EARLY DAY SURVEY INSTRUMENTS

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Instruments shown here are part of the collection of vintage survey equipment housed at Shine & Associates.

"How can we know who we are and where we are going if we don't know anything about where we have come from and what we have been through, the courage shown, the costs paid, to be where we are?" – David McCullough

Surveying is a profession in which we spend as much time looking backward as we do forward. Part of the goal of a boundary survey is to follow in the footsteps of previous surveyors—at times, as far back as the granting Sovereign. In achieving this task, it is important to understand the instruments used by early surveyors and the physical conditions they encountered while carrying out their work.

Scribed stone in Jim Hogg County, near Hebronville

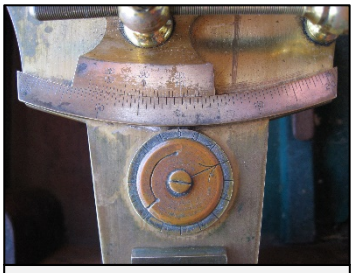
For instance, if we look for scribed stones at corners called to be 1,900 varas apart and the surveyor had a 10-vara chain, then it follows that if he stretched out that chain 190 times, he planted those scribed stones exactly 1,900 varas apart. However, let's consider if his chain, in reality, measured 10.1 varas. If the early surveyor stretched the chain out 190 times (and called it 1,900 varas), then he actually planted those scribed stones 1,919 varas apart. As long as he used this unadjusted chain, this chaining error would occur on every line he surveyed. If the surveyor was attempting to lay out a 640-acre grant in a square, he would actually have included 652.31 acres between the four scribed stones.

1840s-era 20-vara chain. This type of chain was used to lay out most of the grants in Texas.

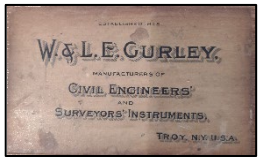
Speaking of the vara – it is still the official measure of Texas! When a survey is filed at the General Land Office, it is required to be reported in varas. It is a unit of measure that originated in Spain more than 500 years ago and was brought to the new country. Our Texas land systems have a strong Spanish-Mexican influence, and our use of the vara is only one indicator. In the Colonization Law of 1823, a vara was defined as "three geometrical feet". Varying lengths of the vara were used until the State Legislature in 1919 standardized the measurement to be 33 1/3 inches. Therefore, the 10-vara chain mentioned above should measure 27.78 feet, but in our example, it would have measured 28.03 feet.

An 1860-1870s-era W. & L.E. Gurley open-faced compass on Jacob's staff. This one is famous because it was used to lay out the Texas A&M University Campus. Whoop!

It was required that every county seat have a line monumented to the true meridian and a true-measurement standard chain of 10 varas available to local surveyors to adjust their compasses and chains. The instructions to surveyors were to use chains in which the link was 6 2/3" and an open-face compass of the Rittenhouse construction. In our collection, Shine & Associates has two W. & L.E. Gurley compasses built by the company, which opened its doors in Troy, New York in 1845. These scientific instruments are precisely machined as well as beautiful in their own right.



Vernier for dealing with variation and reading minutes more precisely. Round knob is 'out' counter. Surveyor kept up with how many times the chainer ran out of pins.



The oldest instrument in Shine & Associates' collection is a colonial compass, circa 1740-1800. The compass face on reads: "Made by Benjamin Warren – Plymouth, New England." The only other Warren instrument known to survive is housed at Yale University in the Streeter Collection of Weights and Measures. Shine & Associates' compass is thought to predate the one in the Streeter Collection because the one at Yale reads: "Made by Benjamin Warren & Sons." This compass is even more significant because it is likely Paul Revere printed the compass face for Benjamin Warren. Silvio Bedini, a historian at Smithsonian Institution who specializes in early scientific instruments, found an entry in one of Paul Revere's daybooks of his silversmith, engraving, and printing work that states he printed one hundred compass cards for Benjamin Warren.

Compass face reads: "Made by Benj. Warren Plymouth New England". Compass is made of cherry wood.