Missouri Surveyor

A Quarterly Publication of the
Missouri Society of Professional Surveyors

Jefferson City, Missouri March 2021

What's in this issue...

CALENDAR OF EVENTS

2021

March 19, 2021
Elgin Workshop
Chateau on the Lake, Branson

April 29, 2021
Board Meeting
Lodge of Four Seasons,
Lake Ozark, MO

April 30-May 1, 2021
43rd Annual Spring Workshop
Lodge of Four Seasons,
Lake Ozark, MO

July 10, 2021
Board Meeting
MSPS Office, Jefferson City, MO

August 26-27, 2021
Review Course
Jefferson City, MO

October 14-16, 2021
64th Annual Meeting and Convention
Tan-Tar-A Resort, Osage Beach, MO

December 4, 2021
Board Meeting
MSPS Office, Jefferson City, MO

Additional Dates for Spring Workshop
April 27-May 1, 2022
May 3-May 7, 2023
May 1-May 5, 2024

Cover: Jason Beasley, LSIT with the Land Survey Program locating a cave to help search for/restore mile points for a project on the Missouri-Iowa line. This was located in Section 14, Township 67 North, Range 8 West, Clark County (photo by Tyler James). For Back Cover, see Page 39 for caption.

Donald R. Martin, Editor

Notes from the Editor's Desk

Donald R. Martin

Spring greetings dear readers and welcome to the March 2021 Edition of *Missouri Surveyor*. Spring editions bring the annual report on our ol' pard Tripod the three-legged groundhog and his celebration of February 2nd. The holiday this year came with its own COVID twist. You see, as your favorite surveying land beaver exited his den that fateful Tuesday he was met by his very shadow standing toe-to-toe at Tripod's feet. With that, ol' pard immediately jumped back to maintain the obligatory six feet of social distancing, but that rascally shadow matched his steps and violated protocol! From there, the 'Pod began an endless fleeing from a maskless shadow in hot pursuit of our Corona-fearing marmot. Where this race led to is anyone's guess. But the shadow's failure of following the Fauci fathom frightens faithful followers of formula for freedom from fear of the flu-like phantom framing our folkways for the foreseeable future.

This edition kicks off with our *President's Message*. Mr. Graham gives readers food-for-thought in sharing his own thoughts on the legislative issue of just how much experience is needed to become a surveyor. Then, MSPS member Steve Weible offers more of his mastery of Missouri's surveying lore in *Claims to Land and the Fifth Principal Meridian*. Journey back to the era of Tiffin, Meigs, Rector and the lead-up to the 5th PM and Missouri's PLSS in this fine article. We next solemnly announce the passing of two of our brethren, *Charlie Miller of Joplin and Eddie Murray of Wentzville*. Sadden by their passing, we are honored to recognize these two wonderful surveyors. Afterwards comes a Dick Elgin piece in which the good Doctor writes about a favorite topic – historic instrumentation. It is *The St. Louis Maker, A.S. Aloe & Company*. Then about midway through the edition we have *Carol Payne Retires from the Land Survey Program*. An Associate Member of MSPS for many years, Ms. Payne is leaving the archive after a successful career helping Missouri surveyors with records research.

The first part of Joe Clayton's tale of *Retracing the Osage Treaty Line* anchors the latter half of the March edition. Joe allowed me to join in the telling of his story which will continue on in the next edition of *Missouri Surveyor*. It is a detailed look at Clayton's efforts to continue the MSPS commemoration of Joseph C. Brown's survey of the Missouri Territory border with the Indian Territory of 1816. Follow along as he shares his journey through time and across western Missouri seeking evidence of 200-year-old mile posts. Information from our National Society follows in *NSPS News & Views*. This collection of recent press releases includes a report on Missouri's place in a national ranking of highway infrastructure. While "12th Worst" is nothing to be proud of, imagine the surveying opportunities which would accompany a remedy to this situation! We wrap it up with snippets from the National Geodetic Survey in *NGS News & Events*.

Pards, I hope you find this edition to your liking, with content of interest. Remember, any contributions you wish to make to these pages is welcome. With that, I best break-it-down and bunch-it-up so I can start getting ready for the next edition …I'll get back with ya' then…

Donald

THE MISSOURI SURVEYOR

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President's Message

Earl Graham

As I sit here this morning it is a beautiful day: a light covering of snow, bright sunshine through my window, and one degree outside. What a great day to be in the office! I love Missouri. I love the seasons. But ten or so days below freezing in winter, and then ten or so days of one hundred degrees in summer helps me understand why people retire to Florida. Hopefully, by the time you are reading this it will be a beautiful spring day.

As of mid-February, we have a bill circulating in the Missouri House of Representatives (HB 1073) with draft language which would change requirements for licensure in Missouri. Not surprisingly, the proposed language came under fire. Personally, I feel some portions did not read very well and could be open to interpretation. This is the case when dealing with legislation. It is discussed with sponsors who in turn draft the language to be proposed in a bill. During this development of a bill, politicians, lawyers and policy "wonks" work to create proposed legislation which embodies the intentions of those seeking change. It may the case that something got lost in translation. But the MSPS Legislative Committee and I are watching this closely. In partnership with our sponsor, Representative Don Mayhew, PLS, we will see to it that the best interests of MSPS and our intentions are clearly understood in any legislation dealing with surveying.

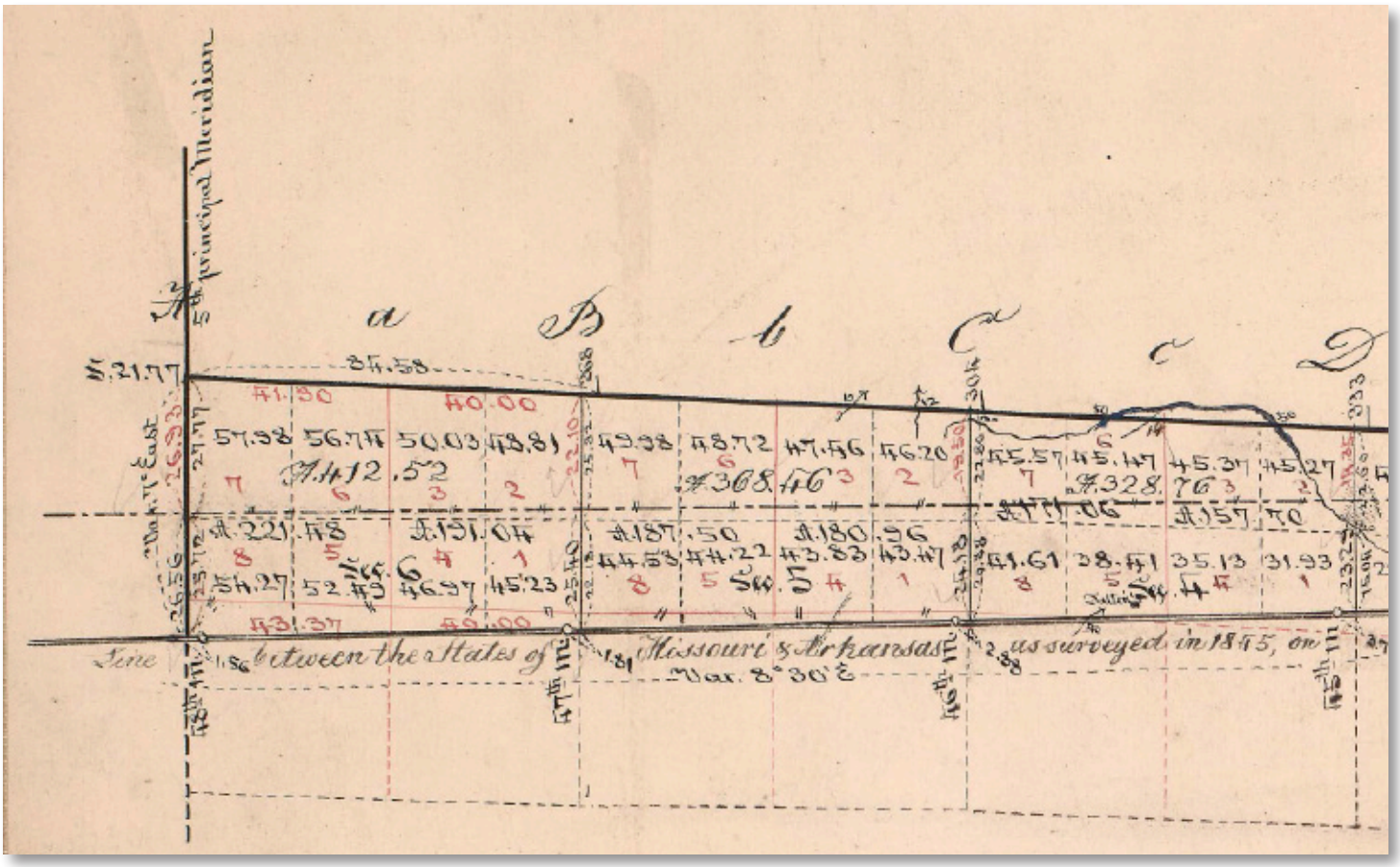
The most important change we are seeking is to get away from the currently required four-year period which comes after an applicant passes the LSIT test and before their acceptance to sit for the PLS exam. This four-year regulation is contributing to a drastic decrease in the numbers of prospective surveyors. Like all of those concerned with the quality of our enrollees, I respect and value the internship time spent under the immediate supervision of a practicing PLS. I want that to continue. But ours is a profession where many of those interested in becoming a PLS do so after having spent a create deal of time assisting and learning from a mentor PLS. That time should count towards qualifying experience. It is no less important whether it occurs before or after achieving LSIT status. Imagine the discouragement of getting that LSIT certificate only to have to continue interning even though you have more than four years of experience under your belt! Let's make it so all high-quality experience learned from a guiding PLS is respected equally. We have coupled this with a proposed increase to three credit hours for college level study in the Legal Aspect of Land Surveying.

In Hollywood, the Music industry, and in Sports we hear that a certain individual has "it". No one has ever been able to completely define "it" but almost anyone can recognize when someone has "it". My experience has been that the same is true with Surveyors. They have "it", or they don't; and usually a six-month probationary period tells the tale. It is my opinion that if the individual has "it" then over-regulating additional years of experience is not really going to make a difference, and the same goes for those who don't have "it". I for one am in favor of four-years of satisfactory experience with a PLS before or after LSIT status is fine. If it would help us attract the "it" people, then let's try it! My mind goes back to a few great summer interns we have had over the years, one is now an Engineer and Project Manager for a large construction company. Another is an Attorney who also holds an Engineering Degree. Still others have gone on to do great things in other fields. While all these people showed great promise in our field none of them entered our industry. Maybe there were barriers; barriers like too much time to complete. I think it's time to shake things up a little.

Earl

Claims to Land and the Fifth Principal Meridian

by Steven E. Weible, PLS, December 2020



Fifth Principal Meridian at the west side of Township 21 North, Range 1 East at the Missouri-Arkansas state line from 1850 township plat. (Courtesy of the Missouri State Land Survey)

The final report of the Board of Revision was expected to reach Secretary of the Treasury Albert Gallatin around the first of March 1812 (Marshall, Vol. 2, pg 216). Soon after the report arrived at its destination, those having certificates for confirmed claims began requesting patents. The land descriptions in the certificates were vague, however, having no reference to adjoining tracts or any common point. By April 1812 Secretary Gallatin had refused to issue any more patents based on these vague descriptions. It was clear that the boundary surveys would have to be completed before the tracts of land could be given a definite location. Thus Secretary Gallatin wanted the principal deputy surveyor to survey all of the confirmed claims, connecting them relative to one another (*Territorial Papers*, Vol. 14, pg 546).

Section five of the Act of June 13, 1812, chapter 99 (U. S. Statutes at Large, Vol. 2, pg 748), directed the principal deputy surveyor to survey into townships as much land as may be directed by the President of the United States along with all of the confirmed private claims that had not already been surveyed under the authority of the United States. The principal deputy surveyor was further directed to make out a "general and connected plat" of all of the surveys to be made by him along with all those that had already been made.

Meanwhile, the General Land Office was created by the Act of April 25, 1812, chapter 68, *An Act for the establishment of a General Land Office in the Department of the Treasury* (U.S. Statutes at Large, Vol. 2, pg 716). Edward Tiffin from Ohio was nominated by President James Madison to be Commissioner of the General Land Office and was confirmed by the U.S. Senate on May 6, 1812 (*Senate Executive Journal*, Vol. 2, pg 262-263). His duties were to manage all activities relating to the public lands of the United States and other lands patented or granted by the United States, as had previously been

handled by the offices of the Secretary of State, Secretary and Register of the Treasury and Secretary of War.

Later in 1812 Jared Mansfield resigned as Surveyor General of the United States and returned to the U.S. Military Academy at West Point to take the position of professor of natural and experimental philosophy, which had been newly created by the Act of April 29, 1812, chapter 72 (U.S. Statutes at Large, Vol. 2, pg 720). Josiah Meigs from Georgia was nominated by President James Madison to replace Mansfield and was confirmed by the U.S. Senate on November 16, 1812 (*Senate Executive Journal*, Vol. 2, pg 303-304). On November 24, 1812, Edward Tiffin sent Meigs his commission and directed him to go to Cincinnati, Ohio, to assume his duties. Tiffin expected that there should be general instructions in the office as had been given to Mansfield by the Secretary of the Treasury to provide Meigs sufficient guidance and direction. Meigs arrived in Cincinnati on March 22, 1813 to find that the first clerk of the office had died (*Territorial Papers*, Vol. 8, pg 215).

Understandably, Josiah Meigs was uncertain as to how he should proceed. He would later write to Edward Tiffin, "*I hope you will not think me timid if I ask you direction for my Conduct* " (*Territorial Papers*, Vol. 14, pg 691). He desperately wanted Mansfield to come back and explain it all to him (*Territorial Papers*, Vol. 8, pag 215).

In a letter to Meigs, dated June 22, 1813, Principal Deputy Surveyor Silas Bent expressed his concerns about the surveys to be done in the Territory of Missouri. He emphasized his belief that the public lands and the confirmed private claims should be surveyed at the same time. The township and section lines would serve as a framework on which to connect the private claims and a means to check for and detect errors in the measurements. He advocated for a system of meridian and standard lines such as had been implemented by Jared Mansfield for the public lands in the Territories of Indiana and Illinois. He was concerned, though, that the area over which the private claims were scattered was too extensive to have authorized, since the President of the United States would have to direct that it be done (*Territorial Papers*, Vol. 14, pg 681).

Bent noted that it might be difficult to run a meridian north from the south boundary of the territory because of the damage done by the New Madrid earthquakes, which had continued over the past eighteen months. It might, therefore, be better to establish the meridian north of that area and then push it to the south. He concluded his letter by stating that it was not an easy matter to find an exceptional solution that would satisfy all the concerns related to the survey of the private claims (*Territorial Papers*, Vol. 14, pg 681).

Meigs further solicited the opinions of William Rector, a deputy surveyor working in the Kaskaskia District of the Territory of Illinois, as to the best plan for surveying the confirmed private claims in the Territory of Missouri. Rector responded in a letter, dated July 24, 1813, advocating for reckoning the ranges from the Third Principal Meridian in the Territory of Illinois and extending its Base Line across the Mississippi River into the Territory of Missouri. His reasoning rested on the belief that the extension of an existing system would cause less confusion than the introduction of a new one. Rector stressed the necessity of surveying enough township exteriors so as to enclose the confirmed private claims before any of those claims were surveyed. Once the township exteriors were in place, the private claims could then be surveyed and referenced to them. It would not be necessary to further divide the townships into sections at that time unless there were only a few private claims in the township (*Territorial Papers*, Vol. 14, pg 688). This plan would be sufficient to prepare a connected plat of the private claims to meet the immediate need for issuing patents. The townships could then be subdivided into sections at a later time to facilitate the sales of the intervening public lands.

Meigs forwarded the comments from Bent and Rector to Edward Tiffin in a letter, dated July 26, 1813, noting that he approved of Rector's idea to use the Third Principal Meridian and its Base Line, which, he stated, was located about 24 miles south of the mouth of the Missouri River. He further noted that, if the entire area between the Arkansas River and the Missouri River was to be surveyed into townships, it would probably be advantageous to run a second Base Line about 150 to 160 miles south of the mouth of the Missouri River (*Territorial Papers*, Vol. 14, pg 690).

Edward Tiffin responded by letter, dated August 12, 1813, inquiring of Meigs whether he had found any instructions in his office pertaining to the surveying of the public lands, confirmed private claims and donation claims in the Territory of Missouri. Neither the Secretary of the Treasury nor the President of the United States was available at that time to give direction, so no surveying could be authorized to proceed. Tiffin, however, offered his own observations, noting that he agreed with Silas Bent that the public lands and the confirmed private claims should be surveyed at the same time. He thought that the Base Line of the Third Principal Meridian was too far north and wondered if it would be better instead to run a new Base Line west from the mouth of the Ohio River.

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Claims to Land and the Fifth Principal Meridian *(continued)*

He also suggested that it might be better to run a meridian north from about the mouth of the Arkansas River instead of pushing it south from a point on the Missouri River (*Territorial Papers*, Vol. 14, pg 695).

Meigs replied on August 24, 1813, reporting that he had found no particular instructions in his office relative to surveys in the Territory of Missouri, but that Secretary Gallatin had wholly approved of the system devised by Jared Mansfield. He conceded that Tiffin's ideas appeared correct, being consistent with the plan that Mansfield had implemented. He also noted that he had designated William Rector to replace Silas Bent as Principal Deputy Surveyor in the Territory of Missouri. Bent had been commissioned in February 1813 as a Judge of the Superior Court of the Territory of Missouri (*Territorial Papers*, Vol. 14, pg 631) and could no longer give his full attention to the duties of Principal Deputy Surveyor. Consequently, the acting Secretary of the Treasury had ordered a replacement (*Territorial Papers*, Vol. 16, pg 355).

William Rector was commissioned on September 14, 1813 (*Territorial Papers*, Vol. 15, pg 345) and assumed his new duties in St. Louis in November 1813. On November 18, 1813, he reported to Josiah Meigs that he had received from Silas Bent all of the papers belonging to the Principal Deputy Surveyor. Having reviewed the information and become more acquainted with the work for which he was now responsible, he affirmed his belief that townships should be laid out before any of the confirmed private claims were surveyed. He had consulted with men familiar with the territory and had developed an idea of the limits of the area that would include the majority of the confirmed private claims. The area was bounded on the north by an east-west line about 50 miles north of St. Louis, on the west by a north-south line about 60 miles west of St. Louis, on the south by the Arkansas River and on the east by the Mississippi River (*Territorial Papers*, Vol. 14, pg 707, 709).

During this time, the United States was fighting the War of 1812. Congress had declared war with the United Kingdom of Great Britain and Ireland by the Act of June 18, 1812, chapter 102 (U.S. Statutes at Large, Vol. 2, pg 755). Most of the battles between the U.S. and British militaries were fought around the Great Lakes and along the Atlantic coast. The frontiers of the northwest and the Mississippi Valley, however, were kept in a constant state of alarm by hostile Indians, who were being supplied and encouraged by the British. As a result, the prospects for surveying in the Territory of Missouri were doubtful and no appropriations were made by Congress (*Territorial Papers*, Vol. 14, pg 766).

In preparation for the expected war, Congress had passed the Act of December 24, 1811, chapter 10, *An Act for completing the existing Military Establishment* (U.S. Statutes at Large, Vol. 2, pg 669) and the Act of January 11, 1812, chapter 14, *An Act to raise an additional Military Force* (U.S. Statutes at Large, Vol. 2, pg 671). Each effective, able-bodied man, who enlisted in the military as a non-commissioned officer or soldier and faithfully discharged his duty during his term of service, was promised 160 acres of land. The Act of May 6, 1812, chapter 77, *An Act to provide for designating, surveying and granting the Military Bounty Lands* (U.S. Statutes at Large, Vol. 2, pg 728), reserved a total of six million acres of land, fit for cultivation, to satisfy the bounties promised to soldiers. Of that total, two million acres were to be located in the Territory of Missouri between the St. Francis River and the Arkansas River. The lands so designated were to be laid off into townships and subdivided into sections and then quarter sections of 160 acres.

While the war stymied surveying activities in the Territory of Missouri, there were some changes ahead that would affect its administration in the future. On March 28, 1814 Edward Tiffin wrote to President James Madison, lobbying for an exchange of positions with Josiah Meigs. He stated, "*I am sure I fully comprehend the principles upon which Mr. Gallatin and Mr. Mansfield the former Surveyor General acted relative to the surveys in the western country and ... that I could have the work done, and the returns made, at least equally as well, if not in a superior manner to what it has ever yet been, north west of the Ohio*" (*Madison Papers*). Josiah Meigs followed up with a letter to the President, dated April 3, 1814, indicating that "*If, in the opinion of the President and Senate, this would advance the public interest, it would be acceptable to the Subscriber* " (*Madison Papers*).

On Monday, October 10, 1814, Meigs resigned as Surveyor General of the United States and Tiffin resigned as Commissioner of the General Land Office (*Madison Papers*). On that same day President Madison presented nominations to the U.S. Senate for their new positions. The Senate confirmed the appointments the next day on October 11, 1814 (*Senate Executive Journal*, Vol. 2, pg 534; *Territorial Papers*, Vol. 8, pg 313).

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In Memory of Charlie Miller – Missouri PLS #1405

Missouri surveyor Charles (Charlie) E. Miller, age 86, of Joplin, Missouri, passed away on the morning of February 1, 2021 in the comfort of his home.

Charlie was born in Bristow, Oklahoma on February 9, 1934 to the union of the late Perry and Edith (Gilmore) Miller.

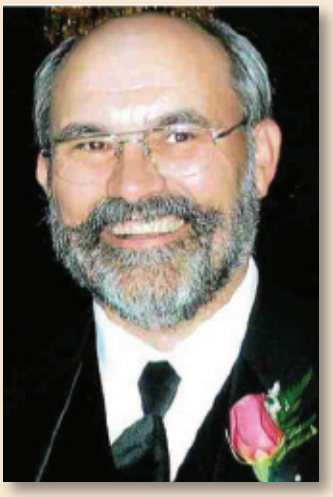
After graduating from Bristow High School in 1952, Charlie began a long career in the land surveying field. He worked for the Oklahoma Highway Department, Allgeier Martin & Associates, Inc.and the City of Joplin. In 1977 Mr. Miller started Tri-State Engineering with business partner Steve Lett. Charlie retired from Tri-State Engineering on January 1, 1995. During his career, Charlie was appointed by the Governor of Missouri as the Jasper County Surveyor in 1987, serving in that position for eight years.

On December 5, 1959, Charlie was united in marriage to Barbara J. White in Tulsa, Oklahoma. They spent 56 precious years together before her passing on May 11, 2016. Charlie was also preceded in death by a son, Brian Miller, on December 1, 2000.

Survivors include children; Curtis Miller of Joplin, Missouri, Eric Miller and his wife Melanie of Seneca Missouri, Janet Jenkins of Broken Arrow, Oklahoma; siblings, Russell Miller, Barry Miller, Laritha Lee; eight grandchildren; seven great grandchildren; together with several extended family members and friends.

Funeral services were held on Friday, February 5, 2021 in the chapel of Thornhill-Dillon Mortuary followed by burial at Osborne Memorial Cemetery in Joplin.

In Memory of Eddie B. Murray – Missouri PLS #1973



Missouri surveyor Eddie Blane Murray PLS, of Wentzville passed away Saturday, January 30, 2021 of complications from COVID-19 while surrounded by his loved ones. He was 69 years old. He is survived by his wife of 48 years, Mary Rose Murray, *nee* Siesennop, their three sons, Edward Jess Murray, Aaron Daniel Murray (Jessie) and Mitchell Tucker Murray (Meagan), two brothers, Dennis Murray (Mindy), Kelley Murray, one sister Sue Drullinger (Dan), and many loved grandchildren, nieces and nephews.

Eddie's land surveying career took flight when he began working for Pitzman's Company of Surveyors in the City of St. Louis in 1975. Eddie's knowledge of city surveying was extensive and he was happy to share it and help anyone he could. Mr. Murray was licensed as a Professional Surveyor in Missouri in 1983 and in Illinois in 1995.

Eddie was passionate about boundary surveying. He served as both a Director and President of the St. Louis Chapter of MSPS in 1989. Actively involved in local and state professional associations, he was an advocate for continuing improvement and professionalism of the surveying profession.

Eddie enjoyed hunting, fishing and working on his steam engine/tractor. He liked helping anyone who needed help at the steam engine shows he and Mary often attended. But more than anything, he loved being with his grandchildren. Eddie was a friend and mentor to many. He will be greatly missed.

Eddie Murray's Memorial Service was held at Pitman Funeral Home in Wentzville, Missouri on March 13th.

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The St. Louis Maker, A.S. Aloe & Company

by Dr. Richard Elgin, PS, PE

St. Louis, Boomtown

St. Louis, the "Gateway to the West," immortalized by Eero Saarinen's Gateway Arch on the west bank of the Mississippi River in downtown St. Louis, was one of America's great boomtowns. The city is forever connected with the settlement of America's west and the frontier. Founded in 1764 by the French, St. Louis and the area west of the Mississippi was also governed by the Spanish, then the French (again) prior to the 1803 Louisiana Purchase. The 1840 federal census recorded 16,469 persons in the city, fifth largest among Western cities. From 1830 the growth rate had been about 180%, mostly from immigration. Some emigrants settled in the city, but most "fitted out" and moved on to claim western lands. In the fall of 1834 the "Missouri Republican" reported "For several days our streets have been crowded with wagons and carriages, filled with apparently substantial and worthy people, bending their course for the Far West." In the years 1835-1837 about 30,000 immigrants entered Missouri. About 7000 stayed in St. Louis, many of them having immigrated from the German states. St. Louis' population doubled between 1840 and 1845. By 1850 the City had captured the Mississippi River trade and the trade which was headed west, either overland or up the Missouri River. The city's population was 77,860, eighth largest of America's cities. In 1860 its population was 161,000 people, the majority of which were foreign-born.

The Early St. Louis Makers

Along with the tremendous influx of German immigrants came a small cadre of master craftsmen. Names like Ryhiner, Nutz, Wuger, Winzer, Blattner and Werne were to become the early (pre-1860) instrument makers in St. Louis. Later (post-1860) St. Louis makers were the Aloe family (lead by the patriarch Albert Sidney Aloe), Fink, Hernstein, Kessel, Kuhlo, Mahn, Prince, Ruckert, Sprengnether, Winzer, the Wissler family, Zeiser, and today the Seiler family.

Aloe Compass

In his 1962 "Makers" book/catalog (both volumes), the late Charles Smart lists 46 different makers as being located in New York City and 27 in Philadelphia. The author knows of 24 St. Louis makers, so the "Gateway City" is not far behind the two eastern cities where many important makers were located. But, St. Louis started much later. The first St. Louis maker to appear in the St. Louis 1838-1839 directories was Charles Ryhiner at 26 Chestnut Street. Jacob Blattner was next, being first listed in the 1839-1840 directories next door to Ryhiner, at 24 Chestnut.

A.S. Aloe & Company (1860-1959)

The A.S. Aloe & Company began very modestly as a one-man operation on the corner of Third and Olive in 1860. The company prospered and in 1882 published the following ad: "Largest House in the States....Always on hand a large supply of Engineer and Surveyor's Transits, Levels, Compasses, Mining Transits and Compasses, Drawing and Profile Paper, etc." The growth did not stop there. A 1905 ad simply stated "...the largest house in the world." Disregarding the advertising exaggeration typical of the period, in the early 1900's, A.S. Aloe & Company was the largest supplier of surveying, mathematical instruments and allied goods in St. Louis and was probably the largest west of the Mississippi River.

The company founder, Albert Sidney Aloe was born in 1841 in Edinburgh, Scotland, son of Sadoc and Nancy Aloe. Albert immigrated as a child, probably with his parents, to New York City. His father, Sadoc, was in business there beginning in 1854 as an optician. The term optician at that time applied not only to those who sold optical goods, but also to those who made them. The elder Aloe probably did both.

In 1856 the young Albert left New York. He sailed around Cape Horn to San Francisco where he remained for a year, probably working in the optical trade as a lens grinder. He was in South America for a while, but by 1860 Albert had settled in St. Louis, across from the Post Office with a small business dealing in optical goods.

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The St. Louis Maker, A.S. Aloe & Company *(continued)*

In 1863 he married Miss Isabella Prince. She came from a notable Belfast family, her grandfather having been a West Indian governor. This union produced four sons: Sidney, Louis, David and Alfred. The oldest of the three became prominent in St. Louis business circles, and the youngest was a career officer in the U.S. Army.

By 1865 Albert and his father, Sadoc, were in business together as opticians in St. Louis under the name S. Aloe & Son. In addition to selling eyeglasses, they also sold opera and field glasses, telescopes, microscopes and magnifiers.

This arrangement lasted only a couple of years and in 1867 Albert was in business for himself as A.S. Aloe. In 1876 he went into a partnership with William H. Hernstein. From 1876 until 1880 the company was doing business as Aloe & Hernstein. In 1880 it was changed to Aloe, Hernstein & Company. In 1885 Albert again decided to go his own way and established A.S. Aloe & Company. This was the final form of the company name which was to last 76 years and through two following generations of Aloes.

Cover from an Aloe catalog.

The company grew to manufacture and sell surgical instruments, photographers' equipment, optical devices and surveying equipment. The company likely made some surveying equipment and sold the instruments to other makers (a common practice of the period). Some instruments engraved "A.S. Aloe & Company" have the maker's name (A. Wissler, for example) hidden in the instrument. Aloe purchased instruments from Gurley for many years. Most of the late Aloe instruments were made by Adolph Wissler of St. Louis.

Albert Sidney Aloe passed away on Monday, January 30, 1893, at the age of 51 years. His funeral was held the following Wednesday with friends invited to attend. The obituary carried the notice, "New York papers please copy."

Upon Albert's death the control of A.S. Aloe & Company was given to his second son, Louis P. Aloe. Louis was born July 20, 1867 in St Louis. He was groomed from the very beginning for his leadership role. His education began with the Stoddard School, was continued at the Wyman Institute of Alton and he attended Washington University in St. Louis. Louis interrupted his education to work in the family business and was listed on the company masthead as secretary/treasurer at the time of his father's death.

The company was incorporated in 1893, the same year as Albert's death. With incorporation came a new modern letterhead for each department. These letterheads carried a list of major items sold by that department and an appropriate engraved logo, i.e. a wye level for the mathematical instrument department, a camera on the photographic department stationary and the ubiquitous spectacles for the optical department. A.S. Aloe continued to be carried as president on the letterhead through the year 1895, possibly to reflect a period of mourning. Later the masthead was changed to read, "L.P. Aloe, Prest. & Treas.; D.B. Aloe, Vice-prest.; T.D. Benjamin, Secretary."

Under Louis' leadership the company continued to prosper and grow. It became necessary to separate the optical and surgical departments. The optical department remained at 5th and Olive and the surgical department moved to 1921 Olive. The company suffered a disastrous fire in 1912; however, they soon rebuilt and were doing business as usual.

Louis and his wife had four children, all girls: Clarable, Viola, Isabel, and Louise. The fate of the company was to revolve around Isabel, who, while attending Smith College, met Howard F. Baer. Howard was the son of David Baer, a German-Jewish immigrant who had made his money as

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Claims to Land and the Fifth Principal Meridian *(continued)*

After the war had ended, Josiah Meigs, as Commissioner of the General Land Office, wrote to the President on March 6, 1815, concerning the surveys of the military bounty lands. For the surveys in the Territory of Missouri, he suggested establishing a meridian line run north from the mouth of White River (*Territorial Papers*, Vol. 10, pg 514). On March 9, 1815, Edward Tiffin, as Surveyor General of the United States, wrote to Meigs, proposing to run a base line west from the mouth of the St. Francis River to the Arkansas River. This base line would be the base from which to begin the surveys of the military bounty lands (*Territorial Papers*, Vol. 10, pg 515).

Meigs wrote to Tiffin on March 23, 1815, stating that the surveys of the military bounty lands were a high priority, but that he would need to consult with the President on how to proceed in the Territory of Missouri. He also directed that the Principal Deputy Surveyor should survey into townships and sections as much as was needed to include the majority of the confirmed private claims. This was also a high priority, because of the outcry from the claimants who couldn't get their patents until the surveys were completed (*Territorial Papers*, Vol. 17, pg 154). Meigs wrote to Tiffin again on March 24, 1815, advising that upon further consideration, he thought it would be proper to have a Standard Meridian run from the confluence of the Arkansas River and the Mississippi River with a parallel run west from the mouth of the St. Francis River for the surveys of the military bounty lands (*Territorial Papers*, Vol. 15, pg 20).

Meigs further inquired of William Rector about a plan for surveying the townships needed to connect the confirmed private claims. Rector responded on April 17, 1815 still committed to extending the surveys from the Third Principal Meridian. He proposed to start in the Illinois Territory where the south boundary of Township 2 South intersected the Mississippi River. He proposed to extend that line west across the river (somehow), set a township corner and then mark off eight ranges (48 miles) west. From that endpoint he proposed to mark the range line (or meridian line) south until it intersected either the Mississippi River or the Arkansas River and north until it intersected the River Jeffreon (the identity of which is uncertain). Next, he proposed that township lines (or correction lines) be marked off east of his meridian line to intersect the Mississippi River. The first correction line would be seven townships (42 miles) north of his base line and the rest would be every sixth township (36 miles) south of his base line. The correction line at 36 townships (216 miles) south of his base line would be extended west until it intersected the Arkansas River. His base line would also be extended west for an additional 12 ranges (72 miles). The correction line seven townships (42 miles) north of his base line would be extended west until it intersected the Indian boundary, which would have to be marked north from the bank of the Missouri River across from the mouth of the Gasconade River. Setting up a framework such as this would allow several deputies to simultaneously begin laying off the townships so that the confirmed private claims could be surveyed (*Territorial Papers*, Vol. 15, pg 26).

On July 26, 1815 Edward Tiffin wrote to Josiah Meigs informing him that instructions had been prepared for William Rector to survey the two million acres for military bounty lands. A meridian line was to be accurately run due North from the confluence of the Arkansas and Mississippi Rivers far enough to intersect a base line run due West from the confluence of the St. Francis and Mississippi Rivers. The bounty lands were then to be laid off from these base and meridian lines. Tiffin also noted, "*I have been assured by every one acquainted with the lower country that on account of the Inundations, the undergrowth, weeds & Flies of various descriptions, no mortal man could take the woods before October either North of the Illinois or in Missouri* " (*Territorial Papers*, Vol. 15, pg 72 & Vol. 17, pg 203).

Tiffin wrote to Meigs again on August 29, 1815 informing him that William Rector had been further directed to lay off a number of Ranges and to run the exterior boundaries of about 200 townships so that the confirmed private claims could be surveyed (*Territorial Papers*, Vol. 15, pg 79).

On October 9, 1815 William Rector entered into contracts for the surveys of the Fifth Principal Meridian, its Base Line and the military bounty lands. Prospect K. Robbins was contracted to survey "*a line due North agreeably to the true meridian, from the confluence of the Arkansas and Mississippi rivers to the Southerly bank of the Missouri river, which said line is known and termed on the annexed plat - The fifth principal meridian*" (MoSLS microfiche: 720/3286B3). Joseph C. Brown was contracted to "*survey a Base Line due west, from the mouth of the St. Francis river to the Arkansas River...*" He was further instructed to lay off a number of township exteriors south of the Base Line and east of the Fifth Principal Meridian and then to subdivide into sections other townships south of the Base Line and west of the Fifth Principal Meridian. He was also instructed to "*lay out and Survey all the confirmed claims of individuals for land that may fall or lye within the Townships above mentioned that are to be subdivided (if any there be) and lay said surveys of claims down connectedly on the plats of the Townships ...*" (*Territorial Papers*, Vol. 15, pg 89).

Fifth Principal Meridian at the west side of Township 44 North, Range 1 East where it intersects the south bank of the Missouri River on the 1853 township plat. (Courtesy of the Missouri State Land Survey)

Additional contracts were made with other deputy surveyors to lay out the township exteriors and to subdivide the townships for the military bounty lands. These deputy surveyors included: Byrd and Charles Lockhart, October 12, 1815; Daniel and John C. Sullivan, October 17, 1815; William L. May and Nelson Rector, October 25, 1815; Angus L. Langham, October 25, 1815; Stephen Rector, October 27, 1815; Thomas Cox, November 1, 1815; Elias Rector and Gabriel Field, November 4, 1815; Stephen Hempstead, November 7, 1815; and Henry Elliott, November 17, 1815. William Russell was contracted on December 2, 1815 to survey all of the private claims that had been confirmed by the

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Claims to Land and the Fifth Principal Meridian *(continued)*

Board of Revision that were located within the area being laid off for military bounties between the Arkansas River and the St. Francis River (*Territorial Papers*, Vol. 15, pg 91).

On January 15, 1816, William Rector reported to Edward Tiffin that the Fifth Principal Meridian had been surveyed from the confluence of the Mississippi and Arkansas Rivers to the south bank of the Missouri River, a total of three hundred and seventeen miles 32 chains and 76 links. The intersection with the south bank of the Missouri River was located about thirty-six miles west of St. Louis. He further reported that the Base Line had been surveyed from the mouth of the St. Francis River to the Arkansas River, a length of 84.5 miles (*Territorial Papers*, Vol. 15, pg 103). With a reference system now established, the surveys of the confirmed private claims could proceed with earnest.

SOURCES

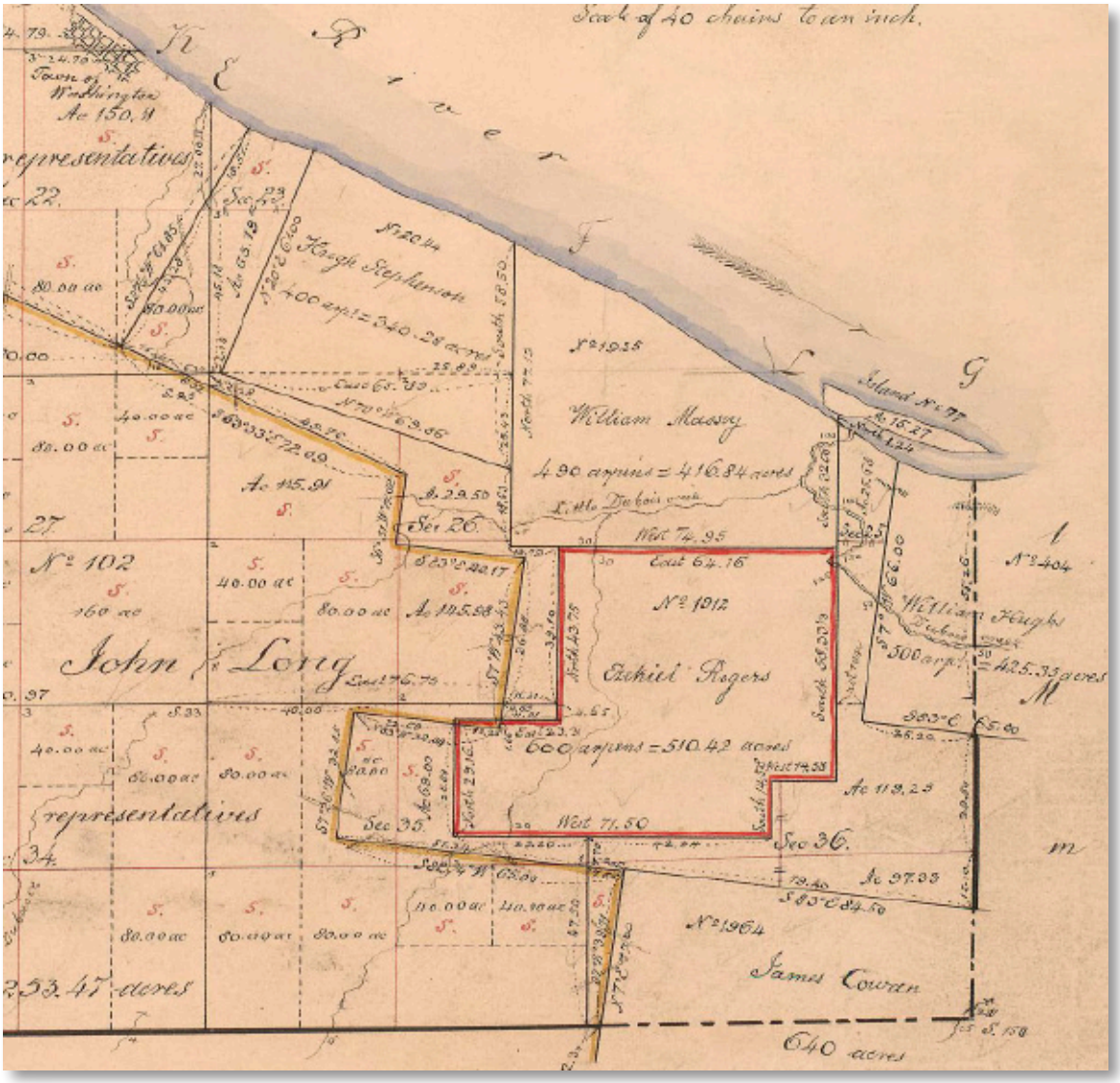
Marshall, Thomas Maitland, *The Life and Papers of Frederick Bates,* Missouri Historical Society, 1926

Madison Papers

Senate Executive Journal

The Territorial Papers of the United States, compiled by Clarence Edwin Carter, 1948

U. S. Statutes at Large



Fifth Principal Meridian at the east side of Township 44 North, Range 1 West where it intersects the south bank of the Missouri River on the 1853 township plat. (Courtesy of the Missouri State Land Survey)

Carol Payne Retires from the Land Survey Program

by Donald Martin

Carol Payne, the *Repository Section Chief* for the Land Survey Program of the Missouri Department of Agriculture retired as of the end of February, 2021. Her departure marks the goodbye of an enduring figure of the Land Survey Program, one who maintained exemplary service standards who was then called upon to lead in the development of the online ordering system surveyors used to this day. Known statewide by surveyors and the good people of our state's county recorders offices, she had been with the Program for twenty-five years.

Ms. Payne joined the Land Survey Program in the mid-1990's after a few years of otherwise, unfulfilling service with other State agencies. Always devoted to her work, which she enjoyed, too often the previous engagements found her burdened by poor management while yearning to do her part in serving the citizens of her home state. With friends being aware of Carol's talents and desires, she was approached by a fellow church member Diane Hess about a position. Ms. Hess spoke in glowing review of the agency she worked for and described the man she worked for as a "great boss." That agency was the State Land Survey Program, then part of the Missouri Department of Natural Resources, and the "great boss" was Bob Myers.

Going to work for Ms. Hess in *Document Distribution*, Carol was busied with pulling microfiche and sending records to surveyors. "I loved it from day one!" She had found her place in service to Missouri; she had found her work-home.

From 1995 to 1997, Carol worked for her friend Diane Hess. During that time, she began to learn the lore and depth of Missouri's surveying records archive from the master, Norman Brown. An icon in our state's surveying community Norman guided Ms. Payne to a thorough understanding of the treasured records who's charge she then shared with the other members of the Program's family. As were they, Carol too became an entrusted steward of those ancient archives.

Finding her work so engaging, Carol resumed her college education during her fledgling years with the Program. Dedicating herself to learning even greater skills to offer to the Program, she undertook studies in the discipline of business. When new positions were authorized for the Program, Carol's work and educational attainments were rewarded with a promotion to the *Preservation Section* of the Program. With that, Ms. Payne hit-the-road, driving from county to county throughout Missouri filming their records to add to the fiche archive of the Program's Rolla office. So thorough were her travels that Carol has the distinction of seeing and photographing every county courthouse in Missouri. That's one hundred and fourteen counties, plus the City of St. Louis.

By 1998 Carol had the college credits necessary for a degree in her initial major, Psychology & Sociology, but she continued on in the study of business to support her desire to move forward in the business of Missouri's surveying archives. Although it was jokingly said around the Program's Rolla office that a psychology degree would help in dealing with staff, Carol corrects any inferences made from such a statement by reflecting, "I always had really good staff." And have a staff she did as Carol was promoted during that time to supervise *Distribution* upon Diane Hess's retirement. Her role as supervisor coincided with her graduation with a Bachelor's degree in Business Administration.

> On behalf of the Missouri surveying community, we thank Carol for her many years of fine service. I am sure that her expertise and kind voice on the phone will be missed. Enjoy your retirement.
> - *Earl Graham, MSPS President*

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Carol Payne Retires from the Land Survey Program *(continued)*

The turn of centuries in 2000 was more than the turning over of calendar pages. It was the era of Y2K angst where the once annoyance of technology implementation became imperative. The time for a new century was a time for new ways of doing things and new ways of thinking. Change and changes abounded. The Program too was changing. Gone were the birth and development stages where the Program had to demonstrate its value in the face of skepticism. The burgeoning era found the Program mature, an established presence in the work and lives of Missouri's surveyors. It was an era which also found change in leadership since the 1997 retirement of Bob Myers. Mike Flowers had become the State Land Surveyor. It was also a time for a newly promoted and graduated Carol Payne to start making a mark.

Challenged by Mr. Flowers to improve customer service in quantifiable ways, Carol's *Distribution* team set about narrowing the gap. They met and attained a turn-around proficiency of three to five days! That is faster than third party vendors are required to ship by Amazon. Carol and her *Section* achieved that in an era when Amazon was still a bookseller!

In 2005, Carol was joined by teammates Diana Sanders and Jacque Walters. This core group were to guide *Document Distribution* for the years to come and they did so by guiding it towards new vistas and past hard times. They were a team of out-of-the-box thinkers who always sought improvement and delivered superior service. They established enhanced performance and procedural fine-tuning as expectations in their daily operations. They were even conducting their own research into technology upgrades for the Program, upgrades which would render greater benefits to Missouri surveyors.

It was during this time that a new leader from within the Department of Natural Resources, Doyle Childers listened to input from the Program's team members. On a tour of their facility, amid row after row of file cabinets and roll after roll of microfiche, Mr. Childers saw the archive for what it had become due to lack of support from within the Department of Natural Resources. It was 19th Century records housed as a 20th Century relic expected to meet 21st Century expectations. Doyle turned to the Land Survey staff and said the memorable words, "start the project!" Missouri's surveying records were going digital! The scanning began by Linda Miller and the *Preservation* team as Missouri's ancient surveying notes and plats walked the wire from paper to pixel.

Requests, research, and response were still handled by the *Distribution* staff, but it was all facilitated by the ease and speed of computer access to digital files. Missouri surveyors again were the beneficiaries. But in state government, there is a new challenge lurking behind every accomplishment. So was the case as the era of digitizing Missouri's surveying archives was followed by the decimation of the Program's staff in 2010. The Land Survey Program was required to eliminate ten positions that year, and the era of doing-more-with-less began.

> Carol has been a vital part of the Land Survey Program for the last 25 years. She has been a valuable source of knowledge and experience, and she has been instrumental in the digital transformation of the Repository Section. Although Carol's retirement will leave a huge void in the Land Survey Program, we're all very happy for her and wish her the best.
> - *Ron Heimbaugh, State Land Surveyor*

With assistance from the technology staff within the larger Department, Payne guided the development of the automated system of online records we have today. Literally working her way out of a job – the *Distribution Section* was to cease existence upon completion of the automation project - Carol was instrumental in the creation of access and retrieval on demand by customers online. It was done by 2012 and it continues to this day. She recalls the development as a "tough two years", but surveying customers know it now as a tried-and-true system year after year.

So now, this devoted public servant will go on to other endeavors. She will be a dedicated fan on the sidelines of her grandson's soccer games, a last-minute baby sitter when plans haven't gone as planned, a traveler to reunions of family and friends which have been put-off too long. These happy things elicit happy thoughts for Carol, and it is happy times ahead. But with the happiness of retirement is the sadness of departure. "Bittersweet" she calls it when referring to saying goodbye to the people and mission of the Land Survey Program.

While free now to see, serve and share with family, her family, it is a family she leaves. A family of friends and colleagues. In reflection she waves goodbye. Gone to the archive of memory is the steady hand of leadership from

one she will always call "Mister"; Mr. Myers. Gone is the tutelage of Norman Brown; "It's awfully simple if you know what your doing, and simply awful if you don't." Gone is having been one of only three employees to have served all four State Land Surveyors. Gone are the times she worked diligently alongside Jacque, Diana, Linda and Christy. Leaving more than them, Carol too leaves a legacy. One of energy, enthusiasm and innovation. And Missouri surveyors were the beneficiaries.

On behalf of the Missouri Society of Professional Surveyors, we wish you well Carol Payne. Thank you for your twenty-five years of dedicated service to the program and Missouri's surveyors. Thank you more for your contributions to our success, your help with what we do, your pleasant demeanor in the face of our demands, and your smile. Mostly for you smile. Keep that with you, and we will keep you, in memory, with us, always.

To all my friends and colleagues,

With the joy of retirement comes a sad reality that I will no longer have the day to day contact. The friendships I've made with LSP staff and our surveying clients will last a lifetime. Missed will be the challenge of researching "hard to find" plats, the pleasant phone calls, and our in person meet ups at MSPS meetings.

As for the LSP staff, they will remain dear to me. More than coworkers, they are extended family. I will miss our picnics, lunches and camaraderie. Particularly, my "girls" will be missed; Jacque, Christy, Misty. You made my job easy. It was my pleasure to have shared our service together. To the four gentlemen I worked for, our State Land Surveyors Robert E. Myers, J. Michael Flowers, Darrell Pratte and Ron Heimbaugh, accept my "thanks" for your guidance of the Program.

As I close this chapter of my life, I say not "good-bye" but "see you later". It's time for me to ride off into the sunset, travel and visit grandkids.

- Carol Payne

Retracing the Osage Treaty Line

by Joe Clayton and Don Martin

In 2016 I was a proud participant in the Missouri Society of Professional Surveyors activities honoring the bi-centennial of the survey of the Osage Treaty Line by Joseph C. Brown. The Osage Treaty Line was imagined in treaties between the Osage tribes and representatives of the United States to be the boundary between the Missouri Territory and lands of the native peoples. With terms being agreed upon in 1815, a line approximately twenty-two miles east of the current Missouri-Kansas state line at the junction of the Kaw and Missouri Rivers was to be the western extents of the Missouri Territory. Chosen as the base for the line was Fort Clarke, now Fort Osage on the south bank of the Missouri is where the Line commenced. It was at the Fort Osage National Historic Landmark and its built replica of 1812 Fort Clark where MSPS members gathered in recognition nearly five years ago.

Placed at the site that day was a commemorative "Indian Line" stone. MSPS has gone on to commission and place a placard near the stone telling the story of the Osage Treaty Line survey. That survey started in 1816 at the behest of Surveyor General William Rector who engaged Joseph C. Brown to survey the portion of the line extending south from Fort Clark. The 2016 commemoration also included the setting of a replica stone on the Line near Stark City in southwest Missouri. The positions for these commemorations resulted from ties made during subsequent General Land Office surveys, laying the ground work for the general "path" of the Treaty Line. But, no evidence of the actual Brown survey was found! I was left to hauntingly ponder if there was still something out there; something "touched" by Brown and his party. At each mile he placed a Milepost and left a mound. I wondered if I could recover any of the mounds.

The small, pink square northeast of Independence is the "Fort Square", an enclave around Fort Clark, designated by treaty in 1809. At the Fort in 1816, Joseph C. Brown established mile point Zero of the Osage Treaty Line at a red oak overlooking the Missouri River. From that point, Brown would survey the Line (here in green) south which runs just to the east of Butler, Nevada, Carthage and Neosho.

Unable to completely walk away for the Line, I never stopped researching and reading records from the GLO surveys which came along in the years after the Treaty Line survey. In Townships 46 and 47 between the current towns of Pleasant Hill and Strasburg in Cass County, every Treaty Line Milepost was tied to sections corners established by the GLO crews. There was the chance for recovery. But further work in that vicinity revealed errors in the distances along the Treaty Line. I would go on to find such errors existed all along the Line. Hopes of finding any of those ancient mounds seemed even more unlikely. But I couldn't let go. I continued turning to GLO plats, and looking at an overlay of the Treaty Line's path on Google Earth. I was intrigued. Intrigued by a treasure hunt that if nothing else offered personal satisfaction…and the recovery of history.

Working for the Joplin office of Anderson Engineering, I took on a number of out-of-town projects in 2019. These projects meant a lot of nights away from home as a hotel guest. While home is where the heart is, it is also where most of life's distractions are. Despite the call of the rockin', good-time surveyor's nightlife beckoning me while on tour, I devoted my hotel evenings to my hobby of finding the Osage Treaty Line. I could focus and continue my research. But the same problems of distance errors quelled every hope for a locale which may reveal a mound. I scoured the records for some manner of evidence which was not dependent upon GLO surveys and distance calls along the Line. What was needed was a natural feature call. The records were full of them. Chain and link citations to the crossing of waterways. Field notes taking inventory of terrain and habitation. I looked among them for something significant to lock on to. There was just such a call. At Mile 218 and 71 chains, Brown noted "*An extensive cave did not explore it*."

The Map and the Method

Among the great benefits of this Twenty-First Century life is the convenience of carrying a research library with you everywhere you go. Accessing mine each evening in my hotel rooms, I had taken to the internet as something of a "next step" to shore up my research. Recalling Brown's call of a cave just beyond Mile 218 I broadened the data sources for my search. On the website of the Library of Congress, I found old USGS maps. Old information becomes new again when everyday it seems someone pulls something from an archive, scans it and puts it out there to be found. Narrowing my search to Washington County Arkansas just south of Fayetteville in the vicinity of Mile 218, I found old information becoming new to me. On a geological survey map from 1888 intended for cataloging mineral wealth to be found in northwest Arkansas, there were plotted many caves. Surely the subject of Brown's call was among them, but which?

Through the internet I reached out to spelunkers of that vicinity. They excitedly connected the Brown cave to their Fancher's Cave, famed for its use saving the county records during the Civil War. While it did fall in the same general latitude, their renowned cave of Southern lore was too far east by four miles. From calls by Brown for crossings of the West Fork of the White River with the cave being between those calls, the grotto I was seeking rested near present-day West Fork and Greenland, Arkansas. I needed to scale dimensions on the GLO plats to start shedding the layers of this mystery. I needed a map.

Compiling hardcopies printed from digital records of GLO plats, I went about piecing together an extensive paper map along the course of the Treaty Line. I was going old school! Taping segments together offered some geographic relationships, but my 11" x 17" prints were of varying scales. I resolved my inconsistent scales by localizing my measurements within a given map segment. Taking a sheet of paper and using a side as a straight edge laying along a plot of the Treaty Line, I would "zero" the calls starting at a recognizable feature from the field notes. For the cave vicinity, I began with Brown's call on the south bank of the West Fork of the White River. Cited as

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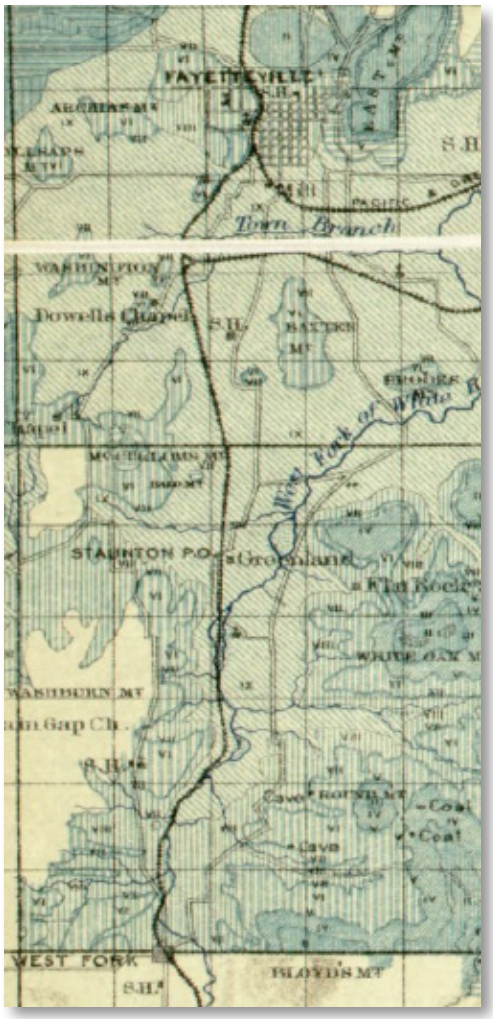


From Brown's notes, "An extensive cave did not explore it." Here plotted on the 1888 USGS survey map from the Library of Congress online archive.

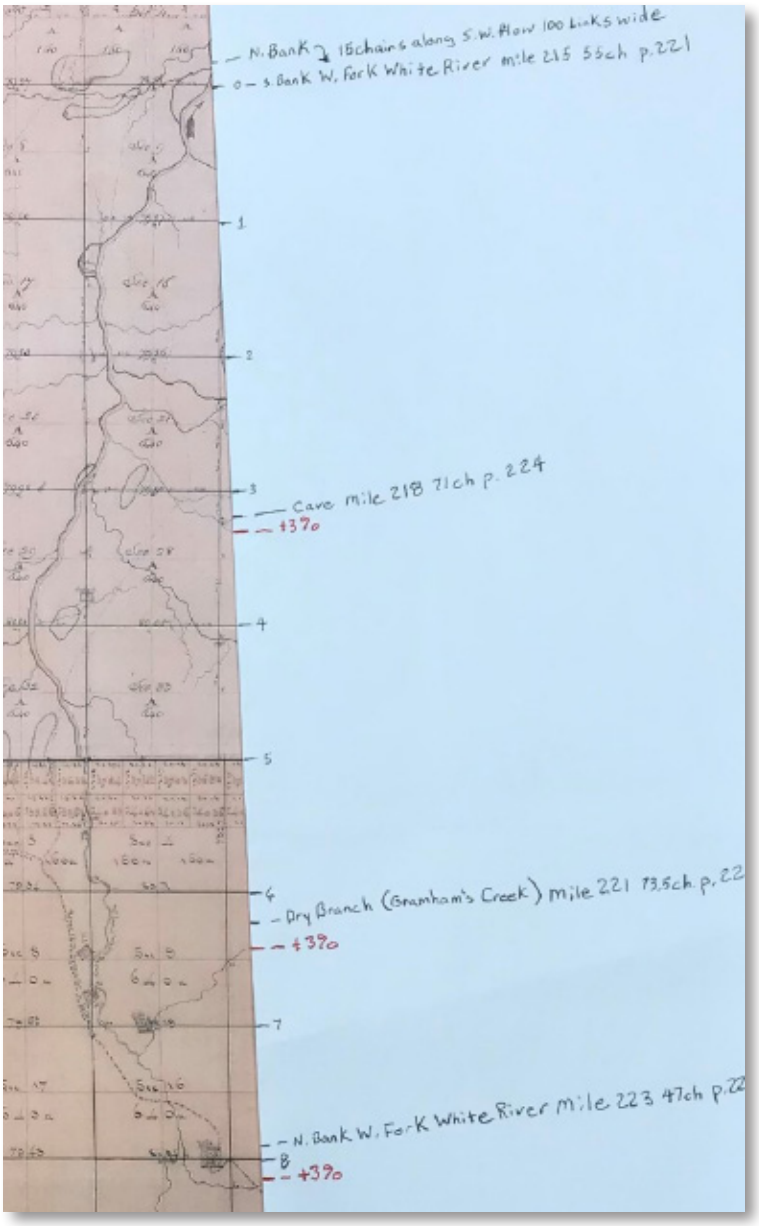
Retracing the Osage Treaty Line *(continued)*

Mile 215 and 55 chains I equated it to 0. Next, I scaled the miles down my paper straight edge. This was followed with my plotting of Brown's calls along the paper scale, included adjusted calls accounting for a 3% overage found in our computations of Brown's measurements.

My theory was I could wedge my scale into only one location on the GLO map and that should lead me to the correct cave shown on the 1888 USGS map. This would give me a redundant check on location and a surety of being in the correct location. Sliding the paper scale into place it became clear almost at once that the cave shown on the 1888 USGS map in the Northwest Quarter of Section 27, Township 15 North, Range 30 West of the 5th P.M. was the cave from the Osage Treaty Line survey.

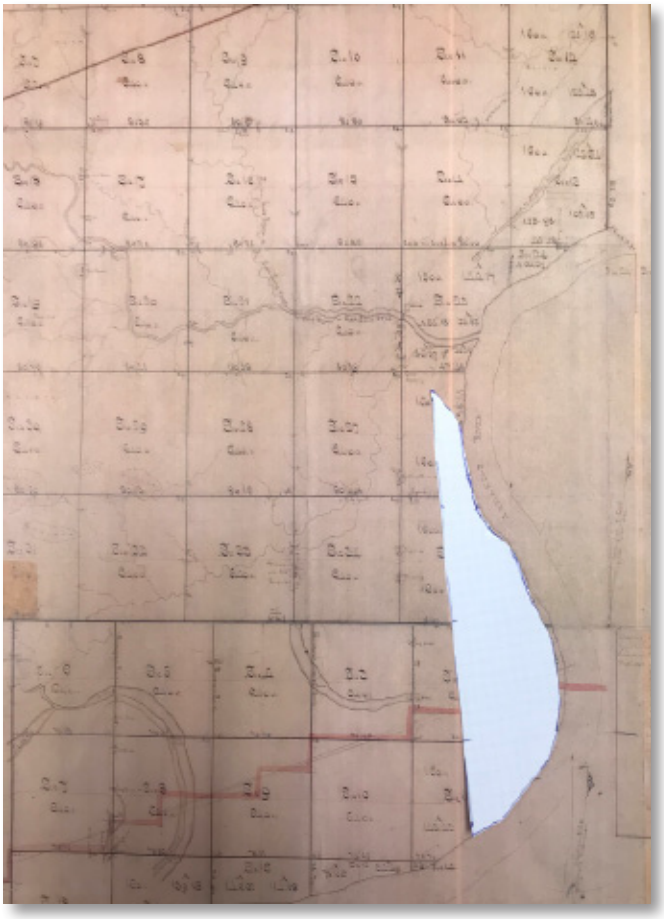
I was pleased. Although I had yet to recover any indication of Milepost, I now had something to be pleased about. I had my method. My paperbound localization of prorated scaling between natural feature calls of Brown would guide me to locations to "try". *The map and the method* were key to moving forward in this treasure hunt. I was enthused. My newfound enthusiasm was too much to keep to myself. I started by reporting my "find" to Stan Emerick. The guiding force of the MSPS's commemoration of the 1816 survey of the Osage Treaty Line, Stan had become a mentor to my retracement efforts of this historic survey. From then on, I would annoy anyone who came near me with my map and scale. The touting of my map and method culminated with a friendly yet exasperated admonishment muttered by my good friend Jim Herre. It was Jim who was my partner in field recovery of the Line. As I was wearing out anyone who would listen at that year's Southwest Chapter annual picnic, I pushed aside the potato salad to unroll my map. Jim then softly quipped to my son, "your dad has that damn map out again!"

My excitement at this point was all well and good, but I knew there was more to look at beyond the cave. Over 250 miles more. Then it hit me; I had needed the 1888 USGS map in Arkansas because there were no USPLSS ties to the Osage Treaty Line in Arkansas. Missouri on the other hand had more than a dozen ties all plotted on the GLO plats maps. If I could plot a course on paper at the cave location why couldn't I do that for the whole line? Knowing that each water crossing and natural feature Brown called would be within a mile of two milepost with mounds, I realized any linear error would be under 100 feet localized in this way. To do this I would need to be able to scribe a straight line on the GLO plats to be able to scale from the Brown calls and mileposts. To apply more of my method, I needed more map. With that realization, I bought a ream of paper and a three pack of double-sided tape. Then I set about printing, cutting and taping GLO plats. I was piecing together what would become a map of more than thirty-seven in length.



The paper scale with Brown's calls. Note the "cave" citation in the middle of the image. The paper scale's straight edge is lying along the plotted Osage Treaty Line south of Fayetteville Arkansas.

Scribing the line across the Missouri portion of my map was easy. I simply followed the GLO plat ties to the Treaty Line. But Arkansas was to be a little harder. Sure, I had the cave location but I had yet scribed a line on the GLO plats covering Arkansas. In the case of the cave vicinity, I had merely laid my scaled calls on top of the plat. To draft scribe the Treaty Line I looked at Brown's meander calls near the Arkansas River in Townships 8 and 9 North, Range 30 West. Again, I used a paper scale and applied my method. I started on plain paper plotting the meander's and calls from the milepost. Replicating the courses of Brown's calls in a manner akin to a dot-to-dot puzzle I closed this paper traverse back on its beginning point, forming a nice polygon. Cutting the polygon from the paper as a seamstress would cut a pattern, I then overlayed the shape on my map. It fit like a glove! There, along the left side of my paper polygon being a straight edge, I then scribed the potential Treaty Line on the Arkansas portion of my map.



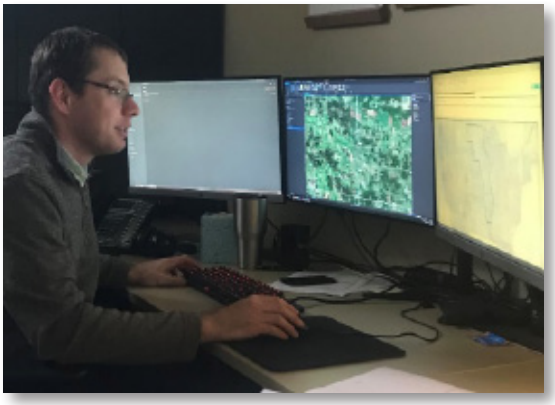
The "nice polygon" fitting in place. The left edge is where I scribed the Treaty Line. That is the Arkansas River winding along the right side of the polygon (Brown's meanders), approximately 15 miles east of Fort Smith.

It was then the waning days of the summer of 2019. The closing of summer means two things to surveyors: temperatures that are more comfortable for physical labor, and tree canopies dropping the leaf covers to create favorable conditions for GPS signals and sight lines. It was time to prep for a fall in the field.

Talent, Tech and Tools

The approaching fall was coming amidst the usual bundle of "paying" surveys I had going on behalf of Anderson Engineering. Retracement of the Osage Treaty Line was not among those projects. Recovery of the line was a volunteer effort I had undertaken starting with the 2016 MSPS commemoration of the Line's survey. There were others who contributed then, but I was not ready to walk away once we had set our replica stones and held our public outreach events. I wanted to touch Brown's work. So, I continued the volunteering.

This meant the field recovery portion of my work would occur on my time. Mine that is, and that of anyone willing to join me. But my employer's at Anderson did extend invaluable resources to aide in my new weekend hobby. Without much prodding and provocation (I would have been willing to beg!), they offered support in three critical ways – talent, tools and tech. Next then, I turned to the talent!



GIS Specialist Scott Wagoner of Anderson Engineering in Joplin, Missouri.

Over the more recent course of my career, that being since the year 2000 (it just sounds too epic to refer to it as "the turn of the Century." Even more grandiose is to say my career has spanned into its second Century – but its true), I had become a pretty fair user of GIS technologies and processes for surveying. Though a user and champion of geographic information I did know the limits of my own expertise. I also was feeling the limits of my 37' paper map and the collection of digital GLO plats in my computer. It was time to overcome these limits by recruiting the talent. The "talent" in this case was Scott Wagoner, GIS Specialist from Anderson Engineering's Joplin office.

(continued on next page)

Retracing the Osage Treaty Line *(continued)*

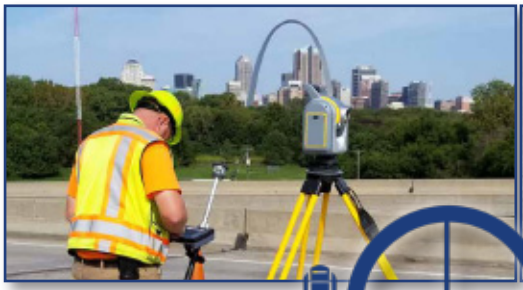
I had previously partnered with Scott in what may be the most prevalent form of surveyor and GIS'er unison, asset management. As is the case for such projects, I as the surveyor was data acquisition while the GIS Specialist was the analysis. Together, we made it work and got our clients geospatially organized. Having seen first-hand the creative and technical abilities Scott could utilize, I sought to have him share similar skills for my surveying search. We started with me telling him what I sought to achieve. Then, I unveiled "that damn map." The 37 footer unspooled its way to Scott's feet like a red carpet before a visiting dignitary, and he knowingly smiled. Instead of mocking my homespun collection of linework covered with scribed 19th Century cursive, Scott intuitively saw it for was it was. It was analog GIS. Knowingly, he merely asked for a coordinate file and a file path to the GLO plats. In a matter of minutes he delivered digital file sets of geo-rectified aerial imagery with overlays of GLO plats. My map and my method would now be moused!

Having tapped the talent, I next gathered the tech and tools from the inventory of Anderson Engineering. As I had on the asset management projects, I would be coupling an IPad with a GNSS receiver accessing corrections on-the-fly through the MoDOT Real-Time Network. Onboard the IPad was ESRI's ArcMAP Collector with which I would view the aerials with GLO plat overlays. Along with the GLO linework, the images were overlayed with estimated line and milepost positions along the Treaty Line. These "try" positions were plotted from calls made from the GLO surveys to the Treaty Line. These calls were made by the crews led by the sworn deputy surveyors establishing the PLSS in western Missouri. The coverage area of these calls was along the Treaty Line from the vicinity of Lone Jack, Missouri 20 miles southeast of Kansas City to Newton County, 20 miles southeast of Joplin. In 2016, past MSPS President Robert Ubben and tagged coordinates onto the perpetuated PLSS corners on each side of the presumed Treaty Line course south of Lone Jack and through Cass County. The Ubben measured coordinates on these corners were the basis of the digital path that was the projected Treaty Line in my GIS layers.

21st Century aerial image with 19th Century GLO plat overlay. The "digital path" of the Osage Treaty Line is the black line running north-south with the black circles being "calls" of PLSS crossings of the Treaty Line and nearby Mileposts. The GLO overlay is from the 1827 plat by Mcree, representing the 1821 survey by Silas Rector. The Treaty Line here splits Sections 24 and 25 of Township 47 North, Range 30 West of the 5th Principal Meridian in southeastern Jackson County near Lone Jack, Missouri.

Along with having images and projected positions as waypoints, ArcGIS Collector would more importantly be my data collection platform. I would capture positions of mileposts and mounds by tagging coordinates with a Trimble R2 RTK Bluetooth connected to the IPad. The 21st Century positions would become part of the record for the remaining milepost mounds I could recover as well as field verified positions in a new GIS layer I would create. These verified positions would then allow me to refine my waypoints for addition recovery of Osage Treaty Line milepost and accessories.

(continued on page 26)



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Retracing the Osage Treaty Line *(continued)*

At that point I was more than ready. I was armed with the original field notes, the path scribed on a GLO Plat map, the perpetuated GLO ties and field work used to create a digital path. It was time to hit the field and begin a surveyor's journey through space and time. If things went the way I hoped, the backroads I was to drive would turn to ancient trails, the ties plotted from current corners would lead to GLO call ties from 1820, and forgotten mounds would rise from the ground. In 2019 I integrated historic records with the survey and mapping technologies of GPS and GIS and set out to bring to bear my modern advantages on this 200 year-old survey.

To the Field

It was now the middle of October and there was perfect weather for walking around western Missouri woods. Although the weather was perfect, my timing wasn't. I had but three weeks for field work and then the woods would fill with deer hunters. There was also the matter of doubt; my own, haunting doubts. You see, this was not my first attempt of field recovery of the Osage Treaty Line. The 2016 memorial event of the original survey's bi-centennial found me surveying for the placement of commemorative markers of the line. At Ft. Osage on the south bank for the Missouri River, Robert Ubben and I covered a little ground for the purpose of placing a replica stone. With the help of Bob Shotts from Lebanon, I preceded the festivities at the Fort when he and I followed the GLO calls to mark a southern commemorative point near Stark City in Newton County. But neither site included recovery of actual 1816 survey marks. I always felt the commemoration would not rest as completed until mounds from the actual mileposts left by Brown and his men were found.

My doubts were also compounded from what I referred to as a previous "failure" on my part of find field evidence from the original survey. In 2017 I made a feeble attempt at recovering of the Treaty Line. But this attempt was not founded on thorough research and it certainly did not reflect diligence on my part. Presuming there was to be an easy route to recovery by following the GLO calls to the Osage Treaty Line made by the GLO surveyors coming to the region five years after Brown, I looked for a simple, quick retracement of milepost mounds just waiting to be found. Since there appeared to be many surveyors' calls made from the PLSS to the Treaty Line along a stretch from Milepost 25 to Milepost 30, I made my first search there. Just south of Lone Jack in Cass County, about four miles east of Pleasant Hill, I weakly made a soft attempt at finding the Line. But I was making a fundamental surveyor's mistake. As a surveying novice might explicitly follow the calls of a deed instead of retracing evidence of a boundary, I traced the old calls instead of seeking and stepping in evidence of Brown's footprints.

Not finding any prospective evidence in the field that 2017, I walked away defeated. I allowed my hopes to be crushed with my pitiful performance of "none and done." But later I recovered and resolved to give a serious effort. From that defeat I regrouped and began laying the foundation of what would lead to making my *map* and finding my *method*. I would then progress to finding the talent and gathering the tech and tools. It was my lack of success in 2017 which set the stage for a figurative and literal recovery in 2019. I moved past the doubts and embraced that perfect weather. But where would I start?

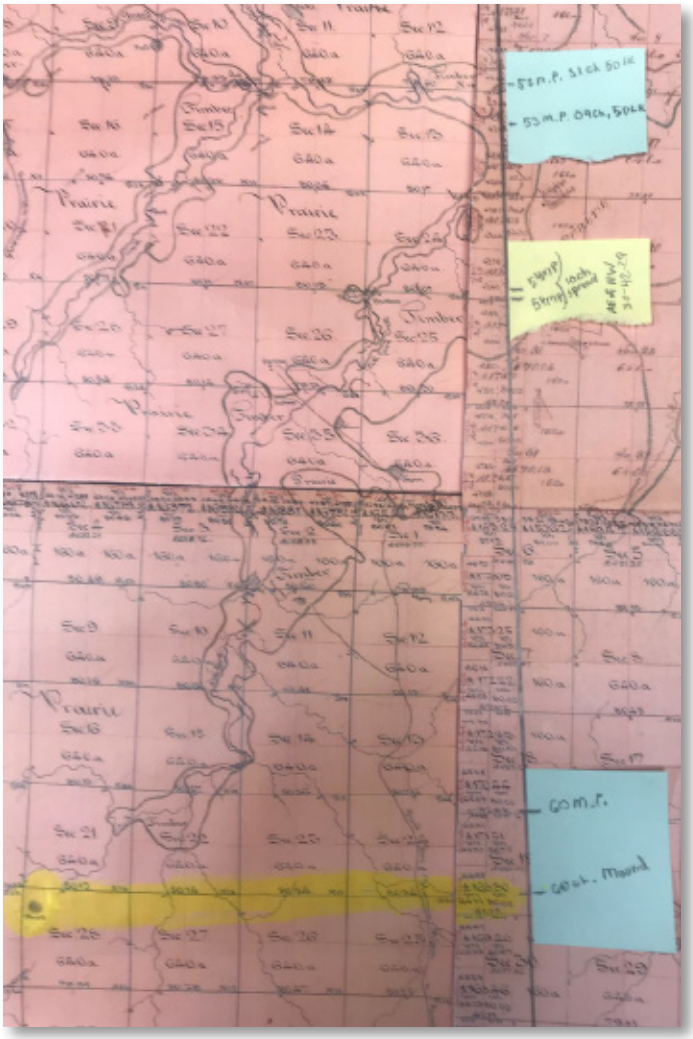
The original field notes by Brown from 1816 were my first guide. Brown was always a dutiful scrivener of the facts as he found them in the field, but the Osage Treaty Line notes were monotonous in their mile-by-mile tally of his journey south. But all I recalled from those notes were repeated citations at each mile of "Raised a Mound." Raised Mounds…mounds that would have survived over one hundred years of agriculture, cultural migration, weather and the regular heave and thaw of prairie soils. Mounds lost in the expanse of western Missouri prairies. Prairies! Along the course of the Osage Treaty Line, Brown did more than record chains measured and mounds raised. He also

For the notes of Joseph Brown's 1816 survey of the Osage Treaty Line to be understood, contemporary readers need to be aware of his milepost naming convention *versus* the linear mileage along the Line. For a point of beginning, Brown commenced his southerly trek from a large red oak tree on the south bank of the Missouri River. The oak was just north of Fort Clark and in solely linear terms it was to be his starting place, his "zero" point for subsequent measurements along the Treaty Line. The zero point was also the first milepost, and as such it would bear the name of the first; a first is named One. So, point zero became Milepost 1. Milepost 1 was zero feet (or miles) from the beginning of the Osage Treaty Line. Thus, one mile south of the zero point is the second Milepost and it is named Milepost 2. Although, it is but one linear mile from the zero point. Repeated along the full course of the Treaty Line, my search for Milepost 55 would be near a locale which was 54 nominal miles along the Treaty Line. So is the case at every one-mile interval where all milepost proper names are "one" greater than their corresponding distance from Fort Clark.

noted conditions as they were, making something of an inventory of terrain and natural features. More that mentioning his water crossing, he noted where his crews worked their way through stands of timber versus stretching their legs with long strides upon open prairie. The GLO surveyors following him in 1821 did the same thing. And these notes were plotted onto the plats. The very plats I had as an overlay to my digital path.

Quickly loading my aerial images under the linework of the GLO plats, it was revealed that human and natural activity of 200 years had not left western Missouri unchanged. But along the vicinity of the Treaty Line, there were multiple locations where it appeared that the 2010's looked a lot like the 1810's. There were watercourses now where there were surveyor crossing then. There were pastures and stubbled, open fields of soy beans and corn where ancient draftsmen plotted prairies in the 1820's. And between the rivers, creeks, draws and prairies were bushy, dark green images of trees in the 2000's. In some places, the bushy, green areas matched-up with the old, cursive notations and lines from the GLO plats. The notes read "timber", and the lines traced the edges of that very timber.

If there were mounds to be found, the best hope for their continued existence would lay in those undisturbed zones of timber. It was there, free from threat of plough and erosion where any evidence of a few men spending a few minutes mounding dirt and stone into a little pile may still reside. It was in those places where I might touch just what Brown had touched in 1816. Scrolling across the aerial images on my computer, one such matching area where ArcGIS polygons lined up with GLO plat lines was near the vicinity of Mileposts 53 through 55. In that brief, terrain-matching stretch came an interesting correlation with a comment left by Brown in his original field notes. Here he broke the monotony of his mile-by-mile comment of "Raised a Mound". A glorious exception was there to be read in his notes for Milepost 55. It was there Brown recorded, "Raised a Sm. Mound of Stone between 54 & 55." A mound of stone was a mound more durable for two centuries. It also plotted where undisturbed ground of the 21st Century aligned with undisturbed ground of the early 19th Century. It was there I would be that next weekend.



The yellow note on my 37' mosaic of GLO plats is for Milepost 54, the first original survey accessory I found on the Osage Treaty Line. Near the bottom of the image is where Brown noted, "At 60 Ch in this mile are large Mounds West. Nearest of which is 3 ¾ Miles distant." In 1827, GLO draftsmen plotted the Mounds West in the northwest of Section 28, T41N, R30W. That mound can still be seen today from Route D in Bates County, 7 miles northeast of Butler, Missouri.

On October 19th of 2019, I set out for Milepost 55 and vicinity; I set out for the Osage Treaty Line. I was headed for a stretch of woods two-miles long on the aerial images of my GIS base map. There I hoped to find the "Mound of Stone". This notation was further augmented in Brown's records by his citation of natural mounds at some distance to the west in his 60th mile, *which read* At 60 Ch in this mile are large Mounds West Nearest of which is 3 ¾ Miles distant." Traveling from my home in Joplin, I made my way north to Adrian, Missouri and then nine miles east to a locale about two miles south of the South Grand River in Bates County. There, in Township 42 North, Range 29 West I started in earnest my search for Brown's Line. Getting there, I was driving on county roads which I had already traveled numerous times from above when on those hotel evenings I planned by gazing down upon aerial photographs. My modern trail maps. Topping a hill on the road I came upon a whole family at work on the land. Believing I was near to my destination in Section 30, I called on the members of this family. They informed me the ground they were working was the land of their parents.

(continued on next page)

Retracing the Osage Treaty Line *(continued)*

It was then a little less than a two-hours since my dawn departure and the drive had passed without incident. I was ready for an incident then. If my map, my method, the talent, the tech and the tools were all right, I was where I needed to be for an incident. For the recovery of a *mound* at Milepost 55. I suspected the milepost mound, if still in its place since 1816, would be south of the working family's land. On their neighbor's property it should be within 10 chains of their common fence. Cautious about entering onto land without first consulting current owners, the working family phoned and left a message on the neighbor's voice mail for me. After hanging up, they assured me I need not worry and I was free to help myself.

Setting aside my IPad and GPS receiver, I turned to the proven technology of dowsing. With all the confidence of a water witch in a drought, I took gentle hold of my properly spec'ed and tuned wire coat hangers. Under the watchful and bewildered gaze of the working family, I took determined walking steps to repeatedly cross the ground vicinity which coincided with the ArcMap display on the IPad. I wasn't getting the expected scientific reaction of the wires turning across one another as I intersected what I presumed was the ground position of my digital path. Widening my search area, I walked to the west and then…aha! The wires crossed (yes, with this "technology", crossed wires are a literal good thing!). Standing there with my crossed wires, or more properly, my activated sensors it looked as though I was not on the line shown on my map. I fired up the GPS and synced with the ArcMAP Collector application on the IPad. After a moment of visual ground truthing and comparisons between verifiable features on the digital image, I saw my problem. The ground features and the georeferenced photo were "off", shifted away from there proper alignment along east to west offset of about 200 feet. By my visibly confirmed location of observable features on the ground, the realignment of my computed line along the east to west shift, and the finding of the "earth flow disturbance" which caused the witching wires to cross as my steps bisected the ancient path taken by Brown and the chain his men pulled along and over the ground, I could then synchronize all of my data sources. Everything would now be lined up with my digital line, my aerial photographs, my GLO plat overlays, and the magnetically attractive chained line all in place and related to one another. Everything was now on order and straightened out. Everything that is except the opinions of the seemingly startled family of on lookers. I am pretty sure their collective sentiment was "he's lost his damn mind!"

Now having the path aligned, it was time to venture into the woods towards my estimated locale of Milepost 54. Stepping over a fence and then proceeding no more than 20 to 25 paces, I saw it! Stopping to stand in stunned silence, I peered at the rise in the ground among the small hickories. Before me rested a mound. Slowly and for some reason softly, I took a short walk encircling the small earthen knob. In this wooded stroll about the artifact, I not only marveled at my find; I also was scanning the surrounding woods for any evidence which could explain the mound's presence in this place. Any evidence that is, which would indicate the mound was <u>not</u> an Osage Treaty Line milepost mound. Take a shot you dummy! screamed the inner surveyor of my conscience. Put some numbers on it! I promptly tagged the mound with a quick GNSS observation. I then framed the mound for photographs by surrounding it with lathe and a board bag. Anticipating that my 2 ½ foot lathes would also give any images a sense of scale, I went on about my picture taking.

At Milepost 54, Brown's crew left this in 1816 where they "Raised a Sm. Mound of Stone between 54 & 55."

Seeking further affirmation that what I had was one of Brown's mounds, I recorded and plotted my observation. I then compared my observed values to the alignment of my digital Treaty Line. Being 0.47' west of my calculated line, the alignment looked good. As for linear placement along the course of the Treaty Line, my discovery measured 53.131 miles. So there at Milepost 54, being 53 miles from the zero point, things were 691.68 feet too long. Although a furlong and half a chain does not sound close in today s world, I thought I was onto to something. After all, 10 ½ chains of excess over a course of 4,240 chains was less than 0.16' per pull

of a 66' chain. In 1816! I think I had a mound from 1816 for Milepost 54. I think I had something "touched" by Brown.

I realized this was but one mound, and more were needed to convincingly verify the Osage Treaty Line. I also recalled an adage from Missouri's own Norman Brown, the living Ol' Sage of surveying. Whenever a surveyor too quickly or too easily affirmed the lineage of recovered archaic evidence of an ancient survey, Norman Brown would point out that, "even a blind hog can find an acorn now and then." I knew I needed to find more mounds. But the next day was my birthday. I needed to share the news and photographs with everyone I used to bother with "that damn map." I needed to go home. But come the next weekend, I would be back at it. As far as I was concerned, those woods were full of acorns, or a least one per mile, and I was going to find some more!

After a birthday weekend where I certainly got at least one gift I wanted (that gift being the mound at Milepost 54), I consulted with my GIS partner Scott Wagoner. Anxious to hear how I fared, and celebration the two of us may have shared rapidly found Scott getting back into problem solving mode as I described my field visual orientation verses that orientation on the map. Understand the dilemma of the almost 200' east-west shift, he described how he could develop a suitable constant to move the alignment if only we had more monument positions to work from. The corners we had tied-in showed about 168' between our GLO "Frame Layer" and the observed locations. Now, with the first mound found our enthusiasm was up.

This progress fueled me to devote extra time in my research evenings trimming GLO plats digitally. Scott then took these refined images and over-laid them into the already existing GLO Frame Layer like stitching a quilt together. His placement of these 19th Century maps into the contemporary digital world was a key piece of solving the puzzle. Scott surely did his part, and I would next do more of mine. I needed my field observations and the GLO plats on the same reference frame. Only then could I move beyond my paper map and develop more precise search locations. I needed to locate more field evidence of the citations Brown made in his notes of features along the course of the Treaty Line. I needed to recover more mounds.

The following Saturday found me one mile south of the Milepost 54 mound I recovered the previous weekend. Still in that undisturbed stretch of terrain in its wooded cover, I resumed my search. I may have moved around the timber like a blind hog, but another acorn of a mound was to be found. Brown's crew had left a mound at Milepost 55, and it was there. Indeed, it had grown a bit, enlarged under a cover of modern world debris. My trek through those woods was coinciding with the graphic display on my IPad. The computed point displayed in ArcMAP Controller was being approached by the graphic crosshair. The graphic crosshair was moving with each step I took. Then as the trees seemingly cleared and the terrain descended towards a low point, I saw another mound. The next mound. My second mound. Near where a milepost was to be, where Brown noted a call to his crew piling a mound of stone, was a mound. But now the mound of stone was also a mound of garbage. It was truly a case of one man's trash being another man's treasure. It was my treasure, left there 200 years ago, for me to touch. Milepost 55 was "found" and a measurement was taken. I was on the Osage Treaty Line.

Debris of our modern world atop the stone mound raised by Brown's survey crew in 1816. This would be Milepost 55 of the Osage Treaty Line.

Retracing the Osage Treaty Line will continue in the June issue of *Missouri Surveyor*.

The St. Louis Maker, A.S. Aloe & Company *(continued)*

a whisky wholesaler before prohibition. Howard and Isabel were married in 1926. Howard graduated from Princeton and worked for his uncle in Charleston, West Virginia until Louis' failing health brought Howard and Isabel to St. Louis in 1927.

After only 24 months on the job, Howard found himself as head of A.S. Aloe & Company, with the death of his father-in-law, Louis Aloe. Faced with the responsibility of a large successful company at the onset of the Great Depression, Howard said, "I was scared to death...I worked like hell and cut the budget." And cut the budget he did. By 1930 he had sold all departments except the surgical supply. The medical supply unit went on to become national in scope and eventually merged with the Brunswick Corporation in 1959.

Thus ended the largest and most notable supplier of surveying equipment in St. Louis. A.S. Aloe & Company fell victim of the Great Depression, along with many other corporations large and small.

About this Article

This article is a summary of A.S. Aloe & Company. It was partially taken from "The St. Louis Makers of Surveying Instruments Since 1830" by Hugh Parsons, PS and Dick Elgin. That article was written in 2000 as a part of Hugh's BA, History from Missouri University of Science & Technology (Rolla). Dick is a researcher of the early American makers of surveying equipment and collector of same.

ALOE COMPASS TO BE RAFFLED BY

SOUTHWEST CHAPTER AT THE ANNUAL MSPS MEETING

TAN-TAR-A RESORT, LAKE OF THE OZARKS IN OCTOBER

This compass is marked "A.S. Aloe & Co. 7567, St. Louis". It has folding sights (an unusual feature) and an outkeeper. The serial number records for Aloe are not extant, so the date of manufacture for this compass is unknown. The instrument is from the collection of Dick Elgin. The custom box was built by his late father, Bob Elgin.

Miller Wenhold Capitol Strategies Announces John M. Palatiello & Associates, Inc. Rebranding

NSPS, January 28, 2021

Miller Wenhold Capitol Strategies, LLC

GOVERNMENT AFFAIRS AND GRASSROOTS ADVOCACY

Miller Wenhold Capitol Strategies, LLC, a leading government relations and association management firm serving a diverse portfolio of clients, announced it is rebranding its corporate identity in completion of its acquisition of John M. Palatiello & Associates, Inc., which provides government relations services to NSPS.

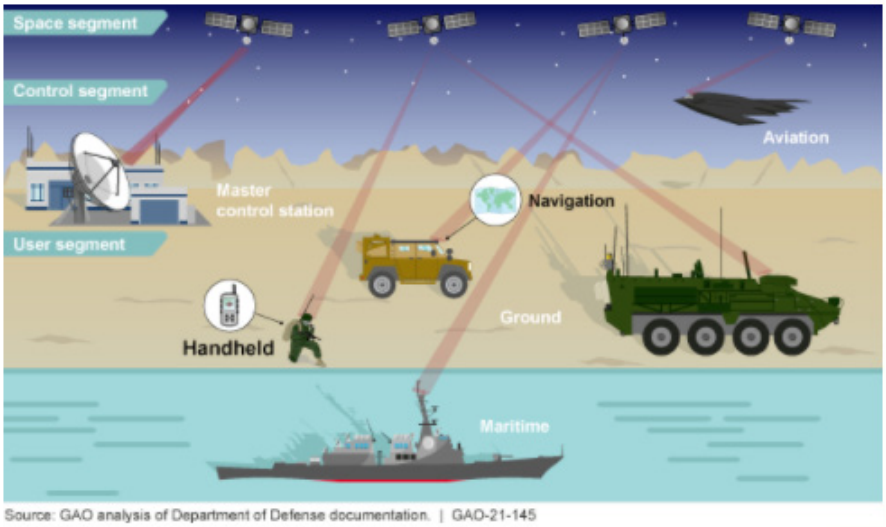
The National Society of Professional Surveyors (NSPS), has undergone new Lobbying Disclosure Act filings under Miller Wenhold and will enjoy a seamless transition to their representation in Washington, DC. All of the firms' lobbying and government relations activities will be branded and marketed as Miller/Wehnold Capitol Strategies, LLC.

DOD Developing New Jam-Resistant GPS Capability

NSPS, January 28, 2021

A recent Government Accountability Office (GAO) report found that the Department of Defense (DOD) has been developing the capability to use its more jam-resistant military-specific GPS signal for 2 decades. The Air Force launched the first GPS satellite capable of broadcasting the M-code signal in 2005, but is only now completing development of the software and other equipment needed to use it. The GPS modernization effort spans DOD and the military services, but an Air Force program office is developing M-code cards for eventual production and integration into weapon systems. DOD is closer to being able to use military code (M-code)—a stronger, more secure signal for the GPS designed to meet military needs. However, due to the complexity of the technology, M-code remains years away from being fielded across DOD.

The Global Positioning System Involves Satellites, a Ground Control System, and Receivers



Source: GAO analysis of Department of Defense documentation. | GAO-21-145

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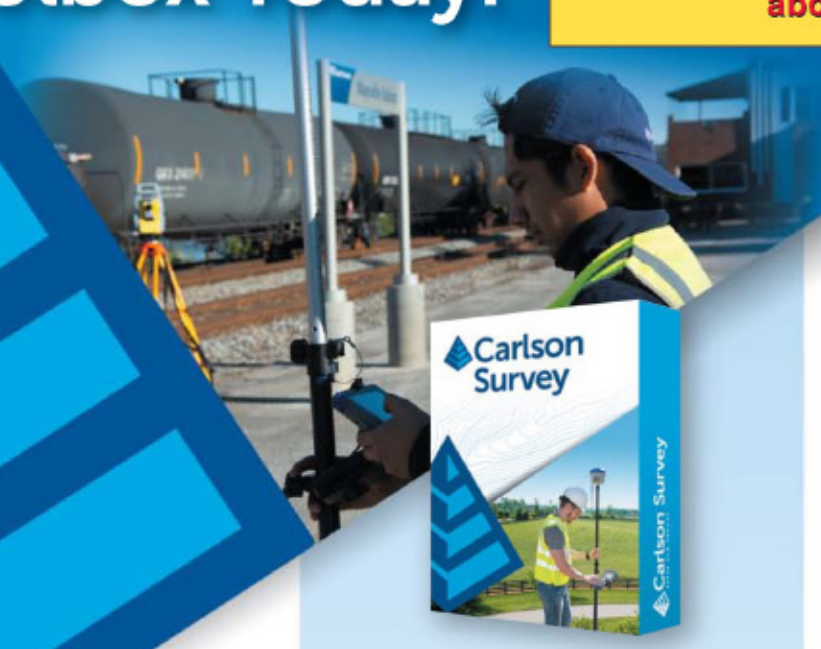

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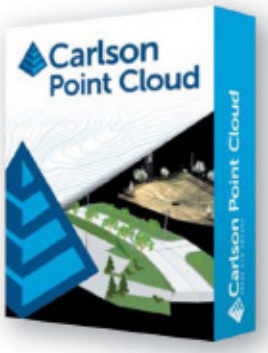

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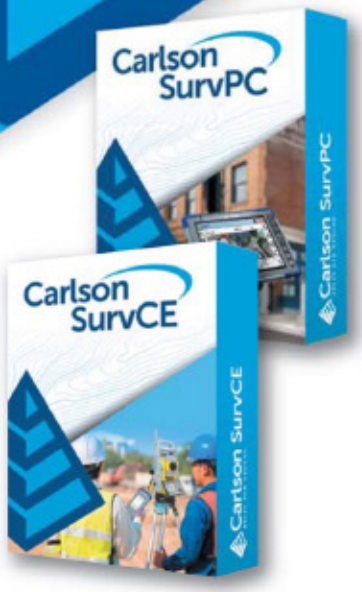

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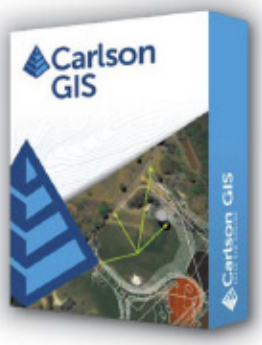

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NSPS Thanks Department of Labor for Repealing Davis Bacon Requirement

NSPS, January 21, 2021

NSPS government affairs consultant John Palatiello and registered lobbyist John "JB" Byrd last week participated in a virtual meeting with Cheryl Stanton, Administrator of the Wage and Hour Division of the U.S. Department of Labor to thank her for her efforts issuing AAM 235, rescinding an Obama-era guidance classifying members of survey crews as "laborers and mechanics" under the Davis-Bacon Act. Rescission of the 2013 AAM 212 culminated a 7-year NSPS effort to restore the standing of surveyors as professionals and crew members as valued technicians.

President Trump Issues Surveying-Related Orders on Final Days in Office

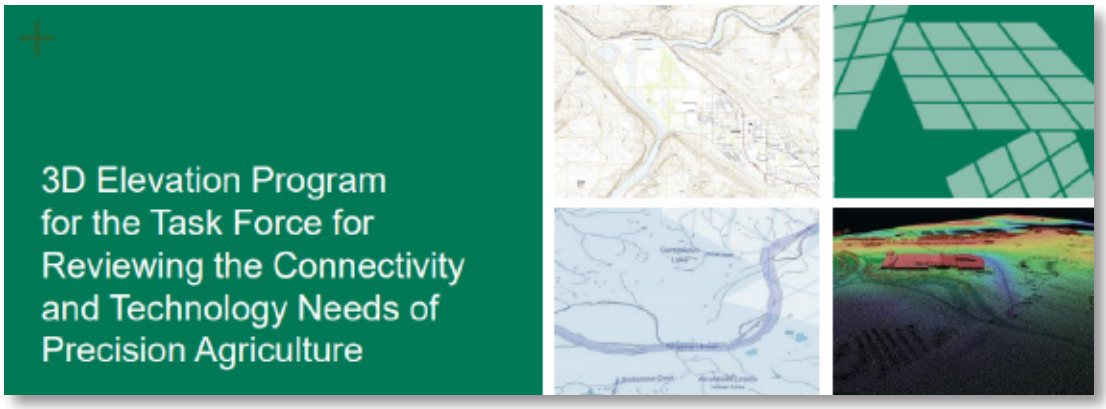
NSPS, January 21, 2021

Shortly before leaving office on Wednesday, January 20, President Trump issued two orders of interest to the surveying profession. An Executive Order strengthens "Buy America" rules on the acquisition of unmanned aircraft systems using Federal funds. A space policy directive on positioning, navigation and timing (PNT) seeks to protect the global positioning system (GPS).

NSPS Assists USGS 3DEP Presentation to the FCC and USDA

NSPS, January 21, 2021

Kevin Gallagher of USGS recently made a presentation on the 3D Elevation Program (3DEP) before a meeting of the mapping working group of the Task Force for Reviewing the Connectivity and Technology Needs of Precision Agriculture in the United States. The task force advises the Federal Communications Commission and the U.S. Department of Agriculture on rural connectivity and advancing broadband coverage. Last year, NSPS member Brent Birth from Pennsylvania was added to the mapping working group advising the task force, the FCC, and USDA. Birth secured Gallagher's invitation to provide the briefing.



USDOT Awards $1 Billion for 70 Infrastructure Projects

NSPS, December 3, 2020

$1 billion is being invested toward U.S. infrastructure through the Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grants program. The funding has been awarded to 70 projects in 44 states. The program selection criteria encompassed safety, competitiveness, quality of life, state of good repair, sustainability, innovation and stakeholder partnerships.

State Infrastructure Rated by Bridges, Roads and Rails

NSPS, November 19, 2020

Using data from the U.S. Department of Transportation, 24/7 Wall St. created an index to identify the states in which infrastructure is falling apart. The index comprises three measures: the share of roadway in poor condition, the share of bridges considered to be structurally deficient, and the number of train derailments between 2015 and 2019. To maintain transportation infrastructure states typically use revenue from taxes levied on gasoline sales. However, greater spending does not always align with better overall conditions – especially as some states have only recently ramped up investment to compensate for past neglect.

Getty Images

The Missouri Rating: 12th Worst!

- **Roadway in poor condition**: 28.9% (10th highest)
- **Structurally deficient bridges**: 8.6% of bridges (18th highest)
- **Locomotive derailments from 2015-2019**: 194 (5 per 100 miles of track – 14th most out of 49 states)
- **State highway spending per licensed driver**: $329 (2nd lowest)

Missouri has one of the largest highway networks in the country, with 34,000 miles of highway. Much of that network is in disrepair – 28.9% of state roads are in poor conditions, the 10th highest share of any state. ACSE awarded Missouri's infrastructure a grade of C-, and gave its road systems a D+.

The full report is available at: https://www.usatoday.com/story/money/2020/11/11/states-that-are-falling-apart/114708118/

National Geodetic Survey

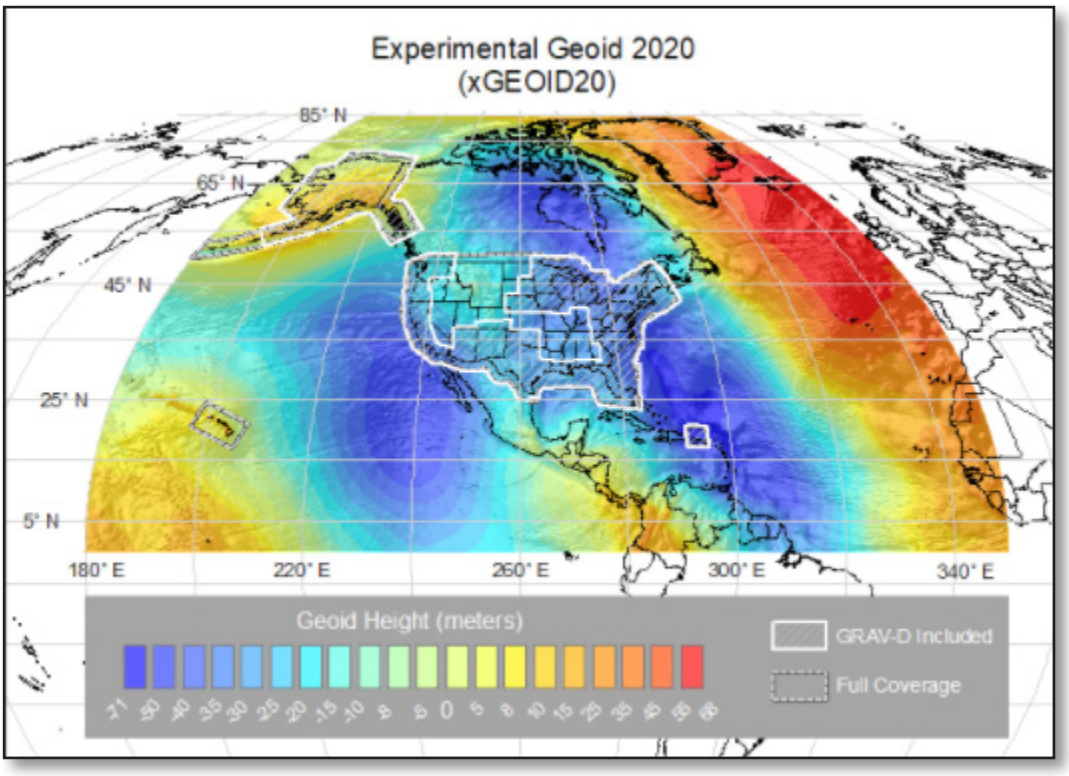
Positioning America for the Future

NGS News & Events

NGS Releases New Geoid Model

January 29, 2020

NGS has released its annual experimental geoid model (xGEOID), which is the foundation for determining precise heights in the modernized National Spatial Reference System (NSRS). A geoid model approximates mean sea level as determined by the Earth's gravity field. The xGEOIDs provide preliminary - but increasingly accurate - views of the changes expected from modernizing the NSRS and replacing the North American Vertical Datum of 1988. Experimental Geoid Model 2020 (xGEOID20) is the first joint experimental geoid model produced through international cooperation among the United States, Canada, and Mexico. It incorporates the latest satellite gravity model, all available airborne gravity data from the NGS Gravity for the Redefinition of the American Vertical Datum program, and an improved digital elevation model.



For further information - *https://beta.ngs.noaa.gov/GEOID/xGEOID/*

NGS Paper Demonstrates the Accuracy of Geoid System

January 22, 2020

In a few years, NGS will modernize the nation's height system. Instead of measuring inland heights from a "mean sea level," heights will be measured relative to a constant geopotential surface known as the geoid - a model of the shape of the Earth under the influence of gravity and rotation. By providing the shape of this undulating surface everywhere, the new system will allow surveyors to use GPS receivers to determine precise heights anywhere. In a new paper in the Journal of Geodesy, NGS describes a test of the geoid-based system in Colorado. The test demonstrated that the system has a relative accuracy of better than 5 centimeters in mountainous terrain - a worst case scenario for geoid determination. When combined with earlier surveys in Texas and Iowa (which showed better than 2 centimeter accuracy in smoother terrain), these results indicate the new national height system will provide more accurate elevations everywhere.

NGS to Host International Comparison of Absolute Gravimeters

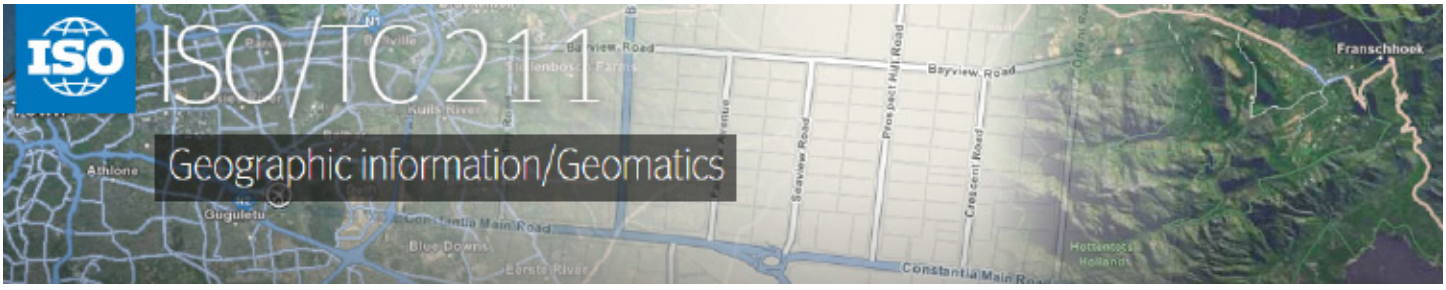
January 15, 2020

NOAA's Table Mountain Gravity Observatory near Boulder, Colorado, has been selected as the host of the next International Comparison of Absolute Gravimeters (ICAG) in the summer of 2023. These comparisons, which take place every four years, are certified by the International Bureau of Weights and Measures in Sevres, France. Institutions from around the world will send representatives to confirm the consistent operation of their extremely accurate gravity instruments. The event will also include informal meetings and discussions between the visiting scientists and NOAA staff. The event will be co-organized with researchers from the National Institute of Standards and Technology. This is the first international comparison to be held in North America. The goal is to identify and correct tiny offsets in the output of these instruments. NGS uses absolute gravity measurements to help monitor long-term changes to the new vertical datum.

NGS Represents U.S. at International Standards Meeting

January 8, 2020

NGS's chief geodesist represented the U.S. at a working group meeting for the International Standardization Organization (ISO) technical committee on geographic information and geomatics. The working group discussed the replacement of the American Samoa Vertical Datum of 2002 with a local tidal datum and the adoption of GEOID18 for the U.S. mainland, Puerto Rico, and the U.S. Virgin Islands. The working group also discussed a recent publication that detailed the mission, mandate, and other details of the ISO Geodetic Registry. ISO standards provide an internationally recognized framework for the development of geodetic products and services.



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NGS, Partners Coordinate on Geodesy Technologies

December 11, 2020

NGS met with stakeholders from the National Geospatial-Intelligence Agency and the Applied Research Laboratories at the University of Texas-Austin to agree on plans to add Global Navigation Satellite System (GNSS) sensors at all 10 sites of the Very Long Baseline Array (VLBA) network. The VLBA is a U.S. network of gigantic radio antenna dishes supporting the International Earth Rotation and Reference Systems Service, a fundamental part of U.S. and international spatial reference systems. NGS scientists described their Site Survey program linking the radio dishes to NGS Foundation Continuously Operating Reference Stations (CORS). NGS's partners expressed enthusiasm for adding the CORS at these VLBA facilities, which will speed NGS foundation plans and improve the accuracy of America's modernized National Spatial Reference System.

NGS Contributes to International Geodesy Working Groups

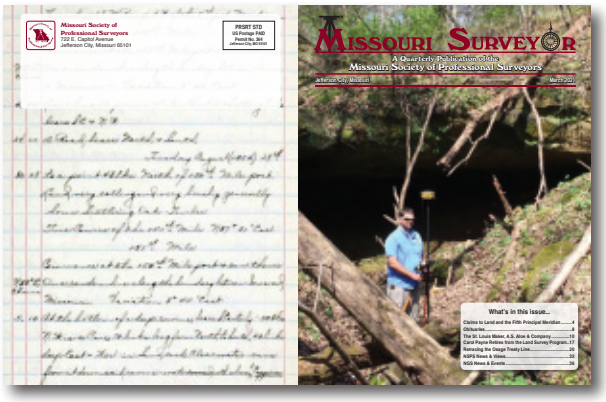
December 4, 2020

NGS employees represented the U.S. in the virtual plenary meeting of the Sistema de Referencia Geocéntrico para las Américas (SIRGAS). SIRGAS is an organization of scientific and national geodetic agencies in the Americas, established in 1993 to modernize legacy national geodetic data systems with a unified geocentric reference frame. The SIRGAS Reference Frame was adopted by the United Nations Global Geospatial Information Management – Americas Regional Committee, which includes the U.S. While modernizing the National Spatial Reference System, NGS intends to closely coordinate and integrate with SIRGAS. NGS staff are highly involved in the SIRGAS working groups on geometric and vertical reference frames. The U.S. has also led in the working group on education, training, capacity building, standards, and nation-to-nation dialog. Newly revised SIRGAS statutes — largely championed by the U.S. — were agreed to during the Directing Council meeting and will meet U.S. needs for the foreseeable future.

SIRGAS

Be a Magazine Cover Model or News Maker!

Highlight your work! Impress your friends! Make your momma proud! Prove to the bankers you are using that commercial loan!



"How" you may ask? By sharing photos, stories and news with Missouri Surveyor! It is really that simple. Just as this edition's cover features Missouri surveyors you and your work may be featured as well. All content is welcome! For the cover, high quality images in landscape format at an aspect-ration comparable to 17"x11" work best; stories and articles merely need to be in Microsoft Word.

Cover (back): Transcribed copy of the field notes (Field Notes of the Original Government Surveys Volume 635, page 391) from the 1854 survey by John Williams to amend the Closing Corners to the proper state line in the vicinity of the border immediately west of the Des Moines River. The citation (bottom of page) at 5.10 chains past Mile Post 150 describes the cave as "…70 links long from North to South, 40 links deep East & West – in Sand rock. Clear water runs from it down said ravine – water covered with slimed Copperas."

bears S.E. & N.W.

24.00 A Road bears North & South

Tuesday August (1854) 29th

80.38 to a point 48 lks North of 150th Mile post.
Land very rolling and very brushy generally
Some Scattering Oak Timber.
True Course of the 150th Mile N 87° 51' East

151st Mile

Commence at the 150th Mile post & run thence
N 88° E Chains On a random line along the boundary between Iowa and
Missouri. Variation 8° 45' East.
5.10 At the bottom of a deep ravine, bears S.Easterly - 30 lks
N.W. is a Cave 70 links long from North to South, 40 links
deep East & West in Sand rock. Clear water runs
from it down said ravine - water covered with slime, Copperas