



By **Silvio A. Bedini**

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John Johnson (1771-1842) Surveyor, Millwright, Builder, Architect and Civil Engineer

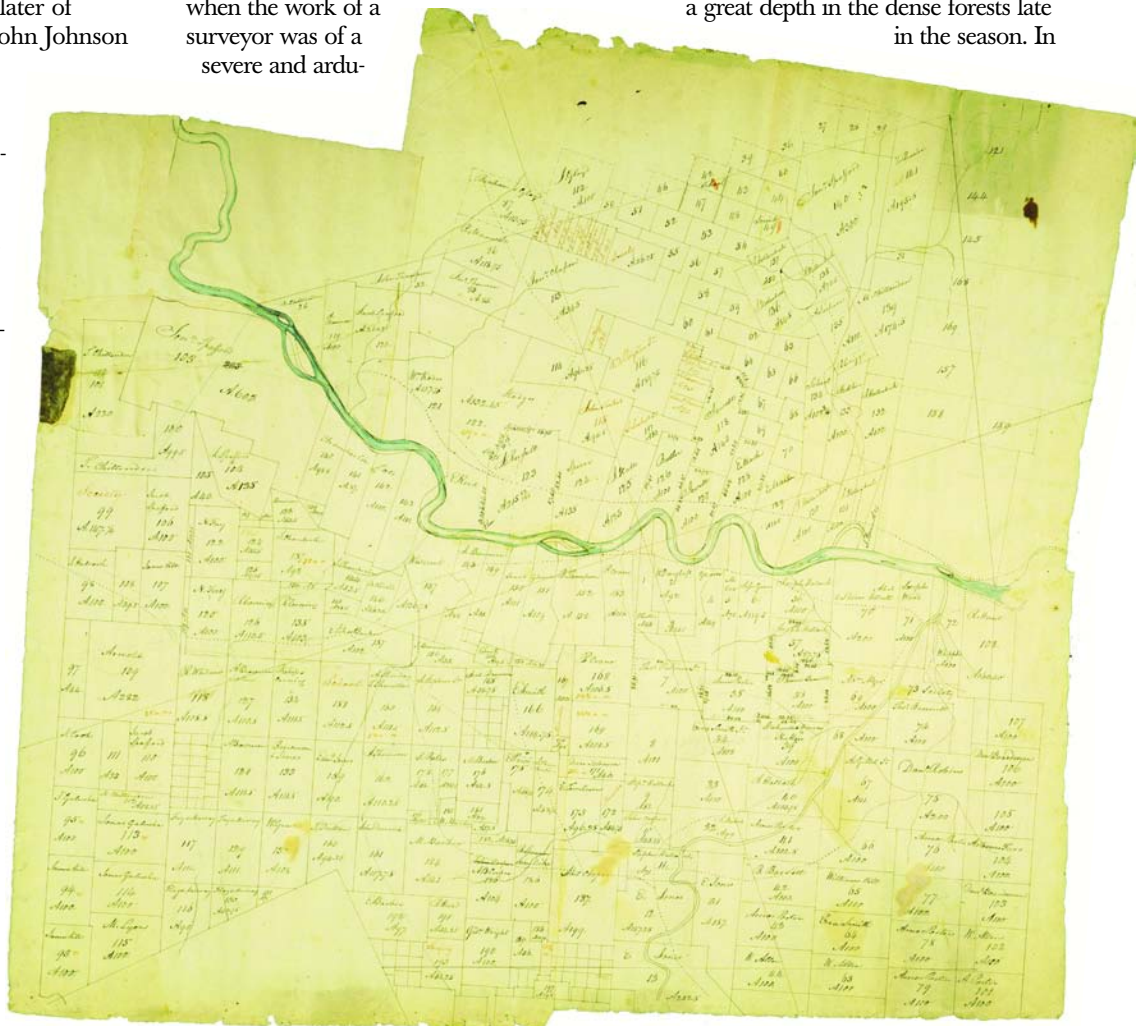
John Johnson was a descendant in the sixth generation of John Johnson of Waterham, England, who had settled in Massachusetts before 1635, and had become principal proprietor of Ipswich and later of Andover, Massachusetts. John Johnson was born in Canterbury, New Hampshire on December 2, 1771. After receiving an academic education, he made a special study early in his life of surveying, mill design and bridge building. An inviting field for his interests was provided by the development of Vermont that was then in progress, and in 1796 he moved there to Essex on the Winooski River. Here he built a dam and a bridge at Hubbells Falls, as well as grist, saw and paper mills which he then operated for some time.

There was such a steadily increasing demand for his services in surveying and mill

"Williston, Huntington, Richmond and Gores" survey by Johnson (no date). Courtesy of Special Collections, Bailey Howe Library, University of Vermont.

and bridge engineering in various locations, that in 1808 he was induced to remove to Burlington, where he lived until his death. He made surveys and re-surveys of many towns in northern Vermont in an early period when the work of a surveyor was of a severe and ardu-

ous nature. The population of the country was scanty, money was scarce, the few roads were of the rudest description. The extremely rugged surface of the region often presented almost unsurmountable barriers to progress, while the snow lay at a great depth in the dense forests late in the season. In



conducting these surveys, Johnson's practice was to encamp with his party wherever night overtook him. When he surveyed the town of Westmore in the months of February and March 1800, the snow covered the ground to a mean depth of five or six feet.

Johnson's skills and occupations extended well beyond surveying and included the design of mechanical structures as well as buildings. He was retained by private and public patrons to develop plans and specifications for a

wide variety of building types, among them mills, dams, barns, houses, and at least one church. His bridge plans were drawings of professional quality, executed mostly in ink with some water color, and included carefully itemized specifications for timber and other materials, written instructions concerning milling of the timber and its assembly, and accounting of the costs.

In 1796-97 Johnson constructed the first grist and saw mills in Waterville, Vermont and soon achieved recognition as the most prominent surveyor, millwright, and bridge engineer in lower Canada and Vermont. He designed what was then known as the Johnson arch truss for long bridges, some of which survived for more than a century in Vermont, New York and Canada. He also constructed the Chittenden County Courthouse and the first building of the University of Vermont in Burlington.

A plan he made in 1816 for a bridge across the Onion River at Winooski Falls, between Burlington and

Colchester, is among the oldest of Johnson's surviving timber-frame designs. Sets of rafter trusses, as he called them, provided support for the three-span crossing (57 feet clear span). Johnson called for a structure 24 feet wide, sufficient to accommodate

two travel lanes divided by one set of the trusses. Trestles sheathed in wooden planks separate spans of the 228-foot bridge.

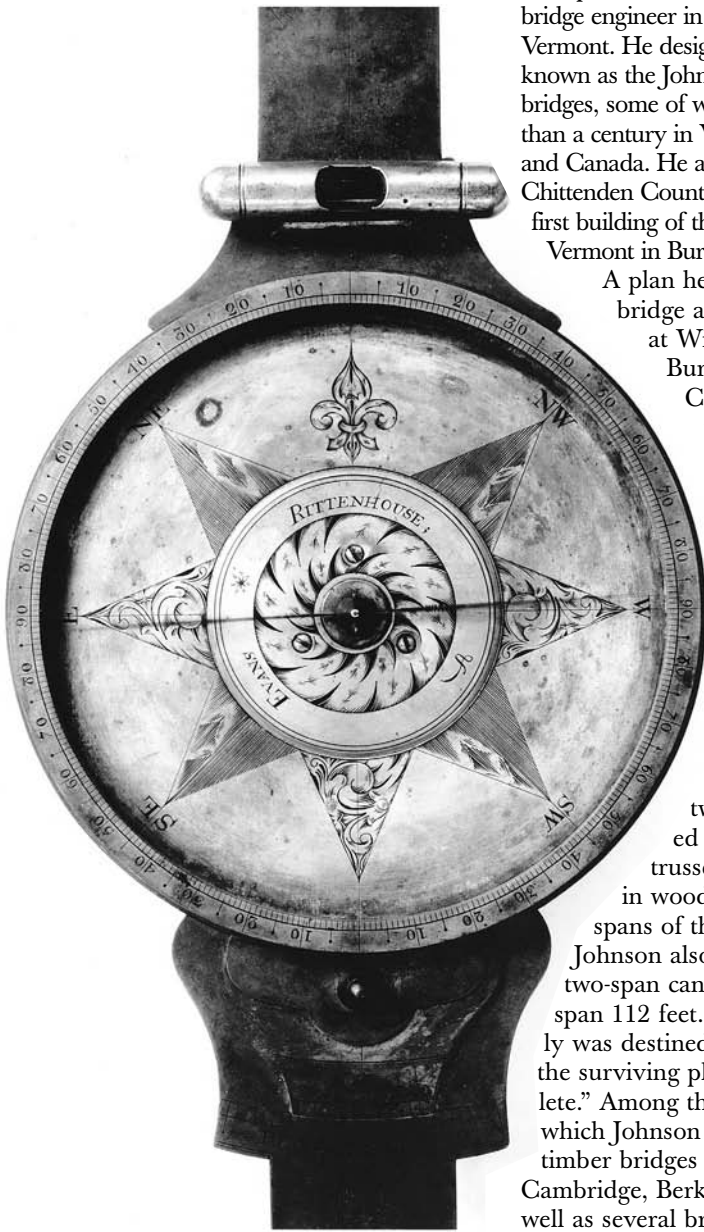
Johnson also experimented with a two-span cantilever structure, each span 112 feet. The bridge apparently was destined for Waterford, but the surviving plan is marked "obsolete." Among the Vermont towns for which Johnson produced plans for timber bridges were Essex, Cambridge, Berkshire, and Milton as well as several bridges in other states. (Examples of Johnson's sketches and renderings appear in "Timber Crossings," an informative article about the history of Vermont's covered bridges written by UVM Professor Robert McCullough. The article may

be viewed online at www.uvm.edu/coveredbridges/papers/McCulloughpaper/McCullough.htm)

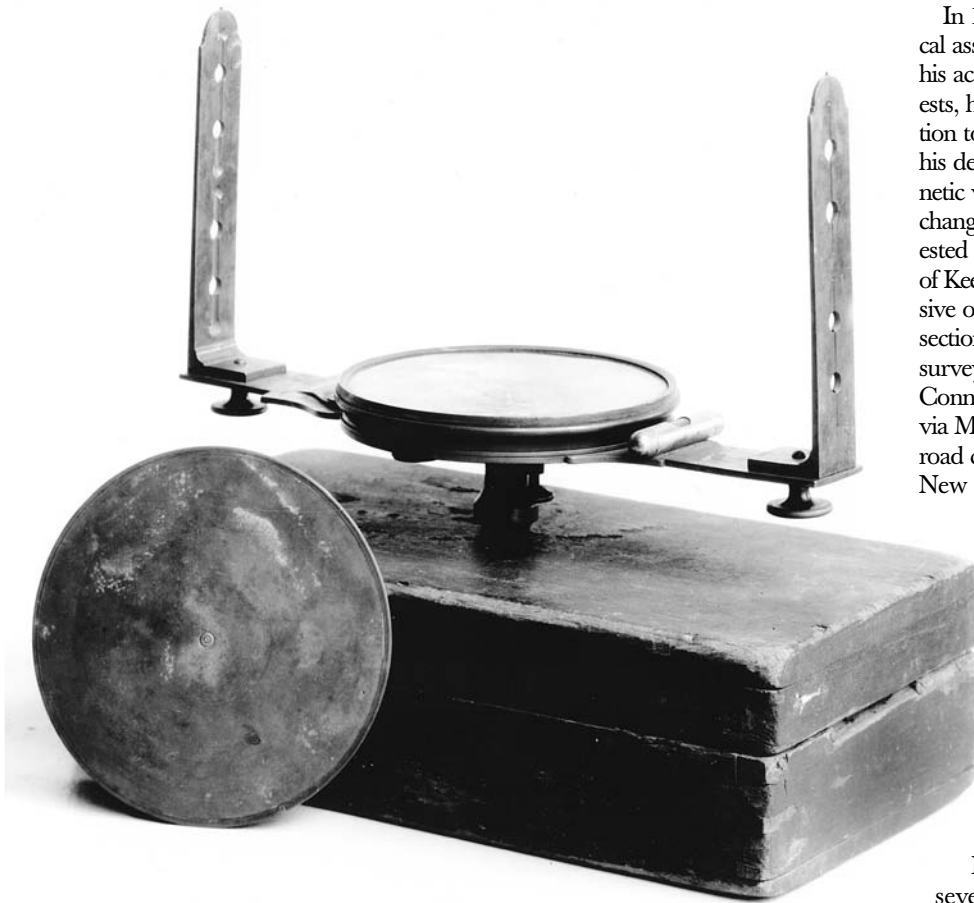
During 1800-1812 Johnson had surveyed a large number of the towns in northern Vermont. He was a captain in the state militia, and during the War of 1812 his services were in constant demand by officers in command of operations on Lake Champlain. His home became the headquarters of these officers while they were stationed in Burlington. Johnson furnished the government with maps and data on the region around Lake Champlain, and with maps showing the best routes for military movement through the Champlain valley. From 1813-23 and again from 1832-38 he served as the third Surveyor General of the state.

Among Johnson's most important contributions to the state were his surveys of towns in the state's northern part. Many of these towns had confusing land claims, some of which dated back to charters from New Hampshire. The confusion was due to many poorly recorded or unrecorded land deals, some of which had been made by one of his predecessors, Ira Allen. Johnson expended considerable effort to straightening out these difficulties, and his beautifully drawn and detailed town maps provided a clear way for the people to determine the history of ownership for plots of land. Now preserved at the University of Vermont, these town maps provide historians and geographers with excellent records of land ownership in Vermont's early period.

In 1815 Johnson was appointed one of the United States commissioners for the investigation and settlement of claims against the government for the transportation of troops and supplies in that section of the country. He retained this office until 1817, when he was appointed by the United States commissioners under the Treaty of Ghent to superintend the surveys of the northeastern boundary line between the United States and Canada. The survey was made in compliance with the Treaty of Ghent. Thomas Barclay, commissioner for Great Britain under the Treaty, and Cornelius P. Van Ness for the United States, were appointed to ascertain and run the line. An actual survey was arranged and surveyors appointed. After spending two difficult summers with his sons in the wilder-



Brass vernier surveying compass by Rittenhouse and Evans, Philadelphia c. 1780. Courtesy of the National Museum of American History, Smithsonian Institution.



Vernier surveying compass by Rittenhouse and Evans, with cover and field case.
 Courtesy of the National Museum of American History, Smithsonian Institution.

ness of northern Maine in 1817 and 1818, and after about twenty miles of the line had been surveyed, the work was discontinued, due to disagreements between the United States and Great Britain.

However, an exploring party under Colonel Bouchette on the part of Great Britain and John Johnson for the United States, made an exploring line in 1817 extending ninety-nine miles from the monument at the head of the St. Croix River, and produced separate reports of their work. In 1818 Johnson, with a Mr. Odell who had replaced Colonel Bouchett, finished running the exploring line to the Beaver or Metis River. He completed this important work in 1820 and his reports and surveys provided the basis of the treaty of 1842.

Rittenhouse Instrument

Among the surveying instruments owned by Johnson in 1818 and used for surveying the boundaries between the United States and Canada was a brass surveying vernier compass made in c. 1780 by the

firm of Rittenhouse and Evans of Philadelphia. Although the instrument originally was attributed to David Rittenhouse and a Philadelphia clockmaker named David Evans, the instrument in fact was made by David's brother Benjamin Rittenhouse and his nephew Benjamin Evans. Eleanor Rittenhouse, the sister of David and Benjamin, was married in 1770 to a Philadelphia blacksmith named David Evans, and her brothers witnessed the marriage certificate. David and Eleanor Evans were the parents of a son they named Benjamin Evans, and when the boy was six years of age, his parents relocated to the Norriton farm of David Rittenhouse. Benjamin Rittenhouse lived in the adjoining Worcester township and he trained his young nephew Benjamin Evans in making clocks and instruments. In 1791 Benjamin Evans became a journeyman clockmaker and had a permanent position in the Worcester clock shop of his uncle. When in 1801 Benjamin Rittenhouse had a financial collapse, Benjamin Evans moved to Chester County.

In 1806 Johnson organized a mechanical association in Vermont, and despite his active management of business interests, he also devoted considerable attention to scientific matters. From 1818 until his death he maintained a record of magnetic variations and meteorological changes. In 1822 Johnson became interested also in developing the iron industry of Keeseville, New York. He was an extensive owner of lands in Essex and other sections of the state. In 1825 he made surveys for a canal to connect the Connecticut River and Lake Champlain via Montpelier. He was secretary of a railroad convention having delegates from New Hampshire, Vermont,

Massachusetts and New York which met in Montpelier in 1830. For a period of time he was in charge of locating United States lighthouses on the Atlantic coast as far south as Virginia.

Johnson was twice married, in 1799 to Rachel Ferry of Granby, Massachusetts and after her death he married Lucinda Smith of Richmond, Vermont. He had seven children. One of his sons, Edwin Ferry Johnson (1803- 18__) also achieved considerable distinction as a surveyor and engineer. Johnson was one of the most highly respected citizens of the state; he enjoyed entertaining and his home was constantly the scene of extended hospitality. He was one of the ablest men in his field and many young men who worked under him and under his instruction became qualified as surveyors and engineers. He died in Burlington, Vermont on April 30, 1842 following a sudden attack of erysipelas (an infection of the skin, caused by a strep bacteria). Johnson's many accomplishments were endless and filled a list that remained unfaded long after his death. His own buildings and engineering projects survived for many years, and the work of the many young men he had trained in his field maintained and continued the tradition of excellence he had established. At the time of his death Hemenway's *Gazetteer* wrote, "When Mr. Johnson died, Vermont lost a citizen whose acquaintance was so extensive, and the regard in which he was held so high, that few men in the section of the country where he lived have passed from the stage of life more generally lamented." *A*