

FREDERICK HEISELY: CLOCK AND COMPASS MAKER

Silvio A. Bedini

Most clockmakers in the late 18th and early 19th centuries specialized in clocks, leaving the production of surveyor's compasses in the hands of mathematical instrument makers. Some, however, made both types of instrument. Included in this number were John G. Hoff and his son John, George Ford, and David and Benjamin Rittenhouse of Pennsylvania, Andrew Ellicott and the Chandlee family of Maryland, Jonathan Simpson of Kentucky, George Crow of Delaware, John Potter of Massachusetts, Horatio Clark of Vermont, Stephen Hassam of New Hampshire, and Daniel Burnap, Thomas Harland, Benjamin Hanks, Gurdon Huntington, and the Doolittle family of Connecticut--and also Frederick Heisely.¹

Frederick Heisely (1759-1843) belonged to the large but not very well known group of highly skilled craftsmen of German descent who catered to the community of rich German-American farmers in Pennsylvania and Maryland. Heisely, who was born in Lancaster, Pennsylvania, apprenticed with John George Hoff, a Lancaster clockmaker born and trained in Germany. In 1778 he enlisted in the Second Pennsylvania Regiment, and saw service in New Jersey and Philadelphia. In 1783, after completing his apprenticeship, Heisely married Hoff's eldest daughter, Catherine. Soon thereafter he moved to Frederick (then termed Fredericktown), Maryland, and opened shop. On January 15, 1786 the following advertisement appeared in *The Maryland Chronicle*:

Frederick Heisely

Clock and watchmaker begs leave to inform the public in general, and his old customers in particular, that he has removed his shop to his dwelling house at the Sign of the Dial opposite Mr. Jacob Steiner's Saddle shop and store in Market Street in Frederick-Town where he now follows making clocks of all kinds. Musical chime clocks as well as common and plain ones, likewise large town-clocks if required, repairs in the best manner and at a most reasonable rate. He also makes surveyors Compasses and other Mathematical Instruments, such as protractors, scales of different sorts, 2 or 4 Perch chains, and Pocket compasses with sun dials, &c. &c. N.B. He gives the highest price for brass.

There are many published accounts of Heisely's whereabouts during the next dozen or so years, and most of them disagree with one

another. The correct chronology seems to be as follows. Heisely probably moved back to Lancaster in 1793, joining into a partnership with his father-in-law. Soon, however, he returned to Fredericktown, perhaps lured by the opportunity to build a tower clock for the (German) Evangelical Reformed Church there. This clock, erected around 1796-97, kept time until 1953, when it was taken down and donated to the Smithsonian Institution. It is now on display in the Hall of Timekeeping in the National Museum of American History.

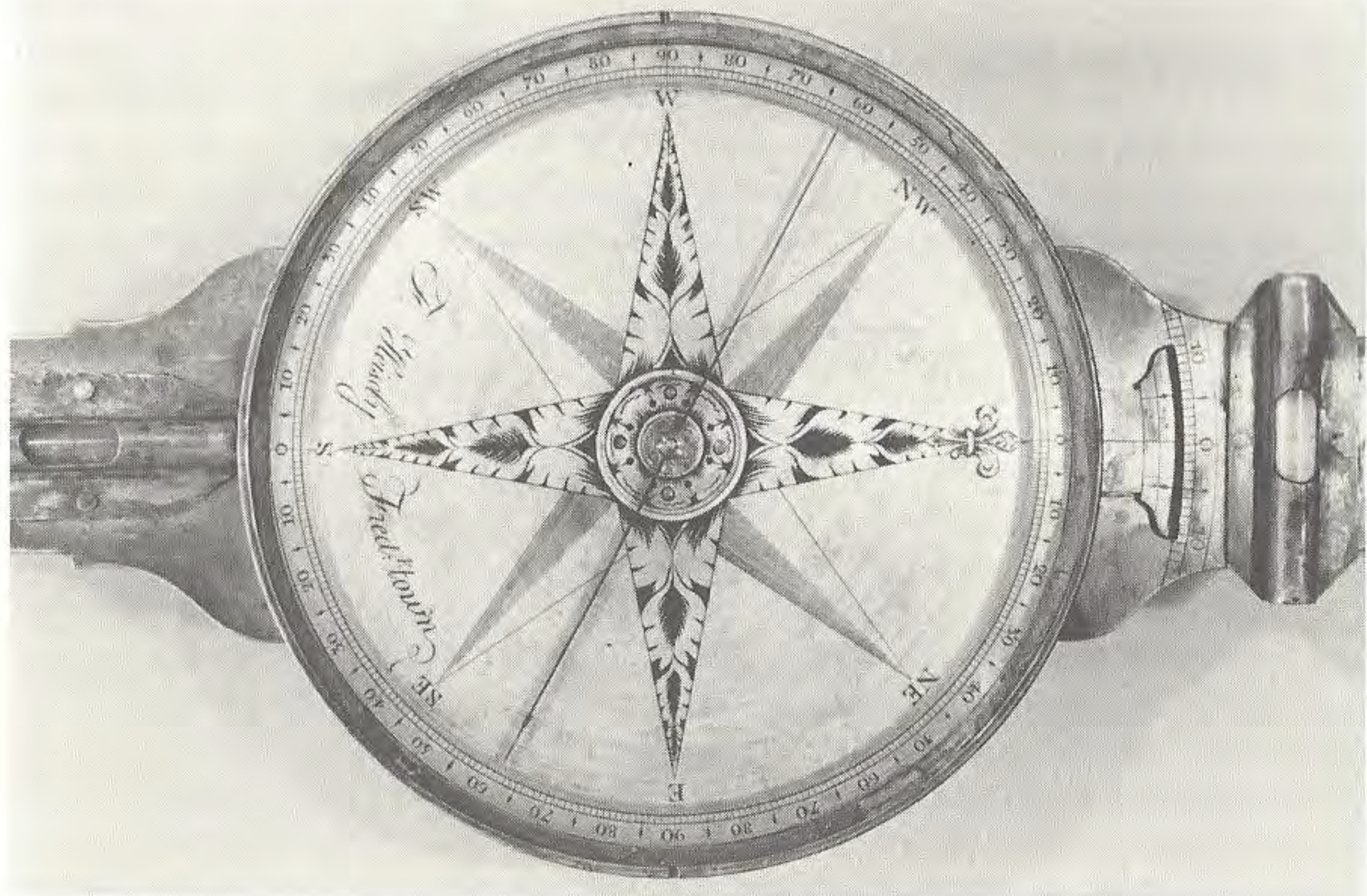
On September 12, 1798, perhaps in recognition that work on the tower clock had been completed, Heisely advertised in the Fredericktown newspaper, *The Rights of Man*:

FREDERICK HEISELY

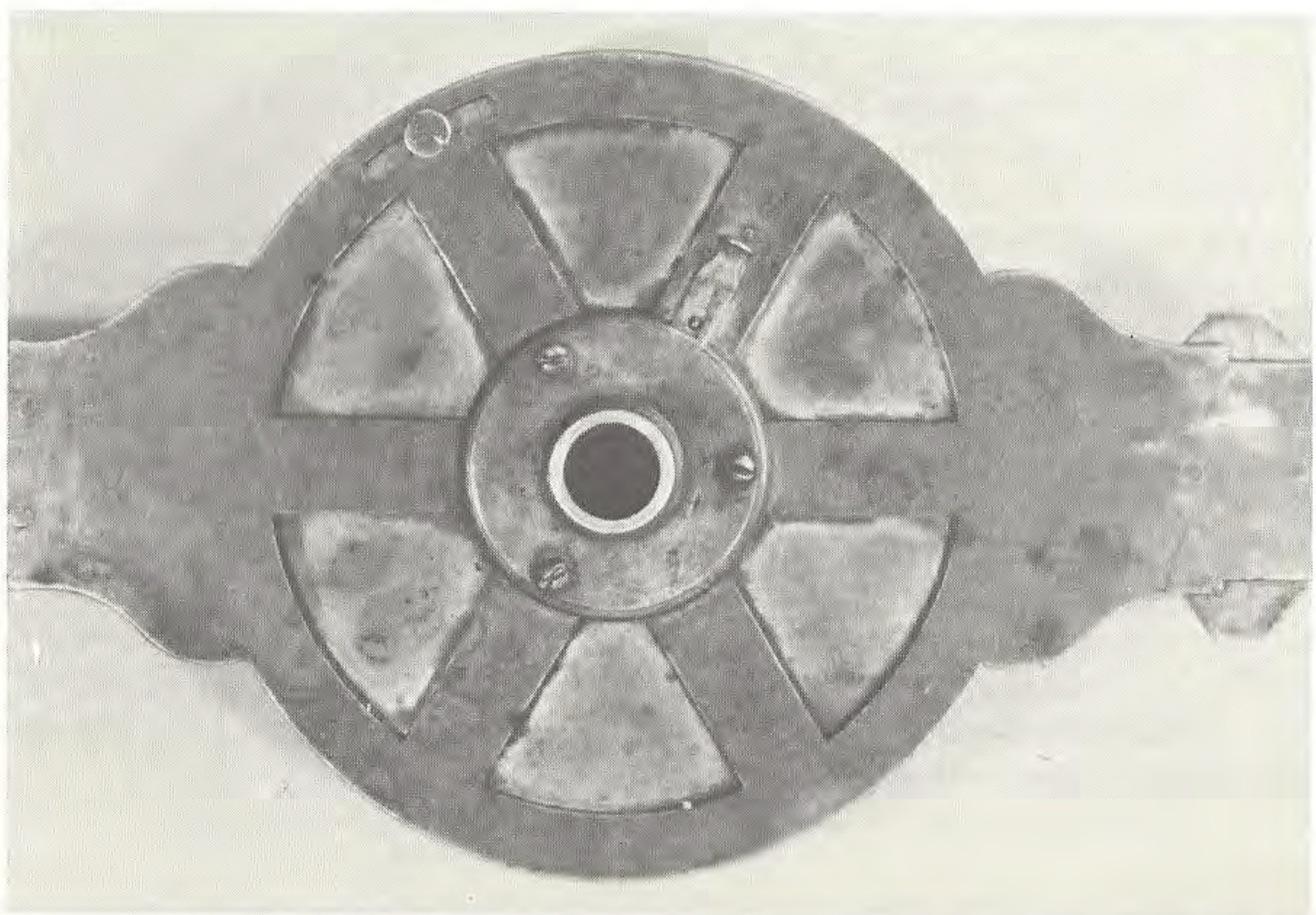
Respectfully informs the public that he has recommenced the clock and watchmaking business in the house he formerly occupied, next door to the post office, Frederick-Town. He returns his sincerest thanks to his friends and former customers, and begs leave to assure them that no pains shall be spared on his part to merit their future attention.

He makes, repairs and sells all kinds of surveyors instruments, at the shortest notice and on the most reasonable terms as usual, but much improved.

Several surveyor's compasses inscribed "F. Heisely Fred.^ktown" are now known--two vernier compasses (one at the Ohio State Museum, and one at the National Museum of American History), and two plain compasses (in private hands).² The dials on these compasses read clockwise. Presumably, therefore, these instruments were made before the elder Heisely knew about the counterclockwise dials introduced by David Rittenhouse, or before he was convinced that this innovation was an improvement on the old design.³ The NMAH compass is further unusual in that six segments have been cut out of its bottom plate, presumably to save brass and/or reduce the weight of the instrument. The Ohio State Museum instrument is further unusual in that it is built like a railroad compass, with the vernier on the dial rather than on the arm.⁴ It thus antedates William J. Young's patent for this improvement by perhaps as much as 20 or 30 years. (see "Young's Improved Compass Made By Hagger" pp. 125-128 in this issue of *Rittenhouse*.)



Surveyor's Vernier Compass marked "F. Heisely Fred:ktown" (NMAH)



Underside of Surveyor's Vernier Compass marked "F. Heisely Fred:ktown" (NMAH)

Several surveyor's compasses, both plain and vernier, signed "F. Heisely Harrisburg" are known (one is in the Audubon Society at Audubon, Pennsylvania), made after the Heiselys' 1811 move to the capital of Pennsylvania.

Heisely's two sons, George Jacob (1789-1880) and Frederick Augustus (1792-1875), were both brought up into the business. In addition to his skill with clocks and compasses, George Jacob Heisely played the flute and, it is claimed, played a major role in the history of "The Star Spangled Banner." During the War of 1812 he was serving in the Pennsylvania Militia, together with the musicians, Ferdinand and George Durang, when a copy of the poem that Francis Scott Keyes had penned during the bombing of Fort McHenry on September 13 and 14, 1814 reached their camp. Heisely suggested that the poem be sung to the tune of "To Anacreon in Heaven," a suggestion followed by the Durang brothers who soon thereafter introduced what was to become our national anthem on the stage of the Holliday Street Theatre in Baltimore. Frederick Augustus Heisely also served in the War of 1812, but was wounded.

Both brothers returned to Harrisburg, and to instrument making, after the War. There is at least one extant compass (in the Henry Ford Museum at Dearborn, Michigan) signed "Heisely & Son Harrisburg"--which son worked on this instrument is not known. There are also extant compasses signed "G. J. Heisely Harrisburg" and others signed "F. A. Heisely Harrisburg" (one is in the Gurley Collection at Troy, New York). Note that while the elder Heisely's compasses had an ornate rose, similar to that used by his mentor, his sons adopted a much simpler design: a star or fleur-de-lis at north, and letters indicating the cardinal and ordinal points.

In 1836 Frederick Augustus sold his property in Harrisburg, moved to Pittsburgh, and advertised as a "Clock, Watch, and Mathematical Instrument Maker." In 1839 the following advertisement appeared in *The Harrisburg Directory, and Stranger's Guide*:

GEORGE J. HEISELY

Clock, Watch and Mathematical Instrument Maker
Respectfully informs his friends and the public in general, that he intends to carry on the above business in all its various branches, and that he has on hand an assortment of Compasses and Drafting instruments of a superior quality for Engineers, Surveyors and Architects, and is ready to make to order on the shortest notice all kinds of instruments in his line, on moderate terms, at his shop on the West Corner of Second and Walnut Streets.

An apprentice will be taken, and a journeyman watch maker or instrument maker will find employment.

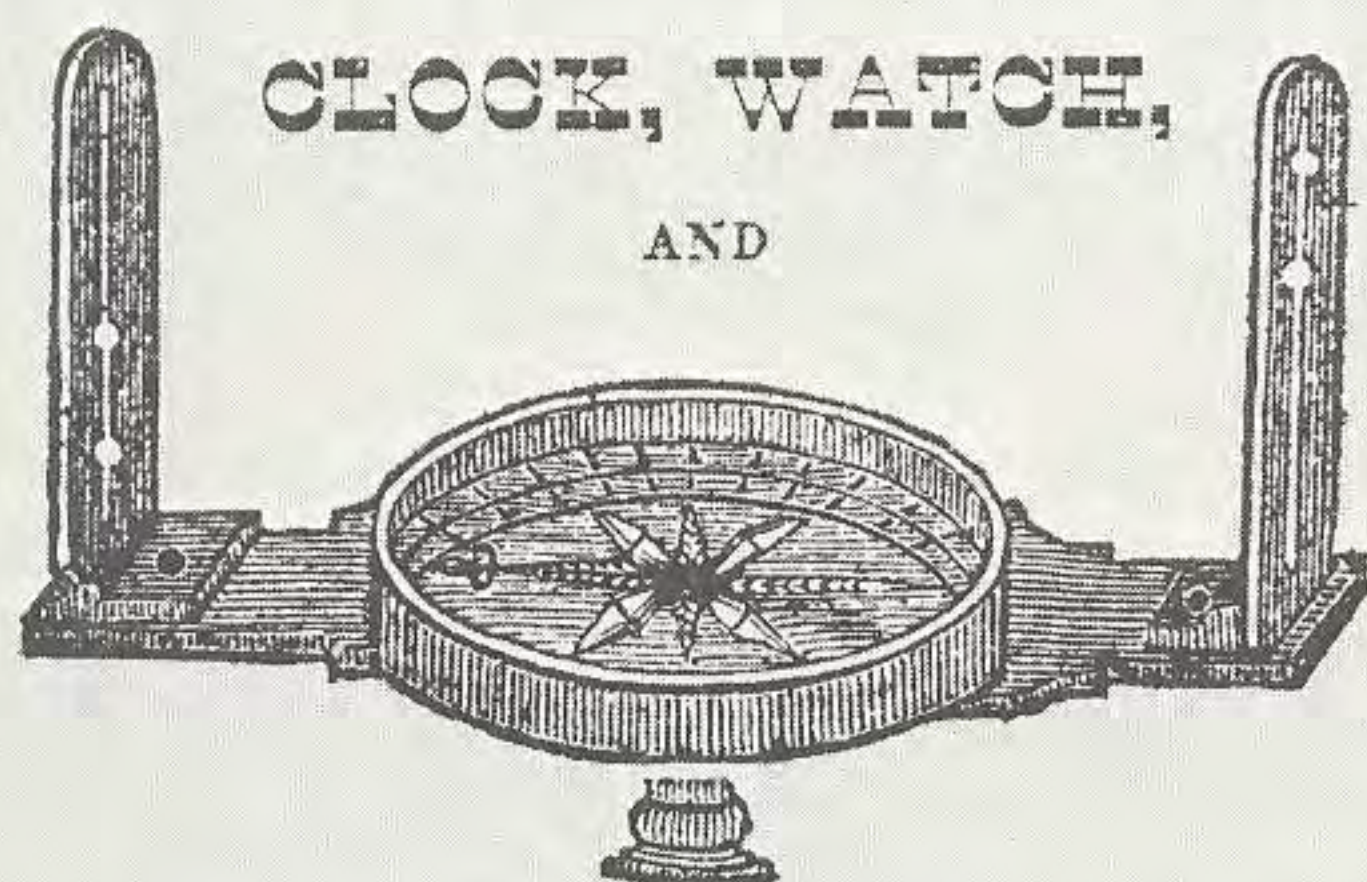
1. Charles Smart, *The Makers of Surveying Instruments in America Since 1700* 2 vols. (Troy, NY, 1962 and 1967).

2. Smart, *op. cit.* See also William Guthman, "Surveyor's Equipment of the Western Frontier," *Antiques* (Sept. 1970), p. 424.

3. Deborah Warner, "The Surveyor's Compass," *Rittenhouse* 1 (1987): 66.

4. shown in Silvio A. Bedini, *Early American Scientific Instruments and Their Makers* (Washington, D.C., 1964), p. 61.

F. A. HEISELY,



Mathematical Instrument Maker,

No. 6, St. Clair Street,

Between Penn and Liberty,

PITTSBURGH.

from Harris' *Pittsburgh Business Directory*, 1837.

YOUNG'S IMPROVED COMPASS MADE BY HAGGER

Deborah Jean Warner

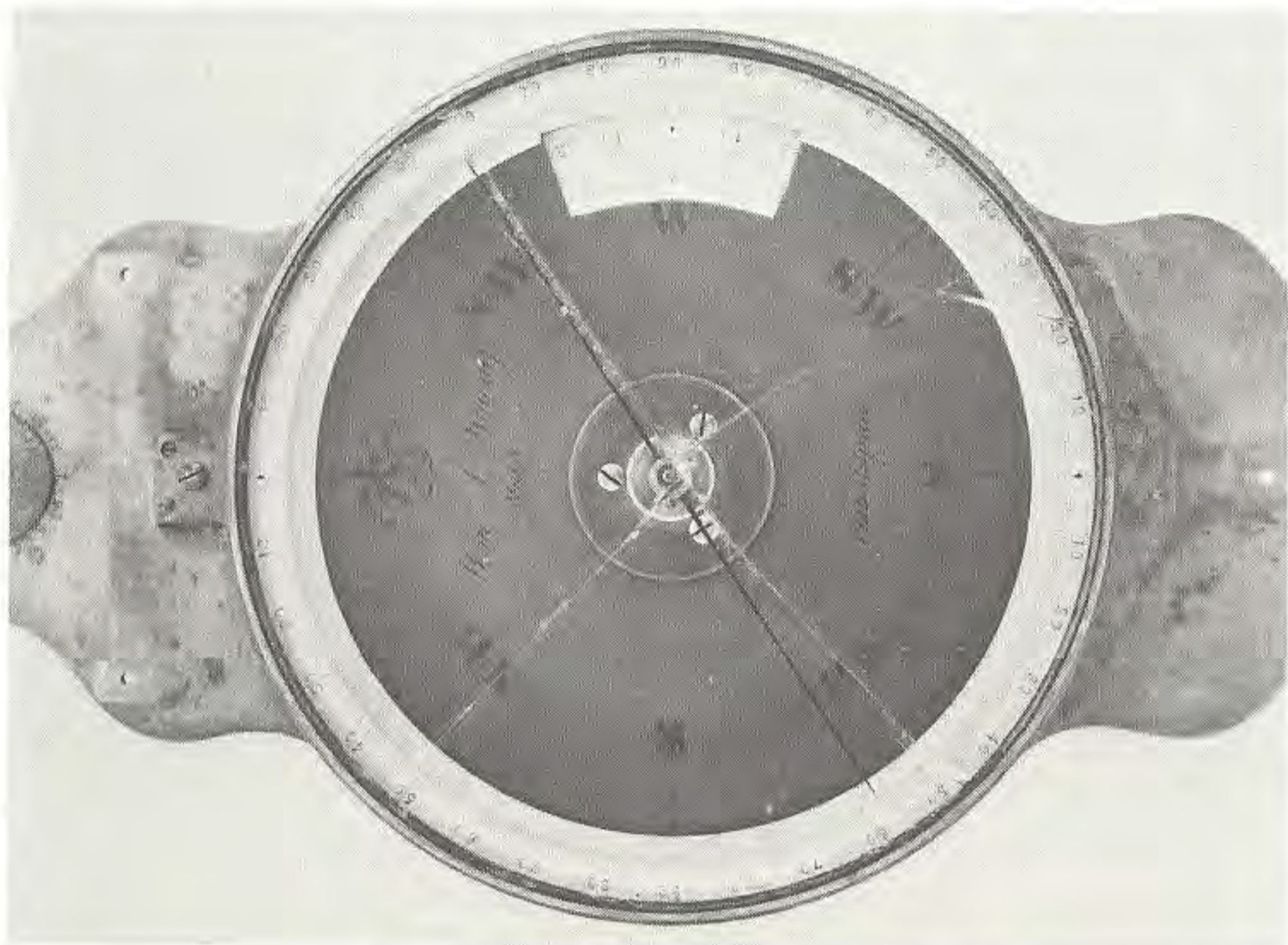


Brass Object from Rio Grande County Museum and Cultural Center

This brass plate was found in 1961 at Saguache, Colorado, near a shelter used by Native Americans. It is now in the Rio Grande County Museum and Cultural Center in Del Norte, Colorado. The plate is 16" long; the center section is $6\frac{1}{4}$ " diameter. Marked around the center are the words "Hagger Maker Baltimore", and "W. J. Young's Improved". The cardinal and ordinal points are marked with letters; a fleur-de-lis marks north. At west there is an opening ($1\frac{1}{2}$ " x $\frac{1}{2}$ ") with a vernier (60-30-0-30-60) with 12 divisions to each side of the central zero (presumably reading to 5'). There are 6 small holes evenly spaced around the edge of the center section (presumably to hold a graduated ring); 3 holes at the end of each arm (to hold vertical sights); 2 holes on the northern arm (for an e-w level) and 2 on the southern arm (for a n-s level); 2 more holes, one larger than the other, on the southern arm (to hold the tangent screw). Surrounding the central hole (through which the needle pivot and a shoulder on the center passed) there are several more small holes (to hold the center to the upper plate, to attach a cover plate to the lower end of the center, and for the needle lifter screws).

This Colorado instrument appears to be the upper plate of a surveyor's vernier compass of the form invented by William J. Young (1800-1870), an enterprising mathematical instrument maker in Philadelphia.¹ Young applied for a patent on his improved compass

late in 1830, and received it in 1832.² Because of legal technicalities, the patent was surrendered, and reissued in 1834.³ Young's improved compass had two features. The first, which enabled surveyors to measure horizontal angles without reference to magnetic north, was a double compass plate. The upper plate carried the compass box. The lower plate was graduated, and hidden except at one point, where it was exposed by an opening, provided with vernier, in the upper plate. Young's second innovation, designed to relieve eye strain, consisted of coloring the surface of the compass plate green or bronze, rather than silver. A narrow silvered rim surrounding the colored surface gave a distinct view of the needle point.



Surveyor's Vernier Compass marked "Wm. J. Young Maker Philadelphia"
(NMAH--Gift of Gettysburg College)

It is probably impossible to determine how many improved compasses Young produced, but it is clear that his design was well received in some quarters. Following their discussion of his patent the Franklin Institute noted that "Those who are aware of the excellence of the instruments made by Mr. Young, will be prepared to believe that what he denominates improvements are really such, and the result in the present instance will certainly justify the anticipation." An example of Young's improved compass is now in the National Museum of American History. This instrument must date from the the period 1840-1852/53--after Young changed his signature from "W. J. Young" to "Wm. J. Young", and before he began to mark his instruments with serial numbers. Since it does not carry the word "patent", it may in fact date from after the expiration of Young's patent in 1846. A later

modification of Young's compass, with the vernier moved outside the compass box, became the standard railroad compass.

The Colorado compass suggests a collaboration, otherwise unknown, between William J. Young and the Hagger family of Baltimore. A native of Massachusetts, Benjamin K. Hagger (ca. 1769-1834) moved to Baltimore in 1817 and opened a navigational instrument shop "At the Sign of Hadley's Quadrant."⁴ He took his son John into the business in 1827. In 1830, according to an advertisement in the *Baltimore American*, Hagger & Son were now trading "At the Sign of Dr. Franklin". They also boasted "an extra establishment for the purpose of manufacturing surveyors compasses and levelling instruments, which we are now making of a superior quality, and offer for sale wholesale and retail at very reduced prices." A surveyor's plain compass marked "B. K. Hagger & Sons Makers, Baltimore" is stylistically similar--especially the letters and the fleur-de-lis--to the Colorado compass. (Note that Young used a fleur-de-lis to mark north on his patent drawing and on his earliest compasses. By the 1840s he had begun using a combination of fleur-de-lis and 5-pointed star.)



Surveyor's Plain Compass marked "B. K. Hagger & Son Makers, Baltimore"
(NMAH--Gift of Baldwin-Wallace College)

The vertical sights (now missing) of the Colorado compass were attached to the upper plate. Although this configuration seems awkward, it was in fact described in the text of Young's patent. The patent drawings, however, show the sights attached to the lower plate, and the Gettysburg College instrument is constructed in this manner.

Young's most important innovation was the surveyor's transit, which he introduced in 1831. This new instrument may be seen as a modification of his improved compass in which the open sights (attached to the upper plate) were replaced with a telescope which could be transited. The transit was an immediate success, becoming the standard instrument for laying out railroads and other engineering projects.

It is intriguing to speculate about who brought the improved vernier compass west from Baltimore to Colorado. Could it have been one of the great explorers, such as John C. Fremont (his 4th expedition), Otto Mears, John Williams Gunnison, Edward Fitzgerald Beale, or George M. Wheeler. Probably not. Young's compass was a special purpose instrument designed for engineering work. It is too heavy for general reconnaissance, and not sufficiently precise for triangulation.

1. Deborah Jean Warner, "William J. Young: From Craft to Industry in a Skilled Trade," *Pennsylvania History* 52 (1985): 53-68.

2. "For an improved Surveying Compass; William J. Young, City of Philadelphia, January 17," *Journal, Franklin Institute* (1832): 34.

3. "William J. Young of Philadelphia, Penn. Letters Patent" Jan. 11, 1834. "For an improvement in the Surveyor's Compass; William J. Young, city of Philadelphia," *Journal, Franklin Institute* (1834): 113.

4. For a surveyor's plain compass marked "BENJ. K. HAGGER, BALTIMORE" see James Mulder, "Benjamin K. Hagger," *Rittenhouse* 2 (1988): 51.