Determining the Facts

Forms and Structures of the Textile Industry

The Rhode Island System - In the United States, the first use of water-powered spinning frames was at Slater's Mill in Pawtucket, Rhode Island. Additional mills based on the pattern of the Slater Mill were quickly built. Usually referred to as the "Rhode Island System," these mills borrowed heavily from standard English patterns, especially that of spinning in a factory and "putting out" the spun yarn to be woven into cloth at workers' homes. The spinning mills were housed in a variety of building types that were usually based on contemporary house types and buildings used for light industry in the region. Their appearance did not directly relate to the manufacturing activity they contained. Slater's Mill was typical of early Rhode Island mills. It used traditional building construction forms and techniques to meet the requirements of the evolving industry. Early wooden mills like Slater's were replaced in the early 1800s by somewhat larger structures of either rubble stone or granite block with interior wood framing. They still looked like large houses, but they were more solid and provided better protection against the danger of fire.

The Mills at Waltham - Francis Cabot Lowell and his circle of Boston friends were the first to improve upon the design and organization of the early New England textile mills. Lowell's Boston Manufacturing Company was producing cloth by 1815, utilizing power looms he had developed after observing similar machines in British factories. That mill at Waltham, Massachusetts, was the first vertically integrated factory in the United States, which means that all operations for cloth production were accomplished under one roof. Construction of the second mill at Waltham in 1816-1818 completed the evolution of the physical form, structural system, and construction technique that later would be used in Lowell.

The standard Waltham plan was rectangular, 150'-160' long (reflecting the dependability of interior overhead line shafting) by 40'-50' wide (the optimum for spaces relying on exterior windows for natural light). The four stories of open floor space had a dormer-lit gable roof, brick construction with stone foundations, and a full-height exterior stair tower centered in one of the long elevations. Initially, these mills were built either as a series of similar structures, or constructed so they could easily be expanded.

The Boott Cotton Mills - Built in the 1830s, the four original Boott mill buildings reflected the typical Waltham mill structure. The four rectangular brick "boxes" each had four stories and a dormer-lit attic, water wheels, and a basement. Stair towers centrally located on the exterior of each building provided access to upper floors.

As the century progressed, new technologies affected the millyard's development. Structures were added. The development of new means of fire protection such as ceiling sprinklers and better lineshaifting to run machinery reduced the danger of fires spreading, allowing existing buildings to be connected. As sources of artificial lighting were
introduced, the original width of buildings was increased. The introduction of steam power made it possible to construct several additional large buildings. The complex demonstrates the challenges of expanding on an increasingly restrictive site, bounded by a canal and a river. The Boott Mill complex is one of the few corporations at Lowell that managed to expand on its site while retaining and enhancing the architectural quality of the millyard.

Questions for Reading 3

1. Where had industrial development begun in the United States before Lowell was established?

2. How were the operations of Slater's Mill different from those of the Boston Manufacturing Company?

3. Why was brick considered a better construction material for a mill than wood?

4. Why do you think the stair towers were placed on the exterior of the mill?