. An elevator inside the hoist house lifted raw materials to the top of the furnace, but the hot and dangerous work of charging was still done by men tipping barrows over the throat of the furnace. A bell and hopper mechanism on its top gave them some protection from dust and noxious gases. Had the furnace continued to operate, automated charging would probably have been introduced.