

SWIFT WATERS: THE EARLY INDUSTRIAL ENVIRONMENT IN THE AGE OF WATERPOWER

Jamie Eves

*Also see: **Swift Waters, Hot Steam**, a PowerPoint presentation on the different types of industrial power, including electricity, used by the mills at Willimantic Falls, 1822-2012.*

Like the rest of New England, eastern Connecticut is a land of steep hills, plentiful rainfall, and an abundance of small rivers. It was from those rivers – the Willimantic, Natchaug, Quinebaug, Fenton, Little, Moosup, Hop, French, Yantic, and Shetucket – that eastern Connecticut drew the power that fueled its 19th-century Industrial Revolution. Neither deep nor wide, but swift and powerful, foaming and swirling, the little rivers tumble out of flinty hills and join the larger Connecticut and Thames rivers on their journeys to the sea. In Windham, the Willimantic River drops more than 90 feet in less than a mile as it tumbles through a rocky gorge. The power of gravity was there for the taking.



The Willimantic River in Willimantic, a 19th-century mill city in the town of Windham, Connecticut. This dam was constructed in 1854 to divert water into a raceway that flowed under the Willimantic Linen Company's Mill No. 1. Altogether, the Willimantic River drops more than 90 feet in less than a mile as descends through the narrow, rocky Willimantic Gorge. From the collections of the Windham Textile and History Museum. Photo by Stephanie Conforti.



This head race (the part of the raceway that carries water to the mill's wheelhouse) flowed from the Willimantic River to the Willimantic Linen Company's Spool Shop and Mill No. 1. Sluice gates (shown upper right) controlled the amount of water entering the raceway. The sewer pipe, railroad bridge, and stanchions of today's Frog Bridge for vehicular traffic were added later. Today, the water in the raceway turns turbines that generate electricity. From the collections of the Windham Textile and History Museum. Photo by Stephanie Conforti.

Connecticut's first, **preindustrial mills** had appeared earlier, in the 1600s and 1700s, along these and other little rivers and even smaller brooks and streams. Small, family-run, and utilizing traditional technologies, preindustrial mills – also known as country mills – were relatively simple affairs. Constructed by colonial grist millers, sawyers, tanners, and fullers, they met the needs of local, rural communities for flour, boards, leather, and fulled cloth. Their mill houses, constructed mostly of timber, were only one or two stories. Their simple stone-and-earth dams diverted water from rivers and millstreams into small, narrow, ditch-like raceways, which carried it to turn the creaking waterwheels that powered the mills. Their profits were modest. They created only a few jobs. And their impact on the environment was limited. Nevertheless, they featured most of the technologies – although in smaller form – that would later drive the big industrial mills.

In the nineteenth century, newer, grander, and more technologically sophisticated industrial mills suddenly sprang up along the rivers. Beginning in the 1790s with Samuel Slater's large, new textile mill in Pawtucket, Rhode Island, the Industrial Revolution came to America. Soon, industrial mills opened in eastern Massachusetts, southern New Hampshire, southwestern Maine, and eastern Connecticut. These new industrial mills were much larger than the old country gristmills, sawmills, fulling mills, and tanneries of preindustrial times. They had broader, sturdier dams; wider and stone-lined raceways that resembled canals more than the narrow, shallow sluices and wooden troughs of preindustrial times; and bigger, more powerful, and faster-moving waterwheels. Their buildings were usually made of stone or brick rather than wood, and rose as high as four or more stories. Rather than just one or two mill hands, each of the new mills employed dozens – sometimes hundreds – of men, women, and children. By the end of the 19th century, more than 100 industrial textile mills operated in eastern Connecticut, churning out vast quantities of cotton, wool, linen, and silk thread and cloth each year. Connecticut – and America – had entered a new era: the Industrial Age!



Mill pond above the dam at the Wauregan Mills in the industrial mill village of Wauregan, in the town of Plainfield, Connecticut, as it looked c. 1950. From the collections of the Windham Textile and History Museum.



Raceway at the Wauregan Mills, c. 1950. Industrial-era aceways were wide and deep like canals and carried large amounts of water to power the mills. From the collections of the Windham Textile and History

Museum.

The new industrial mills required faster, more efficient means of transportation. At first, old-fashioned sailing ships brought in raw cotton from the U. S. South to seaports and river ports like Norwich, New London, Middletown, and Hartford in Connecticut, and Providence in Rhode Island. Horse-drawn wagons carried the big bales inland to the mills. But transportation by road was slow and expensive, so in the 1840s, **the railroad came to Connecticut**, and industrialization really took off. Coal-fueled steam trains now chugged across the Connecticut countryside, bringing in raw cotton and wool and carting out finished thread and cloth.

First villages and then cities grew up around the industrial mills. In eastern Connecticut the new textile mill cities included Willimantic, Manchester, Baltic, Danielson, Taftville, Jewett City, Putnam, Stafford Springs, South Coventry, Yantic, Moosup, Dayville, Thompson, Wauregan, and Plainfield. Connecticut's population surged. Disease, crowding, floods, fires, crime, and other urban problems increased. But at the same time urban services like schools, theaters, post offices, clubs, and newspapers became more widely available. Connecticut moved into a new age.

By the 1880s, a new industrial ecosystem had emerged in Connecticut's mill cities, supplanting the old agrarian ecosystem of colonial times. At its center were the rivers, dams, raceways, railroads, and mill buildings of the Industrial Revolution. The dams blocked fish from migrating upstream. The mills dumped industrial dyes directly into the rivers. When the rivers suffered from summertime droughts, the owners responded by erecting water-storage dams upstream, in the process creating most of Connecticut's lakes and major ponds. When, in the 1870s, the mills grew too large and numerous to be powered by the rivers alone, their owners installed coal-fueled steam boilers that joined the railroads in filling the air with thick black smoke. Railroad tracks radiated out from the mill cities like spokes, linking them to booming river- and seaports like Norwich, New London, Hartford, and Providence. As workers flocked to the new jobs, the cities grew larger. Nearby forests were converted to farmland, to feed the city folks and their horses, mules, and oxen. Wild plants and animals disappeared. People, crops, weeds, and other domestic plants, and pests and livestock became more numerous.



The early industrial mills were located in New England rather than the South, where the cotton was grown, because the waterpower, capital, surplus free labor, and markets were in or near New England. The cotton was shipped north by ship and — later — by rail. In this photo, a cotton bale is unloaded in Willimantic, Connecticut, at the American Thread Company, c. 1950. From the collections of the Windham Textile and History Museum.



Raceway at the Wauregan Mills in Wauregan, Connecticut, c. 1950. From the collections of the Windham Textile and History Museum.