
Wherever you place it, chances are good that East Liverpool, Ohio, did not make the short list. It’s a small town hugging a curve in the Ohio River, roughly 40 mi northwest of Pittsburgh. But it was here—at the Beginning Point of the U.S. Public Land Survey (Point of Beginning)—that the ruthlessly efficient grid of land subdivisions that would define development patterns for most of the country began in the mid-1780s.

For years, the Northwest Territory—which encompasses the states of Ohio, Michigan, Indiana, Illinois, and Wisconsin as well as parts of Minnesota—had been the wild frontier beyond the seemingly impenetrable Appalachian Mountains. In Ohio, the forests were so dense, wrote James L. Williams, P.S., in his book Blazes, Posts & Stones: A History of Ohio’s Original Land Subdivisions (Columbus, Ohio: Compass & Chain Publishing, 2015), that “the first surveyors believed that a squirrel could travel from the Ohio River to Lake Erie without ever touching the ground. Wolves, bears, and wildcats roamed the forests at night. Hostile Indians prowled the trails and rivers seeking to terrify and drive out the new settlers.”

But it was the region to which a young, financially strapped nation turned as it prepared to expand into the resource-rich American continent. After the conclusion of the Revolutionary War, Americans and British signed the 1783 Treaty of Paris. Under its terms, the United States received basically everything east of the Mississippi River, says Ann Besch, P.S., an instructor in the Surveying and Mapping Program at the University of Akron. Technically, seven of the original 13 colonies had land that extended from sea to sea (which meant the Pacific Ocean, in theory, but in reality meant the Mississippi).

According to Williams, the newly created Congress of the United States “was nearly $40 million in debt,” mostly to France, which had supplied weapons and equipment to the colonies. And the Congress, he wrote, which was formed under the Articles of Confederation, had no power to levy taxes. But it did have that land west of the colonies, secured from the British. Thomas Jefferson, both a surveyor and the son of a surveyor, headed a committee to divvy up the frontier.

According to Besch, several things had to happen. The United States had to get the British out and it needed Native American tribes in the region to give up their claims to the land. (The 1785 Treaty of Fort McIntosh nominally accomplished this, but the American government and Native American tribes would continue to clash over contested claims of land ownership in Ohio and throughout the nation.) Further, those states with western land claims had to cede them to the federal government, which would then open them up to development. In exchange for ceding their land, those states would be relieved of their portion of America’s war debt.

The Land Ordinance of 1785 spelled out how the land would be surveyed and sold. The land would be divided into 6 mi square townships. A north-to-south column of these townships was called a range, and the townships were further subdivided into 1 sq mi segments (640 acres) called sections.

Thomas Hutchins began the first major U.S. land survey near East Liverpool, Ohio—just west of Pennsylvania and on the northern shore of the Ohio River.
The point of beginning for the survey of the Northwest Territory was specified as the intersection of the western boundary of Pennsylvania and the northern bank of the Ohio River.

The townships were numbered from south to north. According to Williams, the ranges were to be distinguished by their prospective number westward from the Pennsylvania line. “Townships were to be sold whole or in lots, provided that none of these were sold under the price of one dollar per acre,” Williams wrote.

As Williams noted, surveyors were directed to mark the corners each mile along the boundaries of the townships, but internal lines were to be shown on paper only—not in the field. The surveyors were to note natural features such as rivers, salt licks, and mill sites. This put the surveyor into the role of explorer and geographer.

Once the ordinance passed, Congress wasted little time moving the survey forward. Within a week, it appointed Thomas Hutchins as the young country’s first Geographer of the United States. Hutchins, a topographical engineer in the British Army, had served in the French and Indian War. A skilled cartographer, he had surveyed the so-called Great Trail from Fort Pitt (Pittsburgh) to Detroit. Hutchins also surveyed the Ohio River from Fort Pitt to Louisville, Kentucky, from, Williams wrote, the bow of a boat.

When the Revolutionary War broke out in 1775, Hutchins was in London but refused to fight against the Americans and was imprisoned for high treason. He escaped and fled to Paris, where he befriended Benjamin Franklin, and later returned to the United States and served on behalf of the American army.

By law, the point of beginning for the survey of the Northwest Territory was specified as the intersection of the western boundary of Pennsylvania and the northern bank of the Ohio River. (Besch notes that the actual point is now underwater because of changes in the course of the river.)

Hutchins’s survey team was meant to include deputy surveyors from each of the 13 states; the idea, Besch says, was these surveyors would help spread the word in their home states about available western lands. But initially, he had only eight deputies.

According to the East Liverpool Historical Society, in late summer 1785 Hutchins and his assistants made an arduous two-week journey—more than 300 mi—over the mountains to Pittsburgh, then a cabin village of about 300 people. They assembled a work crew, about 30 men in all, and set off toward the Ohio River. Before they could begin the survey, Hutchins and his deputies had to find the western boundary of Pennsylvania. (The 1763–1767 Mason-Dixon line, which established the southern...
boundary of Pennsylvania, stopped about 30 mi shy of the western border.)

The survey began on September 30, 1785. As Williams noted, Hutchins observed the sun at sunrise with a sextant and calculated his position on the northern bank of the Ohio River at its intersection with the western border of Pennsylvania as 40 degrees, 38 minutes, 2 seconds north. Hutchins, according to Williams, ran the initial east–west line himself—a line that became known as the Geographer’s Line.

The underlying conceptual challenge of the survey, of course, was that a survey dividing the land into perfect squares was impossible. Since meridian lines converge as they extend north, the townships would never be exactly square.

The Land Ordinance specified that lines had to be run by the true meridian, but the goal, says Besch, was to get the survey done, so absolute accuracy was not the highest priority. Hutchins tried to run the lines to true meridian, but it was time consuming, so he asked Congress to suspend that requirement, which it did.

According to Williams, the Land Ordinance did not specify what markings would be used to identify the survey’s course. “The surveyors developed their own system of marking line trees with two notches and setting wooden posts at corners,” Williams wrote. “Then they located bearing trees to each corner and notched and blazed these trees accordingly.”

Ohio proved a challenging environment. “If you can survey in Ohio, you can survey anywhere,” says Besch. For starters, the southwestern corner of the state is very rugged. The 66 ft Gunter’s chain that surveyors of the time used was hard to extend horizontally, she explains. “So they were using a two-pole chain, 53 feet long. They were supposed to be holding it horizontal but often didn’t.” The rugged topography also made it harder to stay “on line” and tested the endurance of the group.

In a post on the website of the East Liverpool Historical Society, historian C.M. Mayberry, Ph.D., wrote that surveyors found a region “cut by deep valleys with sides so steep that only a few feet at a time could be measured on the horizontal. One surveyor wrote later, ‘Before I had gone a mile I discovered that is was impossible to do accurate chaining in such broken country where the hills were so steep it was often with difficulty that they could be climbed.’”

But the topography was not the only challenge. Native tribes harassed the surveyors. They were, Williams wrote, provoked by the British, who wanted to check American expansion into the northwest.

As early as 1776 Henry Hamilton, the British governor of Detroit, “adopted a plan to terrify the American colonists from venturing over the Alleghenies,” wrote Williams. “He paid bounties to the Indians for American scalps and became known as ‘the Hair-Buyer.’ Parties of Indians with bloody scalping knives prowled the forests seeking surveyors and settlers.”

The Native Americans, Williams continued, attacked settler boats “traveling down
the Ohio River by displaying captured female settlers who begged for help from the passing boats. If the boat ventured too close to the shore, the native people would attack, kill, and scalp those aboard. It was a vicious and terrifying time to be on the western frontier."

Williams noted that surveyors often worked in winter to avoid Native American war parties and worked with a constant level of vigilance.

Fear of attack and the generally rugged land, Mayberry added, meant that the first year’s survey advanced but 4 mi over eight days before Hutchins ordered a retreat. During the second summer season, in 1786, the survey again started late in the summer because Hutchins demanded a military escort. It took an order from the Secretary of the War to authorize 150 troops. According to Mayberry, most of them, however, remained in a camp on the river because of a lack of equipment; only about 30 accompanied the surveyors, "too few for adequate protection as they spread out over the several ranges."

According to Mayberry’s account, one morning the surveyors found a Native American warning: a stake driven the previous day had been found broken, and red paint was smeared on a tree nearby. Later in the day, a soldier brought a message that the Shawnees were gathering to "cut Hutchins off with all his men."

After retreating to a fort in West Virginia, the surveyors waited a few weeks, and when no Native Americans appeared, they continued their work until bad weather hit in November. In total, the 1786 work extended the survey 49 mi.

Of course, native peoples in the region, including the Shawnee, “came to realize pretty quickly that the guys with the compasses were there to steal their land,” Besch says. “They didn’t sit around and take that easily.”

The survey was discontinued after three summers. In the near term it seemed to have been something of a failure. Hutchins and his crew spent the summers of 1786 and 1787 working on the survey until Congress cut it off. Hutchins and his “Gentlemen Surveyors,” as they were called, had completed only seven ranges.

In hindsight, Congress had vastly underestimated the work involved. According to Mayberry, Congress had appropriated $5,000 and apparently expected the job to be done in a single season. Mainly because of fear of Native Americans, it had extended over three seasons and cost almost $15,000.

Further, Besch says, while Hutchins’s survey was under way, Congress had also made large land deals with companies that conducted their own surveys and then sold plots of land. This, in part, explains why Hutchins’s survey didn’t result in the sale of as much land as expected.

The work also didn’t pay well for the surveyors and their crew—only $2 per 1 mi, "not enough to cover the surveyors' expenses, let alone their time working and their losses to the Indians," Williams wrote. “Horses and supplies were often lost at an alarming rate to marauding Indian bands and these losses were absorbed by the surveyors."

Still, Hutchins’s work, and the work of nearby private surveys, succeeded in laying the foundation for America’s westward expansion. According to conservation biologist Curt Meine, in his collection of essays, Correction Lines: Essays on Land, Leopold, and Conservation (Washington, D.C.: Island Press, 2004), “about 70 percent of the land in the continental United States—all but the thirteen original states, Maine, Vermont, West Virginia, Kentucky, Tennessee, and Texas—is delineated according to the land-survey system.” In total, the survey Hutchins began would go on to cover more than 3 million sq mi of land.

The Point of Beginning survey was named a National Historic Landmark in 1965 and a national historic civil engineering landmark in ASCE’s Historic Civil Engineering Landmark Program in 1985.

Meine quotes geographer Hildegard Binder Johnson, who noted that the survey lines were set “with complete disregard of the terrain. This unconditional rule [made] it possible for the survey to be continuous not only in concept but in practice over thousands of square miles—the most extensive uninterrupted cadastral system in the world.”

The political underpinnings of the grid were clear as well. As Meine notes, while the “efficient distribution of lands” meant indigenous people were being forced off their land, for the new Americans the Point of Beginning survey symbolized the promise of individual land ownership as a “bulwark against the inequities of European land tenure and a stabilizing keel for the embarking democracy.”

—T.R. WITCHER

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