

HISTORIC AMERICAN ENGINEERING RECORD

CHAMBERS-MCKEE WINDOW GLASS COMPANY

(American Window Glass Company)

(American Saint-Gobain)

(Jeannette Sheet Glass Company)

(GGI)

HAER No. PA-221

Location: Jeannette, Westmoreland County,
Pennsylvania

Date of Construction: 1888

Fabricator: James Chambers, H. Sellers McKee

Present Owner: (GGI)

Present Use: closed (1993)

Significance: The largest window glass factory in America when constructed in the late 1880s, the American Window Glass Company plant at Jeannette embodies the first three generations of window glass technology: the transition from artisanal production to Lubbers machines, and the replacement of Lubbers technology by Fourcault machinery. Until it closed, this was the last plant in North America using this technology.

Historian: Richard O'Connor, August 1991

Project Information:

In February 1987, the Historic American Engineering Record (HAER) and the Historic American Buildings Survey (HABS) began a multi-year historical and architectural documentation project in southwestern Pennsylvania. Carried out in conjunction with America's Industrial Heritage Project (AIHP), HAER undertook a comprehensive inventory of Westmoreland County to identify the region's surviving historic engineering works and industrial resources (Edward K. Muller and Ronald G. Carlisle, Westmoreland County, Pennsylvania: An Inventory of Historic Engineering and Industrial Sites. Washington, DC: U.S. Department of the Interior, 1994.) Archives for HAER/AIHP projects are located at the Indiana University of Pennsylvania.

CHRONOLOGY

- 1888 Chambers-McKee Window Glass Company built with first continuous melting tank in America
- 1891 James Chambers opens Chambers Glass Company in Arnold, Pennsylvania
- 1899 Chambers forms American Window Glass Company, absorbing Chambers-McKee and Chambers Glass companies
- 1904 Lubbers cylinder-drawing machines installed, displacing skilled gatherers and blowers
- 1928 Fourcault sheet-drawing machines replace Lubbers cylinder-drawing machines
- 1958 American Saint-Gobain formed by merger of American Window Glass Company with Blue Ridge Glass Corporation, owned by Saint-Gobain of France
- 1970 Renamed ASG
- 1978 Float, Inc. merges ASG and Fourco Glass to create AFG
- 1983 AFG closes Jeannette plant
- 1985 Plant reopened as ESOP under name JSG (Jeannette Sheet Glass)
- 1987 JSG enters Chapter 11 bankruptcy
- 1989 General Glass International buys plant and renames it GGI (General Glass Industries)
- 1993 GGI closes Jeannette plant

Introduction

During the summer of 1991, the Historic American Engineering Record (HAER) conducted a three month study of the flat glass industry¹ at Jeannette, Pennsylvania, a community of ten thousand residents in Westmoreland County, approximately 30 miles east of Pittsburgh. Jeannette has been a "Glass City" for over a century, its workers turning out table wares, containers and novelties in addition to window glass. At their peak, in the years immediately following World War II, the city's seven glass plants employed over 5000 men and women, but residents generally agree that incompetent and dishonest management squandered much of the industrial inheritance.² Until 1993, one of the two factories still in operation was the General Glass Industries (GGI) window glass factory, the most recent successor to the Chambers-McKee Window Glass Company (C-M), one of the town's first plants. GGI operated the last Fourcault sheet drawing process in North America.

¹ Between 1889 and 1940, window glass was a subcategory of the flat glass branch of the glass industry, devoted primarily to providing glass for construction and furniture. On the basis of technology and markets, the industry was divided in to two major branches, plate and window. Plate glass was cast, ground and polished in discrete operations, in thicknesses ranging from seven sixty-fourths of an inch to one and one-half inches. Its primary markets were automobiles, mirrors and tabletops, and storefronts. The second branch, and the subject of this study, was common window glass. Known as cylinder, crown and sheet glass (after the various production processes), by the early twentieth century window glass consisted of three types: thin glass (lantern, microscope and photographic dry plate glass); common window glass (window and door glazing); and crystal sheet (automobile replacement glass, show cases, table tops). During the nineteenth century, and especially before the production of plate glass in America became commercially viable, residential, commercial and industrial glazing were the end uses, and the economic vitality of the window glass industry reflected the general economic health of the construction industry. United States Tariff Commission, Flat Glass and Related Products, 2nd Series, No. 123 Washington: GPO, 1937; p. 79.

² Steven W. Keller, "Working in 'the Glass City': The Making and Shattering of Jeannette, Pennsylvania, 1888-1991," Field report submitted to Folklife Division, America's Industrial Heritage Project, Allegheny Heritage Center, Johnstown, PA, 1991.

The HAER documentation effort focused on three aspects of the window glass industry's historic legacy in Jeannette. Founded in 1888, C-M contained the first continuous melting tank furnace in the United States, a qualitative break from traditional pot and furnace melting technique. Rebuilt over twenty times since then, the tank stands today in the same place as the first one over a century ago. Second, each of the three different glass-shaping techniques used at Jeannette during the past century--the hand process (1888-1904); the Lubbers cylinder process (1904-1928); and Fourcault sheet machine process (1928-)--represents an era in the industry's technological history. The innovative continuous tank notwithstanding, Chambers-McKee still depended on skilled craftsmen to turn molten batch into lights of glass, and thus continued the industry's artisanal production traditions. In 1904, five years after Chambers-McKee joined the American Window Glass Company (AWGC) trust, the company replaced blowers and gatherers at Jeannette and the rest of its factories with the revolutionary Lubbers cylinder drawing process. It retained the cylinder process for nearly a quarter century before the superior quality and efficiency of sheet glass production confronted the AWGC with the difficult choice between bankruptcy or substituting sheet for cylinder machinery. The Fourcault machines installed in 1928 are still making glass today, albeit rebuilt and modified many times in the intervening years. Thus, from a historical perspective, the Jeannette window glass factory's technological significance rests on its innovations (continuous tank and Lubbers process), its persistence (Lubbers in the 1920s and Fourcault today), the variety of its technological experiences, and the site's current integrity.

The history of technological innovation at Jeannette complements the conventional wisdom on late nineteenth and early twentieth century American industrial development. During this period, historians argue,³ a "second industrial revolution" spread from

³ Ronald Schatz and James Barrett place their studies of electrical and packinghouse workers in the context of a "second industrial revolution." Ronald Schatz, The Electrical Workers (Urbana, IL: Univ. of Illinois Press, 1983), 3-4; and James R. Barrett, Work and Community in the Jungle (Urbana, IL: Univ. of Illinois Press, 1987), 2-3. There is ample historical evidence to support the concept. See, for example, Harold G. Vatter, The Drive to Industrial Maturity (Westport, CT: Greenwood Press, 1975); Alfred Chandler, The Visible Hand (Cambridge, MA: Harvard University Press, 1977); and Martin J. Sklar, The Corporate Reconstruction of American Capitalism, 1890-1916 (Cambridge: Cambridge University Press, 1988).

older manufacturing centers to their rural hinterlands, creating satellite communities whose economic vitality came from new manufacturing industries like electrical equipment and automobiles, and from heat-using process industries like steel, glass and chemicals. Based on new sources of power - coal, coke, gas, oil and electricity, and more sophisticated technologies - industries of the "second industrial revolution" were more concentrated and their firms larger and better financed than others, railroads excepted. But what of the anomalies displayed by older industries like glass that were rapidly transforming themselves to the new model? Unlike electrical equipment, automobiles and telecommunications, glass was an old commodity with deeply ingrained artisanal production traditions, including a customary knowledge of its behavior and properties that was widely diffused among tradesmen but relatively unknown to the companies. Again, unlike the products of the newly developing industries, glass did not lend itself to laboratory experimentation because the greatest difficulties encountered in its manufacture occurred in the scale, volume and heat of factory production, conditions not easily replicated in the laboratory.⁴ For glass and other older industries to join the "second industrial revolution," they too, like electrical equipment and chemicals, needed large amounts of capital and exploitable, patentable technologies. But they also had to overcome entrenched craft and entrepreneurial traditions that influenced their transformation in every respect.⁵

Background

Well into the 1880s, production of window glass took place much as it had for a century past. Still sensitive to the cost and availability of adequate fuel, manufacturers continued to locate and relocate in regions where coal and/or natural gas were plentiful, obtainable, and cheap, and near major transportation arteries. Increases in the scale of production and the division of labor notwithstanding, old manufacturing methods continued: batch was still melted in pots inside furnaces, and craftsmen still shaped the viscous mass into lights of glass. The

⁴ Liddell notes the difficulty of applying the results of laboratory experiments to factory conditions. Liddell, "Science," 128; on the other hand, Fourcault purportedly used hot wax and a small-scale model to demonstrate his sheet drawing process. Glass Industry, Vol. 2, No. 8 (August, 1921), 190-1.

⁵ Including traditions of secrecy and "the mutual distrust between glass men and scientists." Liddell, "Science," 114-23.

remarkable stability in firm size, technology and skill was both cause and effect of strong, deeply-rooted subcultures of workers and manufacturers, typified by family and financial linkages among firms and by the strength of kinship, custom and organization among workers. It was this nineteenth century world that the Chambers-McKee factory helped transform.⁶

Tremendous demand for fuel and transportation shaped the geography of production among heat-using process industries like glass. In America, continuous glass production dated from the eighteenth century. Small operations by later standards, the earliest sat adjacent abundant supplies of sand and wood in three well-defined regions--southern New Jersey, central New York State, and the Ohio River Valley from Pittsburgh to Wheeling. As the population spread west, Pittsburgh increasingly became the industry's center and, by the 1880s, its output nearly equaled that of all other regions combined.⁷

⁶ The following discussion of nineteenth century window glass production summarizes Richard O'Connor, "Cinderheads and Iron Lungs: Window-glass craftsmen and the Transformation of Workers' Control, 1880 - 1905," (Ph.D. diss., University of Pittsburgh, 1991), 25-50, which contains fuller documentation. One of the best sources on nineteenth century glass industry is Joseph Weeks, Special Report on Glass, U.S. Census of Manufactures, 1880 (Washington, DC: GPO, 1883), passim. See also the two economic history classics on the American glass industry: Warren Candler Scoville, Revolution in Glassmaking (Cambridge: Harvard University Press, 1948), 14-6, 30-84; and Pearce Davis, Development of the American Glass Industry (Cambridge: Harvard University Press, 1949), 118-39; as well as Trevor Bain, "The Impact of Technological Change on the Flat Glass Industry and the Unions' Reactions to Change: Colonial Times to the Present" (Ph.D. diss., University of California at Berkeley, 1964), 20-61, 153-211; and Dennis Zembala, "Machines in the Glasshouse: the Transformation of Work in the Glass Industry, 1820-1915" (Ph.D. diss., The George Washington University, 1984), 64-66, 93-97, 132-60, 192-220.

⁷ On glass regions, see O'Connor, "Cinderheads," 50-79.

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