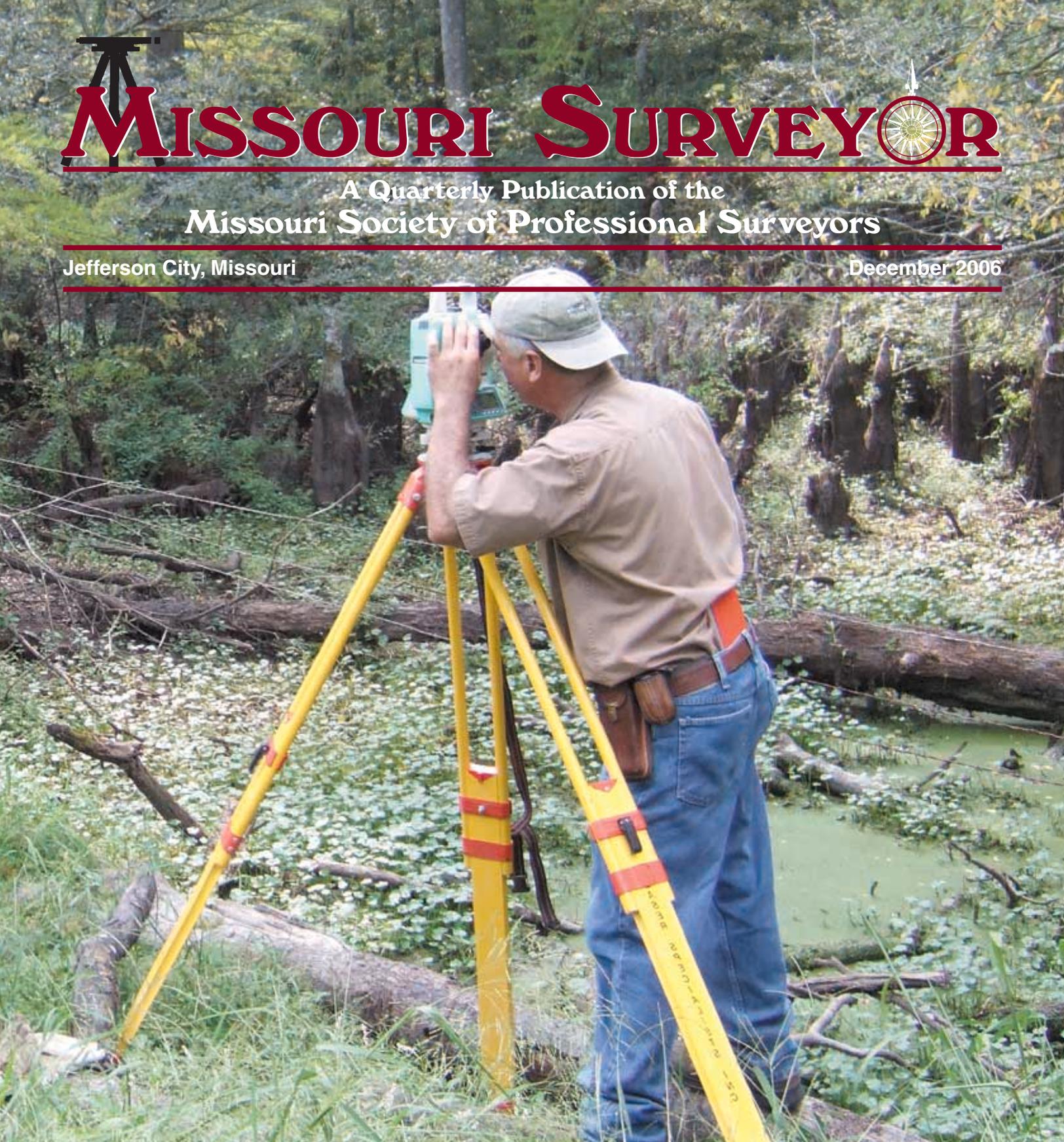


MISSOURI SURVEYOR

A Quarterly Publication of the
Missouri Society of Professional Surveyors

Jefferson City, Missouri

December 2006



After the Expedition	4
Surveying With Solar Instruments	15
Land Surveying in Colonial America: 1600-	19
Following the Footsteps	26
Line of Sight	28

Cover photo by Ralph Riggs

MISSOURI SURVEYOR

CALENDAR OF EVENTS

2006-2009

December 2, 2006
Board Meeting
Jefferson City, MO

January 13, 2007
CST Exam
Florissant Valley
Community College

March 7-13, 2007
ACSM Joint Conference
American's Center
St. Louis, Missouri
Headquarters Hotel:
Millennium Hotel St. Louis

May 11-12, 2007
Board Meeting, Scholarship
Golf Fundraiser and Education
Workshop by Eric Harris

July 13-14, 2007
Board Meeting and Minimum
Standards Workshop
The Resort at Port Arrowhead
Lake Ozark, MO

October 4-6, 2007
50th Annual Meeting and Convention
Tan-Tar-A Resort,
Golf Club and Marine
Osage Beach, MO

December 1, 2007
Board Meeting, MSPS Office
Jefferson City, MO

May 8-10, 2008
Spring Workshop
Lodge of Four Seasons
Lake Ozark, MO

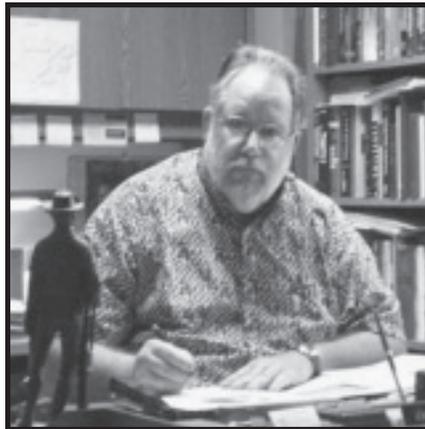
May 7-9, 2009
Spring Workshop
Lodge of Four Seasons
Lake Ozark, MO

John Alan Holleck, Editor



Notes from the Editor's Desk

by John Alan Holleck



As incredible as it may seem, not only is December just around the corner but we are about to finish the sixth year of the Third Millennium since the so-called Christian era began. It is the Friday after Thanksgiving (yes I am late with my message) and I am also watching football. Texas A & M just beat Texas and it looks like two former Big Eight schools will contest for the conference championship next weekend. Sorry, St. Louis but it is at Arrowhead! Unfortunately, I dislike the two possible contenders — Nebraska and Oklahoma. I have digressed long enough, so on to the new issue.

For the final time, an article by Patrick Lee will lead-off an issue of the *Missouri Surveyor*. Entitled, "After the Expedition: The Accomplishments, the Members of the Corps & The Journals," Patrick sums up the outcome of the two-year odyssey of the Lewis and Clark party. Next up is a poem by the Executive Director of NSPS, Curt Sumner, entitled "Rushmore" about three surveyors and that other guy. Congratulations are in order for Don Martin, Surveyor of the Year and Jim Mathis winner of the Robert E. Myers Service Award for their contributions to MSPS and the surveying profession.

For this issue, the theme is surveying history. The next article "Surveying With Solar Instruments" by Johnny Ingram provides some interesting observations about its use. This is followed by "Land Surveying in Colonial America: 1600-" by John Watson. Most of the article discusses surveying in the Virginal colony to 1660. Page twenty portrays the last annual convention in pictures. The next article is "Following in the Footsteps" (the boundary surveyor's credo) by Bob Hysmith, a Texas land surveyor. Bob discusses some of the "treasures" he has uncovered during his years in the field. The theme continues with "Line of Sight, Line Trees, and Original Government Bearing Tree[s]—Do They Still Exist?" The author, Roger Bran reiterates those things Norman Brown is always talking about.

The final quarter of this issue leaves the historical theme with an article by Terry McHenry, editor of *The Nevada Traverse*. In "Eminent Domain—Has the Sovereign Gone Too Far?", Terry discusses a recent Connecticut Supreme Court Case. The final article is by my friend Wilhelm A. Schmidt of Pennsylvania. His article is entitled "Fair Use: The Legality of Reprinting Articles in Newsletters," which is a subject I took notice of for my efforts as your favorite hard-working editor. Have a safe and prosperous Holiday season and enjoy the December issue. 

THE MISSOURI SURVEYOR

Published quarterly by the
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Professional Surveyors

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EDITOR

John Alan Holleck
8510 E. 59th St.
Kansas City, MO 64129
Phone or FAX (816) 353-1782
E-mail: editor@missourisurveyor.org

PUBLISHER

Sandra Boeckman
P.O. Box 1342
Jefferson City, MO 65102
(573) 635-9446 FAX (573) 635-7823
E-mail: mspss@missourisurveyor.org

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President's Message



by F. Shane Terhune

I am very happy to be addressing you and serving you as your President of MSPS for the coming year.

We have just completed the 49th annual MSPS convention in St. Charles MO. Attendance was very good with great programs and very plush accommodations, I am normally a Motel 6 man myself. Dan Govero and his crew do an outstanding job by finding speakers and preparing programs for our benefit. This is always a thankless and time consuming job and I would put our programs up against other state societies any day. If you missed Margaritaville Friday

night at the convention you missed good food, music, and entertainment along with Jim "Poncho Villa" Mathis in a sombrero adorned with a flashing red pepper light.

I observed two common points of interest expressed by many of you at the annual business meeting and during other conversations over the three-day period. The first is what can we do to add some youth to our graying profession. The majority of us do not set out to be land surveyors, rather we stumble into our profession by accident or fate. This normally requires us to be non-traditional students to receive our college credit hours we obtain to be eligible to take the exams. A small percentage of us set out in college to become a PLS and attend a two year degree program available in our state or other states. This candidate normally comes from a surveying background, or has youthful dreams of becoming a Land Surveyor. This youth I speak of needs to become our target for recruitment by some method to impress them to consider our profession. I came about my profession from the first group I mentioned being an accidental tourist who remained on the train (or slept through my stop). This type of candidate needs to be identified from within our own everyday field crews and techs.

Could that 19-year old kid wearing headphones that loses a hammer or machete every other day be your next LSIT? Could be, if they have the aptitude and desire. It is our responsibility as professionals to supply mentoring and offer development opportunities to these persons we employ or work with daily. Many of our crews have developed only into being measuring crews with GPS rover operation knowledge. They have no idea what to do with that data they return to the office with for plotting, calculations and analysis by others. Let us challenge these people and give them an opportunity to learn the necessary calculations and protractors to develop the decision making of a potential PLS even though this is not always profitable on paper. If these persons have no interest in becoming licensed find someone that is. It is also our responsibility to make available the needed formal education required to be eligible to sit for our LSIT exam. We have several good programs in our state that need our support by volunteering and also financially.

This brings us to the second concern expressed by many is how to use the financial windfall we are currently experiencing. Can we as individuals and a professional organization make an investment in our future by offering more scholarships and carefully investing in night courses for existing college credit courses? I challenge our membership as the keeper of our profession to solve some of these issues during this year. I've said enough for now. I look forward to a busy month of December on the road to Jeff City for our board meeting, and the privilege of visiting several local MSPS chapters for the swearing in ceremonies of their officers.

As this year winds down I urge everyone take time out to relax and spend time with your family, and friends during the holiday season. As we look forward to next year, I'll catch you on down the line. 🇺🇸

Cover photo by Ralph Riggs of Bob Shotts in the cypress swamps at Pond Creek National Wildlife Refuge, Horatio, Arkansas, T10S, R32W.

After the Expedition

The Accomplishments, the Members of the Corps, & The Journals

Edited by Patrick Lee

This is the 21st and final article in the series on the Lewis and Clark Expedition

“St. Louis, September 23, 1806

Sir,

It is with pleasure that I announce to you the safe arrival of myself and party at 12 Oclk. today at this place with our papers and baggage. In obedience to your orders we have penetrated the Continent of North America to the Pacific Ocean...”

Beginning with those words, Meriwether Lewis wrote to President Thomas Jefferson about the completion of their mission. At least 50 years earlier, a teenage Jefferson had heard speculation of such a route across the continent. Four previous attempts to organize such an exploration had been unsuccessful. Lewis' letter must have been a sweet reward to the patient President. Almost...

The primary purpose in sending the Corps of Discovery was to find the Northwest Passage, a trade route across the continent, south of the Canadian border. The commercial possibilities of such a route for Americans were endless. It also held the promise of drawing the fur trade farther south, making it an American-Indian enterprise, rather than the current British-Indian one. That route was expected to be by water, with a short land portage from the headwaters of the Missouri River, over a single ridge of low, forested mountains, to the headwaters of the Columbia or Oregon River.

Lewis' letter tried to put the best possible face on their discovery. He described the route, but the land portage wasn't a single day over a low mountain range. It was 340 miles instead, and of those miles, *“140 [are] over tremendous mountains which for 60 mls. Are covered with eternal snows;”*. He was describing the Bitterroot Mountains. Anyone reading Lewis' positive account would know immediately: There is no water route across the continent. With that knowledge, a lot of interest in Lewis and Clark and their adventure disappeared.

The faithful Captain concludes his long letter with, *“I am very anxious to learn the state of my friends in Albemarle [County, Virginia] particularly whether my mother is yet living. I am with every sentiment of esteem Your Obt. And very Humble servant.*

*MERIWETHER LEWIS Capt.
1st. U.S. Regt. Inftry”.*

If finding the Northwest Passage was the primary purpose, President Jefferson's written instructions held three other



William Clark



Meriwether Lewis

important requests for information, about plants and animals, about the native people, and about the land itself. In these endeavors, the Corps of Discovery was far more successful.

The Captains returned with descriptions or seeds or cuttings of 178 plants previously unknown in the United States. They brought back descriptions or skins or bones or complete skeletons of 122 animals likewise new to science.

Instructed to bring back intelligence on all the native tribes, to be at peace with those tribes, and to promote peace between the tribes, the explorers were successful in two out of three. They documented appearance, dress, manners and morals of over 50 tribes. Except for a near-violent confrontation with the Teton Sioux in central South Dakota and a fatal one with the Blackfoot in northwestern Montana, their contacts were varying degrees of cordial. (At least one Blackfeet, and probably two, were killed by Lewis and his scouting party when the Indians attempted to steal the explorers' horses and guns.)

They were not at all successful in convincing the Indian tribes to live in peace with one another. Warfare among the tribes had been a way of life for centuries. It was how the Indians chose their chiefs. Who were the bravest, strongest, fiercest men among them, the ones qualified to be chiefs? That could only be determined by warfare. They would not cease a way of life they'd known forever simply because some strangers told them they should.

Finally, the Corps returned with a detailed description of the land itself, its rivers, topography, geology, its plant and animal production. William Clark was the mapmaker. He combined his measurements with those of other European and native accounts, to produce a map that extended from the mouth of the Missouri River north of St. Louis to the mouth of the Columbia River on the Pacific Ocean. Clark added to his map throughout the years, but it marked the first time that entire river-and-land route had been mapped by someone who had seen it with his own eyes.

(continued on page 5)

After the Expedition (continued)

What became of the Captains and their men after September 23, 1806? President Jefferson appointed Lewis Territorial Governor of Upper Louisiana, headquartered in St. Louis. Although the new governor was a skilled military man, he had no skills in leading a civilian government, where people were free to criticize his decisions. Lewis wanted to marry and courted several young ladies but could find no one to take his hand. Charged by his patron Jefferson to write an account of their journey, and encouraged repeatedly by the President to do so, Lewis never managed to write a single word. All of this troubled Lewis greatly, and he began to drink. For a stomach ailment, he took laudanum, an opium-in-alcohol medicine for pain. When reimbursement was denied for certain government expenses, which Lewis had advanced from his own pocket, both his character and his finances were at risk.

In late September of 1809, Lewis boarded a boat in St. Louis, bound for Washington City to press his case personally with President Madison, his patron Jefferson now retired to Monticello. He got off the boat in Tennessee and began an eastward trek along the Natchez Trace. On October 11, 1809, at an isolated dwelling known as Grinder's Stand where he had stopped for the night, it all became too much for Meriwether Lewis, and he took his own life. He was buried there. In 1848, an obelisk was placed near Hohenwald, TN, between Memphis and Nashville, to commemorate his life. The spire's top is broken off to symbolize a life cut short.

If Lewis' post-Expedition life was marked by disappointment and death, Clark's was just the opposite. President Jefferson appointed him Brigadier General of the Militia and Indian agent for Upper Louisiana, also headquartered in St. Louis. It was his responsibility to represent the rights and interests of the Indian people to the federal government in a time when that government was less and less concerned about those rights and interests.

Clark had the difficult task of relocating the tribes further and further west. Jefferson and Clark held to an eventually-disregarded belief that if the Indians could become farmers like the white men, they wouldn't need the huge expanses of land they'd hunted for centuries. Once they became farmers, that land would be available for settlement. All they needed was time to make the transition from hunter to farmer and distance from the whites who kept pushing every westward. It was Clark's responsibility as Superintendent of Indian Affairs to give the Indians that time and distance. He

did move the tribes west, first beyond the Mississippi River and then beyond the Missouri Territory, but always with that motive of time-and-distance.

The Indians and their Superintendent were both victims of land-hungry settlers pushing ever-westward. Through it all, Clark remained an advocate for the Indians. He liked and respected them. They liked and respected him. He was one of the few white men the Indians could trust. Every year, Chiefs from the north and the west would come to St. Louis to see the "Red Haired Chief," their name for Clark.

In 1820, Missouri Territorial Governor Clark stood for election as governor of the new State of Missouri. He was soundly defeated in that campaign. His opponent got twice as many votes as he did. One of the charges leveled against Clark in that campaign was this one: "Clark is too good to the Indians."

William Clark was also a businessman, of somewhat limited success, in St. Louis. A steady source of his income through the years was the various governmental positions he held. As an individual, he was held in high esteem by all except his most partisan political opponents.

He was married twice. He was widowed twice. He had seven children, four of whom outlived him. He and his first wife, Julia, named their firstborn son, Meriwether Lewis Clark. Several years after his return from the West,

Charbonneau and Sacagawea brought their son, Jean Baptiste ("Pompey") to St. Louis, and Clark took guardianship of the boy and provided for his education. Several years later, Clark performed a similar service for Pomp's little sister, Lizette.

William Clark, who repeatedly credited "Providence" for their safe return, helped bring the Protestant Episcopal Communion to St. Louis in 1819, marking the first time that expression of the Christian faith had been celebrated west of the Mississippi. He died September 1, 1838, at age 68.

What happened to the men? Those in the army received double their normal pay and grants of land. Charbonneau and Drouillard were paid for their civilian services. Most of the men disappeared into history, with only a fact or two or perhaps their date of death noted. Some might have died prematurely from the effects of either syphilis or malaria contracted on the Expedition. At least six were killed in Indian encounters

Georges Drouillard, "Drewyer" of the journals, the half-Shawnee hunter and interpreter, and undoubtedly the Corps' *(continued on page 6)*

Charged by his patron Jefferson to write an account of their journey, and encouraged repeatedly by the President to do so, Lewis never managed to write a single word.

After the Expedition (continued)

most valuable single member, was killed by the Blackfeet Indians while beaver hunting in the spring of 1810.

Most credible sources believe Sacagawea died at North Dakota in 1812, perhaps in her 25th year. With little justification, some hold out for her passing at the age of 100 in Wyoming. Her husband, Toussaint Charbonneau, continued to live among the Indians, served as a government interpreter. He was noted as still alive in 1839, age probably somewhere between 70 and 80 years, and having a new and very young Indian wife.

Jean Baptiste Charbonneau, "Pompey", was raised by Clark in St. Louis. He traveled to Germany as a young man, and learned three European languages during six years of study there. He returned and became a mountain man, guide and interpreter. He died in Oregon in 1866, age 61.

Seaman, Lewis' faithful Newfoundland, probably returned to St. Louis, and may have traveled eastward with his master thereafter. His final fate is unknown. One account, considered credible, puts him with Lewis on that final, fateful night on the Natchez Trace in 1809.

York, Clark's slave, was required to take up residence in St. Louis, though he desired to return to Louisville, KY, where he had a wife. The issue became a matter of great contention between the two men. York assessed his contribution to the Expedition as meriting his freedom. Clark disagreed, and he subjected York to harsher treatment. As of 1832, in notes made by Washington Irving from an interview, Clark said he eventually freed York and set him up in a hauling business, but that York lost the business through neglect, and cholera claimed his life in Tennessee. Some oral tradition holds that York made his way west and lived to be an old and respected man among the Indians.

Sergeant John Ordway appears to have become a prosperous farmer and landowner in Missouri's Bootheel region, but may have been reduced to poverty by the New Madrid Earthquakes of 1811-12. Court records from 1818 count him deceased, leaving a widow and two children.

Sergeant Patrick Gass, born in 1771, was promoted to that rank upon the death of Charles Floyd. His journal disappeared but not before someone used it as the basis for a book about the Expedition, with authorship attributed to Gass. He settled in Wellsburg, WV, remained a bachelor until he was almost 60, when he married 20 year old (or younger) Maria Hamilton. He fathered at least six children, and died around 1870, at age 98, the oldest survivor of the Corps.

Sergeant Nathaniel Pryor was in and out of the army several times before opening a trading post on the post on the Arkansas River. He had an Osage wife and was an Indian agent to that tribe. He died in 1831, and Pryor, OK, bears his name.

Little is know of John Shields, the Expedition's blacksmith and handyman, other than he trapped with Daniel Boone, married, but died in Indiana in 1809. Meriwether Lewis, in his 1807 report to Secretary of War Dearborn, asked extra consideration for Private Shields because, "Nothing was more peculiarly useful to us, in various situations, than the skill, and ingenuity of this man as an artist, in repairing our guns, accoutrements, &c."

Of the Field brothers, Joseph was killed in 1807, most likely by Indians on a trip back up the Missouri, and Reuben died in Kentucky in 1822 or 1823.

George Shannon was the Expedition's youngest member at something less than 20 in 1804. He was memorialized in the journals for having gotten lost several times. In 1807, assisting in the attempted return of Mandan Chief Sheheke, Shannon took a lead ball in his leg when the Arikaras forced the party to turn back. His leg was amputated above the knee, and for his use of a wood prosthesis, he was dubbed "Peg-leg" Shannon. He became an attorney in Kentucky, and later a state senator in

Missouri. He died in Missouri in 1836.

John Colter was the only man to take leave of the Corps voluntarily before it completed its journey. At the Mandan Villages, he was granted permission to go back west with two trappers bound for the Yellowstone River. He became a mountain man and was the first to explore an area of hot springs, boiling mud and sulfur smells that came to be known as "Colter's Hell." (Eventually, it would be renamed Yellowstone National Park.) Colter survived several violent encounters with the Blackfeet. Captured by the Indians, he witnessed fellow trapper and Expedition member John Potts "made a riddle of" by Blackfeet guns, his body then tomahawked into pieces. Colter was stripped naked and given the opportunity to outrun the Indians and save his own life. He did it, too, and made his way over 300 cactus covered miles to safety, with only an Indian blanket for covering. He returned to Missouri, married an Indian woman and fathered a son, but died of jaundice in Franklin County, Missouri in 1813.

William Bratton served in the War of 1812 but may have been surrendered as a prisoner of war. He eventually made

Most credible sources believe Sacagawea died at North Dakota in 1812, perhaps in her 25th year. With little justification, some hold out for her passing at the age of 100 in Wyoming.

(continued on page 8)

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After the Expedition (continued)

his way to Ohio, where he married and fathered 10 children. He died in 1841, at age 63.

Alexander Willard remained in the St. Louis area for awhile, spent 28 years in Wisconsin, and the remainder of his life in Sacramento County, CA. His wife of 58 years survived him, as did six of his 12 children. He was 86.

Somewhere between 1825 and 1828, William Clark recorded on the front of his journal, the fates, as he understood them, of the men of the Corps of Discovery. That list reads:

"Capt. Lewis Dead
Odoway Dead
N. Pryor at Fort Smith
Rd. Windser on Sangamah Ills.
G. Shannon Lexington Ky.
R. Fields near Louisville
Wm. Bratton near Greenville Ohio
F. Labieche St. Louis
R. Frazier on Gasconade [River?]
Ch. Floyd Dead
P. Gass Dead
J. Collins do. [Ditto]
J. Colter do.
P. Cruzate Killed
J. Fields do.
S. Goodrich dead
G. Gibson dead
T. P. Howard

H. Hall
Alr. Willard Mo.
Geo. Drulard [Drouillard] Killed
Tous. Charbono Mand[ans]
Se car ja we au Dead
Tousant [Pompey] Charbon in
Wertenburgh, Gy.
H. McNeal dead
J. Shields do.
J. Potts Killed
J. B. Le Page dead
J. Thompson Killed
Wm. Warner Vir.
P. Wiser Killed
Whitehouse
Warpenton
Newman

While Clark's record indicates considerably accuracy, note that he reported Patrick Gass as dead, even though Gass lived until about 1870.

What became of the specimens and journals? The specimens were shipped to President Jefferson, who forwarded many of them to the American Philosophical Society in Philadelphia. Most of the animal specimens have disappeared, but a portion of the herbaria now remain archived in that city.

With Lewis' death, the task of producing a written account of the Expedition fell to William Clark, who eventually recruited Nicholas Biddle to the task. It wasn't until 1814 that Biddle's work reached the public, and it sold very poorly. The journals themselves remained with the American Philosophical Society, mostly forgotten. In 1893, Elliott Coues produced a three-volume work based on Biddle's work. To mark the centennial of the Expedition, Reuben Gold Thwaites produced an eight volume edit of the journals in 1904.

Over 400 letters and documents relating to the effort were published by Donald Jackson in the [Letters of the Lewis & Clark Expedition with Related Documents](#) in 1962 and again

in 1978. The first letter is from 1783, when Thomas Jefferson wrote to George Rogers Clark (William's older brother) asking if he'd lead a western exploration. (The answer was no.) The last is an affidavit filed by Patrick Gass in 1854.

In 1979, Gary Moulton, Ph.D., joined the University of Nebraska and with the sponsorship of a number of entities, began a new edit of all the journals. That project took 20 years and resulted in a 13 volume work. A single volume summary was released in 2003.

William Clark wrote in journals from the time he was a young man, a habit he kept all his life. In quantity and consistency, Clark was the most faithful scribe of the multiple journal keepers on the Expedition. His work in those nearly 2 1/2 years provides the best single window on their grand and awesome undertaking.

Three days after their return to St. Louis, on September 26, 1806, he wrote in his journal, "*a fine morning we commenced wrighting &c.*" To all of them who "commenced wrighting &c."...Lewis, Clark, Floyd, Gass, Ordway and Whitehouse and others, and the scholars, writers and editors who followed them ... all the rest of us hearty debt of gratitude.



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Sources for this article include:

[Undaunted Courage](#), by Stephen Ambrose, Simon & Schuster, © 1996
[Letters of the Lewis & Clark Expedition](#), edited by Donald Jackson, University of Illinois Press, © 1962
[The Journals of Lewis & Clark](#), edited by Bernard DeVoto, Houghton Mifflin Company, © 1953 and 1981
[An American Legacy: The Lewis and Clark Expedition, Curriculum and Resource Guide for Middle and Junior High Schools](#), Lewis and Clark Trail Heritage Foundation, © 2000, Revised 2001 (For brief sketches on the post-Expedition lives of the Corps participants)
[Dear Brother](#), Edited by James J. Holmberg, Yale University Press, © 2002
"We Proceeded On", the quarterly publication of the Lewis and Clark Trail Heritage Foundation, a source of information on post-Expedition lives of the following individuals, cited by name and issue date:
Bratton, 2/81
Charbonneau, 2/00
Colter, 5&6/83, 9/94
Drouillard, 8/00
Gass, 2/01
Ordway, 5/01
Sacagawea, 11/99
Seaman, 2/00
Shannon, 7/82
Shields, 7/79
Willard, 5/80

MO Colleges/Universities Where Land Surveying Coursework is Available

The following list will be updated quarterly as new information becomes available.

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Contact: Ken Eichman
Longview Community College
Science and Technology Bldg.
500 Longview Road
Lee's Summit, Missouri 64081
816-672-2283

Florissant Community College - St. Louis, Missouri

Contact: Ashok Agrawal
Florissant Community College
3400 Pershall Road
St. Louis, Missouri 63135
314-595-4535

Missouri State University - Springfield, Missouri

Contact: Thomas G. Plymate
Southwest Missouri State University
901 So. National
Springfield, Missouri 65804-0089
417-836-5800

Mineral Area College - Flat River, Missouri

Contact: Jim Hrouda
Mineral Area College
P.O. Box 1000
Park Hills, Missouri 63601
573-431-4593, ext. 309

St. Louis Community College at Florissant Valley

Contact: Norman R. Brown
St. Louis Community College at Florissant Valley
3400 Pershall Road
St. Louis, Missouri 63135-1499
314-595-4306

Three Rivers Community College - Poplar Bluff, Missouri

Contact: Larry Kimbrow, Associate Dean
Ron Rains, Faculty
Three Rivers Community College
2080 Three Rivers Blvd.
Poplar Bluff, Missouri 63901
573-840-9689 or -9683
877-TRY-TRCC (toll free)

University of Missouri-Rolla - Rolla, Missouri

Contact: Distance & Continuing Education
University of Missouri-Rolla
conted@umr.edu
103 ME Annex
Rolla, Missouri 65409-1560
573-341-4132

University of Missouri-Rolla - Rolla, Missouri

Contact: Surveying Courses in Civil Engineering
Dr. Bill Schonberg, Chairman
University of Missouri-Rolla
Dept. of Civil Eng.
civil@umr.edu
1870 Miner Circle
Rolla, Missouri 65409-0030
573-341-4461

University of Missouri-Columbia, Missouri

Contact: Lois Tolson
University of Missouri-Columbia
W1025 Engineering Bldg. East
Columbia, Missouri 65211
573-882-4377

Missouri Southern State College - Joplin, Missouri

Contact: Dr. Tia Strait
School of Technology
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Rushmore

©Written by Curt Sumner (March 2006)

Surveyors like to talk about
Three men, who they adore
Three of those whose faces
Are carved on Mount Rushmore

We like to tell the stories of
Their exploits, bold and wise
Three surveyors on the Mount
With some other guy

One led his country to freedom
His fame stretched far and wide
Another sent out Lewis and Clark
Across the Great Divide

One led his country, through a war
To preserve it, as a nation
He made sure all men were free
Proclaimed their emancipation

Washington, Jefferson, and Lincoln
Perched there, way up high
Sitting there on Mount Rushmore
Beside that other guy

Washington left a legacy
With maps of his creation
Jefferson left a footprint
The plan for a new nation

Lincoln learned to survey land
To lay out towns and roads
And through the help of his good friends
Into politics he strode

Now some may ask you to recount
Who is that other man
Why is he, upon the Mount
With our surveying friends

What did he do, that was so great
That honored spot to fill
Among other things, he led the charge
To capture San Juan Hill

Washington, Jefferson, and Lincoln
Their eyes look toward the sky
Sitting there on Mount Rushmore
Beside that other guy

But he revered those hardy men
With the compass and the chain
Who mapped the boundaries of the land
From the mountains to the plain

He knew of George, and Tom, and Abe
And Boone, the surveyor, too
He'd often talk, of how they were brave
He had respect for what we do

He's with Washington, Jefferson, and Lincoln
Now you know, just like I
Though he was never just like us
Teddy, was a really good guy

Yeah, Washington, Jefferson, and Lincoln
Perched there, way up high
Sitting there on Mount Rushmore
With another pretty good guy 

Reprinted from *Old Dominion Surveyor*
July/November 2006

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Surveyor of the Year – 2006

Donald R. Martin

The Surveyor of the Year award has been given since 1987. This award is given to a MSPS member who has given freely of his time and efforts to the organization and toward the better of the surveying profession. This is the most prestigious and gratifying recognition for a member of this society. The recipient for this year's award has a vast experience in the surveying field and is being recognized for what he has given to the surveying profession.

This year's recipient is Donald R. Martin. He grew up in and around Oklahoma and southern Texas before moving to Missouri where he finished his high school years, graduating in 1978. He received an Associate degree from Longview Community College, and a Bachelor of Science degree from Williams Wood University where he is currently enrolled in Graduate Studies.

His career with Missouri Highway and Transportation Department started in 1978 in Kansas City. In 1994 he became the Survey Liaison Coordinator at MoDOT headquarters. In this position he coordinated relationships with outside agencies and associations; was responsible for training and providing technical support of CADD for surveyors and R & D of new procedures, equipment and software for Design and Construction until 1999. He received

his license as a Missouri Professional Land Surveyor in 1999. From 1999-2002 Don became the Highway Liaison Surveyor of MoDOT, supervising the business unit for photogrammetry and surveying. From 2002 to present Don has been the Survey Superintendent for the Missouri Department of Conservation. In this position he directs the construction, engineering and boundary surveying operations for the department's capitol improvements and land boundary programs.



Don was just elected as President Elect for the MSPS, having served on the Board as Secretary-Treasurer and Vice President, as well as serving on several committees. He is currently serving as a surveying representative to the Design Alliance and is on the Advisory Council for Civil & Construction Technology for Linn State Technical College.

Congratulations, and thank you, to Don Martin for his dedication to the surveying profession. 🇺🇸

How to Keep Yourself on Task With the Projects You Pitch

Sometimes the workplace projects that you pitch don't quite turn out the way you wanted them to, and you start to look like a dreamer in the eyes of your employers. The following are a few tricks to make sure you don't bite off more than you chew.

- **Set up two deadlines.** The first will be your own deadline date (earlier than the real one). Having the second, later one will allow you enough time to fine-tune your project so that it comes out the way you envisioned it.
- **Create rewards of yourself.** That way, you can meet the deadlines and not procrastinate. It can be as simple as a three-day weekend once you've finished your task, or treating yourself to lunch at a swanky restaurant. Think about lying by the ocean or enjoying a lobster feast just before you delve into your work. It will help you avoid procrastination.
- **Learn how to delegate work appropriately.** Prioritize properly. Learn how to say "no" to menial tasks that somebody else can do and might get in the way of the more important task at hand.

— adapted from *Employer-Employee.com*

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Robert E. Myers Service Award – 2006

Thomas J. “Jim” Mathis

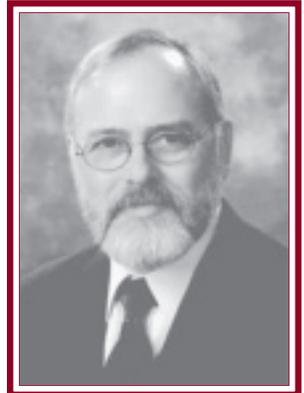
The Robert E. Myers service award has been given to an MSPS member since 1990. This award recognizes a member for exemplary service and dedication to the surveying profession and in particular to the Society over an extended period of time. The recipients of this award stand out among surveyors who have gone the extra mile with their commitment and enthusiasm to getting the job done.

This year's recipient was Thomas “Jim” Mathis from Poplar Bluff, Missouri. He attended Three Rivers Community College and finished his BS in Civil Engineering at the University of Missouri in Columbia. Returning to southern Missouri, he started his own surveying and engineering business which has been serving Southeast Missouri for over 25 years. He received his Registered Land Surveyor's License in 1978 and his Professional Engineer's License in 1987. His company specializes in boundary surveys along with ALTA surveys, subdivisions surveys and civil engineering projects.

He has been a member of MARLS/MSPS for over 25 years; he is a charter member and past-president of the Southeast Chapter of MARLS/MSPS; and regularly attends the MSPS board meetings. As a Registration board member he is

involved with surveying problems and attends meetings nationwide with NCEES. Jim has been a speaker at the Minimum Standards workshops for several years and presents continuing education sessions at local chapter meetings.

Jim is also licensed in Arkansas and a member of the Arkansas Society of Professional Surveyors, the National Society of Professional Engineers, the Missouri Society of Professional Engineers, and in 2003 was inducted into the University of Missouri's Civil Engineering Academy of Distinguished Alumni. In 1998, Jim was appointed by Governor Mel Carnahan as a member of the Land Survey Division of the Missouri Board for Architects, Professional Engineers, Professional Land Surveyors and was elected chairman of the Land Survey Division in 2002. He was re-appointed by Governor Bob Holden in 2002.



Thanks, Jim, for your many years of service to MSPS and the surveying profession! 🇺🇸

The other day, a gentleman at a store in a small town read that a methamphetamine lab had been found in an old farm house in the adjoining county. He asked me a rhetorical question. “Why didn't we have a drug problem when you and I were growing up?”

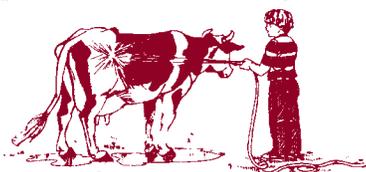
I did have a drug problem when I was a kid growing up on the farm.

I was drug to church on Sunday morning.

I was drug to church to family reunions and community socials no matter the weather.

I was drug by my ears when I was disrespectful to adults.

I was also drug to the woodshed when I disobeyed my parents, told a lie, brought home a bad report card, did



not speak with respect, spoke ill of the teacher or the preacher, or if I didn't put forth my best effort.

I was drug to the kitchen sink if I uttered a profane four letter word. (I do know what Lye soap tastes like.)

I was drug out to pull weeds in mom's garden and flower beds and cockleburs out of dad's fields.

I was drug to the homes of family, friends, and neighbors to help out to fix a clothesline or chop some fire wood, and if my mother had ever known that I took a single dime as a tip for this kindness, she would have drug me back to the wood shed.

Those drugs are still in my veins; and they affect my behavior in everything I do, say, and think.

They are stronger than cocaine, crack or heroin, and if today's children had this kind of drug problem, the world might be a better place today.

Author unknown

As seen in the *Evergreen State Surveyor*, Spring 2005

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Surveying With Solar Instruments

by Johnny Ingram, RPLS #2160



This is an operator's view of a solar compass. (Photos courtesy of Johnny Ingram)

The Solar Compass — an instrument not common to a lot of Texas Surveyors. Most everyone has used instruments to determine a Solar Based direction; but, are you one of the few who have actually operated a Solar Compass or even seen a Solar Transit? I can now claim that credit and you will soon have that opportunity: read on for details. First, a little background. I was introduced to the Solar Compass while attending The Surveyors Historical Society — Rendezvous 2005 in Spokane, Washington. I attended a program held on the campus of Gonzaga University to learn about the solar instrument and how it was used in the survey of our Public Land Sites. Tim Kent, formerly of The Bureau of Land Management (BLM) and the US Forest Service conducted a program on “Surveying with Solar Instruments.”

Mr. Kent, recently retired and now an instructor at the Oregon Institute of Technology, presented a program on the history, application and use of the Solar Instrument. His eight-hour program included a morning of classroom instruction and an afternoon of field application. September in the northwest is not one of bright sunshine. Regardless, our schedule was to continue “rain or shine”. Sure enough, the sun was not shining and the weather was dreary. The only thing bright about the day was Mr. Kent's instruction.



A close up view of sunlight on a solar instrument.

Using instruments from the BLM, participants had the opportunity to acquaint themselves with both the Solar Compass and the Solar Transit. The morning session was filled with a study of elements which must be considered

(continued on page 16)

Surveying With Solar Instruments (continued)

when using the Solar Instrument. Items such as solar declination, the yearly path of the sun, solar time and determination of latitude and longitude at apparent solar noon. These do not sound like terms common to my surveying vocabulary. Maybe not common, but important to users of the Solar Instrument. I am overwhelmed by the experience and knowledge of the early surveyors and their equipment.

A quote by US Deputy Surveyor John Fitzhugh says, “The solar compass is a fine instrument in the hands of an astronomer or mathematician. When in perfect order its results are quick and reliable, but under control of an “ignoramus” it is the wildest “machine” that was ever used to trace a line.” This quote may some day be used to describe the Global Positioning System (GPS) of today.

I must fall into the “ignoramus” category because the Solar Compass is beyond my ability to describe. It is a fantastic piece of equipment. Mr. William A. Burt, due to aberrations to the magnetic compass in Michigan in 1835, developed a method to solve the spherical triangle using a mechanical device, thus the Solar Attachment. The Solar Instrument provides a relatively easy method to determine “Astronomic North” and this is possible with only an adjustment of the instrument. Mr. Kent also included a review of the development and survey of the townships and sections of the Public Land States. West Texas Surveyors would appreciate the similarity of the “straight lines” surveyed before the advent of the solar attachment.

Older surveyors are always eager to show the younger crowd “how we did things in the old days”. Reading a vernier is one that will usually bring joy to us “grey hairs”. At least when the plate is in the normal horizontal position. When the verniers are in different positions, this task can become daunting. This came to be only the first of several tasks we found to be difficult. I recall agreeing just how good it would be to have the use of some of our more familiar tools. The optical plummet, digital readouts, electronic measurement and radios are a few that come to mind.



Traverse course on Gonzaga University campus.

In the field exercise we were to determine the distance and true direction between two points. The major obstacle we faced was a deep water pond between the two points. It was interesting to watch “experienced surveyors” ponder the method to make this solution. Not only were the methods varied; but, it was a sight watching the groups communicate, measure distances, set points, measure angles and record the results of their work. To help complicate the issue, our chains were not all of common units and were not necessarily of standard length. We were continually humbled in our effort to organize and solve a simple problem using only the tools and equipment available to those early surveyors.

Most groups finally completed their traverse. Not, the remaining challenge was to determine the unknown distance and direction. Armed with only a pencil, paper and trig table, we started this new task. I remind you, no electronic devices were available and the ground as a seat was hard. As mentioned, clouds ruled the day. We still had not been able to observe our true direction. All afternoon, the clouds had held steady and refused to cooperate. Our solar instruments had served only part of their capability.

Then, as we were mastering the manual calculation, the sun made its grand appearance. You would have thought a bunch of college coeds were present, with the scramble to our instruments. With some additional coaching and a few adjustments, there was the “fruits of our labor” — a small dot of sunlight between the parallel lines on the mirrored observation plate, thus Astronomic North. We observed in reverence, we had finally seen the light and it was worth the wait.

I recommend this experience to all surveyors. It will add to your knowledge and provide a better understanding how things were accomplished in an earlier time. You may just be better prepared to follow “the footsteps of the original surveyor”.

Preparation of this article was guided by a previous paper written by Dave Wellman and Karla Powell entitled “The Solar Observation” printed in The Oregon Surveyor, dated December 2005/January 2006.



Side view of a solar compass.

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Land Surveying in Colonial America: 1600-

by John Watson, RPLS #5498

Beginning with the First Virginia Colony there was an apparent need for those industrious souls with the knowledge of mathematics, geometry, law and trigonometry. These men are known as land surveyors. The vast wilderness of America that lay before the early settlers would have to be cleared and subdivided in order for Francis Bacon's ideas "Of Plantations" and the concept of British Mercantilism to take root. This task required men such as Captain John Smith, Augustine Hermann, Captain John Sherman and John Love who were among the early colonial surveyors. Land surveying is an "art" which is involved in every aspect of land speculation, establishment of boundaries, community planning, and the laying out of farms and plantations and thus surveyors exercised considerable political power. I believe John Love described the basic need for surveying in his statement:

What would be more ridiculous than for me to go about to Praise an Art that all Mankind know they cannot live Peaceably without? It is near hand as ancient (no doubt on't) as the World; for how could Men set down to Plant without knowing some Distinction and Bounds of their Land? But (Necessity being the Mother of Invention) we find the Egyptians, by reason of the Nyles over flowing, which either washt away all their Bound Marks, or cover'd them over with Mud, brought the Measuring of Land first into an Art, and Honoured much the Professors of it. Ther great Usefulness, as well as the pleasant and delightful Studie, and wholsom Exercise of which, tempted to many to apply themselves thereto, that at length Egypt (as in Bermuda now) ever Rustick could measure his own land.

The early surveyors grasped the modern technology of the time and through many trials and the use of various instruments made tremendous accomplishments both for society and themselves. These men paved the way for a new nation.

Among the first to arrive in this new world of America was John Smith who arrived in 1608 at the First Virginia Colony. Although not a surveyor, he had training in mathematics and engineering and was considered a cartographer. Before the need to survey land there was a need for a general map that represented the overall bounds of the new colony; thus the need for cartographers who could accomplish this task. These cartographers were the first surveyors of the colonies. On instructions from the London Council Smith immediately found it necessary to explore the James River and the outreaches of the colony. He was instructed to prepare a map of the entire region and send it back to England. During one of his expositions, as legend has it, he was captured by Panaunkee Indians where he dazzled them with his ivory

spherical compass sundial. After his release from Powhatan he made many journeys across Chesapeake Bay and up several rivers. Smith's map has been described as "the most authoritative survey of the country yet furnished and had no real predecessor". Smith's map remained the standard map for the region for more than half a century. Smith was also responsible for another important map of the period. In 1614 he explored and mapped the coast of New England from Cape Cod to Pembrocks Bay and he was the first to use the name "New England" for the region. According to Silvio Bedini this map became the standard chart for the northern coast of English America and was instrumental in attracting the Pilgrims to that region and leading them to "Plymouth" which first appeared on Smith's chart.

These early surveyors . . . paved the way for a new nation.

Another famous cartographer was Augustine Hermann. He was a surveyor, who was described as one of the most lusty and colorful personalities of 17th century Colonial America. According to Bedini, Hermann's full career

combined surveying, mapping, engineering, industry, profiteering, fur trading, land speculation, slave trading, public administration, diplomacy, law and farming. Beginning in 1659 Hermann realized a need for a map of the Maryland region and in 1660 he delivered a rough sketch of the map to Lord Baltimore who was so pleased by the map he granted several large land grants to Hermann. Ultimately Hermann would own lands between 20,000 and 25,000 acres. Hermann surveyed these lands and patented them as well as many others Hermann's map took over a decade to complete. The map was titled *Virginia and Maryland as it is Planted and Inhabited This Present Year 1670 Surveyed and Exactly Drawne by the Only Labour & Endeavor of Augustine Hermann Bohemiensis* and was considered important and had immense geographical importance. According to Bedini, Hermann's map was one of the major cartographic achievements of the 17th century and it was copied and adapted by mapmakers for more than a century. Hermann received an additional land grant of 13,000 acres from Lord Baltimore upon the map's completion.

Following the Third Virginia Charter and Dale's Laws, the Virginia Company had a problem of attracting prospective settlers. Thus the company had to make concessions and had to figure a way to make it profitable. The company developed the headright system and that coupled with the development of tobacco as a cash crop created renewed interest in the colonies. Here the colonial surveyor first achieved his importance.

The headright system consisted of an award of 100 acres to all who purchased a share in the Virginia Company venture

(continued on page 23)

Scenes from the 2006 Annual Convention



Executive Director Sandra Boeckman and President Steve Borgmann during annual business meeting.



Remarks from incoming President Shane Terhune.



Speaker Gary Kent.



Speaker Joseph Loon.



Robert E. Myers Service Award presented to Jim Mathis.



Surveyor of the Year Award presented to Donald Martin.



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Bob Wethington, PLS

by J. Michael Flowers



Long time MARLS and MSPS member Robert "Bob" Wethington, died as a result of an accidental fall at his home on October 9, 2006. Bob was an employee of the Land Survey Program for 23 years and retired as a Land Surveyor II in August of 1996.

Bob was licensed as a Land Surveyor in 1962. He was also a Missouri Professional Engineer. Prior to his returning to college at the University of Missouri-Rolla, Bob worked for the Missouri Department of Transportation between 1958 and 1970 as an engineering inspector and senior construction inspector. He graduated from UMR in 1972 with a bachelor's degree in Civil and Geological Engineering. He then worked for the Missouri Lead Operating Company before he started his career with the Land Survey Program. Bob had also worked for the Missouri Pacific Railroad Company, as well as a riverboat deckhand and a shipyard steel fitter in his younger days.

Bob spent the last 12 years of his career in the Land Survey Program's Geodetic Section. From the very first project the Land Survey Program undertook utilizing GPS to determine 1st order positions on horizontal control networks, Bob was involved. He completed numerous countywide Geographic Reference System projects. He started in Kansas City in 1986 and worked for four years developing the Kansas City Metro Control project. He was responsible for research, field reconnaissance, monumentation and the GPS observations for Jackson, Clay and Platte Counties. After completing this major project, Bob moved across the state and worked on the geodetic control in the St. Louis regional area. Bob was a long-time member of MARLS/MSPS, ACSM, ASCE, Missouri Association of Geologists and the Knights of Columbus. In the past years, he was a strong supporter of the Rolla Kiwanis Club and assisted with the distribution of American Flags on Columbus Day. Farewell to Bob, a good friend and fellow land surveyor.

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Land Surveying in Colonial America: 1600- (continued)

and 50 additional acres for every person brought to the new colony. Thus most surveys were based on multiples of 50 acres. The land was virtually free and the major costs were for the survey and the patent. At first surveyors were public officials and their place in administrative hierarchy was between that of a lawyer and the clerk of a county court. Their position was by official appointment and the fees and practices were carefully regulated. As stated before, these surveyors were involved in every aspect associated with the development of land in the colonies.

The pioneering surveyor was unlike the typical English gentleman that had settled in the colonies. They embodied the sophistication of the Enlightenment and the ruggedness of the frontier explorer. According to Bedini:

The colonial surveyor had to have an iron constitution, boundless energy, and an abundance of health. Generally he was a man of rough and ready ways, who was capable of living without the company of other people for months at a time. He responded to the challenge of the wilds, and was intrigued by the mystery of unknown lands that stretched endlessly in all directions.



These men would endure bears, wolves, rattlesnakes and fleas. They would endure total isolation from home and their families all for the betterment of society. Through the use of letters and field books these men wrote down their trials and the incredible stories of not only the land but of survival. Once the field work was complete these men would return to their offices for countless hours of calculation and drafting in order to prepare the final survey plats and maps and the metes and bounds descriptions.

Most of the early grants in Virginia were laid out near natural water courses because the water course served as a natural boundary and because the water course was the life blood of the colony. The surveyors would run lines from an obvious point on the water course and then inland for one-half the distance of the acreage of the grant. This would serve as the baseline. Then other lines would be run perpendicular to this baseline. The surveyors would mark or "blaze" trees along the route. Natural landmarks made the best monuments. One early problem the surveyors encountered was with their techniques. The instruments and techniques of the time were quite sophisticated, but were designed for surveying in lands that had been cleared for centuries such as those in England. The use of Theodolites and Transits required lines of sight which were virtually impossible in the untouched forested wilderness of the new world. American surveyors had to rely on the circumferenter, commonly called the plane surveying compass, the plane table and the Gunter's chain. These instruments made it possible to follow a line without the sight of a natural monument.

With the ever growing population and economy of the new world there became a need for more and more competent surveyors; men of knowledge of American surveying and not just that of Europe. John Love saw a need for specialized training and understanding of the unique environment of each colony throughout America. After surveying for many years in the colonies he published a book in 1688 which was written specifically for surveying in America and is called *GEODAESIA: OR, THE ART OF SURVEYING AND Measuring of Land, Made EASIE*. The book describes in detail the geometry required for surveying, the various instruments available and how to use them, and the different applications of geometry for practical surveying. The book describes how to specifically lay out any plot of land, how to lay out new lands, and how to survey a Manor, County or Country, as well as how to prepare the proper survey documents such as plats and metes and bounds descriptions. The book described trigonometry and how to use heights and distances to make maps of rivers and harbors. Lastly the book contains table of Latitudes, Sines and Tangents and Logarithms, all of which are most important for calculating the various measurements. This book as widely used by Colonial American surveyors and affected considerable impact on the art.

Surveyors would become increasingly important as the colonies merged into a nation. Our nation would be defined by both its government and its geography. The early surveyors of 1600 through 1660 forged the early boundaries of the colonies, plantations, farms and town out of a wilderness, they developed techniques of land planning and recordation and they had a profound effect on the politics of the various colonies. Men like Augustine Hermann ran successful businesses, contributed to politics, raised a family and still managed an incredible career as a surveyor. Men like Captain John Sherman, who was the first surveyor of Watertown, Massachusetts, and his family, most of whom were surveyors. Men like John Love who took colonial surveying to the next level with his book. The stories of these early colonial land surveyors and their immense contributions to our nation are often untold, yet these men carved our nation. They are the forefathers of other surveyors who are also our celebrated national heroes; men like George Washington and Thomas Jefferson. Surveying, although often unsung, was one of the oldest and most important professions of the colonies and is still today. 🇺🇸

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Following the Footsteps

by Bob Hysmith, RPLS #5131

To the Texas Surveyor, the words “Following the Footsteps of the Original Surveyor”, comes as natural as the word “Howdy”. I’m sure most of you have also wondered about the numerous other “footsteps” we follow. G & R Surveying, LLC, (the company I work for), recently contracted with Westchase Construction to lay out the control and construction staking for a project called Robertson Hill Apartments. I was lucky enough to be made Project Manager, though at the time I thought it was just another typical construction job. I soon discovered it was anything but typical. The site is located right on the edge of downtown Austin in site of the Capital Dome on a hill overlooking Interstate Highway 35 and across the street from the historical French Legation complex (now a museum).

The first day on site we met for the pre-construction meeting. Attending this meeting was Gary Ramirez and Larry Havens of Westchase Construction, several sub-contractors, a City of Austin official and an Archaeologist, Jerrell Blake, Jr. of Bluestone Research. I wondered what an Archaeologist was doing here and so after the meeting I introduced myself and we began to talk. That’s when I found out that this site had more History to it than my research had revealed.

Predating the Republic of Texas by about 10,000 years, Robertson Hill was occupied by some of the first native Texans, the American Indians. They most likely chose this site because of a natural spring fed creek (later called Waller Creek), the commanding view of the countryside and the availability of raw material used to make projectile points. The hill is situated on the crest of a remnant terrace deposited by the Colorado River during the Pleistocene period. Prehistoric artifacts recovered at Robertson Hill were found just above these terrace deposits in gravelly, sandy loam from the Holocene. The artifacts include many flakes, but also some very interesting projectile points. All of the projectile points were used as spear or dart points (for use with an atlatl or spear thrower), or possibly knives. Other artifacts included choppers, scrapers and drills. Angostura projectile points were the oldest artifacts found at Robertson Hill. These straight sided points with a straight edge base date to over 8,800 years ago, which places them in the Late-Paleo-Indian period. Two leaf-shaped dart points were also recovered. They are similar to the Pedernales point tool type, which places them in the Middle Archaic period, around 4,000 years ago. Also recovered at Robertson Hill was a ‘Lange’. This point type has been found on sites in Central Texas that date to the Late Archaic, 2,800 years ago. Many flakes and fragments of chert left by the prehistoric visitors to Robertson Hill are identified by archaeologists as “initial reduction flakes”. This type of chert flake and the quantity of unfinished projectile points recovered suggests that



Project Manager Jerrell Blake, Jr., and Bob Hysmith, RPLS, hold a large point dated from 850-600 B.C.

prehistoric people found Robertson Hill a good place to locate abundant working material. They apparently knapped the chert cobbles into expedient tools and blanks they could carry away and finish into points and knives as needed later.

The spring, uncovered during recent excavation for the apartment complex, was filled in some time around the 1950s. The steep ravine carved out by the spring was clearly visible before excavation began. There were a few large Live Oak trees left on site that grew along the high banks.

Along with the prehistoric artifacts, there were some more recent historical items found at Robertson Hill. Several medicine bottles, a small hammer used to repair shoes, a blacksmith’s tool for pulling and shaping horseshoes, a wrench used to work on wagon wheels, a horse bridle bit and of course a whiskey bottle.

Some other interesting facts about Robertson Hill are that it was the first of the newly surveyed lots for sale by the Republic of Texas. It was purchased by Anson Jones in February of 1840, four years before he became President of the Republic of Texas. The property was then purchased from Jones by Alphonse Dubois de Saligny in September of 1840. He built a fine home with a wide porch to take advantage of the hill top breezes and the commanding view of Austin. Saligny had been sent by France to determine if they should recognize Texas as an independent nation-state.

Later, Saligny worked with Captain Charles Elliott, the British charge d’affaires, using all their diplomatic skills to prevent Texas annexation by the United States. By the middle of

(continued on page 27)

Following the Footsteps (continued)

1841, the French Legation, a blend of Anglo and Louisiana French features, was complete. The property did not stay in Saligny's possession long. In December of 1840, while the house was being built, Saligny sold the property to his friend, Father Jean Marie Odin. Odin kept the property for seven years but could not afford its upkeep, so he sold it to Moseley Baker, a hero of the Texas revolution, in October of 1847. Soon thereafter, Baker sold the property and house to Dr. Joseph W. Robertson in May of 1848.

Robertson, along with other prominent Austin citizens, founded the Colorado Female Academy to educate young ladies from primary school through college. Unfortunately, the college only lasted two semesters. Some time in 1849, the Robertsons moved to the house that the family would occupy until May of 1945. Robertson, an Austin pioneer, first came to Texas in 1836. After settling his family between Bastrop and the future site of Austin, Dr. Robertson represented Bastrop County in the Fourth Congress of the Republic of Texas (1839-1840), and was instrumental in the creation of Travis County out of a part of Bastrop County. The Robertson family later moved to Austin, and Dr. Robertson opened a pharmacy on Congress Avenue in 1841. In June of 1841, Robertson's wife and daughter died, leaving him and his young son alone. Robertson's second wife, Lydia Lee, is also an Austin pioneer. She arrived in 1840 from Cincinnati with her sister and brothers. On September 7, 1842, Lydia and Joseph Robertson were married. In 1843, the Robertsons had the first of their ten children. That same year, Robertson was called upon to be the fifth mayor of Austin. Dr. Robertson died in early August 1870.

Robertson Hill, as the area became known when Dr. Robertson purchased the property in 1848, is also historically significant as the first African American community in Austin, which developed starting around the last quarter of the 19th century. The Ebenezer Third Baptist Church, first organized

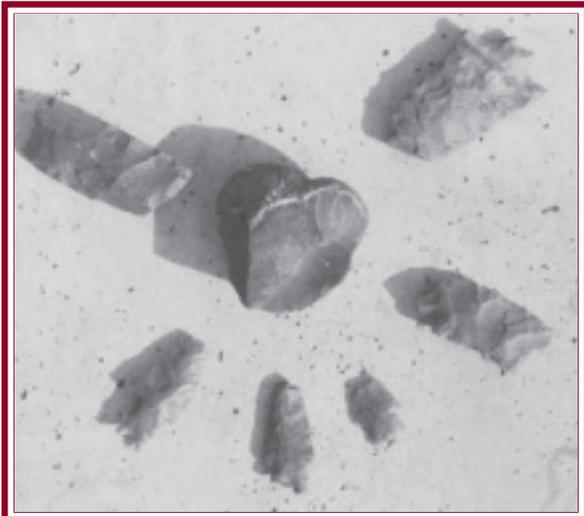
in 1875 in the home of Mrs. Eliza Hawkins on 9th and Colorado streets, was built on the corner of East 10th and San Marcos in 1885. At the same time, the Robertson Hill Public School, the first African American High School, was constructed on the southeast corner of East 11th and San Marcos streets.

The 1900 Sanborn map depicts a neighborhood of several wood frame houses between 10th and 11th streets. One of the buildings on the Sanborn map was later labeled as the "Colored Auditorium". This building was used as a community center, dance hall, and then finally as an apartment building. As a community center, the old auditorium was utilized by the Ebenezer Third Baptist Church. Before excavation for the apartments began, the sunken foundation footprint of the old auditorium was extant within the projected area.

Robertson Hill has been an attractive place to be for a long time, for many of the same reasons. Prehistoric people like the hill because it provided raw materials, fresh water from the spring, and a nice view. Republic of Texas folks liked the hill for its proximity to downtown Austin, perhaps for the fresh water, but certainly the view. The same can be said for the Robertson family, and the African American community.

The need for chert cobbles is long gone and the spring's fresh water was covered over in the 1950's, but two important reasons make this a great place for a luxury apartment complex, residents will enjoy the proximity to downtown and the pleasing view.

I would like to thank Jerry Blake of Bluestone Research and Dr. Allan T. Morton of ACI Consulting for providing the historical information on this site and allowing me to use parts of their report on Robertson Hill. 🇺🇸



(Right) Artifacts from the 1800s include: (bottom right, counterclockwise) wrench for wagon wheels; shoe hammer; clamp/plier for horseshoes; whiskey bottles; bridle bit; and medicine bottles.



(Left) Old artifacts found at the site include: (center) a Chert Cobble; (upper right) large point; (bottom three) dart points; and (middle left & right) angostura projectile points, dated from 8800 years ago.

Line of Sight, Line Trees, and Original Government Bearing Tree – Do They Still Exist?

by Roger Bran, LS

I say “Yes”, but knowing how we survey today it is very rare that we have the opportunity to even look for them. As an old timer, having 48 years as a field surveyor and having been County Surveyor for over 34 of those years, I have experienced the transition from the transit and steel tape to the EDM and theodolites to total stations, and now GPS.

Back in the good old days, 50 years ago, in transit and tape surveys (the wire link Gunter chains were already not used, even by me) we used to measure along or very near the Section or Quarter Section lines and we could observe those lines as we went.

These section lines were usually marked with fences or even roads and trails nearby, so if there were any trees still standing (or in some cases fallen over but still there) we could visually inspect them for any possibility of being one of these tree types, assuming of course that we had knowledge of the information in the original Government field notes.

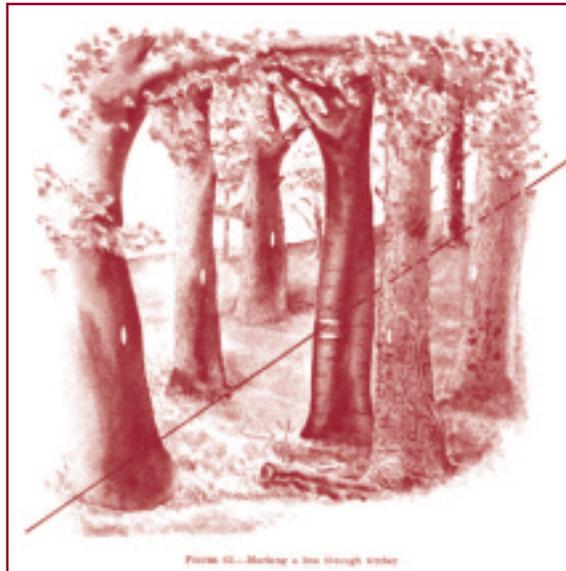
Today how many of us even get close to the line between the corner markers? With GPS and total stations, you no longer observe or are interested in examining the line location itself. For those of you who are not familiar with line of sight trees or line trees look at the following copy of Figure 63, page 100 of the 1973 BLM Manual of Surveying instructions.

Dodd’s book of the Original Instructions governing Public Land Surveys 1815-1855 defines the sight trees and line trees as: *“those trees which may intercept your line must have two chops or notches cut on each side of them without any other marks whatever. These are called ‘sight trees, line trees or station trees’.”*

Dodd goes on to say *“A sufficient number of other trees standing nearest to your line, on either side of it, are to be blazed on two sides diagonally, or quartering towards the line, in order to render the line conspicuous, and readily to be traced, the blazes to be opposite each other, coinciding in direction with the line where the trees stand very near it, and to approach nearer each other the further the line passes from the blazed trees. Due care must ever be taken to have the lines so well marked as to be readily followed”.*

Excerpts from pages 99 and 100 of the BLM 1973 Manual are as follows:

“A blaze is a smoothed surface cut upon a tree trunk at about breast height. The bark and a small amount of live wood tissue are removed with an axe or other cutting tool, leaving a flat surface which forever brands the tree. The size of the blaze depends somewhat upon the size of the tree, but should not be made larger than the surface of an axe blade. A blaze five or six inches in height and from two to four inches in width is usually ample.”



“A hack is a horizontal notch cut well into the wood, also made at about breast height. Two hacks are cut to distinguish them from other accidental markers. A vertical section of the finished hack marks resembles a double-V extending across a tree from two to six inches depending upon the diameter of the tree.”

“The blaze and hack mark are equally permanent but so different in character that one should never be mistaken for the other. The difference becomes important when the line is retraced in later years.”

“The lines should be so well marked as to be readily followed and blazes plain enough to leave recognizable scars as long as the trees stand.”

“This can be accomplished by blazing just through the bark into the live wood tissue. The blazes should be narrow so that they will heal before decay begins, and special care should be taken not to loosen the cambium layer around the blaze since this will prevent overgrowth.”

F. Hodgman in his 1913 Manual of Land Surveying mentions the ‘marking line’ as the marking of trees and brush along lines was required by law as positively as the erection of monuments, by the act of 1796, which is still in force. The old rules are unchanged. All lines on which are to be established the legal corner boundaries will be marked after this method. Page 99 of the 1973 BLM Manual says: *“Those trees which may be intersected by the line will have two chops or notches cut on the sides facing the line, without any other marks*

(continued on page 29)

Line of Sight (continued)

whatever. These are called sight trees or line trees. A sufficient number of other trees standing within 50 links of the line, on either side of it, will be blazed on two sides diagonally or quartering toward the line, in order to render the line conspicuous, and readily to be traced in either direction, the blazes to be opposite each other, coinciding in direction with the line where the trees stand very near it, and to approach nearer each other toward the line the farther the line passes from the blazed trees."

In early surveys, an opposite practice prevailed. Where trees two inches or more in diameter occur along a line, the required blazes will not be omitted. The practice of blazing a random line to a point some distance away from an objective corner, and leaving through timber a marked line which is not the true boundary, is unlawful, and no such surveys are acceptable. The decisions of some State courts make the marked trees valid evidence of the place of the legal boundary, even if such line is crooked, and has the quarter section corner far off the blazed line.

Recently while engaged to locate a section line for an adverse possession claim by my client's neighbor. I needed to place stakes along the actual Section line. In doing so, I observed an old blaze on a large oak tree standing within about 3 feet of this section line. Line of sight trees are NOT mentioned in the PLSS government field notes, therefore, there would be no proof that this tree is an authentic line of sight tree. However, I am certain that it is.

Line Trees, those actually on the section line, are supposed to be measured to and be identified in the field notes. These would be extremely rare to find today due to the PLSS being done in the 1850s in this SE Minnesota area and I am not sure if those notches (hacks) would show up very good today. In all my years of surveying in this area, I believe I have found only one of these, it being in Olmstead County and that one found over 30 years ago. The blazed tree shown in Figure 2 is near the section line between Sections 29 and 30 in T104N, R10W in Fillmore County. Bearing trees to the PLSS corner monuments are not quite so rare to find in our area. Some of the local surveyors still find them and posi-

tively identify them. I have found and used a few in Dodge County where I am still County Surveyor. ■

(Editor asks: is it better to mark the bearing tree with a sign or plaque so that the public and landowners can act to preserve it, or leave it unmarked so as not to draw the attention of vandals?)

Reprinted from the "Minnesota Surveyor", Vol. 13, No. 1, Spring 2006



Figure 2

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Eminent Domain – Has the Sovereign Gone Too Far?

by Terry W. McHenry, PLS

Often referred to a condemnation, the power of federal, state, local governing bodies or other authorized entities to exercise their sovereign right to take private real property has recently received a more liberal boost in the arm.

In *Kelo, et al., v. City of New London, et al.*, heard before the Supreme Court of Connecticut, No. 04-108, and then argued before the U.S. Supreme Court in February 2005, being decided in June 2005, it has been determined to be permissible to use eminent domain to encourage economic development, even if private business benefits. The rationale seemingly is increased tax revenues (for the condemning local governing body) coupled with a projected improved local economy.

The two-pronged question that has been mounting for at least two decades is this: has the “public use” intent expressed in the Fifth and Fourteenth Amendments to our Constitution been abused? And are we seeing an escalating scope in the power of eminent domain, in particular, from a branch of government not vested with the granting authority (viz., the Judicial Branch)?

Since the 5-4 decision of the High Court was handed down, more than one commentator whose profession deals in real property in one form or another has opined on the substance of *Kelo*. This commentator now adds to that mounting collection of concerns.

BACKGROUND

Conceived at the time of the Roman Empire, the power to seize private land by the sovereign was absolute, containing none of the protectionary clauses we know today. Condemnation as a concept wound its way through history up to the beginning of the British Empire, primarily on the merits of takings for public use. As the Colonies were formed, and independence declared from the British Crown, the concept of eminent domain was carried forward into the Constitution of the United States of America. Being addressed initially in the Fifth Amendment to the Constitution, the verbiage read in part as follows:

No person . . . shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.

Here we see a tacit recognition of a preexisting power (in the Crown), but with an amended provision for just compensation and due process of law.

As has been aptly pointed out by Jeffery N. Lucas, PLS, Esq., in a recently published commentary¹, the Fifth Amendment in terms of eminent domain has been made applicable to the individual states by the Fourteenth Amendment to the Constitution, which is the source of private property rights for U.S. citizens. This amendment reads, in part, as follows:



No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any state deprive any person of life, liberty, or property, without due process of law.

The three key criteria of a valid taking under the power of eminent domain are due process of law, just compensation, and public use.

Thus, the right to own real property and the right to have it involuntarily divested are sourced in the state. This granting and divesting authority are vested in the Congress at the Federal level, and in the individual state's legislatures at the state level.

For Nevada, the power of eminent domain is codified primarily in NRS Chapter 37. Here we see outlined the parameters for taking of private property by the state and its political subdivisions (i.e., counties, cities), plus other statutorily authorized entities. Statute law is law derived by the people represented in Senate and Assembly in the legislative process.

The branch of government assigned responsibility under our Constitution for interpreting statutes passed by Congress at the Federal level, and by the states' legislatures at the state level, is the Judicial Branch, which is tiered downward in a strict system of hierarchy from the U.S. Supreme Court to the state's Supreme Courts, and finally the District (or trial) Courts at the county level.

DISCUSSION

The three key criteria of a valid taking under the power of eminent domain are *due process of law, just compensation, and Public use*. The first two criteria are fairly well settled, although the second (just compensation) most often becomes a matter of contention in a takings proceeding. The third, public use, warrants our attention. It was the substantive element in *Kelo*, and is the principal thrust of this commentary.

(continued on page 32)

Eminent Domain (continued)

Due Process of Law

Due process of law has been defined as follows:

A course of legal proceedings according to those rules and principles which have been established in our systems of jurisprudence for the enforcement and protection of private rights. Due process of law implies the right of the person affected thereby to be present before the tribunal which pronounces judgment upon the question of life, liberty, or property, in its most comprehensive sense; to be heard, by testimony or otherwise, and to have the right of controverting, by proof, every material fact which bears on the question of right in the matter involved.²

Just Compensation

As regards property taken for public use, the term is comprehensive and includes all elements.

Just compensation is the fair market value of property taken at time of taking, plus compensation for delay in payment. It requires that the owner be put in as good as position pecuniarily as he would otherwise have been.³

Public Use

The question of whether a particular use is a 'public use' is a judicial one. See, e.g., *City of Cincinnati v. Vester*, 281 U.S. 439, 444 (1930). However, the court has historically insisted on a high degree of judicial deference to legislative determination. "The role of the judiciary in determining whether that power is being exercised for a public purpose is an extremely narrow one." See *Berman v. Parker*, 348 U.S. 26, 32 (1954). When it is a state action being challenged under the Fourteenth Amendment, there is the additional factor of the Court's willingness to defer to the highest court of the state in resolving such an issue. See *Hawaii Housing Authority v. Midkiff*, 467 U.S. 229 (1984). "We think that it is the function of Congress to decide what type of taking is for public use and that the agency authorized to do the taking may do so to the full extent of its statutory authority." *United States ex rel. TVA v. Welch*, 327 U.S. 546, 551-552 (1946).

At an earlier time the prevailing judicial view was that the term 'public use' was synonymous with 'use by the public', and if there was no duty upon the taker to permit the public a right of use or enjoyment of the property taken, the taking was regarded as invalid. However, this view was rejected some time ago. See, e.g., *Mt. Vernon-Woodberry Cotton Duck Co. v. Alabama Interstate Power Co.*, 240 U.S. 30, 32 (1916).

The more modern concept of public use seems to have evolved and broadened into a more subjective definition,

incorporating such things as economic development, urban renewal and beautification, erection of low-cost housing developments and, generally, promotion of aesthetic values as well as economic ones. Additionally, it has been determined that there is no requirement "that government possess and use property at some point during the taking". See 467 U.S. 243. Instead, properties have, and do, pass into private hands as a result of some takings.

The term 'public use', it seems, has evolved into 'public interest' or 'public welfare', as the more correct phraseology.

Two contributing factors bear down on the public use debate. One, it is known that many agencies granted the power of eminent domain have in recent years seen funding become tighter, and thus are seeking alternative methodologies in reducing expenditures and expanding income sources. Two, it is no secret that the Judicial Branch of government has been accused in recent years of stepping into that gray band (if not over the distinct line intended by the founding fathers)

which separates the legislative from the judicial branches of government.

Moreover, we are all well aware of the intense debates over Presidential nominees to the U.S. Supreme Court, for example. Distilled down to the core elements, these debates are over the proper judicial role, of which there are varying opinions, both within the stream of judicial candidates,

and the Congressional leaders conducting the hearings. These opinions run the gamut from interpreting the words of the law broadly or loosely, to narrowly or strictly. Chief Justice John Marshall stated 200 years ago in *Marbury v. Madison* that it is the duty of the judge to say what the law is, not what it ought to be (which is the province of the legislature). The proper meaning of the law, whether construing the Constitution, the law of statute or contracts, policies or deeds, is found in the plain words of the law itself. In each instance, it is the duty of a judge to give faithful meaning to the words as written.

Challenges to the U.S. Constitution itself have surfaced, in recent times, with increasing intensity. The debate has been over the question of whether the Constitution was intended to be a living document, in which judges should "update" its provisions according to the "needs" of the times. Or, was it intended to be an enduring document, in which its original meanings and principles were to be permanently maintained, subject only to changes adopted in accordance with amending clauses (themselves being brought about through due process)? Our Constitution would become an historical

(continued on page 36)

The question that begs an answer is whether the current judicial interpretations of 'public use' are within the parameters envisioned by the framers of our Constitution...



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Fair Use: The Legality of Reprinting Articles in Newsletters

by Wilhelm A. Schmidt. LS (3/10/2002 — revised 3/23/2002)

The newsletters of state societies frequently contain reprints from other professional newsletters and from magazines. One reason is that there is insufficient original material available for publication. Surveyors are just not prolific writers. Another reason is that some of the material is of general interest and begs to be disseminated more broadly.

Imagine my delight when an article of mine is reprinted! It does not happen all too often, but articles of mine have been reprinted in newsletters from Maine to California, and even as far away as Australia. But then, imagine my chagrin when I come upon an article that was reprinted without permission — either from the editor of the publication in which it first appears, or from me! That, unfortunately, happens more often than it should.

Getting permission is, first of all, a matter of courtesy. But more importantly, it is a legal requirement. Reprinting an article without permission may infringe the copyright, even if the source of the article is acknowledged. The publication of an article in a professional newsletter or magazine does not automatically make it available for reprinting.

To underscore this fact, Earl Burkholder placed the encircled c and a date after his name under the title of an article he recently wrote on “Writing for Professional Society Newsletters” (*Benchmarks*, Vol 15, Number 6, November 2001). The article is a primer on the technicalities of writing. Earl was the editor of the *Journal of Engineering Surveying*, the publication of the surveying (now geomatics) division of ASCE, for many years, and knows something about writing. But it is also a declaration of the ownership of the writing. He concludes his article with the question: *“What does the copyright notice under the title mean? Your attorney can tell you specifically, but my understanding of the intent is that a copyright exists to protect the creative work of the copyright holder against unlawful copying or use. I feel we have been ethically careless in the past and many have willfully photocopied material in violation of legitimate copyrights. We need to be more specific about securing permission to copy material and can learn from the experience of Texaco. In August, 1992, Texaco lost a copyright suit because the judge did not agree with Texaco’s interpretation of ‘fair use.’”*

Earl does not explain fair use. But Salvatore A. Marsico does, in an article entitled “Exclusive Right to Writings: The Delicate Balance” (*SALIS*, Volume 61, Number 4, November 4, 2001) Sal is both an attorney and an educator. In this article, he examines specifically the legality of copying textual material



for use in the classroom. But his analysis applies to the reprinting of articles in newsletters.

Fair use, Sal writes, *“is a statutory defense to a claim that a violation of copyright exists.”* *“In general, ‘fair use’ exists when it is for the purposes of criticism, comment, news reporting, teaching (including multiple copies), scholarship, or research.”* To qualify as fair use, however, the use must meet *“the tests of (1) brevity, (2) spontaneity, and (3) cumulative effect.”* Sal cites House Report No. 94-1476, which spells out in detail the type of material that can be copied, the circumstances under which it can be copied, the number of excerpts that may be copied and the number of instances of copying that may occur in one term. Without quoting the report, let me say that the stated limitations are frighteningly strict.

The reprinting of articles in newsletters seems to fall into the category of fair use. The newsletters serve both a reporting and a teaching function. The articles may not be accompanied by criticism, comment, scholarship or research. But, we may ask, with little equivocation, what could be fairer than to increase the circulation of an article among those who can benefit from it?

(continued on page 36)

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Fair Use: The Legality of Reprinting Articles in Newsletters (continued)

The problem is that their reprinting does not meet the tests of fair use. Articles are almost always reprinted in their entirety. Segments of the articles can hardly be reprinted without losing their gist.

Moreover, since the newsletters in which they are reprinted are distributed to all the members of the society, the copying is multiple. So much for brevity! The republication of these articles is also well planned. They cannot be chosen for inclusion in the newsletter the minute before it goes to the printer. So much for spontaneity! The cumulative effect of reprinting the articles, finally, is to deprive authors of the potential commercial value of their writing. Few of us writers of professional articles will ever publish a collection of them. But authors of a myriad of articles on a specific topic (e.g. Silvio Bedini) may well consider the unauthorized reprinting of their articles as acts of piracy. So much for keeping the cumulative effect in check!

Where does that leave us? Pretty much where we began. Atty. Marsico informs me that “copyright is property and as such can be owned, transferred or sold”. The question is whose property? It depends on the author’s contractual

agreement with the original publisher. The author of an article usually retains the copyright, unless he was commissioned to write it; then it falls under the “work for hire” doctrine and is the property of the publisher. It is incumbent upon the editor of the newsletter wishing to reprint the article to determine its rightful owner and to acquire the right to reprint it.

The reprinting of an article with compensation, of course, presumes permission. Its reprinting without compensation requires the consent of the owner, preferably written. In those instances in which the original publisher has the right only to the first printing, reprinting the article requires only the consent of the author. It requires the consent of the original publisher as well if the article is reprinted in the original format. As a formality, however, both the author and the original publisher should be contacted.

Speaking for myself alone, I want to say that I gladly give permission to reprint any of my articles. All I ask is that you send me a complimentary copy of the newsletter in which the article appears. The delight it will give me is all the compensation I want. 🇺🇸

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Eminent Domain (continued)

artifact if its original sense became irrelevant, to be replaced by the views of successive waves of justices intent on “updating” it with contemporary moral values and theory. This is precisely what the Founding Fathers, the crafters of the words of our constitutional form of government, sought to avoid when they instituted a “government of laws, not of men”.

The question that begs an answer is whether the current judicial interpretations of ‘public use’ are within the parameters envisioned by the framers of our Constitution, and the Fifth and Fourteenth Amendments thereto, or has the sovereign extrapolated their intent?

“I believe there are more instances of the abridgment of the freedom of the people, by gradual and silent encroachments of those in power, than by violent and sudden usurpations.”
— James Madison

CONCLUSION

Certainly every citizen who owns real property should be aware of the evolving patterns in matters of law that condone more liberal interpretations and, in this case, can result in the disenfranchisement of private property rights. In Justice

O’Connor’s dissenting opinion (joined by Justices Rehnquist, Scalia and Thomas) on *Kelo* there was a clear warning that no private property is now safe from the pressures of development.

The reader can draw his or her own opinion and conclusions. Bear in mind that at the state level, it is the legislature where parameters for eminent domain are established, and first weighed if challenged. If you have concerns, these should be expressed in writing to your elected representatives and the New York State Association of Professional Land Surveyors to effect change.

“Government is not reason; it is not eloquence; it is force. Like fire, it is a dangerous servant and a fearful master.”
— George Washington 🇺🇸

Endnotes

¹Trampling Private Property Rights? *POB Magazine*, Vol. 31, No. 1, Oct. 2005, Pg. 58.

²*Black’s Law Dictionary*, Rev. 4th Ed., West Publishing Co. 1968.

³*Ibid.*

Terry W. McHenry is a licensed professional land surveyor in Nevada, the principal of a land and water boundary consulting firm, and editor of The Nevada Traverse. The article first appeared in Vol. 32, No. 4, December 2005, of The Nevada Traverse. Mr. McHenry may be contracted at editor@nvtaverse@sbcglobal.net.

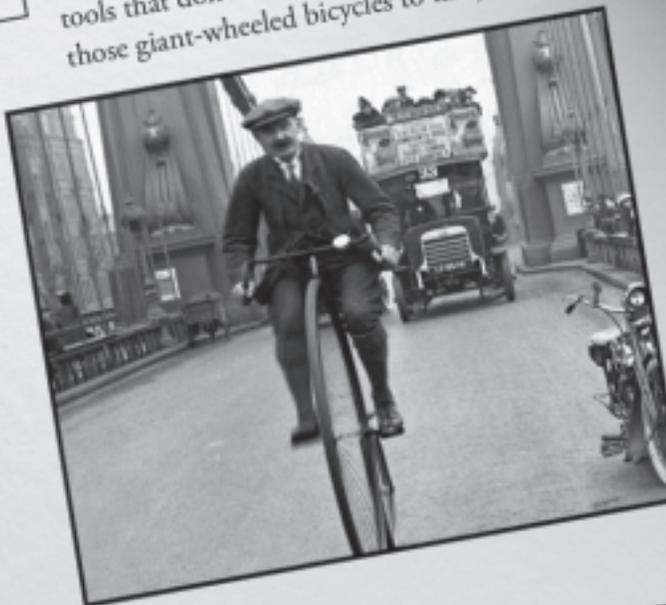
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The New Math New Conversion Table

- | | |
|---|---|
| 1. Ration of an igloo's circumference to its diameter = Eskimo Pi | 14. 1 million bicycles = 2 megacycles |
| 2. 2000 pounds of Chinese soup = Won ton | 15. 365.25 days = 1 unicycle |
| 3. 1 millionth of a mouthwash - 1 microscope | 16. 2000 mockingbirds = 2 kilomockingbirds |
| 4. Time between slipping on a peel and smacking the pavement = 1 bananosecond | 17. 52 cards = 1 decacards |
| 5. Weight an evangelist carries with God = 1 billigram | 18. 1 kilogram of falling figs = 1 Fig Newton |
| 6. Time it takes to sail 220 yards at 1 nautical mile per hour = Knot-furlong | 19. 1000 milliliters of wet socks = 1 literhosen |
| 7. 16.5 feet in the Twilight Zone = 1 Rod Serling | 20. 1 millionth of a fish = 1 microfiche |
| 8. Half of a large intestine = 1 semicolon | 21. 1 trillion pins = 1 terrapin |
| 9. 1,000,000 aches - 1 megahertz | 22. 10 rations = 1 decoration |
| 10. Basic unit of laryngitis = 1 hoarsepower | 23. 100 rations = 1 C-ration |
| 11. Shortest distance between two jokes = A straight line | 24. 2 monograms = 1 diagram |
| 12. 453.6 graham crackers = 1 pound cake | 25. 4 nickels = 2 paradigms |
| 13. 1 million-million microphones = 1 megaphone | 26. 2.4 statute miles of intravenous surgical tubing at Cornell University Hospital = 1 IV League |
| | 27. 100 Senators = Not 1 decision |

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