

Silvio A. Bedini

William Austin Burt (1792-1858) Inventor of the Solar Compass

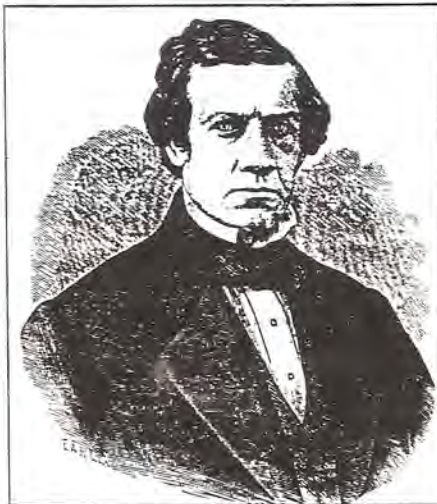
Undoubtedly one of the most talented and colorful figures in the history of American surveying, William Austin Burt is remembered for inventions that revolutionized several separate fields of endeavor. At the age of 34, he invented the first practical typewriting machine ever produced, and the first to be patented in the United States. At the age of 36, he patented his invention for "True Meridian Finding," which became known as the solar compass, and which was adopted by the U.S. government for surveying public domains. In his final years he patented an equatorial sextant for marine navigation. Although he pursued the career of surveyor, during his lifetime, he also worked in a variety of other occupations, several of which, like surveying, remember him today as a pioneer and leader.

Born in Petersham, Massachusetts on his father's farm on June 13, 1792, he was the fifth child of Alvin and Wealthy (Austin), and a descendant of Richard Burt, who migrated from England to Taunton, Massachusetts in 1638. His father had served in the American Revolution and was to serve again in the War of 1812. Young Burt was able to attend school only from the time he learned his alphabet until he was nine.

His father had a reverse in circumstances and had to sell his farm when young William was ten years old. The family moved to Freehold, New York, and a year later to Broadalbin, New York. His family circumstances made it necessary for the boy to work with his father. His education consisted mainly of teachings "in piety and virtue" from his mother.

According to family tradition, it was at this period that his mind "took a mechanical turn and a thirst for knowledge . . . With knife and gimlet, (and) little saw grist mills were made and set running by a rivulet nearby, the result of earnest labors." His father permitted him to attend the district school for three weeks when he was 14, and there he first began the study of arithmetic. He reportedly made good progress. Thereafter he continued his studies without a teacher, persistently utilizing every leisure moment, at night by the light of pine knots burning in the fireplace, and during the day while engaged in making shingles with a drawknife, with a book propped up near his work.

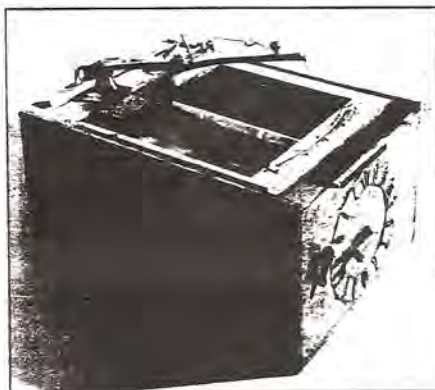
He avidly absorbed the contents of a book on navigation published in 1779, and at 16 he



dreamed of one day becoming the master of a ship, pursuing his navigational studies, mastering the principles of determining the latitude, using the traverse board and the quadrant.

Applying his natural inclination for mechanics, he succeeded in constructing "a quadrant, with which he determined the latitude of his father's house with a near approach to accuracy." He had never seen a nautical instrument before. He also endeavored to extend "his Astronomical knowledge by comparing a large number of almanacs of different dates with each other and with certain data found in the treatise on navigation." He was deterred from his decision to follow the sea, however, by the entreaties of his mother, whose father had been lost in a shipwreck.

When he was 18, Burt purchased a second-hand surveying compass, repaired it, and for



The Typographer, replica made in 1893 by the inventor's grandson, Austin Burt. Courtesy of the National Museum of American History, Smithsonian Institution.

the next several years used it to make surveys in the vicinity of his home near East Aurora, New York. With the advent of the War of 1812, he enlisted in the Army.

At the age of 21, Burt was married on July 4, 1813 to Phoebe Cole of Wales Center, Erie County, New York, and settled in that community. In time he and his wife became the parents of five sons. During the next few years Burt worked as a millwright, serving also as justice of the peace, local postmaster and as county surveyor.

Burt had long fostered a desire to see the West, and in 1817 he journeyed alone as far as Pittsburgh and St. Louis, then headed northward through Illinois and Indiana to Detroit, and then back to Buffalo. In 1822 he made a second trip westward, and purchased a tract of land in Macomb County, Michigan, not far from Detroit.

Two years later Burt moved his family to Michigan. He made a clearing on the land he had purchased and built a log house and a log blacksmith shop. There he first worked as a millwright, building a sawmill near Auburn, Michigan, and then took other contracts to construct grist and saw mills.

In 1826 he was elected a member of the Michigan territorial council, and became interested in developing internal improvements in the territory. He sponsored a project for a canal around St. Mary's Falls, which later became the Sault Ste. Marie canal.

It was during this period that he produced his first invention, the "Typographer," which was the precursor of the modern typewriter. He constructed it in his blacksmith shop with only the tools available to him, and others he could make. He confided the details of his invention to John Sheldon, then proprietor and editor of the *Michigan Gazette*, the direct progenitor of the *Detroit Free Press*. It was Sheldon who provided Burt with type from the *Gazette* office for his typewriting machine. On July 23, 1829 he was granted U.S. Patent No. 259 for the "Typographer." It was the first typewriting machine to be patented in the United States, and the first practical typewriting machine ever produced. It was not until 1874 that the name "typewriter" came into use. Burt's invention was too advanced for its time and it was not until about 1874, when the name "typewriter" first came into use, that a market developed for the machine. **CONTINUED ON PAGE 60**

In 1831 William Austin Burt was elected county surveyor of Macomb County and at the same time was appointed District Surveyor by the governor. In 1833 Burt became associate justice of the Macomb circuit court in Michigan, at the same time that he was serving as postmaster of Mt. Vernon. In the same year he was selected by the General Land Office in Washington, D.C. as U.S. Deputy Surveyor for the territory northwest of Ohio. He continued to serve in that capacity until 1855.

It was during this period, while engaged in a surveying contract in the region of Milwaukee, Wisconsin in 1834, that he encountered difficulties in the field due to magnetic attraction, making the surveying compass unreliable. The experience suggested to him the possible application of a solar device and led him to the invention of the solar compass. By means of this instrument the surveyor was enabled to remedy variations of the magnetic needle due to outside causes. The instrument determines the true meridian by a single observation, the sun being on the observer's meridian.

Burt was granted a patent for the invention in 1836, and the first examples of the solar compass were produced by the prominent Philadelphia maker of mathematical instruments, William J. Young & Sons. The instrument was exhibited at the Franklin Institute in



Burt's Solar Compass made by William J. Young of Philadelphia. Inscribed "Burt's Patent Made by Wm. J. Young Phil.a" on compass plate. Brass, 14 inches long, 6-1/2 inches wide, and 9-1/2 inches high. Courtesy of the National Museum of American History, Smithsonian Institution.



The Equatorial Quadrant, invented and patented by William Austin Burt. Patent model. Courtesy of the National Museum of American History, Smithsonian Institution.

1836, and again in improved form in 1840. Burt was awarded the Scott legacy medal and twenty dollars in gold for the invention. In 1851 the instrument was awarded a prize medal by Prince Consort Albert at the London World's Fair.

The Burt solar compass was adopted by the U.S. government for use in surveying the public domains and has continued in use to the present time.

In 1836-1837 and 1842-1843 Burt spent two seasons surveying in Iowa. In his capacity as Deputy Surveyor in 1836, he ran the course of the fifth principal meridian in Iowa, using his solar compass for the first time. Between 1840 and 1847, with the assistance of Alvin and Austin Burt, two of his five sons, all of whom he had trained as surveyors and who successively became deputy surveyors, he surveyed the upper peninsula of Michigan. On September 19, 1844, during the course of this survey, while working near Teal Lake in Marquette County, Burt and his surveying party discovered specimens of iron ore, the first recorded in the region.

At the same time that Burt was surveying the upper peninsula of Michigan, a geological sur-

vey was in progress under the supervision of the geologist, Dr. Douglas Houghton. Upon the sudden unexpected death of Houghton in 1845, Burt took over his geological notes, completed the survey, and prepared and submitted the final report.

In 1852 he was elected a member of the Michigan state legislature, and served as chairman of the committee on internal improvements.

Burt's lifelong interest in the sea and navigation finally compelled him in 1851 to take passage on a sailing vessel to England, a voyage that lasted six weeks. He was particularly interested in observing the accuracy of the course laid by the ship's compass, an interest which led to his third invention, the equatorial sextant.

It is a combination of the reflecting sextant, with meridian, azimuth and hour circles, designed to give the azimuth and hour angle simultaneously by observation of the altitude of heavenly bodies, the corresponding angles being read on the respective circles. Burt was granted a patent for the quadrant in 1856.

In 1855 Burt wrote *Key to the Solar Compass and Surveyor's Companion*, which was reprinted in 1858.

Burt was a member of the Masonic fraternity and of the Baptist church. He died in Detroit on August 18, 1858. In about 1929 the Michigan state legislature passed a resolution recognizing Burt's achievements and proposing his name for the Hall of Fame of New York University. In addition to acknowledging the three inventions for which he became known, the Resolution noted that he was the first white man to discover iron ore in the state, and

Whereas, because of his clear vision and judgement Mr. Burt conceived the idea of making possible the marketing of the rich mineral products of the Superior Country by way of a ship canal around the Falls of Ste. Mary, thereby placing Michigan in the front ranks of the iron and steel industry, and directed his activities to that end as a member of the Territorial, and later the State Legislature . . . PS

Silvio A. Bedini is an historian at the Smithsonian Institution in Washington, and a contributing editor to Professional Surveyor.

THEY LEFT THEIR MARK

by

WILLIAM AUSTIN BURT & HIS SONS,
Surveyors of the Public Domain.

It was June 1840 when U.S. surveyor William Austin Burt first entered Michigan's Upper Peninsula, a wilderness that, according to Henry Clay, "stretched beyond the remotest settlement of the United States". Neither Burt nor his sons could have envisioned the role they would play in helping shape the future of this area. William Austin would soon discover a new source of wealth for Michigan and the nation, and the event would confirm the value of Burt's unique invention for surveying the expanding U.S. Frontier, the solar compass. His son John would become a leader in the growth and development in the Upper Peninsula, particularly Marquette County.

William Austin was on the Michigan Territorial Council, and in 1839, named associate judge for Macomb County Circuit Court. In that same year, at age 41, he received his first contract as a deputy surveyor and began surveying public lands. With his unique blend of mechanical genius, a quest for accuracy, and a Yankee determination, he soon solved a problem that had plagued public land surveyors since 1785 by inventing the solar compass. It became the required instrument for all public land surveys, and saved the government millions of dollars on future surveys.

William and his son John also played instrumental roles in developing canal and railroad projects in the Upper Peninsula. In 1855 William Austin Burt authored a practical manual entitled "A Key to the Solar Compass and Surveyor's Companion". It is still in print, and still used by surveyors who have to retrace land boundaries.

Throughout his life William Austin Burt adhered to the strong religious and moral principles that formed the foundation of his character. His word was his bond, and his integrity was never questioned. In many ways he typifies the American pioneer as the rugged surveyor who explored and accurately charted the wilderness. With inventive mind and creative spirit he persevered, usually for the benefit of others. His lack of personal greed enabled William Austin Burt to leave a lasting legacy of public service.

Partial Contents: America's first typewriter - Burt's writing machine; Quest for accuracy - public land surveys and the solar compass; Surveys in the upper peninsula and a mountain of iron; the Michigan / Wisconsin boundary survey; Completion of the Soo Canal.

Appendices: The Burt Lineage; the Author's Connection; the Burts' Surveying Contracts; the Burts' Iron Mining Business; Burt's Solar Compass.

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About the Author

John S. Burt, a direct descendant of William Austin Burt, has devoted more than a decade to researching and writing "They Left Their Mark." Although he has authored several articles pertaining to the accomplishments of his distinguished ancestor, "They Left Their Mark" is John Burt's first book and the first full biography of William Austin Burt and his sons.

John holds a BS degree in marketing from San Jose State University. For the past 25 years he has been engaged in sales and sales management for Pfizer, Inc., where he is currently a Certified Senior Medical Representative. He is also a licensed Real Estate Broker in California.

Mr. Burt is a charter member of the Surveyors Historical Society, a Life member of the Marquette County Historical Society, and is a supporting member of the Historical Society of Michigan.

It is anticipated that John Burt will be at our 1987 Annual Membership meeting and will be autographing your copies of his book at that time if you so desire.