THE GLASS INDUSTRY OF WESTERN PENNSYLVANIA, 1797-1857

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Since the closing years of the eighteenth century, glassmaking has played an important part in western Pennsylvania. While Pittsburgh was earning for itself the name of the Birmingham of America it was also becoming known as a glassmaking center. The district of which Pittsburgh is the nucleus became, in fact, the leading glassmaking district in the United States. And Pittsburgh glass became famous for its distinctive beauty, not only in the United States, but in many foreign countries as well.

The industry extends back to the time when western settlers began to regard glass as a necessity rather than as a luxury. There was an increasing need for glass windows to take the place of oiled paper or clapboard shutters in the new homes. Bottles were in demand for containers of whiskey and porter, and glass tableware was needed to displace crude utensils such as wooden bowls, trenchers, noggins, gourds, and hard-shelled squashes.

The western settlers could not depend upon the East for their glass. The difficulty of securing raw materials and capital, as well as the restrictions of the British mercantile system, prevented the early growth of a glass industry in the East or anywhere else in the country. Although commission merchants in the western settlements purchased shipments of window glass and glassware from the East soon after the Revolution, the physical difficulties and high cost of carriage by pack horse over several hundred miles of mountains and wilderness seemed an insurmountable barrier in supplying the demand for these fragile articles in the trans-Al-

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1 Read at a meeting of the Historical Society of Western Pennsylvania on May 26, 1936. Mr. Bining, who is a teacher of history in the Ambridge Senior High School, presented a thesis on this subject in partial fulfillment of the requirements for a master's degree at the University of Pittsburgh in February, 1936. Ed.
legheny settlements. These difficulties really proved a stimulus for the manufacture of glass within the region. It was the great demand for glass in the rapidly growing settlements, shut off from the East, that led several commission merchants to promote the building of glassworks.²

Advantages for transportation determined the choice of location. The early enterprisers built their works along the Ohio and its tributaries, which formed natural outlets for their products. After operations were well under way, they sold glass to pioneers traveling westward, as well as to settlers in the communities where the glass was made.

The demand for glass bottles was an important contributing factor in the development of the industry. As a result of poor transportation facilities in the western country during the period of early settlement, the farmers converted their surplus grain into whiskey for shipment in that form to outside markets. At first, kegs were the chief containers for whiskey; but as time passed, bottles came more and more into use, especially when taverns began to dot the highways of travel. Bottled whiskey was transported down the streams to the main water-highways and thence down the Ohio River, sometimes to the Kentucky settlements and sometimes even as far as New Orleans. Isaac Craig and James O'Hara, who were among the first glassmakers in western Pennsylvania, carried on a thriving commission business in liquors, porter, and beer. They also owned distilleries, and in conjunction with their glass business they shipped down the rivers boatloads of bottles, both filled and empty.³

Before the close of the eighteenth century, two successful glassworks were operating in western Pennsylvania. Craig and O'Hara had erected the Pittsburgh Glassworks on the south side of the Monongahela River at Pittsburgh, a favorable location for shipping their products down the Ohio.⁴ Albert Gallatin and a group of men had built the New Geneva

² James O'Hara and Company, invoice books, 1784–86, Denny-O'Hara Papers (Historical Society of Western Pennsylvania).
³ Zadok Cramer, *Pittsburgh Almanach*, 57 (Pittsburgh, 1807); *Pittsburgh Gazette*, February 12, 18, 1797; *Pittsburgh Mercury*, September 23, 1813; François A. Michaux, *Travels to the West of the Alleghany Mountains*, 158, 194, 195 (Reuben G. Thwaites, ed., *Early Western Travels*, vol. 3—Cleveland, 1904).
⁴ James O'Hara to James Morrison, June 24, 1805; O'Hara to P. R. Frieze, [July], 1805, Denny-O'Hara Papers, letter book; Allegheny County Archives, Deed Book 9, p. 105, 406, 407; Deed Book 12, p. 75, 308.
Glassworks on the Monongahela River near Georges Creek, whence shipments were sent westward over two routes, one by way of the Monongahela to the Ohio River, the other by way of the overland route to Wheeling. A third successful glassworks was erected in the fall of 1807 in Pittsburgh. The following year it was acquired by Benjamin Bakewell, who soon became one of America's foremost glassmakers. His works was the first in western Pennsylvania to produce flint glass, and the only works of its kind in the United States during this period to remain in operation until flint glassmaking was permanently established.

During these early years, the glassmakers met with many difficulties. They were unable to utilize many raw materials that later were to prove important in the industry. Raw materials were relatively inaccessible at that time because methods of extracting and preparing them were crude and because facilities for shipping them were poor. Lead was shipped up the river from Illinois; alkaline salt was shipped from Ohio; and alkali was usually nothing more than potash derived from burnt timber. The only sand available was the coarse, yellow material, found along the streams in the vicinity of Jacob's Creek, Whitely, and Belle Vernon. Because of impurities in this local product, such as alumina, manganese, and oxide of iron, the glass resulting from the "melt" was either brown or green in color. Later, when the Missouri region was opened, a better grade of sand was discovered, and Pittsburgh was then assured a fine white sand for the manufacture of flint glass. Not until the middle of the century, however, were the near-by quarries of Juniata and Hancock opened, and not until then was Pittsburgh's leadership in the glass industry definitely established.

The clay used in making furnace crucibles in which the glass was melted was obtained with great difficulty. Thomas Hutchins, who visited

5 Tree of Liberty (Pittsburgh), May 7, 1803; Thaddeus M. Harris, Journal of a Tour into the Territory Northwest of the Alleghany Mountains, 32 (Boston, 1803).


7 John Bradbury, Travels in the Interior of America in the Years 1809, 1810, and 1811, 253 (Reuben G. Thwaites, ed., Early Western Travels, vol. 5—Cleveland, 1904); Edmund Flagg, The Far West: or, a Tour beyond the Mountains, 97 (Reuben G. Thwaites, ed., Early Western Travels, vol. 26—Cleveland, 1906).
the western country during the Revolutionary period, thought that there was in the region an abundance of clay suitable for glassworks. Actually the contrary was true. Pittsburgh glassmakers repeatedly offered rewards for the discovery of good clay beds, but without success. It was necessary, therefore, to cart clay in barrels over the mountains from New Jersey at great expense. Later, when a better grade of glass was demanded, western Pennsylvania began to rely upon clays from England, Germany, and Holland. Not until the third quarter of the century was a method discovered to prepare Missouri clay for glass-furnace crucibles.

A second major problem that confronted the glassmakers of western Pennsylvania was the difficulty of securing and keeping skilled glass blowers. This was the problem that characterized the glass industry in America from early colonial times, and even long after political independence had been secured, the dependence upon foreign skilled workers was keenly felt. The early arrivals were chiefly German glassmakers, although a few English and French craftsmen appeared. Conditions in the frontier country, with its extensive areas of free land, instilled in these workers a spirit of wanderlust and freedom from restraint. Employers were forced to offer inducements in order to secure and keep blowers. Often they advanced money toward the traveling expenses of prospective workers, who, when settled, received other considerations, such as a free house, free fuel, and wages even when the furnace was not in blast, as well as the privilege of making a garden.

Thus the shortage of skilled workers led to practices that later in the


10 Letters of James O'Hara to James Morrison and to Daniel Vertner, April 19, 1805; to Frederick M. Amelung, April 19, May 26, 1805, January 18, 1806; to Henry W. Muhlenbergh, June 11, 1805; to Joseph Carson, April 29, 1810; to Christopher Steeny and Adam Greiner, April 18, 1812, Denny-O'Hara Papers, letter book; *Hunt's Merchants' Magazine*, 28:514 (April, 1853).
The glass industry grew steadily. Two factors were chiefly responsible for this growth; first, the increase

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12 *Pittsburgh Gazette*, January 27, 1787; March 22, 1788; February 6, 1790; July 20, 1797; November 14, 1800; Commonwealth (Pittsburgh), April 3, 1816.
in population of the western country, and second, the advantages of water-highways. These two factors were closely related in the rapid settlement of Ohio that followed the decision of the national government in 1800 to sell land there on credit. The purchase of Louisiana from France in 1803 opened up more than a million square miles for settlement. Soon the Ohio and Mississippi rivers became important highways in the exchange of the lead, sand, and saltpeter of Louisiana and Missouri territories, on the one hand, and the glass of Pittsburgh, on the other. Glass was shipped down the rivers to the forts, stockades, and settlements along the route as far as New Orleans. The political settlement with France also opened the way for the shipment of large quantities of bottled porter down the Mississippi to the West Indies and the Atlantic coast in seagoing vessels that had been built along the upper Ohio River; while large cargoes of glass were shipped down the rivers on flatboats, reloaded upon seagoing vessels at New Orleans, and consigned to the Atlantic coast or even to Europe.

The embargo of 1807, while depressing many industries of the nation, really had a beneficial effect on the glass industry of western Pennsylvania. A new wave of immigration ensued, and capital was transferred from shipping interests to industry in the West, as exemplified in the organization of the Bakewell company. In 1808, when window glass was selling for thirteen dollars a box of one hundred feet, Cramer's Almanack called the attention of its readers to the fact that an additional twenty thousand dollars' worth of glass could be used in Pittsburgh alone.

The War of 1812 also benefited the glass industry. The only apparent inconveniences resulted from interference with trade in the western country and from restrictions on importation of foreign clay and diamonds. But as a result of the double duty on foreign glass, the demand for the domestic product increased, while the necessity for depending upon domestic raw materials and markets tended to unify the East and the West. To such a point had the industry progressed by 1817 that pro-

13 Michaux, Travels, 158; Harris, Journal, 32.
14 James Hall, Letters from the West: Containing Sketches of Scenery, Manners, and Customs, 36 (London, 1828); Michaux, Travels, 177.
15 Zadok Cramer, Pittsburgh Magazine Almanack, 57 (Pittsburgh, 1808).
duction at five works in the Pittsburgh district alone reached $240,000, and technical improvements in design and quality led visitors to heap praises upon Pittsburgh craftsmen and their distinctive products.\textsuperscript{16}

The years from 1817 to 1837 may be called the period of competition in the glass industry. Previously, the difficulty and high cost of transporting glass from the East over several hundred miles of bad roads had prevented serious competition from foreign glass. Following the War of 1812, however, the improvements in transportation facilities and the depreciation of the currency made the problem of competition a serious one. Furthermore, in order to regain her former markets, Great Britain inaugurated a policy of stifling American industries by shipping enormous quantities of goods and selling them, sometimes at a loss. As a result of the enormous influx of foreign glass and the accompanying panic, the industry in western Pennsylvania declined.

In order to remedy the distressing conditions, the glassmakers in the Pittsburgh region joined with other manufacturers in the movement for tariff protection. Describing the alarming results of the discontinuance of the double duties that had been established during the exigencies of war, a report of a committee appointed by the citizens to inquire into the state of manufacturing in the city, made on December 21, 1816, stated that the production of flint glass made in Pittsburgh, formerly valued at $130,000 per year, had decreased about $30,000 a year.\textsuperscript{17} On February 14 of the following year, Walter Lowrie of western Pennsylvania, in a resolution presented to the Pennsylvania Senate, depicted the effects of foreign imports on the major industries of the state: "The citizens of this state have already embarked extensive capitals in manufactures, particularly in iron and glass, woollen and cotton goods. But the large and unprecedented importation of foreign articles, has given a shock to our infant manufactures, unprotected as they now are by discriminating duties."\textsuperscript{18} Such statements as these reveal the plight of the manufacturers


\textsuperscript{17} Niles' Weekly Register, 12: 130 (April 26, 1817).

\textsuperscript{18} Pennsylvania, Senate Journal, 1816-17, p. 234, 252, 255; Niles' Weekly Register, 12: 39-41 (March 15, 1817).
and explain their desire for federal legislation to protect and encourage the manufactures of the state.

While western Pennsylvania glassmakers were feeling the effects of the influx of foreign manufactures, the financial panic of 1818–21 descended upon the region and brought about an almost complete cessation of industry. The crisis was the result of a faulty money system and of speculation resulting from the rapid business expansion during the period of embargo and the period of war. Nevertheless there was a tendency to place a preponderant emphasis upon the lack of high protection as the cause for the nationwide depression. At a meeting held in Pittsburgh on October 9, 1819, two glassmakers, Benjamin Bakewell and George Sutton, were appointed to a committee for obtaining signatures to a tariff memorial that was to be sent to Congress and to the state legislature. A second committee was appointed at this meeting to collect information relative to the decline of manufacturing since the close of the war. The latter committee reported on December 24, 1819, that the production of the different kinds of glass in Pittsburgh had decreased from a total of $235,000 to $35,000.¹⁹

At the same time that glassmakers were bombarding Congress with petitions, a movement aimed at the support of domestic industries swept western Pennsylvania and manifested itself in a general boosting of domestic goods. As early as the fall of 1818 a precedent was established by the Bakewell company when that firm made a set of cut-glass tableware for President Monroe. People were urged to follow the example of the president in not buying foreign articles if domestic ones could be obtained.²⁰ Messrs. Bakewell, Page, and Bakewell were keenly aware of the need for encouraging protection. The following year they sent to the editor of *Niles' Weekly Register*, a protectionist publication, a pair of glass decanters “as a token of the high sense we entertain of the service you have rendered our country, by the publication of many valuable essays on political economy, and as a specimen of the progress of the arts in


²⁰ *Pittsburgh Gazette*, October 6, 1818; *Pittsburgh Mercury*, November 10, 1818.
the west.\textsuperscript{21} The token was conveyed with the expressed hope that Congress would adopt at the ensuing session a measure that would be beneficial to domestic industry.

Pittsburgh glassmakers also took part in organizing societies for the purpose of encouraging domestic manufactures. At a meeting of the Allegheny County Society for Protecting Agriculture and Domestic Manufactures, held on February 3, 1820, William Eichbaum and Thomas Bakewell were appointed to a committee of prominent citizens who were to circulate subscription papers with a view to enlarging the membership of the society. At this meeting a resolution was passed to send memorials to Congress petitioning aid and protection for manufacturers.\textsuperscript{22} At this time many glassmakers also joined cooperative marketing associations, such as the Pittsburgh Manufacturing Association, whose first president was George Sutton. In this association's warehouse one of the chief articles of Pittsburgh manufacture was window glass.\textsuperscript{23}

In Congress the supporter of the cause of the glassmakers was Henry Baldwin of Pittsburgh. He had been instrumental in securing an increased duty on cut glass at the close of the war, and now he became the leader of the political faction in favor of higher duties. In defending a new tariff bill he frankly admitted that it was protective in principle and detail, but he resented the charge that the bill was partial to his own city and declared:

This has been called a Pittsburg, a cut-glass bill, local, partial in its operations—and I have been charged with framing it from interested motives. . . . I tell the house frankly, that I have not lost sight of the interest of Pittsburg, and would never perjure myself if I had; but the charges shall be met plainly, and if you are not convinced that the interests of that place are identified with the nation, that cut glass can be defended on national grounds, then I agree, that Pittsburg, its representative, its favorite manufacture, and the tariff, may go together.\textsuperscript{24}

\textsuperscript{21} \textit{Niles' Weekly Register}, 17:34 (September 18, 1819).
\textsuperscript{22} \textit{Pittsburgh Gazette}, August 27, 1819; February 18, 1820.
\textsuperscript{23} See Pennsylvania, Laws, 1819-20, p. 75-80.
\textsuperscript{24} \textit{Niles' Weekly Register}, 18:249ff. (June 3, 1820); \textit{Annals of Congress}, 16 Congress, 1 session, 36:1933, 1934.
Although Baldwin's measure passed the House of Representatives, the Senate by a majority of one decided to postpone consideration of it until the next session, at which time the question of the tariff was again temporarily shelved. The cries of the protectionists in state and national legislatures, in local societies and national conventions, were hushed when the economic depression subsided.

Another attempt to effect protective legislation, made in 1822, also failed, but Baldwin was rewarded in 1824 by the passage of the tariff act of that year. This act increased the duties on glass considerably. At this time, also, the glassmakers were further benefited by the return of prosperous conditions. Glass factories were now working full time, and by the close of the first quarter of the century, western Pennsylvania glass was known and sold from Maine to New Orleans, and even abroad.\(^{25}\)

Although the tariff problem lost its economic significance during the prosperous years that followed, it was revived in party conflicts. The final outcome of party manipulation at this time was the tariff of 1828, which was known as the "Tariff of Abominations." In spite of prosperous conditions and unexpected reductions in the price of glass, opposition to this tariff became vociferous, especially in the South. The voices of the protectionists in Congress and the reports of the manufacturers at home had little influence in allaying the clamors. In the meantime it was generally recognized in Congress that a downward revision of the tariff was inevitable, and accordingly in 1832 a bill was presented and passed. Although the act reduced duties as a whole, it affected the rates on glass but little.\(^{26}\)

The crisis in the tariff controversy came with the Ordinance of Nullification, which declared that the tariff acts of 1828 and 1832 were null and void within the borders of South Carolina. It was at this critical moment that Henry Clay laid before Congress his famous compromise measure, designed to reduce the tariff to the level fixed in 1816, the proposed reductions to be made in easy stages over a period of ten years. To the glass industry of western Pennsylvania, the compromise act meant

\(^{25}\) Samuel Jones, *Pittsburgh in the Year Eighteen Hundred and Twenty-six*, 69 (Pittsburgh, 1826).

\(^{26}\) *Congressional Debates*, 22 Congress, 1 session, p. 1219, 1275, 1276.
that the gains made for the cause of protection would be wiped out by 1842. By the third decade of the nineteenth century, however, the industry was established on a firm basis, and the change of tariff rates had little effect. Furthermore, the manufacture of pressed glass by machinery had become so efficient that America was actually exporting this type of glass to Europe.

During this same period the glassmakers faced competition at home. The problem arose from attempts of other districts to enter markets formerly controlled by western Pennsylvania and was closely related to the improvement of transportation facilities to the West. From early times, Pittsburgh, the nucleus of western Pennsylvania, had been considered the key position in the trade between the East and the West. After the completion of the National Road to Wheeling in 1822, the glassmakers of the Wheeling district secured advantages for transporting raw materials and glass manufactures far above those of Pittsburgh. Likewise, the Erie Canal gave advantages to New England glassmakers for shipping their products to the region south of the Great Lakes.

From the beginning, the glassmakers in western Pennsylvania took part in the movement for better transportation facilities. They foresaw the advantages that a waterway system across Pennsylvania would have in satisfying the increasing demand for glass in the East. The completion of the Pennsylvania Canal System in 1834 made those advantages possible. This land and water route ushered in a quicker and cheaper method of transportation. Shipping lines advertised fast freight service that reduced the time required for transit between Pittsburgh and Philadelphia to about eight days. Freight rates were lowered about sixty-six and two-thirds per cent. Glass was shipped eastward to the region that during the early period had been the only source for glass. The amount of window glass shipped to eastern markets from the commencement of navigation in the spring of 1835 until November of the same year was 5,908 boxes, or 531,720 pounds.*7

The Pennsylvania Canal System, while providing facilities for the

*7 Daily Advocate and Advertiser (Pittsburgh), April 8, 1835; Hazard's Register of Pennsylvania, 14: 387; 16: 336 (December 20, 1834; November 21, 1835); Canal Commissioners of Pennsylvania, Report, 1837, p. 26.
east-west trade, did not solve the problem of supplying Pennsylvania glass to the Lakes region. This region was being supplied by glassmakers of Boston, who shipped their flint glass by way of New York City and the Erie Canal. The glassmakers of the Wheeling district also shipped glass to the Ohio and Indiana markets. In 1825, after much controversy, which involved conventions, memorials, and press propaganda, the legislature of Pennsylvania passed a bill providing for a canal from the Ohio River to Erie by way of the Beaver and Shenango rivers, and two years later it joined with the legislature of Ohio in providing for a canal connecting the Beaver and Lake Erie Canal with the Ohio Canal extending from Marietta on the Ohio River to Cleveland. The latter, or the Pennsylvania and Ohio Cross Cut Canal, was completed about 1840, and Pittsburgh secured access to Lake Erie at Cleveland. The results were important for the glass industry. Freight rates on glass over the new waterway between the two cities were reduced to about twenty and three-fourths cents per hundred pounds.28

A third transportation project was the improvement of the Monongahela River. From the beginning this river had played an important part in the development of the glass industry of western Pennsylvania. Sand of the Brownsville region supplied the glassworks all along the river, including those at Pittsburgh. In the exchange of raw and finished products with the East, the Monongahela served as part of the route, during the time of year when the water was high. When the National Road was completed there was a need for improving the river so that Pittsburgh might compete with Wheeling with its longer navigable season, and thus divert part of the trade that was growing between Wheeling and Baltimore. Although the movement for improvement began before the completion of the National Road, nothing was actually done until after the incorporation of the Monongahela Navigation Company in 1836. Perhaps no group contributed more to the success of the undertaking than the glassmakers. Among those who were active in the work were James W. Nicholson, George Sutton, Anthony Beelen, Thomas Bakewell, Benedict Kimber, George Hogg, James L. Bowman, William

28 Pittsburgh Gazette, February 4, 1845.
Eberheart, Andrew Stewart, Morgan Robertson, William Eichbaum, and William Bakewell.

During the period between 1837 and 1857 the glass industry reached a condition of relative stability. A constant demand for glass had developed as a result of the tremendous growth in population and the improvement in standards of living. And, too, the high degree of efficiency in manufacturing that had been attained permitted the industry to meet foreign and domestic competition.

There were still difficulties to be overcome, however. The problem presented by the seasonal character of navigation on the Ohio River was not done away with until the advent of the railroad. While the average rate for shipping a hundred pounds of glass by water from Pittsburgh to Cincinnati ranged between ten and fifteen cents during seasons of navigation, rates on glass when the water was low were advanced to a dollar or more. Attempts were made to lengthen the navigable season by constructing light-draft steamboats that could operate in shallow water while carrying moderate loads of merchandise. But nothing was done to improve the river to which the commercial and industrial prestige of Pittsburgh was chiefly due. The railroad solved these transportation difficulties. Among the glassmakers who took an active part in the movement of railroad construction were Benjamin Bakewell, Thomas Bakewell, Frederick Lorenz, George Hogg, and Harmar Denny.

The development of transportation had a revolutionary effect on the glass industry. Whereas in 1800 almost a month was required to ship glass by wagon over the roads between Pittsburgh and Philadelphia, by 1841 only about ten days were required. The reduction in rates was also impressive. The cost of shipping a hundred pounds of glass over this route in 1800 was about ten dollars, but by the latter year the cost had dropped to about a dollar and a quarter. This reduction on wagon service was of course partly due to the low rates on the Pennsylvania Canal System, which were sometimes as low as a dollar and thirteen cents a hundred pounds. After 1853 the rates of canal transportation were reduced to forty or fifty cents to conform with those charged by the railroad. This last stage in transportation development was the most revolutionary for
the glass industry, for it not only reduced the rates of glass shipment, but also introduced the factor of speed.

Another factor that tended toward the stabilization of the industry was technical improvement. A cheapening of the processes of manufacture aided in creating a more nearly universal demand for glass. Perhaps the most revolutionary discovery in this field resulted from a series of experiments conducted in the fifties to ascertain the practicability of using lime as a substitute for lead in making tableware. The success of lime glass was due to the work of such men as John Adams, William Phillips, James P. Wallace, and William Leighton. The introduction of larger furnaces and sand-washing machines further lessened the cost of production, besides bettering the quality of glass. The pressing machine, which was developed to a high degree of efficiency in western Pennsylvania, contributed a method of producing fine glassware in large quantities and thus enabled even the lowliest person to make use of this household convenience.

The industry had advanced rapidly in size during the first half century of its history. In 1856 there were about forty-five glasshouses in Pittsburgh and Allegheny. The records show nine window- and green-glass firms operating twenty-two furnaces and producing 561,600 half boxes of window glass, valued at $1,123,200; bottles and druggists' ware, valued at $329,250; and 80,000 demijohns, valued at $32,000. A report on tableware manufactory in Pittsburgh during the year 1857 listed eight firms, which produced $1,147,540 worth of glass from their 150 pots. A second report for the same year listed for the Pittsburgh district thirty-three glassworks, controlled by nineteen firms, which employed 1,982 employees, with total wages of $910,116 for the year. The total production of these glassworks reached the unprecedented sum of $2,631,990, a production that exceeded that of any section in the United States. Surely the wonders wrought in this industry during a period extending over a little more than half a century depict a story filled with romance characteristic of glassmaking throughout the ages.