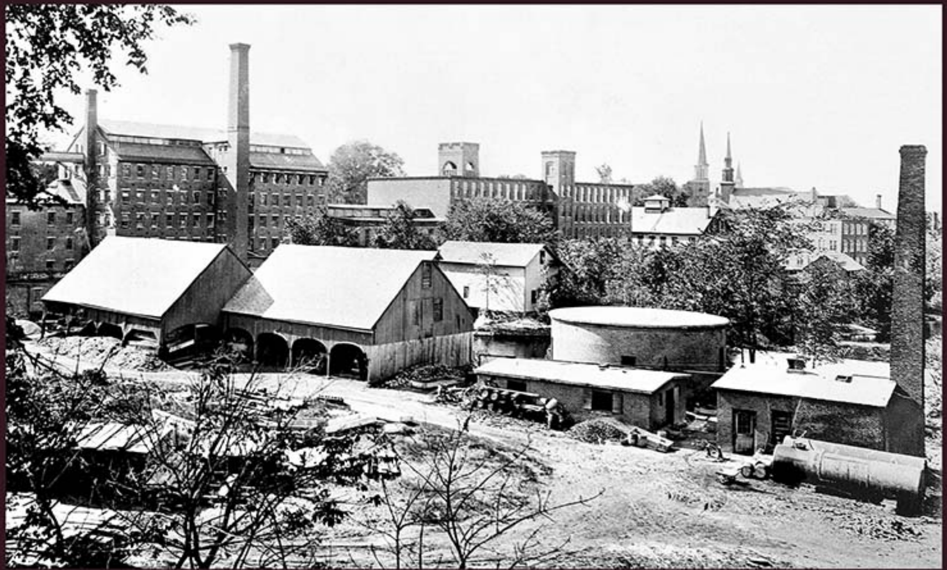
THE CLAREMONT GAS WORKS

Late 1890s view of Monadnock Mills, showing the Gas Works in the foreground. From left to right: two open coal storage sheds, the Storage House, the round 1859 Gasholder House behind, and the original 1859 Retort House and draft chimney. The two long metal tanks outside the Retort House stored oil added to the gas to make it burn with a brighter flame.

SOURCE: CLAREMONT HISTORICAL SOCIETY



The Claremont Gas Works began making "illuminating gas" to light local streets and buildings in 1859, and starting in 1905 it made gas more suitable for heating. Water-powered industry on Claremont's Sugar River expanded in the 1830s. The Monadnock Mills Co. across the river eventually became the largest textile company in the upper Connecticut River Valley. Industrial towns like Claremont needed artificial light and adopted coal illuminating gas technology, invented in England in the late 1700s and first used in America at Baltimore in 1817. The Monadnock Mills Co. and other Claremont investors chartered the Claremont Gas Light Co. in 1854 for the "manufacture, sale, and distribution of gas for lighting streets, factories, and all other buildings." Gas production began in 1859, and by 1866 the Gas Works provided the mills and village with 2 million cubic feet of illuminating gas.

At the start of the 20th century, electric utilities were competing with gas, and Claremont, then New Hampshire's largest town, chose to light its streets with electricity. In 1905, the Claremont Gas Light Co. modernized the Gas Works, which in 1911 delivered 9 million cubic feet of gas to 9,000 customers through 10 miles of pipe and sold gas-fired heating appliances from its own showroom. After World War II, natural gas became available in New England, and Claremont's coal gas plant closed in 1948. Almost 100 years of gas making left contaminated soil, and the Claremont Gas Works "Superfund" site was cleaned up by the U.S. Environmental Protection Agency in 2015.

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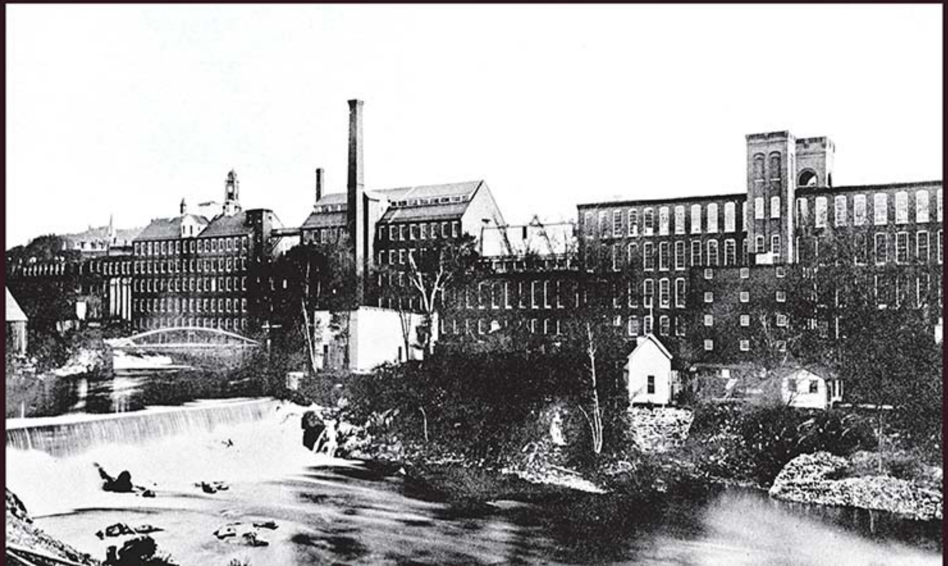
> **From our knowledge of gas, we can most cheerfully recommend it as the best light in the world—the sun, moon, and stars excepted—as more economical, safe, and every way desirably than any other artificial light.**
>
> *Claremont National Eagle*
> APRIL 10, 1856

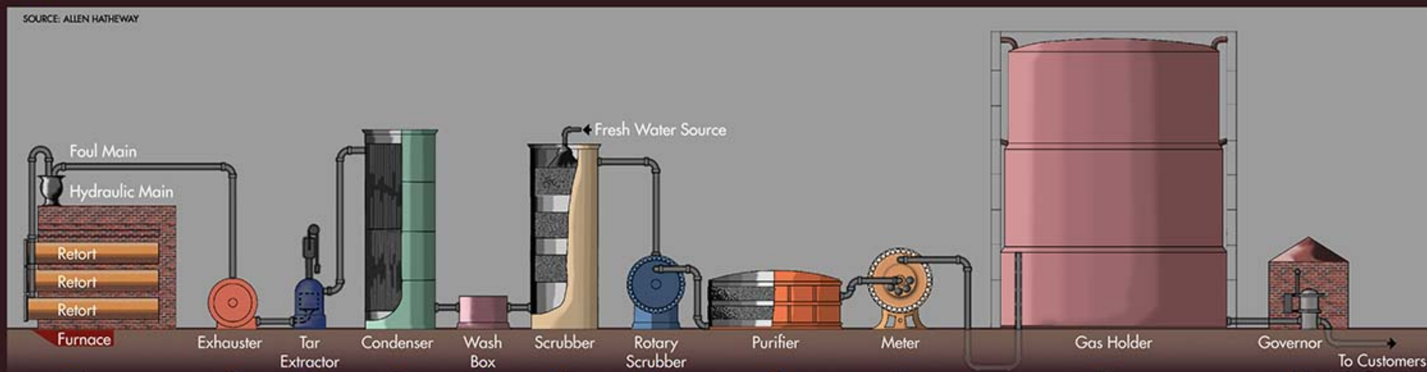


Monadnock Mills from across the Sugar River, showing the mill dam and part of the Gas Works at left. The 1870 Moseley Arch Bridge visible above the dam carried illuminating gas pipes to the mill and is now a National Historic Civil Engineering Landmark. The Monadnock Mills complex, including the Gas Works, was listed in the National Register of Historic Places in 1979.

SOURCE: DAVID PUTNAM

MAKING GAS AT CLAREMONT

Typical Coal Gas Process [LEFT TO RIGHT]



DISTILLATION

Gas coal was baked in airtight retorts at 600°–800°F for several hours, producing raw gas.

CLARIFICATION

An exhauster sucked gas from the retorts and forced it through a tar extractor and a water-filled condenser to cool it and remove more tar. Scrubbers removed ammonia and tar with solid filters.

PURIFICATION

In the purifier, gas was forced through powdered lime, iron filings, and wood chips to remove sulfur, cyanide, and arsenic to improve illuminating qualities and meet health regulations.

DISTRIBUTION

Gas production was measured by a meter. Gas was stored in one or more gas holders, where the weight of a floating tank forced gas through a pressure regulator governor and into pipes for distribution to customers.

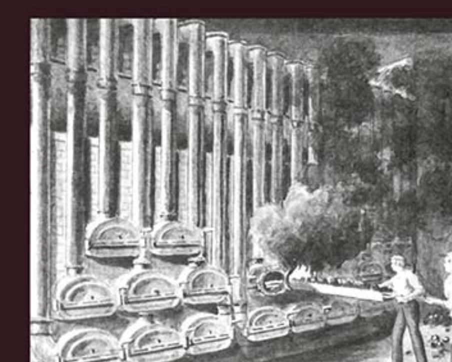
Claremont Gas Light Co. sign found in the ruined Gas Works buildings and salvaged by the City of Claremont.

Claremont coal gas production changed over time before replacement with natural gas. After the Civil War, urban demand for illuminating gas increased. By the 1870s most U.S. towns of over 10,000 people had a manufactured-gas plant, including, in New Hampshire, Concord, Manchester, and Portsmouth. Claremont gas-making technology followed industry trends. Illuminating gas was made in three steps: distillation, clarification, and purification. Starting in 1859, the Claremont Gas Light Co. distilled bituminous “gas coal” in the Retort House, heating the coal in airtight chambers, or retorts, to produce coal gas. Clarification and purification removed tar and harmful chemicals, which were flushed into the Sugar River or buried on site. Gas stored in the Gasholder House was sent to consumers through a system of pressurized pipes.

In the 1890s, the Claremont Gas Light Co. adopted an oil gas process, adding oil from Pennsylvania’s then-new oil industry, making gas with more illuminating power. In 1905 the company built a new, larger plant to make carbureted water gas. This equipment, developed in the 1880s, blew steam over hot “coke” (what is left of coal after distillation), making hydrogen and carbon monoxide, which were then enriched with oil, making a hotter-burning gas suitable for heating use. New Hampshire’s gas industry adopted this new process, but shortly after World War II it was replaced by natural gas, which has twice the thermal energy of coal gas. New Hampshire’s coal gas industry ended dramatically when the Laconia gasworks exploded in March 1952.

Charging gas coal into retorts by hand and removing the hot leftover residue was dirty, hot, strenuous work, often performed by unskilled, immigrant laborers.

SOURCE: UNITED OTTO COMPANY, 1908



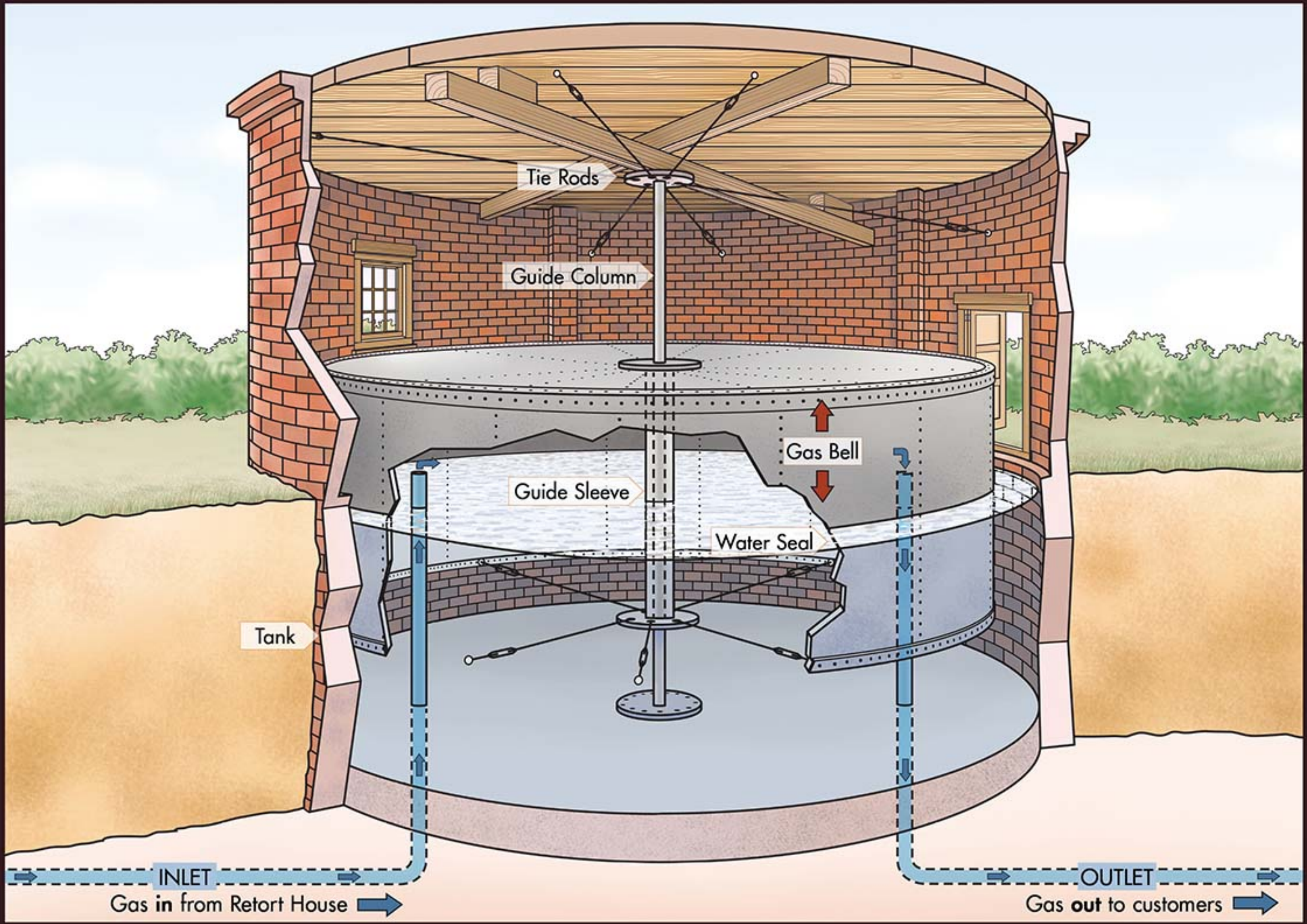
THE CLAREMONT GASHOLDER HOUSE

Claremont's 1859 Gasholder House was a rare example of early gas-storage technology. Coal gas was stored and sent to consumers using a simple structure called a gasholder, a sealed vessel that rose vertically as it was filled with gas during the day and fell as gas was consumed at night, with greater demand in darker and colder months. The Claremont Gas Light Co.'s gasholder technology followed typical industry patterns. The company's first gasholder—the round, brick 1859 Gasholder House, held about 12,000 cubic feet of gas. Its vertical movement was guided by a central column, an early 19th-century British design. Claremont's gasholder was reportedly the last known example in the world when the building was demolished in 2015.

In 1905, the Claremont Gas Light Co. built a second, 50,000-cubic-foot-capacity gasholder for its new carbureted water gas plant. The new design incorporated a telescoping, multiple-section tank supported by an external steel frame. The new holder increased delivery pressure of the gas and helped age it to improve quality. The 1859 gasholder became a "relief holder" to cool the gas, regulate pressure, and remove the last traces of coal tar. In 1924, an even larger gasholder of similar design was built for additional storage capacity. The 1905 holder became the relief holder, and the 1859 holder became a coal tar storage well.

The 1859 Claremont Gasholder House ruins before demolition in 2015. The components of the rare pre–Civil War structure are expressed by the concentric pavement rings, vertical wood and steel posts, and overhead truss rods of the plaza around you.

SOURCE: MILESTONE HERITAGE CONSULTING



How Claremont's 1859 Gasholder House Worked

Gasholder houses shared the same basic structure and operated on the same general principles. Claremont's 36-foot-diameter, brick-walled Gasholder House sheltered a watertight, belowground pit, or tank, filled with water. The tank contained a smaller-diameter gas bell, a giant upside-down hollow cup made of riveted iron plates that floated open end down in the water. This arrangement created a water seal, forming an airtight space under the bell. Fresh gas was pumped into the space through an inlet pipe in the tank floor. The pressure of the trapped gas, held by the water seal, forced the bell upward, filling it with stored gas. The bell's vertical travel was guided by a central iron guide column inside a tubular guide sleeve at the center of the bell. The tank and column were held in place by radiating tie rods. The gas-filled bell acted like a giant piston. Gravity pushed the bell down, pressurizing the gas and forcing it into an outlet pipe and into service mains for delivery to consumers.

ILLUSTRATION: DENNIS O'BRIEN: MAPS AND WAYFINDING, LLC